SOLICITATION, OFFER AND AWARD	1. THIS CONTRACT IS A RATED ORDER UDER DPAS (15 CFR 350) →	RATING A70	PAGE 1 OF 112 PAGES

2. CONTRACT NO.	3. SOLICITATION NO.	4. TYPE OF SOLICITATION	5. DATE ISSUED	6. REQISITION/PURCHASE NO.
M67854-07-C-2072	M67854-05-R-2000	[ ] SEALED BID (IFB) [X] NEGOTIATED (RFP)	25 April 2005	M9545007RCR7CW2

ISSUED BY CODE M67854

COMMANDING GENERAL
MARCORSYSCOM
ATTN: A/C Contracts – LEK
2200 LESTER STREET
QUANTICO, VA 22134-6050
POC: Ms. Lee Hoyland; (703)432-4189, lee.hoyland@usmc.mil

8. ADDRESS OFFER TO (If other than Item 7)

NOTE: In sealed bid solicitations "offer" and "offeror" mean "bid" and "bidder".

SOLICITATION

9. Sealed offers in original and ____ copies for furnishing the supplies or services in the Schedule will be received at the place specified in Item 8, or if handcarried, in the depository located in _____ until _____ local time
(Hour) (Date)

CAUTION – LATE Submissions, Modifications, and Withdrawals: Section L, Provision No. 52.214-7 or 52.215-1. All offers are subject to all terms and conditions contained in this solicitation.

10. FOR INFORMATION CALL →	A. NAME	B. TELEPHONE (NO COLLECT CALLS)		C. E-MAIL ADDRESS
	Lee Hoyland	(703)	432-4189	lee.hoyland@usmc.mil

11. TABLE OF CONTENTS

(X)	SEC	DESCRIPTION	PAGES	(X)	SEC	DESCRIPTION	PAGE
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✓	B	SUPPLIES OR SERVICES AND PRICES/COSTS	8			PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACH.	
✓	C	DESCRIPTION/SPECS/WORK STATEMENT	2	✓	J	LIST OF ATTACHMENTS	2
✓	D	PACKAGING AND MARKING	1			PART IV – REPRESENTATIONS AND INSTRUCTIONS	
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OFFER (Must be fully completed by offeror)

NOTE: Item 12 does not apply if the solicitation includes the provisions at 52.214-16, Minimum Bid Acceptance Period.

In compliance with the above, the undersigned agrees, if this offer is accepted within 180 calendar days (60 calendar days unless a different period is inserted by the offeror) from the date for receipt of offers specified above, to furnish any or all items upon which prices are offered at the price set opposite each item, delivered at the designated point(s), within the time specified in the schedule.

13. DISCOUNT FOR PROMPT PAYMENT (See Section I, Clause No. 52.232-8 →	10 CALENDAR DAYS %	20 CALENDAR DAYS %	30 CALENDAR DAYS %	CALENDAR DAYS %

14. ACKNOWLEDGEMENT OF AMENDMENTS (The offeror acknowledges receipt of amendments to the SOLICITATION for offerors and related documents numbered and dated:)

AMENDMENT NO.	DATE	AMENDMENT NO.	DATE
0001	24 May 2005	0006	23 May 2005
0002	27 May 2005	0007	12 October 2005
0003	01 June 2005	0008	13 October 2005
0004	03 May 2005	0009	18 October 2005
0005	05 May 2005	0010	20 October 2005

15A. NAME AND ADDRESS OF OFFEROR	CODE 25209	FACILITY	16. NAME AND TITLE OF PERSON AUTHORIZED TO SIGN OFFER (Type or Print)
Northrop Grumman Systems 10880 W. Nursery Road Linthicum Heights, MD 21090			[redacted]

15B. TELEPHONE NUMBER	15C. CHECK IF REMITTANCE ADDRESS [ ] IS DIFFERENT FROM ABOVE – ENTER SUCH ADDRESS IN SCHEDULE	17. SIGNATURE	18. OFFER DATE
[redacted]		[redacted]	13 May 2005

AWARD (To be completed by Government)

19. ACCEPTED AS TO ITEMS NUMBERS	20. AMOUNT	21. ACCOUNTING AND APPROPRIATION
See Section B	$32,735,632.00	See Section G

22. AUTHORITY FOR USING OTHER THAN FULL AND OPEN COMPETITION:	23. SUBMIT INVOICES TO ADDRESS SHOWN IN (4 copies unless otherwise specified) →	ITEM
[ ] 10 U.S.C. 2304(c) ( ) [ ] 41 U.S.C. 253(c) ( )		See Section G

24. ADMINISTERED BY (If other than Item 7) CODE	25. PAYMENT WILL BE MADE BY CODE
See Section G	See Section G

NAME OF CONTRACTING OFFICER (Type or print)	27. UNITED STATES OF AMERICA	28. AWARD DATE
Lee Hoyland **United States Marine Corps**	Lee E Hoyland (Signature of Contracting Officer)	30 March 2007

IMPORTANT – Award will be made on this Form, or on Standard Form 26, or by other authorized official written notice.

AUTHORIZED FOR LOCAL REPRODUCTION
Previous edition is unusable

STANDARD FORM 33 (REV. 9-97)
Prescribed by GSA - FAR (48 CFR) 53.214(c)

This award is made based on Solicitation M67854-05-R-2000 and the Contractor's Final Proposal Revision dated 2 June 2006 as modified by the Contractor's Final Proposal Revision dated 13 November 2006. The following administrative revisions are made:

1. Section B, Schedule of Supplies/Services and Prices/Costs, is modified to exercise Option Items 0100. All references to the word "option" with regard to these items are deleted.

2. Section G, Contract Administration Data, is modified as follows:

a. **G.3 Paying Office**

The paying office for this contract is:

HQ0338 DFAS Columbus Center
DFAS-CO/South Entitlement Operations
P.O. Box 182264
Columbus, OH 43218-2264

b. **G.4 Contract Administration**

Contract Administration for this contract will be under the cognizance of:

S2103A - DCMA Northrop Grumman Baltimore
P. O. Box 1693
Mail Stop 1285
Baltimore, MD 21203-1693

c. **G.5 Contractor's Offices**

Contractor's office that will supervise and administer the contract shall be:

See Section A-1, Block 15A

d. **G.11 Accounting and Appropriation Data**

ACRN	CLIN	Appropriation Data	Amount
AA	0001	1771319 M7KC 260 67854 067443 2D C3099D 45007RCR7CW2	[redacted]
AA	0002	1771319 M7KC 260 67854 067443 2D C3099D 45007RCR7CW2	[redacted]
AA	0100	1771319 M7KC 260 67854 067443 2D C3099D 45007RCR7CW2	[redacted]
Total Funding Available			[redacted]

e. **G.12 Allotment of Funds**

As stated in G.8, each cost-reimbursement CLIN executed under this contract shall be subject to FAR clause 52.232-20, Limitation of Cost, or 52.232-22, Limitation of Funds as applicable.

For the purposes of paragraph (b) of the FAR 52.232-22, Limitation of Funds, clause of this contract the following applies:

a) **CLIN 0001**

For the purposes of paragraph (b) of the "Limitation of Funds" clause of this contract –

(i) the amount available for payment and allotted to this contract is [redacted]

(ii) the item provided for by such amount is CLIN 0001; and

(iii) the period of performance for which it is estimated that such amount will provide is through [redacted]

(iv) It is anticipated that the Contracting Officer will unilaterally allot funds from time to time through out the period of performance.

b) **CLIN 0002** is fully funded, FAR 52.232-20, Limitation of Cost applies.

c) **CLIN 0100** is fully funded, FAR 52.232-20, Limitation of Cost applies.

3. **Section H, Special Contract Requirements**, is modified as to add the following:

a. **H.1 Substitution of Personnel**

(a) The Contractor agrees that a partial basis for award of this contract is the list of key personnel proposed. Accordingly, the Contractor agrees to assign to this contract those key persons whose resumes were submitted with the proposal necessary to fulfill the requirements of the contract. No substitution shall be made without prior notification to and concurrence of the Contracting Officer in accordance with this requirement.

(b) All proposed substitutes shall have qualifications equal to or higher than the qualifications of the person to be replaced. The Contracting Officer shall be notified in writing of any proposed substitution at least forty-five (45) days, or ninety (90) days if a security clearance is to be obtained, in advance of the proposed substitution. Such notification shall include: (1) an explanation of the circumstances necessitating the substitution; (2) a complete resume of the proposed substitute; and (3) any other information requested by the Contracting Officer to enable him/her to judge whether or not the Contractor is maintaining the same high quality of personnel that provided the partial basis for award.

The following have been designated as key personnel:

Position	Name
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]

Position	Name
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]

b. **H.14 Incorporation of Proposal**

The specific portions of the Contractor's technical and management Final Proposal Revision dated 2 June 2006 (as modified by the Contractor's technical and management Final Proposal Revision dated 13 November 2006) that exceed any of the Government's threshold requirements and/or meet or exceed any of the Government's objective requirements provided in the Schedule, Statement of Work, or Performance Specification (including, but not limited to dates, performance values, and/or any other measurable criteria) are hereby incorporated by reference with the same force and effect as if they were given in full text, and supersede the Government's threshold requirements that were exceeded and/or the Government's objective requirements that were met and/or exceeded. This clause is not applicable to the portions of the Contractor's proposal identified and attached in Section J.

4. **Section I, Contract Clauses,** is modified as follows:

252.242-7002 Earned Value Management System (Mar 2005)

(a) In the performance of this contract, the Contractor shall use an earned value management system (EVMS) that has been recognized by the cognizant Administrative Contracting Officer (ACO) as complying with the criteria provided in DoDI 5000.2, Operation of the Defense Acquisition System.

(b) If, at the time of award, the Contractor's EVMS has not been recognized by the cognizant ACO as complying with EVMS criteria (or the Contractor does not have an existing cost/schedule control system that has been accepted by the Department of Defense), the Contractor shall apply the system to the contract and shall be prepared to demonstrate to the ACO that the EVMS complies with the EVMS criteria referenced in paragraph (a) of this clause.

(c) The Government may require integrated baseline reviews. Such reviews shall be scheduled as early as practicable and should be conducted within 180 calendar days after (1) contract award, (2) the exercise of significant contract options, or (3) the incorporation of major modifications. The objective of the integrated baseline review is for the Government and the Contractor to jointly assess areas, such as the Contractor's planning, to ensure complete coverage of the statement of work, logical scheduling of the work activities, adequate resourcing, and identification of inherent risks.

(d) Unless a waiver is granted by the ACO, Contractor-proposed EVMS changes require approval of the ACO prior to implementation. The ACO shall advise the Contractor of the acceptability of such changes within 30 calendar days after receipt of the notice of proposed changes from the Contractor. If the advance approval requirements are waived by the ACO, the Contractor shall disclose EVMS changes to the ACO at least 14 calendar days prior to the effective date of implementation.

(e) The Contractor agrees to provide access to all pertinent records and data requested by the ACO or duly authorized representative. Access is to permit Government surveillance to ensure

that the EVMS complies, and continues to comply, with the criteria referenced in paragraph (a) of this clause.

(f) The Contractor shall require the following subcontractors to comply with the requirements of this clause: In accordance with the Contractor's Management Proposal submitted in response to Solicitation M67854-05-R-2000, [redacted]

(Contracting Officer to insert names of subcontractors selected for application of EVMS criteria in accordance with 252.242-7001(c).) See (f) above.

5. **Section J, List of Attachments and Exhibits,** is modified as follows:

a. Paragraph J.1 is modified to read as follows:

J.1 Attachments

Attachment (1) – Statement of Work for the Ground/Air Task Oriented Radar, Increment I

Attachment (2) – Performance Specification dated 3 May 2006

Attachment (3) – DD Form 254, Department of Defense Contract Security Classification Specification

Attachment (4) – List of Government Furnished Property

Attachment (5) – Technical Manual Contract Requirements

Attachment (6) – Integrated Master Plan dated 13 November 2006 and submitted in response to Solicitation M67854-05-R-2000

Attachment (7) – Statement of Work for the G/ATOR Performance Based Support submitted in response to Solicitation M67854-05-R-2000

Attachment (8) – Identification and Assertion of Use, Release, or Disclosure Restrictions submitted in response to Solicitation M67854-05-R-2000

b. Attachment (3) solicitation DD254 is replaced with the contract DD254.

c. Attachment (6) is added.

d. Attachment (7) is added.

e. Attachment (8) is added.

SECTION B – SUPPLIES OR SERVICES AND PRICES

B.1 Blocks 15A – 15F

Item	Description	Qty	Unit	Unit Price	Amount
0001	Ground/Air Task Oriented Radar (G/ATOR) System Development and Demonstration in Accordance with the Attached Statement of Work and Performance Specification (Cost Plus Incentive Fee (CPIF))	1	Lot	Target Cost	[redacted]
				Target Fee (6%)	[redacted]
				Target Cost + Fee	[redacted]
				Min Fee (2%)	[redacted]
				Max Fee (10%)	[redacted]
				Share/Ratio	[redacted]
0002	Other Direct Costs and Travel in Support of CLIN 0001, 0003, and 0005 (Cost – Non-Fee Bearing)	1	Lot	[redacted]	[redacted]
0003	Contract Data Requirements Lists (CDRLs) in support of CLINs 0001, 0002, Option CLINs 0005, 0100, 0200, and 0300 (if exercised) in Accordance with the Exhibits Included at Table 1-1 Below	1	Lot	[redacted]	[redacted]
OPTION 0004	Integrated Architecture Behavior Model (IABM) Integration into CLIN 0001	1	Lot	If needed, this option will be negotiated with the prime contractor and included in the cost of CLIN 0001	
OPTION 0005	Engineering Services and Support in Accordance with Section C (Labor Hours)	10,000	Hours	See Labor Rates Below	

Table 1-1 – CLIN 0003 Exhibits

Exhibit	Title	Exhibit	Title
A001	Contract Work Breakdown Structure	B00J	Failure Summary and Analysis Report
A002	Status Report	B00K	Test Procedure
A003	Integrated Master Schedule	B00L	Test/Inspection Report
A004	Management Plan	B00M	Failure Modes, Effects, and Criticality Analysis Report
A005	Conference Agenda	B00N	Electromagnetic Interference Test Procedures (EMITP)
A006	Conference Minutes	B00P	Electromagnetic Interference Test Report
A007	Receipt of Government Material Report	B00Q	Technical Report-Study/Services
A008	Government Furnished Information Deficiency Report	B00R	Corrosion Prevention and Control Plan
A009	Cost Performance Report	B00S	Safety Assessment Report
A00A	Contract Funds Status Report	B00T	System Safety Hazard Analysis (SSHA) Report

Exhibit	Title	Exhibit	Title
B001	Systems Engineering Management Plan	B00U	Health Hazard Assessment Report
B002	Performance Specification Documents	B00V	Hazardous Materials Management Program Plan
B003	System/Subsystem Specification	B00W	Hazardous Materials Management Program Report
B004	System/Subsystem Design Description	B00X	Contractor's Configuration Management Plan
B005	Interface Requirements Specification	B00Y	Configuration Audit Summary Report
B006	Interface Design Description	B00Z	Engineering Release Record (ERR)
B007	Software Development Plan (SDP)	B010	Engineering Change Proposal (ECP)
B009	Software Requirements Specification	B011	Request for Deviation (RFD)
B00A	Software Design Description	B012	Notice of Revision (NOR)
B00B	Software Test Plan (STP)	B013	Configuration Status Accounting Information
B00C	Software Test Description	B01A	Request for Nomenclature
B00D	Software Test Report	B01B	Test Plan
B00E	Software Product Specification	B01C	Reliability Test Report
B00F	Software Version Description	B01D	TEMPEST Control Plan
B00G	Reliability Prediction and Documentation of Supporting Data	B01E	Logistics Management Information (LMI) Data Product
B00H	Failure Analysis and Corrective Action Report	C001	Technical Manuals

Option CLIN 0005 Labor Categories and Rates

Rate Category			Government Fiscal Year				
			[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
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[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
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Rate Category			Government Fiscal Year				
			[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
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[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Item	Description	Qty	Unit	Unit Price	Amount
0100	Radar Environmental Simulator (CPIF)	1	Lot	Target Cost	[redacted]
				Target Fee (6%)	[redacted]
				Target Cost + Fee	[redacted]
				Min Fee (2%)	[redacted]
				Max Fee (10%)	[redacted]
				Share Ratio	[redacted]
OPTION 0200	Contractor Developed Trailer, if proposed. (CPIF)	1	Lot	Target Cost	[redacted]
				Target Fee	[redacted]
				Target Cost + Fee	[redacted]
				Min Fee	[redacted]
				Max Fee	[redacted]
				Share Ratio	[redacted]
OPTION 0300	Contractor Developed Generator, if proposed. (CPIF)	1	Lot	Target Cost	[redacted]
				Target Fee (6%)	[redacted]
				Target Cost + Fee	[redacted]
				Min Fee (2%)	[redacted]
				Max Fee (10%)	[redacted]
				Share Ratio	[redacted]

Item	Description	Qty	Unit	Unit Price	Amount
OPTION 1000	G/ATOR Low Rate Initial Production (LRIP) in Accordance with the Attached Statement of Work and Performance Specification (FPI-ST Modified)	2	Ea	Target Cost	[redacted]
				Target Fee [redacted]	[redacted]
				Target Price	[redacted]
				Initial Share Ratio	[redacted]
				Final Share Ratio	[redacted]
				PTA	[redacted]
OPTION 1010	Other Direct Costs and Travel in Support of CLIN 1000 and 1020 (Cost – Non-Fee Bearing)	1	Lot	NTE [redacted]	[redacted]
OPTION 1020	Contract Data Requirements Lists (CDRLs) in support of CLINs 1000 - 1010 in Accordance with the Exhibits Included at Table 1-2 Below	1	Lot	NSP	[redacted]
OPTION 1030	Technical Data Package in Accordance with Exhibits B014 – B019 (FFP)	1	Lot	[redacted]	[redacted]
OPTION 1040	Software Source Code/Model Driven Architecture Models in Accordance with Exhibit B008 (FFP)	1	Lot	[redacted]	[redacted]
OPTION 1050	Initial Operating Spares (FFP)	2	Sets	[redacted]	

Table 1-2 – CLIN 1020 Exhibits

Exhibit	Title	Exhibit	Title
A002	Status Report	B00L	Test/Inspection Report
A003	Integrated Master Schedule	B00Q	Technical Report-Study/Services
A005	Conference Agenda	B00Z	Engineering Release Record (ERR)
A006	Conference Minutes	B010	Engineering Change Proposal (ECP)
A007	Receipt of Government Material Report	B011	Request for Deviation (RFD)
A008	Government Furnished Information Deficiency Report	B012	Notice of Revision (NOR)
B00H	Failure Analysis and Corrective Action Report	B013	Configuration Status Accounting Information
B00J	Failure Summary and Analysis Report	D001	Contractor Validation Plan
B00K	Test Procedure		

Item	Description	Qty	Unit	Unit Price	Amount
OPTION 2000	G/ATOR Full-Rate Production Systems (FPI-ST Modified) in Accordance with the Attached Statement of Work and Performance Specification				
OPTION 2000AA	Delivered 66 Months After Contract Award	1	Ea	Target Cost	[redacted]
				Target Fee [redacted]	[redacted]
				Target Price	[redacted]
				Initial Share Ratio	[redacted]
				Final Share Ratio	[redacted]
				PTA	[redacted]
OPTION 2000AB	Delivered 72 Months After Contract Award	1	Ea	Target Cost	[redacted]
				Target Fee [redacted]	[redacted]
				Target Price	[redacted]
				Initial Share Ratio	[redacted]
				Final Share Ratio	[redacted]
				PTA	[redacted]
OPTION 2010	Other Direct Costs and Travel in Support of CLINS 2000, 2020, 2040, 2050, and 2060 (Cost – Non-Fee Bearing)	1	Lot	NTE [redacted]	[redacted]
OPTION 2020	Contract Data Requirements Lists (CDRLs) in support of CLINs 2000 - 2010 and 2040 – 2060 if exercised in Accordance with the Exhibits Included at Table 1-3 Below	1	Lot	NSP	[redacted]
OPTION 2030	Refurbishment and Retrofit of EDM to Production Configuration (FFP)	1	Ea	[redacted]	
OPTION 2040	G/ATOR Full-Rate Production Systems (FPI-ST Modified) in Accordance with the Attached Statement of Work and Performance Specification				
OPTION 2040AA	Delivered 78 Months After Contract Award	1	Ea	Target Cost	[redacted]
				Target Fee [redacted]	[redacted]
				Target Price	[redacted]
				Initial Share Ratio	[redacted]
				Final Share Ratio	[redacted]
				PTA	[redacted]
OPTION 2040AB	Delivered 81 Months After Contract Award	1	Ea	Target Cost	[redacted]
				Target Fee [redacted]	[redacted]
				Target Price	[redacted]
				Initial Share Ratio	[redacted]
				Final Share Ratio	[redacted]
				PTA	[redacted]
OPTION	Delivered 84 Months After Contract	2	Ea	Target Cost	[redacted]

Item	Description	Qty	Unit	Unit Price	Amount
2040AC	Award			Target Fee [redacted]	[redacted]
				Target Price	[redacted]
				Initial Share Ratio	[redacted]
				Final Share Ratio	[redacted]
				PTA	[redacted]
OPTION 2050	G/ATOR Full-Rate Production Systems (FPI-ST Modified) in Accordance with the Attached Statement of Work and Performance Specification				
OPTION 2050AA	Delivered 90 Months After Contract Award	1	Ea	Target Cost	[redacted]
				Target Fee [redacted]	[redacted]
				Target Price	[redacted]
				Initial Share Ratio	[redacted]
				Final Share Ratio	[redacted]
				PTA	[redacted]
OPTION 2050AB	Delivered 93 Months After Contract Award	1	Ea	Target Cost	[redacted]
				Target Fee [redacted]	[redacted]
				Target Price	[redacted]
				Initial Share Ratio	[redacted]
				Final Share Ratio	[redacted]
				PTA	[redacted]
OPTION 2050AC	Delivered 96 Months After Contract Award	2	Ea	Target Cost	[redacted]
				Target Fee [redacted]	[redacted]
				Target Price	[redacted]
				Initial Share Ratio	[redacted]
				Final Share Ratio	[redacted]
				PTA	[redacted]
OPTION 2060	G/ATOR Full-Rate Production Systems (FPI-ST Modified) in Accordance with the Attached Statement of Work and Performance Specification				
OPTION 2060AA	Delivered 102 Months After Contract Award	1	Ea	Target Cost	[redacted]
				Target Fee [redacted]	[redacted]
				Target Price	[redacted]
				Initial Share Ratio	[redacted]
				Final Share Ratio	[redacted]
				PTA	[redacted]
OPTION 2060AB	Delivered 105 Months After Contract Award	2	Ea	Target Cost	[redacted]
				Target Fee [redacted]	[redacted]
				Target Price	[redacted]
				Initial Share Ratio	[redacted]
				Final Share Ratio	[redacted]
				PTA	[redacted]
OPTION 2060AC	Delivered 108 Months After Contract Award	2	Ea	Target Cost	[redacted]
				Target Fee [redacted]	[redacted]

Item	Description	Qty	Unit	Unit Price	Amount
				Target Price	[redacted]
				Initial Share Ratio	[redacted]
				Final Share Ratio	[redacted]
				PTA	[redacted]

Table 1-3 – CLIN 2020 Exhibits

Exhibit	Title	Exhibit	Title
A002	Status Report	B00L	Test/Inspection Report
A003	Integrated Master Schedule	B00Y	Configuration Audit Summary Report
A005	Conference Agenda	B00Q	Technical Report-Study/Services
A006	Conference Minutes	B00Z	Engineering Release Record (ERR)
A007	Receipt of Government Material Report	B010	Engineering Change Proposal (ECP)
A008	Government Furnished Information Deficiency Report	B011	Request for Deviation (RFD)
B00H	Failure Analysis and Corrective Action Report	B012	Notice of Revision (NOR)
B00J	Failure Summary and Analysis Report	B013	Configuration Status Accounting Information
B00K	Test Procedure	D001	Contractor Validation Plan

Item	Description	Qty	Unit	Unit Price	Amount
OPTION 3000	Interim Contractor Logistics Support in Accordance with the Attached Statement of Work Paragraph 3.4.4 (CPFF)	1	Lot	Estimated Cost	[redacted]
				Fixed Fee	[redacted]
				Estimated CPFF	[redacted]
OPTION 3010	Contract Data Requirements Lists (CDRLs) in support of CLIN 3000 in Accordance with the Exhibits Included at Table 1-4 Below	1	Lot	NSP	[redacted]

Table 1-4 – CLIN 3010 Exhibits

Exhibit	Title
A002	Status Report
A003	Integrated Master Schedule
A005	Conference Agenda
A006	Conference Minutes
A009	Cost Performance Report
A00A	Contract Funds Status Report
C002	Training Conduct Support Document

Item	Description	Qty	Unit	Unit Price	Amount
OPTION 4000	Performance Based Logistics Support (FFP per Unit)	12	Mo	[redacted]	[redacted]
OPTION 4010	Contract Data Requirements Lists (CDRLs) in support of CLIN 4000 in Accordance with Exhibits E (to be proposed by offeror)	1	Lot	[redacted]	[redacted]

B.2 Limitation of Cost or Limitation of Funds Language

The clause entitled "Limitation of Cost" (FAR 52.232-20) or "Limitation of Funds" (FAR 52.232-22), as appropriate, shall apply separately and independently to each separately identified estimated cost.

B.3 Payment of Fee(s) (Completion)

(a) For purposes of this contract, "fee" means "target fee" in cost-plus-incentive-fee type contracts and "fixed fee" in cost plus fixed fee type contracts for completion and phase type contracts.

(b) The Government shall make payments to the Contractor, subject to and in accordance with the clause in this contract entitled "Fixed Fee" (FAR 52.216-8) or "Incentive Fee", (FAR 52.216-10), as applicable. Such payments shall be equal to six percent (6 %) of the allowable cost of each invoice submitted by and payable to the contractor pursuant to the clause of this contract entitled "Allowable Cost and Payment" (FAR 52.216-7), subject to the withholding terms and conditions of the "Fixed Fee" or "Incentive Fee" clause, as applicable (percentage of fee is based on fee dollars divided by estimated cost dollars, including facilities capital cost of money). Total fee(s) paid to the Contractor shall not exceed the fee amount(s) set forth in this contract.

(c) In the event of discontinuance of the work under this contract, or any specified phase of the contract, in accordance with the clause of this contract entitled "Limitation of Funds" (FAR 52.232-22) or "Limitation of Cost" (FAR 52.232-20), as applicable, the fee shall be equitably adjusted by mutual agreement to reflect the diminution of work. If the adjusted fee is less than the sum of all fee payments made to the Contractor under this contract, the Contractor shall repay the excess amount to the Government. If the adjusted fee exceeds all payments made to the Contractor under this contract, the Contractor shall be paid the additional amount, subject to the availability of funds. In no event shall the Government be required to pay the Contractor any amount in excess of the funds obligated under this contract at the time of the discontinuance of work.

(d) Fee(s) withheld pursuant to the terms and conditions of this contract shall not be paid until the contract has been modified to reduce the fee(s) in accordance with paragraph (c) above, or until the Procuring Contracting Officer has advised the paying office in writing that no fee adjustment is required.

NOTE: Percentage of fee is based on fee dollars divided by estimated cost dollars, including facilities capital cost of money.

B.4 Other Direct Costs and Travel

Other direct costs (ODCs), (including GFE repair and maintenance), and travel includes those costs, necessary for the direct support of this contract but not included in the cost/price of another item. ODCs do not include costs necessary to support this contract in the normal course of business (i.e. allocated to overhead). ODCs and travel may be reimbursed provided such costs are specifically authorized and provided that the costs are reasonable, allowable, and allocable in accordance with the laws and regulations (e.g. FAR Part 31). Contractor shall be reimbursed for travel costs in accordance with the Federal Acquisition Regulation as limited by the Joint Travel Regulations, Volume II and the following: (1) where official company travel can reasonably be planned in advance so as to take advantage of available discounted standard or coach airfares; and (2) travel to and from work, shall not be reimbursed hereunder. The contractor is not entitled to additional fee for ODCs or travel but is entitled to those costs normally associated with ODCs, such as overhead and burden costs.

SECTION C – DESCRIPTION/SPECIFICATIONS/STATEMENT OF WORK

C.1 Statement of Work / Performance Specification / Integrated Master Plan

The contractor will perform efforts associated with CLINs 0001, 0002, 0003 and (if and to the extent exercised) Option CLINs 0004, 0005, 0100, 0200, 0300, 1000, 1010, 1050, 2000, 2010, 2030, 2040, 2050, 2060 and 3000 in accordance with Attachment (1) Statement of Work for the Ground/Air Task Oriented Radar (G/ATOR), Attachment (2) G/ATOR Performance Specification, and Attachment (5) Integrated Master Plan (IMP). (IMP to be provided by Offeror as part of the proposal)

C.2 Performance Based Support

If and to the extent exercised, the contractor will perform efforts associated with Option CLIN 4000 in accordance with Attachment (6) Statement of Work for the G/ATOR Performance Based Support. (To be provided by Offeror as part of the proposal)

C.3 Contract Data Requirements Lists (CDRLs)

The data ordered under CLIN 0003, and (if and to the extent exercised) Option CLINs 1020, 1030, 1040, 2020, 3010, and 4010 shall be provided in accordance with DD Form 1423, Exhibits A – E. (Exhibits E to be provided by Offeror as part of the proposal). The purpose of the CDRL is to provide information regarding data or other items to be delivered to the Government. The CDRL provides for a concise means of addressing the content, distribution, inspection and acceptance location, due dates and frequency, and any other information pertinent to the data requirement. The Authority shown on each Exhibit defines the data content and format requirements. Unless otherwise specified in an Exhibit, contractor format is acceptable.

C.4 Assignment and Use of National Stock Numbers (NSNs)

To the extent that National Stock Numbers (NSNs) or preliminary NSNs are assigned by the Government for the identification of parts, pieces, items, subassemblies or assemblies to be furnished under this contracts, the Contractor shall use such NSNs or preliminary NSNs in the preparation of provisioning lists, package labels, packing lists, shipping containers and shipping documents as required by the applicable specifications, standards, or Data Item Descriptions of the contract or as required for orders for spare and repair parts. The cognizant Government Contract Administration Office will be responsible for providing the Contractor such NSNs or preliminary NSNs which may be assigned and which are not already in the possession of the Contractor.

C.5 Engineering Services and Support

Option CLIN 0005, if exercised, is a labor hours CLIN that will provide for services and support within in the general scope of the G/ATOR Increment I contract but not included in the cost/price of any other item included herein. The Government is not obligated to purchase a minimum quantity under this CLIN. Orders placed under this CLIN will be done by the issuance of Technical Directions (TDs) against established the labor categories and rates included in Section B for the applicable Government fiscal year. Prior to the issuance of a TD, the Government will request a proposal from the Contractor delineating the estimated level of effort. At a minimum, each TD will include the following:

1. Subject
2. Description/Scope of the effort
3. Deliverables
4. Period of performance
5. Estimated level of effort and labor categories
6. Ceiling/Funding

Only the Procuring Contracting Officer (PCO) is authorized to issue a TD or to authorize any changes to a TD.

C.6 Updating Specifications and Standards

If, during the performance of this or any other contract, the contractor believes that any contract contains outdated or different versions of any specifications or standards, the contractor may request that all of its contracts be updated to include the current version of the applicable specification or standard. Updating shall not affect the form, fit or function of any deliverable item or increase the cost/price of the item to the Government. The contractor should submit update requests to the Procuring Contracting Officer with copies to the Administrative Contracting Officer and cognizant program office representative for approval. The contractor shall perform the contract in accordance with the existing specifications and standards until notified of approval/disapproval by the Procuring Contracting Officer. Any approved alternate specifications or standards will be incorporated into the contract.

C.7 Contractor's Proposal

The contracting officer, may, upon contract award, incorporate all or parts of the contractors proposal submitted in response to RFP M67854-05-R-2000. If portions of the proposal are included as attachments to this contract, they will fall under FAR 52.215-8(d) in the order of precedence clause. Any portions of the proposal are incorporated by reference are hereby designated as item (e) of the clause.

SECTION D – PACKAGING AND MARKING

D.1 Supply Items

All supplies delivered under this contract shall be prepared for delivery (preserved, packed, palletized, and marked) in accordance with American Society of Testing and Materials Designation (ASTM D) 3951-98 (2004) entitled "Standard Practice for Commercial Packaging" and the Contractor's best practices so as to preclude damage during transit and ensure safe delivery.

D.2 Data Items

All reports and technical documentation required to be delivered under this contract shall be packaged in accordance with best commercial practice to ensure safe delivery at destination. Classified reports, data, and documentation shall be prepared for shipment in accordance with National Industrial Security Program Operating Manual (NISPOM), DOD 5220.22-M dated January 1995.

D.3 Unique Identification (UID)

All items delivered under this contract are required to be uniquely identified in accordance with DFARS 252.211-7003, Item Identification and Valuation and DoD mandates. DoD policy on UID can be found at http://www.acq.osd.mil/dpap/UID.

SECTION E – INSPECTION AND ACCEPTANCE

E.1 52.252-2 Clauses Incorporated by Reference (Feb 1998)

This contract incorporates one or more clauses by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. Also, the full text of a clause may be accessed electronically at this/these address(es):

http://www.arnet.gov/far/ or http://farsite.hill.af.mil/

Federal Acquisition Regulation (48 CFR Chapter 1) (Clauses/Provisions); clauses preceded by a '2' refer to Defense Federal Acquisition Regulation (DFAR) Supplemental clauses:

52.246-2	Inspection of Supplies - Fixed Price (Aug 1996)
52.246-2 (Alt I)	Inspection of Supplies – Fixed Price (Jul 1985)
52.246-3	Inspection of Supplies – Cost Reimbursement (May 2001)
52.246-4	Inspection of Services - Fixed Price (Aug 1996)
52.246-5	Inspection of Services – Cost Reimbursement (Apr 1984)
52.246-6	Inspection – Time-and-Material and Labor Hour (May 2001)
52.246-8	Inspection of Research and Development – Cost-Reimbursement (May 2001)
52.246-8 (Alt I)	Inspection of Research and Development – Cost-Reimbursement (Apr 1984)
52.246-11	Higher-Level Contract Quality Requirement (Feb 1999) – See SOW Sec 2
52.246-15	Certificate of Conformance (Apr 1984)
52.246-16	Responsibility for Supplies (Apr 1984)
252-246-7000	Material Inspection and Receiving Report (Mar 2003)

E.2 The supplies/services ordered hereunder will be inspected/accepted at:

CLIN	Inspect At	Inspect By	Accept At	Accept By
0001	Origin	DCMA/Government Rep	Origin	DCMA/Government Rep
0002	Origin	DCMA/Government Rep	Origin	DCMA/Government Rep
0003	IAW 1423	IAW 1423	IAW 1423	IAW 1423
0005	IAW TD(s)	DCMA/Government Rep	IAW TD(s)	DCMA/Government Rep
0100	Origin	DCMA/Government Rep	Origin	DCMA/Government Rep
0200	Origin	DCMA/Government Rep	Origin	DCMA/Government Rep
0300	Origin	DCMA/Government Rep	Origin	DCMA/Government Rep
1000	Destination	Government Rep	Destination	Government Rep
1010	Origin	DCMA/Government Rep	Origin	DCMA/Government Rep
1020	IAW 1423	IAW 1423	IAW 1423	IAW 1423
1030	Destination	Government Rep	Destination	Government Rep
1040	Destination	Government Rep	Destination	Government Rep
1050	Origin	DCMA/Government Rep	Origin	DCMA/Government Rep
2000	Destination	Government Rep	Destination	Government Rep
2010	Origin	DCMA/Government Rep	Origin	DCMA/Government Rep
2020	IAW 1423	IAW 1423	IAW 1423	IAW 1423
2030	Origin	DCMA/Government Rep	Origin	DCMA/Government Rep
2040	Origin	DCMA/Government Rep	Origin	DCMA/Government Rep
2050	Origin	DCMA/Government Rep	Origin	DCMA/Government Rep
2060	Origin	DCMA/Government Rep	Origin	DCMA/Government Rep
3000	Origin	DCMA/Government Rep	Origin	DCMA/Government Rep

CLIN	Inspect At	Inspect By	Accept At	Accept By
3010	IAW 1423	IAW 1423	IAW 1423	IAW 1423
4000	Origin	DCMA/Government Rep	Origin	DCMA/Government Rep
4010	IAW 1423	IAW 1423	IAW 1423	IAW 1423

SECTION F – DELIVERIES OR PERFORMANCE

F.1 52.252-2 Clauses Incorporated by Reference (Feb 1998)

This contract incorporates one or more clauses by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. Also, the full text of a clause may be accessed electronically at this/these address(es):

http://www.arnet.gov/far/ or http://farsite.hill.af.mil/

Federal Acquisition Regulation (48 CFR Chapter 1) (Clauses/Provisions); clauses preceded by a '2' refer to Defense Federal Acquisition Regulation (DFAR) Supplemental clauses:

52.242-15	Stop-Work Order (Aug 1989)
52.242-15 (Alt I)	Stop-Work Order (Apr 1984)
52.242-17	Government Delay of Work (Apr 1984)
52.247-29	F.O.B. Origin (Jun 1988)
52.247-34	F.O.B. Destination (Nov 1991)
52.247-55	F.O.B. Point for Delivery of Government-Furnished Property (Jun 2003)
52.247-58	Loading, Blocking, and Bracing of Freight Car Shipments (Apr 1984)
52.247-65	F.O.B. Origin, Prepaid Freight – Small Package Shipments (Jan 1991)
252.247-7023	Transportation of Supplies by Sea (May 2002)

F.2 The supplies/services ordered hereunder will delivered no later than:

CLIN	Deliver By or Period of Performance
0001	42 Months After Contract Award (MACA) – Includes 6 months of Developmental Testing (DT).
0002	Contract Award through Completion of CLIN 0001
0003	IAW DD Form 1423
0005	To be specified in Technical Directions
0100	42 MACA – Includes 6 months of DT.
0200	42 MACA – Includes 6 months of DT.
0300	42 MACA – Includes 6 months of DT.
1000	54 MACA
1010	Date of Option Exercise through Completion of CLIN 1000
1020	IAW DD Form 1423
1030	NLT 6 Months After Completion of CLIN 1000
1040	NLT 6 Months After Completion of CLIN 1000
1050	To Be Decided (TBD)
2000AA	66 MACA
2000AB	72 MACA
2010	Date of Option Exercise through Completion of CLIN 2000
2020	IAW DD Form 1423
2030	To Be Decided (TBD)
2040AA	78 MACA
2040AB	81 MACA
2040AC	84 MACA
2050AA	90 MACA
2050AB	93 MACA

CLIN	Deliver By or Period of Performance
2050AC	96 MACA
2060AA	102 MACA
2060AB	105 MACA
2060AC	108 MACA
3000	Date of Option Exercise through 72 MACA
3010	IAW DD Form 1423
4000	One Year from the Date of Option Exercise
4010	IAW DD Form 1423

SECTION G – CONTRACT ADMINSTRATION DATA

G.1 52.252-2 Clauses Incorporated by Reference (Feb 1998)

This contract incorporates one or more clauses by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. Also, the full text of a clause may be accessed electronically at this/these address(es):

http://www.arnet.gov/far/ or http://farsite.hill.af.mil/

Federal Acquisition Regulation (48 CFR Chapter 1) (Clauses/Provisions); clauses preceded by a '2' refer to Defense Federal Acquisition Regulation (DFAR) Supplemental clauses:

252.201-7000 Contracting Officers Representative (Dec 1991)
252.242-7000 Postaward Conference (Dec 1991)

G.2 Postaward Conference

The Administrative Contracting Officer (ACO) shall establish the date of a Post Award Orientation Conference to be held with the Contractor within thirty (30) days of contract award. The Post Award Orientation Conference will be conducted in accordance with Federal Acquisition regulation Sub Part 42.5. The ACO or designee will prepare the agenda, notify appropriate Government and Contractor representatives, act as or designate a Chairperson, and prepare and distribute a report of the conference. The report will include all information and guidance provided to the Contractor. Any change(s) to the contract will be made only by a contract modification referencing the applicable terms of the contract.

This provision shall in no event constitute grounds for excusable delay by the Contractor in performance of any provision of the contract.

G.3 Paying Office

The paying office for this contract is:

HQ0338 DFAS Columbus Center
DFAS-CO/South Entitlement Operations
P.O. Box 182264
Columbus, OH 43218-2264

G.4 Contract Administration

Contract Administration for this contract will be under the cognizance of:

S2103A - DCMA Northrop Grumman Baltimore
P. O. Box 1693
Mail Stop 1285
Baltimore, MD 21203-1693

G.5 Contractor's Offices

Contractor's office that will supervise and administer the contract shall be:

See Section A-1, Block 15A

G.6 Procuring Contracting Officer (PCO)

The Procuring Contracting Officer for this procurement is:

Ms. Lee E. Hoyland

Address:

Commanding General
MARCORSYSCOM (MC2I)
Ms. Lee E. Hoyland
2200 Lester Street
Quantico, VA 22134-6050

Phone Numbers: Voice (703) 432-4189
FAX (703) 432-3547

E-mail Address:lee.hoyland@usmc.mil

G.7 Contracting Officer's Representative (COR)

The Contracting Officer's Representative for the procurement is TBD

Address:

Commanding General
MARCORSYSCOM (MC2I)
Attn: TBD
2200 Lester Street
Quantico, VA 22134-6050

Phone Numbers: Voice (703) 432-
FAX (703) 432-3547

E-mail Address:TBD

G.8 Allotment of Funds

a. Each cost-reimbursement CLIN executed under this contract shall be subject to FAR clause 52.232-20, Limitation of Cost, or 52.232-22, Limitation of Funds as applicable.

b. Each incrementally funded cost-reimbursement CLIN will include the following applicable to that CLIN:

a) **CLIN 0001**

For the purposes of paragraph (b) of the "Limitation of Funds" clause of this contract –

(i) the amount available for payment and allotted to this contract is [redacted]

(ii) the item provided for by such amount is CLIN 0001; and

(iii) the period of performance for which it is estimated that such amount will provide is through [redacted]

(iv) It is anticipated that the Contracting Officer will unilaterally allot funds from time to time through out the period of performance.

b) **CLIN 0002** is fully funded, FAR 52.232-20, Limitation of Cost applies.

c) **CLIN 0100** is fully funded, FAR 52.232-20, Limitation of Cost applies.

G.9 Submission of Invoices

In compliance with DFARS 252.232-7003, "Electronic Submission of Payment Requests (January 2004)", the Department of Defense (DoD) utilizes Wide Area Workflow (WAWF) to electronically process vendor requests for payment. The contractor is required to utilize this system when processing invoices, vouchers and receiving reports under this contract - unless the provision at DFARS 252.232-7003(c) applies. If not already accomplished, the contractor shall (i) register to use WAWF at https://wawf.eb.mil and (ii) ensure an Electronic Business Point of Contact is designated in the Central Contractor Registration at http://www.ccr.gov within ten (10) days after award of the contract.

The contract auditor (DCAA) is the authorized representative of the contracting officer for—

(A) Receiving vouchers from contractors;

(B) Approving interim vouchers for provisional payment and sending them to the disbursing office;

(C) Authorizing direct submission of interim vouchers for provisional payment to the disbursing office for contractors with approved billing systems; and

(D) Reviewing completion/final vouchers and sending them to the administrative contracting officer.

G.10 Accounting Classification Reference Number (ACRN)

The Accounting Classification Reference Number (ACRN) is the double letter prefix to the long line accounting classification citation number contained in the accounting data sheet attached to the contract, or listed below. It is used as a method for tracking expenditures against individual contract line items. In instances where multiple long line accounting classification numbers are applicable to single line items, each will be prefixed by a separate ACRN and subline item. Each line item, subline item, task and subtask listed in the schedule or Statement of Work shall have an accounting classification reference number assigned at the time of award or upon issuance of the task or delivery order.

The applicable Accounting and Appropriation data are detailed in G.11 below.

G.11 Accounting and Appropriation Data

ACRN	CLIN	Appropriation Data	Amount
AA	0001	1771319 M7KC 260 67854 067443 2D C3099D 45007RCR7CW2	[redacted]
AA	0002	1771319 M7KC 260 67854 067443 2D C3099D 45007RCR7CW2	[redacted]
AA	0100	1771319 M7KC 260 67854 067443 2D C3099D 45007RCR7CW2	[redacted]
Total Funding Available			[redacted]

SECTION H – SPECIAL CONTRACT REQUIREMENTS

H.1 Substitution of Personnel

(a) The Contractor agrees that a partial basis for award of this contract is the list of key personnel proposed. Accordingly, the Contractor agrees to assign to this contract those key persons whose resumes were submitted with the proposal necessary to fulfill the requirements of the contract. No substitution shall be made without prior notification to and concurrence of the Contracting Officer in accordance with this requirement.

(c) All proposed substitutes shall have qualifications equal to or higher than the qualifications of the person to be replaced. The Contracting Officer shall be notified in writing of any proposed substitution at least forty-five (45) days, or ninety (90) days if a security clearance is to be obtained, in advance of the proposed substitution. Such notification shall include: (1) an explanation of the circumstances necessitating the substitution; (2) a complete resume of the proposed substitute; and (3) any other information requested by the Contracting Officer to enable him/her to judge whether or not the Contractor is maintaining the same high quality of personnel that provided the partial basis for award.

The following have been designated as key personnel:

Position	Name
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]

H.2 Unauthorized Changes

No order, statement, or conduct of Government personnel who might visit the contractor's facility or in any other manner communicate with contractor personnel during the performance of this contract shall constitute a change under the "CHANGES" clause of this contract.

No understanding or agreement, contract modification, change order, or other matter deviating from or constituting an alteration or change of the terms of the contract shall be effective or binding upon the Government unless formalized by contractual documents executed by the Contracting Officer.

The Contracting Officer is the only person authorized to approve changes in any of the requirements of this contract and, notwithstanding provisions contained elsewhere in the contract, the said authority remains solely with the Contracting Officer. In the event that the contractor

effects any change at the direction of any person other than the Contracting Officer, the change will be considered to have been made without authority at the contractor's expense, and no adjustment shall be made in the contract price or other contract terms and conditions as consideration for the aforementioned unauthorized change. Further, should the unauthorized change be to the Government's detriment, the contractor may be held financially responsible for its correction.

H.3 Extension of Commercial Warranty

The Contractor shall extend to the Government the full coverage of any standard commercial warranty normally offered in a similar commercial sale, provided that such warranty is available at no additional cost to the Government. The Contractor shall provide a copy of the standard commercial warranty with the item. The standard commercial warranty period shall begin upon the final Government acceptance of the applicable item or software. Acceptance of the standard commercial warranty does not waive the Government's rights under the "Inspection" clause, nor does it limit the Government's rights with regard to other terms and conditions of the contract. In the event of a conflict, the terms and conditions of the contract shall take precedence over the standard commercial warranty.

H.4 Reserved

H.5 Government Furnished Property

Only the property, equipment, and material listed in Attachment (4) in the quantity shown will be furnished by the Government (quantities shown are on a per system basis). The Contractor may use any or all of the indicated GFP in their approach to this effort. All other property, equipment, and material required in the performance of this contract shall be furnished by the contractor.

H.6 Contractor Notice Regarding Late Delivery

In the event the Contractor for any reason anticipates or encounters difficulty in complying with the contract delivery schedule or in meeting any of the other requirements of the contract, they shall immediately notify the Contracting Officer in writing, with a copy to the cognizant Contract Administration Officer, if assigned, giving pertinent details. However, this data shall be considered informational only in character and receipt by the Government shall not be construed as a waiver by the Government of (a) any delivery schedule or date, or (b) compliance with any other contract requirement by the Contractor, or (c) any other rights or remedies provided to the Government by law or under this contract.

H.7 Technical Directions

(a) Performance of the work under CLIN 0005 may be subject to written technical directions issued by the Procuring Contracting Officer. As used herein, technical directions are defined to include the following:

(1) Directions to the Contractor which suggest pursuit of certain lines of inquiry, shift work analysis, fill in details, or otherwise serve to accomplish the contractual statement of work.

(2) Guidelines to the Contractor which assist in the interpretation of drawings, specifications or technical portions of the work description.

(b) Technical directions must be within the general scope of work stated in the contract. Technical directions may not be used to: (1) assign additional work under the contract; (2) direct a change as defined in the "CHANGES" clause of this contract; (3) increase or decrease the contract price or estimated contract amount, the level of effort, or the time required for contract performance; or (4) change any of the terms, conditions, or specifications of the contract.

(c) If, in the opinion of the Contractor, any technical direction calls for effort outside the scope of the contract or is inconsistent with this requirement, the Contractor shall notify the Contracting Officer in writing within ten (10) working days after receipt of any such direction. The Contractor shall not proceed with the work affected by the technical direction unless and until the Contractor is notified by the Contracting Officer that the technical direction is within the scope of the contract.

(d) Nothing in the foregoing paragraph shall be construed to excuse the Contractor from performing that portion of the contractual work statement which is not affected.

H.8 Government Production and Research Property

If the Contractor plans to use, in performing the work under this Contract, any items of Government property in the Contractor's possession under a facilities contract or other agreement independent of this contract, the contractor shall identify (by contract number, Government agency, and contract administrator) the facilities he proposes to use. Moreover, the offeror shall request written concurrence to use each item of such Government property from the cognizant Contracting Officer.

H.9 Incorporation of Representations and Certifications by Reference

All representations and certifications and other written statements made by the contractor in response to Section K of the solicitation or at the request of the contracting officer, incident to the award of the contract or modification of this contract, are hereby incorporated by reference with the same force and effect as if they were given in full text.

H.10 Responsibility in Subcontracting

The contractor shall provide the technology processes, test procedures, data, drawings, and/or other information required to facilitate competition to the fullest extent feasible, and assure performance by selected subcontractors. The contractor will be fully responsible for assuring that all appropriate contractual provisions and clauses are passed down to its subcontractors, and that those provisions are enforced.

H.11 Central Contractor Registration

All offerors must ensure that they are registered in the Central Contractor Registration and remain registered throughout the period of performance. This is mandatory for award of any Government contract. To register, go on-line to **http://www.ccr.gov**.

H.12 52.216-17 Incentive Price Revision -- Successive Targets (Oct 1997) (Modified) – Applicable to CLINs 1000 and 2000, 2040, 2050 and 2060

(a) General. The supplies or services identified in the Schedule as Items 1000 and 2000 are subject to price revision in accordance with this clause; provided, that in no event shall the total

final price of these items exceed the ceiling price derived from the negotiated total firm target price (the sum of the negotiated total firm target cost, and the total firm target profit calculated in accordance with (d)(2) below); a point of total assumption percentage [redacted]%; and the Government share of the final profit adjustment formula (see (d)(4) below). The prices of these items shown in the Schedule are the initial target prices, which include an initial target profit of [redacted]% percent of the initial target cost. Any supplies or services that are to be (1) ordered separately under, or otherwise added to, this contract and (2) subject to price revision in accordance with this clause shall be identified as such in a modification to this contract.

(b) Definition. "Costs," as used in this clause, means allowable costs in accordance with Part 31 of the Federal Acquisition Regulation (FAR) in effect on the date of this contract.

(c) Submitting data for establishing the firm fixed price or a final profit adjustment formula.

(1) For CLIN 1000, within 60 days after the end of the month in which the Contractor has completed the Critical Design Review for CLIN 0001; and (2) For CLIN 2000, 6 months prior to the completion of CLIN 1000, and for CLINs 2040, 2050 and 2060, 6 months prior to the completion of CLIN 2000 the Contractor shall submit the following data:

(i) A proposed firm target cost for supplies delivered and to be delivered and services performed and to be performed.

(ii) A detailed statement of all costs incurred in the performance of this contract through the end of the month specified above, in the format of Table 15-2, FAR 15.408 (or in any other form on which the parties may agree), with sufficient supporting data to disclose unit costs and cost trends for--

(A) Supplies delivered and services performed; and

(B) Inventories of work in process and undelivered contract supplies on hand (estimated to the extent necessary).

(iii) An estimate of costs of all supplies delivered and to be delivered and all services performed and to be performed under this contract, using the statement of costs incurred plus an estimate of costs to complete performance, in the format of Table 15-2, FAR 15.408 (or in any other form on which the parties may agree), together with--

(A) Sufficient data to support the accuracy and reliability of the estimate; and

(B) An explanation of the differences between this estimate and the original estimate used to establish the initial target prices.

(d) Establishing firm fixed price or final profit adjustment formula. Upon the Contracting Officer's receipt of the data required by paragraph (c) of this section, the Contracting Officer and the Contractor shall promptly establish either a firm fixed price or a profit adjustment formula for determining final profit, as follows:

(1) The parties shall negotiate a total firm target cost, based upon the data submitted under paragraph (c) of this section.

(2) If the total firm target cost is more than the total initial target cost, the total initial target profit shall be decreased. If the total firm target cost is less than the total initial target cost, the total initial target profit shall be increased. The initial target profit shall be increased or decreased by [redacted]% percent of the difference between the total initial target cost and the total firm target cost. The resulting amount shall be the total firm target profit.

(3) If the total firm target cost plus the total firm target profit represent a reasonable price for performing that part of the contract subject to price revision under this clause, the parties may agree on a firm fixed price, which shall be evidenced by a contract modification

(4) Failure of the parties to agree to a firm fixed price shall not constitute a dispute under the Disputes clause. If agreement is not reached, or if establishment of a firm fixed price is inappropriate, the Contractor and the Contracting Officer shall establish a profit adjustment formula under which the total final price shall be established by applying to the total final negotiated cost an adjustment for profit or loss, determined as follows:

(i) If the total final negotiated cost is equal to the total firm target cost, the adjustment is the total firm target profit.

(ii) If the total final negotiated cost is greater than the total firm target cost, the adjustment is the total firm target profit, less [redacted] percent of the amount by which the total final negotiated cost exceeds the total firm target cost.

(iii) If the total final negotiated cost is less than the total firm target cost, the adjustment is the total firm target profit, plus [redacted] percent of the amount by which the total final negotiated cost is less than the total firm target cost.

(iv) The total firm target cost, total firm target profit, and the profit adjustment formula for determining final profit shall be evidenced by a modification to this contract signed by the Contractor and the Contracting Officer.

(e) Submitting data for final price revision. Unless a firm fixed price has been established in accordance with paragraph (d) of this section, within 60 days after the end of the month in which the Contractor has delivered the last unit of supplies and completed the services specified by item number in paragraph (a) of this section, the Contractor shall submit in the format of Table 15-2, FAR 15.408 (or in any other form on which the parties agree)--

(1) A detailed statement of all costs incurred up to the end of that month in performing all work under the items;

(2) An estimate of costs of further performance, if any, that may be necessary to complete performance of all work under the items;

(3) A list of all residual inventory and an estimate of its value; and

(4) Any other relevant data that the Contracting Officer may reasonably require.

(f) Final price revision. Unless a firm fixed price has been agreed to in accordance with paragraph (d) of this section, the Contractor and the Contracting Officer shall, promptly after submission of the data required by paragraph (e) of this section, establish the total final price, as follows:

(1) On the basis of the information required by paragraph (e) of this section, together with any other pertinent information, the parties shall negotiate the total final cost incurred or to be incurred for the supplies delivered (or services performed) and accepted by the Government and which are subject to price revision under this clause.

(2) The total final price shall be established by applying to the total final negotiated cost an adjustment for final profit or loss determined as agreed upon under subparagraph (d)(4) of this section.

(g) Contract modification. The total final price of the items specified in paragraph (a) of this section shall be evidenced by a modification to this contract, signed by the Contractor and the Contracting Officer. This price shall not be subject to revision, notwithstanding any changes in the cost of performing the contract, except to the extent that--

(1) The parties may agree in writing, before the determination of total final price, to exclude specific elements of cost from this price and to a procedure for subsequent disposition of these elements; and

(2) Adjustments or credits are explicitly permitted or required by this or any other clause in this contract.

(h) Adjustment of billing prices. (1) Pending execution of the contract modification (see paragraph (e) of this section), the Contractor shall submit invoices or vouchers in accordance with billing prices as provided in this paragraph. The firm target prices shall be used as the billing prices.

(2) If at any time it appears from information provided by the contractor under subparagraph (i)(1) of this section that the then-current billing prices will be substantially greater than the estimated final prices, the parties shall negotiate a reduction in the billing prices. Similarly, the parties may negotiate an increase in billing prices by any or all of the difference between the target prices and the ceiling price, upon the Contractor's submission of factual data showing that the final cost under this contract will be substantially greater than the target cost.

(3) Any adjustment of billing prices shall be reflected in a contract modification and shall not affect the determination of any price under paragraph (d) or (f) of this section. After the contract modification establishing the total final price is executed, the total amount paid or to be paid on all invoices or vouchers shall be adjusted to reflect the total final price, and any resulting additional payments, refunds, or credits shall be made promptly.

(i) Quarterly limitation on payments statement. This paragraph (i) shall apply until a firm fixed price or a total final price is established under subparagraph (d)(3) or (f)(2).

(1) Within 45 days after the end of each quarter of the Contractor's fiscal year in which a delivery is first made (or services are first performed) and accepted by the Government under this contract, and for each quarter thereafter, the Contractor shall submit to the contract administration office (with a copy to the contracting office and the cognizant contract auditor) a statement, cumulative from the beginning of the contract, showing--

(i) The total contract price of all supplies delivered (or services performed) and accepted by the Government and for which final prices have been established;

(ii) The total cost (estimated to the extent necessary) reasonably incurred for, and properly allocable solely to, the supplies delivered (or services performed) and accepted by the Government and for which final prices have not been established;

(iii) The portion of the total interim profit (used in establishing the initial contract price or agreed to for the purpose of this paragraph (i)) that is in direct proportion to the supplies delivered (or services performed) and accepted by the Government and for which final prices have not been established--increased or decreased in accordance with subparagraph (d)(4) of this section when the amount stated under subdivision (ii) of this section, differs from the aggregate firm target costs of the supplies or services; and

(iv) The total amount of all invoices or vouchers for supplies delivered (or services performed) and accepted by the Government (including amounts applied or to be applied to liquidate progress payments).

(2) Notwithstanding any provision of this contract authorizing greater payments, if on any quarterly statement the amount under subdivision (1)(iv) of this section exceeds the sum due the Contractor, as computed in accordance with subdivisions (1)(i), (ii), and (iii) of this section, the Contractor shall immediately refund or credit to the Government the amount of this excess. The Contractor may, when appropriate, reduce this refund or credit by the amount of any applicable tax credits due the Contractor under 26 U.S.C. 1481 and by the amount of previous refunds or credits effected under this clause. If any portion of the excess has been applied to the liquidation of progress payments, then that portion may, instead of being refunded, be added to the unliquidated progress payment account consistent with the Progress Payments clause. The Contractor shall provide complete details to support any claimed reductions in refunds.

(3) If the Contractor fails to submit the quarterly statement within 45 days after the end of each quarter and it is later determined that the Government has overpaid the Contractor, the Contractor shall repay the excess to the Government immediately. Unless repaid within 30 days after the end of the statement submittal period, the amount of the excess shall bear interest, computed from the date the quarterly statement was due to the date of repayment, at the rate established in accordance with the Interest clause.

(j) Subcontracts. No subcontract placed under this contract may provide for payment on a cost-plus-a-percentage-of-cost basis.

(k) Disagreements. If the Contractor and the Contracting Officer fail to agree upon (1) a total firm target cost and a final profit adjustment formula or (2) a total final price, within 120 days after the date on which the data required in paragraphs (c) and (e) of this section are to be submitted, the Contracting Officer shall promptly issue a decision in accordance with the Disputes clause.

(l) Termination. If this contract is terminated before the total final price is established, prices of supplies or services subject to price revision shall be established in accordance with this clause for (1) completed supplies and services accepted by the Government and (2) those supplies or services not terminated under a partial termination. All other elements of the termination shall be resolved in accordance with other applicable clauses of this contract.

(m) Equitable adjustments under other clauses. If an equitable adjustment in the contract price is made under any other clause of this contract before the total final price is established, the adjustment shall be made in the total target cost and may be made in the maximum dollar limit on

the total final price, the total target profit, or both. If the adjustment is made after the total final price is established, only the total final price shall be adjusted.

(n) Exclusion from target price and total final price. If any clause of this contract provides that the contract price does not or will not include an amount for a specific purpose, then neither any target price nor the total final price includes or will include any amount for that purpose.

(o) Separate reimbursement. If any clause of this contract expressly provides that the cost of performance of an obligation shall be at Government expense, that expense shall not be included in any target price or in the total final price, but shall be reimbursed separately.

(p) Taxes. As used in the Federal, State, and Local Taxes clause or in any other clause that provides for certain taxes or duties to be included in, or excluded from, the contract price, the term "contract price" includes the total target price or, if it has been established, the total final price. When any of these clauses requires that the contract price be increased or decreased as a result of changes in the obligation of the Contractor to pay or bear the burden of certain taxes or duties, the increase or decrease shall be made in the total target price or, if it has been established, in the total final price, so that it will not affect the Contractor's profit or loss on this contract

H.13 Workman's Compensations, General Liability, and Automobile Liability

The Contractor in accordance with the applicable insurance clauses specified in Section I, shall procure and maintain, during the entire period of performance under this contract, the following minimum insurance:

(a) Worker's Compensation and Employer's Liability Insurance: Minimum amount $100,000.

(b) General Liability Insurance: Minimum amount $500,000 per occurrence for bodily injury.

(c) Automobile Liability Insurance: Minimum amount $20,000 per occurrence for property damage; $200,000 per person for bodily injury; $500,000 per occurrence for bodily injury.

H.14 Incorporation of Proposal

Except for the specific portions of the Contractor's proposal of 2 June 2006, as modified by the Contractor's 13 November 2006 proposal, identified and attached in Section J, the Contractor's technical, management and cost proposals of 2 June 2006, as modified by the Contractor's 13 November 2006 proposal, incident to the award of the contract, are hereby incorporated by reference with the same force and effect as if they were given in full text.

SECTION I – CONTRACT CLAUSES

Current through FAC 2005-03 and DCN 20050422

I.1 52.252-2 CLAUSES INCORPORATED BY REFERENCE (FEB 1998)

This contract incorporates one or more clauses by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. Also, the full text of a clause may be accessed electronically at this/these address(es):

http://www.arnet.gov/far/ or http://farsite.hill.af.mil/

Federal Acquisition Regulation (48 CFR Chapter 1) (Clauses/Provisions); clauses preceded by a '2' refer to Defense Federal Acquisition Regulation (DFAR) Supplemental clauses:

52.202-1	Definitions (Jul 2004)
52.203-3	Gratuities (Apr 1984)
52.203-5	Covenant Against Contingent Fees (Apr 1984)
52.203-6	Restrictions on Subcontractor Sales to the Government (Jul 1995)
52.203-7	Anti-Kickback Procedures (Jul 1995)
52.203-8	Cancellation, Rescission, and Recovery of Funds for Illegal or Improper Activity (Jan 1997)
52.203-10	Price or Fee Adjustment for Illegal or Improper Activity (Jan 1997)
52.203-12	Limitation on Payments to Influence Certain Federal Transactions (Jun 2003)
52.204-2	Security Requirements (Aug 1996)
52.204-4	Printed/Copied Double-Sided on Recycled Paper (Aug 2000)
52.204-7	Central Contractor Registration (Oct 2003)
52.209-4 Alt II	First Article Approval – Government Testing (Sep 1989) Alt II (Sep 1989)
52.209-6	Protecting the Government's Interest when Subcontracting with Contractors Debarred, Suspended, or Proposed for Debarment (Jan 2005)
52.211-5	Material Requirements (Aug 2000)
52.211-15	Defense Priority and Allocation Requirements (Sep 1990)
52.215-2	Audit and Records--Negotiation (Jun 1999)
52.215-8	Order of Precedence--Uniform Contract Format (Oct 1997)
52.215-10	Price Reduction for Defective Cost or Pricing Data (Oct 1997)
52.215-12	Subcontractor Cost or Pricing Data (Oct 1997)
52.215-13	Subcontractor Cost or Pricing Data--Modifications (Oct 1997)
52.215-14	Integrity of Unit Prices (Oct 1997) Alternate I (Oct 1997)
52.215-15	Pension Adjustments and Asset Reversions (Oct 2004)
52.215-18	Reversion or Adjustment of Plans for Post-Retirement Benefits (PRB) Other Than Pensions (Oct 1997)
52.215-21	Requirement for Cost or Pricing Data or Information Other than Cost or Pricing Data—Modifications (Oct 1997)
52.216-7	Allowable Cost and Payment (Dec 2002)
52.216-8	Fixed Fee (Mar 1997)
52.219-8	Utilization of Small Business Concerns (May 2004)
52.219-9 Alt II	Small Business Subcontracting Plan (Jan 2002) Alternate II (Oct 2001)
52.219-16	Liquidated Damages--Subcontracting Plan (Jan 1999)
52.222-1	Notice to the Government of Labor Disputes (Feb 1997)
52.222-2	Payment of Overtime Premiums (Jul 1990) (zero)
52.222-3	Convict Labor (Jun 2003)

52.222-4	Contract Work Hours and Safety Standards Act--Overtime Compensation (Sep 2000)
52.222-21	Prohibition of Segregated Facilities (Feb 1999)
52.222-26	Equal Opportunity (Apr 2002)
52.222-29	Notification of Visa Denial (Jun 2003)
52.222-35	Equal Opportunity for Special Disabled Veterans, Veterans of the Vietnam Era, and Other Eligible Veterans (Dec 2001)
52.222-36	Affirmative Action for Workers with Disabilities (Jun 1998)
52.222-37	Employment Reports on Special Disabled Veterans, Veterans of the Vietnam Era, and Other Eligible Veterans (Dec 2001)
52.223-3	Hazardous Material Identification and Material Safety Data (Jan 1997)
52.223-5	Pollution Prevention and Right-to-Know Information (Aug 2003)
52.223-6	Drug-Free Workplace (May 2001)
52.223-11	Ozone-Depleting Substances (May 2001)
52.223-14	Toxic Chemical Release Reporting (Aug 2003)
52.225-13	Restrictions on Certain Foreign Purchases (Mar 2005)
52.226-1	Utilization of Indian Organizations and Indian-Owned Economic Enterprises (Jun 2000)
52.227-1	Authorization and Consent (Jul 1995)
52.227-1 Alt I	Authorization and Consent (Apr 1984)
52.227-2	Notice And Assistance Regarding Patent And Copyright Infringement (Aug 1996)
52.227-3	Patent Indemnity (Apr 1984)
52.227-9	Refund of Royalties (Apr 1984)
52.227-10	Filing of Patent Applications--Classified Subject Matter (Apr 1984)
52.227-12	Patent Rights -- Retention by the Contractor (Long Form) (Jan 1997)
52.228-5	Insurance-Work on a Government Installation (Jan 1997)
52.228-7	Insurance –Liability to Third Persons (Mar 1996)
52.229-3	Federal, State, and Local Taxes (Apr 2003)
52.230-2	Cost Accounting Standards (Apr 1998)
52.230-6	Administration Of Cost Accounting Standards (Apr 2005)
52.232-1	Payments (Apr 1984)
52.232-7	Payments under Time-and-Materials and Labor Hour Contracts (Dec 2002)
52.232-8	Discounts for Prompt Payment (Feb 2002)
52.232-9	Limitation on Withholding Of Payments (Apr 1984)
52.232-11	Extras (Apr 1984)
52.232-16	Progress Payments (Apr 2003)
52.232-17	Interest (Jun 1996)
52.232-20	Limitation of Cost (Apr 1984)
52.232-22	Limitation of Funds (Apr 1984)
52.232-23	Assignment of Claims (Jan 1986)
52.232-25	Prompt Payment (Oct 2003)
52.232-32	Performance-Based Payment (Feb 2002)
52.232-33	Payment by Electronic Funds Transfer--Central Contractor Registration (Oct 2003)
52.233-1	Disputes (Jul 2002)
52.233-1 Alt I	Disputes (Dec 1991)
52.233-3	Protest After Award (Aug 1996)
52.233-3 Alt I	Protest After Award (Jun 1985)
52.237-3	Continuity of Services (Jan 1991)
52.239-1	Privacy or Security Safeguards (Aug 1996)

52.242-1	Notice of Intent to Disallow Costs (Apr 1984)
52.242-3	Penalties for Unallowable Costs (May 2001)
52.242-4	Certification of Final Indirect Costs (Jan 1997)
52.242-10	F.O.B. Origin—Government Bills of Lading or Prepaid Postage (Apr 1984)
52.242-12	Report of Shipment (REPSHIP) (Jun 2003)
52.242-13	Bankruptcy (Jul 1995)
52.243-1	Changes--Fixed-Price (Aug 1987)
52.243-1 Alt II	Changes—Fixed-Price (Apr 1984)
52.243.2	Changes—Cost Reimbursement (Aug 1987)
52.243-2 Alt II	Changes—Cost Reimbursement (Apr 1984)
52.243-2 Alt V	Changes—Cost Reimbursement (Apr 1984)
52.243-3	Changes—Time-and-Materials or Labor Hour (Sep 2000)
52.243-6	Change Order Accounting (Apr 1984)
52.243-7	Notification of Changes (Apr 1984) (15/30)
52.244-2	Subcontracts (Aug 1998) and Alt I (Mar 2005)
52.244-5	Competition in Subcontracting (Dec 1996)
52.244-6	Subcontracts for Commercial Items (Dec 2004)
52.245-2	Government Property (Fixed Price Contracts) (May 2004)
52.245-5 Dev	Government Property (Cost-Reimbursement Time-And-Materials, Or Labor Hour Contracts) (May 2004)
52.245-9	Use and Charges (Apr 1984)
52.245-17 Dev	Special Tooling (May 2004) Deviation (Apr 1984)
52.245-18	Special Test Equipment (Feb 1993)
52.245-19	Government Property Furnished "As Is"(Apr 1984)
52.246-23	Limitation of Liability (Feb 1997)
52.246-24Alt I	Limitation of Liability—High Value Items (Feb 1997) Alt I (Apr 1984) (Exceeding $100,000 per unit)
52.246-25	Limitation Of Liability--Services (Feb 1997)
52.247-1	Commercial Bill of Lading Notations (Apr 1984)
52.247-63	Preference for U.S. Flag Air Carriers (Jun 2003)
52.248-1	Value Engineering (Feb 2000)
52.249-2	Termination for Convenience of the Government (Fixed Price) (May 2004)
52.249-6	Termination (Cost Reimbursement) (May 2004)
52.249-8	Default (Fixed-Price Supply And Service) (Apr 1984)
52.249-14	Excusable Delays (Apr 1984)
52.251-1	Government Supply Sources (Apr 1984)
52.253-1	Computer Generated Forms (Jan 1991)

252.201-7000	Contracting Officer's Representative (Dec 1991)
252.203-7001	Prohibition on Persons Convicted of Fraud or Other Defense-Contract Related Felonies (Dec 2004)
252.203-7002	Display of DoD Hotline Poster (Dec 1991)
252.204-7000	Disclosure of Information (Dec 1991)
252-204-7002	Payment for Subline Items Not Separately Priced (Dec 1991)
252.204-7003	Control of Government Personnel Work Product (Apr 1992)
252.204-7004	Required Central Contractor Registration Alternate A (Nov 2003)
252.204-7005	Oral Attestation of Security Responsibilities (Nov 2001)
252.205-7000	Provision of Information to Cooperative Agreement Holders (Dec 1991)
252.209-7004	Subcontracting with Firms that are Owned or Controlled by the Government of a Terrorist Country (Mar 1998)
252.211-7000	Acquisition Streamlining (Dec 1991)

252.211-7003	Item Identification and Valuation (April 2005)
252.215-7000	Pricing Adjustment (Dec 1991)
252.215-7002	Cost Estimating System Requirements (Oct 1998)
252.219-7003	Small, Small Disadvantaged And Women-Owned Small Business Subcontracting Plan (DoD Contracts) (Apr 1996)
252.223-7001	Hazard Warning Labels (Dec 1991)
252.223-7004	Drug-Free Work Force (Sep 1988)
252.223-7006	Prohibition on Storage and Disposal of Toxic and Hazardous Materials (Apr 1993)
252.225-7001	Buy American Act and Balance Of Payments Program (Apr 2003)
252.225-7002	Qualifying Country Sources as Subcontractors (Apr 2003)
252.225-7004	Reporting of Contract Performance Outside the United States and Canada – Submission after Award (Apr 2005)
252.225-7006	Quarterly Reporting of Actual Contract Performance Outside the United States (Apr 2005)
252.225-7005	Identification of Expenditures in the United States (Apr 2002)
252.225-7012	Preference for Certain Domestic Commodities (Jun 2004)
252.225-7013	Duty-Free Entry (Jan 2005)
252.225-7014	Preference for Domestic Specialty Metals (Apr 2003)
252.225-7015	Restriction on Acquisition of Hand or Measuring Tools (Apr 2003)
252.225-7016	Restriction on Acquisition of Ball or Roller Bearings (May 2004) and Alt I (Apr 2003)
252.225-7031	Secondary Arab Boycott Of Israel (Apr 2003)
252.225-7033	Waiver of United Kingdom Levies (Apr 2003)
252.225-7041	Correspondence in English (Jun 1997)
252.225-7042	Authorization to Perform (Apr 2003)
252.225-7043	Antiterrorism/Force Protection for Defense Contractors Outside The United States (Jun 1998)
252.227-7013	Rights in Technical Data--Noncommercial Items (Nov 1995)
252.227-7014	Rights in Noncommercial Computer Software and Non-Commercial Computer Software Documentation (Jun 1995)
252.227-7015	Technical Data—Commercial Items (Nov 1995)
252.227-7016	Rights in Bid or Proposal Information (Jun 1995)
252.227-7019	Validation of Asserted Restrictions--Computer Software (Jun 1995)
252.227-7025	Limitations on the Use or Disclosure Of Government-Furnished Information Marked with Restrictive Legends (Jun 1995)
252.227-7027	Deferred Ordering of Technical Data or Computer Software (Apr 1988)
252.227-7030	Technical Data--Withholding of Payment (Mar 2000)
252.227-7037	Validation of Restrictive Markings on Technical Data (Sep 1999)
252.231-7000	Supplemental Cost Principles (Dec 1991)
252.232-7003	Electronic Transmission of Payment Requests (Jan 2004)
252.232-7004	DoD Progress Payment Rates (Oct 2001)
252.233-7001	Choice of Law (Overseas) (Jun 1997)
252.235-7010	Acknowledgment of Support and Disclaimer (May 1995)
252.239-7000	Protection Against Compromising Emanations (Jun 2004)
252.242-7000	Postaward Conference (Dec 1991)
252.242-7003	Application for U.S. Government Shipping Documentation/ Instructions (Dec 1991)
252.242-7004	Material Management And Accounting System (Dec 2000)

252.242-7005	Cost/Schedule Status Report (Mar 2005)
252.243-7001	Pricing of Contract Modifications (Dec 1991)
252.243-7002	Requests for Equitable Adjustments (Mar 1998)
252.244-7000	Subcontracts for Commercial Items and Commercial Components (DoD Contracts) (Mar 2000)
252.245-7001	Reports of Government Property (May 1994)
252.246-7000	Material Inspection and Receiving Report (Mar 2003)
252.246-7001	Warranty of Data (Dec 1991) and Alt I (Dec 1991)
252.247-7023	Transportation of Supplies by Sea (May 2002)
252.247-7024	Notification of Transportation of Supplies by Sea (Mar 2000)
252.249-7002	Notification of Anticipated Contract Termination or Reduction (Dec 1996)
252.251-7000	Ordering from Government Supply Sources (Nov 2004)

I.2 CLAUSES INCORPORATED IN FULL TEXT

52.209-4 -- First Article Approval -- Government Testing (Sep 1989) Alt II (Sep 1989)

(a) The Contractor shall deliver one (1) unit(s) of Lot/Item 1000 within see Section F of this contract to the Government at see Section F for first article tests. The shipping documentation shall contain this contract number and the Lot/Item identification. The characteristics that the first article must meet and the testing requirements are specified elsewhere in this contract.

(b) Within 60 calendar days after the Government receives the first article, the Contracting Officer shall notify the Contractor, in writing, of the conditional approval, approval, or disapproval of the first article. The notice of conditional approval or approval shall not relieve the Contractor from complying with all requirements of the specifications and all other terms and conditions of this contract. A notice of conditional approval shall state any further action required of the Contractor. A notice of disapproval shall cite reasons for the disapproval.

(c) If the first article is disapproved, the Contractor, upon Government request, shall submit an additional first article for testing. After each request, the Contractor shall make any necessary changes, modifications, or repairs to the first article or select another first article for testing. All costs related to these tests are to be borne by the Contractor, including any and all costs for additional tests following a disapproval. The Contractor shall furnish any additional first article to the Government under the terms and conditions and within the time specified by the Government. The Government shall act on this first article within the time limit specified in paragraph (b) of this clause. The Government reserves the right to require an equitable adjustment of the contract price for any extension of the delivery schedule or for any additional costs to the Government related to these tests.

(d) If the Contractor fails to deliver any first article on time, or the Contracting Officer disapproves any first article, the Contractor shall be deemed to have failed to make delivery within the meaning of the Default clause of this contract.

(e) Unless otherwise provided in the contract, the Contractor –

(1) May deliver the approved first article as a part of the contract quantity, provided it meets all contract requirements for acceptance and was not consumed or destroyed in testing; and

(2) Shall remove and dispose of any first article from the Government test facility at the Contractor's expense.

(f) If the Government does not act within the time specified in paragraph (b) or (c) of this clause, the Contracting Officer shall, upon timely written request from the Contractor, equitably adjust under the Changes clause of this contract the delivery or performance dates and/or the contract price, and any other contractual term affected by the delay.

(g) The Contractor is responsible for providing operating and maintenance instructions, spare parts support, and repair of the first article during any first article test.

(h) Before first article approval, the Contracting Officer may, by written authorization, authorize the Contractor to acquire specific materials or components or to commence production to the extent essential to meet the delivery schedules. Until first article approval is granted, only costs for the first article and costs incurred under this authorization are allocable to this contract for

(1) progress payments, or
(2) termination settlements if the contract is terminated for the convenience of the Government.
If first article tests reveal deviations from contract requirements, the Contractor shall, at the location designated by the Government, make the required changes or replace all items produced under this contract at no change in the contract price.

(i) The Government may waive the requirement for first article approval test where supplies identical or similar to those called for in the schedule have been previously furnished by the Offeror/Contractor and have been accepted by the Government. The Offeror/Contractor may request a waiver.

FAR 52.215-19 Notification of Ownership Changes (Oct 1997)

(a) The Contractor shall make the following notification in writing:

(1) When the Contractor becomes aware that a change in its ownership has occurred, or is certain to occur, that could result in changes in the valuation of its capitalized assets in the accounting records, the Contractor shall notify the Administrative Contracting Officer (ACO) within 30 days.

(2) The Contractor shall also notify the ACO within 30 days whenever changes to asset valuations or any other cost changes have occurred or are certain to occur as a result of a change in ownership.

(b) The Contractor shall—

(1) Maintain current, accurate, and complete inventory records of assets and their costs;

(2) Provide the ACO or designated representative ready access to the records upon request;

(3) Ensure that all individual and grouped assets, their capitalized values, accumulated depreciation or amortization, and remaining useful lives are identified accurately before and after each of the Contractor's ownership changes; and

(4) Retain and continue to maintain depreciation and amortization schedules based on the asset records maintained before each Contractor ownership change.

(d) The Contractor shall include the substance of this clause in all subcontracts under this contract that meet the applicability requirement of FAR 15.408(k).

FAR 52.217-7 Option for Increased Quantity--Separately Priced Line Item (Mar 1989)

The Government may require the delivery of the numbered line item(s)/subline item(s), identified in the Schedule as an option item(s), in the quantity and at the price(s) stated in the Schedule. If more than one option exists, each option is independent of any other option except as shown below, and the Government has the right to unilaterally exercise any such option (except as shown below), whether or not it has exercised other options. Option(s) shall be exercised, if at all, by written notice signed by the Contracting Officer and sent within the time(s) specified below:

CLIN	Latest Option Exercise Date
0004	To be Determined
0005	Prior to the End of the Contract
0100	12 Months After Contract Award (MACA)
0200	At Contract Award
0300	At Contract Award
1000	48 MACA
1010	48 MACA (Exercise is contingent upon the exercise of CLIN 1000)
1020	48 MACA (Exercise is contingent upon the exercise of CLIN 1000)
1030	54 MACA (Exercise is contingent upon the exercise of CLIN 1000)
1040	54 MACA (Exercise is contingent upon the exercise of CLIN 1000)
1050	To be Determined
2000	60 MACA
2010	60 MACA (Exercise is contingent upon the exercise of CLIN 2000)
2020	60 MACA (Exercise is contingent upon the exercise of CLIN 2000)
2030	To be Determined
2040	72 MACA (Exercise is contingent upon the exercise of CLIN 2000)
2050	84 MACA (Exercise is contingent upon the exercise of CLIN 2040)
2060	96 MACA (Exercise is contingent upon the exercise of CLIN 2050)
3000	33 MACA
3010	33 MACA (Exercise is contingent upon the exercise of CLIN 3000)
4000	60 MACA
4010	60 MACA

52.247-67 Submission of Commercial Transportation Bills to the General Services Administration for Audit (Jun 1997)

(a)

(1) In accordance with paragraph (a)(2) of this clause, the Contractor shall submit to the General Services Administration (GSA) for audit, legible copies of all paid freight bills/invoices, commercial bills of lading (CBL's), passenger coupons, and other supporting documents for transportation services on which the United States will assume freight charges that were paid --

(i) By the Contractor under a cost-reimbursement contract; and

(ii) By a first-tier subcontractor under a cost-reimbursement subcontract thereunder.

(2) Cost-reimbursement Contractors shall only submit for audit those CBL's with freight shipment charges exceeding $50.00. Bills under $50.00 shall be retained on-site by the Contractor and made available for GSA on-site audits. This exception only applies to freight shipment bills and is not intended to apply to bills and invoices for any other transportation services.

(b) The Contractor shall forward copies of paid freight bills/invoices, CBL's, passenger coupons, and supporting documents as soon as possible following the end of the month, in one package to the:

General Services Administration
Attn: FWA
1800 F Street, NW
Washington, DC 20405.

The Contractor shall include the paid freight bills/invoices, CBL's, passenger coupons, and supporting documents for first-tier subcontractors under a cost-reimbursement contract. If the inclusion of the paid freight bills/invoices, CBL's, passenger coupons, and supporting documents for any subcontractor in the shipment is not practicable, the documents may be forwarded to GSA in a separate package.

(c) Any original transportation bills or other documents requested by GSA shall be forwarded promptly by the Contractor to GSA. The Contractor shall ensure that the name of the contracting agency is stamped or written on the face of the bill before sending it to GSA.

(d) A statement prepared in duplicate by the Contractor shall accompany each shipment of transportation documents. GSA will acknowledge receipt of the shipment by signing and returning the copy of the statement. The statement shall show --

(1) The name and address of the Contractor;

(2) The contract number including any alpha-numeric prefix identifying the contracting office;

(3) The name and address of the contracting office;

(4) The total number of bills submitted with the statement; and

(5) A listing of the respective amounts paid or, in lieu of such listing, an adding machine tape of the amounts paid showing the Contractor's voucher or check numbers.

52.252-6 Authorized Deviations in Clauses (Apr 1984)

(a) The use in this solicitation or contract of any Federal Acquisition Regulation (48 CFR Chapter 1) clause with an authorized deviation is indicated by the addition of "(DEVIATION)" after the date of the clause.

(b) The use in this solicitation or contract of any Defense FAR Supplement (48 CFR Chapter 2) clause with an authorized deviation is indicated by the addition of "(DEVIATION)" after the name of the regulation.

252.242-7002 Earned Value Management System (Mar 2005)

(a) In the performance of this contract, the Contractor shall use an earned value management system (EVMS) that has been recognized by the cognizant Administrative Contracting Officer (ACO) as complying with the criteria provided in DoDI 5000.2, Operation of the Defense Acquisition System.

(b) If, at the time of award, the Contractor's EVMS has not been recognized by the cognizant ACO as complying with EVMS criteria (or the Contractor does not have an existing cost/schedule control system that has been accepted by the Department of Defense), the Contractor shall apply the system to the contract and shall be prepared to demonstrate to the ACO that the EVMS complies with the EVMS criteria referenced in paragraph (a) of this clause.

(c) The Government may require integrated baseline reviews. Such reviews shall be scheduled as early as practicable and should be conducted within 180 calendar days after (1) contract award, (2) the exercise of significant contract options, or (3) the incorporation of major modifications. The objective of the integrated baseline review is for the Government and the Contractor to jointly assess areas, such as the Contractor's planning, to ensure complete coverage of the statement of work, logical scheduling of the work activities, adequate resourcing, and identification of inherent risks.

(d) Unless a waiver is granted by the ACO, Contractor-proposed EVMS changes require approval of the ACO prior to implementation. The ACO shall advise the Contractor of the acceptability of such changes within 30 calendar days after receipt of the notice of proposed changes from the Contractor. If the advance approval requirements are waived by the ACO, the Contractor shall disclose EVMS changes to the ACO at least 14 calendar days prior to the effective date of implementation.

(e) The Contractor agrees to provide access to all pertinent records and data requested by the ACO or duly authorized representative. Access is to permit Government surveillance to ensure that the EVMS complies, and continues to comply, with the criteria referenced in paragraph (a) of this clause.

(f) The Contractor shall require the following subcontractors to comply with the requirements of this clause: In accordance with the Contractor's Management Proposal submitted in response to Solicitation M67854-05-R-2000 [redacted]

(Contracting Officer to insert names of subcontractors selected for application of EVMS criteria in accordance with 252.242-7001(c).) See (f) above.

SECTION J – LIST OF ATTACHMENTS AND EXHIBITS

J.1 Attachments

Attachment (1) – Statement of Work for the Ground/Air Task Oriented Radar, Increment I

Attachment (2) – Performance Specification dated 3 May 2006

Attachment (3) – DD Form 254, Department of Defense Contract Security Classification Specification

Attachment (4) – List of Government Furnished Property

Attachment (5) – Technical Manual Contract Requirements

Attachment (6) – Integrated Master Plan dated 13 November 2006 and submitted in response to Solicitation M67854-05-R-2000

Attachment (7) – Statement of Work for the G/ATOR Performance Based Support submitted in response to Solicitation M67854-05-R-2000

Attachment (8) – Identification and Assertion of Use, Release, or Disclosure Restrictions submitted in response to Solicitation M67854-05-R-2000

J.2 Exhibits

Exhibit	Title
A001	Contract Work Breakdown Structure
A002	Status Report
A003	Integrated Master Schedule
A004	Management Plan
A005	Conference Agenda
A006	Conference Minutes
A007	Receipt of Government Material Report
A008	Government Furnished Information Deficiency Report
A009	Cost Performance Report
A00A	Contract Funds Status Report
B001	Systems Engineering Management Plan
B002	Performance Specification Documents
B003	System/Subsystem Specification
B004	System/Subsystem Design Description
B005	Interface Requirements Specification
B006	Interface Design Description
B007	Software Development Plan (SDP)
B008	Computer Software Product End Items (Software Source Code/MDA Models)
B009	Software Requirements Specification
B00A	Software Design Description
B00B	Software Test Plan (STP)
B00C	Software Test Description
B00D	Software Test Report
B00E	Software Product Specification

Exhibit	Title
B00F	Software Version Description
B00G	Reliability Prediction and Documentation of Supporting Data
B00H	Failure Analysis and Corrective Action Report
B00J	Failure Summary and Analysis Report
B00K	Test Procedure
B00L	Test/Inspection Report
B00M	Failure Modes, Effects, and Criticality Analysis Report
B00N	Electromagnetic Interference Test Procedures (EMITP)
B00P	Electromagnetic Interference Test Report
B00Q	Technical Report-Study/Services
B00R	Corrosion Prevention and Control Plan
B00S	Safety Assessment Report
B00T	System Safety Hazard Analysis (SSHA) Report
B00U	Health Hazard Assessment Report
B00V	Hazardous Materials Management Program Plan
B00W	Hazardous Materials Management Program Report
B00X	Contractor's Configuration Management Plan
B00Y	Configuration Audit Summary Report
B00Z	Engineering Release Record (ERR)
B010	Engineering Change Proposal (ECP)
B011	Request for Deviation (RFD)
B012	Notice of Revision (NOR)
B013	Configuration Status Accounting Information
B014	Technical Data Package (Product Drawings/Models and Associated Lists)
B015	Technical Data Package (Commercial Drawings/Models and Associated Lists)
B016	Technical Data Package (Special Inspection Equipment Drawings/Models and Associated Lists)
B017	Technical Data Package (Special Tooling Drawings/Models and Associated Lists)
B018	Technical Data Package (Drawing Number Assignment Report)
B019	Technical Data Package (Proposed Critical Manufacturing Process Description)
B01A	Request for Nomenclature
B01B	Test Plan
B01C	Reliability Test Report
B01D	TEMPEST Control Plan
B01E	Logistics Management Information (LMI) Data Product
C001	Technical Manuals
C002	Training Conduct Support Document
D001	Contractor Validation Plan

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STATEMENT OF WORK
For the
GROUND/AIR TASK ORIENTED RADAR (G/ATOR)

1 SCOPE. This Statement of Work (SOW) defines the effort required of the Contractor for the design, engineering development, fabrication, Developmental Test (DT) of one Engineering Development Model (EDM) of the Ground/Air Task Oriented Radar (G/ATOR) Increment I system; optional development of a Radar Environmental Simulator (RES); optional development of an alternative power source; optional development of an alternative trailer; optional integration of the JROC/JCS approved / validated Integrated Architecture Behavior Model (IABM) (Increment I Enabled / Increment III Threshold); optional purchase of a G/ATOR Technical Data Package (TDP); optional purchase of software source code/Model Driven Architecture (MDA) models; optional production of two G/ATOR Low Rate Initial Production (LRIP) systems; optional initial production of the production-baselined G/ATOR system; optional Interim Contractor Logistics Support (ICLS); and optional Performance Based Logistics (PBL) of the G/ATOR system. This SOW includes the efforts associated with Program Management, System Engineering, Configuration Management, Quality Assurance, Testing, Integrated Logistics Support, Maintenance Planning, Supply Support, Technical Data, Support and Test Equipment, Operations and Maintenance Training and System Testing.

The scope of the work includes support of Government-led Developmental Test (DT), DT/OT and Initial Operational Test and Evaluation (IOT&E). Part I of this SOW addresses the requirements for the Increment I EDM, and the optional LRIP systems, RES, alternative power source, alternative trailer, ICLS, and IABM efforts. Part II addresses the optional requirement for production systems. All optional efforts require written Government approval of the Contracting Officer before work may proceed.

The Contractor is responsible for designing, developing and manufacturing a design that fulfills the requirements of G/ATOR Air and Ground performance requirements using an evolutionary (incremental) approach. The Contractor shall provide all specific material, services and necessary support documentation, shall adhere to established schedules and cost goals, and shall apply sound management practices to complete the tasks identified in this SOW.

1.1 Background.

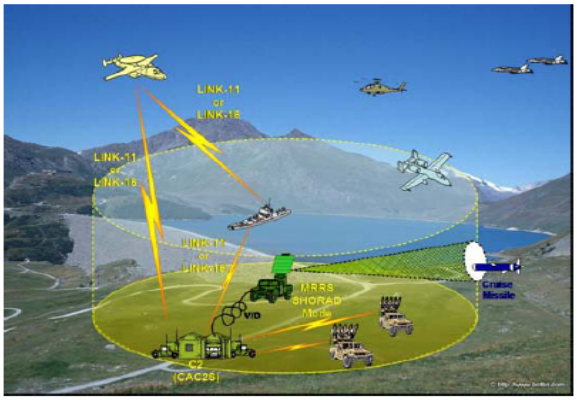
1.1.1 Development.

1.1.1.1 G/ATOR System. The G/ATOR program designs, develops, produces and deploys a short/medium range radar system that will fulfill the requirements specified in the G/ATOR Performance Specification. The system shall be developed and produced as four separate Increments. The first increment, Increment I, shall satisfy the Short Range Air Defense (SHORAD) and Tactical Air Operations Center (TAOC) Air Surveillance missions including Identification Friend or Foe (IFF). The Increment I design will provide for growth to all

following Increments without equipment re-design and will provide a computer software architecture that allows for the computers, computer software and firmware to be upgraded via open architecture with the functionality of all following Increments. Increment II will develop and produce systems based on the Increment I baseline to meet the ground counter battery/ target acquisition requirement. Increment III will address the air mission requirements for Mode 5/S Identification Friend or Foe (IFF), Decoys, Mainbeam Cancellation, Advanced Radar Environmental Simulator (RES) distributed simulation capability, Non-Cooperative Target Recognition (NCTR), Composite Tracking Network (CTN) upgrade, sensor netting, and an Integrated Data Environment (IDE) capability. Increment IV will incorporate an air traffic control (ATC) capability. The System Specifications for the G/ATOR system will be developed during the System Development and Demonstration (SDD) Phase based upon the Government provided Performance Specification (PS). Upon successful DT of the Increment I EDM and IOT&E of the Increment I LRIP systems, the Government may exercise the option for the first year of Full Rate Production (FRP). Figure 1 depicts the operational view of G/ATOR Increments I, II, and IV.

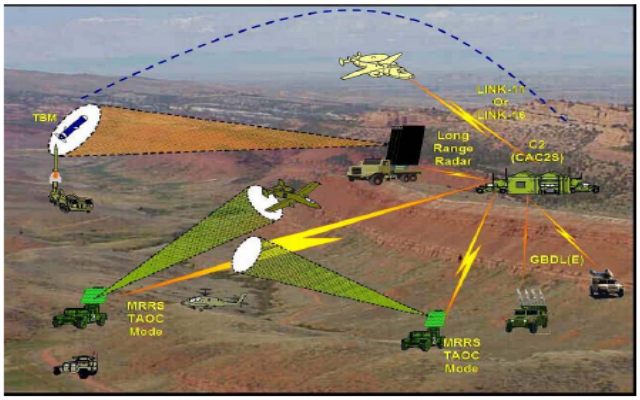
Increment I (SHORAD)

AIR DEFENSE

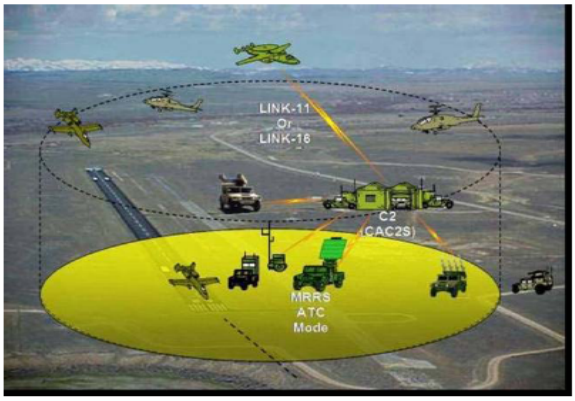


Increment I (TAOC)

AIR SURVEILLANCE

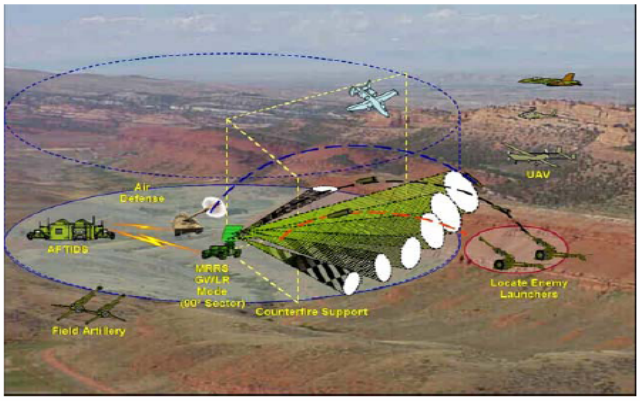


AIR TRAFFIC CONTROL



Increment IV (ATC)

GROUND WEAPONS LOCATING



Increment II (Ground)

Figure 1. G/ATOR Operational Views by Increment

1.1.1.2 G/ATOR Radar Environmental Simulator. A GP RES is currently under development in support of the AN/TPS-59 sustainability program. It is intended for this GP RES to be used to support G/ATOR developmental and operational testing by providing the capability to inject simulated targets, clutter, and interference into the G/ATOR receive path. As a risk mitigation effort, the Government may exercise an option to the basic G/ATOR development contract for the development of a G/ATOR RES, in the event that the AN/TPS-59 RES program appears to be incapable of supporting the G/ATOR development schedule. The G/ATOR RES option, if exercised, will perform as described in the PS. Additionally, the Advanced RES may be negotiated during Increment III.

1.1.1.3 Single Integrated Air Picture (SIAP). The Program Office's objective is to implement the JROC / JCS approved / validated IABM solution in a cost effective manner that does not adversely affect successful system production and fielding. The Contractor can expect IABM integration to affect the following sensor functions, and may constitute a total software replacement for these functions:

- Track processing functionality
- Track correlation functionality
- Combat identification functionality
- CTN interface functionality
- SIAP-specific peer-to-peer network.

G/ATOR Increment I IABM contract efforts shall consist of defining the interface requirements between G/ATOR and C2/IABM. In general, this will consist of radar track measurements. Processor cabinet card slots shall be reserved in Increment I for the option to locate the IABM functionality at the radar. The Contractor shall regularly attend and provide input to IABM working group meetings.

Approved ICWG protocols and procedures shall be integrated into the G/ATOR system. Should the JROC / JCS approved / validated IABM solution become available for incorporation into G/ATOR Increment I; the Government may exercise the IABM option.

1.1.1.4 Alternative Prime Power Source Solution. It is the Government's intention to provide as Government Property (GP) the lightweight Advanced Medium Mobile Power Set (AMMPS) 60 KW Generator as the power source solution. Each contractor may provide an alternative power source solution that best supports their design and meets the mobility and capability requirements per the PS. The Contractor furnished prime power solution must:

- meet or exceed the MEP 806's specifications (power rating, fuel consumption, POL, reliability, noise level, protection, ability to be paralleled, etc.),
- have a reasonable expectation of being operated and maintained by MOS 1141 / MOS 1142, and
- support the G/ATOR's mobility, transportability and deployability requirements.

The Government may exercise an option to use the Contractor's alternative power source solution, if an alternative was part of the Contractor's proposal.

1.1.1.5 Alternative Trailer. The Government intends to furnish the Light Tactical Trailer (LTT-HC) NSN 2330-01-387-5424 or equivalent, as part of the GP for the G/ATOR system. However, the Government may exercise an option to use the Contractor's alternative trailer, if an alternative was part of the Contractor's proposal, to satisfy the G/ATOR mobility requirement.

1.1.1.6 Technical Data Package. Following successful IOT&E and Physical Configuration Audit (PCA), the Government may exercise an option to procure the Technical Data Package for the G/ATOR system.

1.1.1.7 Software Source Code/Model Driven Architecture Models. Following successful IOT&E and PCA, the Government may exercise an option to procure software source code/MDA models.

1.1.2 G/ATOR Increment I Low Rate Initial Production. Following successful G/ATOR Increment I DT and Milestone C (MS C) approval to enter the Production and Deployment Phase, the Government may exercise the option for two LRIP systems, associated spares, and data.

1.1.3 G/ATOR Increment I Production. Following successful G/ATOR Increment I IOT&E, the Government may exercise an option for the first year of Increment I FRP.

1.1.4 Interim Contractor Logistics Support. Not less than 90 days prior to G/ATOR DT, the Government may exercise the option for ICLS of the Increment I G/ATOR system. ICLS will consist of: training support, supply support, field engineer technical support, and maintenance support.

1.1.5 Performance Based Logistics. The Government may exercise an option to implement PBL for G/ATOR prior to Initial Operational Capability (IOC) for up to three years of support, based on the Contractor's proposed PBL strategy and a Business Case Analysis (BCA) to be conducted early in the SDD Phase.

2 Applicable Documents.

2.1 General

The following specified documents form a part of this Statement of Work to the extent specified herein. In the event of conflict between the applicable documents and this SOW, the SOW shall take precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained. Unless otherwise stated, the following documents may be obtained from the Document Automation and Production Service, Building 4/D, 700 Robbins Avenue, Philadelphia, PA 19111-5094 or visit http://dodssp.daps.mil.

2.2 Government Documents.

2.2.1 Specifications, Standards and Handbooks

DEPARTMENT OF DEFENSE STANDARDS - Mandatory .

MIL-STD-130M	2 Dec 2005	Identification Marking of U.S. Military Property
MIL-STD-188-125-2	7 Apr 05	High-Altitude Electromagnetic Pulse (HEMP) Protection for Ground-Based C^4I Facilities Performing Critical, Time Urgent Missions, Part 2 Transportable Systems
MIL-STD-196E	17 Feb 98	Joint Electronics Type Designation System
MIL-STD-461E	20 Aug 99	Requirements for the Control of Electromagnetic

		Interference Characteristics of subsystems and equipment
MIL-STD-464A	19 Dec 02	Electromagnetic Environmental Effects Requirements for Systems
MIL-STD-469B	24 Jun 96	Radar Engineering Interface Requirements, Electromagnetic Compatibility
MIL-STD-810F(3)	5 May 03	Environmental Engineering Considerations and Laboratory Tests
MIL-STD-882D	10 Feb 00	Standard Practice for System Safety
MIL-STD-1472F(1)	5 Dec 03	Human Engineering, Design Criteria Standard
MIL-STD-2073-1D(1)	10 May 02	DoD Standard Practice for Military Packaging
MIL-STD-38784 (2)	1 Dec 00	Standard Practice for Manuals, Technical: General Style and Format Requirements

DEPARTMENT OF DEFENSE MILITARY SPECIFICATIONS - Mandatory

MIL-PRF-29612B	31 Aug 01	Training Data Products
MIL-PRF-49506	11 Nov 96	Logistics Management Information

DEPARTMENT OF DEFENSE MILITARY SPECIFICATIONS - Guidance

MIL-STD-1686C	25 Oct 95	Electrostatic Discharge Control Program for Protection of Electrical and Electronics Parts, Assemblies and Equipment

DEPARTMENT OF DEFENSE MILITARY HANDBOOKS - Guidance

MIL-HDBK-61A	7 Feb 01	Configuration Management Guidance
MIL-HDBK-217F(2)	28 Feb 95	Reliability Prediction of Electronic Equipment
MIL-HDBK-237C	17 Jul 01	Electromagnetic Environmental Effects & Spectrum Certification Guide
MIL-HDBK-338B	1 Oct 98	Electronic Reliability Design Handbook

MIL-HDBK-502	30 May 97	Acquisition Logistics
MIL-HDBK 511	15 May 00	Interoperability of Interactive Electronic Technical Manuals (IETM)
MIL-HDBK-512A	31 Oct 01	Parts Management
MIL-HDBK-781A	1 Apr 96	Reliability Test Methods, Plans, and Environments for Engineering Development, Qualification, and Production
MIL-HDBK-1221(3)	5 Aug 02	Evaluation of Commercial Off The Shelf (COTS) Manuals
MIL-HDBK-29612-2A	31 Aug 01	Instructional Systems Design/Systems Approach to Training and Education (Part 2 of 5 Parts)

Copies of these documents are available online at http://assist.daps.dla.mil/quicksearch/ or from the Standardization Document Order Desk, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

2.2.2 Other Government Documents, drawings and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

Mandatory Compliance

CJCSI 6510.01C	1 May 2001	Information Assurance and Computer Network Defense
DISR Baseline Registry 05-2.0		Department of Defense Information Technology Standards Registry Baseline Release 05-2.0
DoDD 4650.1	8 Jun 04	Policy for Management and Use of the Electromagnetic Spectrum
DoDI 5000.2	12 May 03	Operation of the Defense Acquisition System
DoDD 5000.59	4 Jan 94	DoD Modeling and Simulation (M&S) Management (with Change 1 of 20 Jan 98)
DoDI 5000.61	13 May 03	DoD Modeling and Simulation Validation, Verification and Accreditation

DoDI 5200.1	13 Dec 96	Information Security Program
DoD 5200.1R	14 Jan 97	Information Security Program Regulations
DoDI 5200.40	30 Dec 97	DoD Information Technology Security Certification and Accreditation Process (DITSCAP)
DoDI S5230.28	2 Oct 00	Low Observable (LO) and Counter Low Observable (CLO) Programs (U)
DoDI 6055.11Ch 1	6 May 96	Protection of DoD Personnel from Exposure to Radiofrequency Radiation and Military Exempt Lasers
DoDI 4120.11	13 Apr 04	Standardization of Mobile Electric Power (MEP) Generating Sources
MA ICD	22 Nov 02	GIG Mission Area Initial Capabilities Document
MCO 11310.8C	29 Nov 99	Joint Operating Procedures Management and Standardization of Mobile Electric Power Generating Sources
Website		Militarily Critical Technologies List (MCTL) www.dtic.mil/mctl/
NTIA Manual	Jan 06	National Telecommunications and Information Administration
OSJTF Ver 2.0	Sep 04	A Modular Open Systems Approach (MOSA) to Acquisition – Program Manager's Guide, Sep 2004
NAVSEA OP 3565		Electromagnetic Radiation Hazards, Hazards to Personnel, Fuel and other Flammable Material (HERP/HERF), Vol 1
NAVSEA OP 3565		Electromagnetic Radiation Hazards, Hazards to Ordnance (HERO).
NTIA Report 84-157	Aug 84	Measurement Procedures for the Radar Spectrum Engineering Criteria
RSEC	Sep 03	Manual of Regulations and Procedures for Federal Radio Frequency Management –Section 5.5

MCO 1553.1B	24 May 91	The Marine Corps Training and Education System
G/ATOR SCG	7 Jun 05	Security Classification Guide for the Ground/Air Task Oriented Radar (G/ATOR)
USML		United States Munitions List (USML). 22 C.F.R 121.1, XIII(b)(1).
SCORM		Shareable Content Object Reference Model (SCORM); http://www.adlnet.gov
MCAIMS		Marine Corps Automated Instructional Management System (MCAIMS). http://www.tecom.usmc.mil/gtb/mcaims

Other Government Documents – Guidance Only.

COE I&RTS v4.1	03 Oct 03	Common Operating Environment Integration and Runtime Specification (I&RTS October 2003)
DoDI 5000.61	13 May 03	DoD Modeling and Simulation (M&S) Verification, Validation and Accreditation (VV&A)
MCWP 3-37	21 Sep 98	Marine Corp Weapons Publication (MCWP) 3-37, Nuclear, Biological and Chemical Defense Operations

2.3 Non-Government Documents. The following documents of the exact revision listed below form a part of this document to the extent specified herein.

Mandatory Compliance

CMU/SEI-93-TR-24	1 Feb 93	Capability Maturity Model for Software, Version 1.1
CMU/SEI-93-TR-25	1 Feb 93	Key Practices of the Capability Maturity Model, Version 1.1
ANSI/EIA-748-A-1998 (R 2002)	1 June 98	Earned Value Management System (EVMS) Guidelines

ISO 9001:2000	8 Dec 00	Quality Management Systems-Requirements
IEEE 1012-1998	1 May 98	Software Standard for Verification and Validation
IEEE 1012a-1998	16 Sep 98	Supplement to IEEE Standard for Software Verification and Validation: Content Map to IEEE/EIA 12207.1-1997
IEEE 1220-1998	1 May 98	Standard for Application and Management of the Systems Engineering Process
IEEE 1278.1A	1 May 98	IEEE Standard for Simulation Distributed Interactive – Application Protocols – Enumeration and Bit Coded Values
IEEE 1516	1 May 00	IEEE Standard for Modeling & Simulation (M&S) Coded Values High Level Architecture (HLA) Framework and Rules
IEEE/EIA 12207.0-1996	Mar 98	Software Life Cycle Processes
IEEE/EIA 12207.1-1997	Apr 98	Software Life Cycle Processes-Life Cycle Data
IEEE/EIA 12207.2	27 May 98	Software Life Cycle Processes-Implementation Considerations
MDSE ICD	15 APR 05	Missile Defense System Exerciser (MDSE) Interface Control Document (ICD), Builds 3.3, 3.4, and 4.0
JDEP ICD	1 Jun 01	Joint Distributed Engineering Plant (JDEP) Interface Control Document (ICD), Version 1.0
DIS ICD	1 Jun 01	Distributed Interactive Simulation (DIS) Interface Control Document (ICD), Version 1.0,

(Application for copies of IEEE standards should be addressed to the Institute of Electrical and Electronics Engineers, PO Box 1331, 445 Hoes Lane, Piscataway, NJ 08855-1331 or visit www.ieee.org.)

Guidance Only

CMU/SEI-2002-TR-011	01 Aug 02	CMMI for Systems Engineering/Software Engineering/Integrated Product and Process Development/Supplier Sourcing, Version 1.1 Continuous Representation (CMMI-SE/SW/IPPD/SS, V1.1, Continuous)
CMU/SEIU-2005-TR-011	May 05	CMMI Acquisition Model (CMMI-AM), Version 1.1
EIA-649	01 Feb 99	National Consensus Standard for Configuration Management
EIA-625	10 Nov 94	Requirements for Handling Electrostatic Discharge-Sensitive (ESDS) Device

(Application for copies of EIA documents should be addressed to Electronic Industries Alliance Corporate Engineering Department, 2500 Wilson Boulevard, Arlington, VA, 22201 or visit www.eia.org.)

ANSI Z400.1-1998	01 Jan 98	American National Standard Hazard Chemical MSDS Preparatory Document

(Application for copies of ANSI documents should be addressed to American National Standard Institute Inc., 25 West 43rd Street, New York, NY, 10036 or visit www.ansi.org.)

ASME Y14.100-2000	2001	Engineering Drawing and Related Documentation Practices and Index
ASME Y14.34M	1996	Associated Lists

(Application for copies of ASTM Y14.100-2000 and ASTM Y14.34M should be made to the American Society of Mechanical Engineers at (800) 843-2763 or Infocentral@asme.org.)

NAS 411	11 Mar 94	Hazardous Materials Management Program

(Application for copies of NAS 411 should be addressed to the Aerospace Industries Association of America, 1250 Eye Street, NW, Suite 1200, Washington, DC 20005-3924 or visit www.aia-aerospace.org.)

2.4 Forms.

DD Form 1494	Aug 96	Application for Equipment Frequency Allocation
DD Form 1586	Aug 96	Contract Funds Status Report
DD Form 2734/1-5	Aug 96	Cost Performance Report Format

DD Form 61	Oct 97	Request for Nomenclature

SOW PART I
Development

3 Requirements.

3.1 G/ATOR System. The Contractor shall perform all tasks required and delineated in this SOW to design, develop, integrate, test, produce, manufacture, deliver and prepare associated documentation, provide logistic support, provide technical support, provide field service support, provide training, develop technical manuals and deliver one G/ATOR EDM for DT.

3.1.1 G/ATOR Radar Environmental Simulator (RES). If the G/ATOR Increment I RES option is exercised, the Contractor shall perform all tasks required and delineated in this SOW and the PS to develop, deliver and prepare associated documentation, fabricate, integrate, test, obtain independent verification and validation, provide technical support, deliver technical manuals, provide training, and deliver advanced RES units in the quantities specified in the contract. This effort includes the associated Program Management, Systems Engineering, and Logistics efforts delineated in this SOW for the basic G/ATOR system. During Increment III, options may be negotiated to develop and deliver an advanced RES to embed the RES within the G/ATOR and meet Joint Force Commander simulation requirements contained in the following:

- Missile Defense System Exerciser (MDSE) Interface Control Document (ICD), Builds 3.3, 3.4, and 4.0, 15 Apr 2005
- Joint Distributed Engineering Plant (JDEP) Interface Control Document (ICD), Version 1.0, 1 Jun 01
- Distributed Interactive Simulation (DIS) Interface Control Document (ICD), Version 1.0, 1 Jun 01
- IEEE 1278.1A, Distributed Interactive Simulation Standard dated 1998
- IEEE 1516, HLA Standard dated Sep 00

3.1.2 Integrated Architecture Behavior Model (IABM). The Government may exercise an option for the integration of the IABM functionality into the Increment I G/ATOR. If the option is exercised, the Contractor shall perform all tasks required and delineated in this SOW to develop, deliver and prepare associated documentation, fabricate, test, provide technical support, deliver technical manuals, provide training, and integrate IABM into G/ATOR Increment I units in the quantities specified in the contract. The G/ATOR strategy to conform to IABM requirements shall include adherence to Modular Open Systems Architecture (MOSA) principles and DoD Information Technology Standards Registry (DISR) standards. This effort includes the applicable Program Management, Systems Engineering, and Logistics efforts delineated in this SOW for the basic G/ATOR system. In addition, the Contractor shall be actively involved in IABM development through attendance at IABM working groups. The results of the development working group include, but are not limited to: functionality, feasibility, technical impact, interfaces and risk (performance, cost, and schedule).

3.1.3 Alternative Power Prime Source. The Government may exercise the option for an alternative prime power source. If the option is exercised, the Contractor shall provide all materials, equipment, personnel and facilities to effect the modification and integration of the alternative power prime source. Support and logistics plan for the Offeror-provided power source shall be included in the ICLS and PBL. Additionally, the Offeror shall prepare a waiver for a Non-Standard Generator as required by DoDI 4120.11 and MCO 11310.8C.

3.1.4 Alternative Trailer. The Government may exercise the option for an alternative trailer. If the option is exercised, the Contractor shall provide all materials, equipment, personnel and facilities to manufacture, fabricate, integrate, produce, test, and deliver the types and quantities of deliverables specified by the contract. Support and logistics plan for the Offeror-provided trailer shall be included in the ICLS and PBL.

3.1.5 Technical Data Package. Following successful IOT&E and PCA, the Government may exercise an option to procure the G/ATOR TDP or may procure it under future contracts.

3.1.6 Software Source Code/Model Driven Architecture Models (MDA). Following successful IOT&E and PCA, the Government may exercise an option to procure software source code/MDA models.

3.1.7 Increment I Low Rate Initial Production (LRIP). Based on successful DT and a favorable MS C decision, the Government may exercise an option for procurement of two Increment I LRIP systems. If the option is exercised, the Contractor shall provide all materials, equipment, hard tooling, personnel, and facilities necessary to manufacture, fabricate, integrate, produce, test, and deliver the two LRIP systems.

3.1.8 Increment I Production. After successful G/ATOR Increment I development, the Government may exercise an option for additional production units. If the option is exercised, the Contractor shall provide all materials, equipment, hard tooling, personnel, and facilities necessary to manufacture, fabricate, integrate, produce, test, and deliver the types and quantities of deliverables specified by the contract.

3.1.9 Increment I Interim Contract Logistics Support (ICLS). The Government may exercise an ICLS option not less than 90 days prior to G/ATOR Developmental Testing for the Increment I system. If the option is exercised, the Contractor shall provide all materials, equipment, facilities and personnel to fully support the system in the following areas to a level at or greater than the threshold readiness levels stated in the PS: training support, technical data support, including Technical Manuals, supply support and maintenance support. See Logistics section 3.4 below.

3.1.10 Performance Based Logistics (PBL). The Government may implement PBL for G/ATOR prior to Initial Operational Capability (IOC). The Government may exercise an option to procure PBL or a portion of PBL to support the G/ATOR system for three years. The decision to exercise the PBL option will be based on the Contractor's proposed PBL strategy and a

Business Case Analysis (BCA) to be conducted by the Government early in the SDD Phase. The Contractor shall perform a Supportability Analysis using MIL-HDBK-502 as a guide to ensure that all performance based and supportability requirements identified in the PS are achieved. The analysis shall cover all logistics elements to identify potential alternative method(s) of supporting G/ATOR. The analysis should determine if the alternative method(s) provides best value, as compared to organic support functions. The analysis shall provide a trade study identifying quantitative projections of improvements to system readiness and supportability, recommended performance metrics, associated costs to implement and maintain the alternative methods(s), and projected life cycle cost savings.

NOTE: Alphanumeric characters within parentheses following some of the following SOW paragraphs indicate the Data Item Description Number within the Contract Data Requirements List (CDRL) that identifies the data required by that SOW paragraph. Data Item Descriptions following those paragraphs prescribe the format and content of the data required.

3.2 Program and Data Management.

3.2.1 Program Management. The Contractor shall prepare an updated Contractor Work Breakdown Structure (CWBS) to plan, schedule, budget, and control the resources allocated to meet the requirements of the contract. The CWBS shall serve as the basis for program and technical planning, performance measurement, and status reporting. The Contractor shall develop a Performance Measurement Baseline (PMB) to be discussed with the Government and presented to the Government at the Integrated Baseline Review (IBR). Program management practices shall provide visibility into the Contractors' organization and techniques used in managing the program, specifically sub-Contractor data management. The Contractor shall submit to the Government a monthly Progress, Status and Management Report. All program management documentation shall be readily available to Government representative(s). (A001, A002)

DI-MGMT-81334A, Contract Work Breakdown Structure
DI-MGMT-80368, Status Report (Contractor's Management and Status Report)

3.2.1.1 Assignment of Responsibility and Authority. The Contractor shall identify the organizational elements responsible for the conduct of the activities delineated in this SOW. Responsibilities shall be assigned and clear lines of authority defined for determining and controlling the resources necessary to satisfy each element of this SOW. The Contractor shall appoint in writing all persons filling key personnel billets. The Contractor shall notify the Government within ten days of any changes regarding authority, responsibility, or key personnel changes made by the Contractor during the period of performance. Substitutions for key personnel shall have equal or greater qualifications than the position requires, and must be pre-approved by the Government.

3.2.1.2 Schedule Planning. The Contractor shall maintain and publish at least monthly, an accurate Integrated Master Schedule (IMS) and recommend program schedules, including review and evaluation techniques, which provide for the earliest delivery schedule while at the same time satisfying all contract requirements in a cost-effective manner. The IMS shall include all significant events, critical paths and tasks from start to completion of the contract. The

Contractor shall maintain the current IMS in the Data Management System (DMS). The Contractor shall notify the Government in writing of any anticipated or projected work stoppages or delays that will impact schedules. (A003)

DI-MGMT-81650, Integrated Master Schedule

3.2.1.3 Risk Management. The Contractor shall establish and document a risk management program for monitoring, reporting, and controlling risk(s) that encompasses all work associated with this effort. The Contractor shall use early testing and confidence building activities to reveal and quantify actual risks. Risk(s) shall be addressed at each technical and management review and at each Integrated Product Team (IPT) meeting. (A004)

DI-MGMT-80004, Management Plan (Risk Management Plan)

3.2.1.4 Integrated Product/Process Teams (IPT). The Contractor shall establish IPTs to accomplish System Development and Demonstration (SDD) Phase activities. IPTs shall, as a minimum, be established in the following functional areas: management, systems engineering, software, configuration management, test and evaluation, logistics, safety, training and if applicable, Anti-Tamper. Membership of the IPTs shall include Government, prime Contractor, subContractors, and appropriate supporting Contractors of both the Government and prime Contractor. Each IPT shall establish a charter and schedule. The Contractor shall host, provide an agenda and minutes for each IPT meeting. The Contractor shall provide representation to appropriate G/ATOR program-level Government IPTs. (A005, A006)

DI-ADMN-81249A, Conference Agenda (IPT)
DI-ADMN-81250A, Conference Minutes (IPT)

3.2.1.5 Interface Control Working Groups(ICWG). The Contractor shall attend all the Interface Control Working Groups (ICWGs) necessary to help define the Interface Control Documents (ICDs) as depicted in Table 3-2 of the PS. This includes the Marine Air Command and Control Systems (MACCS) ICWG. The Contractor shall utilize the approved ICDs generated from the ICWGs in development of the G/ATOR system.

3.2.1.6 Government Property (GP).

3.2.1.6.1 Equipment. The Government will notify the Contractor of the availability GP. Proposals shall list required delivery date of GP to meet proposed delivery schedules. The Contractor shall provide for all accountability, security, preventive/corrective maintenance and storage for the GP provided. The Contractor shall inspect and inventory all GP received and identify and report any discrepancies/deficiencies to include associated costs (materials, labor and test (if applicable)) for repair of the GP to like new conditions if necessary. Upon approval by the Government, the Contractor shall conduct any necessary repair actions and such costs shall be chargeable to the Other Direct Costs contract line item number (CLIN). The Government will forward an accountability agreement to the Contractor for signature on an annual basis. The Management Control Activity, Marine Corps Logistics Base (Code 581-1B/MCA), Albany, Georgia, is the control and coordination point for all Marine Corps GP. A list of potential equipment available for issue as GP is provided in Section J, J.1 Attachments, Attachment (4) of the RFP/contract. (A007)

DI-MGMT-80389B, Receipt of Government Materiel Report

3.2.1.6.2 Information. Proposals shall list required delivery date of GP to meet proposed schedules. The Contractor shall notify the Government of any deficiencies in the GP received. A list of pertinent information available for issue as GP is provided in Section J, J.1 Attachments, Attachment (4) of the RFP/contract. (A008)

DI-MGMT-80596, Government Furnished Information Deficiency Report

3.2.2 Meetings, Formal Reviews, Conferences, and Audits. The Contractor shall plan, host, attend, coordinate, support and conduct meetings, formal reviews, conferences, and audits (hereinafter called "reviews") in conjunction with the Government. The reviews will be conducted at Contractor and / or Government facilities. Reviews requiring demonstration and/or examination of equipment will be conducted at mutually agreed upon Government and / or Contractor locations. All such reviews shall be included in the program schedule and may be held concurrently with the Government's approval. The Contractor shall prepare agendas for government approval. The Contractor shall prepare conference presentation materials, and provide minutes and reports following each review. The Government reserves the right to cancel any review or to require any review to be scheduled at critical points during the period of performance. Action item documentation, assignment of responsibility for completion and due dates shall be determined prior to adjournment of all reviews. A summary of all action items, responsible parties, and estimated completion dates shall be included with the minutes. Minutes shall be entered into the Data Management System (DMS) described in paragraph 3.2.3 of this SOW.

3.2.2.1 Integrated Baseline Review. An IBR shall be held at the Contractor's facility within 60 days after contract award. The purpose of this review is for the Contractor to formally present to the Government the Performance Measurement Baseline (PMB), which identifies key milestones and supporting schedules; to show that resources are adequate and available for contractual tasks; to demonstrate that required tasks are adequately planned and can be objectively measured; to detail the Contractor's program implementation processes, including Earned Value Management System (EVMS) per ANSI/EIA 748-A-1998 (R2002); to present the Contractor's program management team; and to evaluate program risk. Joint Contractor and Government pre-review of the PMB shall be conducted to ensure that the PMB can be approved at the IBR with minimal post-IBR outstanding action items. The Contractor shall provide an agenda and written minutes of the Integrated Baseline Review. (A004, A005, A006)

DI-MGMT-80004, Management Plan (Performance Measurement Baseline)
DI-ADMN-81249A, Conference Agenda (Integrated Baseline Review)
DI-ADMN-81250A, Conference Minutes (Integrated Baseline Review)

3.2.2.2 In-Process Review. In Process Reviews (IPR) shall be held at least quarterly at dates and locations mutually agreed upon. The Government reserves the right to cancel any review or to require any review to be scheduled during the period of performance. Areas addressed at an IPR shall include, but are not limited to: Program Status, Contract Cost, Contract Schedule, Integrated Logistics, Technical Performance Measurement, Safety, Outstanding Management Issues, Risk (cost, performance and schedule) identification and resolutions. Actual versus expected performance of each area shall be addressed. The Contractor shall prepare presentation materials providing an overview of all agenda items. The Contractor shall provide an agenda and

written minutes for each IPR. (A005, A006)

DI-ADMN-81249A, Conference Agenda
DI-ADMN-81250A, Conference Minutes

3.2.3 Data Management. The Contractor shall establish and document through a Data Management Plan, a single, centralized Data Management System (DMS) for management of all data to include, but not limited to, all necessary technical data (e.g. requirements, specifications, drawings (conceptual design, developmental design, product), engineering notebooks, parts lists, etc), management plans and updates thereto, and historical archives and updates of minutes of meetings and reviews. Tracking of Action Items resulting from various program reviews, IPRs and IPT meetings shall be accomplished and displayed in the DMS. The Contractor, in developing information that will be furnished to the Government, shall make the maximum use of existing data and provide maximum multiple use of technical information. Specific data management functions shall include schedule control for deliverables, maintenance of deliverables, approval of deliverable format, and distribution of data products. The DMS shall also serve as the Data Accession List. The system shall include facilities for storage of all data developed or utilized for this contract, and shall provide equal access to data by the Government. The DMS shall use Microsoft® Office or compatible products unless otherwise negotiated and agreed to by the Government. The Contractor shall ensure all data is centrally available with unlimited Government access for review via an Integrated Data Environment (IDE). The Government reserves the right to review all data associated with and developed for the G/ATOR. (A004)

DI-MGMT-80004, Management Plan (Data Management Plan)

3.2.4 Contractor Performance Measurement.

3.2.4.1 Cost Control and Accounting. The Contractor shall establish, maintain and use in the execution of the contract, accounting methodology which ensures that all labor and material expenditures are accrued against the proper contract line items; that cost performance is measured (value for completed tasks); planned and actual costs to date (in both monthly and cumulative date formats); and that a reliable cost and schedule status is reported to the Government. The Contractor shall provide the Government access to all pertinent records and data. The Contractor shall use the following guidelines, where appropriate, in the preparation of the financial report: (1) composite (or detailed) labor rates, if used; (2) separation between direct and overhead costs; and (3) recurring costs. The Contractor shall provide cost performance and schedule information during scheduled meetings/reviews. Contractor format is acceptable; however, standard Cost Performance Report (CPR) format is desirable. The level of reporting shall be to the level of indenture approved by the Government at the Integrated Baseline Review (IBR).

3.2.4.2 Earned Value Management System. The Contractor shall provide a copy of Government acceptance of its Earned Value Management System (EVMS) if the system has already been accepted as compliant with the Earned Value Management System Guidelines of ANSI/EIA-748-A-1998 (R2002) Otherwise, the Contractor must anticipate Government acceptance process. The Contractor will implement its previously accepted EVMS upon contract award; or if not previously accepted, upon Government acceptance. The EVMS, tailored to the

requirements of the G/ATOR SDD phase contract, will be prepared by the Contractor for Government concurrence at the IBR.

3.2.4.3 Contract Work Breakdown Structure. The Contractor shall use the CWBS required by paragraph 3.2.1 of this SOW as the framework for planning, budgeting, and reporting program status, cost, and schedule to the Government. SubContractor data shall be incorporated into the Contractor's CWBS. Application of EVMS to SubContractors is at the discretion of the Contractor with the advice of the Administrative Contracting Officer (ACO).

3.2.4.4 Contractor Cost Data Reporting. The Contractor shall provide cost performance and schedule information during scheduled meetings and reviews and shall submit the following reports, as required (including electronic format):

3.2.4.4.1 Contract Performance Report, DD Forms 2734/1 through 2734/5. Although an emphasis exists on the Format V report, copies of the other formats may be requested as required. Current CPR data shall be available for discussion during programmatic reviews. (A009)

DI-MGMT-81466A, Contract Performance Report

3.2.4.4.2 Contract Funds Status Report, DD Form 1586. The Contract Funds Status Report (CFSR) provides DoD Components with information to update and forecast contract funding requirements, to plan and decide on funding changes, to develop funding requirements and budget estimates in support of approved programs, and to determine funds in excess of contract needs and available for deobligation. (A00A)

DI-MGMT-81468, Contract Funds Status Report

3.3 Systems Engineering. The Contractor shall establish and maintain an effective systems engineering program IAW Institute of Electrical and Electronics Engineers (IEEE) 1220-1998. The systems engineering program shall provide an interdisciplinary approach governing the total effort to transform the G/ATOR requirements into a system solution, including Technical Performance Measures (TPM), integration of design engineering, engineering specialties, manufacturing, test and logistics support to satisfy operational performance, safety, cost and schedule objectives. The requirements of the PS shall be incorporated into the Contractor prepared, Government approved, G/ATOR System Specifications (see paragraph 3.3.5 of this SOW).

3.3.1 Engineering Management. The Contractor shall manage the systems engineering program, IAW IEEE 1220-1998. Systems engineering management shall include, but not be limited to:

1. Engineering organization description within the program IPT structure identifying roles and responsibilities and key personnel.
2. Technical plans for manufacturing, logistics, computer resources, security, safety, reliability and maintainability, and training;
3. Technical plans for requirements management and tracking, requirements baseline control, interface management, configuration management, validation and verification, and risk management.
4. Flow down of engineering plans and processes to subcontractors.
5. Integrated Master Schedule and program plan.
6. Technical Performance Measures (TPMs) & other technical parameter budgets;
7. Incorporation of Incremental upgrades;
8. Entrance and exit criteria for technical reviews and other program events;
9. Engineering metrics

Systems engineering management shall be documented in a Systems Engineering Management Plan (SEMP) IAW IEEE 1220-1998. The SEMP shall be submitted to the Government for approval and updated as required. Progress in achieving technical goals stated in the SEMP shall be reported at IPRs and technical reviews. (B001)

DI-MGMT-81024, Systems Engineering Management Plan

3.3.2 Requirements Engineering. The Contractor shall develop G/ATOR Specifications as they relate to the G/ATOR system functional baseline, the system allocated baseline, and the system production baseline as developed from the PS. The Contractor shall provide technical support to the Government in the development of the Capability Production Document (CPD) to include interface requirements for the SIAP and the Marine Air Command and Control System (MACCS) Family of Systems (FoS). The Contractor shall identify all interfaces and develop design products that are matched to requirements for messages, power and signals, and physical interfaces to include cables and connectors.

3.3.2.1 Requirements Traceability. The Contractor shall provide an electronic means for tracing requirements from the Performance Specification to System/Subsystem Specifications to System/Subsystem Design Descriptions. This requirements trace shall be in the Dynamic Object Oriented Requirements System (DOORS) format and made available to the Government.

3.3.3 Modeling and Simulation. The Contractor shall develop a G/ATOR Engineering performance Modeling and Simulation (M&S) capability. The M&S capability shall incrementally mature consistent with the G/ATOR design maturity. M&S shall be used to support design trade off analysis and to predict G/ATOR performance prior to major test events, and to support the MACCS FoS M&S.

3.3.3.1 Modeling and Simulation Plan. An M&S plan, IAW DoDD 5000.59 section 1.2, which provides for Verification, Validation, and Accreditation (VV&A) of the model using guidelines in DoDI 5000.61, shall be developed and delivered to the Government for approval. The M&S plan shall disclose all M&S to be utilized (e.g., MATLAB models, Excel Spreadsheet tools, RCS Models, etc.), M&S description, its specific intended use (e.g. System Requirements Review (SRR), Preliminary Design Review (PDR), Critical Design Review (CDR), Development

Test/Operational Test (DT/OT), M&S requirements, analysis plans and reports. Additionally, any G/ATOR Key Performance Parameters (KPPs) or other PS requirements that are being addressed shall be delineated in the M&S Plan. The M&S plan shall include schedules for release of M&S Analysis Reports, VV&A plans, names of key technical personnel, and the detailed M&S Verification and Validation (V&V) Accreditation Process. The M&S Plan shall include the M&S Level of Reliance. The Level of Reliance is derived from IEEE 1012-1998 and IEEE 1012a-1998, tailored and mirrors the software integrity levels schema. The technical review panel (TRP) shall recommend to the Accreditation Authority (AA) a decision to accredit M&S that have an M&S level of reliance of at least 3. (A004)

DI-MGMT-80004, Management Plan (Modeling and Simulation)

3.3.4 Open Systems Design/Modular Open Systems Architecture (MOSA). The Contractor shall produce an open architecture/open systems design/MOSA approach that accommodates G/ATOR requirements unique to Increments II, III, and IV. See OSJTF – A Modular Open Systems Approach (MOSA) to Acquisition Ver 2.0. For those portions of hardware, firmware, or software that are driven to closed and / or proprietary system architectures by mission specific requirements, an orderly, planned hardware/firmware/software migration strategy to an open, non-proprietary solution shall be provided.

3.3.5 Specifications.

3.3.5.1 Performance Specification. The Contractor shall provide a G/ATOR Performance Specification derived through the systems engineering process utilizing the Government-provided technical specifications and performance requirements. The Government must approve the Performance Specification before it can be used for further system design and development. (B002)

DI-SDMP-81465A, Performance Specification Documents

3.3.5.2 Detail Specifications.

3.3.5.2.1 System/Subsystem Specifications. The Contractor shall provide System/Subsystem Specifications (SSS) that meet all the requirements of the Performance Specification. The SSS shall specify the performance requirements for a system or subsystem and the verification methods to be used to ensure that each requirement has been met. The SSS shall be used as the basis for design and qualification testing of a system or subsystem. (B003)

DI-IPSC-81431A, System/Subsystem Specification (SSS)

3.3.5.2.2 System/Subsystem Design Descriptions. The Contractor shall provide System/Subsystem Design Descriptions (SSDD). The SSDD shall describe the system- or subsystem-wide design and the architectural design of a system or design of a system or subsystem. (B004)

DI-IPSC-81432A, System/Subsystem Design Description (SSDD)

3.3.5.2.3 Interface Requirements Specifications. The Contractor shall provide Interface Requirements Specifications (IRS) for all the internal and external requirements imposed on the system, subsystems, Hardware Configuration Items (HWCIs), and Computer Software

Configuration Items (CSCIs). All IRSs shall be non-proprietary. (B005)
DI-IPSC-81434A, Interface Requirements Specification (IRS)

3.3.5.2.4 Interface Design Descriptions. The Contractor shall provide Interface Design Descriptions (IDD) for all the internal and external interfaces of the system, subsystems, HWCIs, and CSCIs. All IDDs shall be non-proprietary. (B006)
DI-IPSC-81436A, Interface Design Description (IDD)

3.3.6 Technical Reviews. The Contractor shall schedule and co-chair with the Government the system technical reviews described in paragraphs 3.3.6.2 through 3.3.6.9. Technical reviews are to be event-driven, with focus on confirmation of completed effort. Subsystem hardware technical reviews shall be scheduled as determined by the Contractor or as requested by the Government. HWCIs and firmware-intensive HWCIs that impact software design and development shall be first considered at software reviews. For each technical review, the Contractor shall provide an agenda, facilities, and minutes. The Functional Configuration Audit/System Verification Review (FCA/SVR) and the Physical Configuration Audit (PCA) are discussed under paragraph 3.3.19.2 of this SOW.

3.3.6.1 Government Review Team. The Government will assemble a review team for each Technical Review. The Contractor shall provide the Government Review Team a documentation package consistent with the Contractor–proposed, Government-approved entry requirements no less than 45 days in advance of the Technical Review. Typical documentation includes but is not limited to system performance and item specifications. The Contractor shall meet with the Government Review Team in advance of the Technical Review to identify and resolve issues. The Contractor shall track Government Review Team issues and their resolution shall be established.

3.3.6.2 System Requirements Review. The System Requirements Review (SRR) shall be conducted to confirm that the user's requirements as identified in the Government-provided PS have been translated into the Contractor Performance Specification and preliminary System Specification, that critical technologies are identified and required technology demonstrations are planned, and that risks are well understood and mitigation plans are in place. Documentation and studies to be reviewed at the SRR include the PS, Functional Analysis, results of technology assessments and trade studies to justify system design approach, preliminary Human-Systems Integration (HSI) approach, preliminary System Maintenance Concept, significant system design criteria (reliability, maintainability, logistics requirements, etc.), system engineering planning, Government-developed Test and Evaluation Master Plan (TEMP), draft top-level Technical Performance Measurement, and system design documentation (layout drawings, conceptual design drawings, selected supplier components data, etc.). The SRR confirms that system-level requirements are clearly understood to permit the Contractor to begin development of the system-level Functional Baseline. (A005, A006)
DI-ADMN-81249A, Conference Agenda
DI-ADMN-81250A, Conference Minutes

3.3.6.3 System Functional Review. The System Functional Review (SFR) shall be conducted to approve the System Functional Baseline and its associated SSS and to review the

draft System Allocated Baseline, allowing work to proceed on definition of the design of items below the system level. The SFR should include an assessment of the adequacy of items including:

- Verification that the System Performance Specification reflects requirements that will meet user expectations
- Review of applicable trade studies
- Functional analysis and allocation of requirements to items below system level
- Draft Item Performance, draft System Specification and selected Item Detail Specifications
- Design data defining the overall system
- Verification that risks associated with the system design are at acceptable levels for engineering development
- Verification that design selections have been optimized through trade study analyses
- Supporting analyses (e.g., logistics) and plans are identified and complete where appropriate
- Technical Performance Measurement data and analysis
- Plans for evolutionary design and development are in place and that the system design is modular and open.

(A005, A006)

DI-ADMN-81249A, Conference Agenda
DI-ADMN-81250A, Conference Minutes

3.3.6.4 Software Specification Review (SSR). The objective of the review is to demonstrate convergence on computer software subsystem requirements as an integrated part of the system and subsystem requirements, and readiness to initiate preliminary design for the computer software subsystem. The Software Requirements Specification shall be reviewed at the SSR. An SSR shall be held separately for every CSCI. Multiple SSRs (3 or more) may be scheduled so that they occur sequentially within the same time period for convenience of scheduling, but they must be distinct and stand alone. For efficiency, topics that are common across CSCIs may be presented once, during the SSR for the first CSCI being reviewed. The SSR shall include an assessment of the adequacy of items including:

- System architecture
- CSCI requirements (including capabilities, functional description, interfaces between CSCI and other CIs within the system, interfaces between CSCI and external entities, algorithms to be defined and implemented, a description of where industry and Government standards are to be applied such as COE, ISP architecture, data and processing accuracy, execution time, size, capacity)
- Trade Studies
- Safety critical requirements
- Quality requirements (including reliability, availability, maintainability)
- Human Machine Interface (HMI) requirements
- Software metrics
- Test plans

- Risk
  (A005, A006)
  DI-ADMN-81249A, Conference Agenda
  DI-ADMN-81250A, Conference Minutes

3.3.6.5 Preliminary Design Review. The Software Preliminary Design Review (Software PDR) and the System Preliminary Design Review (System PDR) shall be conducted concurrently and in the same venue.

3.3.6.5.1 Software Preliminary Design Review. The Software PDR shall include review of the draft SubSystem Specifications and draft Interface Design Description / Interface Requirements Specification. Results of the Software PDR shall be briefed at the System PDR. (A005, A006)
3.3.6.5.2 DI-ADMN-81249A, Conference Agenda
DI-ADMN-81250A, Conference Minutes

3.3.6.5.2 System Preliminary Design Review. The System PDR shall be used to resolve any issues in the SSS, and to review the draft System/Subsystem Design Documents, and draft Interface Design Descriptions / Interface Requirements Specifications. The System PDR shall include each equipment, hardware, and software configuration item and related peculiar support equipment. The Contractor shall show through analysis and/or demonstration that evaluations of materials, lead times, tooling, fabrication techniques, assembly methods, test equipment, skills, processes, and inspection techniques have been accomplished for all equipment, hardware, and software configuration item and related support equipment, and the producibility objectives have been achieved. Trade studies for design decisions shall be presented. The reviews shall evaluate the progress, technical adequacy, and risk resolution (on a technical, cost, and schedule basis) of the design and shall assess the technical risk associated with the selected manufacturing (assembly) methods (processes). The System PDR also shall identify all single source, sole source, and diminishing source(s) of supply. (A005, A006)
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DI-ADMN-81250A, Conference Minutes

3.3.6.6 Critical Design Review. The Software Critical Design Review (Software CDR) and the System Critical Design Review (System CDR) shall be conducted concurrently and in the same venue.

3.3.6.6.1 Software Critical Design Review. The Software CDR shall include review of the final Software Design Description and final Interface Design Description / Interface Requirements Specification. Results of the Software CDR will be briefed at the CDR. (A005, A006)
3.3.6.6.2 DI-ADMN-81249A, Conference Agenda
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3.3.6.6.2 System Critical Design Review. The System CDR shall present a final design that incorporates the corrections for all deficiencies identified from the PDR. Documentation to be reviewed includes the Product Baseline, the System Product Specification, final Interface Design Descriptions / Interface Requirements Specifications, final Detail, Material, and Process Specifications. The System CDR shall be a detailed review of the hardware, software and

firmware design for the G/ATOR and all data items required by the contract, and shall result in the final System / Subsystem Design Description (SSDD). Trade studies for specific design decisions shall be presented. The Contractor shall provide traceability capable of demonstrating the design furnished at System CDR, which implements the performance requirements of the G/ATOR, and present the methods used to verify and validate the design. The Contractor shall deliver an assessment of the results of producibility analyses conducted on system hardware ensuring detailed producibility design solutions satisfy the established requirements. Topics covered at the System CDR shall include, but not be limited to, the following:

- Detailed evaluation of Program Plan indicating Design, Fabrication, Test Phases and Specification/Interface specification/drawings
- Detailed evaluation of Electrical/Mechanical/Software Design
- EMI/Thermal/Cooling Design
- Detailed Reliability/Maintainability Analysis
- HSI Analysis and Issues
- Environment, Safety and Health (ESH) Analysis
- NBC Survivability
- Packaging/Handling/Storage/Transportability
- Testing documents
- Interoperability
- TPMs and technical budgets established in the SEMP

(A005, A006)

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3.3.6.7 Design Readiness Review (DRR). The DRR is a mid-SDD Phase review in which the Milestone Decision Authority (MDA) assesses the program's progress and technical maturity, and determines whether the system is ready to enter the Demonstration (testing) Sub-Phase of SDD. In preparation for the DRR, the Contractor shall conduct a pre-DRR. (A005, A006)

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3.3.6.8 Test Readiness Review. The Contractor shall conduct a Test Readiness Review (TRR) for Government approval approximately 30 days prior to the start of DT. The purpose of the TRR is for the Contractor to conduct a formal review of the system's readiness for testing. Results of the TRR shall be documented and be made available to the Government no later than 15 days prior to the start of Government-led DT. Emphasis shall be placed on system requirements, using test results and their analysis. Remaining problem areas and their projected resolution dates shall be addressed. Completion of the TRR allows initiation of formal Configuration Item and Software Configuration Item testing. (A005, A006)

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3.3.6.9 Production Readiness Review (PRR). PRRs are performed to formally evaluate the Contractor's production readiness, identify existing or projected manufacturing problems, and

areas of risk. The Contractor shall demonstrate progress in the following areas: (1) attaining the program production goals, (2) resolving manufacturing problems (or that a plan for their resolution acceptable to the Government has been developed), and (3) mitigating all production risks. The Contractor shall show that the system design has included those key production factors (e.g., least cost, minimum time, manufacturing simplicity/flexibility, resource availability, etc.) necessary to assure the system can be acquired on schedule at minimum cost. The agenda of the PRR shall include, as applicable, at least the following considerations:

- A Manufacturing Program Review to include the overall manufacturing system and detailed factors such as: manufacturing organization, responsibilities, facilities and equipment, manufacturing methods, and production flow.
- A status review of all production efforts for cost and schedule considerations.
- A status review of manufacturing technology and other previously recommended actions to reduce cost, manufacturing risk, and industrial base concerns.
- The identity of open production concerns which require additional direction/effort to minimize risk to the production program.
- A status review of production engineering efforts, tooling and test equipment demonstrations, and proofing of new materials, processes, methods, special tooling, test equipment.
- A status of the hazard list from Environmental, Safety and Health (ESH) analysis.
- The status of long lead items for production, if any.

An initial successful Production Readiness Review (PRR) shall take place prior to MS C at the Contractor's facility, at a date proposed by the Contractor in the IMS and approved by the Government. Prior to the FRP Decision for each increment, a successful PRR shall take place. The date of the FRP PRR will be proposed by the Contractor in the IMS and approved by the Government. (A005, A006)

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3.3.7 Software. The software requirements stated in the SOW apply to all phases and components of the G/ATOR development where software is developed, reused, or modified.

3.3.7.1 Software Development. The Contractor shall, IAW IEEE 12207.0-1996 and 12207.1-1997, design, develop, test, validate and deliver the software required to meet the G/ATOR performance requirements. The Contractor shall maintain software development processes certified to the Software Engineering Institute's (SEI's) Software Capability Maturity Model (SW-CMM) Level 3 or higher that encompasses the development of all G/ATOR system software. SW-CMM is defined in CMU/SEI-93-TR-24 and -25. Higher certification is defined as SW-CMM Level 4 or greater, CMMI-SW certification Level 3 or greater, or additional CMMI certifications (i.e. CMMI-SE/SW, CMMI-SE/SWW/IPPD, and CMMI-SE/SW/IPPD/SS) at Level 3 or greater. CMMI categories and ratings are defined in CMU/SEI-2002-TR-011, CMU/SEIU-2005/TR-011. SEI is retiring the SW-CMM model at the end of fiscal year 2007 in favor of a more integrated paradigm (i.e. CMMI). The Contractor should work toward achieving a minimum CMMI-SW Level 3 certification. The Contractor is responsible for ensuring that the SW-CMM Level 3 or higher certified processes are implemented consistently among all

organizations developing software for the G/ATOR system. The Contractor shall develop a Software Development Plan (SDP) IAW IEEE/EIA 12207.1-1997 paragraph 5.3.1.4 and EIA/IEEE 12207.2 Annex K. The SDP shall be subject to review and approval by the Government and shall adhere to the Contractor's SW-CMM Level 3 or higher certified processes. The Contractor shall manage the software development IAW the SDP. Software metrics shall be established by the SDP and reported monthly and at software reviews IAW the IMS using the EVMS indicators of the SDP. The Contractor shall use existing Commercial-Off-The-Shelf (COTS), Government-Off-The-Shelf (GOTS), and Non-Developmental Item (NDI) software to the maximum extent possible in the development and production of the G/ATOR. (B007)

DI-IPSC-81427A, Software Development Plan (SDP)

3.3.7.2 New Software. Any newly developed software, including modification of pre-existing software programs, should be developed by the Contractor IAW the COE Integration and Run-Time Specification (I&RTS) and/or current requirements.

3.3.7.3 Software Allocation. The Contractor shall functionally allocate all software as CSCIs. Each CSCI may be further subdivided into lower level CSCIs. The Contractor shall implement an electronic system for centrally collecting and managing all design, development and test information for each CSCI. The Contractor shall make available all artifacts, (e.g., trade studies, software development folders, engineering notebooks, etc.) for Government inspection and evaluation, as required.

3.3.7.4 Software Reviews. The Contractor shall conduct, for all application and support CSCIs, a Software Specification Review. Review of software design and readiness will be formally addressed at the Software PDR, the Software CDR, the Test Readiness Review, and the FCA. The results of the Software PDR and CDR shall be presented at the System PDR and the System CDR. Software Specification Reviews will report on metrics established by the SDP.

3.3.7.5 Software Testing Program. The Contractor shall establish, implement, and conduct a Software Testing Program, including Computer Software Component (CSC) integration testing and Component Software Unit (CSU) testing IAW software testing practices outlined in IEEE/EIA 12207.2.

3.3.7.6 Software Source Code/Model Driven Architecture Models. If the Government exercises the Software Source Code/MDA Models option, the Contractor shall provide all applicable software source code and MDA Models developed in support of the G/ATOR. The software source code shall include all source files (in ASCII format), executables, libraries, environment specifications (to include tool name and versions), scripts, directory structure and compile instructions. The MDA models shall include the platform independent model (PIM), all platform specific models (PSM) and interface definition sets in Unified Modeling Language (UML). (B008)

DI-MCCR-80700, Computer Software Product End Items (Software Source Code/MDA Models)

3.3.7.7 Software Requirements Specification. The Contractor shall provide a Software

Requirements Specification (SRS) for Government approval. The SRS shall specify the requirements for the CSCI(s) and the verification methods to be used to ensure that each requirement has been met. (B009)

DI-IPSC-81433A, Software Requirements Specification (SRS)

3.3.7.8 Software Design Description. The Contractor shall provide a Software Design Description (SDD) for Government approval. The SDD shall describe the design of a CSCI, CSCI-wide design decisions, the CSCI architectural design, and the detailed design needed to implement the software. (B00A)

DI-IPSC-81435A, Software Design Description (SDD)

3.3.7.9 Software Test Plan. The Contractor shall provide a Software Test Plan (STP). The STP shall describe the plans for qualification testing of CSCIs and software systems. It shall describe the software test environment to be used for the testing, the tests to be performed, and provide the schedules for test activities. (B00B)

DI-IPSC-81438A, Software Test Plan (STP)

3.3.7.10 Software Test Description. The Contractor shall provide a Software Test Description (STD). The STD describes the test preparations, test cases, and test procedures to be used to perform qualification testing of a CSCI or software system or subsystem. (B00C)

DI-IPSC-81439A, Software Test Description (STD)

3.3.7.11 Software Test Report. The Contractor shall provide a Software Test Report (STR). The STR is a record of the qualification testing performed on a CSCI, a software system or subsystem, or other software-related item. (B00D)

DI-IPSC-81440A, Software Test Report (STR)

3.3.7.12 Software Product Specification. The Contractor shall provide a Software Product Specification (SPS) to the Government for approval. The SPS shall contain or reference the executable software, source code/files, and software support information, including “as built” design information and compilation, build, and modification procedures, for a CSCI. (B00E)

DI-IPSC-81441A, Software Product Specification (SPS)

3.3.7.13 Software Delivery. The Contractor shall prepare a Software Version Description (SVD) IAW IEEE/EIA 12207.2 detailing the configuration for each build of software. The SVD shall identify and describe a software version consisting of one or more CSCIs and shall be used to release, track, and control software versions. The SVD shall be published, distributed, and updated for each software release. This document shall be appended with specific operating procedure changes for system access, operation, maintenance and security safeguards created by the software release. The Contractor shall provide an SVD for each software build to the Government via the DMS. (B00F)

DI-IPSC-81442A, Software Version Description (SVD)

3.3.8 Reliability and Maintainability Program. The Contractor shall maintain a comprehensive Reliability and Maintainability (R&M) program to ensure the G/ATOR meets the

R&M standards set forth in the Performance Specification (Para 3.3 and all respective paragraph indentures). The design shall be monitored throughout the entire period of performance to identify and assess any changes, which would impact reliability or maintainability. The Contractor shall develop reliability analysis and predictions as required to ensure compliance with the performance specification. The program shall encompass all aspects of reliability with respect to design selection of components, predictions, and testing. If it is determined that an item is an expendable, an analysis shall be performed at the next higher indenture level. The Contractor shall maintain and make available to the Government all R&M data on any vendor or subContractor supplied item and shall inform the Government of any part or component, which will degrade system R&M requirements. The R&M program shall minimally include the following tasks:

3.3.8.1 Procedures and Controls. The Contractor shall maintain procedures and controls, which ensure products, obtained from suppliers, vendors and subContractors meet reliability requirements, to include but not limited to:

- Establish, implement, and maintain documented procedures, which detect and/or preclude the use of substandard or counterfeit parts in the production process, and impose similar requirements on subContractors.
- Provide the Government with reasonable notice of any special R&M program review meetings scheduled with subContractors so Government representatives may attend at their discretion.

3.3.8.2 Reliability Predictions. The Contractor shall provide detailed design reliability predictions based on a defined configuration and associated models. MIL-HDBK-217F(2) and MIL-HDBK-338B may be used for guidance. The predictions shall be allocated down to the lowest indenture level and updated each time significant design or mission profile changes significantly impact the G/ATOR or any of its subsystems. The reliability modeling method shall mathematically relate the reliability block diagrams of the G/ATOR to time-event relationships. These tasks shall be performed down to the Lowest Replaceable Unit (LRU) level. (B00G)

DI-RELI-81497, Reliability Prediction and Documentation of Supporting Data

3.3.8.2.1 Reliability Centered Maintenance. The Contractor shall conduct a Reliability Centered Maintenance analysis within the Integrated Product Team environment, with high mechanical usage items emphasized.

3.3.8.3 Failure Reporting, Analysis, and Corrective Action System. The Contractor shall develop a closed-loop failure reporting system, procedures for analysis of failures to determine cause, and documentation for recording corrective actions (CA) taken. The Failure Reporting, Analysis, and Corrective Action System (FRACAS) shall include uniform failure reporting, failure analysis reports and corrective actions. All hardware/software failures from system level down to the component level shall be subject to these requirements throughout the testing period. The Contractor shall notify the Government within 24 hours of any critical failure (i.e., one that prevents the system from performing its mission). Non-critical failures shall be reported within 10 working days of the occurrence. (B00H, B00J)

DI-RELI-81315, Failure Analysis and Corrective Action Report

DI-RELI-80255, Failure Summary and Analysis Report

3.3.8.4 Maintainability. The Contractor shall ensure the G/ATOR is designed to provide the end-user and technicians assurance of system operation and ease in fault detection and isolation in a timely and cost-effective manner, and ease of repair.

3.3.8.5 Maintainability Demonstration. The Contractor shall provide a maintainability demonstration test procedure to validate compliance with the maintainability requirements, as defined in the Performance Specification. The Contractor test results shall be documented in a test report. (B00K, B00L)

DI-NDTI-80603, Test Procedure (MD)
DI-NDTI-80809B, Test/Inspection Report (MD)

3.3.8.6 Failure Modes, Effects, and Criticality Analysis. The Contractor shall perform a Failure Modes, Effects, and Criticality Analysis (FMECA) on the G/ATOR system for Government review. (B00M)

DI-ILSS-81495, Failure Modes, Effects, and Criticality Analysis Report

3.3.8.7 Performance Monitoring/Conditional Based Maintenance/Fault Location. Performance Monitoring/Condition Based Maintenance/Fault Location shall adhere to the standards stated in the Performance Specification.

3.3.9 Human Systems Integration. The Contractor shall apply effective Human Systems Integration (HSI) principles during G/ATOR design, production and integration. The Contractor shall ensure manpower, personnel, training, personnel survivability and habitability, and human factors engineering requirements have been incorporated into the layout, design, and arrangement of equipment having an operator or maintainer interface. The Contractor shall also integrate HSI principles into its systems safety program. The HSI program shall ensure that the G/ATOR system can be set up, operated, maintained, supported, tore down, and controlled in its intended operational environment, including cold weather attire and Nuclear, Biological, and Chemical Mission Oriented Protective Posture IV (MOPP IV) gear per MCWP 3-37. A qualitative assessment of the human-machine interface (HMI), based on the judgment of the operators, maintainers, and human-factor experts, shall be conducted in accordance with DoD's DISR. G/ATOR shall include approved MCHS workstations compatible with current and future C2 systems.

3.3.9.1 Personnel Survivability and Habitability. The Contractor shall ensure personnel survivability issues have been incorporated into the design and integration of the G/ATOR, including:

- protection against fratricide
- detection of NBC agents
- instantaneous, cumulative, and residual nuclear, biological, and chemical effects
- integrity of the crew compartment
- provisions for rapid egress when the system is severely damaged or destroyed

The Contractor shall also ensure habitability requirements that are necessary for meeting and

sustaining system performance are incorporated into the G/ATOR. Appropriate Fire extinguishers (Class A, B, C, or D) and United States Coast Guard approved heavy duty mounting brackets shall be contractor furnished and rated for marine and vehicle installations for both operation and transport.

3.3.9.2 Human Factors Engineering. Human factors design requirements shall be established to develop effective man-machine interfaces and preclude system characteristics that require extensive cognitive, physical, or sensory skills, or complex manpower or training intensive tasks or result in frequent or critical errors. Component load sizes shall be designed for lifting and carrying IAW MIL-STD 1472F(1).

3.3.10 Electromagnetic Interference. The Contractor shall perform Electromagnetic Interference (EMI) testing IAW MIL-STD-464A.

3.3.10.1 Electromagnetic Interference Test Procedure.
Prior to commencement EMI testing and IAW the Government-approved Contractor's Test Plan, the Contractor shall develop EMI test procedures that are IAW MIL-STD-461E. (B00N)
DI-EMCS-80201B, Electromagnetic Interference Test Procedures (EMITP)

3.3.10.2 Electromagnetic Interference Test Report. The Contractor shall prepare an Electromagnetic Interference (EMI) test report documenting the results of G/ATOR EMI tests. The Contractor shall also discuss in the test report the resolution(s)/EMI fix(es) with schedule for resolving all outstanding test issues. (B00P)
DI-EMCS-80200B, Electromagnetic Interference Test Report (EMITR)

3.3.11 Grounding, Bonding and Shielding. The Contractor shall ensure that the G/ATOR and subsystems are properly grounded, bonded and shielded to prevent ground loops and common ground returns for power/control circuits to minimize electromagnetic interference. The Contractor shall ensure that all externally exposed metal parts, shields, control panels, switch handles, connectors, bushings, etc. are grounded to the system chassis.

3.3.12 Electrostatic Discharge Control. The Contractor shall establish, implement and document an Electrostatic Discharge (ESD) Control program following the guidelines provided in EIA-625. The ESD protective measure shall be used in manufacturing, packaging, storing, and transportation of ESD sensitive components. The Contractor shall ensure that ESD identification markings on all ESD sensitive subassemblies are visible during equipment installation, maintenance or repair. MIL-STD-1686C, paragraph 5.7, may be used for guidance.

3.3.13 Electromagnetic Radiation Hazards. The G/ATOR design shall protect personnel, fuels, and ordnance from hazardous effects of electromagnetic radiation IAW NAVSEA OP 3565 Vol 1 and 2. Safe-distances for Hazards to Electromagnetic Radiation to Fuel / Personnel / Ordinance (HERF/HERP/HERO) shall be determined and contained in the training, literature, operation guides (MIL-HDBK-237C) and maintenance manuals.

As part of the Test Plan, the Contractor shall perform the following surveys and assessments:

- Hazards of Electromagnetic Radiation to Personnel (HERP) Study IAW DoDI 6055.11

criteria.

- Hazards of Electromagnetic Radiation to Fuels (HERF) Study IAW MIL-STD-464A.
- Hazards of Electromagnetic Radiation to Ordnance (HERO) Study. Ordnance shall not experience inadvertent ignition or degraded ordnance performance after exposure to radiated electromagnetic energy from the G/ATOR system. MIL-STD-464A applies.
- The following CDRLs apply to HERP, HERF, and HERO studies listed above. (B00K, B00L)
  DI-NDTI-80603, Test Procedure
  DI-NDTI-80809B, Test/Inspection Report (Technical Report-Study)

3.3.14 Nuclear, Biological, and Chemical Contamination Survivability. The Contractor shall demonstrate that the G/ATOR meets the Nuclear, Biological, and Chemical (NBC) contamination survivability requirements cited in the System Specification. The Contractor shall report results as part of developmental testing. (B00Q)
DI-MISC-80508A, Technical Report-Study/Services

3.3.15 Quality Management System. The Contractor shall have in place a quality program that complies with the requirements of ISO 9001:2000. The Contractor's quality management system shall ensure product conformation to contractual requirements. The Contractor shall make available all quality management documentation for the Government to review upon request.

3.3.16 Corrosion Prevention and Control. The Contractor shall develop and submit to the Government, a corrosion prevention and control plan that describes the Contractor's specific measures to be implemented. If the Contractor makes use of composite materials or dissimilar metals in his design, the impact of corrosion on these materials shall be stated and monitored. (B00R)
DI-MFFP-81403, Corrosion Prevention and Control Plan

3.3.17 System Security. The use and distribution of classified material is anticipated and shall be protected. All classified information (documents, electronic transmissions, hardware, etc.) pertaining to the G/ATOR system and sub-systems shall be provided appropriate levels of protection as required by DOD and Marine Corps regulations and instructions. The handling, storage, and destruction of all classified information shall be done IAW DODI Directive 5200.1 and DOD 5200.1-R, DOD Information Security Program Regulation. Further analysis should be conducted to determine the need for any special security considerations in order to ensure that OPSEC is preserved. To reduce the possibility of compromise of classified information, vendors shall adhere to the G/ATOR Security Classification Guide. The Contractor shall implement a comprehensive security program encompassing personnel, facilities, system integrity, and data information assurance. Risk analysis, operating approvals, and other requirements shall be employed to ensure compliance in-garrison and facilitate future determination at any deployed location. COMSEC requirements beyond the bounds of current cryptographic inventories must developed with NSA concurrence and cryptographic validation. All COMSEC requirements will be coordinated through the Cryptologic Systems Group (CPSG).

3.3.17.1 Information Assurance. The Contractor shall provide expert technical and security services to accomplish the certification and accreditation of the G/ATOR. The Contractor shall provide personnel knowledgeable and expert in the security process including, experience in evaluating information system security architectures and the certification and accreditation (C&A) process. The Contractor shall support certification and accreditation of G/ATOR. This task will consist of process support, analysis support, coordination support, security certification test support, and security documentation support. NSA shall evaluate security software processes prior to its implementation and any proposed cryptographic system, equipment, assembly, module, integrated circuit, component or software "with the capability of maintaining secrecy or confidentiality of information" covered under Category XIII(b)(1) of the United States Munitions List (USML). 22 C.F.R 121.1, XIII(b)(1).

3.3.17.1.1 Process Support. The Contractor shall implement Defense Information Technology Security Certification and Accreditation Process (DITSCAP) IAW DoDI 5200.40 and CJCSI 6510.01C, Information Assurance and Computer Network Defense, 1 May 2001. The Contractor shall recommend process tailoring as provided for in the DITSCAP, participate in process activities, and document the results of those activities. G/ATOR infrastructure and communications architecture shall plan for Computer Network Attack (CNA) and have Computer Network Defense (CND) that complies with all IT standards in the DISR Baseline Release 05-2.0. Personnel operating the G/ATOR systems will be trained to operate in this environment.

3.3.17.1.2 Analysis Support**.** The Contractor shall perform analyses to validate established security requirements and to recommend additional security requirements. The Contractor shall analyze, through system level testing, the adequacy of the required protective features, assess residual risk, and assist in determining the readiness of the system for accreditation. For detected vulnerabilities that could preclude accreditation, the Contractor shall recommend human procedures, software configuration parameters, system changes, or combinations thereof to mitigate the risk associated with the vulnerability.

3.3.17.1.3 Coordination Support. As directed by the Government, the Contractor shall coordinate with or participate in meetings with any Sensitive Compartmented Information (SCI) and collateral classified security Certification Authorities (CA) to keep them informed on system security matters, address specific security issues, and obtain guidance. The CA for SCI ISs is Special Security Office (SSO) Navy/ONI-524; for cryptographic systems, the CA is the Commander, Naval Security Group; for collateral classified and unclassified ISs, the CA is MARCORSYSCOM. The Contractor shall coordinate or participate in meetings with other organizations as directed by the Government.

3.3.17.1.4 Security Certification Test Support. In addition to the testing performed for Analysis Support, the Contractor shall support the formal Government Security Test and Evaluation (ST&E) of the G/ATOR system. This support shall include pre-test preparations, participation in the tests, analysis of the results, and assisting the Certifying Authority (CA) Test Director with preparation of required reports.

3.3.17.1.5 Security Documentation Support. The Contractor shall document the results of DITSCAP process activities and Contractor technical or coordination activity. The Contractor shall prepare an updated System Security Authorization Agreement (SSAA) (with all required appendices), including the Trusted Facility Manual (TFM), and the Security Features User's Guide (SFUG). The test procedures section of the SSAA and the TFM and SFUG must address all operating systems (e.g., Windows NT/95/98/2000, UNIX). The results of activity not pertinent to the SSAA, TFM, or SFUG shall be documented in a Technical Report. Furthermore, the Contractor shall prepare a Task SCI Access List when SCI is required in the performance of this SOW. (B00Q)

DI-MISC-80508A, Technical Report- Study/Services (System Security Authorization Agreement with required appendices)

3.3.17.2 Anti-Tamper. The Contractor shall establish and execute an Anti-Tamper program (if required) for protection of G/ATOR Critical Technology in the case of unplanned loss occurring during, but not limited to, transportation, training, testing, and maintenance/supply operations, in addition to wartime losses. Critical Technologies and thresholds above which they must be protected are defined in the Militarily Critical Technologies List and DoDI S5230.28.

3.3.18 Environmental, Safety and Health. G/ATOR shall be designed with the safety of its operating/maintenance personnel in mind. Where risks or hazards exist, safety equipment and/or safety procedures shall be identified and provided with the system. Trained personnel shall be able to operate and maintain the G/ATOR under normal operational conditions without being exposed to unsafe conditions. Safe-distances for Hazards to Electromagnetic Radiation to Fuel / Personnel / Ordinance (HERF/HERP/HERO) shall be determined and contained in the training, literature, operation guides (MIL-HDBK-237C) and maintenance manuals. G/ATOR support for CLAWS/SLAMRAAM performance and safety requirements after being subjected to G/ATOR Radio Frequency (RF) emissions shall be documented in training, literature, operation guides (MIL-HDBK-237C) and maintenance manuals. G/ATOR shall be designed for:

- HERF IAW NAVSEA OP 3565, VOL 1 Electromagnetic Radiation Hazards, Hazards to Personnel, Fuel and other Flammable Material (HERP/HERF).
- HERP IAW NAVSEA OP 3565, VOL 1 Electromagnetic Radiation Hazards, Hazards to Personnel, Fuel and other Flammable Material (HERP/HERF)
- HERO IAW NAVSEA OP 3565, VOL 2 Electromagnetic Radiation Hazards, Hazards to Ordnance (HERO).

3.3.18.1 System Safety Program Plan. The Contractor shall provide updates to the system safety program plan. The plan identifies and evaluates safety and health hazards, defines risk levels, and manages the probability and severity of all hazards associated with development, use, and disposal of the system IAW MIL-STD-882D. Residual risks will be evaluated by the Government IAW Tables A-I through A-IV of MIL-STD-882D and accepted as appropriate. The Contractor must identify all explosive safety risks as such in the system safety program plan.

3.3.18.2 Safety Assessment. The Contractor shall perform and document a Safety Assessment

to identify all safety features of the hardware, software, and system design and to identify procedural, hardware and software related hazards that may be present in the G/ATOR including specific procedural controls and precautions that should be followed. In addition, the Contractor shall make recommendations applicable to hazards at the interface of G/ATOR with the other system(s) identified in the Performance Specification. The Contractor shall provide a Safety Assessment Report (SAR) that documents the Safety Assessment and clearly identifies any residual risks of the G/ATOR. The SAR shall include a signed statement that all identified hazards have been eliminated or their associated risks controlled to acceptable levels and that the G/ATOR is ready to test, field or operate. (B00S)

DI-SAFT-80102B, Safety Assessment Report (SAR)

3.3.18.3 System Hazard Analysis. The Contractor shall perform and document a System Hazard Analysis (SHA) to identify hazards and assess the risk of the total system design, including software, batteries and specifically of the subsystem interfaces. The SHA shall verify system compliance with safety requirements contained in system specifications; identify previously unidentified hazards associated with the subsystem interfaces and system functional faults; and recommend actions necessary to eliminate identified hazards and/or control their associated risk to acceptable levels. The SHA shall include any selected hazards, hazardous areas, or other specific items to be examined or excluded. The Contractor shall provide a System Safety Hazard Analysis (SSHA) report to the Government and identify any residual hazards that require Government acceptance. (B00T)

DI-SAFT-80101B, System Safety Hazard Analysis (SSHA) Report

3.3.18.4 Operating and Support Hazard Analysis. The Contractor shall perform and document an Operating and Support Hazard Analysis (O&SHA) to evaluate activities for hazards or risks introduced into the system by operational and support procedures and to evaluate adequacy of operational and support procedures used to eliminate, control or abate identified hazards or risks. The O&SHA shall document system safety assessment of procedures involved in system production, deployment, installation, assembly, test, operation, maintenance, servicing, transportation, storage, modification, demilitarization, and disposal. The O&SHA shall include the minimum hazard probability and severity reporting thresholds and the specific procedures to be evaluated. The Contractor shall provide an Operating and Support Hazard Analysis (O&SHA) report to the Government. (B00Q)

DI-MISC-80508A, Technical Report, Study/Services (OSHA)

3.3.18.5 Health Hazard Assessment. The Contractor shall perform and document a Health Hazard Assessment (HHA) to identify health hazards, evaluate proposed hazardous materials, and propose protective measures to reduce the associated risk to a level acceptable by the Government. The HHA shall include the minimum hazard probability and severity reporting thresholds and any selected hazards, hazardous areas, hazardous materials, or other specific items to be examined or excluded. The Contractor shall provide a Health Hazard Assessment (HHA) report to the Government. (B00U)

DI-SAFT-80106B, Health Hazard Assessment Report (HHAR)

3.3.18.6 Preliminary Hazard Analysis. The Contractor shall perform and document a Preliminary Hazard Analysis (PHA) to identify safety critical areas, to provide an initial

assessment of hazards, and to identify requisite hazard controls and follow-on actions. Based upon the best available data, including mishap data (if accessible) from similar systems and other lessons learned, hazards associated with the proposed design or function shall be evaluated for hazard severity, hazard probability, and operational constraint. Safety provisions and alternatives needed to eliminate hazards or reduce their associated risk to a level acceptable by the Government shall be included. At a minimum, the PHA shall consider hazardous components (e.g., fuels, propellants, lasers, explosives, toxic substances, hazardous construction materials, pressure systems, and other energy sources) for identification and evaluation and include any selected hazards, hazardous areas, or other specific items to be examined or excluded. The Contractor shall submit a Preliminary Hazard Analysis Report to document safety critical areas, to provide an initial assessment of hazards, and to identify requisite hazard controls and follow-on actions. (B00Q)

DI-MISC-80508A, Technical Report, Study/Services (PHAR)

3.3.18.7 Subsystem Hazard Analysis. The Contractor shall perform and document a Subsystem Hazard Analysis to identify all components and equipment that could result in a hazard or whose design does not satisfy contractual safety requirements. The Subsystem Hazard Analysis shall verify subsystem compliance with safety requirements contained in subsystem specifications and other applicable documents; identify previously unidentified hazards associated with the design of subsystems including component failure modes, critical human error inputs, and hazards resulting from functional relationships between components and equipment comprising each subsystem; and recommend actions necessary to eliminate identified hazards or control their associated risk to acceptable levels. This shall include Government Property (GP), nondevelopmental items, and software. Areas to consider are performance, performance degradation, functional failures, timing errors, design errors or defects, or inadvertent functioning. The human shall be considered a component within a subsystem, receiving both inputs and initiating outputs, during the conduct of this analysis. The Subsystem Hazard Analysis shall include the specific subsystems to be analyzed and any selected hazard, hazardous areas, or other specific items to be examined or excluded. The Government will provide the technical data on GP to enable the Contractor to accomplish the defined tasks. The Contractor shall submit a Subsystem Hazard Analysis Report to document the results of the subsystem hazard analysis, and document actions necessary to identify hazards or control their associated risks to acceptable levels. (B00Q)

DI-MISC-80508A, Technical Report, Study/Services (SUBHAR)

3.3.18.8 System Safety Working Group. A System Safety Working Group (SSWG) is a component of the System Engineering IPT. The SSWG shall meet at least once every three months, as part of the regularly scheduled System Engineering IPT, to review safety issues. As a minimum, the agenda shall provide for status reporting, analysis of problem areas, evaluation of schedules and proposed changes to the program. Open agenda items shall be assigned to a Contractor or Government team member for action. Each assigned agenda item shall have a completion date and the action officer (i.e. team member) shall provide the status of action at subsequent meetings. (A006)

DI-ADMN-81250A, Conference Minutes

3.3.18.9 Hazardous Materials Management Program. The Contractor shall implement a

Hazardous Materials Management Program (HMMP) IAW or similar to NAS 411. The Contractor shall avoid the use of toxic chemicals, hazardous materials and ozone depleting substances in the design, operational support and disposal of the G/ATOR. Manufacturing processes that will have a detrimental impact upon the environment shall be avoided. More information on chemicals and hazardous materials to be avoided can be obtained from the Environmental Protection Agency (EPA). The Contractor shall make available Material Safety Data Sheets (MSDS) required by OSHA Hazard Communication Standard Code of Federal Regulation 29 CFR 1910.1200 and prepared according to ANSI Z400.1-1998 to the Government for review.

3.3.18.9.1 Hazardous Materials Management Program Plan. The Contractor shall provide a Hazardous Materials Management Program (HMMP) Plan to the Government for review and approval. (B00V)

DI-MGMT-81398, Hazardous Materials Management Program (HMMP) Plan

3.3.18.9.2 Hazardous Materials Management Program Report. The Contractor shall provide a Hazardous Materials Management Program (HMMP) Report to the Government for review and approval. (B00W)

DI-MISC-81397, Hazardous Materials Management Program (HMMP) Report

3.3.18.10 Pollution Prevention Program. The Contractor shall implement a pollution prevention program that shall identify and quantify impacts as early as possible during system development, and identify and implement actions needed to prevent or abate the impacts. The Contractor shall make available information regarding the pollution prevention program and implementation progress to the Government

3.3.18.11 Environmental Safety and Occupational Health. The Contractor shall provide the Government with an assessment of applicable Environmental Safety and Occupational Health (ESOH) laws and regulations, identifying any potential compliance issues. (B00Q)

DI-MISC-80508A, Technical Report, Study/Services (ESOH)

3.3.19 Configuration Management Process. The Contractor shall maintain a configuration management (CM) process for the control of all hardware and software configuration documentation, media and parts representing or comprising the G/ATOR. The principles contained in EIA-649 and MIL-HDBK-61A may be used for guidance. The Contractor's CM process shall be documented in a CM Plan and shall consist of configuration identification, configuration control, configuration status accounting, and configuration audits. Consideration for interfacing with other acquisition requirements such as design review, assurance, and other program related disciplines shall be addressed. The Contractor shall designate a CM representative to serve as a primary point of contact to the Government for all CM matters. The Contractor's representative shall be responsible for any subContractor’s CM efforts. The Contractor shall notify the Government of any changes at the Contractor's facility, which affect the Contractor's established CM process. (B00X)

DI-CMAN-80858B, Contractor’s Configuration Management Plan

3.3.19.1 Configuration Identification. The Contractor shall participate in a joint

Government/Contractor CM IPT to designate configuration items (CIs) to be managed by the Government and those to be managed by the Contractor at a lower level/tier. For those CIs that have been identified for Government control, the Contractor shall provide form, fit, function, and internal and external interface documentation necessary for configuration status accounting. The Contractor shall establish management practices for those lower level/tier CIs.

3.3.19.2 Configuration Management Meetings/Audits.

3.3.19.2.1 Functional Configuration Audit/System Verification Review. The Functional Configuration Audit/System Verification Review (FCA/SVR) shall be performed to verify that the G/ATOR and its CIs are accurate, complete, and compatible. Additionally, the FCA will verify that the CIs have achieved the performance and functional characteristics delineated in the System Specification. The Government and the Contractor shall conduct the FCA jointly, at a time and place mutually agreed to, with the Government chairing the audit, using the guidelines contained in MIL-HDBK-61A, section 8. As part of the Configuration Management Plan required by paragraph 3.3.19, the Contractor shall provide an approach and proposed schedule for conducting the FCA, and will also identify the CIs/CSCIs to be audited. The Contractor shall be responsible for providing the system to be audited, facilities, personnel, documentation (including drawings), and other support as may be required. The Contractor shall develop a Configuration Audit Summary Report after each audit. The Contractor shall correct all audit discrepancies as documented in the configuration audit summary reports. The functional baseline will be validated upon completion of the FCA and resolution of audit discrepancies. (B00Y)

DI-CMAN-81022C, Configuration Audit Summary Report (Functional/SVR)

3.3.19.2.2 Physical Configuration Audit. The PCA shall be performed to verify that G/ATOR and its configuration items (CIs) are accurate, complete, compatible, and that the CIs have achieved the performance and functional characteristics defined in the functional configuration baseline. The Government and the Contractor shall conduct the PCA jointly, at a time and place mutually agreed to, with the Government chairing the audit. The Contractor shall be responsible for providing the system to be audited, facilities, personnel, documentation (including drawings), and other support as may be required. The PCA shall verify the drawings reflect the "as-built" configuration of all newly developed or modified portions of the system; accurate form, fit, function information is provided on control drawings for nondevelopmental/ commercial off-the-shelf items; and confirm the drawings accurately represent the "as-built" production configuration. Whenever possible, the PCA shall be conducted incrementally, concurrent with hardware fabrication and assembly. As part of the Configuration Management Plan required by paragraph 3.3.19, the Contractor shall provide an approach and proposed schedule for conducting the PCA and identification of the CIs/CSCIs to be audited. The Contractor shall participate and assist the Government in the conduct of the PCA, using the guidelines contained in MIL-HDBK-61A, section 8. The Contractor shall document the results of the PCA after each audit and shall correct all audit discrepancies documented in the configuration audit summary reports. In the event the Government finds evidence the drawings and/or documents do not adequately represent the equipment, production shall cease until all discrepancies are corrected and the Government approves the configuration audit summary report. The product baseline will be established upon completion of the PCA and resolution of audit discrepancies. (B00Y)

DI-CMAN-81022C, Configuration Audit Summary Report (Physical)

3.3.19.3 Parts Management Program. Within 90 days after contract award, the Contractor shall provide evidence that they have established and can maintain a parts management program. This program shall ensure the use of parts that meet contractual requirements, reduce proliferation of parts through standardization and enhance equipment reliability and supportability, and proactively manage obsolescence. The Government may perform audits, verifications, inspections or evaluations to ascertain program conformance and adequacy of the implementing procedures. The procedures, planning and all other documentation media and data that define the Parts Control Program and the parts selected for use shall be made available to the Government for its review and use. The Contractor may utilize MIL-HDBK-512A as a guide for developing and maintaining the parts management program.

3.3.19.4 Baseline Management. The Contractor shall be responsible for keeping the established baseline current. Additionally, the Contractor shall maintain the accuracy of the established baseline to ensure form, fit, function and interface of the G/ATOR. The Contractor shall establish definitive processes, which identify how the baseline will be managed/maintained. These processes shall be defined in the Contractor's configuration management plan and made available for Government review.

3.3.19.4.1 Functional Baseline. The Contractor shall utilize performance specification criteria when developing the functional baseline. The Contractor's Functional Baseline shall describe the G/ATOR functional interoperability and interface characteristics and the verification required to demonstrate the achievement of those specified characteristics. The Functional Baseline shall be reviewed and approved by the Government at the SFR.

3.3.19.4.2 Allocated Baseline. The allocated baseline shall describe the CIs/CSCIs to a level of design detail that is greater than that for a functional baseline. The allocated baseline shall be supplemented by specifications, drawings, and related data as necessary to specify: (1) the essential CI functional characteristics, as allocated from higher-level CI; (2) external and internal interface requirements for each CI; (3) physical characteristics necessary to ensure compatibility with associated systems and CI's; and (4) constraints on the design of a CI, including GP employed, envelope dimensions, component standardization and ILS requirements. The allocated baseline will be established upon successful completion of the System PDR with all associated documentation. Government approval shall be required prior to making changes to the allocated baseline.

3.3.19.4.3 Product Baseline. The Contractor shall establish the product baseline by the successful completion and Government acceptance of the Software CDR and the System CDR. The Contractor shall make changes to the product baseline only through the Request for Deviations (RFD) and Change Notices. PCA validates the Product Baseline. The Contractor shall make changes to the Product Baseline after PCA only through the Engineering Change Proposal (ECP) process.

3.3.19.5 Configuration Control. The Contractor shall implement configuration control methods and procedures, which maintain the integrity and traceability of an established baseline.

Changes to established baselines shall only be made after Government approval of Request for Deviations, Change Notices and ECPs. Sufficient supporting data to evaluate the proposed change, such as drawings, supplemental drawings, sketches, specifications, or manufacturer's data sheets, shall be submitted with ECPs and RFDs. Changes shall be identified to the affected assembly serial number, or if not part of an assembly, to the affected equipment serial number. The Contractor shall provide technical support to the Government's Configuration Control Board. The Contractor's configuration control process shall be included in the Data Management System and be available for Government review.

3.3.19.5.1 Engineering Release System. The Contractor shall maintain an engineering release system and shall use the system to issue newly approved configuration documentation to functional activities (e.g. manufacturing, logistics, quality control, and engineering) and to authorize the use of configuration documentation associated with an approved configuration. The Contractor shall maintain current and historical engineering release information for all configuration documentation for the G/ATOR. The Contractor shall submit an Engineering Release Record (ERR) upon approval of each ECP. The Contractor shall ensure all Government approved ERR information/documentation is reflected in the Configuration Status Accounting (CSA) database as part of the Contractor's DMS. (B00Z)

DI-CMAN-80463C, Engineering Release Record (ERR)

3.3.19.5.2 Engineering Change Proposals. Engineering Change Proposals shall be submitted by the Contractor, and shall be limited to those that are necessary or offer significant benefit to the Government. MIL-HDBK-61A, Table 6-2 provides guidance concerning the classification of ECPs. Class I ECPs shall be approved by the Program Office to: (a) Correct deficiencies; (b) Add or modify interface or interoperability requirements; (c) Make a significant and measurable effectiveness change in the operational capabilities or logistics supportability of the system; (d) Effect substantial life cycle costs/savings; and (e) Prevent slippage in an approved production schedule. Class II ECPs shall be submitted by the Contractor to the Administrative Contracting Officer (ACO) for approval for those engineering changes, which impact none of the factors listed above. As a minimum, Class I ECPs shall contain the following information: (a) Date prepared; (b) Originator; (c) ECP Classification; (d) ECP Number; (e) Reason/need for change; (f) System designation (nomenclature, model, P/N); (g) Name of part (or lowest assembly) affected to include part numbers; (h) Baselines affected (to include drawings, specifications, CAGE, revision level, etc.); (i) Title of change; (j) Description of change; (k) Effect on interfaces (Interchangeability and Interoperability); (l) Total costs/savings w/ breakout; (m) Retrofit information; (n) Ozone Depleting Substances; (o) Impact on any engineering disciplines (such as quality, environmental, safety, health, reliability, maintainability, etc.); (p) Justification for change; (q) Priority of change; (r) Impacts to any logistics support elements (such as software, manuals, spares, tools, etc.) being utilized by Government personnel in support of the product; and (s) Alternatives evaluated or considered. (B010)

DI-CMAN-80639C, Engineering Change Proposal (ECP)

3.3.19.5.3 Requests for Deviation. The Contractor shall process Requests for Deviation (RFD) from current approved configuration documentation. Authorized deviations are a temporary departure from the requirements and do not constitute a change in an approved baseline. Submission of recurring deviations is discouraged and shall be minimized. Where it is

determined that a change should be permanent, the Contractor shall process an Engineering Change Proposal. MIL-HDBK-61A, paragraph 6.3.1a provides guidance concerning the classification of RFDs. (B011)

DI-CMAN-80640C, Request for Deviation (RFD)

3.3.19.5.4 Notices of Revision. The Contractor shall generate and submit Notices of Revision (NOR) concurrently with Engineering Change Proposals (ECPs) when technical documentation controlled by another Contractor or Government agency requires changes following approval of an ECP. (B012)

DI-CMAN-80642C, Notice of Revision (NOR)

3.3.19.5.5 Notification of Changes to Commercial Equipment/Software. The prime Contractor shall submit notification to the Government when changes occur to commercial equipment or software, which is being procured by the Contractor. (B00Q)

DI-MISC-80508A, Technical Report - Study/Services (CN)

3.3.19.6 Configuration Status Accounting. The Contractor shall establish and maintain a Configuration Status Accounting (CSA) program, which represents the configuration of the G/ATOR. The CSA shall provide baseline documentation, delineate the status of changes to the baseline, delineate status of changes to the internal and external interfaces, including those described in paragraph 3.3.19.1, record implementation of approved changes, and provide an audit trail for engineering changes, drawings and associated lists, software, and other related technical documentation. The CSA system shall provide status accounting reports on all products in the baseline. All approved changes, which have been installed in the G/ATOR, shall be recorded. (B013)

DI-CMAN-81253A, Configuration Status Accounting Information

3.3.19.6.1 Serialized Tracking/Unique Identification. Unique Identification (UID) marking in accordance with MIL-STD-130M is required and development of specific item marking requirements shall be based upon the criteria of MIL-STD-130M.

3.3.19.7 Engineering Drawings.

3.3.19.7.1 Vendor Item Control Drawing. The Contractor shall prepare a vendor item control drawing for commercial item(s) approved for use in the design and not covered by Government or nationally recognized industry association specifications and standards. The Contractor shall provide evidence that the part complies with the requirements of the applicable part documentation. Existing test data (such as supplier originated objective evidence of compliance or Government/Industry Data Exchange Program (GIDEP) reports) shall be used to the maximum extent practicable.

3.3.19.7.2 Conceptual Design Drawings. The Contractor shall create conceptual design drawings and associated lists. Revised and/or updated existing drawings and new drawings shall be included in the conceptual design drawing package. Conceptual design drawings shall be used as the engineering data to support design analysis and the development of pre-production hardware. The conceptual design drawings shall serve as the basis for establishing the allocated

baseline and for future development of the developmental design drawings. These drawings shall also be used for configuration management and for controlling and using materials, parts, and assemblies whether produced in-house or vendor supplied. Those items which have been developed at private expense and are considered proprietary, and for which the Government has not acquired unlimited rights, shall be documented in control drawings.

3.3.19.7.3 Developmental Design Drawings. The Contractor shall create developmental design drawings and associated lists. If furnished by the Government, the Contractor shall use existing drawings as the basis for creating the developmental design drawings. Revised and/or updated existing drawings and new drawings shall be included in the developmental design drawing package. Developmental design drawings shall be used as the engineering data to support design analysis and the development of pre-production hardware. The developmental design drawings shall serve as the basis for establishing the allocated baseline and for future development of the product drawings. These drawings shall also be used for configuration management and for controlling and using materials, parts, and assemblies whether produced in-house or vendor supplied. Those items which have been developed at private expense and are considered proprietary, and for which the Government has not acquired unlimited rights, shall be documented in control drawings.

3.3.19.7.4 Product Drawings. The Contractor shall develop a complete product drawing package and associated lists. This process may require the revision and update of existing drawings, and/or development of new drawings to meet the requirements of product drawings and associated lists. Revised and newly created drawings shall be developed to document any design change and shall reflect all changes resulting from Government approved ECPs. Existing, revised, and new product drawings and associated lists shall be used as the engineering data for procuring, controlling, and using materials, parts, and assemblies whether produced in-house or supplied by the vendor. The drawings shall be used for the manufacture, assembly, provisioning, inspection, testing, and configuration management of the materials, parts, modules, subassemblies, and assemblies of the equipment covered under this contract. The drawings and associated lists shall not carry any proprietary markings and provide the necessary design, engineering, manufacturing, and quality assurance requirements information necessary to enable the procurement or manufacture of an interchangeable item duplicating the physical and performance characteristics of the original product, without additional design engineering effort or recourse to the original design activity. Those items which have been developed at private expense and are considered proprietary, and for which the Government has not acquired unlimited rights, shall be documented in control drawings. New product drawings should conform to ASME Y14.100-2000 and ASME Y14.34M.

3.3.19.7.5 Technical Data Package. Under an option to the basic contract, the Government may procure the G/ATOR product drawings and other technical documentation as part of the TDP. (B014, B015, B016, B017, B018)

DI-SESS-81000C, Product Drawings/Models and Associated Lists
DI-SESS-81003C, Commercial Drawings/Models and Associated Lists
DI-SESS-81004C, Special Inspection Equipment Drawings/Models and Associated Lists
DI-SESS-81008C, Special Tooling Drawings/Models and Associated Lists

DI-SESS-81011C, Drawing Number Assignment Report
DI-SESS- 81012C, Proposed Critical Manufacturing Process Description

3.3.19.8 Request for Nomenclature. The Contractor shall submit a Request for Nomenclature (DD Form 61) IAW MIL-STD-196E for the system. This requirement is mandatory for use in type designation of communications and electronic materiel. (B01A)
DI-CMAN-81254A, Request for Nomenclature

3.3.20 Testing/Verification.

3.3.20.1 DT Test Plan. The Contractor shall prepare a Test Plan (TP) that encompasses all EDM hardware and software sub-system and system level testing and training consistent with the TEMP and Performance Specification, Section 4, when applicable, for participation by the Government. The TP shall be the top-level working document that ties all Contractor and subcontracting test activities together. The following elements shall be emphasized in the TP:

- Type of test, include as a minimum:
  - System/subsystem/software performance
  - Environmental, including Electromagnetic Environmental Effects
  - Electromagnetic Interference (EMI)
  - High Altitude Electromagnetic Pulse Survivability
  - Nuclear, Biological, Chemical (NBC) contamination survivability
  - Safety
  - Interoperability
  - Radar Spectrum Engineering Criteria (RSEC)
- Test event
- Purpose of the test
- Matrix depicting how verification is to be accomplished (e.g., analysis, test, simulation)
- Date of test start and end
- Location of the test
- Need for Government test support, especially laboratories
- Overall schedule of individual tests. (B01B)

DI-NDTI-80566, Test Plan

3.3.20.1.1 Government Test Facilities. If Government test facilities are required by the Contractor in the TP, the Contractor shall notify the Government of the need no later than the completion of the PDR. The DoD Major Range and Test Facilities Base (MRTFB) may be used to the maximum extent possible for assistance in requesting test facilities. For MRTFB and training range testing, the Contractor shall prepare requested range information such as RADHAZ, EMI, HERP, HERF, HERO, range test support, range test plan, etc.

3.3.20.2 Contractor Support to Government Testing. The Contractor shall support the Government DT and OT by providing on-site/in-house personnel.

3.3.20.2.1 Contractor Role in DT. The Contractor shall provide on-site maintenance, training, logistics, and technical support for the period of the test. Test support requirements shall be tailored to the test being conducted. The Contractor shall provide all required organizational, intermediate, and depot level support equipment and spare parts needed to maintain the G/ATOR and ancillary equipment to ensure completion of each test IAW the TP schedule. The Contractor shall support test execution, analyze DT data, conduct DT failure analysis, and maintain a data tracking system throughout all DT efforts. The Contractor shall write the DT Test report for Government review and approval. The training and incorporation of active duty Marines into the test shall be maximized to the extent appropriate. (B00L)

DI-NDTI-80809B, Test Report

3.3.20.2.2 DT/OT Test Plan. The Contractor shall prepare a Test Plan (TP) that encompasses all hardware and software sub-system and system level testing and training consistent with the TEMP and Performance Specification, Section 4, for the first LRIP unit. Emphasis shall be placed on design and component differences between the EDM and the LRIP. The focus shall be on risk reduction for OT. Those tests conducted via simulation in DT shall be conducted with the LRIP in an operational environment. As such, the training and incorporation of active duty Marines into the test shall be required. (B01B)

DI-NDTI-80566, Test Plan

3.3.20.2.3 DT/OT Test. The Contractor shall provide on-site maintenance, training, logistics, and technical support for the period of the test. The Contractor in conjunction with the previously trained Marines shall conduct tests, analyze data, conduct failure analysis, and maintain a data tracking system throughout all test efforts. The Contractor shall produce a DT/OT Test report for Government review and approval. (B00L)

DI-NDTI-80809B, Test Report

3.3.20.2.4 Contractor Role in OT. The Contractor shall support Government OT by providing training, logistics, and technical support for the period of the test. Test support requirements shall be tailored to the test being conducted. The Contractor shall provide all required organizational, intermediate, and depot level unique support equipment. to ensure completion of each test IAW the TP schedule.

3.3.20.3 Reporting Test Results. The PM shall be notified within one business day of any PS or ORD/CDD Key Performance Parameter (KPP) that has failed or is failing to achieve the allocated threshold. For other than the KPPs, the Contractor shall certify by signature on the recorded data sheets to indicate the validity of the test results. Both shall be followed up in writing in the form of a report. KPP reports shall include a time-phased projection of when the threshold will be achieved or exceeded. This report shall address the following as a minimum:

- System requirements -- cite specific source document and paragraph
- Parameter to be met -- annotate KPPs
- Parameter threshold/objective
- Demonstrated value (of parameter) to date
- Impact, resolution and projected schedule/cost to complete. (B00L)

DI-MISC-80809B, Test/Inspection Report (KPP)

3.3.20.4 Reliability Testing and Reports. The Contractor shall conduct system and subsystem reliability testing using MIL-HDBK-781A as a guide. Summary reports and a final report shall be provided to the Government. Summary reports shall also be submitted when problems are encountered which prevent reliability data from being obtained. (B01C)

DI-TMSS-81586, Reliability Test Reports

3.3.20.5 System Integration/Qualification Tests. The Contractor shall develop and implement System Integration/Qualification Tests (SIT) procedures to demonstrate the adequacy and suitability of the Contractor's integration processes and procedures for achieving the performance inherent in the design. The results of the tests shall demonstrate that the techniques and processes employed do not degrade the design and meet all requirements in the Performance Specification. (B00K, B00L)

DI-NDTI-80603, Test Procedure (SIT)
DI-NDTI-80809B, Test/Inspection Report (SIT)

3.3.20.6 Software Stress Test. The Contractor shall plan and conduct a software stress test prior to DT. The software stress test may be conducted at the end of the System Integration Test. The Contractor shall determine the scope of software stress testing required to ensure the software being developed meets all specified technical, operational, and performance requirements and the acceptance criteria under maximum loading conditions. Test data shall include normal and abnormal, legal and illegal inputs (e.g. go no go path testing, and boundary value analysis) for maximum loading and tracking conditions utilizing the RES. All test plans and procedures shall be subject to review and approval by the Government. Test results shall be provided to the Government. (B00C),(B00L)

DI-IPSC-81439A, Software Test Description (STD)
DI-NDTI-80809B, Test/Inspection Report

3.3.20.7 Interoperability Testing. The Contractor shall make available a complete system and provide all support for interoperability testing to ensure the G/ATOR is compatible with systems specified in the Performance Specification and applicable Key Interface Protocols. G/ATOR shall be tested and certified for interoperability IAW JITC procedures per the GIG Mission Area Initial Capabilities Document (MA ICD).

3.3.20.7.1 Radio Frequency Spectrum Compatibility. G/ATOR and subsystems shall comply with DoD, National and International regulations for the use of the electromagnetic spectrum (such as the NTIA Manual and DoDD 4650.1). The Contractor shall ensure that G/ATOR operates using the Contractors proposed frequencies. G/ATOR shall comply with DoD, National and International spectrum management policies, DODI 5000.2 and regulations (MIL-STD-461E & MIL-STD-469B) as applicable. Frequencies allocated shall be obtained in accordance with DoDD 4650.1. The Contractor shall provide at SRR, a completed DD Form 1494 for obtaining frequency allocation for Government review and approval. (B00Q)

DI-MISC-80508A, Technical Report-Study/Services

3.3.20.8 Radar Spectrum Engineering Criteria (RSEC) Testing. The Contractor shall accomplish Radar Emission Bandwidth Testing IAW Section 5.5 Radar Spectrum Engineering Criteria

(RSEC) of the Manual of Regulations and Procedures for Federal Radio Frequency Management (May 2003 Edition, September 2003 Revision). The testing procedures used by the Contractor shall conform to the requirements of NTIA-Report 84-157 Measurement Procedures for the Radar Spectrum Engineering Criteria (August 1984). The Contractor shall supply the Government with all test procedures, test data, and test analyses for each test evolution for approval. (B00K, B00L)

DI-NTDI-80603, Test Procedure (RSEC)
DI-MISC-80809B, Test/Inspection Report

3.3.20.9 High Altitude-Electromagnetic Pulse Survivability. The Contractor shall, through simulation, analysis, or test, demonstrate that the G/ATOR meets its performance requirements after being subjected to the High Altitude-Electromagnetic Pulse (HEMP) environment IAW MIL-STD-188-125-2.

3.3.20.9.1 Test for Electromagnetic Propagation and Evaluation for Secure Transmission. The Contractor shall implement a Test for Electromagnetic Propagation and Evaluation for Secure Transmission (TEMPEST) Control Program. To meet this requirement the Contractor shall develop a TEMPEST Control Plan, which reflects the G/ATOR Performance Specification. The Contractor shall conduct TEMPEST testing on the G/ATOR and shall document all test results. (B01D, B00K, B00L)

DI-MGMT-81026, TEMPEST Control Plan
DI-NDTI-80603, Test Procedure (MD)
DI-NDTI-80809B, Test/Inspection Report (MD)

3.3.20.10 Information System Certification and Accreditation (C&A) Testing. Information System C&A testing will be conducted IAW the Appendix H (Security Test and Evaluation Plans and Procedures) of the SSAA required by paragraph 3.3.17.1 of this SOW. The Contractor shall assist in the conduct of C&A testing.

3.3.20.11 Environmental Testing. The Contractor shall accomplish environmental testing to ensure that the system meets the requirements in the G/ATOR Performance Specification. The test procedures shall comply with the requirements of MIL-STD-810F(3) Environment Engineering Considerations and Laboratory Tests with the specific requirements defined in the Performance Specification for each area. An environmental test plan shall be included in the TP required by paragraph 3.3.20.1 of this SOW. The Contractor shall provide a Detailed Environmental Test Plan (Task 405 of MIL-STD-810F(3), consisting of one document that provides an environmental test plan for each environmental area listed in paragraphs 3.3.23.1.1 through 3.3.23.1.8, below; and individual Environmental Test Reports (Task 406 of MIL-STD-810F) for tests required in paragraphs 3.3.23.1.1 through 3.3.23.1.8, below. (B01B)

DI-NTDI-80566, Test Plan (Environmental)

3.3.20.11.1 Temperature. The Contractor shall accomplish tests to verify:

- Operating Temperature Range
- Storage Temperature Range

- Transportation Temperature Range
- Operation under full solar radiation
- Storage/Transportation under full solar radiation. (B00L)
  DI-NTDI-80809B, Test/Inspection Report

3.3.20.11.2 Humidity. The Contractor shall accomplish tests to verify:

- Operating Humidity Range
- Storage Humidity Range
- Transportation Humidity Range
- Operation During Heavy Rainfall
- Transitory Immersion Testing. (B00L)
  DI-NTDI-80809B, Test/Inspection Report

3.3.20.11.3 Pressure. The Contractor shall accomplish tests to verify:

- Operating Pressure Range
- Storage Pressure Range
- Transportation Pressure Range. (B00L)
  DI-NTDI-80809B, Test/Inspection Report

3.3.20.11.4 Wind. The Contractor shall accomplish tests to verify:

- Normal System Operations under maximum operating wind speed
- Normal System Operations under maximum wind and ice loading
- Degraded System Operations under maximum degraded wind speed
- Antenna withstands maximum deployed wind speed
- Antenna withstands maximum lowered wind speed
- Antenna withstands maximum stowed wind speed. (B00L)
  DI-NTDI-80809B, Test/Inspection Report

3.3.20.11.5 Ice/Icing/Deicing. The Contractor shall accomplish tests to verify:

- Normal System Operations under system and antenna maximum ice loads
- Normal System Operations with Anti-Icing agents applied
- Normal System Operations after ice removal using deicing agents
- Anti-icing and deicing fluids don't damage the system or components. (B00L)
  DI-NTDI-80809B, Test/Inspection Report

3.3.20.11.6 Shock and Vibration. The Contractor shall accomplish tests to verify:

- Transit Drop Survival
- Rail Impact Survival
- Road Vibration Survival
- Ship Vibration Survival
- Rough Handling Survival (IAW MIL-STD-2073-1D(1)). (B00L)
  DI-NTDI-80809B, Test/Inspection Report

3.3.20.11.7 Corrosion. The Contractor shall accomplish tests to verify:

- Salt Fog on Exposed System Elements
- Salt Fog on Shelter Unit Elements
- Salt Fog on Storage Unit Elements. (B00L)
  DI-NTDI-80809B, Test/Inspection Report

3.3.20.11.8 Airborne Particulates. The Contractor shall accomplish tests to verify:

- Normal System Operation while exposed to airborne sand environment
- Normal System Operation while exposed to airborne dust environment. (B00L)
  DI-NTDI-80809B, Test/Inspection Report

3.3.20.12 Software Testing Program. See paragraph 3.3.7.5.

3.3.20.12.1 Software Test Plan. See paragraph 3.3.7.9.

3.3.20.12.2 Software Test Description. See paragraph 3.3.7.10.

3.3.20.12.3 Software Test Report. See paragraph 3.3.7.11.

3.3.20.13 Maintainability Demonstration. See paragraph 3.3.8.5.

3.3.20.14 Electromagnetic Interference. See paragraph 3.3.10.

3.3.20.14.1 Electromagnetic Interference Test Procedure. See paragraph 3.3.10.1.

3.3.20.14.2 Electromagnetic Interference Test Report. See paragraph 3.3.10.2.

3.3.20.15 Nuclear, Biological and Chemical Contamination Survivability. See paragraph 3.3.14.

3.3.20.16 Security Certification Test Support. See paragraph 3.3.17.1.4.

3.4 Logistics.

3.4.1 Supportability Analysis. The Contractor shall perform a Supportability Analysis based on their integrated logistics support concept. The analysis, using MIL-HDBK-502 as a guide, shall ensure that the supportability requirements identified in the PS are incorporated as a system performance requirement by utilizing an effective systems engineering process. The analysis shall cover all logistics elements and identify potential alternative methods of supporting G/ATOR. Upon completion of the analysis, the Contractor shall provide a trade study report providing identification of quantitative projections of improvements to system readiness and supportability, recommended performance metrics, and associated costs to implement and maintain, and projected life cycle cost savings. (B00Q)

DI-MISC-80508A Technical Report – Study/Services

3.4.1.1 Maintenance Planning. The Contractor shall develop the maintenance plan for the system in accordance with MIL-PRF-49506 and MIL-HDBK-502. It shall cover all aspects of maintenance for the equipment, to include planning information and other factors required for resource support calculations. All maintenance functions shall be assigned to the lowest level that has the capabilities to perform the maintenance task and shall support the Marine Corps' three level maintenance concepts. All repairs shall be accomplished using common tools and general purpose test equipment to the maximum extent possible. To aid in the maintenance of the system the Contractor shall recommend a Maintenance Assist Module (MAM) kit, consisting of at least single point of failure CCAs or all critical system CCAs. The maintenance plan should be the basis for the development of all maintenance-related Integrated Logistics Support (ILS) items.

3.4.1.2 Preventative Maintenance (PM). The contractor shall identify and document the procedures for all preventive maintenance checks and services. PM shall be performed primarily at the organizational level. PM includes, but is not limited to, inspections, cleaning, lubrication, and performance checks and services. PM should be scheduled and performed as required while in storage and under operational conditions. A PM task list shall be incorporated into the system technical manuals. The list shall include: Level of maintenance performing the action, Test Measurement Diagnostic Equipment (TMDE) and tools required for the action, frequency that the action is performed (daily, weekly, monthly, quarterly, semi-annual, annual), expected duration of the task, and procedures to perform the task.

3.4.2 Level of Repair Analysis. The Contractor shall conduct a Level of Repair Analysis (LORA) in accordance with MIL-PRF-49506 to define optimal maintenance planning on potential candidates for operational and intermediate maintenance items with projected high failure rates. The preferred model is Computerized Optimization Model for Predicting and Analyzing Support and Structures (COMPASS). The Contractor shall develop a task inventory defining all tasks required to operate, maintain, and sustain the system requirements defined in the PS. The Contractor shall identify all logistics support resources required to perform each task. The Contractor shall identify the manpower, personnel, and training requirements for each task. (B01E)

DI-ALSS-81529 Logistics Management Information (LMI) Data Product (LORA)

3.4.3 Technical Data Support. Technical data support, including Technical Manuals: Interactive Electronic Technical Manuals. The Government will provide a Technical Manual Contract Requirements (TMCR) document. The Contractor shall provide Interactive Electronic Technical Manuals (IETMs) using MIL-STD- 38784(2) Manuals, Technical: General Style and Format Requirements, and MIL-HDBK 511 Interoperability of Interactive Electronic Technical Manuals (IETM) as reference, to support all levels of maintenance, as applicable, in accordance with the TMCR. A hardcopy of each Technical Manual (TM) and an electronic copy of the IETM will be provided with each system. The Contractor shall provide Commercial Off-The-Shelf (COTS) manual(s), if applicable, for the G/ATOR system, as referenced in MIL-HDBK 1221(3) Department of Defense Handbook for Evaluation of Commercial Off-the-Shelf (COTS) Manuals, to include supplemental data as necessary, in an electronic format included with the IETM unless the entire COTS information is embedded in the IETM. The manual(s) shall

contain installation, operation, troubleshooting and maintenance instructions. The manual(s) shall include a complete repair parts list, including exploded views of all assemblies and subassemblies. (C001)

G/ATOR TMCR 0001-05

3.4.4 Increment I Interim Contractor Logistics Support. The Government may exercise an ICLS option 90 days prior to G/ATOR DT (approximately 33 months after contract award), and extending through the end of the contract. The following documents shall be delivered in support of ICLS activities. (A002, A003, A005, A006, A009, A00A)

DI-MGMT-80368, Status Report
DI-MGMT-81650, Integrated Master Schedule
DI-ADMN-81249A, Conference Agenda (IPT)
DI-ADMN-81250A, Conference Minutes (IPT)
DI-MGMT-81466A, Contract Performance Report (CPR)
DI-MGMT-81468, Contract Funds Status Report (CFSR)

If the ICLS option is exercised, the Contractor shall provide all materials, equipment, facilities and personnel to fully support the system to a level at or greater than the threshold readiness levels stated in the PS and will include training support, supply support, and maintenance support.

3.4.4.1 Training Support. Initial factory training for Increment I will consist of a training program, as referenced in the MCO 1553.1B, The Marine Corps Training and Education System, that teaches basic operational and maintenance objectives to support Government-conducted DT and OT, as referenced in DI-SESS-81525B Test Plan.

3.4.4.1.1 Training Materials. Lesson plans, training guides, and the analysis associated with those shall be developed. All training publications, courseware and other material identified from the analysis shall be developed in IAW MIL-HDBK-29612-2A, MIL-PRF-29612B, Systems Approach to Training (SAT) processes, and all applicable Marine Corps Communication Electronics Schools (MCCES) orders. Increment I training will support follow-on Increments and will be further developed as input to formal schoolhouse curriculum training as cited in Performance Specification Training Data Products, and Instructional Systems Development/Systems Approach to Training and Education, to be delivered in the production phase of Increment I. Training materials will have the Training and Education Command (TECOM) as oversight and approval authority for those materials. All training material shall be delivered in electronic format that is compliant with the latest version of the DOD Shareable Content Object Reference Model (SCORM) (currently, version 1.2) and the current Marine Corps Automated Instructional Management Systems (MCAIMS) software (currently, version 32). Any training curriculum delivered shall be in accordance with current Marine Corps curriculum development standards. Training materials shall be delivered to the schools in both paper and electronic formats. Computer based training is desired. (C002) It is anticipated that the Marine Corps will transition to web-based training delivery methods (e.g. Aviation Training Systems). Training systems should be designed for seamless transition to web-based delivery methods.

DI-SESS-81523B Training Conduct Support Document.

3.4.4.1.2 Instructor and Key Personnel Training (I&KPT). Instructor and Key Personnel Training (I&KPT) course shall be conducted prior to equipment fielding to allow formal operation and maintenance course to be brought on line coinciding with equipment fielding.

Instructional materials shall be developed that effectively demonstrates operation and maintenance of the radar system. This material shall be initially developed during developmental and operational testing and presented during I&KPT and modified in accordance with the recommendations of the Marines participating in those classes. All material developed during this phase shall be delivered to the Marines. Material developed for conversion and I&KPT should be used in developing the Training and Education Command (TECOM) curriculum where appropriate.

A Front end Analysis, a Training Effectiveness Evaluation process, and a Media Analysis shall be conducted in accordance with the SAT processes to determine the appropriate learning strategy and training concept.

3.4.4.2 Supply Support. The Contractor shall build or procure and have available sufficient spares of Lowest Replaceable Units (LRU) to meet minimal down time and operational availability based on the LORA and failure data through the SDD phase. As a function of Supply Support, the Contractor shall provide all depot level LRU repair. The Contractor shall provide a G/ATOR recommendation for procurement of spares to support operational maintenance for the LRIP models.

3.4.4.3 Maintenance Support. The Contractor shall perform all required maintenance on the EDM and the LRIP models, through DT until Marines have been trained to assume organizational level maintenance in support of OT. The Contractor shall support the Government by providing a maintenance field engineer technician having the knowledge and skills required to support all aspects of the G/ATOR through OT.

3.4.5 Logistics Statement of Objectives (SOO). If the PBL option is exercised by the Government, the Contractor shall perform all tasks contained in the Contractor SOW developed as part of the Contractor's proposal response to the SOO.

SOW PART II
Production

4 Production. If the production option(s) are exercised, the Contractor shall provide all materials, equipment, hard tooling, personnel, and facilities necessary to manufacture, fabricate, integrate, produce, test, and deliver the types and quantities of deliverables specified by the contract. The Contractor shall continue the management, systems engineering, and logistics efforts begun in the SDD Phase.

4.1 Production Verification

4.1.1 Product/Process Verification. The Contractor shall perform Product/Process Verification (PPV) on each design detail part to verify production processes are IAW the design, manufacturing, inspection, and test documentation. PPV shall be performed following delivery of test articles, and prior to manufacture of any additional units. PPV shall reflect the documentation/tooling used during fabrication of hardware. PPV documentation shall be contained in individual folders for each configuration item and include actual inspection data. PPV folders shall be available for review upon request and shall be kept as baseline documentation and stored in a fire safe location.

4.1.1.1 Product/Process Review. The Contractor shall host a Government review of the PPV folders at the manufacturing facilities after completion of PPV.

4.1.2 Production Line Validation. The Contractor shall conduct Production Line Validation (PLV) consisting of a physical demonstration of the “critical” operations determined by the Government. The Government with Contractor support will witness the physical demonstration of these “critical” operations. The Contractor shall demonstrate the use of Production documentation/tooling in the fabrication of hardware.

4.1.3 Production Verification Test. The Contractor shall support a Product Verification Test (PVT) on the LRIP systems and the first two manufactured systems that follow the FRP Decision. These two systems shall be representative of the latest system configuration and shall reflect any modifications resulting from Contractor and Government test programs. The Contractor shall prepare a production verification test plan IAW DI-NDTI-80566. The PVT plan shall provide a non-destructive means of verifying the system produced meets or exceeds the requirements of the Product Specification. The Contractor shall perform failure analysis and corrective action (FA/CA) on hardware failures that occur during PVT. All corrective actions shall be coordinated with and approved by the Government and are subject to additional production verification testing. All costs associated with LRU and component level failures during PVT that are attributable to design, shall be the responsibility of the Contractor. The Contractor shall prepare a test report detailing the test data and results. (B00L)
DI-NDTI-80809, Test/Inspection Report

4.1.4 Production Acceptance Test. The Contractor shall develop and implement Production Acceptance Test (PAT) procedures to demonstrate the adequacy and suitability of the Contractor's production processes and procedures for achieving the performance inherent in the

design. The results of the test shall demonstrate the system meets all requirements identified in the Product Specification. The Contractor shall conduct testing that will ensure that the manufacturing processes, equipment, and procedures are effective. These tests shall be conducted on all end items from the first production lot, on randomly selected items from subsequent lots, and will be repeated if the manufacturing process or design change significantly, or if a second source is brought on line. (B00K, B00L)

DI-NDTI-80603, Test Procedure (PAT)
DI-NDTI-80809B, Test/Inspection Report (PAT)

4.2 Qualification/Verification of Suppliers (SubContractors and Vendors). The Contractor shall assure the qualification of each of his suppliers. The qualification shall consist of inspection and testing to verify that established requirements for Line Replaceable Units (LRUs) and components are met. The Contractor will be responsible for LRU and subsystem qualification in a system level integration effort. All LRU and subcomponents shall complete qualification testing prior to the system level PAT. The Contractor shall maintain an Approved Vendor List (AVL).

4.3 Special Tooling and Special Test/Inspection Equipment. The Contractor shall use commercial tooling and test/inspection equipment as opposed to Special Tooling (ST) and Special Test Equipment/Inspection Equipment (STE/SIE) to the maximum extent practical. The Contractor shall develop ST and STE/SIE necessary to test the hardware only if required. ST, STE and SIE planning and initial design will be conducted and the Contractor shall notify the Government as to potential utilization. For an item to be procured as a breakout spare/repair part, the Contractor shall include the capability to test to the level for which acceptance test procedures are required.

4.3.1 Special Inspection Equipment Design Criteria. The Contractor shall include and maintain the following documentation in the design of SIE to support system and LRU acceptance tests, or to support breakout and repair part procurement actions: (a) Equipment operating instructions, (b) Calibration procedures, (c) Drawings and associated lists and (d) Equipment Descriptions (EDs). Computer program and Tape Preparation Instructions (TPIs) shall be included as part of the EDs.

4.3.2 Validation of Special Inspection Equipment. All SIE and associated software and documentation will be validated by the Government prior to use for accepting hardware. The Contractor shall verify the SIE is ready for validation and notify the ACO/ PCO a minimum of 15 working days prior to scheduled validation. The Contractor shall prepare an SIE validation plan and make it available in electronic format to the Government for review at the time the ACO is notified of the validation. (D001)

DI-MISC-80759, Contractor Validation Plan

4.3.3 Special Inspection Equipment Control. Upon completion of the validation, the Contractor shall maintain control of SIE. The Contractor's control of the SIE shall include configuration control, tamper-proofing, and location following validation. Any change to the SIE must be approved by the procuring activity prior to implementation. The requirement to revalidate will be evaluated on a case-by-case basis.

4.3.4 Special Tooling. ST and STE designs shall represent full-scale production configuration and meet the full-scale production rate as individual equipment, by duplication, or by upgrading. During the design of the special equipment, consideration shall be given to standardization of common components to reduce spare parts required to support the production line. When tooling is used as a medium of inspection for quality assurance provisions, the calibration, validation, and revalidation procedures of the tooling shall be included within the quality program planning.

4.4 Parts Management. The Contractor shall continue the Parts Management Program required by SOW paragraph 3.3.19.3.

4.4.1 Parts Material and Process Control. Under the Parts Management Program, the Contractor shall develop and implement a Parts Material and Process (PMP) Control program that assures system performance, reliability and environmental requirements are met. The Contractor and Project Office shall coordinate selection of all electronics parts through IPTs. The PMP will define how parts will be evaluated and qualified for use. The Contractor shall make the list of all potential electronic parts intended for use in the design available to the Government through timely communication with the integrated process team. Selection and evaluation of the electronic components shall be based primarily on the following criteria:

- Part manufacturer production process
- Part reliability and performance test data
- Part suitability in the application
- Part technology and availability
- Parts that have been successfully qualified for use in similar Department of Defense systems

Those parts chosen for system use that have commonality with similar Department of Defense systems may be considered for waiver of the parts qualification requirements.

4.4.1.1 Approved Parts Material and Process List. The Contractor shall establish and maintain a PMP list. The PMP list shall be divided into three sections: 1) Electrical and Electronic Equipment parts, 2) Mechanical parts, 3) Materials and Processes.

4.4.1.2 Parts Obsolescence Management. The Contractor shall document and implement a components and materials obsolescence management approach. The Contractor shall monitor and evaluate electronic part life cycle status and availability on the tactical design throughout the duration of the contract. The Contractor shall employ design techniques that mitigate parts obsolescence in an effort to reduce total life cycle costs for the system. The Contractor is responsible for resolution of all identified obsolete items that will affect hardware delivery under this contract and contract options, including items required to support in-house STE and SIE.

4.5 Configuration Management. The Contractor shall continue the Configuration Management Program initiated during the SDD phase under paragraph 3.3.19, and its applicable subparagraphs, above.

4.5.1 Engineering Release System. The Contractor shall continue the Engineering Release

System initiated during the SDD phase. (B00Z)
DI-CMAN-80463C, Engineering Release Record (ERR)

4.5.2 Engineering Change Proposals. The Contractor shall implement ECPs through production block changes and/or through back-fit kits, as appropriate. (B010)
DI-CMAN-80639C, Engineering Change Proposal (ECP)

4.5.3 Requests for Deviation. The Contractor shall continue the RFD process initiated during the SDD phase. (B011)
DI-CMAN-80640C, Request for Deviation (RFD)

4.5.4 Notices of Revision. The Contractor shall continue the NOR process initiated during the SDD phase. (B012)
DI-CMAN-80642C, Notice of Revision (NOR)

4.5.5 Notification of Changes to Commercial Equipment/Software. The Contractor shall continue the Notification of Changes to Commercial Equipment/Software process initiated during the SDD phase. (B00Q)
DI-MISC-80508A, Technical Report - Study/Services (CN)

4.5.6 Configuration Status Accounting. The Contractor shall continue the CSA program initiated during the SDD phase. (B013)
DI-CMAN-81253A, Configuration Status Accounting Information

4.5.7 Configuration Audits. The Contractor shall conduct, under Government oversight, a PCA prior to Full Rate Production. (B00Y)
DI-CMAN-81022C, Configuration Audit Summary Report (Physical)

4.6 Refurbishment and Retrofit of Units. The Contractor shall refurbish and retrofit the previously delivered EDM unit to include all corrective actions and modifications approved by the time of the issuance of the Initial Operational test and Evaluation (IOT&E) report (approximately 90 days after completion of IOT&E).

4.7 Production Management and Control. The Contractor shall continue the management and control processes initiated during the SDD phase.

4.7.1 Management. The Contractor shall continue to maintain and update the IMS developed during the SDD phase. (A003)
DI-MGMT-81650, Integrated Master Schedule

4.7.1.1 Management Reports. The Contractor shall continue to provide Status Reports initiated during the SDD phase. (A002)
DI-MGMT-80368, Status Report

4.7.1.2 Integrated Product/Process Teams. The Contractor shall continue to participate in the IPTs established during the SDD phase. (A005, A006)

DI-ADMN-81249A, Conference Agenda (IPT)
DI-ADMN-81250A, Conference Minutes (IPT)

4.8 Government Furnished Property. The Contractor shall continue to report receipt of Government Material and discrepancies in GP. (A007), (A008)
DI-MGMT-80389B, Receipt of Government Materiel Report
DI-MGMT-80596, Government Furnished Information Deficiency Report

4.9 Failure Reporting, Analysis and Corrective Action System. The Contractor shall continue the FRACAS program initiated during the SDD phase. (B00H, B00J)
DI-RELI-81315, Failure Analysis and Corrective Action Report
DI-RELI-80255, Failure Summary and Analysis Report

Statement of Work/Contract Line Item Number (CLIN) Cross Walk

Paragraph	CLIN	SOW Section Title
1.1.1.2	0100	Radar Environmental Simulator
1.1.1.4	0300	Interim Power Source
1.1.1.5	0200	Alternative Trailer
1.1.1.6	1030	Technical Data Package
1.1.1.7	1040	Software Source Code/Model Driven Architecture Models
1.1.2	1000	G/ATOR Inc I Low Rate Initial Production
1.1.3	2000	G/ATOR Inc I Production
1.1.4	3000	Interim Contractor Logistics Support
1.1.5	4000	Performance Based Logistics
3	0001	Requirements
3.1	0001	G/ATOR System
3.1.1	0100	Radar Environmental Simulator
3.1.2	0004	Single Integrated Air Picture
3.1.3	0300	Alternative Power Source
3.1.4	0200	Alternative Trailer
3.1.5	1030	Technical Data Package
3.1.6	1040	Software Source Code/Model Driven Architecture Models
3.1.7	1000	Increment I Low Rate Initial Production
3.1.8	2000	Increment I Production
3.1.9	3000	Increment I Interim Contract Logistics Support
3.1.10	4000	Performance Based Logistics
3.2	0001	Program and Data Management
3.2.1	0003/1020/2020/3010	Program Management
3.2.1.1	0003/1020/2020/3010	Assignment of Responsibility and Authority
3.2.1.2	0003/1020/2020/3010	Schedule Planning
3.2.1.3	0003/1020/2020/3030	Risk Management
3.2.1.4	0003/1020/2020/3010	Integrated Product/Process Teams
3.2.1.5	0003/1020/2020/3010	Interface Control Working Groups
3.2.1.6	0001	Government Property
3.2.1.6.1	0003/1020/2020	Equipment
3.2.1.6.2	0003/1020/2020	Information
3.2.2	0001	Meetings, Formal Reviews, Conferences, and Audits
3.3.2.1	0001	Requirements Traceability
3.2.2.1	0003/1020/2020/3010/3030	Integrated Baseline Review
3.2.2.2	0003/1020/2020/3010	In-Process Review
3.2.3	0003/1020/2020/3030	Data Management
3.2.4	0001	Contractor Performance Measurement
3.2.4.1	0001	Cost Control and Accounting

Paragraph	CLIN	SOW Section Title
3.2.4.2	0001	Earned Value Management System
3.2.4.3	0001	Contract Work Breakdown Structure
3.2.4.4	0003	Contractor Cost Data Reporting
3.2.4.4.1	0003/1020/2020/3010	Contract Performance Report, DD Forms 2734/1 through 2734/5
3.2.4.4.2	0003/1020/2020/3010	Contract Funds Status Report, DD form 1586
3.3	0001	Systems Engineering
3.3.1	0003/1020/2020/3010	Engineering Management
3.3.2	0001	Requirements Engineering
3.3.3	0001	Modeling and Simulation
3.3.3.1	0003/1020/2020/3030	Modeling and Simulation Plan
3.3.4	0001	Opens Systems Design/Modular Open Systems Architecture (MOSA)
3.3.5	0001	Specifications
3.3.5.1	0003	Performance Specification
3.3.5.2	0001	Detail Specifications
3.3.5.2.1	0003	System/Subsystem Specifications
3.3.5.2.2	0003	System/Subsystem Design Descriptions
3.3.5.2.3	0003	Interface Requirements Specifications
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3.3.6	0001/0003	Technical Reviews
3.3.6.1	0001	Government Review Team
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3.3.6.3	0003/1020/2020/3010	System Functional Review
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3.3.6.5	0003/1020/2020/3010	Preliminary Design Review
3.3.6.5.1	0003/1020/2020/3010	Software Preliminary Design Review
3.3.6.5.2	0003/1020/2020/3010	System Preliminary Design Review
3.3.6.6	0001	Critical Design Review
3.3.6.6.1	0003/1020/2020/3010	Software Critical Design Review
3.3.6.6.2	0003/1020/2020/3010	System Critical Design Review
3.3.6.7	0003/1020/2020/3010	Design Readiness Review (DRR)
3.3.6.8	0003/1020/2020/3010	Test Readiness Review (TRR)
3.3.6.9	0003/1020/2020/3010	Production Readiness Review (PRR)
3.3.7	0001	Software
3.3.7.1	0003	Software Development
3.3.7.2	0001	New Software
3.3.7.3	0001	Software Allocation
3.3.7.4	0001	Software Reviews
3.3.7.5	0001	Software Testing Program
3.3.7.6	1040	Software Source Code/Model Driven Architecture Models
3.3.7.7	0003	Software Requirements Specification

Paragraph	CLIN	SOW Section Title
3.3.7.8	0003	Software Design Description
3.3.7.9	0003	Software Test Plan
3.3.7.10	0003	Software Test Description
3.3.7.11	0003	Software Test Report
3.3.7.12	0003	Software Product Specification
3.3.7.13	0003	Software Delivery
3.3.8	0001	Reliability and Maintainability Program
3.3.8.1	0001	Procedures and Controls
3.3.8.2	0003	Reliability Predictions
3.3.8.2.1	0001	Reliability Centered Maintenance
3.3.8.3	0003	Failure Reporting, Analysis, and Corrective Action System
3.3.8.4	0001/0003	Maintainability
3.3.8.5	0003/1020/2020	Maintainability Demonstration
3.3.8.6	0003	Failure Modes, Effects, and Criticality Analysis
3.3.8.7	0001	Performance Monitoring/Conditional Based Maintenance/Fault Location
3.3.9	0001	Human Systems Integration
3.3.9.1	0001	Personnel Survivability and Habitability
3.3.9.2	0001	Human Factors Engineering
3.3.10	0001	Electromagnetic Interference
3.3.10.1	0003	Electromagnetic Interference Test Procedure
3.3.10.2	0003	Electromagnetic Interference Test Report
3.3.11	0001	Grounding, Bonding and Shielding
3.3.12	0001	Electrostatic Discharge Control
3.3.13	0003/1020/2020	Electromagnetic Radiation Hazards
3.3.14	0003	Nuclear, Biological, and Chemical Contamination Survivability
3.3.15	0001	Quality Management System
3.3.16	0003	Corrosion Preventions and Control
3.3.17	0001	System Security
3.3.17.1	0001	Information Assurance
3.3.17.1.1	0001	Process Support
3.3.17.1.2	0001	Analysis Support
3.3.17.1.3	0001	Coordination Support
3.3.17.1.4	0001	Security Certification Test Support
3.3.17.1.5	0003	Security Documentation Support
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G/ATOR Performance Based Logistics (PBL) Statement of Work (SOW)

Scope. This Statement of Work (SOW) defines the effort to be performed by Northrop Grumman in providing performance-based logistics for the Ground/Air Task Oriented Radar (G/ATOR) system over its life cycle. This contract shall be a Performance Based Logistics (PBL) Support contract with performance measured against the metrics, and in the manner prescribed, in paragraph 4.0 of this document. It is understood that after completion of a Business Case Analysis (BCA), the Government may require modifications to this SOW to meet emerging requirements or economic conditions.

In exercising this option for a PBL support program, the Government desires to assign responsibility, within the limits prescribed by Government regulations or the Department of Defense (DoD) instructions or directives, for Total Life Cycle System Management (TLCSM) for the G/ATOR system to Northrop Grumman, and to further designate Northrop Grumman as the Product Support Integrator (PSI). The primary responsibility of the PSI shall be to provide total logistic life cycle support for the G/ATOR system, except for Government Furnished Equipment (GFE) unless otherwise directed by the Government, to meet or exceed all logistical performance parameters as specified in the SOW, PS, or SOO. Achieving and sustaining an Operational Availability (A_o) at Threshold of 90% and Objective of 95% shall be accomplished.

In addition to meeting or exceeding the performance requirements of the PS, the PSI shall, at a minimum, perform the following tasks in support of the G/ATOR system TLCSM. Unless otherwise directed by the Government, these tasks are not applicable to any GFE included in the G/ATOR system.

1.1 Applicable Documents. The following documents of the exact date and issue specified form a part of this SOW and shall be used for guidance in performing the requirements of this SOW. In the event of a conflict between the applicable documents and this SOW, the SOW shall take precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

■ MIL-M-87268A(1)	15 Jan 01	Manuals, Interactive Electronic Technical – General Content, Style, Format, and User-Interaction Reports
■ MIL-PRF-29612B	31 Aug 01	Training Data Products
■ MIL-PRF-49506	11 Nov 96	Logistics Management Information (LMI)
■ MIL-STD-882D	10 Feb 00	Standard Practice for System Safety
■ MIL-STD-2073-1D (1)	10 May 02	DoD Standard Practice for Military Packaging
■ MIL-STD-38784 (2)	1 Dec 00	Standard Practice for Manuals, Technical: General Style and Format Requirements
■ MIL-HDBK-61A	7 Feb 01	Configuration Management Guidance
■ MIL-HDBK-502	30 May 97	Acquisition Logistics
■ MIL-HDBK-512A	31 Oct 01	Parts Management

■ MIL-HDBK-781A	1 Apr 96	Reliability Test Methods, Plans, and Environments for Engineering Development, Qualification, and Production
■ MIL-HDBK-1221(3)	5 Aug 02	Evaluation of Commercial Off The Shelf (COTS) Manuals
■ MIL-HDBK-29612-2A	31 Aug 01	Instructional Systems Design/Systems Approach to Training and Education (Part 2 of 5 Parts)

2.0 Management.

2.1 Program Management. Northrop Grumman shall function as the Product Support Integrator (PSI) for the G/ATOR system and shall be charged with implementing all sources of support, public and private, defined herein to achieve the logistics performance requirements as specified in the Performance Specification (PS) and subsequent G/ATOR design specifications developed during the System Development and Demonstration (SD&D) Phase. The PSI shall be responsible for the management and oversight of all subcontractors, vendors, and suppliers under contract to provide goods and services for the G/ATOR system.

2.2 Contract Work Breakdown Structure (CWBS). The PSI shall expand on the Contract Work Breakdown Structure (CWBS) provided with this SOW (Table 2-2) to no more than the 5th level of indenture to facilitate in planning, scheduling, budgeting, and controlling the resources allocated to meet the requirements of this SOW. The CWBS shall serve as the basis for performance measurement, and status reporting. (CDRL L001 – DI-MGMT-81334A, Contract Work Breakdown Structure)

2.3 Contract Status Reporting. The PSI shall submit to the Government a monthly Progress, Status and Management Report. The report shall address all activities accomplished in the previous 30 day period, all activities planned for the next 30 days, the status of contract funding, changes to key personnel and subcontractor's or vendors, current values for the PBL Performance Metrics, and all supportability issues to include their cause, recommended corrective action, and current status. The PSI shall inform the Government in writing at least 90 days in advance of any significant technical or funding issues that may affect the PBL program. (CDRL L002 – DI-MGMT-80368, Status Report)

2.4 Schedule Planning. The PSI shall develop and maintain a PBL Master Schedule. It shall include all significant events, critical paths and tasks from the start of the PBL effort through completion. As the logistics support effort progresses, adjustments, additions, or deletions to the schedule may be required to reflect program changes. The PBL schedule shall be revised as required but changes may not be implemented until approved by the Government. The PSI shall inform the Government in writing of any anticipated events that may impact the schedule. (CDRL L003 – DI-MGMT-81650, PBL Master Schedule)

2.5 PBL Management Plan. The PSI shall develop a Performance Based Logistics (PBL) Management Plan documenting the strategy, processes, and procedures intended to

be used to provide performance based logistics support for all G/ATOR systems. The plan shall include an organizational chart with all key personnel identified and their roles and responsibilities clearly defined. The PBL Master Schedule shall be included in the plan. (CDRL L004 – DI-MGMT-80004, Management Plan)

2.6 Meetings, Conferences, and Discussion Groups. The PSI shall plan, host, attend, chair, coordinate, support and conduct meetings, formal reviews, conferences, audits, and discussion groups as required, and as delineated in the PBL Master Schedule. The meetings shall be conducted at the PSI's or Government facilities as appropriate. The PSI shall prepare and distribute agendas and presentation materials, and shall prepare minutes and reports following each meeting. At a minimum, the PSI shall conduct PBL Program Reviews quarterly to discuss the status of the program and technical issues. (L005 - DI-ADMN-81249A, Conference Agenda; L006 - DI-ADMN-81250A, Conference Minutes)

2.7 Data Management. The PSI shall establish and maintain an access restricted, password protected, web based, Integrated Data Environment (IDE) Data Management System (DMS) fully compatible with the DMS implemented during the SD&D Phase of the G/ATOR program. The DMS shall use Microsoft® Office or compatible products, and shall provide controlled access to all logistics plans, schedules, technical reports, meeting minutes, status reports, and supportability analysis data for authorized PSI and Government personnel.

Ground/Air Task Oriented Radar (G/ATOR)

Volume II – Management
(Change Pages to June 2, 2006 Proposal)

Final Proposal Revision

NOVEMBER 13, 2006

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3.8	**T-A3.8**	**OBJECTIVE MODES OF OPERATION.**			N/A
3.8.1	**T-A3.8.1**	Combined Mode of Operation.			N/A
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3.8.1.1.1	**T-A3.8.1.1.1**	Range Coverage.			N/A
3.8.1.1.2	**T-A3.8.1.1.2**	Azimuth Coverage.			N/A
3.8.1.1.3	**T-A3.8.1.1.3**	Height Coverage.			N/A
3.8.1.1.4	**T-A3.8.1.1.4**	Elevation Coverage.			N/A
3.8.1.2	**T-A3.8.1.2**	Search Volume Revisit Period.			N/A
3.8.1.2.1	**T-A3.8.1.2.1**	Search Volume Fence.			N/A
3.8.1.3	**T-A3.8.1.3**	Target Track			N/A
3.8.1.3.1	**T-A3.8.1.3.1**	Latency.			N/A
3.8.1.3.1.1	**T-A3.8.1.3.1.1**	Radar Report Latency.			N/A
3.8.1.3.1.2	**T-A3.8.1.3.1.2**	External Request Response Latency.			N/A
3.8.1.3.2	**T-A3.8.1.3.2**	Firm Track			N/A
3.8.1.3.3	**T-A3.8.1.3.3**	Probability of Firm Track.			N/A
3.8.1.3.4	**T-A3.8.1.3.4**	Probability of Drop Track			N/A
3.8.1.4	**T-A3.8.1.4**	Track Volume.			N/A
3.8.1.4.1	**T-A3.8.1.4.1**	Range.			N/A
3.8.1.4.2	**T-A3.8.1.4.2**	Azimuth.			N/A
3.8.1.4.3	**T-A3.8.1.4.3**	Height.			N/A
3.8.1.4.4	**T-A3.8.1.4.4**	Elevation.			N/A
3.8.1.4.5	**T-A3.8.1.4.5**	Track Continuity.			N/A
3.8.1.5	**T-A3.8.1.5**	Firm Track Update Rate.			N/A
3.8.1.5.1	**T-A3.8.1.5.1**	Fence Update Rate.			N/A
3.8.1.5.2	**T-A3.8.1.5.2**	Above Fence Update Rate			N/A
3.8.1.5.3	**T-A3.8.1.5.3**	Dedicated Hostile / C2 Commanded Track Update Rate.			N/A
3.8.1.6	**T-A3.8.1.6**	Firm Track Range Requirements.			N/A
3.8.1.6.1	**T-A3.8.1.6.1**	Targets Larger than Type 0.			N/A
3.8.1.6.2	**T-A3.8.1.6.2**	Type 0 Targets.			N/A
3.8.1.6.3	**T-A3.8.1.6.3**	Type 1 Targets.			N/A
3.8.1.6.4	**T-A3.8.1.6.4**	Type 2 Targets.			N/A
3.8.1.6.5	**T-A3.8.1.6.5**	Firm Track Range Performance in Other Than the Nominal Environment.			N/A
3.8.1.6.6	**T-A3.8.1.6.6**	Firm Track Initiation.			N/A

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3.8.1.6.8	**T-A3.8.1.6.8**	Pop-up Target.			N/A
3.8.1.7	**T-A3.8.1.7**	Other Dedicated Hostile / C2 Commanded Waveform Uses.			N/A
3.8.1.8	**T-A3.8.1.8**	External Cues.			N/A
3.8.1.9	**T-A3.8.1.9**	Track Load.			N/A
3.8.1.9.1	**T-A3.8.1.9.1**	360 Degree.			N/A
3.8.1.9.2	**T-A3.8.1.9.2**	Per Sector.			N/A
3.8.1.9.3	**T-A3.8.1.9.3**	Per Beam.			N/A
3.8.1.10	**T-A3.8.1.10**	False Track Rate.			N/A
3.8.1.10.1	**T-A3.8.1.10.1**	False Track Rate in the Other than Nominal Environments.			N/A
3.8.1.11	**T-A3.8.1.11**	Velocity.			N/A
3.8.1.12	**T-A3.8.1.12**	Target Acceleration.			N/A
3.8.1.13	**T-A3.8.1.13**	Resolution.			N/A
3.8.1.13.1	**T-A3.8.1.13.1**	Range Resolutions.			N/A
3.8.1.13.1.1	**T-A3.8.1.13.1.1**	Non-Dedicated Track Resolution.			N/A
3.8.1.13.1.2	**T-A3.8.1.13.1.2**	Dedicated Track Resolution.			N/A
3.8.1.13.2	**T-A3.8.1.13.2**	Angular Resolutions.			N/A
3.8.1.14	**T-A3.8.1.14**	Radar Accuracy.			N/A
3.8.1.14.1	**T-A3.8.1.14.1**	Non Dedicated Track Waveforms.			N/A
3.8.1.14.1.1	**T-A3.8.1.14.1.1**	Range.			N/A
3.8.1.14.1.2	**T-A3.8.1.14.1.2**	Azimuth.			N/A
3.8.1.14.1.3	**T-A3.8.1.14.1.3**	Height.			N/A
3.8.1.14.2	**T-A3.8.1.14.2**	Dedicated Hostile / C2 Commanded Track Waveforms.			N/A
3.8.1.14.2.1	**T-A3.8.1.14.2.1**	Range.			N/A
3.8.1.14.2.2	**T-A3.8.1.14.2.2**	Azimuth.			N/A
3.8.1.14.2.3	**T-A3.8.1.14.2.3**	Height.			N/A
3.8.1.15	**T-A3.8.1.15**	Tracker Functionality.			N/A
3.8.1.15.1	**T-A3.8.1.15.1**	Tracker Performance.			N/A
3.8.1.15.2	**T-A3.8.1.15.2**	Kill Assessment Support.			N/A
3.8.1.16	**T-A3.8.1.16**	Instrumented Range and Height.			N/A
3.8.2	**T-A3.8.2**	USER DEFINED Mode of Operations.			N/A
3.8.2.1	**T-A3.8.2.1**	Search Volume.			N/A
3.8.2.1.1	**T-A3.8.2.1.1**	Range Coverage.			N/A
3.8.2.1.2	**T-A3.8.2.1.2**	Azimuth Coverage.			N/A
3.8.2.1.3	**T-A3.8.2.1.3**	Height Coverage.			N/A
3.8.2.1.4	**T-A3.8.2.1.4**	Elevation Coverage.			N/A

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3.8.2.2.1	**T-A3.8.2.2.1**	Search Volume Fence.			N/A
3.8.2.3	**T-A3.8.2.3**	Target Track			N/A
3.8.2.3.1	**T-A3.8.2.3.1**	Latency.			N/A
3.8.2.3.1.1	**T-A3.8.2.3.1.1**	Radar Report Latency.			N/A
3.8.2.3.1.2	**T-A3.8.2.3.1.2**	External Request Response Latency.			N/A
3.8.2.3.2	**T-A3.8.2.3.2**	Firm Track			N/A
3.8.2.3.3	**T-A3.8.2.3.3**	Probability of Firm Track.			N/A
3.8.2.3.4	**T-A3.8.2.3.4**	Probability of Drop Track			N/A
3.8.2.4	**T-A3.8.2.4**	Track Volume.			N/A
3.8.2.4.1	**T-A3.8.2.4.1**	Range.			N/A
3.8.2.4.2	**T-A3.8.2.4.2**	Azimuth.			N/A
3.8.2.4.3	**T-A3.8.2.4.3**	Height.			N/A
3.8.2.4.4	**T-A3.8.2.4.4**	Elevation.			N/A
3.8.2.4.5	**T-A3.8.2.4.5**	Track Continuity.			N/A
3.8.2.5	**T-A3.8.2.5**	Firm Track Update Rate.			N/A
3.8.2.5.1	**T-A3.8.2.5.1**	Fence Update Rate.			N/A
3.8.2.5.2	**T-A3.8.2.5.2**	Above Fence Update Rate			N/A
3.8.2.5.3	**T-A3.8.2.5.3**	Dedicated Hostile / C2 Commanded Track Update Rate.			N/A
3.8.2.6	**T-A3.8.2.6**	Firm Track Range Requirements.			N/A
3.8.2.6.1	**T-A3.8.2.6.1**	Targets Larger than Type 0.			N/A
3.8.2.6.2	**T-A3.8.2.6.2**	Type 0 Targets.			N/A
3.8.2.6.3	**T-A3.8.2.6.3**	Type 1 Targets.			N/A
3.8.2.6.4	**T-A3.8.2.6.4**	Type 2 Targets.			N/A
3.8.2.6.5	**T-A3.8.2.6.5**	Firm Track Range Performance in Other Than the Nominal Environment.			N/A
3.8.2.6.6	**T-A3.8.2.6.6**	Firm Track Initiation.			N/A
3.8.2.6.7	**T-A3.8.2.6.7**	Slant Range Versus Elevation.			N/A
3.8.2.6.8	**T-A3.8.2.6.8**	Pop-up Target.			N/A
3.8.2.7	**T-A3.8.2.7**	Other Dedicated Hostile / C2 Commanded Waveform Uses.			N/A
3.8.2.8	**T-A3.8.2.8**	External Cues.			N/A
3.8.2.9	**T-A3.8.2.9**	Track Load.			N/A
3.8.2.9.1	**T-A3.8.2.9.1**	360 Degree.			N/A
3.8.2.9.2	**T-A3.8.2.9.2**	Per Sector.			N/A
3.8.2.9.3	**T-A3.8.2.9.3**	Per Beam.			N/A

L.4.f.2.a	Part A: System Technical Requirements				
Section L	Proposal Section	Proposal Outline	Section M	SOW	Performance Specification
3.8.2.10	**T-A3.8.2.10**	False Track Rate.			N/A
3.8.2.10.1	**T-A3.8.2.10.1**	False Track Rate in the Other than Nominal Environments.			N/A
3.8.2.11	**T-A3.8.2.11**	Velocity.			N/A
3.8.2.12	**T-A3.8.2.12**	Target Acceleration.			N/A
3.8.2.13	**T-A3.8.2.13**	Resolution.			N/A
3.8.2.14	**T-A3.8.2.14**	Radar Accuracy.			N/A
3.8.2.14.1	**T-A3.8.2.14.1**	Range Resolutions.			N/A
3.8.2.14.1.1	**T-A3.8.2.14.1.1**	Non-Dedicated Track Resolution.			N/A
3.8.2.14.1.2	**T-A3.8.2.14.1.2**	Dedicated Track Resolution.			N/A
3.8.2.14.2	**T-A3.8.2.14.2**	Angular Resolutions.			N/A
3.8.2.15	**T-A3.8.2.15**	Tracker Functionality.			N/A
3.8.2.15.1	**T-A3.8.2.15.1**	Non Dedicated Track Waveforms.			N/A
3.8.2.15.1.1	**T-A3.8.2.15.1.1**	Range.			N/A
3.8.2.15.1.2	**T-A3.8.2.15.1.2**	Azimuth.			N/A
3.8.2.15.1.3	**T-A3.8.2.15.1.3**	Height.			N/A
3.8.2.15.2	**T-A3.8.2.15.2**	Dedicated Hostile / C2 Commanded Track Waveforms.			N/A
3.8.2.15.2.1	**T-A3.8.2.15.2.1**	Range.			N/A
3.8.2.15.2.2	**T-A3.8.2.15.2.2**	Azimuth.			N/A
3.8.2.15.2.3	**T-A3.8.2.15.2.3**	Height.			N/A
3.8.2.16	**T-A3.8.2.16**	Instrumented Range and Height.			N/A
3.8.2.16.1	**T-A3.8.2.16.1**	Tracker Performance			N/A
3.8.2.16.2	**T-A3.8.2.16.2**	Kill Assessment Support.			N/A

L.4.f.2.b	Part B: Logistics Support				
Section L	Proposal Section	Proposal Outline	Section M	SOW	Performance Specification
1	**T-B1**	**Interim Contractor Logistics Support.**	T.4.1	3.4.4	
1.1	**T-B1.1**	Technical Data.		3.4.3, 3.1.5	
1.2	**T-B1.2**	Technical Publications.		3.4.3	
1.3	**T-B1.3**	Training Materials and Course Descriptive Data.		3.4.3, 3.4.4,, 3.4.4.1, , 3.4.4.2	3.2.2, 3.3.11
1.4	**T-B1.4**	Transportability Program.			
1.5	**T-B1.5**	Interim Contractor Support.		3.4.4	
2	**T-B2**	Performance Based Statement of Work.	T.4.2	3.4.5	
2	**T-B2**	Performance Based Statement of Work.	T.4.2	3.1.10, 3.4.5	

L.4.f.2.b	Part B: Logistics Support				
Section L	Proposal Section	Proposal Outline	Section M	SOW	Performance Specification
2.1	**T-B2.1**	Performance Based Logistics Overview.		3.4.1, 3.4.2, 3.4.4.2, 3.4.4.3, 3.4.5	
2.1	**T-B2.1**	Performance Based Logistics Overview.		3.4.5	
	T-B2.2	Performance Metrics		3.4.5	
2.3	**T-B2.3**	G/ATOR Maintenance Plan		3.4.1.2	4.3
2.4	**T-B2.4**	Performance Based Support Strategy (PBSS)		3.1.10, 3.4.4.3	

L.4.f.3	Volume II: Management				
Section L	Proposal Section	Proposal Outline	Section M	SOW	Performance Specification
1.	Part A. Integrated Master Plan (IMP) (details provided below)	1.0 Part A. Integrated Master Plan (IMP)	M.1.1 – M.1.5	3.2.1.1; 3.2.1.3; 3.3.3, 3.3.3.1, 3.3.4, 3.3.5.2.3, 3.3.5.2.4, 3.3.7, 3.3.7.7; Part II 4 (all), 3.1.7,	

L.4.f.3	Volume II: Management				
Section L	Proposal Section	Proposal Outline	Section M	SOW	Performance Specification
	Details for planning, establishing, and implementing all processes the Offeror intends to use managing the program. (see breakout for specific sections)	Part A – Section 1.5 Program Processes and Practices *Program Management:* 1.5.1 Program Management 1.1 Program Management Overview *Risk Management:* Risk Management Processes 1.5.1.9 Risk Assessment and Mitigation Plan 1.1.4 Initial Risk Assessment 1.5.1.10 Configuration Management 1.5.1.11Data Management 1.5.1.12 Product Assurance 1.5.2 Earned Value Management 1.5.3 Technical Management 1.5.4.7 Verification 1.5.4.9.2 Reliability 1.5.4.9.3 Maintainability 1.5.4.9.4 Environmental 1.5.4.19.2 Human Factors 1.5.4.19.3 Safety 1.5.5 Hardware Development *Software Management:* 1.5.6 Software Development Appendix. VI: Software Development Plan 1.5.7 Logistics Supportability 1.5.7.3.12 Training 1.5.7.4 Interim Contractor Support 1.5.8 Production Preparation and Readiness 1.5.8.2.5 Packaging		3.1.2, 3.1.5, 3.1.7, 3.1.8, 3.1.9, 3.1.10, 3.2, 3.2.1, 3.2.1.1, 3.2.2, 3.2.1.3, 3.2.1.4, 3.2.1.5, 3.2.1.6, 3.2.2, 3.2.2.1, 3.2.2.2, 3.2.2.3, 3.2.4, 3.2.4.1, 3.2.4.2,.3.2.4.3, 3.2.4.4, 3.2.4.4.1, 3.2.4.4.2, 3.3, 3.3.1, 3.3.2, 3.3.3, 3.3.3.1, 3.3.4, 3.3.5.1, 3.3.5.2 (all), 3.3.6, 3.3.6.1, 3.3.6.2, 3.3.6.3,. 3.3.6.4, 3.3.6.5, 3.3.6.5.1, 3.3.6.5.2, 3.3.6.6, 3.3.6.6.1.1, 3.3.6.6.2, 3.3.6.7, 3.3.6.8, 3.3.6.9, 3.3.7, 3.3.7.1, 3.3.7.10, 3.3.7.11, 3.3.7.12, 3.3.7.13, 3.3.7.2, 3.3.7.3, 3.3.7.4, 3.3.7.5, 3.3.7.6, 3.3.7.7, 3.3.7.8, 3.3.7.9, 3.3.8 (all), 3.3.9 (all), 3.3.10 (all), 3.3.11 thru 3.3.17.2, 3.3.18 (all) 3.3.7 (all)	
	Contract Work Breakdown Structure (CWBS) to Level 5.	Appendix I: CWBS Appendix II: CWBS Dictionary		3.2.1, 3.2.4.3	

L.4.f.3	Volume II: Management				
Section L	Proposal Section	Proposal Outline	Section M	SOW	Performance Specification
	Essential system engineering tasks, their interrelationships with program milestones, and the specific entry and exit criteria to be used to track and measure successful task completion. Proposed milestones/events, major events, essential tasks, and significant accomplishments for each milestone/event, entrance and exit criteria for each task, and an event oriented time-line tied directly to the IMS. Details to show the interrelationships of milestones and task schedules. Exit criteria for each major event must match the significant accomplishments identified and expected for that event.	1.4 Detailed Program Plan 1.3 System Integration/Test Plan Appendix III: IMP table		3.1.1, 3.1.5, 3.1.6, 3.1.3, 3.1.2, 3.1.7, 3.1.8, 3.1.9,. 3.1.10, 3.2.1.1, 3.2.2, 3.2.2.1, 3.3.3, 3.3.4, 3.3.5, 3.3.5.1, 3.3.5.2 (all), 3.3.6, 3.3.6.2, 3.3.6.3, 3.3.6.4, 3.3.6.5, 3.3.6.5.1, 3.3.6.5.2, 3.3.6.6, 3.3.6.6.1.1, 3.3.6.6.2, 3.3.6.7, 3.3.6.8, 3.3.6.9, 3.3.7.10, 3.3.7.11, 3.3.7.12, 3.3.7.4, 3.3.7.6, 3.3.7.7, 3.3.7.8, 3.3.7.9, 3.3.7.5, 3.3.8, 3.3.8.5, 3.3.8.4, 3.3.9, 3.3.10, 3.3.11, 3.3.12, 3.3.13, 3.3.14, 3.3.17, 3.3.18.4	
		Top-to-bottom traceability from G/ATOR performance specification requirements through the Statement of Work (SOW) task development activities to Level 5 CWBS.	Appendix IV: PS/SOW/CWBS Cross Reference Matrix		

L.4.f.3	Volume II: Management				
Section L	Proposal Section	Proposal Outline	Section M	SOW	Performance Specification
		Describe plans for conducting the G/ATOR program, controlling and accomplishing each effort, and managing cost and schedule risk Organizational structure and how the organization will support the G/ATOR program. Relationship between the program and the overall corporate structure, the reporting responsibilities, lines of authority, the role of upper and functional (matrix) management, the role of proposed subcontractors' decision-making authority, and the communication processes. Offeror's internal development organization and the Offeror's internal production organization. Offeror's approach to organizing for production. Relationship between the program organization and subcontractors, to include the integration of specialty engineering activities.	1.5.1 Program Management 3.1 Organization Structure 1.1 Program Management Overview Appendix V: Teaming Documents		
		Staffing plan (curve) showing the personnel build-up to meet the development schedule and that depicts staffing levels and requisite skills through the life of the contract.	1.4.3 Staffing Plan		

L.4.f.3	Volume II: Management				
Section L	Proposal Section	Proposal Outline	Section M	SOW	Performance Specification
2.	Part B. Integrated Master Schedule (IMS)	2.0 Part B. Integrated Master Schedule (IMS)	M.1.1 – M.1.5	3.2.1.2; 3.2.2.1; 3.2.2.2; 3.2.4; 3.2.4.4;3.2.4.2, Part II 4 (all), 3.2.1.6, 3.2.1.6.1, 3.2.4.2, 3.3.5.1, 3.3.5.2.1, 3.3.5.2.3, 3.3.5.2.4, 3.3.6, 3.3.6.2, 3.3.6.3, 3.3.6.4, 3.3.6.5, 3.3.6.5.1, 3.3.6.5.2, 3.3.6.6, 3.3.6.6.1.1, 3.3.6.2, 3.3.6.7, 3.3.6.8, 3.3.6.9, 3.3.8	
3.	Part C. Personnel	3.0 Part C. Personnel			
3.1	Organization Structure	3.1 Organization Structure	M.2	3.2.1.1, 3.2.1.4, 3.2.4.3	
3.2	Personnel Programs and Processes	3.2 Personnel Programs and Processes	M.2		
3.3	Key Personnel	3.3 Key Personnel	M.2		
4.	Part D. Teaming Arrangements	4.0 Part D. Teaming Arrangements			
4.1	Subcontractor Selection	4.1 D.1 Subcontractor Selection	M.3.1		
		4.2 Small Business Plan	M.2c, M.3.2		
5.	Part E. Business Practices	5.0 Part E. Business Practices			
5.1	Integrated Product and Process Development/Integrated Product Teams	5.1 Integrated Product and Process Development/Integrated Product Teams	M.4.1	3.2.1.4, 3.2.1.3, 4.7.1.2, 3.1.2, 3.1.1, 3.2.1.5	
5.2	Systems and Design Engineering	5.2 System and Design Engineering	T.2.2, T.2.6, T.4.1	3.3 (all), 3.2.4, 3.3.4, 3.3.5, 3.3.5.1, 3.3.5.2 (all), 3.3.8 (all), 3.3.8.1, 3.3.9 (all), 3.3.10 (all), 3.3.11, 3.3.13, 3.3.14, 3.3.15, 3.3.18 (all)	3.6.10
5.3	Offeror (Team) Quality Program	5.3 Quality Program	T.4.2	3.3.15	
5.4	Earned Value Management System (EVMS)	5.4 Earned Value Management System (EVMS)	M.4.3	3.2.4, 3.2.4.1, 3.2.4.2, 3.2.4.3, 3.2.4.4, 3.2.4.4.1, 3.2.4.4.2, 3.2.2.1,	

L.4.f.3	Volume II: Management				
Section L	Proposal Section	Proposal Outline	Section M	SOW	Performance Specification
5.5	Facilities and Equipment	5.5 Facilities and Equipment	M.5	3.2.1.6, 3.3.2, 4 (all)	
5.6	Technology Protection	5.6 Technology Protection	M.4.2	3.3.17 (all)	3.7.36, 3.7.36.1, 3.7.36.2

L.4.f.4	Volume III: Past Performance				
Section L	Proposal Section	Proposal Outline	Section M	SOW	Performance Specification
1.	Volume III				
1.1	Relevant Past Performance Information	1.1 Relevant Past Performance Information	P.1		
1.2	Terminated Contracts	1.2 Terminated Contracts	P.1		
1.3	Miscellaneous	1.3 Miscellaneous			
1.3.1	New Corporate Entities	1.3.1 New Corporate Entities	P.1		
1.3.2	Subcontractor Consent To Government For Discussion	1.3.2 Subcontractor Consent To Government For Discussion	P.1		
1.3.3	Other Pertinent Past History	1.3.3 Other Pertinent Past History	P.1		
1.4	Past Performance Questionnaire	App A Past Performance Questionnaire	P.1		

L.4.f.5	Volume IV: Cost / Price				
Section L	Proposal Section	Proposal Outline	Section M	SOW	Performance Specification
1.	Organization	1.1 Introduction	**M.4.4, Cost realism and reason-ableness**		
1.1	Cost Volume Table of Contents	1 Cost Volume Table of Contents			
1.2	Part A - Cost Plus Incentive Fee CLINs	1.2 PART A – Cost Plus Incentive Fee CLINs			
1.3	Part B - Fixed Price Incentive Fee CLINs	1.3 PART B - Fixed Price Incentive Fee CLINs			
1.4	Part C – Labor Hours CLINs	1.4 PART C – Labor Hours CLINs			
1.5	Part D - Fixed Price CLINs	1.5 PART D - Fixed Price CLINs			
1.6	Part E – Cost Reimbursable CLIN	1.6 PART E – Cost Reimbursable CLIN			
1.7	Part F – Cost-Plus-Fixed-Fee (CPFF) CLIN	1.7 PART F – Cost-Plus-Fixed-Fee (CPFF) CLIN			
1.8	Part G – RMA and Life Cycle Cost Information	Part G – RMA Life Cycle Cost Information			

L.4.f.5	Volume V: Business Volume				
Section L	Proposal Section	Proposal Outline	Section M	SOW	Performance Specification
1.	Model Contract	1. Model Contract			
2.	Certification	2. Certification			
3.	Subcontracting Plan	3. Subcontracting Plan	M.3.2, M.2c		
4.	Use of Government Property	4. Use of Government Property			
5.	Independent Research and Development (IRAD) Effort	5. Independent Research and Development (IRAD) Effort			
6.	EEO Compliance	6. EEO Compliance			
7.	Facility Clearance	7. Facility Clearance	M.4.2, M.5		

GROUND/AIR TASK ORIENTED RADAR (G/ATOR)
Cross Reference Matrix from Section M Evaluation Factors to Proposal Paragraph

Section M Key Performance Parameter	Proposal Section (T=Technical, M=Management)	Proposal Paragraph Title
T1 Performance		
T.1.1 Key Performance Parameters		
T1.1 K01	T-A3.5	INTEROPERABILITY
	T-A3.2.4.2	Features
	T-A3.2.4.2.4.1	GPS and GPS Antenna
	T-A3.5.1	KPPs.
	T-A3.5.1.1	Information Exchange Requirements (IERs).
	T-A3.5.8	Interfaces.
	T-A3.5.8.3	Voice Communication (Command Net or Convoy Operation).
	T-A3.5.8.4	Intra Radar Team Communication.
	T-A3.5.8.5	Remote Communications.
T1.1 K02	T-A3.1.2	Open Systems Architecture/Modular Open Systems Architecture (MOSA)
	T-A3.5.1	KPPs.
	T-A3.5.1.2	JROC/JCS Approved/Validated Integrated Architecture Behavior Model (IABM).
	T-A3.5.2	Department of Defense (DoD) Information Technology Standards Registry (DISR).
T1.1 K03	T-A3.1.6	Security
	T-A3.1.6.1	Information Assurance
	T-A3.1.6.1.1	Security Container
	T-A3.1.6.1.2	Lock Points
	T-A3.1.6.1.3	Classified Software
	T-A3.1.6.1.4	Public Key Infrastructure (PKI)
	T-A3.1.6.2	Anti-Tamper
	T-A3.2.6.3	Target Track.
	T-A3.2.6.3.1	Latency.
	T-A3.2.6.3.1.2	External Request Response Latency.
	T-A3.2.7.3	Target Track
	T-A3.2.7.3.1	Latency
	T-A3.2.7.3.1.2	External Request Response Latency
	T-A3.5.1	KPPs.
	T-A3.5.1.3	Global Information Grid (GIG).
	T-A3.5.3	Internet Protocol.

Section M Key Performance Parameter	Proposal Section (T=Technical, M=Management)	Proposal Paragraph Title
	T-A3.5.4	Semantic Tagging.
	T-A3.5.5	Information Integrity.
	T-A3.5.6	Providing Network Management Status.
	T-A3.5.7	Obtaining Network Management Status.
	T-A3.5.8	Interfaces.
	T-A3.5.8.1	Communication to C2.
	T-A3.5.8.1.1	Emission Control (EMCON).
	T-A3.5.8.2	Communication to CTN/CEC.
T1.1 K04	T-A3.1.7.5	Blake Chart and Parameter Definition
	T-A3.2.4.3	Radar Modes of Operation
	T-A3.2.6.3	Target Track.
	T-A3.2.6.3	Target Track.
	T-A3.2.6.6	Firm Track Range Requirements.
	T-A3.2.7.3	Target Track
	T-A3.2.7.6	Firm Track Range Requirements.
T1.1 K05	T-A3.2	Performance
	T-A3.2.4.3	Radar Modes of Operation
	T-A3.2.6.13.1	Range Resolutions.
	T-A3.2.6.14	Radar Accuracy.
	T-A3.2.6.14.1	Non Dedicated Track Waveforms.
	T-A3.2.6.6	Firm Track Range Requirements.
	T-A3.2.7.14	Radar Accuracy.
	T-A3.2.7.14.1	Range Resolutions.
	T-A3.2.7.14.1.1	Non-Dedicated Track Resolution.
	T-A3.2.7.6	Firm Track Range Requirements.
T1.1 K06	T-A3.2	Performance
	T-A3.2.6.14	Radar Accuracy.
	T-A3.2.6.14.1.3	Height.
	T-A3.2.7.14	Radar Accuracy.
	T-A3.2.7.15.1.3	Height.
	T-A3.2.7.15.2.3	Height.
T1.1 K07	T-A3.2	Performance
	T-A3.2.4.3	Radar Modes of Operation
	T-A3.2.6.1	Search Volume
	T-A3.2.6.1	Search Volume
	T-A3.2.6.1	Search Volume
	T-A3.2.6.6.6	Firm Track Initiation.
	T-A3.2.6.6.7	Slant Range Versus Elevation.

Section M Key Performance Parameter	Proposal Section (T=Technical, M=Management)	Proposal Paragraph Title
	T-A3.2.6.6.8	Pop-up Target (TAOC).
	T-A3.2.7.1	Search Volume
	T-A3.2.7.2	Search Volume Revisit Period.
	T-A3.2.7.3	Target Track
	T-A3.2.7.4	Track Volume.
	T-A3.2.7.5	Firm Track Update Rate
	T-A3.2.7.5	Firm Track Update Rate
	T-A3.2.7.6	Firm Track Range Requirements.
	T-A3.2.7.6.2	Type 0 Targets
	T-A3.2.7.6.6	Firm Track Initiation (TAOC)
	T-A3.2.7.6.6	Firm Track Initiation.
	T-A3.2.7.6.7	Slant Range Versus Elevation
	T-A3.2.7.6.8	Pop-up Target
T1.1 K08	T-A3.2.4.3	Radar Modes of Operation
	T-A3.2.7.1	Search Volume
	T-A3.2.7.1	Search Volume.
	T-A3.2.7.2	Search Volume Revisit Period.
	T-A3.2.7.3	Target Track
	T-A3.2.7.4	Track Volume.
	T-A3.2.7.5	Firm Track Update Rate
	T-A3.2.7.6	Firm Track Range Requirements.
	T-A3.2.7.6.6	Firm Track Initiation (TAOC)
	T-A3.2.7.6.7	Slant Range Versus Elevation
	T-A3.2.7.6.8	Pop-up Target
T1.1 K09	T-A3.2	Performance
	T-A3.2.4.3	Radar Modes of Operation
	T-A3.2.6.1	Search Volume
	T-A3.2.6.2	Search Volume Revisit Period
	T-A3.2.6.3	Target Track.
	T-A3.2.6.3	Target Track.
	T-A3.2.6.4	Track Volume
	T-A3.2.6.5	Firm Track Update Rate
	T-A3.2.6.6	Firm Track Range Requirements.
	T-A3.2.6.6.4	Type 2 Targets
	T-A3.2.6.6.6	Firm Track Initiation
	T-A3.2.6.6.7	Slant Range Versus Elevation
	T-A3.2.6.6.8	Pop-up Target
	T-A3.2.7.1	Search Volume
	T-A3.2.7.2	Search Volume Revisit

Section M Key Performance Parameter	Proposal Section (T=Technical, M=Management)	Proposal Paragraph Title
		Period.
	T-A3.2.7.3	Target Track
	T-A3.2.7.4	Track Volume.
	T-A3.2.7.5	Firm Track Update Rate
	T-A3.2.7.6	Firm Track Range Requirements.
	T-A3.2.7.6.4	Type 2 Targets
	T-A3.2.7.6.6	Firm Track Initiation (TAOC)
	T-A3.2.7.6.7	Slant Range Versus Elevation
	T-A3.2.7.6.8	Pop-up Target
T1.1 K10	T-A3.2.4.3	Radar Modes of Operation
	T-A3.2.5	Combat Identification Requirements.
	T-A3.2.5.1	Friendly Force Combat Identification.
	T-A3.2.5.2	Identification Friend or Foe (IFF).
	T-A3.2.5.2.1	IFF Antenna.
	T-A3.2.5.2.2	IFF Range Selection.
	T-A3.2.5.2.2.1	SHORAD IFF Range Performance.
	T-A3.2.5.2.2.2	TAOC IFF Range Performance.
	T-A3.2.5.2.3	IFF / Radar Reporting.
	T-A3.2.5.2.3.1	Local Operation and Reporting.
	T-A3.2.5.2.3.2	Remote Reporting.
	T-A3.2.5.2.4	IFF Mode Interrogation.
T1.1 K11	T-A3.2.1.1	Mobility Assets
	T-A3.2.2.1.2	Land Transport.
	T-A3.2.9	Operator Workstations.
	T-A3.2.9.2	Operator Workstation Mobility Mode Configuration.
	T-A3.4.1	Prime Power Protection and Conditioning.
	T-A3.4.1.8	Keep Alive Power.
	T-A3.5.8	Interfaces.
	T-A3.5.8.3	Voice Communication (Command Net or Convoy Operation).
T1.1 K12	T-A3.2.1	Mobility
	T-A3.2.1.2	Configuration
	T-A3.2.1.3	Prime Mover and Trailer Modifications
	T-A3.2.2.1.2	Land Transport.
T1.1 K13	T-A3.2.1	Mobility
	T-A3.2.1.4	Prime Mover Payload
	T-A3.2.1.5	Trailers

Section M Key Performance Parameter	Proposal Section (T=Technical, M=Management)	Proposal Paragraph Title
	T-A3.2.1.7	Prime Mover Axle Weights
	T-A3.2.1.8	Prime Mover Capabilities
	T-A3.2.2	Transportability
	T-A3.2.2.1	Air, Land and Sea Transportability.
	T-A3.2.2.1.1	Air Transport
	T-A3.2.2.1.1.2	Internal C-130 Transport.
T1.1 K14	T-A3.1.3	Human Systems Integration (HSI)
	T-A3.2.1.10	Shock and Vibration Mobility Mode
	T-A3.2.1.8	Prime Mover Capabilities
	T-A3.2.2	Transportability
	T-A3.2.2.1	Air, Land and Sea Transportability.
	T-A3.2.2.1.1.1	External Lift
	T-A3.2.2.1.2.1	Safe Loading / Unloading into / from Prime Mover
	T-A3.2.2.1.2.2	Transport by Rail and Highway
	T-A3.2.2.1.3	Shipboard Transport
	T-A3.2.2.2	Lifting and Tie Down Provisions
	T-A3.2.2.3	Shock and Vibration Transport Mode
	T-A3.2.9	Operator Workstations.
	T-A3.2.9.3	Operator Workstation Transport Mode Configuration.
	T-A3.2.2.1.1.3	Safe Loading / Unloading into / from C-130J
T1.1 K15	T-A3.1.3	Human Systems Integration (HSI)
	T-A3.2.1	Mobility
	T-A3.2.2	Transportability
	T-A3.2.3	Reconfiguration
	T-A3.2.3.2	Operation without Prime Mover(s)
	T-A3.2.3.3	Terrain
	T-A3.2.3.4	Antenna Leveling
	T-A3.2.3.5	Leveling Accuracy
	T-A3.2.3.6	Special Tools
	T-A3.2.3.7	Reconfiguration Time Lines
	T-A3.2.3.7.1	Mobility Mode to Operational Mode (standard dress)
	T-A3.2.4.1	Radar States
	T-A3.2.4.1.1	System Initialization and Configuration State
	T-A3.2.4.1.2	Stand By State

Section M Key Performance Parameter	Proposal Section (T=Technical, M=Management)	Proposal Paragraph Title
	T-A3.2.4.1.3	Ready State
	T-A3.2.4.1.4	Operate State
	T-A3.2.4.2	Features
	T-A3.2.4.2.4	Self Locating
	T-A3.6.7	Wind Loading.
T1.1 K16	T-A3.1.3	Human Systems Integration (HSI)
	T-A3.2.1	Mobility
	T-A3.2.1.8	Prime Mover Capabilities
	T-A3.2.3	Reconfiguration
	T-A3.2.3.2	Operation without Prime Mover(s)
	T-A3.2.3.3	Terrain
	T-A3.2.3.6	Special Tools
	T-A3.2.3.7	Reconfiguration Time Lines
	T-A3.2.3.7.2	Mobility Mode to Operational Mode (MOPP-IV or cold weather gear)
	T-A3.2.3.7.4	Operational Mode to Mobility Mode (MOPP-IV or cold weather gear)
	T-A3.2.4	Radar States, Features and Modes of Operation
	T-A3.6.7	Wind Loading.
T1.1 K17	T-A3.2.1.8	Prime Mover Capabilities
T.1.2 – Search Scheme and Track Logic	T-A3.2	Performance
	T-A3.2.4.3	Radar Modes of Operation
	T-A3.2.6.1	Search Volume
	T-A3.2.6.1	Search Volume
	T-A3.2.6.10	False Track Rate.
	T-A3.2.6.14.2	Dedicated Hostile / C2 Commanded Track Waveforms.
	T-A3.2.6.2	Search Volume Revisit Period
	T-A3.2.6.3	Target Track
	T-A3.2.6.4	Track Volume
	T-A3.2.6.5	Firm Track Update Rate
	T-A3.2.6.6	Firm Track Range Requirements.
	T-A3.2.6.7	Other Dedicated Hostile / C2 Commanded Waveform Uses
	T-A3.2.6.7	Other Dedicated Hostile / C2 Commanded Waveform Uses
	T-A3.2.6.9	Track Load.
	T-A3.2.7.1	Search Volume
	T-A3.2.7.1	Search Volume.
	T-A3.2.7.10	False Track Rate

Section M Key Performance Parameter	Proposal Section (T=Technical, M=Management)	Proposal Paragraph Title
	T-A3.2.7.2	Search Volume Revisit Period.
	T-A3.2.7.3	Target Track
	T-A3.2.7.3	Target Track
	T-A3.2.7.3	Target Track
	T-A3.2.7.3	Target Track
	T-A3.2.7.4	Track Volume.
	T-A3.2.7.5	Firm Track Update Rate
	T-A3.2.7.6	Firm Track Range Requirements.
	T-A3.2.7.7	Other Dedicated Hostile / C2 Commanded Waveform Uses
	T-A3.2.7.8	External Cues
	T-A3.2.7.9	Track Load
T.1.3 – All Weather Performance / Performance in Clutter	T-A3.1.1	Frequency Selection
	T-A3.1.7.4	Clutter Improvement Factor (CIF) Budget
	T-A3.2.4.3.1	Single Mission Mode
	T-A3.2.4.3.2	Combined Air Mode
	T-A3.2.4.3.3	Sectored Mode
	T-A3.2.4.3.4	User Defined Mode
	T-A3.2.4.3.5	Contingency Operation Mode
	T-A3.2.6.1	Search Volume
	T-A3.2.6.1.1	Range Coverage.
	T-A3.2.6.1.2	Azimuth Coverage.
	T-A3.2.6.1.3	Height Coverage.
	T-A3.2.6.1.4	Elevation Coverage.
	T-A3.2.6.10	False Track Rate.
	T-A3.2.6.14.2	Dedicated Hostile / C2 Commanded Track Waveforms.
	T-A3.2.6.2	Search Volume Revisit Period
	T-A3.2.6.3	Target Track.
	T-A3.2.6.4	Track Volume
	T-A3.2.6.5	Firm Track Update Rate
	T-A3.2.6.6	Firm Track Range Requirements.
	T-A3.2.6.7	Other Dedicated Hostile / C2 Commanded Waveform Uses
	T-A3.2.6.7	Other Dedicated Hostile / C2 Commanded Waveform Uses
	T-A3.2.6.8	External Cues
	T-A3.2.6.9	Track Load.
	T-A3.2.6.9	Track Load.
	T-A3.2.7.1	Search Volume.
	T-A3.2.7.10	False Track Rate
	T-A3.2.7.2	Search Volume Revisit

Section M Key Performance Parameter	Proposal Section (T=Technical, M=Management)	Proposal Paragraph Title
		Period.
	T-A3.2.7.3	Target Track
	T-A3.2.7.4	Track Volume.
	T-A3.2.7.5	Firm Track Update Rate
	T-A3.2.7.6	Firm Track Range Requirements.
	T-A3.2.7.7	Other Dedicated Hostile / C2 Commanded Waveform Uses
	T-A3.2.6.9	Track Load.
T.1.4 – Radar Report	T-A3.2.4.3	Radar Modes of Operation
	T-A3.2.6.11	Velocity.
	T-A3.2.6.12	Target Acceleration
	T-A3.2.6.12	Target Acceleration
	T-A3.2.6.12	Target Acceleration
	T-A3.2.6.13	Resolution
	T-A3.2.6.13.1.1	Non-Dedicated Track Resolution.
	T-A3.2.6.13.1.2	Dedicated Track Resolution.
	T-A3.2.6.13.2	Angular Resolutions.
	T-A3.2.6.14	Radar Accuracy.
	T-A3.2.6.14.1.1	Range.
	T-A3.2.6.14.1.2	Azimuth.
	T-A3.2.6.14.1.3	Height.
	T-A3.2.6.14.2.2	Azimuth.
	T-A3.2.6.14.2.3	Height.
	T-A3.2.6.15	Tracker Functionality
	T-A3.2.6.3	Target Track.
	T-A3.2.6.6	Firm Track Range Requirements.
	T-A3.2.7.11	Velocity.
	T-A3.2.7.12	Target Acceleration
	T-A3.2.7.13	Resolution
	T-A3.2.7.14	Radar Accuracy
	T-A3.2.7.15	Tracker Functionality
T.1.5 – Search and Track Volume	T-A3.2.4.2	Features
	T-A3.2.4.2.2	Elevation Control
	T-A3.2.4.2.2.1	Auto Terrain Mask
	T-A3.2.6.1	Search Volume
	T-A3.2.6.16	Instrumented Range and Height
	T-A3.2.6.2	Search Volume Revisit Period
	T-A3.2.6.4	Track Volume
	T-A3.2.6.5	Firm Track Update Rate
	T-A3.2.6.6	Firm Track Range Requirements.
	T-A3.2.7.1	Search Volume.

Section M Key Performance Parameter	Proposal Section (T=Technical, M=Management)	Proposal Paragraph Title
	T-A3.2.7.16	Instrumented Range and Height
	T-A3.2.7.2	Search Volume Revisit Period.
	T-A3.2.7.4	Track Volume.
	T-A3.2.7.5	Firm Track Update Rate
	T-A3.2.7.6	Firm Track Range Requirements.
T.1.6 – Track Load	T-A3.2.6.10	False Track Rate.
	T-A3.2.6.3	Target Track.
	T-A3.2.6.5	Firm Track Update Rate
	T-A3.2.6.9	Track Load.
	T-A3.2.7.3	Target Track
	T-A3.2.7.5	Firm Track Update Rate
	T-A3.2.7.9	Track Load
T.1.7 False Track Rate	T-A3.2.6.10	False Track Rate.
	T-A3.2.6.3	Target Track.
	T-A3.2.6.9	Track Load.
	T-A3.2.7.10	False Track Rate
	T-A3.2.7.3	Target Track
	T-A3.2.7.9	Track Load
T.1.8 Electronic Protection (EP) / Performance in Jamming	T-A3.2.8	Electronic Protection.
	T-A3.5.8	Interfaces.
	T-A3.5.8.1.1	Emission Control (EMCON).
	T-A3.6.10	Survivability.
	T-A3.6.10.1	Survivability Electromagnetic Pulse (EMP) and High-altitude Electromagnetic Pulse (HEMP).
	T-A3.6.9	Electromagnetic Environment (EME) / Electromagnetic Compatibility (EMC).
T.1.9 – Radar Modes of Operation	T-A3.2.4.2	Features
	T-A3.2.4.2.1	Radar Optimization Sectors
	T-A3.2.4.2.1.1	Sector Definition
	T-A3.2.4.3	Radar Modes of Operation
	T-A3.2.4.3.1	Single Mission Mode
	T-A3.2.4.3.2	Combined Air Mode
	T-A3.2.4.3.4	User Defined Mode
	T-A3.2.4.3.5	Contingency Operation Mode
	T-A3.2.6	SHORAD Mode of Operation.
	T-A3.2.7	TAOC Mode of Operation.
	T-A3.2.9	Operator Workstations.
	T-A3.7.2.4	Search Volume.
T2 Design		
T.2.1 Growth	T-A3.7	GROWTH.
	T-A3.1.2	Open Systems Architecture/Modular Open

Section M Key Performance Parameter	Proposal Section (T=Technical, M=Management)	Proposal Paragraph Title
		Systems Architecture (MOSA)
	T-A3.7.1	Technology Insertion.
	T-A3.7.1.1	Array Design Enabler.
	T-A3.7.1.2	Timing Circuits Enabler.
	T-A3.7.1.3	Flexible Design.
	T-A3.7.1.4	Processing Enabler.
	T-A3.7.1.5	Open Card Slots.
	T-A3.7.1.6	Array Design Enabler.
	T-A3.7.1.7	Timing Circuits Enabler.
	T-A3.7.1.8	Flexible Design.
	T-A3.7.1.9	Processing Enabler.
	T-A3.7.2	Technology Insertion.
T.2.2 Reliability, Maintainability and Availability	T-A3.3	MAINTENANCE MODE.
	T-A3.2.4.3.6	Maintenance Mode
	T-A3.2.4.3.7	Training Mode.
T.2.3 Transmit and Receive Components	T-A3.1.7	Offeror Specific Design Data
	T-A3.1.7.1	Antenna Array
	T-A3.1.7.1.1	T/R Modules
	T-A3.1.7.2	Receiver
	T-A3.1.7.2.1	System Noise Temperature
	T-A3.1.7.3	Signal Processor
	T-A3.1.7.3.1	Waveforms
	T-A3.1.7.3.1.1	Range Extended Terrain Clutter Waveforms
T.2.4 System Cooling	T-A3.4.3	System Cooling.
	T-A3.6.1	Operating Temperature.
	T-A3.6.2	Solar Radiation.
T.2.5 Prim Power	T-A3.2.1.6	Prime Power Source Fuel Allocation
	T-A3.4.1	Prime Power Protection and Conditioning.
	T-A3.4.2	Prime Power.
	T-A3.4.2.1	Prime Power Source.
	T-A3.4.2.1.1	Fuel Consumption Rate.
	T-A3.4.2.2	Parallel Operation.
	T-A3.4.2.3	Backwards Compatible.
	T-A3.6.3	Altitude/Atmospheric Pressure.
T.2.6 Equipment Design and Safety	T-A3.1.3	Human Systems Integration (HSI)
	T-A3.1.4	Selection of Materials and Parts
	T-A3.1.4.1	Composite Materials
	T-A3.1.4.1.1	Composite Material Structural Properties
	T-A3.1.4.1.2	Composite Material Buckling

Section M Key Performance Parameter	Proposal Section (T=Technical, M=Management)	Proposal Paragraph Title
	T-A3.1.4.1.3	Composite Material Stress Allowables in Critical Joints
	T-A3.1.4.1.4	Composite Material Stress Allowables in General Structure
	T-A3.1.4.1.5	Composite Material Shielding (Electromagnetic Effects)
	T-A3.1.4.1.6	Composite Material Grounding (Lightning Strike)
	T-A3.1.4.2	Corrosion Control and Prevention
	T-A3.1.4.2.1	Negative Effects of Salt Spray
	T-A3.1.4.2.2	Protective Coatings and Surface Treatments
	T-A3.1.5	Selection of Specifications and Standards
	T-A3.2.1	Mobility
	T-A3.2.1.8	Prime Mover Capabilities
	T-A3.2.2	Transportability
	T-A3.2.3	Reconfiguration
	T-A3.2.3.1	Self Load and Unload
	T-A3.2.3.2	Operation without Prime Mover(s)
	T-A3.2.3.3	Terrain
	T-A3.2.3.4	Antenna Leveling
	T-A3.2.3.5	Leveling Accuracy
	T-A3.2.3.6	Special Tools
	T-A3.2.3.7.1	Mobility Mode to Operational Mode (standard dress)
	T-A3.2.3.7.3	Operational Mode to Mobility Mode (standard dress)
	T-A3.4.1	Prime Power Protection and Conditioning.
	T-A3.4.3	System Cooling.
	T-A3.5.8	Interfaces.
T3 Software		
T.3.1 System Architecture / Software Design	T-A3.1.2	Open Systems Architecture/Modular Open Systems Architecture (MOSA)
	T-A3.1.2.1	Closed and / or Proprietary Solutions
	T-A3.2.6.3	Target Track.
T.3.2 Critical Software Practices	T-A3.9.3	Critical Software Practices
	T-A3.9.4	Software Quality
	T-A3.9.5	Configuration Management

Section M Key Performance Parameter	Proposal Section (T=Technical, M=Management)	Proposal Paragraph Title
T4 Logistics		Part B: Logistics Support
T.4.1 Provisions of Interim Contractor Logistics Support	T-B1	Interim Contractor Logistics Support.
	T-B1.1	Technical Data.
	T-B1.2	Technical Publications.
	T-B1.3	Training Materials and Course Descriptive Data.
	T-B1.4	Transportability Program.
	T-B1.5	Interim Contractor Support.
T.4.2Performance Based Logitics	T-B2	Performance Based Statement of Work.

GROUND/AIR TASK ORIENTED RADAR (G/ATOR)
Cross Reference Matrix from SOW to IMP Reference to Proposal

	Statement of Work	IMP Reference	Primary Reference	Proposal Paragraph
1	Scope			N/A
1.1	Background			N/A
1.1.1	Development			N/A
1.1.1.1	G/ATOR System			N/A
1.1.1.2	Radar Environmental Simulator			N/A
1.1.1.3	Single Integrated Air Picture			N/A
1.1.1.4	Alternative Prime Power Source Solution			N/A
1.1.1.5	Alternative Trailer			N/A
1.1.1.6	Technical Data Package			N/A
1.1.1.7	Software Source Code/Model Driven Architecture Models			N/A
1.1.2	G/ATOR Increment I Low Rate Initial Production			N/A
1.1.3	G/ATOR Increment I Production			N/A
1.1.4	Interim Contractor Logistics Support			N/A
1.1.5	Performance Based Logistics			N/A
2	Applicable Documents			N/A
2.1	General			N/A
2.2	Government Documents			N/A
2.2.1	Specifications, Standards and Handbooks			N/A
2.2.2	Other Government Documents, drawings and publications			N/A
2.3	Non-Government Documents			N/A
2.4	Forms			N/A
3	Requirements.			N/A
3.1	G/ATOR System			T-A 3.1.7
3.1.1	G/ATOR Radar Environmental Simulator (RES)	H05006	**M 1.4.2.1.8**	M-5.1.2.4; M 1.3.9.2
3.1.2	Integrated Architectural Behavior Model		**M 1.5.4.3**	M-5.1.2.3, M 1.3.9.2, T-A 3.5.1, T-A3.5.2
3.1.3	Alternative Power Prime Source.		**T-A 3.4**	M 1.3.9.2; T-A 3.4;
3.1.4	Alternative Trailer			
3.1.5	Technical Data Package		**M 1.5.1.11**	M-1.4.2.6; T-A 3.4.1.1, T-B 1.1
3.1.6	Software Source Code/Model Driven Architecture Models (MDA)		**M 1.4.2.7**	T-A 3.4.1.2
3.1.7	Increment I Low Rate Initial Production (LRIP)		**M 1.4.2.2**	M 1.2.2.1; M 1.5.9; M 1.5.3.2.3, T-A 3.4.1.3
3.1.8	Increment I Production		**M 1.5.9**	M-1.4.2.3; M 1.5.3.2.3, T-A 3.1.4
3.1.9	Increment I Interim Contract Logistics Support (ICLS)		**M 1.4.2.4**	T-A 3.1.5, T-B 1.5; M-1.5.7.4

	Statement of Work	IMP Reference	Primary Reference	Proposal Paragraph
3.1.10	Performance Based Logistics (PBL)	P13	**M 1.4.2.5**	T-A 3.4.1.6, T-B 2.4; T-B 2.0; M-1.1.11
3.1.11				T-A 3.4.1.7
3.1.12				T-A 3.4.1.8
3.1.13				T-A 3.4.1.9
3.2	Program and Data Management		**M 1.5.1**	M.1.5.2; M.1.5.3
3.2.1	Program Management	L02003, M18001, P21001	**M 1.5.1**	M.1.5.2; M.1.5.3, M-APPENDIX I, M-APPENDIX II, M1.4.2.1.3, M 1.5.1.21
3.2.1.1	Assignment of Responsibility and Authority		**M 3.1**	M-1.5.1.1; M-1.5.2.1; M-1.4.3
3.2.1.2	Schedule Planning	C03002, L02004, M18002, P20002	**M 2.1**	M 2.0; M 1.5.1.7
3.2.1.3	Risk Management	C04001, C06001, F06, G09, G10, G11, H05001-05, H12001, H12004	**M 1.2**	T-A 3.9.1.7, M 1.5.1.6, M 5.1
3.2.1.4	Integrated Product/Process Teams (IPT)	A02, B02, L02002, P21003, M18003, P20003	**M 3.1**	M 1.5.2.1; M 5.1
3.2.1.5	Interface Control Working Groups (ICWG)	L02005,	**M 1.5.4.3**	M-5.1; M 5.1.2, M 1.5.1.14; M 1.5.1.9, M 1.5.1.19; T-A 3.5.1
3.2.1.6	Government Property (GP)		**M 1.5.1.7.2**	M 5.2.2.1, M 2.1, M 1.5.4.2.1
3.2.1.6.1	Equipment	L02015	**M 2.1**	
3.2.1.6.2	Information	L02016	**M 1.4.2.1.9**	T-B 1.1, M 1.4.2.2.1, M 1.4.2.3.1
3.2.2	Meetings, Formal Reviews, Conferences, and Audits.		**M 1.5.3.4**	M 1.5.1.19; M 1.4.2, M 1.5.2.3
3.2.2.1	Integrated Baseline Review	C01, C02, C04002, C06002	**M 1.4.2.1.3**	M 2.0; M 1.5.2.2; M 1.5.2.4, M 5.4
3.2.2.2	In-Process Review	L02001	**M 1.5.3.4.1.10**	M 2.0
3.2.3	Data Management	C04003, C06003	**M 1.5.1.11**	T-B 1.1
3.2.4	Contractor Performance Measurement.		**M 5.4**	M 1.5.1.11; M 2.0; M 1.5.2, M 5.2.2.7.3, M 2.1
3.2.4.1	Cost Control and Accounting		**M 5.4**	M 1.5.2
3.2.4.2	Earned Value Management System		**M 5.4**	M 1.5.2; M 2.0
3.2.4.3	Contract Work Breakdown Structure	C03001	**M 1.5.1.2**	M APPENDIX I; II; M 5.4, M3.1
3.2.4.4	Contractor Cost Data Reporting		**M 5.4**	M 1.5.1.11; M 1.5.2; M 2.0
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List of Acronyms

A/D---------- Analog / Digital
AAR ---------- Association of American Railroads
AAW---------- Anti-Air Warfare
ABL---------- Allocated Baseline
ABR ---------- Agile Beam Radar
ABT---------- Air Breathing Threat/Target
AC ---------- Accomplishment Criteria
AC ---------- Alternating Current
ACEIT--------- Automated Cost Estimating Integrated Tool
ACWP -------- Actual Cost of Work Performed
ADC---------- Analog to Digital Converter
ADCP--------- Air Defense Communications Platform
ADM---------- Advanced Demonstration Model
ADPE--------- Automated Data Processing Equipment
ADS ---------- Air Defense System
AESA --------- Active Electronically Scanned Array
AESA --------- Advanced Electronically Scanned Array
AFATDS------- Advanced Field Artillery Tactical Data System
AGBR--------- Affordable Ground Based Radar
AGC---------- Automatic Gain Control
Ai---------- Inherent Availability
AMEC--------- Advanced Microelectronics
AMMPS ------- Advanced Medium Mobile Power Set
AMP---------- Avionics Modernization Program
AMRRAM ------ Advance Medium-Range Air-Air Missile
ANSI---------- American National Standards Institute
ANZAC -------- Australian and New Zealand Army Corp
AOA---------- Alternatives of Analysis
AOC---------- Air and Space Operations Center
AOP---------- Annual Operating Plan
ARM---------- Anti-Radiation Missile
AS---------- Air Support
ASCM--------- Anti-Ship Cruise Missile
ASD ---------- Air Situational Display
ASDS--------- Advanced Seal Delivery System
ASMD--------- Anti-Ship Missile Defense Program
ASQ ---------- American Society for Quality
ASR ---------- Air Surveillance Radar
ASTM--------- American Society of Testing and Materials
AT---------- Anti-Tamper
ATC---------- Air Traffic Control
ATDL--------- Army Tactical Data Link
ATNAVICS ---- Air Traffic Navigation, Integration, & Coordination System
ATP---------- Acceptance Test Procedure
AVL---------- Approved Vendor List
AWACS ------- Airborne Warning and Control System
BAFO --------- Best and Final Offer
BBR ---------- Budget Baseline Revision
BCA---------- Business Case Analysis
BCWP -------- Budgeted Cost of Work Performed
BCWS -------- Budgeted Cost of Work Scheduled
BDZ---------- Base Defensive Zone
BIT---------- Built In Test
BITE--------- Built In Test Equipment
BM---------- Business Manager
BMADS------- Battlespace Management and Air Defense Systems
BOE --------- Basis of Estimate
BOM--------- Bill of Material
BSC --------- Beam Steering Controller
C&A --------- Certification and Accreditation
C/O --------- Checkout
C2---------- Command and Control
C4ISR-------- Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance
CA---------- Contract Award
CA---------- Control Account
CA---------- Courier Access
CAC2S------- Common Aviation Command and Control System
CACCS ------ See CAC2S
CACE -------- Coherent Analytical Computing Environment
CAD/CAM----- Computer Aided Design/Computer Aided Manufacturing
CAIV--------- Cost as an Independent Variable
CAM--------- Control Account Manager
CAPS -------- Control Account Plan
CARC -------- Chemical Agent Resistant Coating
CARD -------- Cost Analysis Requirements Document
CBI--------- Common Buss Interface
CBIT--------- Continuous BIT
CBM--------- Conditional Based Maintenance
CBR --------- Counter Battery Radar
CBT---------- Computer Based Training
CCA--------- Circuit Card Assembly
CCB--------- Change Control Board
CCB--------- Configuration Control Board
CDD--------- Capability Development Document
CDR--------- Critical Design Review
CDRL -------- Contract Data Requirements List
CDT -------- Commodity Design Team
CEA--------- CEA Technologies
CEC--------- Cooperative Engagement Capability
CEG--------- Communication Equipment Group
CEM--------- Corporate Export Management
CEO--------- Chief Executive Officer
CEP--------- Circular Error Probable
CEP--------- Cooperative Engagement Processor
CER--------- Cost Estimating Relationship
CF/FS-------- Counter Fire / Fire Support
CFAR -------- Constant False Alarm Rate
CFFZ-------- Call For Fire Zone
CFO--------- Chief Financial Officer
CFR--------- Code of Federal Regulations
CFSR -------- Contract Funds Status Report
CFZ--------- Critical Friendly Zone
CG---------- Center of Gravity
CG(X)-------- Littoral Combat Family of Ships
CI---------- Configuration Item
CID ---------- Combat Identification
CIF---------- Clutter Improvement Factor
CJR---------- Cobra Judy Replacement
CLAWS------ Complimentary Low Altitude Weapon System
CLIN-------- Contract Line Item
CM---------- Configuration Management
CM---------- Corrective Maintenance

CM---------- Cruise Missile
CMBC---------- Coherent Mainbeam Cancellation
CMD---------- Command
CMIS---------- Configuration Management Information System
CMM ---------- Capability Maturity Model
CMMI---------- Capability Maturity Model Integration
CMMI---------- Carnegie Mellon Management Institute
CMRRP -------- Composite Material Risk Reduction Program
CN ---------- Change Notice
CNA---------- Computer Network Attack
CND---------- Computer Network Defense
CoC---------- Certificate of Conformance
COC---------- Combat Operations Center
COI ---------- Communities of Interest
COM---------- Communications IPT
COMPUSEC --- Computer Security
COMSEC ------ Communications Security
CONOPS ------ Concept of Operations
CONUS-------- Continental United States
COP ---------- Common Operational Picture
CORBA-------- Common Object Request Broker Architecture
COTS --------- Commercial-off-the-Shelf
CP&C --------- Corrosion Prevention and Control
CPFF---------- Cost Plus Fixed Fee
CPI---------- Cost Performance Index
CPIF---------- Cost Plus Incentive Fee
CPP ---------- Comprehensive Program Plan
CPR ---------- Cost Performance Report
CPU ---------- COMMS Processor Unit
CR ---------- Change Request
CR&D---------- Contract Research and Development
CRAF --------- Civilian Reserve Air Fleet
CRAM--------- Counter Rockets Artillery and Mortars
CRC---------- Cyclic Redundancy Checksum
CRD---------- Capstone Requirements Document
CSCI --------- Computer Software Configuration Item
CSLC --------- Coherent Sidelobe Cancellation
CSP ---------- Customer Supplied Property
CTN --------- Composite Tracking Network
CTRL--------- Control
CWBS -------- Contractor Work Breakdown Structure
D/C/T--------- Design, Code, and Test
DA ---------- Design Authority
DAA ---------- Designated Accrediting Authority
DAL---------- Data Accession List
DASC --------- Direct Air Support Center
DBF---------- Digital Beam Forming
DC ---------- Direct Current
DC/AC -------- Documentation Completed Accomplishment Criteria
DCAA--------- Defense Contracts Audit Agency
DCID --------- Director of Central Intelligence Directive
DCMA--------- Defense Contracts Management Agency
DCR ---------- Design Change Request
DD(X) -------- Surface Combatant Family of Ships
DECM--------- Defensive Electronic Countermeasures
DEU ---------- Deployment Equipment Unit
DFARS -------- DoD Federal Acquisition Regulation Supplements
DIA---------- Defense Intelligence Agency
DID ---------- Data Item Description
DISA--------- Defense Information Systems Agency
DISCO -------- Defense Industrial Security Clearance Office
DISR --------- DoD Information Technology Standards Registry
DITSCAP------ DoD Information Technology Security Certification and Accreditation Process
DMP --------- Data Management Plan
DMRPP------- Data Management Requirements Process Plan
DMS --------- Defense Message System
DMS --------- Diminishing Manufacturing Source
DMSIG-------- Domain Special Interest Group
DMSMS ------- (DoD) Diminishing Manufacturing Sources and Material Shortages
DoD---------- Department of Defense
DP---------- Data Processor
DPM --------- Distributed Power Module
DRR --------- Design Readiness Review
DSMC-------- Defense Systems Management College
DSP --------- Digital Signal Processing
DSS --------- Defense Security Service
DT---------- Developmental Test
DT&E-------- Developmental Test and Evaluation
DTC --------- Design-to-Cost
DTED -------- Digital Terrain Elevation Data
DTIC--------- Defense Technical Information Center
DTUC -------- Design To Unit Cost
DVT---------- Design Verification Test
DVT/RR ------ Design Verification / Risk Reduction
DWFG -------- Digital Waveform Generator
DWFG -------- Distributed Waveform Generator
E&M --------- Engineering and Manufacturing
E3---------- Electromagnetic Environmental Effects
EA---------- Electronic Attack
EAC --------- Estimate at Complete
EAR --------- Electronically Agile Radar
EAR --------- Export Administration Regulations
EAR --------- Engineering Action Request
ECCM-------- Electronic Counter Countermeasures
ECD --------- Estimated Completion Date
ECFP--------- Export Compliance Focal Point
ECM --------- Electronic Countermeasures
ECP --------- Engineering Change Proposal
ECRRP ------ Electronic Cooling and Packaging Risk Reduction Programs
ECU --------- Environmental Control Unit
EDM --------- Engineering Development Model
EIA---------- Electronic Industries Alliance
EM ---------- Engineering Manager
EM ---------- Export Management
EM/SEC ------ Emission Security
EMARB ------ Electronic Media Access Review Board
EMC --------- Electromagnetic Compatibility
EMCON ------ Emission Control
EME --------- Electromagnetic Environment
EMI ---------- Electromagnetic Interference
EMI/EMC------ Electro Magnetic Interference / Electromagnetic Compatibility
EMITP ------- Electromagnetic Interference Test Procedure
EMITR ------- Electromagnetic Interference Test Report
EMP --------- Electromagnetic Pulse
EMPRO------ Expeditionary Mission Planner and Radar Opti-

mizer
EMRH---------- Electromagnetic Radiation Hazard
EMRO ---------- Electromagnetic Radiation Operational
EMSEC---------- Emission Security
EMV---------- Electromagnetic Vulnerability
EMW---------- Expeditionary Maneuver Warfare
EP---------- Electronic Protection
EPA---------- Environmental Protection Agency
EPLRS---------- Enhanced Position Location Reporting System
EPM---------- Engineering Program Manager
EPO ---------- Engineering Program Office
ER ---------- Evaluation Report
ERB ---------- Engineering Review Board
ERP ---------- Effective Radiated Power
ERR ---------- Engineering Release Record
ESCO---------- Electronic Systems Company
ESD ---------- Electrostatic Discharge
ESH ---------- Environmental, Safety and Health
ESOH---------- Environmental Safety and Occupational Health
ESS---------- Environmental Stress Screening
ETC---------- Estimate to Complete
EV---------- Earned Value
EVM---------- Earned Value Management
EVMS---------- Earned Value Management System
EW---------- Electronic Warfare
EW/C---------- Early Warning and Control
FAA---------- Federal Aviation Administration
FAB---------- Fabrication
FAI---------- First Article Inspection
FAR---------- False Alarm Reduction
FAR---------- Federal Acquisition Regulation
FBL ---------- Functional Baseline
FCA---------- Functional Configuration Audit
FCI---------- Functional Configuration Item
FD/FI---------- Fault Detection / Fault Isolation
FDFI---------- Fault Detection / Fault Isolation
FE&S---------- Field Engineering and Services
FEA---------- Finite Element Analysis
FET---------- Field Effect Transistor
FFF ---------- Form, Fit, and Function
FFP---------- Firm Fixed Price
FGI---------- Foreign Government Information
FIT ---------- Fault Isolation Test
FL ---------- Fault Location
FMECA-------- Failure Mode, Effects and Criticality Analysis
FOM---------- Figures of Merit
FOV ---------- Field-of-View
FPGA --------- Field Programmable Gate Array
FPI-ST -------- Fixed Price Incentive – Successive Target
FPMH---------- Failure per Million Hours
FPRA ---------- Forward Pricing Rate Agreement
FPRP --------- Forward Pricing Rate Proposal
FRACAS ------- Failure Reporting, Analysis, and Corrective Action System
FRP---------- Full Rate Production
FSC---------- Fire Support Coordinator
FSCM---------- Fire Support Coordination Measures
FSSE---------- Fire Support Software Engineering
FTE---------- Factory Test Equipment
FTI ---------- Firm Track Initiation
FTR---------- Firm Track Range
FTTTY -------- First Time Through Test Yield
FTTY -------- First Time Thru Test Yields
FTY---------- First Time Yield
G & A-------- General and Administrative
G/ATOR ------ Ground/Air Task Oriented Radar
GBDL -------- Ground Based Data Link
GBFR -------- Ground Based Fighter Radar
GCCS-------- Global Command and Control System
GCI --------- Ground Control Intercept
GCSS-MC ---- Global Combat Support System - Marine Corps
GERS -------- Ground Expedient Refueling System
GF---------- Ground Fixed
GFE --------- Government Furnished Equipment
GFI---------- Government Furnished Information
GFP --------- Government Furnished Property
GIG --------- Global Information Grid
GLCM-------- Ground Launched Cruise Missile
GM---------- General Manager
GOTS -------- Government-of-the-Shelf
GP ---------- Government Property
GPS --------- Global Positioning System
GROWLR ----- Ground Weapon Locator Radar
GUI --------- Graphical User Interface
GVW --------- Gross Vehicle Weights
GWLR-------- Ground Weapons Locating Radar
H/W---------- Hardware
HALE--------- High Altitude Long Endurance
HARM-------- High-speed Anti-Radiation Missile
HBCU -------- Historic Black Colleges and Universities
HELRASR ---- Highly Expeditionary Long Range Air Surveillance Radar
HEMP-------- High-altitude Electromagnetic Pulse
HERF -------- Hazard of Electromagnetic Radiation to Fuels
HERO -------- Hazard of Electromagnetic Radiation to Ordnance
HERP -------- Hazards of Electromagnetic Radiation on Personnel
HFE--------- Human Factors Engineering
HIS---------- Hardware Implementation Support
HIS---------- Human Systems Integration
HMI---------- Human Machine Interface
HMMP -------- Hazardous Materials Management Program
HMMWV------- High Mobility Multi-purpose Wheeled Vehicle
HOT --------- Hand-off Test
HPA --------- High Power Amplifier
HPTL-------- High Payoff Target List
HRI --------- Hazard Risk Index
HRR --------- High Range Resolution
HSI---------- Human Systems Integration
HUMMWV ----- High Mobility Multi-purpose Wheeled Vehicle
HW---------- Hardware
HWCI-------- Hardware Configuration Item
I&T ---------- Integration and Test
IABM -------- Integrated Architecture Behavior Model
IADS--------- Integrated Air Defense System
IAW---------- In Accordance With
IBEW-------- International Brotherhood of Electrical Workers
IBIT --------- Initiated Built-In Test
IBR---------- Integrated Baseline Review
ICAO -------- International Civil Aviation Organization

ICD ---------- Identified Capability Document
ICD ---------- Interface Control Document
iCDR ---------- Incremental Critical Design Review
ICE---------- Independent Cost Evaluation
ICLS---------- Interim Contractor Logistics Support
ICWG ---------- Interface Control Working Group
ID---------- Identification
IDD ---------- Interface Design Description
IDE---------- Integrated Data Environment
IDL---------- Interface Design Language
IDS---------- Intrusion Detection System
IEAC---------- Indicated Estimate at Completion
IEEE---------- Institute of Electrical and Electronic Engineers
IEP---------- Integrated Enterprise Process
IER---------- Information Exchange Requirement
IETM ---------- Interactive Electronic Technical Manual
IEW---------- Intelligence and Electronic Warfare
IF---------- Intermediate Frequency
IFCS---------- Integrated Fire Control System
IFF ---------- Identification Friend or Foe
IFFIT ---------- IFF Integration and Tracking
IHM---------- Integrated Health Monitoring
IHMS---------- Integrated Health Monitoring System
IIS---------- Internal Information Services
IKPT---------- Instructor and Key Personnel Training
ILS---------- Integrated Logistics Support
IMA---------- Integrated Microwave Assembly
IMM---------- Interacting Multiple Model
IMP ---------- Integrated Master Plan
IMS---------- Inertial Measuring System
IMS---------- Integrated Manufacturing System
IMS---------- Integrated Master Schedule
INS---------- Inertial Navigation System
INU ---------- Inertial Navigation Unit
IO ---------- Information Operations
IOC ---------- Initial Operational Capability
IOM---------- Install/Operate/Maintain
IOT&E ---------- Initial Operational Test and Evaluation
IPB---------- Intelligence Preparation of the Battlefield
IPDR ---------- Internal Product Design Review
IPPD---------- Integrated Product and Process Development
IPR---------- In-Process Review
IPRS---------- Intranet Program Review System
IPS---------- Integrated Parts Selection
IPT---------- Integrated Product Team
IR---------- Infrared
IRAD ---------- Internal Research and Development
IS---------- Information System
ISB---------- Intermediate Staging Base
iSDP---------- Incremental Software Development Plan
ISE---------- Information System For Engineering
ISO ---------- International Organization for Standardization
ISP---------- Internet Service Provider
IT---------- Information Technology
ITAR---------- International Traffic in Arms Regulation
IUE---------- International Union of Electronics, Electrical, Technical, Salaried, and Machine Workers
IV&V---------- Independent Verification and Validation
IWO---------- Interoperating Element Work Order
J/N ---------- Jamming-to-Noise Ratio
JCS---------- Joint Chiefs of Staff
JDEP---------- Joint Distributed Engineering Plant
JEDMICS ------ Joint Engineering Data Management Information Control System
JEM---------- Jet Engine Modulations
JFC---------- Joint Force Commander
JITC ---------- Joint Interoperability Test Command
JNR---------- Jamming-to-Noise Ratio
JROC ---------- Joint Requirements Oversight Council
JSF ---------- Joint Strike Fighter
JSSEO---------- Joint SIAP System Engineering Organization
JTA---------- Joint Tactical Architecture
JTDL ---------- Joint Tactical Digital Link
JTIDS ---------- Joint Tactical Information Distribution System
JTRS---------- Joint Tactical Radio System
JUTL ---------- Joint Universal Task Lists
KIP---------- Key Interface Profile
KPP---------- Key Performance Parameter
Kw---------- Kilowatt
LAAD---------- Low Altitude Air Defense
LACM ---------- Land Attack Cruise Missile
LCC---------- Life Cycle Cost
LCCA---------- Life Cycle Cost Analysis
LCMR ---------- Lightweight Counter Mortar Radar
LE---------- Lightning Effects
LEOS---------- Low Earth Orbiting Satellite
LL ---------- Long-Lead
LMI---------- Logistics Management Information
LORA ---------- Level Of Repair Analysis
LOS---------- Line-of-Sight
LOs ---------- Local Oscillators
LRIP---------- Low Rate Initial Production
LRM ---------- Lowest Replaceable Module
LRR---------- Logistics Readiness Review
LRU---------- Lowest Replaceable Unit
LSA---------- Logistics Support Analysis
LSE---------- Logistic Support Engineering
LSE---------- Logistics Systems Engineering
LSOO ---------- Logistics Statement of Objectives
LTCC---------- Low Temperature Co-Fired Ceramic
LTP ---------- Leadership for Technical Professionals
LTT ---------- Light Tactical Trailer
LTT-HC---------- Light Tactical Trailer / Heavy Chassis
M&S ---------- Modeling and Simulation
M/T ---------- Maintainability / Testability
MACCS---------- Marine Air Command and Control System
MACG---------- Marine Air Control Group
MACS---------- Marine Air Control Squadron
MACS---------- Marine Air Controlled System
MAGTF ---------- Marine Air Ground Task Force
MAGTF ---------- Marine Air Group Task Force
MAIS ---------- Major Automated Information System
MAM---------- Maintenance Assist Module
MANPRINT----- Manpower, Personnel And Training Integration
MARCORSYS COM---------- Marine Corps Systems Command
MATLAB---------- Performance Simulation Model
MaxTTR ---------- Maximum Time To Repair
MCAIMS---------- Marine Corps Automated Instructional Management Systems

MCCDC ------- Marine Corps Combat Development Command
MCCES-------- Marine Corps Communication-Electronics School
MCHS---------- Marine Corps Common Hardware Suite
MCLB---------- Marine Corps Logistics Base
MCPIDS------- Marine Corps Publications Information Data System
MCPP---------- Marine Corps Planning Process
MCSC---------- Marine Corp Systems Command
MCTSSA------- Marine Corps Tactical Systems Support Activity
MDA---------- Milestone Decision Authority
MDA---------- Model Driven Architecture
MDAPS-------- Major Defense Acquisition Programs
MDD---------- Mode Description Document
MDT---------- Mean Down Time
MDTT--------- Mean Down Time for Training
MEA---------- Database Development
MEARS------- Multi-user Engineering Change Proposal Automated Review System
MEF---------- Marine Expeditionary Force
MEF---------- Material Estimating Factor
MES---------- Manufacturing Execution System
MESA--------- Multi-Role Electronically Scanned Array
MEU---------- Marine Expeditionary Unit
MFC---------- Microsoft Foundation Classes
MFG---------- Manufacturing
MFI---------- Mechanical Fabrication and Integration
MFR---------- Multi-Function Radar
MHE---------- Material Handling Equipment
MHT---------- Multi-Hypothesis Tracker
MI---------- Minority Institutions
MLA---------- Manufacturing License Agreements
MLDT--------- Mean Logistics Delay Time
MLG---------- Marine Logistics Group
MMIC--------- Monolithic Microwave Integrated Circuit
MMR---------- Multi-Mission Radar
MNFS--------- Maximum No-fire Stimulus
MNS---------- Mission Need Statement
MO---------- Master Oscillator
MODAR------- Modular Airborne Radar
MOE---------- Measures of Effectiveness
MOM--------- Measures of Merit
MOP---------- Measures of Performance
MOPP-------- Mission Oriented Protective Posture
MOS---------- Military Occupational Specialty
MOSA--------- Modular Open Systems Approach
MPI---------- The Master Painters Institute
MPM---------- Microframe Program Manager
MPR---------- Manufacturing Program Review
MR---------- Management Reserve
MRB---------- Material Review Board
MROC-------- Marine Corps Requirements Oversight Council
MRP---------- Material Requirements Planning
MRRS--------- Multi-Role Radar System
MS---------- Master Schedule
MSDS--------- Material Safety Data Sheet
MSE---------- Mobile Subscriber Equipment
MSG---------- Meteorological Systems Group
MSL---------- Mean Sea Level
MSP---------- Microsoft Project
MSP---------- Modeling & Simulation Proponent
MTACCS------ Marine Tactical Command and Control System
MTBF-------- Mean Time Between Failure
MTBM-------- Mean Time Between Maintenance
MTBMCF------ Mean Time Between Mission Critical Failure
MTBOMF------ Mean Time Between Operational Mission Failure
MTI---------- Moving Target Indicator
MTP--------- Master Test Plan
MTTR-------- Mean Time To Repair
MTV---------- Medium Tactical Vehicle
MTVT-------- Medium Tactical Vehicle Trailer
MWS--------- Master Work Schedule
NAT---------- Network-Address-Translation
NATO-------- North American Treaty Organization
NBC--------- Nuclear, Biological, and Chemical
NBCCS------- Nuclear, Biological, and Chemical Contamination Survivability
NCES-------- Net Centric Enterprise Services
NCID-------- Non-Cooperative Identification
NCTA-------- Non-Contractual Technical Activity
NCTI-------- Non-Cooperative Target Identification
NCTR-------- Non-Cooperative Target Recognition
NDI---------- Non-Developmental Item
NDIA-------- National Defense Industrial Association
NESI--------- Net Centric Enterprise Solutions for Interoperability
NF---------- Noise Figure
NGA--------- National Geospatial-Intelligence Agency, formerly NIMA
NGC-------- Northrop Grumman Corporation
NGES-------- Northrop Grumman Electronic Systems
NIMA--------- National Imagery and Mapping Agency, see NGA
NISPOM------ National Industrial Security Program Operating Manual
NOR-------- Notice of Revision
NPR--------- New Part Requests
NRE--------- Non-Recurring Engineering
NSC--------- National Systems Cueing
NSTISSAM ---- National Security Telecommunications and Information Systems Security Advisory Memorandum
O&S-------- Operation and Support
O&SHA------ Operating and Support Hazard Analysis
OA---------- Open Architecture
OA---------- Operational Architecture
OA---------- Operational Availability
OAS--------- Offensive Air Support
OBS--------- Organizational Breakdown Structure
OCC-------- Operator Command and Control
OCONUS ---- Outside of Continental United States
ODC--------- Other Direct Cost
OEM--------- Original Equipment Manufacturer
OEO--------- Operational Expeditionary Operations
OJT--------- On The Job Training
OMF--------- Operational Mission Failure
OMFTS------ Operational Maneuver From the Sea
OMG-------- Object Management Group
OOA-------- Object Oriented Analysis
OOASIS------ Object Oriented Approach to Software-Intensive Systems
OOD--------- Object Oriented Design
OOSEM------ Object-Oriented System Engineering Methodology

OPSEC-------- Operations Security
OPTEMPO ----- Operational Tempo
ORD---------- Operational Requirements Document
OSA---------- Open System Architecture
OSD---------- Office of the Secretary of Defense
OSHA--------- Operational and Support Hazard Analysis
OS-JTF------- Open Systems - Joint Task Force
OT ---------- Operational Test
P&L---------- Page and Line
PA---------- Physical Audit
PA---------- Product Assurance
PAE---------- Power Added Efficiency
PAL---------- Program Asset Library
PAR ---------- Program Area Review
PARCS-------- Portable Autonomous Report Collection System
PAT---------- Product Acceptance Test
PBL---------- Performance Based Logistics
PC ---------- Personal Computer
PCA---------- Physical Configuration Audit
PD ---------- Probability of Detection
PDM---------- Product Data Manager
PDP ---------- Professional Development Program
PDR ---------- Preliminary Design Review
PDS ---------- Product Data System
PE---------- Probable Errors
PE---------- Program Events
PEI---------- Primary End Item
PFT---------- Probability of Firm Track
PGG---------- Power Generation Group
PHA ---------- Preliminary Hazard Analysis
PHAR --------- Preliminary Hazard Analysis Report
PHM---------- Power and Health Management
PHM---------- Prognostic Health Management
PHS&T -------- Packaging, Handling, Shipping and Transportation
PK---------- Probability of Kill
PKI---------- Public Key Infrastructure
PLGR -------- Precision Lightweight Global Positioning System Receiver
PLV---------- Production Line Validation
PM---------- Performance Monitoring
PM---------- Preventive Maintenance
PM---------- Program Manager
PMB---------- Performance Measurement Baseline
PMFL --------- Performance Monitoring Fault Location
PMO --------- Program Management Office
PMP---------- Parts, Material, and Process
PO ---------- Purchase Order
POE---------- Point Of Entry
POL---------- Petroleum-Based Fuels, Oils, or Lubricants
PPC---------- Power Personal Computer
PPF---------- Pattern-Propagation-Factor
PPLI---------- Precision Position Location Identification
PPM---------- Program Performance Measure
PPP---------- Program Protection Plan
PPSL--------- Program Parts Selection List
PPV---------- Product / Process Verification
PRF---------- Pulse Repetition Frequency
PRI---------- Pod Radar Initiative
PROD--------- Production
PRR --------- Production Readiness Review
PS---------- Performance Specification
PS---------- Power Supply
PS---------- Preferred Supplier
PSU --------- Power and Signal Unit
PVT---------- Product Verification Test
PWG --------- Process Working Group
QA ---------- Quality Assurance
QER --------- Quality Evaluation Record
QM---------- Quantitative Management
QN ---------- Quality Notifications
QSM--------- Quality Software Management
QUAL -------- Qualification Testing
R&M--------- Reliability and Maintainability
R/E---------- Receiver / Exciter
RAM--------- Random Access Memory
RAM--------- Reliability, Availability and Maintainability
RAM--------- Responsibility Assignment Matrix
RAMSP------- Radar Adaptation and Multi-Scan Processor
R-ARY ------- Radar Array IPT
RBPR-1------- Reliability Analysis Center Publication, Blueprints for Product Reliability
RCR --------- Requirements Change Request
RCS --------- Radar Cross Section
RCSP -------- Radar Control and Signal Processing
RDR --------- Radar IPT
RDR --------- Receiver Dynamic Range
RDR --------- Reference Dynamic Range
RE---------- Receiver Exciter
REA --------- Request for Engineering Action
REACTS ------ Reliability Evaluation and Action To Correct Trouble
REG --------- Radar Equipment Group
REGSIM------- Radar Equipment Group Simulator
RES --------- Radar Environmental Simulator
REVAC ------- Request for Variance at Completion
REX --------- Receiver Exciter
RF---------- Radio Frequency
RFD --------- Request for Deviation
RFEL--------- Request for Export License
RFI---------- Radio Frequency Interference
RFI---------- Request for Information
RFP---------- Request for Proposal
RFRX -------- RF Receiver
RIU ---------- Radar Interface Unit
RLA---------- Repair Level Analysis
RM---------- Requirements Management
RMA--------- Risk Manager's Assistant
RMP--------- Radar Modernization Program
RMP--------- Requirements Management Plan
RN ---------- Revision Notice
ROE--------- Rules of Engagement
RPE --------- Radar Performance Engine
R-PED -------- Radar Pedestal IPT
RPS --------- Resource Planning System
RRB --------- Risk Review Board
RSA --------- Request for Shop Action
RSEC -------- Radar Spectrum Engineering Criteria
RSTA--------- Reconnaissance, Surveillance and Target Acquisition

RTS---------- Real-Time Studio
RTSTB---------- Real Time Sensor Test Bed
RUL---------- Remaining Useful Life
RVM---------- Requirement Verification Matrix
RVP ---------- Requirements Verification Plan
RWU ---------- Radio Workstation Unit
S&DQA---------- Software and Development Quality Assurance
S/W---------- Software
S/WCDR -------- Software Critical Design Review
SA---------- Significant Accomplishment
SA---------- Situational Awareness
SA---------- Supportability Analysis
SA---------- System Architecture
SAD ---------- System Architecture Document
SAE---------- Society of Automotive Engineers
SAM---------- Surface to Air Missile
SAP---------- SAP AG
SAR ---------- Safety Assessment Report
SAR ---------- Special Access Required
SASM---------- Security Anti-Spoofing Module
SAT---------- System Approach to Training
SATCOM-------- Satellite Communications
SBA---------- Small Business Administration
SBC ---------- Single Board Computer
SBIT---------- Startup BIT
SBR ---------- Space-Based Radar
SCA ---------- Salaried Employees Association
SCA ---------- Subcontracts Administrator
SCAMPI-------- Standard CMMI Appraisal Method for Process Improvement
SCCB---------- Software Configuration Change Board
SCD---------- Source Control Drawing
SCI---------- Special Compartment Intelligence
SCIF---------- Sensitive Compartmented Information Facility
SCM---------- Software Configuration Management
SCN ---------- Software Change Notice
SCORM -------- (DoD) Standard Content Object Reference Model
SCP ---------- Simulation Control Panel
SCR ---------- Software Change Request
SDA ---------- Structural Design/Analysis
SDD---------- Software Design Description
SDD---------- System Development and Demonstration
SDF---------- Software Development Facility
SDL---------- Software Development Library
SDP ---------- Software Development Plan
SDPR ---------- Software Development Plan Requirements
SDPR ---------- Software Development Process Requirements
SDR ---------- Secondary Depot Repairable
SDRL ---------- Subcontract Data Requirements List
SD-VOSB------- Service Disable Veteran Owned Small Business
SE---------- Software Engineer
SE---------- Systems Engineering
SEBA ---------- Socio-Economic Business Program
SEI---------- Software Engineering Institute
SEIT---------- Systems Engineering Integration and Test
SEMP---------- System Engineering Management Plan
SENIT---------- Sensor Integration and Tracking
SERD---------- Support Equipment Requirements Document
SFD---------- System Functionality Diagram
SFR---------- System Functional Review
SFUG --------- Security Features User's Guide
SGW ---------- Sensor Gateway
SHM ---------- Structural Health Monitoring
SHORAD------- Short Range Air Defense
SI---------- System Initialization
SIAP---------- Single Integrated Air Picture
SIE---------- Special Inspection Equipment
SIJ ---------- Stand-In-Jamming
SIL ---------- System Integration Lab
SINCGARS----- Single Channel Ground and Airborne Radio System
SIOB --------- Serial Input/Output Board
SIT ---------- System Integration Test
SLAMRAAM---- Surface Launched Advanced Medium Range Air-to-Air Missile
SLATE-------- System Level Automation Tool for Enterprises
SLOC -------- Software Line Of Code
SLOC -------- Source Line of Code
SM ---------- Subcontracts Manager
SME --------- Subject Matter Expert
SMRADR------ Short and Medium Range Air Defense Radar
SMT --------- Surface Mount Technology
SNMP-------- Simple Network Management Protocol
SNR --------- Signal-to-Noise Ratio
SNTP--------- Simple Network Time Protocall
SO ---------- Sales Order
SOA --------- Sustained Operations Ashore
SOA --------- Service Oriented Architecture
SOJ---------- Stand-Off Jammer
SOTM-------- SATCOM On-The-Move
SOW --------- Statement of Work
SP---------- Signal Processor
SP/DP-------- Signal Processor / Data Processor
SPAWAR------ Space and Naval Warfare Systems Command
SPC --------- Software Productivity Consortium
SPC --------- Statistical Process Control
SPD ---------- Supplemental Provisioning Documentation
SPI---------- Schedule Performance Index
SPL---------- Standard Parts List
SPR --------- System Problem Report
SPS---------- Software Product Specification
SQA --------- Software Quality Assurance
SRR --------- System Readiness Review
SRR --------- System Requirements Review
SRS ---------- Software Requirements Specification
SS---------- Single String
SSAA--------- Solid State Active Array
SSAA--------- System Security Authorization Agreement
SSB---------- Source Selection Board
SSC --------- Software Source Code
SSDD -------- System/Subsystem Design Description
SSE---------- System Security Engineering
SSHA -------- System Safety Hazard Analysis
SSR --------- Software Specification Review
SSR --------- System Specification Review
SSS---------- System/Subsystem Specification
SSWG -------- System Safety Working Group
ST---------- Special Tooling
STAR--------- System Threat Assessment Report
STC---------- Sensitivity Time Control

STE---------- Special Test Equipment
STOM---------- Ship To Objective Maneuver
STP---------- Software Test Plan
STR---------- Software Test Report
SUBHAR-------- Subsystem Hazard Analysis Report
SUST ---------- Start Up Self Test
SVD ---------- Software Version Description
SVR ---------- System Verification Review
SW---------- Software
SWGS ---------- Surface Wire Grounding System
SYS-EQ -------- Systems Equipment IPT
T/O---------- Table of Organization
T/R---------- Transmit/Receive
TA---------- Target Acquisition
TA---------- Technical Architecture
TAA---------- Technical Assistance Agreements
TACOM-------- Tank Automotive and Armaments Command
TADIL -------- Tactical Digital Information Link
TAFIM -------- Technical Architecture Framework for Information Management
TAOC -------- Tactical Air Operations Center
TAOM-------- Tactical Air Operations Module
TARS ---------- Tethered Aerostat Radar System
TASR ---------- Terminal Airport Surveillance Radar
TBM ---------- Tactical Ballistic Missile
TBM ---------- Theater Ballistic Missile
TCN ---------- Tactical Component Network
TCP---------- Technical Control Plan
TCP---------- Technology Control Plan
TCPI---------- To Complete Performance Indicator
TDP---------- Technical Data Package
TECOM-------- Test and Evaluation Command
TEE---------- Training Effectiveness Evaluation
TEMP ---------- Test and Evaluation Master Plan
TEMPER-------- Tropospheric Electromagnetic Propagation Equation Routine
TEMPEST ------ Test for Electromagnetic Propagation and Evaluation for Secure Transmission
TES---------- Tactical Engagement System
TETS---------- Third Echelon Test Set
TFM ---------- Trusted Facility Manual
TFSMS -------- Total Force Structure Management System
TIG---------- TOAM Interface Group
TIM ---------- Technical Interchange Meeting
TINA---------- Truth In Negotiations Act
TIU---------- TOAM Interface Unit
TLDD---------- Tactical Logistics Digitization Data
TM ---------- Technical Manual
TMD---------- Tactical Missile Defense
TMD---------- Theater Missile Defense
TMDE -------- Test Measurement and Diagnostic Equipment
TOAC -------- Tactical Air Operations Center
TORA -------- Technology Obsolescence and Risk Assessment
TP---------- Test Plan
TPC---------- Target Processing Center
TPM ---------- Technical Performance Measures
TPS---------- Test Program Set
TQG ---------- Tactical Quiet Generator
TR ---------- Transmit Receiver
TRITAC-------- Tri-service Tactical network
TRR --------- Test Readiness Review
TSM --------- Technical Subcontract Manager
TTCP-------- Technology Transfer Control Plan
TTF --------- Transformation Task Force
TTPC-------- Technology Transfer Control Plan
TWS --------- Track While Scan
Tx/Rx-------- Transmit / Receive
UAE --------- United Arab Emirates
UAV --------- Unmanned Aerial Vehicle
UHF --------- Ultra High Frequency
UID --------- Unique Identification
UML --------- Unified Modeling Language
USAF--------- United States Air Force
USIGS -------- United States Imagery and Geospatial Information Service
USMC-------- United States Marine Corps
USN --------- United States Navy
UUT --------- Unit Under Test
V&V---------- Verification and Validation
VAC --------- Variance At Complete
VARTM ------- Vacuum Assisted Resin Transfer Molding
VCRM-------- Verification Cross Reference Matrix
VDD --------- Version Description Document
VEC --------- Vendor Evaluation Center
VECR -------- Vendor Evaluation Change Request
VHF---------- Very High Frequency
VLO---------- Very Low Observable
VMAP -------- Vector Map (terrain database)
VME --------- VERSAmodule Eurocard
VoIP --------- Voice over Internet Protocol
VP---------- Vice President
VPN --------- Virtual Private Network
VSR --------- Volume Search Radar
VTC---------- Video Teleconference
VTD---------- Virtual Time Delay
VV&A--------- Verification, Validation and Accreditation
WARM -------- Wartime Reserve Mode
WBS--------- Work Breakdown Structure
WCC --------- Weight Control Coordinator
WIPT -------- Working Integrated Product Team
WMS --------- Weight Management System
WOSB -------- Woman Owned Small Business
WPI---------- Work Product Inspection
WSA---------- Work Statement Authorization
WWSS-------- Warfare and Warfare Support Systems

Pages 96 through 817 redacted in entirety

TECHNICAL MANUAL CONTRACT REQUIREMENTS (TMCR) 0001-06

FOR THE

GROUND/AIR TASK ORIENTED RADAR (G/ATOR)

“TM REQUIREMENTS CONTAINED HEREIN HAVE BEEN CLEARED FOR USE BY THE OFFICE OF MANAGEMENT AND BUDGET PUBLICATION NO. 0704-018”

SUBJECT: REQUIREMENTS FOR DELIVERY OF A MARINE CORPS TECHNICAL MANUAL FOR THE GROUND/AIR TASK ORIENTED RADAR (G/ATOR)SYSTEM,WITH DELIVERY OF AN INTERACTIVE ELECTRONIC TECHNICAL MANUAL (IETM)ON CD-ROM, WITH AN OPTION FOR PAPER DELIVERY; COMMERCIAL MANUALS FOR THE G/ATOR WITH AN OPTION FOR ADOBE ACROBAT PORTABLE DOCUMENT FILES (PDF); WITH OPTION TO INTEGRATE GFE ELECTRONIC FILES AS PART OF IETM.

SCOPE: This TMCR presents requirements for preparing the subject electronic manual and commercial manuals ON CD-ROM utilizing Extensive Markup Language (XML) to create an IETM, for G/ATOR (created using the most current version of IADS) and PDF formats (created with Adobe Acrobat) for associated commercial manuals under this contract. The requirements specified herein constitute the technical manual tasks to be performed by the contractor. Included in this TMCR is an **Option** for a paper delivery.

1.0 Data Items. Data Items shall be delivered in accordance with the Distribution Matrix as listed on the CDRLs.

2.0 Applicable Documents

2.1 Government Documents. The following documents were used to establish the requirements of this TMCR to the extent covered herein and may be used for development of the manuals.

2.1.1 The following documents, of the exact issue stated for the development of the G/ATOR, are to be used as **guidance**. In the event of conflict between the requirements of this TMCR and the documents referenced herein, the requirements of this TMCR shall take precedence. These documents support both electronic and paper delivery of TMs.

MIL-STD-38784	Manuals, Technical: General Style and Format Requirements
MIL-HDBK-1221(3)	Manuals, Commercial Off-The-Shelf (COTS)
SG-1A	U. S. Marine Corps Style Guide

2.1.2 The following documents, of the issue in effect, may be used to establish the requirements of this TMCR to the extent covered herein and are to be used for development and revision of manuals, XML text, IETMs and PDF formats for the G/ATOR and associated commercial manuals.

HDBK-511 Interoperability of Interactive Electronic Technical Manuals (IETMs); Department of Defense Handbook for

MIL-STD 2361C Digital Publications Development; Department of Defense Interface Standards

MIL-PRF-87268A Manual, Interactive Electronic Technical: General Content, Style, Format and User-Interaction Requirements for

MIL-PRF-87269A Data Base, Revisable-Interactive Electronic Technical Manuals, for the support of

MIL-PRF-28000B Digital Representation for Communication of Product Data: ICES Application Subsets and IGES Application Protocols

MIL-PRF-28001C Markup Requirements and Generic Style Specification for Exchange of Text and its Representation

MIL-PRF-28002C Raster Graphics Representation in Binary Format, Requirements for

MIL-PRF-28003B Digital Representation for Communication of Illustration Data: CGM Application Profile

MIL-STD-1840C Automated Interchange of Technical Information

3.0 Requirements. The requirements of this TMCR shall take precedence over any other documents.

3.1 Technical Manual Quality Assurance Data. The contractor shall be responsible for the quality of the technical manuals provided by vendors or subcontractors and for the manuals to be developed by his facility. Refer to section 4.0.

3.2 Technical Manuals

3.2.1 System Manual. The contractor shall develop a System Manual for the G/ATOR covering the Organizational Level and the Intermediate and Depot Level of maintenance with Parts List (RPSTL)if applicable. The manual shall provide system and

subsystem oriented instructions for operation, maintenance, installation and test of the G/ATOR. The System Manual shall include operation and maintenance instructions for system cabling and interface devices. To the greatest extent practical, Government Furnished Material, Government technical manuals or Government-approved commercial operation and maintenance manuals, shall be used as references for system and subsystem maintenance.

3.2.2 Commercial Manuals

3.2.2.1 Contractor shall submit commercial manuals for review and acceptance or supplementation as required. In the event that the Government determines supplementation **(OPTION)** is required to make the commercial manual acceptable for Government use, the contractor shall prepare supplementation in accordance with DI-TMSS-80528, to be in the same format as the basic manual. Should the supplemental data required be so extensive that clarity could not be preserved; the contractor will be directed to prepare a new manual. MIL-HDBK-1221 may be used as a **guide** for preparation of supplementation. **Warning** and **Caution** statements will be added, as required for the protection of personnel and equipment. **Written copyright release shall be provided concurrently with each final commercial manual.**

3.2.2.2 Commercial Manuals in Portable Document File (PDF). For those COTS manuals with copyright release, Adobe Acrobat shall be used to provide PDF for inclusion on the CD-ROM containing the IETM. The PDF COTS shall be linked with the references used in the System Manual.

3.2.3 Extensive Markup Language (XML). The contractor shall XML tag the System Manual for the G/ATOR utilizing the Interactive Authoring Display System (IADS) software provided by the Government to the Government furnished Document Type Definition (DTD). The system manual shall be tagged to ensure that the user can locate instructions, figures, schematics or the parts lists required by electronically moving from one part of the manual to another. This technique will roll all information normally associated with the Technical Manual’s, Components List, SL-3 and SL-4 into one electronic manual on CD-ROM. MIL-STD-1840 shall be used in the standardization of formats for exchange of digital information necessary for the development and logistic support of systems throughout their life cycle and formats for delivery of the system manual in electronic media/CD-ROM. The Government will provide a baseline of desired linking requirements to discern which areas shall be

linked versus bi-directionally linked in the form of a desired hyper linking protocol. Raster graphic representation shall be in accordance with MIL-PRF-28002. The Government will provide a graphics filter which depicts the application of Raster versus Computer Graphic Metafile (CGM) in the creation of the IETM.

3.2.4 Interactive Electronic Technical Manual (IETM). Using the developed XML text tagged to the Government furnished DTD, the contractor shall produce an IETM which meets the requirements of paragraph 3.2.3 above.

3.2.5 Media for Review

3.2.5.1 Technical Manual Manuscript Copy for Review. The TM for review shall be the most current stage of development, complete with front matter, text, tables and illustrations. Included shall be corrections resulting from any in-process reviews, validation and verification (Government or Contractor), as applicable. The manuscript copy shall be validated by the Contractor prior to submission to the Government for review. Upon completion of Validation, the contractor shall provide a **Validation Certificate** testifying to the completeness, accuracy and safety of the TM (See 4.1.4). Manuscript copy shall be provided in image text PDF and hard copy forms.

3.2.5.2 IETM CD-ROM for Review. The IETM shall be complete with content to support the installation, operation, test and maintenance, to include components list & parts (RPSTL). Included shall be corrections resulting from in-process reviews and testing (Government or Contractor), as applicable, validation and verification. Contractor shall ensure that all XML data parses against the Government furnished DTD, that all graphics are in accordance with the approved TM graphics specifications, that graphic file naming conventions have been followed, and that all agreed to linking/functionality is present within deliverables. Government requires 60 days for review, approval, disapproval or submission of changes.

3.2.5.3 Commercial Manuals. Commercial manuals shall be used where possible to support operation and maintenance. If Commercial manuals are not complete, the Contractor shall develop new information to be incorporated in the format and media (paper or electronic) as all other commercial manuals.

3.2.5.4 Supplemental Information or Manuals. The cost for developing new information or supplemental manuals shall be negotiated on a case-by-case basis once the scope of the task is

known. Copyright release for all accepted commercial manuals shall be provided concurrently with the submission of the manuals.

3.2.6 Technical Content/Format Manual Organization

3.2.6.1 System Manuals. The system manual contents shall be arranged in chapters according to the following:

Chapter 1	-	General Information.
Chapter 2	-	Safety Precautions.
Chapter 3	-	Installation Data.
Chapter 4	-	Functional Description w/ Components List.
Chapter 5	-	Operation.
Chapter 6	-	Scheduled Maintenance.
Chapter 7	-	Fault Isolation/Troubleshooting.
Chapter 8	-	Alignment/Maintenance/Corrective Procedures.
RPSTL	-	Repair Parts List.

NOTE

Wherever practical, the contractor shall incorporate into the technical manuals of the G/ATOR, use of operation and maintenance flow charts or diagrams to accompany textual information to facilitate ease of use.

3.2.6.1.1 Chapter Requirements

Functional Organization - SUMMARY

a. The TM shall use illustrations integrated with procedural/maintenance tasks, text and the parts lists.

b. Illustrations will show the relationship of components to an assembly and parts to a component.

c. Illustrations shall be keyed in procedural/ disassembly sequence.

d. Text shall be presented in full screen blocks without the need to scroll down.

3.2.6.1.2 Chapter 1 - General Information. Chapter 1 shall describe the system in general physical and functional terms as specified below:

a. Introduction. The introduction shall define the system and its relationship with other systems. The mission of the system shall be stated. The text shall be supported by diagrams showing the interrelationships of the system equipment. The major functional relationship and inputs and outputs to related systems shall be indicated.

b. Physical Arrangement. System areas and compartments shall be described and the system equipment and units contained in the areas shall be listed. The physical arrangement and description shall be supported by illustrations.

c. System Equipment. Each of the equipments comprising the system shall be identified and described. Descriptions of operator-attended equipment shall include general statements as to the nature and purpose of units and indicators. The text shall be supported by illustrations. All equipment shall be shown, whenever possible, in relative scale proportion. An equipment may be separately illustrated with significant features called out, if such details are necessary for proper support of the text.

d. Associated-system Equipment. When required, descriptions and illustrations of associate-system equipment shall be limited to the major units thereof. The descriptions shall be more condensed than those of subject system equipment; otherwise, the same requirements are applicable. In the descriptions, emphasis shall be placed on those associated systems equipments that constitute operational or functional interfaces with the subject system. Such units shall be included in the system illustrations.

e. Reference Data. Reference data shall include a list of the equipment comprising the system and its official designations. A list of common names and abbreviated or informal nomenclature and system characteristics together with a list of referenced publications shall be included as follows:

(1) Capabilities. A summary of system capabilities shall be provided.

(2) Reference Publication. A list of the manuals that pertain to system and system equipments and other documents of interest, such as training materials/courseware and manuals for associated systems equipment shall be included.

(3) Tools and Test Equipment. A list of all special tools and test equipment for system-level maintenance shall be included. Special tools are defined as those tools not listed in the Federal Supply Catalog.

3.2.6.1.3 Chapter 2 - Safety Precautions. Chapter 2 shall describe the hazards associated with system operation and maintenance. Any safety hazards identified in the Safety Assessment Review (SAR) shall be incorporated.

a. Introduction. This description shall orient system supervisory personnel and shall include the following:

(1) Purpose, scope and organization of the system safety instructions.

(2) Basic safety concept.

(3) Basic responsibilities for safety.

b. Electromagnetic Radiation Hazards and Precautions. Describe the radiation hazards to personnel and the precautions to be taken. The hazards of radiation to flammable or explosive materials also shall be described. The description shall include discussions of, locations, minimum safe distances and precautions to be taken when entering areas of radiation hazard.

c. System Hazards and Precautions. Descriptions of system hazards and precautions shall be included, addressed to system personnel and referenced to particular system equipments. The descriptions shall be organized to be consistent with the operation of the system. The descriptions shall supplement and extend equipment safety instructions to the system level, by warning of potential hazards that can be caused during operation or maintenance.

d. Operational and Maintenance Safety Summary. A summary shall be included which emphasizes the proper use of equipment controls, describes the hazards to operators and maintenance personnel or as applicable, the hazard to persons in areas remote from the operations and recommended precautions. An emergency operational routine shall be included which emphasizes the controls that permit immediate deenergizing of the system.

e. Hazardous Components. Identify and briefly describe the hazardous components including radioactive devices and

elements used with the system. The general handling precautions for such components shall be summarized.

3.2.6.1.4 Chapter 3 - Installation Data. Incorporate installation drawings and information to install and checkout the system. System installation data shall include the following:

(1) System Components List that can be extracted by printing for inventory use. Each item of the Components List shall be identified as one of three categories: Supply System Responsibility Item (SSI)/Basic Issue Item (BII), Collateral Material (CM) or Using Unit Responsibility Items (UURI) Additional Authorization List (AAL).

(2) Summary of all utilities required by the system, such as air, water, power, steam, freon, etc.

(3) System interconnection diagrams.

(4) Cable run diagrams.

(5) System piping diagrams.

(6) System cable interconnection check.

(7) Active system tests.

(8) System component installation procedures.

a. Utilities List. A utilities list shall be included that presents in tabular form all utilities required and the quantities of each, in each system, compartment and area.

b. Interconnection Diagrams. Interconnection block diagrams shall be presented with each equipment shown as a block. All cables running between equipments shall be identified by cable number. The number of active and spare leads in each cable shall be included. The illustrations shall also indicate all junction boxes, switchboards, etc., into which interconnection cables enter or leave.

c. Cable Run Diagrams. Isometric diagrams shall be used to indicate the location of all cable runs between compartments or areas. Each cable run diagram shall indicate by compartment

identification for location of all cables shown on the interconnecting diagrams.
Cold-wire check to verify the proper installation checks shall be capable of being and all equipment completely shut

d. System Cable Interconnection Check. Procedures shall be provided of all system cables. These conducted with all power off down.

e. Active System Test. All active system test procedures required to verify the proper installation and operation of the system shall be included. Reference may be made to applicable tests and procedures in Chapter 6. Procedures for complete setup, testing, shut down and data analysis shall also be provided.

f. System Component Installation Procedures. Complete step-by-step instructions shall be provided for installation of system components not covered in any of the equipment manuals for the equipment comprising the system. The following types of supplemental information not provided in the equipment technical manual shall be included:

(1) Instructions required to assemble components.

(2) Instructions required to mount components. Include boring, bracing, mounting diagrams and data for shock mounted equipment.

(3) Instructions for making electrical, waveguide, plumbing and all other interface connections between equipments, components and other systems.

(4) Servicing procedures, such as initial lubrication and adjustments.

g. Installation Drawings. The following drawings shall be included:

(1) Pictorial diagrams.

(2) Outline and mounting dimension data.

(3) Interconnecting wiring and cabling diagrams.

(4) Primary power distribution.

h. Installation Checkout. Step-by-step procedures shall be provided to demonstrate that the system operates correctly and within tolerances. These procedures shall provide for system checkout in three steps as follows:

(1) Installation inspection and pre-energizing procedures.

(2) Turn-on and preliminary tests.

(3) Installation verification tests.

i. Test Procedures. Testing procedures shall be presented in a logical order as follows:

(1) Energize the system.

(2) When test results are within the required tolerance, include a reference to the next logical test. When test results are out of tolerance, include a reference to the corrective maintenance or troubleshooting data. Reference shall be made to troubleshooting diagrams except where probable causes of failure can be predicted, in which case reference may be made directly to an alignment or repair procedure.

3.2.6.1.5 Chapter 4 - Functional Description. Chapter 4 shall describe how the components or equipments comprising the jointly performed major operations and functions and how associated systems contribute to the performance of these major functions. Equipment or associated system interfaces shall be described only as necessary to identify the sources or destinations of system inputs and outputs. Description shall not repeat the functional description provided in associated equipment manuals.

a. Method of Presentation. The presentation shall first define how the system major functions meet the purpose of the system. Each major function shall then be discussed separately at progressively increasing levels of detail. The description of the entire system shall be supported by a basic block diagram of the system. Where textual information can be enhanced pictorially, additional diagrams and other illustrations shall be used. In electronic manuals the same diagram can be incorporated for use throughout the manual (one picture - multiple links).

b. Introduction. The introduction shall describe the general approach that is used in the functional description.

The introduction shall also describe briefly the interrelationship between the system and associated systems.

c. System Function Directory. A system function directory shall tabulate operation control functions and the signal data described in the detailed level of functional analysis. The tabulation shall include the following information, as applicable:

(1) Official function name, colloquial name and

(2) Type of control or signal (a.c. frequency and voltage, d.c. polarity and voltage, hydraulic pressure, mechanical motion, synchro, etc.).

(3) The origin and termination of the control or signal.

(4) Identification of equipments (relay transmitters, coordinate converters, distribution boxes, switches and the like) between the origin and termination of the output control or signal.

(5) Figure numbers of illustrations on which the function is illustrated, including the fault isolation diagrams in chapter 7.

3.2.6.1.6 Chapter 5 - Operation. Chapter 5 shall describe system operating situations, modes and procedures. The descriptions shall be detailed to the level required for an understanding of the operational interfaces of the system equipments and associated systems. Illustrations shall be included when necessary for clarity. The various operating modes shall first be described to acquaint the operator with all equipment combinations that can be employed to affect a given mode of operation.

a. Preoperational Conditions and Setup. Specific preoperational conditions presumed to be in effect prior to system operation shall be established. A system readiness check off list of significant switch positions and indicator status shall be tabulated. For indicators such as dials, where a band of readings are possible, upper and lower limits shall be delineated. The initial conditions of associated-system equipment that directly affect system operation shall be treated in a similar manner.

b. Operating Modes. The primary operating mode shall be discussed in detail and alternate modes shall be treated as modifications of the primary mode. Operating procedures common to all modes shall be detailed under the primary mode and referred to under the alternate modes, with such modifications of procedure as may be necessary. Each mode shall be described in the logical sequence of major phases, events, options, supervisory commands and responsive actions and the following:

(1) Only those equipment operational controls and indicators having system significance shall be explained in the description. When controls must be actuated and indicators observed in a sequence to achieve system operation, the descriptions will cite each control and indicator with a number to indicate the position in the sequence.

(2) Emphasis shall be placed on safety by the use of warnings on the safe operation of controls, which, if operated improperly, could result in hazards to personnel or damage to the equipment. Each control shall be followed by a brief description of its effects at the operator station and at remote stations. The primary mode description shall be supported by both general and detailed illustrations.

(3) Operational phases which involve operator judgment shall be illustrated by operational logic diagrams. The diagrams shall indicate the conditions that must be favorable prior to an operator action or if unfavorable, indicate the alternate action. Illustrations showing dials, gages, status lights, etc., which indicates the favorable or unfavorable conditions shall be included. Special procedures to be followed when an equipment failure may be bypassed (as separate from emergency procedures) shall also be described.

d. Normal Operation. The duties of system operators shall be described in terms of general responsibility and specific step-by-step procedures for operating the system in all of the primary modes. Descriptive words (such as switch, button, dial or indicator) may be added to clarify the type of control involved, for example: “press ACCESS button and observe channel spot.” All system controls and indicators provided for the use of operators shall be covered. Controls and indicators provided only for maintenance and nonsystem application shall not be called out.

e. Emergency Operation. Step-by-step procedures shall be provided for emergency operation of the system. If specially

designated controls have been provided for emergencies, a short statement shall be included describing how they modify or otherwise affect normal system operation. Emergency procedures shall be supported by illustrations.

f. Special Operation. Special operations such as test checkout, training or evaluation exercises shall be described. Illustration support shall include block diagrams and pictorial diagrams.

3.2.6.1.7 Chapter 6 - Scheduled Maintenance. Chapter 6 shall contain all system scheduled test procedures, together with necessary explanations and illustrations. These procedures shall be correlated with the installation checkout requirements, such that any maintenance or performance test procedure also required for checkout may be properly referenced from chapter 3, Installation Data. The Installation Standards Summary Sheet shall also include space for any maintenance or performance test result that should be recorded by the installer. The recorded information will provide a reference to the technician when troubleshooting or when needed for installation acceptance certification. Chapter 6 shall be comprised of the following:

(1) Introduction.

(2) Scheduled maintenance action index.

(3) Scheduled test procedures.

a. Introduction. The introduction shall be an explanation of the purpose, scope and arrangement of the scheduled maintenance material. When a preventive maintenance procedure is critical to the operation of the system and the schedule for servicing is absolute (not recommended), this information shall be conspicuously labeled as a CAUTION. The following statement shall be included: “The scheduled maintenance instructions in this manual are intended to duplicate those furnished in the Planned Maintenance System (PMS).” In case of conflicts, the PMS documentation takes precedence. Such conflicts should be reported immediately on the user comment sheet in accordance with the maintenance procedures for this manual.

b. Scheduled Maintenance Action Index. This index shall include all required scheduled performance tests. The index shall be tabulated as follows:

(1) Column 1, Periodicity. This index shall contain a list of all scheduled actions contained in the chapter. The following periodicity symbols, as appropriate, shall be used:

Interval	**Symbol**
Daily	D
Weekly	W
Monthly	M
Quarterly (3 Months)	Q
Semiannually (6 Months)	S
Annually (12 Months)	A
Overhaul cycle	C
As specified (explain circumstances)	R

(2) Column 2, Maintenance action. This column shall list the title of the maintenance action which corresponds to the periodicity number in column 1.

(3) Column 3, Reference. This column shall state the paragraph or table number of the maintenance procedure that corresponds to the maintenance action listed in column 2.

c. Scheduled Test Procedures. Include the detailed procedures for setting up and performing complete system test. Each procedure shall be numbered and titled to clearly define the test action and the output to be tested.

3.2.6.1.8 Chapter 7 - Fault Isolation. Chapter 7 shall contain fault isolation procedures, illustrations and an explanation of the use of the information presented. The major objective of the system fault isolation procedures contained in chapter 7 shall be described. In addition, this shall contain a brief description of each type of maintenance diagram. A fault directory shall be included which relates fault symptoms found during operation to the fault-isolation procedures. Fault-isolation procedures, fault logic diagrams, control function diagrams and data function-diagrams shall be included as follows:

(1) Operation-based symptom fault directory.

(2) Fault-isolation procedures.

(3) System fault logic and troubleshooting maintenance dependency matrix diagrams.

(4) System control function diagrams.

(5) System data function diagrams.

a. Operation-Based Symptom Fault Directory. The directory shall relate system faults observed during operation described in chapter 5 to fault isolation diagrams. The table(s) shall include references to system fault isolation diagrams and where applicable, directly to equipment troubleshooting diagrams. The content of the table shall include, as applicable, the following information:

(1) Operating procedure step.

(2) Functional description.

(3) Fault isolation procedure.

(4) Alignment procedure.

(5) Fault isolation diagram.

(6) Equipment document.

b. Fault Isolation Procedures. Procedures shall be included for isolation of a trouble to a single equipment or functional area of an equipment. The procedures shall provide for the analysis of switching combinations and observable indications (dials, gauge lamps and meters). The use of any required test equipment shall be described. The procedures shall support the fault-logic, control-function and data function diagrams. The supporting diagrams shall be referenced by figure number. Prerequisite control settings and conditions shall precede each procedure.

c. System Fault Logic and Troubleshooting-Maintenance Dependency-Matrix Diagrams. System fault logic diagrams shall be prepared for fault indications observed during either scheduled tests or operation. These diagrams shall isolate the functional area of the equipment at fault and then refer the user to the equipment technical manual containing the information needed to complete the fault isolation and repair. Each diagram shall include or make reference to information necessary to establish the system test or operating conditions required for starting the fault-isolation procedure. The conclusion boxes shall list the equipment or functional area within and equipment that is the probable source of malfunction and the technical manual reference or references for further

isolation and repair of the fault. Troubleshooting-matrix diagrams may be substituted for or augment fault logic diagrams.

d. Control Function Diagrams. Control function diagrams shall be provided for all system control circuits. The control function diagrams shall be at the system level. The diagrams shall show essential fault isolation test points or comparable indicators and shall include appropriate references to equipment manuals.

e. Data Function Diagrams. Data function diagrams shall show in detail the system information needed to isolate faults within signal or data flow paths. Data function diagrams shall include tolerance values and shall contain references to equipment publications where necessary. All inputs required to develop the output shall be shown.

3.2.6.1.9 Chapter 8 - Alignment/Maintenance Procedures. Chapter 8 shall present the corrective adjustment procedures and support information necessary to restore electrical and mechanical alignment between the various system equipments. All values and tolerances shall be included. The alignment shall be cross-referenced to respective fault isolation procedures and diagrams in chapter 7. Alignment procedures shall include references to equipment publications where further procedures are required at the equipment level. The alignment procedures shall be presented in step-by-step form.

3.2.6.1.10 Chapter 9 - Repair Parts List. Chapter 9 provides parts lists and illustrations necessary for disassembly, inspect on, repair and assembly of the G/ATOR system. Each system shall have a separate parts list. Information for identification of removable and replaceable parts of the system is also provided. The repair parts list is separated into figures by main groups of assemblies and keyed to associated illustrations by item numbers.

a. Figure and Index Number Column. This column lists the figure number and index number assigned to each part on its associated figure.

b. Part Number Column. This column lists the part number for each item in the listing. Either a contractor part number or a vendor part number or a Government standard part number is provided. Parts to which no part number has been assigned are designated “No Number” in the part number column.

c. Commercial and Government Entity (CAGE) Code Column. The appropriate CAGE code, published in the current issue of Cataloging Handbook H4/H8, Commercial and Government Entity (CAGE), is listed in this column opposite each part number. The CAGE code identifies the manufacturer of the part.

d. Description Column. This column describes each part listed. The identifying noun is listed in upper case letters and is separated by a comma from the remaining descriptive modifiers which are lower case. The modifiers consist of values, definitions, specification control drawing numbers and local manufacture item information. The term “(AP)” indicates that the part is an attaching part for the previous index number to the next higher assembly.

(1) Indentation. Parts listed in the Repair Parts List are indented to indicate item relationship to its next higher assembly (NHA). The nomenclature of each assembly is followed in the list (except for attaching parts) by the nomenclatures of its components which are indented one column to the right. This indentation indicates the relationship of each component of the assembly. To determine the next higher assembly of a part or assembly, note the column in which the first word of the nomenclature appears. The first item directly above, which appears one column to the left (except for attaching parts), is the NHA.

(2) Electrostatic Discharge Sensitive Devices. If electrostatic discharge (ESD) sensitive devices are present, they are identified in the description column by the notation “(ESD)”. This is to remind maintenance personnel to use ESD precautions during maintenance handling of the item.

e. Quantity Column. Quantity (Qty) shown in this column is the quantity of each part required for one next higher assembly, subassembly or sub-subassembly. The entry “AR” (As Required) is used when the quantity required must be determined when the part is installed. The entry “Ref” (reference) indicates that the part has been previously listed under its next higher assembly. The “(See Figure for NHA)” notation is the description column for such an item specifies the figure and item number at which the quantity per assembly can be determined.

f. Source, Maintenance and Recoverability Column. This column contains joint military services uniform Source,

Maintenance and Recoverability (SMR) codes. Refer to MCO 4400.120 for SMR code definition.

3.3 Format and Style.

3.3.1 Camera-Ready Copy (CRC) Manuscript (PAPER OPTION).

Preparation of the manuscripts will conform to the format and style in accordance with previously stated requirements.

3.3.2 IETM. The IETM shall be generated from XML files tagged in accordance with MIL-PRF-87268 and capable of being converted to a data base to meet the requirements of MIL-PRF-87269 and the 28000 series of MIL specs for IETM authoring. The IETM shall be tagged IAW the Government furnished DTD, which will render it compatible with the Marine Corps' Future State Repository.

3.3.3 Cover end Title Page. The following distribution statement will be printed on the front cover of all paper unclassified manuals. The statement shall be centered, one-half inch below a 2" Marine Corps seal in 0.09 inch type.

THIS PUBLICATION IS REQUIRED FOR OFFICIAL USE OR FOR ADMINISTRATION OR OPERATIONAL PURPOSES. DISTRIBUTION IS LIMITED TO U.S. GOVERNMENT AGENCIES ONLY. OTHER REQUESTS FOR THIS DOCUMENT MUST BE REFERRED TO: COMMANDANT OF THE MARINE CORPS (ARD), WASHINGTON D.C. 20380-0001.

DESTRUCTION NOTICE: DESTROY BY ANY METHOD THAT WILL PREVENT DISCLOSURE OF CONTENTS OR RECONSTRUCTION OF THE DOCUMENTS.

3.3.4 Use Statement. The statement FOR **"OFFICIAL USE ONLY"** shall appear in 0.20 inch type, 0.125 inch and centered below the bottom horizontal rule line.

3.3.5 Front Matter. Front matter for a paper system manual shall contain a recapitulation of **Warnings and Cautions**, following the Title page, cross-referenced to the text by page number. Front matter shall consist of:

a. Cover and Title Page.

b. Notice of Change Page.

c. List of Effective Pages.

d. Table of Contents.

e. List of Illustrations.

f. List of Tables.

g. Safety Summary, cross-referenced to the appropriate text and page.

3.3.6 Technical Content. The technical manual shall conform to the standards identified.

3.3.7 Publication Numbers. Publications numbers, required for both electronic and paper, shall be assigned a Technical Manual (TM) Identification Number and Publication Control Number (PCN). For electronic manual, templates for the jewel case and the CD-ROM shall be provided. For paper manuals The TM number shall be placed on the front cover and on all pages. The PCN shall be printed in the lower right hand corner of the cover of the paper manuals. All publication numbers shall be assigned by the PGD/PM.

3.3.8 Photographs /Line Drawings/Video. Line drawings shall be prepared in lieu of Photographs (half tones)for paper manuals. Although, photographs and video presentations can be incorporated into the electronic manual for support and clarity.

3.3.9 Illustrations. For paper manuals, illustrations shall follow as close as possible to its first reference in the narrative text. However, when an illustration is extensive and, in the case of paper, requires a foldout sheet, such as for a large schematic diagram, it shall be located at the end of the manual. In-text and foldout artwork and graphic depictions are to be an integral part of the manual and are to be included throughout the text. The contractor shall perform all art services necessary to illustrate and/or clarify written explanations. The format for IETMs shall be in accordance with MIL-PRF-87268.

3.3.10 Clarity. Line art, including schematics, wiring diagrams and block diagrams, shall be of sufficient darkness and sharpness of line to reproduce clearly at required reproduction size without additional treatment. Nomenclature, callouts, tabular material and symbols appearing on illustrations shall be upper case, with 8 point minimum reproduced size.

3.3.11 Publication Date. The publication date shall be the last working day of the month when the manual is signed by the PGD/PM. No hardware changes will be incorporated into the publication after the Copy Freeze Date. The publication date

shall be shown in the lower right hand corner of the paper front cover only. Electronic media shall have a date on the jewel case cover as well as the CD-ROM itself. Copies shall be in accordance with guidance provided prior to publication.

3.3.12 Reproducible Copy and Integrally Related Art. Manuscript (for paper option) having corrections resulting from reviews, technical evaluation, verification and updating of the manuscript manual, as applicable, shall be incorporated. The material shall be prepared at the most economical cost, considering initial and follow-on costs, such as reproduction, printing, handling, filing, storing and equipment and any combination thereof, electric accounting machines, computers and tapes, may be used for preparing text. Reproducible copy shall be 8-1/2x11 inch page size and appropriate foldouts.

4.0 Quality Assurance Provisions

4.1 Quality Assurance Functions. All TM elements and processes shall be evaluated at various stages of development/revision, by one or all of the following QA functions:

a. Quality reviews.

b. Quality program reviews.

c. In-process reviews (IPR).

d. Validation.

e. Verification.

4.1.1 Control of Subcontractors and Vendors. The contractor shall ensure the quality of TMs prepared by subcontractors and vendors.

4.1.2 In-Process Reviews (IPR's).

4.1.2.1 IPR's will be required at stages of TM development by the Government to provide for coordinated monitoring of TM preparation by the contractor and the Government. The contractor shall support IPR's and provide access to TM materials, intermediate products and final products. The IPR's shall include evaluation of:

a. Source data.

b. TM plan/outline.

c. Presentation methods.

d. Modes of preparation.

e. TMCR compliance.

f. Completed documentation “electronic, text (in the case of paper option exercise) and artwork.

g. Current XML tagged files.

h. Current IETM development (IETM on CD-ROM).

i. Current PDF formatted materials.

4.1.2.2 Review Levels. At a minimum, IPR’s will be held at 30%, 60% and 90% completion level and IETM final completion. IPR’s may be requested by the Government to provide for coordinated monitoring of TM preparation by the contractor and the Government. The contractor shall support IPR’s and provide access to TM materials, intermediate products and final products. Contractor shall provide one set of technical manuals and an IETM CD-ROM to each IPR participant or less, as required.

4.1.2.3 IPR Records. The contractor shall act on reported decisions/discrepancies resulting from or associated with IPR’s. Each review shall include corrections from the previous IPR, if applicable. Comments and redline resulting from reviews shall be incorporated. Previous comments from any IPR shall be revisited prior to proceeding with the current IPR. If the previous comments have not been included, the IPR shall not be considered complete.

4.1.2.4 Disposition of IPR Findings. Discrepancies and/or deficiencies found as a result of the IPR shall be corrected prior to certification and acceptance of the TM.

4.1.3 Guidance Conference. A Start of Work Guidance Conference shall be held at contractor’s facility 30 days prior to the start of work on the system manual.

4.1.4 Validation. Validation is a contractor QA responsibility accomplished on all TMs, changes, supplemental data and revisions thereto. Validated manuals are required for testing and training; however, if Government schedule does not

allow for this, contractor may be allowed to validate during training or testing. If time is a consideration, the contractor and Government may, upon approval of the Program Office conduct a joint validation and verification. A TM shall not be ready for the validation or verification until the following conditions have been fulfilled:

a. Contractor's engineering technical review has been completed.

b. Information, illustrations & parts lists reflect correct configuration of the system/equipment, to include all current engineering changes.

c. Procedural instructions are readily understandable by the intended user and adequate to perform all operations and maintenance functions.

d. All procedures have been performed to assure accuracy and performance requirements.

e. Adequacy of data is checked to ensure that it supports the approved maintenance and support plan.

f. Hardware of the proper configuration is available for the validation or verification.

g. All safety hazards identified in the Safety Assessment Report (SAR) are resolved and identified within the text as **CAUTIONS** or **WARNINGS** necessary to protect the equipment or personnel as appropriate.

4.1.5 **Verification.** The Government will verify that the manuals/IETM are accurate during Verification. Government may choose to perform concurrently with contractor's validation effort. Contractor shall provide technical/engineering support and facilities as required to aid Government in the performance of the verification effort. The Contractor shall provide one set of technical manuals and an IETM CD ROM for each verification participant no less than 21 calendar days prior to the scheduled validation/verification effort. The contractor shall incorporate all Government comments from specification compliance reviews, technical accuracy reviews and Government verification reviews into the final submission of manuals.

5.0 Packaging and Delivery

a. Package Marking. In addition to sender and addressee information, the exterior of each package shall bear the following:

(1) Publication number.

(2) Contract or Purchase Order Number.

(3) Type of material enclosed.

(4) Number of containers in the shipment.

b. Packing List. A copy of the letter of transmittal or the packing list, shall be placed inside the package. When a shipment consists of several packages, the letter of transmittal or packing list shall be enclosed in the first package and shall identify the material that was wrapped in each package.

5.1 Manuscript Copy for Review (PAPER OPTION). Manuscript copies shall be wrapped separately and packaged flat in cartons. Final size illustrations shall be included in the manuscript. Foldouts shall be folded as necessary to fit the bound manuscript. Maximum thickness of bound matter shall be three inches but not including covers. If the number of foldouts is enough to cause substantial difference in the thickness of the manuscript on the binding edge, spacers shall be added to equalize the two sides. The review manuscript(s) shall have a blue card stock cover page and bound with posts or inserted into a three-ring binder(s). Elaborate containers shall not be used. Packaging must protect the manuscript so that it cannot shift within the container. Manuscripts are to be delivered as specified on the Distribution Matrix of the CDRL. If commercial manuals are acceptable, the Draft (first submission) shall suffice as Final.

5.2 CD-ROM for Review. CD-ROM shall be wrapped to provide maximum protection during shipping. Each CD-ROM shall be delivered in a standard compact digital audio disc case and wrapping. The case is to be usable as storage for the disc once the plastic cover wrapping is removed. Multiple CD copies may be delivered in the same shipping container. CD-ROMs are to be delivered as specified on the Distribution Matrix of the CDRL.

6.0 Delivery Instructions. Contractor shall provide IETM and any draft manuals for Validation/Verification. Correction of discrepancies or changes resulting from Government training, testing and reviews shall be provided for use and possible

incorporation into the production technical manuals. Verified technical manuals shall be provided for Government fielding. A Master CD, Camera-ready copy (reproducible) and digitized text files for each of the manuals in ASCII XML format and graphics in 300 dpi CCITT.G4 format shall be the final technical manual products. Final submission shall be 30 days after incorporation of changes resulting from Government verification or final review. Upon Government approval of the technical manuals, one set **(Preliminary)** and a CD-ROM and Hard copy TMs shall be over-packed with each end item. A copy of the IETM Master (CD-ROM) and Camera-Ready Hard copy shall be delivered to the PGD/PM

Commercial manuals shall be submitted to the Government for review and approval 60 days after contractor has identified vendor equipment as system component. Should commercial manuals require supplementation, contractor shall submit draft supplementation 60 days after Government request for supplementation. Government requires 60 days for review of original submission or revision. Upon approval of the commercial manual by the Government, the contractor shall over pack 1 copy each with supplement, if applicable, with each end item being procured under this contract. Manuals shall be submitted to the Government by DD250. CD-ROM and Camera-ready copy of each commercial manual supplement, if applicable, shall be provided to the Government for review and acceptance.

1.1 Proposed Equipment List for the GATOR System.

The following is an initial list of Government Property (GP) that may be required for operation of the G/ATOR system. This list is only meant to identify general equipment as the baseline for G/ATOR. This document is for information and initial planning purposes. This list is not all inclusive; the contractor shall provide a recommended list based upon their design's requirements.

Item Description	U/I	Qty	NSN	Unit Cost	Weight	Dimensions L x W x H
M1097A2 HMMWV	EA	AR	2320-01-380-8604	$61,665	5,900 lbs Curb Weight 10300 lbs Gross Vehicle Weight	190.5 x 114 x 86.0 inches
Light Tactical Trailer (LTT-HC)	EA	AR	2330-01-387-5424	$7,058	1,750 lbs Curb Weight 4,200 lbs Gross Vehicle Weight	132 x 85.6 x 42.4 inches
Advance Mobile Medium Power Set (60kw, 50/60 Hz, 3 Phase 120VAC)	EA	AR	TBD	TBD	2800 - 3000 lbs	Similar to USMC's Family of 60kw Tactical Quiet Generator (MEP 806A)
Modular Azimuth Positioning System (AN / PSN-14)	EA	AR	TBD	TBD	Less than 50 lbs	~24 x 16 x 8 inches
Radio Set X (voice capable) w/antenna, mount and vehicle remote i.e. SINCGARS (AN/VRC-92) or current version.	EA	2	5820-01-267- 9477	$24,268	~50 lbs	~10.0 x 15.7 x 3.4 inches
Radio Set Z (voice and data capable, multi band) w/Antenna and mounts i.e. EPLRS (AN/VAQ-2C (v)1)& JTRS	EA	2	5820-01-462-8411	$26,700	~50 lbs	~17.7 x 15.9 x 10.0 inches
OE-254/GRC Antennas.	EA	2		TBD	~45 lbs	~36 x 24 x 12 inches
Integrated Individual Squad Radio	EA	4	TBD	TBD	Helmet Mounted	Helmet Mounted
AN/UPX-37 IFF Interrogator	EA	1	5895-01-460-5448	$91,611	76 lbs	18 x 14.75 x 10.56 inches
IFF Encryption Devices (embedded or standalone)	TBD	AR	TBD	TBD	TBD	TBD
Computer, Digital, Ruggedized Laptop MCHS	EA	2	TBD	TBD	~13.5 lbs	~12.0 x 4.0 x 11.0 inches
Radar Environmental Simulator	EA	1	TBD	TBD	TBD	TBD
Mission Planner Application	EA	2	TBD	TBD	N/A	N/A
Friendly Force Combat Identification Device	EA	AR	TBD	TBD	TBD	TBD
DAGR	EA	2	5825-01-526-4783	$3,439	Hand Held	Hand Held

DEPARTMENT OF DEFENSE CONTRACT SECURITY CLASSIFICATION SPECIFICATION *(The requirements of the DoD Industrial Security Manual apply to all security aspects of this effort.)*	**1. CLEARANCE AND SAFEGUARDING** a. Facility Clearance Required: Secret b. Level of Safeguarding required: Secret

2. THIS SPECIFICATION IS FOR:		**3. THIS SPECIFICATION IS :**	
Request Type :	Prime Contract	Type	Original
Expires		Date	20070330
Contract Number	M67854-07-C-2072		

4. IS THIS A FOLLOW ON CONTRACT?	No
5. IS THIS A FINAL 254?	No

6. CONTRACTOR

A. Name, Address, and Zip Code	B CAGE Code	C. Cognizant Security Office
NORTHROP GRUMMAN SYSTEMS CORP 1580-A WEST NURSEY ROAD LINTHICUM HEIGHTS MD 21090	15055	DEFENSE SECURITY SERVICE 938 ELKRIDGE LANDING ROAD LINTHICUM MD 21090-2917

7. SUBCONTRACTOR

A. Name, Address, and Zip Code	B CAGE Code	C. Cognizant Security Office

8. ACTUAL PERFORMANCE

A. Name, Address, and Zip Code	B CAGE Code	C. Cognizant Security Office

9. GENERAL IDENTIFICATION OF THE PROCUREMENT

RESEARCH, DEVELOPMENT, FABRICATION, TEST MANUFACTURING AND SUPPORT OF GROUND/AIR ORIENTED RADAR (G/ATOR) EQUIPMENT.

10. THIS CONTRACT WILL REQUIRE ACCESS TO:	YES	NO	**11. IN PERFORMING THIS CONTRACT, THE CONTRACTOR WILL:**	YES	NO
a. COMMUNICATIONS SECURITY (COMSEC) INFORMATION		X	a. HAVE ACCESS TO CLASSIFIED INFORMATION ONLY AT ANOTHER CONTRACTOR'S FACILITY OR A GOVERNMENT ACTIVITY		X
b. RESTRICTED DATA		X	b. RECEIVE CLASSIFIED DOCUMENTS ONLY		X
c. CRITICAL NUCLEAR WEAPON DESIGN INFORMATION		X	c. RECEIVE AND GENERATE CLASSIFIED MATERIALS	X	
d. FORMERLY RESTRICTED DATA		X	d. FABRICATE, MODIFY, OR STORE CLASSIFIED HARDWARE	X	
e. INTELLIGENCE INFORMATION			e. PERFORM SERVICES ONLY		X
(1.) Sensitive Compartmented Information (SCI)		X	f. HAVE ACCESS TO U.S. CLASSIFIED INFORMATION OUTSIDE THE U.S., PUERTO RICO, U.S. POSSESSIONS AND TRUST TERRITORIES		X
(2.) NON-SCI		X	g. BE AUTHORIZED TO USE THE SERVICES OF DEFENSE TECHNICAL INFORMATION CENTER(DTIC) OR OTHER SECONDARY DISTRIBUTION CENTER		X
f. SPECIAL ACCESS INFORMATION		X	h. REQUIRE A COMSEC ACCOUNT		X
g. NATO INFORMATION		X	i. HAVE TEMPEST REQUIREMENTS	X	
h. FOREIGN GOVERNMENT INFORMATION		X	j. HAVE OPERATIONS SECURITY (OPSEC) REQUIREMENTS		X
i. LIMITED DISSEMINATION INFORMATION		X	k. BE AUTHORIZED TO USE THE DEFENSE COURIER SERVICE		X
j. FOR OFFICIAL USE ONLY	X		l. OTHER -- See Item 13	X	
k. OTHER -- See Item 13	X				

12. Public Release. Any information (classified or unclassified) pertaining to this contract shall not be released for public dissemination except as provided by the Industrial Security Manual or unless it has been approved for public release by appropriate U.S. Government authority. Proposed public releases shall be submitted for approval prior to release

DIRECT	X	THROUGH (SPECIFY)

Commanding General, Marine Corps Systems Command (LAW),
2200 LESTER STREET QUANTICO , VA 22134-6050

to the Directorate for Freedom on Information and Security Review, Office of the Assistant Secretary of Defence (Public Affairs) * for review.
* In the cases of non-DoD User Agencies, requests for disclosure shall be submitted to the agency.

13. Security Guidance. The security classification guidance needed for this classified effort is identified below. If any difficulty is encountered in applying this guidance or if any other contributing factor indicates a need for changes in this guidance, the contractor is authorized and encouraged to provide recommended changes; to challenge the guidance or the classification assigned to any information or material furnished or generated under this contract; and to submit any questions for interpretation of this guidance to the official identified below. Pending final decision, the information involved shall be handled and protected at the highest level of classification assigned or recommended. (Fill in as appropriate for the classified effort. Attach, or forward under separate correspondence, any documents/guides/extracts referenced herein. Add additional pages as needed to provide complete guidance.)

See attached continuation sheets

14. ADDITIONAL SECURITY REQUIREMENTS Identify the pertinent contract clauses in the contract document itself, or provide an appropriate statement which identifies the additional requirements. Provide a copy of the requirements to the cognizant security office.	YES	X	**NO**
15. INSPECTIONS Elements of this contract are outside the inspection responsiblity of the cognizant security office.	YES	X	**NO**

16. CERTIFICATION AND SIGNATURE Security requirements stated herein are complete and adequate for safeguarding the classified information to be relased or generated under this classified effort. All questions shall be referred to the official named below.

a. Typed Name of Certifying Official	b. Title	c. Telephone (include area code)
SHERI BURROUGHS	**SECURITY SPECIALIST**	**703-432-3956**

d. Addresss (Include Zip Code)
COMMANDING GENERAL MARCORSYSCOM
2200 LESTER STREET
QUANTICO, VA22134-6050

e. Signature

Sheri Burroughs

17. REQUIRED DISTRIBUTION

X	a. CONTRACTOR
	b. SUBCONTRACTOR
X	c. COGNIZANT SECURITY OFFICE FOR PRIME AND SUBCONTRACTOR
	d. U.S. ACTIVITY RESPONSIBLE FOR OVERSEAS SECURITY ADMINISTRATION
X	e. ADMINSTRATIVE CONTRACTING OFFICER
X	f. MARCORSYSCOM (OOU) AND
	BMADS

DD Form 254, OCT 03 (Computer Generated Form)

CONTINUATION SHEET FOR CONTRACT M67854-07-C-2072

10j The contractor shall comply with the requirements of the SECNAV 5510.36 (chapters 2, 9 & 10) for the procedures for handling, marking, storing, transmitting, releasing and destruction of "For Official Use Only" (FOUO) information.

11c. The contractor requires access to classified source data up to and including the classification levels identified in item 1 of this DD Form 254 in support of this work effort. Contractor shall place the appropriate distribution statement on all classified and unclassified technical documents at the bottom of the page, on the front cover or first page if no cover page is used, centered, in the same size print as the majority of the print on the rest of the page. All classified material received, generated, fabricated, or modified by this contract will be returned within 30 days after completion of contract or destroyed with destruction report being submitted to Commanding General, Marine Corps Systems Command (Attn: CMCC). Prior to any destruction of classified information a full listing of documents will be provided to the MARCORSYSCOM (CMCC) for review and approval by thr Project Officer/COTR. All classified information will be physically sighted by the facility security officer and a formal listing will be forwarded to Commanding General, MARCORSYSCOM (CMCC), Quantico VA by 31 December yearly and whenever there is a turnover of custodians.

11d. The contractor is required to provide adequate storage for classified hardware to the levels identified in item 1 of this DD254 which will require at least space for items that cannot be safeguarded in a regular-size approved storage container.

11i. Contractor will follow the provisions of Chapter 8 and Chapter 11 section 1 TEMPEST of the NISPOM that pertains to the automated information system security and processing actions required in this contract performance.

The Contracting Officer and the Project Officer for this contract is KENNETH L VANZANDT TELEPHONE NUMBER: 703-432-4246

Security Classification guides required during this contract is/are GATOR SCG and will be provided under separate cover by the project officer.

In addition to the reporting requirements directed by the NISPOM, the contractor will provide a concurrent report of loss or compromise of classified information to the Commanding General, Marine Corps Systems Command (MCSC) (Attn: Security Manager) 2200 Lester Street Quantico VA 22134-6050.

Contractors will conduct a security review and comply with MARCORSYSCOM 5239.2A, 'WEB SITE ADMINISTRATION' prior to entering government information on a home page (contractor or government web page site). Copy of this order will be provided by the project officer under separate cover to the contractor.Contractor will ensure all articles (including graphics) intended for public release or posting on internet/World Wide Web sites will be processed through the office listed in Item 12 before posting.

Per DoD Memorandum Dtd April 1, 2005 Subject: Facilitating Classified Visits within the Department of Defense and Defense Security Service Industrial Security Letter ISL 05L-1 dtd January 18, 2005, effective February 14, 2005, all contractors under DoD security cognizance will use JPAS for all personnel security actions. If you have not requested a JPAS account, you must do so within 90 days after contract has been awarded. Prior to set up of JPAS account visit requests to activities shall have "Need to Know" certified by MARCORSYSCOM Project Officer. All requests shall contain the information required by the NISPOM and shall not exceed a 12 month period.

All Government Badges issued under this contract will be returned immediately to the MARCORSYSCOM CENTRAL SECURITY STATION upon termination of contract, or individual terminations. When an individual contractor is terminated, for any reason, it is the responsibility of the Facility Security Officer to immediately notify the Command Security Manager, MARCORSYSCOM 2200 Lester Street, Quantico VA 22134-6050. Failure to comply could result in the suspension of all contractor proximity key and NT accounts.

If additional contracting requirements exist where retention of classified information by the contractor facility is required, a written request to retain material for a period but not to exceed 2 years is required.

All work performed within MarCorSysCom sites, will follow the Information Security regulations SECNAVINST 5510.36, 5510-30A and local command security instructions.

ADP PROCESSING: The contractor shall comply with the requirements of the Information Systems Security Programs as described in OPNAVINST 5239._ series, DoD 5220.22-M (Chapter 8), and local command information systems security instructions. All systems, regardless of the level of data processed, will be accredited in accordance with the above instructions. Use of cellular phones, hand-held radios, beepers and/or pagers, cordless telephones, and cordless microphones will be restricted from areas where US Government Protected Information is processed or discussed.

CONTINUATION SHEET FOR CONTRACT M67854-07-C-2072

ATTACHMENT A
AUTOMATED INFORMATION SYSTEMS (AIS) PERSONNEL SECURITY PROGRAM REQUIREMENTS

The U.S. Government conducts trustworthiness investigations of personnel who require access to unclassified information and who perform AIS duties. Requirements for these investigations are outlined in paragraphs 3-614, 3-710 and Appendix K of DoD 5200.2-R, available at http://www.dtic.mil/whs/directives. Falsification of information submitted for any government-conducted investigation may result in contract default. The contractor shall include all of these requirements in any subcontracts involving AIS support.

Personnel performing work on AIS may be either a U.S. citizen or an Immigrant Alien (except as noted below). An Immigrant Alien is defined as a foreign national lawfully admitted to the United States for permanent residence. These personnel shall be designated as filling one of the three AIS Categories listed below. The Contracting Officer's Representative (COR) or Technical Representative (TR) shall determine if they or the contractor shall assign the AIS category to contractor personnel and inform the contractor of their determination. If it is decided the contractor shall make the assignment, the COR or TR must concur with the designation.

AIS Category I (High Risk) – may be filled by U.S. citizens only. Positions in which the incumbent is responsible for the planning, direction, and implementation of a computer security program; has a major responsibility for direction, planning, and design of a computer system, including the hardware and software; or can access a system during the operation or maintenance in such a way, and with relatively high risk for causing grave damage or realizing significant personal gain. Personnel whose duties meet the criteria for AIS Category I designation require a favorably adjudicated Single Scope Background Investigation (SSBI) or SSBI Periodic Reinvestigation (SSBI-PR), the updated standard for the BI listed in DoD 5200.2-R. The SSBI or SSBI-PR shall be updated every 5 years.

AIS Category II (Moderate Risk) – positions in which the incumbent is responsible for the direction, planning, design, operation or maintenance or a computer system, and whose work is technically reviewed by a higher authority at the AIS Category I level to insure the integrity or the system. Personnel whose duties meet the criteria for an AIS Category II designation require a favorably adjudicated National Agency Check (NAC), instead of the DNACI/NACI listed in DoD 5200.2-R.

AIS Category III – all other positions. Personnel whose duties meet the criteria for an AIS Category III designation require a favorably adjudicated NAC.

If an employee has a personnel security investigation at the appropriate level without a break in service for more than 24 months, with favorable adjudication, and in the case of AIS Category I is less than 5 years old, you do not need to submit an additional Electronic Personnel Security Questionnaire (EPSQ) for the trustworthiness determination. If required, the contractor will ensure personnel designated AIS category I, II, or III complete the EPSQ Standard Form (SF) 85P and provide it to their company's designated reviewer for and initial suitability determination. The reviewer will use the criteria outlined in Appendix G, SECNAVINST 5510.30A to make this initial determination. If, based on this initial review, the contractor gives the employee a negative trustworthiness determination the contractor will identify a replacement to the COR reviewer will submit their EPSQs to Defense Security Service (DSS). Investigative packages shall be submitted for all personnel in AIS Category I, II, or III prior to the employee being granted access to the AIS. Specific guidelines for obtaining software and submission of EPSQs are available at the DSS Web Site (www.dss.mil). If you are unfamiliar with the EPSQ SF85P, you may contact your contact you local DSS office for further information.

The contractor will include the AIS Category for each person so designated on Visit Authorization Letters (VAL). VALs will be sent to the following address: Commanding General, MARCORSYSCOM, ATTN: Security, 2200 Lester Street., Quantico, VA 22134.

PRF-G/ATOR

PERFORMANCE SPECIFICATION
FOR THE
GROUND / AIR TASK ORIENTED RADAR
(G/ATOR)

3 May 2006

Record of Changes

Date	Revision	Reason for Change	Entered by:

Refer questions concerning this Performance Specification for the Ground/Air Task Oriented Radar (G/ATOR) to Capt. K. L. Van Zandt, G/ATOR Project Officer, PM Radar Systems, MAGTF C2 Weapons and Sensors Development and Integration (MC2I), Marine Corps System Command, Quantico, VA. (703) 432-4246 or Kenneth.L.VanZandt@usmc.mil

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1 SCOPE.

1.1 Scope.

The Ground Air Task Oriented Radar (G/ATOR) Program is a single materiel solution for the Multi-Role Radar System (MRRS) and Ground Weapons Locating Radar (GWLR) radar requirements. It is structured as an evolutionary acquisition consisting of four blocks of incremental development and production, referred to as Increments I through IV. Each block builds upon the capabilities of the preceding increments in an additive fashion and will be backward compatible with the previous Increments as practical. Increment I supports two distinct mission areas: Short Range Air Defense (SHORAD) and Air Surveillance (Tactical Air Operations Center (TAOC) Mode). The Increment I design provides for growth to all following Increments with no equipment re-design and will provide a computer software architecture that allows for the computers, computer software and firmware to be upgraded with the functionality of all following Increments. The requirements in this document are for Increment I unless otherwise specified.

2 APPLICABLE DOCUMENTS

2.1 General.

The documents listed in this section are specified in sections 3, 4, or 5 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents cited in sections 3, 4, or 5 of this specification, whether or not they are listed.

2.2 Government Documents.

2.2.1 Specifications, Standards, and Handbooks.

The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

DEPARTMENT OF DEFENSE MILITARY STANDARDS - Mandatory

MIL-STD-188-125-2	High-Altitude Electromagnetic Pulse (HEMP) Protection for Ground-Based C4I Facilities Performing Critical, Time-Urgent Missions
MIL-STD-209K	General Requirements of lifting, equipment Tiedown, and multipurpose provisions.
MIL-STD-461E	Requirements for the Control of Electromagnetic Interference Characteristics of Subsystems and Equipment
MIL-STD-464A	Electromagnetic Environmental Effects Requirements for Systems
MIL-STD-469B	Radar Engineering Interface Requirements, Electromagnetic Compatibility
MIL-STD-882D	Standard Practice for System Safety
MIL-STD-889B(3) Notice 2	Dissimilar Metals
MIL-STD-913A	Requirements for the Certification of Sling Loaded Military Equipment for External Transportation by Department of Defense Helicopters
MIL-STD-1366D(1)	Interface Standard for Transportability Criteria
MIL-STD-1472F	Human Engineering, Design Criteria Standard
MIL-STD-1474D	Design Criteria Standard: Requirements 1 and 3
MIL-STD-1686C	Electrostatic Discharge Control Program For Protection of Electrical and Electronic Parts, Assemblies and Equipment (Excluding Electrically Initiated Explosive Devices)

MIL-STD-2525B	Common Warfighting Symbology
MIL-STD-7179	Finishes, Coatings, and Sealants, for the Protection of Aerospace Weapons Systems

DEPARTMENT OF DEFENSE MILITARY STANDARDS - Guidance

MIL-STD-810F(3)	Environmental Engineering Program Guidelines

DEPARTMENT OF DEFENSE MILITARY SPECIFICATIONS - Mandatory

ATPD 2099C	High Mobility Multi-Purpose Wheeled Vehicle (HMMWV) Model 1097A2 System Specification
MIL-DTL-53072C	Chemical Agent Resistant Coating (CARC) System Application Procedures and Quality Control Inspection
191100-615I/J	TAOM Radar System Interface Specification
MIL-PRF-24667A	Non-skid Coating
MIL-PRF-87268A(1)	Manual, Interactive Electronic Technical - General Content, Style, Format, and User-Interaction Requirements
MIS-PRF-54657A	System Performance Specification for the Air Defense System of Systems, SLAMRAAM, CAGE Code 18876, 08 May 03

DEPARTMENT OF DEFENSE MILITARY HANDBOOKS – Guidance

MIL-HDBK-17-1F	Composite Materials Handbook, Volume 1 - Polymer Matrix Composites Guidelines for Characterization of Structural Materials
MIL-HDBK-237C	Electromagnetic Environmental Effects and Spectrum Certification Guidance for the Acquisition Process
MIL-HDBK-338B	Electronic Reliability Design Handbook
MIL-HDBK-419A	Grounding, Bonding and Shielding for Electronic Equipment
MIL-HDBK-454A	General Guidelines for Electronic Equipment
MIL-HDBK-470A	Designing and Developing Maintainable Products and Systems, Volume I and Volume II
MIL-HDBK-472 (1)	Maintainability Prediction (Procedure V)
MIL-HDBK-1791 (2)	Designing for Internal Aerial Delivery in Fixed Wing Aircraft (Fixed Wing Air Transport and Projection Limits only)

(Copies of these document are available online at http://assist.daps.dla.mil/quicksearch/ or http:/www.dodssp.daps.mil or from the Standards Document Order Desk, 700 Robins Avenue, Building 4/D, Philadelphia, PA 19111-5094.)

2.2.2 Other Government documents, drawings, and publications.

The following other Government documents, drawings, and publications forma part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

Directives/Instructions –Mandatory Compliance

DISR Baseline Registry 05-2.0	Department of Defense Information Technology Standards Registry Baseline Release 05-2.0
DoD AIMS 03-1000B	Technical Standard for the ATCRBS / IFF / MK XIIA Electronic Identification System and Military Implementation of Mode S dated 17 March 2003
DoDD 4650.1	Management and Use of the Radio Frequency Spectrum
DoDD 8500.1	Information Assurance
DoDI S5230.28	LO and CLO Anti Tamper Techniques
DoDI 8500.2	Information Assurance (IA)
DoD CIO Memo	Internet Protocol v. 6, 6 Jun 2003
DoD XML Registry	DoD XML Registry and Clearinghouse Policy; http://metadata.dod.mil
DSCA 00-07	Guidelines for Implementation of Anti-Tamper Techniques in Weapon Systems Acquisition Programs, 3 May 2003
DSPO Standard Document SD-18	Parts Application and Reliability Information Manual for Navy Electronic Equipment
G/ATOR SCG	G/ATOR Security Classification Guide, 07 June 2005
OSJTF Ver 2.0	A Modular Open Systems Approach (MOSA) to Acquisition – Program Manager's Guide, Sep 2004
USAF	Anti-Tamper Security Classification Guide, 1 Mar 2001
MDSE ICD	Missile Defense System Exerciser (MDSE) Interface Control Document (ICD), Builds 3.3, 3.4, and 4.0.
JDEP DIS ICD	Joint Distributed Engineering Plant (JDEP) Distributed Interactive Simulation (DIS) Interface control Document (ICD), Version 1.0, 1 Jun 01.

2.3 Non-Government Documents.

The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

EIA Specifications – Mandatory Compliance

EIA-625	Requirements for Handling Electrostatic Discharge-Sensitive (ESDS) Device

(*Application for copies of EIA documents should be addressed to Electronic Industries Alliance Corporate Engineering Department, 2500 Wilson Blvd, Arlington, VA 22201 or at http://www.eia.org*)

IEEE Specification – Mandatory Compliance

IEEE 1278.1A	Distributed Interactive Simulation Standard
IEEE 1516-2000	Standard for Modeling & Simulation HLA Standard

North Atlantic Treaty Organization (NATO) Standards (Mandatory)

STANAG 2175 ED3(2)	Classification and Designation of Flat Wagons Suitable for Transporting Military Equipment
STANAG 2832 ED3(1)	Dimensional Restrictions for the Transport of Military Equipment by Rail on European Railways
STANAG 4193 1, 3, & 4 (ED.1(1))	Technical Characteristics of IFF MKXA and XII Interrogators and Transponders

(STANAG may be purchased from Global Engineering Documents at (800) 854-7179).

2.4 Order of Precedence.

In the event of a conflict between the text of this document and the references cited herein (except for related specification sheets), the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3 REQUIREMENTS.

3.1 Design.

3.1.1 Frequency Selection.

G/ATOR shall be capable of being certified for operational use within the electromagnetic spectrum (Threshold), IAW DoDD 4650.1 and National and International spectrum management policies as applicable.

3.1.2 Open Systems Architecture/Modular Open Systems Architecture (MOSA).

G/ATOR shall use a modular open-systems approach IAW DoD Open System - Joint Task Force (OSJTF Ver 2.0). The Increment I design shall provide for growth to all following Increments by:

a. providing a computer software architecture that allows for the computers, computer software and firmware to be upgraded via modular open systems architecture with the functionality of all following Increments and
b. no equipment re-design.

3.1.2.1 Closed and / or Proprietary Solutions.

Portions of hardware, firmware, or software that are driven to closed and / or proprietary solutions shall not require additional closed hardware/firmware/software when integrating with the system. Secure or classified data systems shall conform to the open systems design approach as much as practical.

3.1.3 Human Systems Integration (HSI).

The design of G/ATOR shall consider the human factors of engineering, safety, health hazards, and personnel survivability. G/ATOR shall be designed to:

a. maximize ease of use during combat actions,
b. minimize skill levels required to operate and maintain it, and
c. meet the applicable general human engineering design criteria requirements of MIL-STD-1472F.

3.1.4 Selection of Materials and Parts.

G/ATOR shall be designed with materials and parts that provide the best value to the Government. G/ATOR's Operational Environments (see 3.6) shall be considered in selection of materials and parts.

NOTES:
Where possible, the following criteria should be adhered to:

1. Materials should be corrosion resistant, coated or metallurgically processed to resist corrosion. The use of non-corrosion resistant ferrous materials, except where specifically required for electronic purposes, should be kept to a minimum.

2. If the use of dissimilar materials is required, care should be taken to prevent galvanic corrosion IAW MIL-STD-889B(3) notice 2.
3. Parts which have been qualified to military standards or specifications should be used to the maximum extent possible whenever they are suitable for the intended purpose (and are available), and should be identified by their part numbers.
4. In applications for which there are no MS, AN, or MIL parts corresponding to a commercial part, the commercial part should /may be used provided its use is commensurate with the design application and has the approval of the procuring activity.
    a. Commercial parts should be defined as those parts obtainable as off-the-shelf in the as-is condition.
5. The number and different types and sizes of hardware should be kept to a minimum.
6. Nonstandard materials and parts selected for use should be equivalent to or better than, similar standard materials and parts.

3.1.4.1 Composite Materials.
The use of Composite Materials is not required. However, if they are used, the following criteria shall be adhered to:

3.1.4.1.1 Composite Material Structural Properties.
G/ATOR's design shall use B-basis, hot-wet material properties when determining the allowable structural composite material properties.

NOTE:
Additional composite material property knockdown/safety factors may be required for strength and stiffness properties based on fabrication methods due to possible increases in porosity, fiber waviness, and residual stresses inherent in the selected fabrication method.

3.1.4.1.2 Composite Material Buckling.
A minimum safety design factor of 3.0 shall be used for buckling.

3.1.4.1.3 Composite Material Stress Allowables in Critical Joints.
A minimum safety design factor of 4.0 shall be used for shear, tensile or compressive stress.

3.1.4.1.4 Composite Material Stress Allowables in General Structure.
A minimum safety design factor of 2.0 shall be used for shear, tensile or compressive stress in structure away from critical joints.

3.1.4.1.5 Composite Material Shielding (Electromagnetic Effects).
G/ATOR shall have proper shielding and grounding techniques in its structural design in order to ensure protection against electromagnetic effects.

3.1.4.1.6 Composite Material Grounding (Lightning Strike).

G/ATOR shall have a sufficient grounding path to dissipate a lightning strike as defined in 3.6.11.4.4 and 3.6.11.4.5.

3.1.4.2 Corrosion Prevention and Control.
G/ATOR will be designed to minimize Corrosion Prevention and Control (CPAC) measures. G/ATOR's design shall resist corrosion in operation, transport and protected storage consistent with warehouse conditions and Maritime Prepositioning Shipping (MPS). Materials and processes for metallic parts shall conform to applicable requirements in MIL-STD-889B(3) notice 2. MIL-HDBK-17-1F and MIL-HDBK-470A should be consulted for design guidance for composite parts. Coatings should be selected and applied IAW MIL-HDBK-470A.

3.1.4.2.1 Negative Effects of Salt Spray.
G/ATOR shall be capable of shipboard transportation and storage, externally and internally, for a minimum of six months without degradation that prevents mission accomplishment.

3.1.4.2.2 Protective Coatings and Surface Treatments.
Finishes of G/ATOR's machined, cast, forged and welded surfaces shall be the minimum required for proper operation, good appearance, and economy of manufacture. Protective coatings and surface treatments shall be IAW MIL-STD-7179. Protective coatings shall not be used in areas which lose that coating during the normal course of operation, testing, and maintenance.

3.1.5 Selection of Specifications and Standards.
The selection of specifications and standards for materials and parts for use in the design of G/ATOR will represent a best value approach for the Government and be approved for use by the procuring activity.

3.1.6 Security.
G/ATOR shall accommodate safeguards to ensure US-only and sensitive information is not released to unauthorized users, from Unclassified to Secret (including NATO, Allied, and Multinational (Coalition) releasable classifications). The Security Classification Guide for Ground / Air Task Oriented Radar, is the governing document in determining classifications related to the G/ATOR. G/ATOR is currently not approved for release to non-United States agencies.

3.1.6.1 Information Assurance.
G/ATOR shall implement Information Assurance Control Measures IAW DoDD 8500.1 and DoDI 8500.2 to ensure appropriate system availability, integrity, confidentiality, authentication and non-repudiation. Sensitive information shall be protected and the integrity of critical processing methods shall be ensured.

3.1.6.1.1 Security Container.

G/ATOR shall include an approved security container for the storage of classified material required for system operation.

3.1.6.1.2 Lock Points.
G/ATOR shall provide approved lock points and / or covers for security devices that shall be maintained on the system for operation.

3.1.6.1.3 Classified Software.
All classified software for the G/ATOR shall be on removable media storage devices to ensure that no classified software is ever permanently installed in any G/ATOR component.

3.1.6.1.4 Public Key Infrastructure (PKI).
G/ATOR shall implement PKI to ensure information security over all voice, video, and data transmission.

3.1.6.2 Anti-Tamper.
G/ATOR shall provide anti-tamper features, if required, for protection of critical weapon system components and technologies in accordance with: USAF Anti-Tamper Security Classification Guide dtd 1 March 2001 and DSCA 00-07 (Guidelines for Implementation of Anti-Tamper Techniques in Weapon Systems Acquisition Programs, 3 May 2003), and DoDI S5230.28 Low Observable (LO) and CLO (Counter Low Observable) Programs.

3.2 Performance.
Unless otherwise specified, all performance parameters are in the nominal environment as defined in Appendix C, C.3.

3.2.1 Mobility.
All requirements in this section are with the G/ATOR in the Mobility Mode. Mobility Mode shall be defined as:

a. Appropriate radar equipment is deactivated,
b. All radar equipment is properly stored aboard the prime mover(s) and trailer(s),
c. Trailer(s) are prepared for movement and coupled with the prime mover, and
d. The prime mover(s) is prepared for movement, communication assets are configured for convoy operation and Marines (and personal equipment) are positioned and readied for movement.

3.2.1.1 Mobility Assets.
G/ATOR shall be capable of battlefield mobility via organic Marine Air Control Group (MACG) assets (High Mobility Multipurpose Wheeled Vehicle (HMMWV) Family of Vehicles) (**KPP**).

3.2.1.2 Configuration.
G/ATOR, including support equipment, shall not exceed two prime movers and two trailers (Threshold) (**KPP**) / single prime mover with trailer (Objective). Support equipment shall be

defined as Organizational Level tool kits, Maintenance Assist Module (MAM) kit and Test Measurement & Diagnostic Equipment (TMDE).

NOTES:
1. The M1097A2 HMMWV is designated as the prime mover and is provided as Government Property (GP)
2. The LTT-HC trailer is the designated GP trailer.

3.2.1.3 Prime Mover and Trailer Modifications.
G/ATOR shall not require permanent modification of its prime mover or trailer. Permanent modification shall be defined as any drilling, welding, cutting, bending or other structure changes.

3.2.1.4 Prime Mover Payload.
The prime mover's total cargo weight, including two man crew (169 lbs per Marine), their equipment (62 lbs assault load and 65 lbs existence load per Marine), radar equipment, prime mover fuel and trailer tongue weight (420 lbs), if required, shall not exceed 90% of the maximum cargo weight limit. Assault loads are survivability equipment and shall be positioned for accessibility and ease of use in the Mobility Mode.

NOTES:
1. The G/ATOR crew consists of four operator / maintainers (2 per prime mover).
2. The existence loads can be stored on any prime mover.
3. The assault loads consist of rifle, helmet, body armor, field protective mask, day pack and other Mission Oriented Protective Posture Level IV (MOPP IV) gear.
4. If the objective vehicle configuration requirement of a "single HMMWV" is achieved, its weight allowance should account for two Marines, two assault loads and two existence loads. Remaining crew members and their equipment will be carried by other means.
5. Weight allocations are exclusive of special equipment and back up prime power sources. Special equipment is defined as specialized test equipment (e.g. Third Echelon Test Set), depot level jigs, and test fixtures not normally needed for day to day operations. Any back up prime power source will be brought forward via other means.

3.2.1.5 Trailers.
Trailers should not exceed 90% of the maximum payload.

3.2.1.6 Prime Power Source Fuel Allocation.
G/ATOR shall include 12 hours (Threshold) / 72 hours (Objective) of on board fuel to support the prime power source exclusive of prime mover's fuel needs.

3.2.1.7 Prime Mover Axle Weights.
The prime mover including any trailer tongue weight shall not exceed the front and rear gross axle weight ratings as specified in the prime mover's System Specification.

3.2.1.8 Prime Mover Capabilities.
G/ATOR's Mobility Mode shall not reduce the prime mover's capabilities to include:

a. Cross country speed of 15 mph,
b. Unimproved road speed of 25 mph, and
c. Improved road speed of 45 mph.

3.2.1.9 Fording Capability.
G/ATOR shall be able to ford rivers and streams up to 30 inches of water.

3.2.1.10 Shock and Vibration Mobility Mode.
G/ATOR shall operate without degradation after being subjected to the shock and vibration conditions equivalent to that of the prime mover.

3.2.2 Transportability.
G/ATOR will support Ship to Objective Maneuver, Seabasing and Maritime Pre-Positioning Shipping Concepts. Unless otherwise specified, all requirements in this section are with the G/ATOR in the Transport Mode. Transport Mode shall be defined as:

a. All radar and communication equipment is deactivated,
b. All radar and communication equipment is properly stored aboard the prime mover(s) and trailer(s),
c. Trailer(s) are prepared for shipment either individually (any trailer support or drop legs are down in the engaged position) or coupled with the prime mover, and
d. The prime mover(s) is prepared for shipment either individually or coupled with a trailer.

3.2.2.1 Air, Land and Sea Transportability.
G/ATOR shall be capable of transport by air, land and sea assets. No special or unique G/ATOR tools and attachments shall be required in the Transport Mode. G/ATOR shall not require removal from its prime mover(s). Special or unique tools shall be defined as items not listed in the standard USMC mechanics tool box (see TM-10200-14 and TM-10510-OD/1F).

3.2.2.1.1 Air Transport.

3.2.2.1.1.1 External Lift.

G/ATOR shall be capable of external transport by CH-53 and MV-22 class aircraft (**KPP**) IAW MIL-STD-913A. This shall be accomplished in no more than four lift loads (2 prime movers and 2 trailers). Lift loads shall not exceed 10,000 lbs.

3.2.2.1.1.2 Internal C-130 Transport.

G/ATOR shall be internally transportable and capable of drive-on, drive-off C-130J aircraft without disassembly IAW MIL-STD-1366D(1). MIL-HDBK-1791(2) should be used as guidance.

3.2.2.1.1.3 Safe Loading / Unloading into / from C-130J.

Components of the G/ATOR (Mission Essential Equipment) shall be configured to accommodate safe loading / unloading into / from the C-130J variant aircraft (**KPP**) IAW MIL-STD-1366D(1) and MIL-HDBK-1791(2). Mission Essential Equipment (MEE) shall be defined as the radar, prime power source(s) and any other operationally essential components other than the prime mover(s).

NOTE:
"Safe loading and unloading" is defined as the equipment having sufficient lift / tie points and fork lift slots to accommodate accepted aircraft transportation / loading practices.

3.2.2.1.2 Land Transport.

3.2.2.1.2.1 Safe Loading / Unloading into / from Prime Mover.

Components of the G/ATOR (Mission Essential Equipment) shall be configured to accommodate safe loading / unloading into / from its prime mover (**KPP**). Mission Essential Equipment (MEE) shall be defined as the radar, prime power source(s) and any other operationally essential components other than the prime mover(s).

NOTES:
1. Any MEE mounted on trailer(s) is to remain on trailer(s). With the exception of maintenance related tasks, there is no operational requirement to remove equipment from the trailer(s).
2. "Safe loading and unloading" is defined as the equipment having sufficient lift / tie points and fork lift slots to be reasonably assured that the equipment will not slip or fall during the loading and unloading procedure causing personnel injury or equipment damage.

3.2.2.1.2.2 Transport by Rail and Highway.

G/ATOR shall be capable of transport by rail and highway (tractor trailer), IAW MIL-STD-1366D(1), STANAG 2832 ED3(1) and STANAG 2175 ED3(2).

3.2.2.1.3 Shipboard Transport.

G/ATOR shall be capable of shipboard transportation and storage.

3.2.2.2 Lifting and Tie Down Provisions.

There shall be no interference between the prime mover's transportability handling provisions and G/ATOR components IAW MIL-STD-209K(1) and MIL-STD-1366D(1).

3.2.2.3 Shock and Vibration Transport Mode.

G/ATOR shall operate without degradation after being subjected to the vibration and shock equivalent to Transit Drop and Rail Impact tests (see MIL-STD-810F(3), Method 516.5, Procedures IV and VII).

3.2.3 Reconfiguration.

3.2.3.1 Self Load and Unload.

G/ATOR shall self off load from / on load to the prime mover(s) without Material Handling Equipment (MHE). If two prime movers are required, hardware shall be provided for simultaneous self off load from / on load to both vehicles.

NOTE:
With the exception of maintenance related tasks, there is no operational requirement to remove equipment from the trailer(s).

3.2.3.2 Operation with or without Prime Mover(s).

G/ATOR shall operate with or without being attached to the prime mover(s).

3.2.3.3 Terrain.

G/ATOR shall operate in level and uneven terrain, with no more than seven degrees of slope within the allotted reconfiguration time lines.

3.2.3.4 Antenna Leveling.

Once in place and set up, G/ATOR shall be capable of manual (Threshold) / auto (Objective) leveling of the antenna. Auto leveling shall be defined as a leveling procedure not requiring any human intervention other than initiation and finalization. If a stand alone device is used to achieve or contribute to manual or auto leveling accuracy, its relevant leveling information shall be inputted directly in the G/ATOR. A backup means to manually input the information shall be provided.

3.2.3.5 Leveling Accuracy.

The Increment I design shall support a stationary leveling accuracy requirement of 0.1 mils in each antenna axis. Leveling accuracy shall be maintained per the radar accuracy requirements specified in Short Range Air Defense (SHORAD) (3.2.6.14), Tactical Air Operations Center (TAOC) (3.2.7.14), Ground (3.7.2.10) and Air Traffic Control (ATC) (3.7.4.14) missions.

3.2.3.6 Special Tools.

G/ATOR shall be reconfigurable without the need for special or unique tools and attachments.

3.2.3.7 Reconfiguration Time Lines.

Mobility Mode is defined in 3.2.1. Operational Mode shall be defined as:

a. G/ATOR is fully assembled, to include any electrical grounding,
b. Ground anchoring equipment that enable the radar to operate in the normal wind loading environment is installed,
c. G/ATOR has confirmed interface connectivity with the appropriate C2 or air defense agency via Data / Radio links, and
d. G/ATOR is initialized, and has progressed to the Operate State.

NOTES:
1. Reconfiguration from the Operational Mode to the Mobility Mode time lines includes recovery of grounding rods and / or grounding systems.
2. Reconfiguration from the Operational Mode to the Mobility Mode time lines does not include recovery of the ground anchors.

3.2.3.7.1 Mobility Mode to Operational Mode (standard dress).
Upon arrival at an appropriate site, G/ATOR shall be capable of reconfiguration from Mobility Mode to the Operational Mode (SHORAD or TAOC) in not greater than 60 minutes (Threshold) (**KPP**) / 30 minutes (Objective), by no more than four Marines dressed in the standard camouflage uniform.

3.2.3.7.2 Mobility Mode to Operational Mode (MOPP-IV or cold weather gear).
Upon arrival at an appropriate site, G/ATOR shall be capable of reconfiguration from Mobility Mode to the Operational Mode (SHORAD or TAOC) in not greater than 90 minutes (Threshold) / 45 minutes (Objective), by no more than four Marines dressed in MOPP-IV or cold weather gear.

3.2.3.7.3 Operational Mode to Mobility Mode (standard dress).
Upon receipt of a movement order, G/ATOR shall be capable of reconfiguration from Operational Mode (SHORAD or TAOC) to Mobility Mode in not greater than 45 minutes (Threshold) / 30 minutes (Objective), by no more than four Marines dressed in the standard camouflage uniform.

3.2.3.7.4 Operational Mode to Mobility Mode (MOPP-IV or cold weather gear).
Upon receipt of a movement order, G/ATOR shall be capable of reconfiguration from Operational Mode (SHORAD or TAOC) to Mobility Mode in not greater than 60 minutes (Threshold) (**KPP**) / 45 minutes (Objective), by no more than four Marines dressed in MOPP-IV or cold weather gear.

3.2.4 Radar States, Features and Modes of Operation.

3.2.4.1 Radar States.
G/ATOR will have various states of operation, to include but not limited to the following indentured paragraphs:

3.2.4.1.1 System Initialization and Configuration State.
During start up and at any time during radar operation, the operator / maintainer, via the Operator Workstations, shall be able to set up, modify and / or verify the following radar parameters and features:

a. Initialization alignments (leveling routines, self location, north alignment, time synchronization, equipment health / readiness validation),

b. Radar Modes of Operation selection, and
c. Operational Parameters (frequency selection / enabling, weather information input, RF blanking, EP, Optimization sectors, IFF PRF and mode enables, auto terrain mask enabled, local / remote radar control, etc).

3.2.4.1.2 Stand By State.
G/ATOR shall have a Stand By State, which shall be defined as: radar equipment is energized and initialized, operational parameters selected and enabled, radar is aligned to north, antenna is leveled, and location and time synchronization routines are completed. From the Stand By State, G/ATOR shall be able to perform Maintenance Mode functions, System Initialization and Configuration functions or proceed into the Ready State.

3.2.4.1.3 Ready State.
G/ATOR's Ready State shall be defined as: achievement of all Stand By State parameters plus nominal performance confirmed via Condition Based Maintenance (CBM), and the antenna is rotating. From the Ready State, G/ATOR shall be able to perform Maintenance Mode functions, System Initialization and Configuration functions or proceed into the Operate State.

3.2.4.1.4 Operate State.
G/ATOR's Operate State is defined as: achievement of all Ready State parameters, plus the radar is transmitting in any one of the Radar Modes of Operation (Single Mission Mode, Contingency Operation Mode, Combined Air Mode, Sectored Mode or User Defined Mode).

3.2.4.2 Features.

3.2.4.2.1 Radar Optimization Sectors.
In all Radar Modes of Operation, except Maintenance Mode, G/ATOR shall provide 6 (Threshold) / 12 (Objective) C2 and operator defined Radar Optimization Sectors. At a minimum, Radar Optimization Sectors shall consist of:
a. RF Blanking sectors,
b. Weather sectors,
c. Electromagnetic Interference / Electromagnetic Compatibility (EMI/EMC) sectors,
d. Clutter sectors,
e. Electronic Protection sectors, and
f. Minimum reported range sectors.

3.2.4.2.1.1 Sector Definition.
G/ATOR shall be capable of defining radar optimization sectors in azimuth and elevation in 1 degree increments, range in 1 nm increments, and height in 100 ft increments.

3.2.4.2.2 Elevation Control.
G/ATOR shall have an operator selectable capability to adjust the G/ATOR's elevation beam positions mechanically (Threshold) / electronically (Objective) from -5 degrees (for a scan from

-5 degrees to 55 degrees) to +2 degrees (for a scan from + 2 degrees to + 62 degrees) in .25 degree increments.

3.2.4.2.2.1 Auto Terrain Mask.
G/ATOR shall have an operator selectable Auto Terrain Mask capability.

3.2.4.2.3 Time Synchronization.
G/ATOR shall have an automatic method to synchronize to Universal Time Constant (UTC) via Global Positioning System (GPS). Synchronization shall occur as part of initialization and configuration, and at a minimum of every 12 hours throughout a deployment.

3.2.4.2.3.1 Time Synchronization Backup.
G/ATOR shall provide an internal back-up timing clock capable of maintaining G/ATOR system time to within 0.0001 seconds of UTC.

3.2.4.2.4 Self Locating.
G/ATOR shall have an automatic self locating feature. This feature shall accept automatic input of location and orientation data from the G/ATOR GP GPS receiver. G/ATOR shall allow manual input of location and orientation data.

3.2.4.2.4.1 GPS and GPS Antenna.
The integration of the GP GPS receiver shall not reduce the GP GPS receiver's performance. G/ATOR shall contain an integrated GPS Antenna requiring no operator actions to deploy.

3.2.4.3 Radar Modes of Operation.
The following is applicable to all Radar Modes of Operation:
An operator selectable radar resource management scheme should be provided that provides radar energy where it is needed by gracefully degrading performance in other less demanding areas. As an example, if extensive clutter waveforms are needed to deal with a clutter region, then maximum TAOC detection range may roll in to the point where performance in the clutter region is acceptable. Or the long range or high altitude search rate may decrease to allow more resources to be provided to SHORAD if needed. Any resource scheme shall clearly indicate to the radar operator / maintainer and remote C2 of any dynamic changes in G/ATOR's performance.

3.2.4.3.1 Single Mission Mode.
G/ATOR shall perform each air mission individually as described in 3.2.6 (SHORAD) and 3.2.7 (TAOC) in a Single Mission Mode of Operation.

3.2.4.3.2 Combined Air Mode.
G/ATOR should have a Combined Air Mode that at a minimum simultaneously performs SHORAD and TAOC full performance air missions. When the radar is operating in the Combined Air Mode, the radar shall not interrupt track continuity during transition to a Single

Mission Mode. Full performance shall be defined as the radar meeting all of the SHORAD and TAOC Single Mission Mode requirements to threshold values. Additionally, if the Air Traffic Control (ATC) Single Mission Mode is included in the Combined Air Mode, it shall meet all of the Single Mission Mode requirements to threshold values.

3.2.4.3.3 Sectored Mode.
G/ATOR should have the ability to perform individual full performance missions on a sector basis. When the radar is operating in the Sectored Mode, the radar shall not interrupt track continuity during transition to a Single Mission Mode. Sectored Mode shall segregate different missions in 1 degree increments.

3.2.4.3.4 User Defined Mode.
G/ATOR should have the ability to tailor / enhance radar performance via the Operator Workstation based on the assigned mission and the battlefield threats. When the radar is operating in the User Defined Mode, the radar shall not interrupt track continuity during transition to a Single Mission Mode. Tailoring parameters shall be manually input by the operator or downloaded from the GP Radar Mission Planner. The G/ATOR shall contain interactive automated safeguards to prevent hazardous and mission incompatible radar operations.

3.2.4.3.5 Contingency Operation Mode.
In the event of the loss of its primary C2 node connectivity, G/ATOR shall be capable of contingency operation. Contingency Operation Mode shall be defined as the capability to perform limited SHORAD and TAOC air control functions, such as Ground Control Intercept (GCI), with augmentation of air control personnel and radio equipment from the operational controlling unit.

3.2.4.3.6 Maintenance Mode.
G/ATOR shall have a Maintenance Mode that utilizes CBM to monitor, isolate and report performance and equipment readiness. On-line monitoring shall be enabled while the radar is in the Operate State. Off-line dedicated failure isolation shall be performed while the radar is in the Stand By and Ready States (See 3.3).

3.2.4.3.7 Training Mode.
Training Mode shall be operated simultaneously with any G/ATOR Radar Mode of Operation. See 3.3.11.

3.2.5 Combat Identification Requirements.

3.2.5.1 Friendly Force Combat Identification.
The radar shall integrate the latest available GP Friendly Force Combat Identification Device (CID).

NOTE:
The latest Friendly Force CID is the Blue Force Tracker. It is a satellite based tracking and communication system, which provides on the move, near real time situational awareness.

3.2.5.2 Identification Friend or Foe.
G/ATOR shall have an Air Traffic Control Radar Beacon System, IFF, MK XIIA System (AIMS) capable of operating in Modes 1, 2, 3A, 4 and C (**KPP**). The GP IFF interrogator (AN/UPX-37 IFF Interrogator) shall be integrated into the G/ATOR's IFF subsystem IAW DoD AIMS 03-1000B and STANAG 4193 1, 3, & 4 (ED.1(1)).

3.2.5.2.1 IFF Antenna.
The Contractor Furnished (CF) IFF antenna shall be a fully integrated detachable (Threshold) / built-in (Objective) part of the radar antenna. Integrated detachable shall be defined as an antenna which is stored separately in the Mobility and Transport Modes from its operational location. Integrated built-in shall be defined as an antenna which is designed to be permanently attached to or constructed into the radar antenna assembly. CF equipment shall be compatible with existing GP IFF interrogator and planned upgrades (Mode 5 and S). G/ATOR's IFF subsystem shall support the GP Interrogator's targets per scan and per beam capability.

3.2.5.2.2 IFF Range Selection.
The IFF subsystem shall have an operator selectable range capability independent of the Radar Mode of Operation. The IFF subsystem shall be capable of independent operation, so that IFF Pulse Repetition Frequency (PRF) is not limited by the radar PRF.

3.2.5.2.2.1 SHORAD IFF Range Performance.
The CF IFF antenna and contractor integration of the GP IFF Interrogator shall support IFF range performance up to 40 nm (Threshold) / 200 nm (Objective) in the SHORAD Mode of Operation.

3.2.5.2.2.2 TAOC IFF Range Performance.
The CF IFF antenna and contractor integration of the GP IFF Interrogator shall support IFF range performance up to 120 nm (Threshold) / 200 nm (Objective) in the TAOC Mode of Operation.

3.2.5.2.3 IFF / Radar Reporting.
Paired target, radar only and IFF only reports shall be processed for local display and transmitted to remote C2 via the Radar Report.

3.2.5.2.3.1 Local Operation and Reporting.
The IFF Subsystem shall have provisions for the local display of IFF Modes 1, 2, 3A and C, numeric codes, and Mode 4 evaluation indicators / messages on the Operator Workstation.

Provisions for Mode 4 encryption devices (stand alone or embedded), back-to-back confidence tests and cryptographic fill shall be provided.

3.2.5.2.3.2 Remote Reporting.

G/ATOR shall process and transfer IFF Modes 1, 2, 3A and C, numeric codes and Mode 4 evaluation indicators / messages to C2.

3.2.5.2.4 IFF Mode Interrogation.

All IFF Modes shall be command interrogated locally via Operator Workstations and remotely via C2. The interrogator's capability to interleave and interlaced modes shall be supported.

3.2.6 SHORAD Mode of Operation.

G/ATOR will support Command and Control situational awareness and direct weapon engagement of specified threats via the CLAWS Weapon System.

3.2.6.1 Search Volume.

The range, azimuth, height and elevation coverage of this section defines a volume that shall be searched such that the Firm Track range requirements of 3.2.6.6.1 - .4 are met throughout the volume consistent with Firm Track initiation (3.2.6.6.6) and update rates (3.2.6.5.1 - .3).
Note: All height requirements are relative to Mean Sea Level.

3.2.6.1.1 Range Coverage.

Search range coverage shall be Firm Track range plus any design dependent transition to track range (See 3.2.6.6.1 - .4 for Firm Track range requirements).

3.2.6.1.2 Azimuth Coverage.

Azimuth coverage shall be 360 degrees.

3.2.6.1.3 Height Coverage.

Search height coverage shall be Firm Track height of **S1** plus any design dependent transition to track height (See 3.2.6.4.3 for Firm Track height requirements) (See Classified Appendix H for S values).

3.2.6.1.4 Elevation Coverage.

Search elevation coverage shall be **S1** to **S2** (Threshold) / **S3** to **S4** (Objective) (See Classified Appendix H for S values).

3.2.6.2 Search Volume Revisit Period.

The Search Volume, as defined in 3.2.6.1, shall be systematically searched in a manner and rate to meet Firm Track and pop up target initiation requirements defined in 3.2.6.6.6 and 3.2.6.6.8.

3.2.6.2.1 Search Volume Fence.

G/ATOR may have a search volume fence that shall extend from the minimum elevation to TBD (vendor design) degrees. The elevation extent of the search volume fence shall provide the quickest reaction time in support of target engagement. If a fence is not used, the track update rate shall be **S1** throughout the volume. (See Classified Appendix H for S values).

3.2.6.3 Target Track.
G/ATOR shall track targets with the necessary accuracies and update rates to support C2 situational awareness and CLAWS engagement. G/ATOR shall provide a means for tracking targets acquired in search (Non Dedicated Tracks), as well as those that are locally and remotely (C2) commanded (Dedicated Hostile / C2 Commanded Tracks).

3.2.6.3.1 Latency.
G/ATOR's design architecture shall minimize internal radar report latencies and external request processing to maximize Command and Control's decision making time line.

3.2.6.3.1.1 Radar Report Latency.
Radar Report latency should not exceed 100 ms. Radar Report latency should be defined as the time delay between the midpoint of the dwell used to make the measurement, and when the measurement data is made available at the C2 interface.

3.2.6.3.1.2 External Request Response Latency.
The G/ATOR latency to an external request should not exceed 100 ms when allowed by doctrine. External Request Response latency should be defined as the delay from the arrival of the request until G/ATOR acknowledgement is made available at the C2 Interface.

3.2.6.3.2 Firm Track.
G/ATOR shall achieve the required Firm Track ranges under full track load (**S1** total tracks with **S2** Dedicated Hostile / C2 Commanded Tracks) (See Classified Appendix H for S values). Firm Track (FT) shall be defined as:

a. the single dwell detection probability at the Firm Track range is equal to or greater than 0.6, and
b. three dimensional position and rate of change information is available.

3.2.6.3.3 Probability of Firm Track.
The Probability of Firm Track (PFT) for the Air Missions shall be 0.9 (Threshold) (**KPP**) / 0.95 (Objective) for a Swerling Case 1 target with Radar Cross Section (RCS) of Types 0, 1 and 2 (see Classified Appendix A for RCS definitions).

3.2.6.3.4 Probability of Drop Track.
Once a Firm Track has been initiated, the probability of drop track shall be equal to or less than one percent under the same environmental conditions in which the Firm Track was initiated.

3.2.6.4 Track Volume.

3.2.6.4.1 Range.
Firm Track range coverage shall be .5 to 40 nm (Threshold) / 70 nm (Objective).

3.2.6.4.2 Azimuth.
Azimuth coverage shall be from 0 to 360 degrees.

3.2.6.4.3 Height.
Firm Track height coverage shall be **S1** to **S2** (Threshold) / **S3** to **S4** (Objective) (See Classified Appendix H for S values).

3.2.6.4.4 Elevation.
Firm Track elevation shall be **S1** to **S2** relative to earth coordinates (See Classified Appendix H for S values).

3.2.6.4.5 Track Continuity.
Once a Type 2 or larger target is in Firm Track, it shall continue to be tracked from maximum to minimum range regardless of elevation angle (**S1** to **S2** and **S3** to **S4** (Threshold) / **S5** to **S6** (Objective)) (See Classified Appendix H for S values).

3.2.6.5 Firm Track Update Rate.
Once a Type 2 or larger target is in Firm Track, G/ATOR shall schedule sufficient radiated RF energy such that its Radar tracks are updated to meet the following requirements:

3.2.6.5.1 Fence Update Rate.
Within the vendor defined fence (if one is included), the Firm Track Update Rate shall be **S1** or less (See Classified Appendix H for S values).

3.2.6.5.2 Above Fence Update Rate
Above the vendor defined fence (if one is included), the Firm Track Update Rate shall be **S1** (Threshold) / **S2** (Objective) (See Classified Appendix H for S values).

3.2.6.5.3 Dedicated Hostile / C2 Commanded Track Update Rate.
Dedicated Hostile / C2 Commanded track update rate shall be **S1** or less regardless of elevation angle or height (**S2** to **S3** (Threshold) / **S4** to **S5** (Objective)) (See Classified Appendix H for S values).

3.2.6.6 Firm Track Range Requirements.

3.2.6.6.1 Targets Larger than Type 0.
G/ATOR Firm Track range (slant) shall be 0.5 nm to 40 nm (Threshold) / 0.5 nm to 70 nm (Objective).

3.2.6.6.2 Type 0 Targets.
G/ATOR Firm Track range (slant) shall be 0.5 nm to 40 nm (Threshold) / 0.5 nm to 70 nm (Objective).

3.2.6.6.3 Type 1 Targets.
G/ATOR Firm Track range (slant) shall be 0.5 nm to 40 nm (Threshold) / 0.5 nm to 70 nm (Objective).

3.2.6.6.4 Type 2 Targets.
G/ATOR Firm Track range (slant) shall be 0.5 nm to 40 nm (Threshold) (**KPP**) / 0.5 nm to 70 nm (Objective).

3.2.6.6.5 Firm Track Range Performance in Other Than the Nominal Environment.
In the presence of rain and clutter (other than the nominal environment), the radar shall perform with the least amount of Firm Track range degradation possible (Threshold) / no degradation (Objective). See Appendix C, C.3 for additional information.

3.2.6.6.6 Firm Track Initiation.
For inbound Type 2 and larger targets whose slant range is at least **S1** and altitude is below **S2**, Firm Track shall be achieved by **S3** (See Classified Appendix H for S values).

3.2.6.6.7 Slant Range Versus Elevation.
For inbound Type 2 and larger targets whose slant range is less than **S1** and altitude is equal to or greater than **S2**, Firm Track shall be achieved by **S3** (as they enter the Track Volume as defined in 3.2.6.4). Inbound targets shall remain in Firm Track regardless of elevation angle (targets shall be tracked through the "Cone of Silence") consistent with 3.2.6.4.4 (See Classified Appendix H for S values).

3.2.6.6.8 Pop-up Target.
Type 2 or larger pop up targets entering the G/ATOR's field of view, including targets originating in the "Cone of Silence", shall be transitioned to Firm Track **S1** seconds or less in the fence or **S2** (Threshold) / **S3** (Objective) or less above the fence. If a fence is not used, targets shall be transitioned to Firm Track **S1** seconds or less (See Classified Appendix H for S values).

3.2.6.7 Other Dedicated Hostile / C2 Commanded Waveform Uses.
G/ATOR may use Dedicated Hostile / C2 Commanded Track waveforms to optimize radar resources for Non Dedicated Tracks. If used on a Non Dedicated Track located Above the Fence, the update rate shall be at the Above the Fence Rate.

3.2.6.8 External Cues.
G/ATOR's search angle shall be increased to **S1** upon receipt of an External Cue (See Classified Appendix H for S values).

3.2.6.9 Track Load.
The "360 degree" and "sector" requirements shall be accomplished simultaneously, whereas the "per beam" requirement is independent.

3.2.6.9.1 360 Degree.
G/ATOR shall be capable of simultaneously tracking **S1** (Threshold) / **S2** (Objective) targets. Within the total track load, G/ATOR shall provide not less than **S3** (Threshold) / **S4** (Objective) Dedicated Hostile / C2 Commanded tracks via dedicated track beams while maintaining all other track and search functionalities and performances (See Classified Appendix H for S values).

3.2.6.9.2 Per Sector.
G/ATOR shall be capable of simultaneously tracking **S1** targets within a **S2** degree sector. Within the sector track load, G/ATOR shall provide not less than **S3** Dedicated Hostile / C2 Commanded tracks via dedicated track beams while maintaining all other track and search functionalities and performances (See Classified Appendix H for S values).

3.2.6.9.3 Per Beam.
G/ATOR shall be capable of simultaneously tracking **S1** targets per beam position (See Classified Appendix H for S values).

3.2.6.10 False Track Rate.
In the nominal environment, under maximum target loading conditions, G/ATOR's False Track Rate shall not be more than **S1** (Threshold) / **S2** (Objective) while maintaining all other performance parameters (Probability of Firm Track, Firm Track Range, Track Load, Track Volume, etc.) to at least threshold values. A false track shall be defined as an erroneous Radar Report transmitted to C2 (See Classified Appendix H for S values).

3.2.6.10.1 False Track Rate in the Other than Nominal Environments.
In other than nominal environments (including noise jamming), the false track rate performance shall have the least amount of degradation possible as compared to the nomimal environment's False Track Rate.

3.2.6.11 Velocity.
G/ATOR shall detect, transition to track, and maintain Firm Track on all target velocities from **S1** to Mach **S2** (Threshold) / **S3** to Mach **S4** (Objective) within threshold time and update rate requirements. Mach 1 shall be defined as 1116ft/sec at sea level at a temperature of 15 degrees C (See Classified Appendix H for S values).

3.2.6.12 Target Acceleration.
G/ATOR shall detect, transition to track, and maintain Firm Track on targets accelerating up to **S1** (Threshold) / **S2** (Objective) (See Classified Appendix H for S values).

3.2.6.13 Resolution.

3.2.6.13.1 Range Resolutions.

G/ATOR shall be capable of resolving two targets of radar cross sections **S1** apart when they are separated by **S2** or less range resolution cells (See Classified Appendix H for S values).

3.2.6.13.1.1 Non-Dedicated Track Resolution.
When using Non Dedicated track waveforms, G/ATOR shall employ a range resolution capability consistent with the 300 ft (Threshold) / 200 ft (Objective) range accuracy requirement (range error standard deviation).

3.2.6.13.1.2 Dedicated Track Resolution.
When using Dedicated Hostile / C2 Commanded Track waveforms, G/ATOR shall employ a range resolution capability consistent with the **S1** range accuracy requirement (range error standard deviation) (See Classified Appendix H for S values).

3.2.6.13.2 Angular Resolutions.
G/ATOR's Azimuth and Elevation resolutions shall be consistent with the antenna's beamwidth characteristics.

3.2.6.14 Radar Accuracy.
All error values listed below are within a single standard deviation with respect to true target position.

3.2.6.14.1 Non Dedicated Track.

3.2.6.14.1.1 Range.
G/ATOR Firm Track range accuracy at maximum range shall be 300 ft or less (Threshold) (**KPP**) / 200 ft or less (Objective).

3.2.6.14.1.2 Azimuth.
G/ATOR's Firm Track azimuth cross range accuracy at 40 nm shall be **S1** (Threshold) or less / **S2** (Objective) or less (See Classified Appendix H for S values).

3.2.6.14.1.3 Height.
G/ATOR's Firm Track height accuracy at 40 nm shall be 1000 ft or less (Threshold) (**KPP**) / 500 ft (Objective) or less.

3.2.6.14.2 Dedicated Hostile / C2 Commanded Track Waveforms.

3.2.6.14.2.1 Range.

G/ATOR Firm Track range accuracy at maximum range shall be **S1** or less (See Classified Appendix H for S values).

3.2.6.15 Tracker Functionality.
G/ATOR's internal tracker functionality shall support a resource management scheme that is capable of transitioning and maintaining track on maneuvering targets traveling to threshold velocity (3.2.6.11) and acceleration (3.2.6.12) values.

3.2.6.15.1 Tracker Performance.
G/ATOR shall maintain a Track Quality Mapping function as described in Annex A of Appendix A. G/ATOR's tracker performance shall be capable of maintaining a Track Quality sufficient to support CLAWS / SLAMRAAM engagements on maneuvering targets in a high clutter and / or jamming environment.

3.2.6.15.2 Kill Assessment Support.
G/ATOR shall support a C2 Kill Assessment function in support of CLAWS / SLAMRAAM intercept evaluations (MIS-PRF-54657A SLAMRAAM SSS).

3.2.6.16 Instrumented Range and Height.
If the design's instrumented range or height values are greater than threshold requirements (**S1** and **S2**), targets larger than Type 2 shall transition to Firm Track and be reported at the greater values (See Classified Appendix H for S values).

3.2.7 TAOC Mode of Operation.
G/ATOR will provide situational awareness for positive airspace control and management.

3.2.7.1 Search Volume.
The range, azimuth, height and elevation coverage of this section defines a volume that shall be searched such that the Firm Track range requirements of 3.2.7.6.1 - .4 are met throughout the volume consistent with Firm Track initiation (3.2.7.6.6) and update rate (3.2.7.5).
Note: All height requirements are relative to Mean Sea Level

3.2.7.1.1 Range Coverage.
Search range coverage shall be Firm Track range plus any design dependent transition to track range (See 3.2.7.6.1 - .4 for Firm Track range requirements).

3.2.7.1.2 Azimuth Coverage.
Azimuth coverage shall be 360 degrees.

3.2.7.1.3 Height Coverage.
Search height coverage shall be Firm Track height of **S1** plus any design dependent transition to track height (See 3.2.7.4.3 for Firm Track height requirements) (See Classified Appendix H for S values).

3.2.7.1.4 Elevation Coverage.
Search elevation coverage shall be **S1** to **S2** (Threshold) / **S3** to **S4** (Objective) (See Classified Appendix H for S values).

3.2.7.2 Search Volume Revisit Period.
The Search Volume, as defined in 3.2.7.1, shall be systematically searched in a manner and rate to meet Firm Track and pop up target initiation requirements defined in 3.2.7.6.6 and 3.2.7.6.8.

3.2.7.3 Target Track.
G/ATOR shall track targets with the necessary accuracies and update rates to support C2 situational awareness, Ground Control Intercept and other flight operations. G/ATOR shall provide a means for tracking targets acquired in search (Non Dedicated Tracks), as well as those that are locally and remotely (C2) commanded (Dedicated Hostile / C2 Commanded Tracks).

3.2.7.3.1 Latency.
G/ATOR's design architecture shall minimize internal radar report latencies and external request processing to maximize Command and Control's decision making time line.

3.2.7.3.1.1 Radar Report Latency.
Radar Report latency should not exceed 100 ms. Radar Report latency should be defined as the time delay between the midpoint of the dwell used to make the measurement, and when the measurement data is made available at the C2 interface.

3.2.7.3.1.2 External Request Response Latency.
The G/ATOR latency to an external request should not exceed 100 ms when allowed by doctrine. External Request Response latency should be defined as the delay from the arrival of the request until G/ATOR acknowledgement is made available at the C2 Interface.

3.2.7.3.2 Firm Track
G/ATOR shall achieve the required Firm Track ranges under full track load (**S1** total tracks with **S2** Dedicated Hostile / C2 Commanded Tracks) (See Classified Appendix H for S values). Firm Track (FT) shall be defined as:

a. the single dwell detection probability at the Firm Track range is equal to or greater than 0.6, and
b. three dimensional position and rate of change information is available.

3.2.7.3.3 Probability of Firm Track.
The Probability of Firm Track (PFT) for the Air Missions shall be 0.9 (Threshold) (**KPP**) / 0.95 (Objective) for a Swerling Case 1 target with Radar Cross Section (RCS) of Types 0, 1 and 2 (See Classified Appendix A for RCS definitions).

3.2.7.3.4 Probability of Drop Track

Once a Firm Track has been initiated, the probability of drop track shall be equal to or less than one percent under the same environmental conditions in which the Firm Track was initiated.

3.2.7.4 Track Volume.

3.2.7.4.1 Range.
Firm Track range coverage shall be .5 to 120 nm (Threshold) / 160 nm (Objective).

3.2.7.4.2 Azimuth.
Azimuth coverage shall be from 0 to 360 degrees.

3.2.7.4.3 Height.
Firm Track height coverage shall be **S1** to **S2** (Threshold) / **S3** to **S4** (Objective) (See Classified Appendix H for S values).

3.2.7.4.4 Elevation.
Firm Track elevation shall be **S1** to **S2** relative to earth coordinates (See Classified Appendix H for S values).

3.2.7.4.5 Track Continuity.
Once a Type 2 or larger target is in Firm Track, it shall continue to be tracked from maximum to minimum range regardless of elevation angle (**S1** to **S2** and **S3** to **S4** (Threshold) / **S5** to **S6** (Objective)) (See Classified Appendix H for S values).

3.2.7.5 Firm Track Update Rate.
Once a Type 2 or larger target is in Firm Track, G/ATOR shall schedule sufficient radiated RF energy such that its Radar tracks are updated at least **S1** rate (See Classified Appendix H for S values).

3.2.7.6 Firm Track Range Requirements.

3.2.7.6.1 Targets Larger than Type 0.
G/ATOR Firm Track range (slant) shall be 0.5 nm to 120 nm (Threshold) / 0.5 nm to 160 nm (Objective).

3.2.7.6.2 Type 0 Targets.
G/ATOR Firm Track range (slant) shall be 0.5 nm to 120 nm (Threshold) (**KPP**) / 0.5 nm to 160 nm (Objective).

3.2.7.6.3 Type 1 Targets.
G/ATOR Firm Track range (slant) shall be 0.5 nm to 70 nm (Threshold) (**KPP**) / 0.5 nm to 100 nm (Objective).

3.2.7.6.4 Type 2 Targets.
G/ATOR Firm Track range (slant) shall be 0.5 nm to 40 nm (Threshold) (**KPP**) / 0.5 nm to 70 nm (Objective).

3.2.7.6.5 Firm Track Range Performance in Other Than the Nominal Environment.
In the presence of rain and clutter (other than the nominal environment), the radar shall perform with the least amount of Firm Track range degradation possible (Threshold) / no degradation (Objective). See Appendix C, C.3 for additional information.

3.2.7.6.6 Firm Track Initiation.
For inbound Type 0 targets whose slant range is at least **S1** and altitude is below **S2**, Firm Track shall be achieved by **S3**. Inbound Type 1 targets whose slant range is at least **S4** and altitude is below **S5**, Firm Track shall be achieved by **S6**. Inbound Type 2 targets whose slant range is at least **S7** and altitude is below **S8**, Firm Track shall be achieved by **S9** (See Classified Appendix H for S values).

3.2.7.6.7 Slant Range Versus Elevation.
For inbound Type 0 targets whose slant range is less than **S1** and altitude is equal to or greater than **S2**, Firm Track shall be achieved by **S3**. (as they enter the Track Volume as defined in 3.2.7.4). Inbound targets shall remain in Firm Track regardless of elevation angle (targets shall be tracked through the "Cone of Silence") consistent with 3.2.7.4. Inbound Type 1 targets whose slant range is less than **S4** and altitude is equal to or greater than **S5**, Firm Track shall be achieved by **S6**. Inbound Type 2 targets whose slant range is less than **S7** and altitude is equal to or greater than **S8**, Firm Track shall be achieved by **S9** (See Classified Appendix H for S values).

3.2.7.6.8 Pop-up Target.
Pop up targets entering the G/ATOR's field of view, including targets originating in the "Cone of Silence", shall be in Firm Track in not greater than **S1** seconds (See Classified Appendix H for S values).

3.2.7.7 Other Dedicated Hostile / C2 Commanded Waveform Uses.
G/ATOR may use Dedicated Hostile / C2 Commanded Track waveforms to optimize radar resources for Non Dedicated Tracks.

3.2.7.8 External Cues.
G/ATOR's search angle shall be increased to **S1** upon receipt of an External Cue (See Classified Appendix H for S values).

3.2.7.9 Track Load.
The "360 degree" and "sector" requirements shall be accomplished simultaneously, whereas the "per beam" requirement is independent.

3.2.7.9.1 360 Degree.

G/ATOR shall be capable of simultaneously tracking **S1** (Threshold) / **S2** (Objective) targets. Within the total track load, G/ATOR shall provide not less than **S3** (Threshold) / **S4** (Objective) Dedicated Hostile / C2 Commanded tracks via dedicated track beams while maintaining all other track and search functionalities and performances (See Classified Appendix H for S values).

3.2.7.9.2 Per Sector.
G/ATOR shall be capable of simultaneously tracking **S1** targets within a **S2** degree sector. Within the sector track load, G/ATOR shall provide not less than **S3** Dedicated Hostile / C2 Commanded tracks via dedicated track beams while maintaining all other track and search functionalities and performances (See Classified Appendix H for S values).

3.2.7.9.3 Per Beam.
G/ATOR shall be capable of simultaneously tracking **S1** targets per beam position (See Classified Appendix H for S values).

3.2.7.10 False Track Rate.
In the nominal environment, under maximum target loading conditions, G/ATOR's False Track Rate shall not be more than **S1** (Threshold) / **S2** (Objective) while maintaining all other performance parameters (Probability of Firm Track, Firm Track Range, Track Load, Track Volume, etc.) to at least threshold values. A false track shall be defined as an erroneous Radar Report transmitted to C2 (See Classified Appendix H for S values).

3.2.7.10.1 False Track Rate in the Other than Nominal Environments.
In other than nominal environments, the false track rate performance shall have the least amount of degradation possible as compared to the nominal environment's False Track Rate.

3.2.7.11 Velocity.
G/ATOR shall detect, transition to track, and maintain Firm Track on all target velocities from **S1** to Mach **S2** (Threshold) / **S3** to Mach **S4** (Objective) within threshold time and update rate requirements. Mach 1 shall be defined as 1116ft/sec at sea level at a temperature of 15 degrees C (See Classified Appendix H for S values).

3.2.7.12 Target Acceleration.
G/ATOR shall detect, transition to track, and maintain Firm Track on targets accelerating up to **S1** (Threshold) / **S2** (Objective) (See Classified Appendix H for S values).

3.2.7.13 Resolution.

3.2.7.13.1 Range Resolutions.
G/ATOR shall be capable of resolving two targets of radar cross sections **S1** apart when they are separated by **S2** or less range resolution cells (See Classified Appendix H for S values).

3.2.7.13.1.1 Non-Dedicated Track Resolution.

When using Non Dedicated track waveforms, G/ATOR shall employ a range resolution capability consistent with the 300 ft (Threshold) / 200 ft (Objective) range accuracy requirement (range error standard deviation).

3.2.7.13.1.2 Dedicated Track Resolution.
When using Dedicated Hostile / C2 Commanded Track waveforms, G/ATOR shall employ a range resolution capability consistent with the **S1** range accuracy requirement (range error standard deviation) (See Classified Appendix H for S values).

3.2.7.13.2 Angular Resolutions.
G/ATOR's Azimuth and Elevation resolutions shall be consistent with the antenna's beamwidth characteristics.

3.2.7.14 Radar Accuracy.
All error values listed below are within a single standard deviation with respect to true target position.

3.2.7.14.1 Non Dedicated Track.

3.2.7.14.1.1 Range.
G/ATOR Firm Track range accuracy at maximum range shall be 300 ft or less (Threshold) (**KPP**)/ 200 ft or less (Objective).

3.2.7.14.1.2 Azimuth.
G/ATOR's Firm Track azimuth cross range accuracy at 40 nm shall be **S1** (Threshold) or less / **S2** (Objective) or less (See Classified Appendix H for S values).

3.2.7.14.1.3 Height.
G/ATOR's Firm Track height accuracy at 40 nm shall be 1000 ft or less (Threshold) / 500 ft (Objective) or less (**KPP**).

3.2.7.14.2 Dedicated Hostile / C2 Commanded Track Waveforms.

3.2.7.14.2.1 Range.
G/ATOR Firm Track accuracy at maximum range shall be **S1** or less (See Classified Appendix H for S values).

3.2.7.15 Tracker Functionality.
G/ATOR's internal tracker functionality shall support its resource management scheme and be capable of transitioning and maintaining track on maneuvering targets traveling to at least the threshold velocity (3.2.7.11) and acceleration (3.2.7.12) values.

3.2.7.15.1 Tracker Performance.

G/ATOR shall maintain a Track Quality Mapping function. G/ATOR's tracker performance shall be capable of maintaining a Track Quality sufficient to support situational awareness, Ground Control Interception and other airspace control measures on maneuvering targets in a high clutter and / or jamming environment.

3.2.7.16 Instrumented Range and Height.
If the design's instrumented range or height values are greater than threshold requirements (**S1** and **S2**), targets larger than Type 0 shall transition to Firm Track and be reported at the greater values (See Classified Appendix H for S values).

3.2.8 Electronic Protection.
G/ATOR shall provide both automatic and operator selectable Electronic Protection (EP) features via the Operator Workstations. These EP features will preserve the integrity and reliability of G/ATOR from the effects of Electronic Attack.

3.2.8.1 Electronic Protection Capabilities and Techniques.
Electronic Protection capabilities and techniques shall include but are not limited to:

a. Frequency Agility (Threshold),
b. Low Sidelobe Antenna (Threshold), **S1** dBi Sidelobe (RMS) or lower (Objective) (See Classified Appendix H for S values),
c. Sidelobe Blanking (Threshold),
d. Multiple Sidelobe Jamming Threats Cancellation Capability (Threshold),
e. Automatic Reconfiguration to a Less Jammed Frequency (Threshold),
f. Coherent Sidelobe Cancellation (CSLC)(Threshold),
g. Polarization Diversity (Objective),
h. Adjustable Transmit Power (Objective),
i. Coherent Mainbeam Cancellation Capability (CMBC) (Increment I enabled), and
j. Decoys (Increment I enabled).

3.2.8.2 Electronic Protection Performance.

3.2.8.2.1 Multiple Sidelobe Jamming Threats.
G/ATOR shall have the capability to cancel **S1** (Threshold) / **S2** (Objective) sidelobe jamming platforms as described in Appendix B (See Classified Appendix H for S values).

3.2.8.2.2 Mainbeam Jamming Threats.
Coherent Mainbeam Cancellation (CMBC) is an Increment III objective requirement which, if proposed, shall be enabled in Increment I. If proposed CMBC shall cancel at least **S1** (Threshold) / **S2** (Objective) jamming sources within the mainbeam (e.g. two broadband jammers or one jammer and its multipath reflection) with the least amount of Firm track range degradation (Threshold) / no degradation (Objective) (See Classified Appendix H for S values).

3.2.8.2.3 Sidelobe Jamming Threats.

G/ATOR's Coherent Sidelobe Cancellation (CSLC) shall cancel and resolve **S1** (Threshold) / **S2** (Objective) broadband Sidelobe jammers located anywhere within the forward hemisphere of the antenna coverage at the ranges and power levels depicted in Appendix B. Targets displaced by at least **S3** in azimuth or elevation from the jammers shall be detected and transitioned to track with the least amount of Firm Track degradation (Threshold) / no degradation (Objective) (See Classified Appendix H for S values).

3.2.8.2.4 Defeat Anti Radiation Threat (Decoys).
Increment I G/ATOR shall provide a communications interface; space and weight allocations for implementation of an active Decoy system during Increment III without redesign (Increment I Enabled). See 3.7.3 for additional information.

3.2.8.2.5 Electronic Attack Identification.
G/ATOR shall have an Electronic Attack Identification (EA ID) capability, which automatically selects and initiates appropriate radar countermeasures.

3.2.8.2.5.1 Electronic Attack Identification Reports.
Automatic EA ID and EP actions shall be reported to C2 and the Operator Workstation for situational awareness and / or manual override.

3.2.8.2.5.2 Electronic Attack Identification Control.
G/ATOR shall enable and disable EA ID functionality via the Operator Workstation.

3.2.8.3 Performance in Jamming.
G/ATOR shall operate with least amount of Firm Track range degradation (Threshold) / no degradation (Objective) in an Electronic Attack (EA) environment. See Classified Appendices A and B for additional EA environment information.

3.2.8.3.1 Coherent Sidelobe Cancellation and Coherent Mainbeam Cancellation Performance.

3.2.8.3.1.1 Attenuation of Jammers.
G/ATOR's CSLC and CMBC (Increment III) systems shall be capable of reducing the received jamming power for each of the Sidelobe and Mainbeam jammers by at least **S1** (Threshold) / **S2** (Objective), provided that their respective initial, pre-cancelled, received power is at least **S3** (Threshold) / **S4** (Objective) above ambient thermal noise (See Classified Appendix H for S values).

3.2.8.3.1.2 Response Time to Jammers.
(See Classified Appendix H).

3.2.8.3.1.3 Cancellation Effects on the Antenna Pattern.

G/ATOR's CSLC and CMBC systems will minimize any negative effects to the antenna pattern(s).

3.2.8.3.1.4 Cancellation in the Blanker and Monopulse Channels.
To maintain performance in a jamming environment, G/ATOR's CSLC system shall be applied to all channels (i.e. Sum, Azimuth, Difference, Elevation Difference, Diagonal Difference and Sidelobe Blanker(s)) as applicable.

3.2.8.4 Electromagnetic Interference.
G/ATOR shall be isolated from the Electromagnetic Environment (EME) to operate with the least amount of degradation (Threshold) / no degradation (Objective), IAW MIL-STD-464A.

3.2.9 Operator Workstations.
The Operator Workstations shall be the Marine's principal interface to G/ATOR. G/ATOR shall include two functionally identical Operator Workstations per system that are capable of being operated simultaneously.

3.2.9.1 Operator Workstation Remote Configuration.
The Operator Workstations and the voice communication circuits shall be capable of being remoted at least 500 ft hardwired (Threshold) / wireless (Objective).

3.2.9.2 Operator Workstation Mobility Mode Configuration.
G/ATOR shall provide the capability to mount and power one Operator Workstation inside the cab of each prime mover (if two are required) to allow for mission / maintenance planning while in the Mobility Mode.

3.2.9.3 Operator Workstation Transport Mode Configuration.
During the Transport Mode, Operator Workstations shall be secured within the G/ATOR.

3.2.9.4 Operator Workstation Capabilities.
The Operator Workstations shall include all-digital presentations with interactive controls and devices required to perform mission and related control functions. These all-digital presentations shall include, but are not limited to: sensor plots, track symbols, flight data, and relevant map information, as well as geographic and range references, free text, preview and computer responses, time and data filters, alerts, advisories, Condition Based Maintenance and other related information.

3.2.9.4.1 Operator Workstation Functionality.
The Operator Workstation(s) shall allow the operator / maintainer to:

a. Plan (via GP Radar Mission Planner),
b. Perform Initialization and Configuration, Stand By, Ready and Operate State functions,
c. Perform Maintenance Mode (on-line and off-line) functions,

d. Perform Training Mode (verify, monitor and control ESC and RES) functions,
e. Verify and monitor system performance (on-line),
f. Verify and monitor radar presentation to C2 (via Plan Position Indicator (PPI) & Range Height Indicator (RHI))
g. Optimize radar performance via PPI & RHI presentations displaying processed (postview) and unprocessed (preview) digital target and noise information,
h. Monitor and optimize weather and clutter cancellation performance via 3D maps,
i. Initialize and monitor Electronic Protection features and functions,
j. Monitor and verify IFF subsystem performance,
k. Perform Interactive Electronic Technical Manuals (IETM) functions, and
l. Perform Test, Measurement, Diagnostic Equipment (TMDE) functions (Objective).

3.2.9.5 Operator Workstation Contingency Capabilities.
G/ATOR Operator Workstations shall be capable of performing limited air control functions (See 3.2.4.3.5).

3.2.9.6 Display.
The Operator Workstation shall have the ability to receive, display, select, and translate between and among:
a. IFF information,
b. Imagery,
c. National Geospatial-Intelligence Agency (NGA) Geospatial data, and
d. Radar Plots.

3.2.9.7 Symbology.
User selectable symbology shall be displayed, at a minimum, IAW MIL-STD-2525B and International Civil Aviation Organization (ICAO) standards.

3.2.9.8 Data Conversion.
The Operator Workstation shall provide the user the capability to select any single or group of Plot data, automatically convert and display between and among differing measurement systems.

3.2.9.9 Units of Measure.
The operator shall be able to select either English or International units of measure including the Ground Mode defined mil (e.g. 6400 mils equal 360 degrees).

3.2.9.10 Coordinate System.
The Operator Workstation shall primarily display all data to Earth Centered Earth Fixed (ECEF) coordinate system based on the WGS-84 standard or follow on, and be capable of operator selectable and user defined datums.

3.3 Maintenance and Training Modes.

G/ATOR will provide automatic or operator commanded features, such as CBM, Auto Calibration and Auto Compensation at the system, subsystem and Lowest Replaceable Unit (LRU) level.

3.3.1 Levels of Failure and Alert.

Failures and alerts shall be classified as to the severity. Failure and alert classifications shall include:

a. Level I - Any failure which prevents the accomplishment of a G/ATOR-supported Mission task.
b. Level II - Any failure which lowers the performance of the radar below threshold values and / or has the potential to damage the radar.
c. Level III - Any failure which lowers the redundancy or overbuild of the radar or degrades performance but not below the threshold level.
d. Level IV - Any failure that is not critical to mission performance which does not qualify as a Level I, II or III failure.
e. Level V – Alerts the maintainer to an approaching out of tolerance condition of a system, subsystem, and Lowest Replaceable Unit (LRU).

3.3.2 Condition Based Maintenance.

The G/ATOR shall incorporate CBM for monitoring, measuring and prognostics on system(s), subsystem(s) and LRU(s) including the radar array structure and pallet. CBM shall exclude GP items.

3.3.2.1 Condition Based Maintenance On-line Monitoring.

CBM on-line monitoring (prognostic / diagnostic built-in-test equipment and routines) shall be utilized during Radar Modes of Operation. CBM on-line monitoring shall operate in a non - interference manner and shall not prevent the radar from performing its primary function. CBM on-line monitoring shall provide information to the operator / maintainer either on request or as changes occur.

3.3.2.1.1 Condition Based Maintenance On-line Monitoring Performance.

CBM on-line monitoring shall allow the operator / maintainer to identify 100% of Level I and II failures and 95% of Level III failures without the use of separate test equipment (see TM-10510-14/1).

3.3.2.1.2 Condition Based Maintenance On-line Monitoring False Alarm Rate.

Of the identified failures (3.3.2.1.1), the false alarm rate shall not be greater than 5%.

3.3.2.2 Condition Based Maintenance Off-line Dedicated Troubleshooting.

G/ATOR shall provide an off-line dedicated troubleshooting and failure isolation capability to the LRU level.

3.3.2.2.1 Condition Based Maintenance Off-line Dedicated Troubleshooting Performance.
CBM off-line dedicated troubleshooting shall isolate 95% of Level I-IV failures to a single LRU (Threshold) / 99% of Level I-IV failures to a single LRU (Objective).

3.3.2.2.2 Condition Based Maintenance Off-line Dedicated Troubleshooting False Alarm Rate.
Of the isolated failures (3.3.2.2.1), the false alarm rate to a single LRU shall not be greater than 5%.

3.3.2.3 Trend Analysis.
G/ATOR shall perform trend analysis that detects, localizes and reports (Level V Alerts), at the earliest possible time, the degradation of system(s), subsystem(s) and LRU(s).

3.3.2.4 Failure and Alert Reporting.
G/ATOR shall report failures or alerts to the operator / maintainer at the Operator Workstations. CBM shall inhibit failure messages from those areas that have been disabled (operator selectable), but it should display the current operational state of system(s) and subsystem(s).

3.3.2.5 Interfacing with Interactive Electronic Technical Manuals.
CBM shall interface with Interactive Electronic Technical Manuals (IETM) Level III (Threshold) / Level IV or better (Objective).

3.3.3 Antenna Auto-Calibration.
G/ATOR shall provide an antenna auto-calibration capability that maintains the array's performance and accuracy to threshold performance levels. Antenna auto-calibration data shall be made available to CBM for trend analysis and reporting.

3.3.4 Antenna Auto-Compensation.
An antenna auto-compensation feature should be provided to correct antenna pattern errors due to element failures.

3.3.5 Performance Data Collection and Extraction.
A data extraction library consisting of operator and maintenance data subsets (Threshold) / engineering data subset (Objective) shall be provided. Data collection shall operate in a non interference manner and shall not prevent the radar from performing its primary function.

3.3.5.1 Operator Data Subset.
The operator data subset shall provide operational information necessary to recreate three deployments each of eight hours in duration. Operational data shall include, but is not limited to: radar reports, radar edits, weather information, clutter information, IFF Modes, Operator Interactions, and C2 commands.

3.3.5.2 Maintenance Data Subset.
The maintenance data subset shall provide CBM failure detection and reporting and system initialization and configuration parameters. The safe data storage margin for the maintenance subset should provide storage for a minimum 30 days.

3.3.5.3 Engineering Data Subset.
Engineering data points should be available to capture data of interest to include In-phase & Quadrature (I&Q) data. The safe data storage margin for the engineering subset should provide storage for a minimum 30 minutes.

3.3.6 Preventive Maintenance.

3.3.6.1 Individual PM Task.
The allocated time to perform Preventive Maintenance (PM) on the G/ATOR shall not be greater than 15 minutes (Threshold) / five minutes (Objective) per task. PM events should not prevent the rapid execution of a mission order. Individual task times are measured in manhours.

3.3.6.2 Cumulative PM.
The cumulative time to perform PM shall not be greater than four hours (Threshold) / two hours (Objective) per month. Cumulative time is measured in manhours.

3.3.7 Corrective Maintenance.
Corrective Maintenance (CM) shall be performed at organizational, intermediate and depot levels as appropriate. CM shall include, but is not limited to: failure isolation, removal and replacement or repair of failed LRUs, and verification that the failure is corrected.

3.3.7.1 Mean Time To Repair.
G/ATOR Mean Time To Repair (MTTR) of Level I, II, III and IV failures shall not be greater than 30 minutes (Threshold) / 15 minutes (Objective). MTTR shall be defined as Repair Time / Number of Repair Incidents. Repair Time shall be defined as the total number of clock-hours to perform failure isolation, LRU replacement and verification of all corrective maintenance actions. Mean Time To Repair is measured in manhours.

NOTES:
1. MTTR is exclusive of depot level maintenance actions.
2. For guidance on MTTR calculations refer to MIL-HDBK-472(1) Procedure V.

3.3.7.2 Maximum Time To Repair.
G/ATOR Maximum Time to Repair (MaxTTR) of Level I, II III and IV failures shall not be greater than 60 minutes at the 90th percentile (Threshold). MaxTTR shall include failure isolation, LRU replacement and verification that the failure is corrected. Maximum Time To Repair is measured in manhours.

NOTES:
1. MaxTTR is exclusive of depot level maintenance actions.
2. For guidance on MaxTTR calculations refer to MIL-HDBK-472(1) Procedure V.

3.3.7.3 Minimum Down Time.
To minimize G/ATOR down time, LRUs should be capable of being replaced while the G/ATOR remains in operation.

3.3.7.4 Tools.
G/ATOR shall be designed to use American Standard hardware and tools.

3.3.8 Refurbishment.
G/ATOR shall be designed for a 30 year service life with Commercial-Off-the-Shelf (COTS), Government-Off-the-Shelf (GOTS) and Non-Developmental Item (NDI) refreshed at 5 year intervals, and system refurbishment at 15 year intervals.

3.3.9 Availability.
G/ATOR will be available to perform the mission sets as described in 6.5.1 (Length of Deployment).

3.3.9.1 Operational Availability.
G/ATOR shall have an Operational Availability (Ao) of 0.90 (Threshold) / 0.95 (Objective).
Operational Availability shall be defined as:

Ao = MTBOMF / (MTBOMF + MTTR + MLDT)
MTBOMF = Mean Time Between Operational Mission Failure
MTTR = Mean Time To Repair
MLDT = Mean Logistics Delay Time

3.3.9.2 Inherent Availability.
G/ATOR shall have an Inherent Availability (Ai) that is calculated as stated in the below formula.
Inherent Availability shall be defined as:

Ai = MTBOMF / (MTBOMF + MTTR)
MTBOMF = Mean Time Between Operational Mission Failure
MTTR = Mean Time to Repair

3.3.10 Reliability.
G/ATOR's reliability will support the availability and Operational Mission Failure values with the least amount of Level I, II and III hardware and software failures possible. G/ATOR will support the mission sets as defined in 6.5.1 (Length of Deployment) without problematic logistics and maintenance issues.

3.3.10.1 Mean Time Between Operational Mission Failure.
G/ATOR shall have a Mean Time Between Operational Mission Failure (MTBOMF) not less than 500 hours (Threshold) / 720 hours (Objective). Operation Mission Failure (OMF) shall be defined as any Level I or II hardware or software failure not correctable within 30 minutes. MTBOMF shall be defined as:

MTBOMF = Total Transmitter Operating Time / Number of Level I or II failures.

3.3.10.2 Mean Time Between Failures.
G/ATOR shall have a Mean Time Between Failure (MTBF) not less than 125 hours (Threshold) / 250 hours (Objective). A MTBF event shall be defined as any Level I, II and III hardware or software failure that requires a maintenance action to correct. MTBF shall be measured in transmitter operate time.

3.3.10.3 Redundancy.
G/ATOR shall minimize the number of single point of failure components.

3.3.10.4 Overbuild.
G/ATOR shall be designed with overbuild to allow graceful degradation of system performance while maintaining threshold performance levels.

3.3.10.5 Wear Out Life.
Electromechanical, hydraulic or mechanical items shall have an operating life not less than 26280 hours (Threshold) / 43800 hours (Objective).

3.3.11 Training Mode.
G/ATOR will provide for radar and C2 operator and maintenance proficiency training.

3.3.11.1 Operator Training.
G/ATOR shall provide simulated radar tracks for local (Operator Workstation) and remote (C2) presentation via the Embedded Simulation Capability (ESC) and / or Radar Environmental Simulator (RES).

3.3.11.1.1 Embedded Simulation Capability.
The ESC shall digitally depict real world radar target scenarios that include Type 0, 1, & 2 Air Breathing Targets (ABTs) and Cruise Missiles (CMs) (Threshold) and Electronic Attack, clutter, and weather environments (Objective). Scenarios shall contain an operator selectable target load up to the G/ATOR's maximum target load capacity.

3.3.11.1.1.1 Embedded Simulation Capability Operator Control.
G/ATOR shall support the operator / maintainer's ability to select, generate, modify, develop, record and store target sets, environments and scenarios via the Operator Workstation. G/ATOR shall support operator selectable playback of generated scenarios in either "Simulation Only" or in "Simulation over Live" events. The simulated tracks shall be marked as simulated.

3.3.11.1.2 Radar Environmental Simulator.
The Radar Environmental Simulator (RES) shall be capable of injecting 20 or more test targets into the G/ATOR receive path that have the same quality and fidelity as actual Type 0, 1, and 2 Air Breathing Targets (ABTs) and Cruise Missiles (CMs). The test targets shall be injected into the IF (Threshold) / RF (Objective) receive path.

3.3.11.1.2.1 Radar Environmental Simulator Operator Control.
G/ATOR shall support the operator / maintainer's ability to select, modify (flight path) and store target sets, environments and scenarios via the Operator Workstations. G/ATOR shall support operator selectable playback of generated scenarios in either "Simulation Only" or in "Simulation over Live" events. The simulated tracks shall be marked as simulated.

3.3.11.2 Maintenance Training.
G/ATOR shall simulate and / or insert a minimum of 10 software and 10 hardware generated CBM reportable faults per subsystem. The fault control program shall reside on the Operator Workstations.

3.4 Prime Power and System Cooling.

3.4.1 Prime Power Protection and Conditioning.
G/ATOR shall have over/under voltage +/- 5 percent and over/under frequency protection +/- 10 percent capable of automatically protecting the equipment and personnel. Protection circuits shall have an override capability.

3.4.1.1 Unique Components.
Any unique power conditioning components shall be built into the G/ATOR.

3.4.1.2 Phase Indicators.
G/ATOR shall have phase indicators to monitor the phase of prime power.

3.4.1.3 Frequency Indicators.
G/ATOR shall have a frequency indicator to monitor the frequency of the three phase power.

3.4.1.4 Alternating Current Voltmeters.
G/ATOR shall have embedded voltmeters to monitor the input Alternating Current voltages.

3.4.1.5 Direct Current Voltmeters.
G/ATOR shall have Direct Current embedded voltmeters to monitor all low voltage power supplies.

3.4.1.6 Elapsed Time Meter.
G/ATOR shall have embedded Elapsed Time Meters to monitor system operating hours for each critical subsystem or area. Radar System Power Applied Time (AC input) and Transmitter Operate Time elapsed time meters shall be provided.

3.4.1.7 Uninterruptible Power Supplies.
Uninterruptible Power Supplies (UPS) shall be provided to key volatile circuitry.

3.4.1.8 Keep Alive Power.
In the Mobility Mode, G/ATOR shall provide operator selectable "keep alive power" to key volatile circuitry via the prime mover, UPS and / or other means to support rapid radar redeployment and reconfiguration.

3.4.1.9 Power Handling.
G/ATOR's power conditioning and protection circuits, cables and harnesses shall be able to handle a 50% increase in operating current.

3.4.2 Prime Power.
G/ATOR shall operate with 60 Hz (+/- 2), 4-wire, 3-phase, 120/208 volts input power of sufficient wattage to support full operation under sector blanking conditions, within the specified temperature and altitude operating environments.

3.4.2.1 Prime Power Source.
G/ATOR's prime power source shall be comparable with the electrical performance characteristics of the MEP-806A Generator Set and sustainable using standard Marine Corps infrastructure, such as maintenance personnel, tools and Petroleum, Oils and Lubricants (POL). Prime power source shall be defined as a power source that:

a. is electrically compatible with the MEP 806A,
b. meets or exceeds the MEP 806A specifications (power rating, fuel consumption, POL, reliability, noise level, protection, etc.),
c. is capable of being operated and maintained by MOS 1141 / MOS 1142, and
d. supports the G/ATOR mobility, transportability and deployability requirements.

3.4.2.1.1 Fuel Consumption Rate.
G/ATOR shall not consume more than 10 gallons per hour of fuel (Threshold) / 5 gallons per hour (Objective) to produce prime power.

3.4.2.2 Parallel Operation.
Sufficient connector points, cabling, isolation breakers, and protection circuits shall be provided to allow for the change out of prime power generators without de-energizing the G/ATOR. Parallel operations shall be performed with or without the prime mover(s). The prime power source shall support parallel operations with a like source and with the 60 kW Family of Tactical Quiet Generator Sets.

3.4.2.3 Backwards Compatible.
G/ATOR shall be capable of operating (electrically) with the 60 kW Family of Tactical Quiet Generator Sets (MEP 806A) and other suitable generators.

3.4.2.4 Shore Power.
G/ATOR shall allow the use of 60 Hz (+/- 2), 4-wire, 3-phase, 120/208 volts commercial shore power.

3.4.3 System Cooling.
G/ATOR's individual cooling system(s) shall not have less than a 10% cooling margin as compared against the maximum cooling requirements. A cooling system shall be defined as any cooling device that provides active and / or passive cooling to a LRU, subsystem or system. Maximum cooling requirements shall be defined as G/ATOR in the Operate State with maximum transmitter duty cycle, maximum track load and clutter rejection processing, in a +131 degree Fahrenheit ambient temperature and 1120 W/m2 solar radiation.

NOTES:
1. The design of G/ATOR's System Cooling must consider the logistical burden placed upon the Operating Forces. G/ATOR should not contain specialized coolants, refrigerant,or require specialized skills sets (i.e. MOS 1161 Refrigeration Mechanic) or equipment to operate and maintain the radar in a combat zone or field environment.
2. Inefficiencies introduced into the cooling system due to life-cycle use issues, such as scaling on cooling fins, must be considered when calculating cooling margin.

3.4.3.1 Cooling System Monitoring.
G/ATOR should be designed with temperature monitoring and reporting capabilities.

3.4.3.2 Shutdown Circuitry.
G/ATOR should be designed with automatic over temperature shutdown circuitry. Any automatic shutdown circuitry shall have an operator enabled over ride capability.

3.5 Interoperability.
All connectivity to external agencies shall be via USMC C2 systems. External agencies shall include, but are not limited to:

a. Global Command and Control System (GCCS)
b. US national, allied, multinational (coalition), and joint C4ISR systems

3.5.1 KPPs.

3.5.1.1 Information Exchange Requirements (IERs).

G/ATOR shall achieve compliance with 100% of the critical IERs (Threshold) (**KPP**) / all IERs (Objective) (See Appendix G).

3.5.1.2 Joint Requirements Oversight Council / Joint Chiefs of Staff Approved/Validated Integrated Architecture Behavior Model .

Increment I hardware and software shall enable Integrated Architecture Behavior Model (IABM) conformance in Increment III without equipment redesign (**KPP**).

3.5.1.3 Global Information Grid.

G/ATOR shall meet Global Information Grid (GIG) requirements to support interoperability with current C2 (Data Links via Cable/SINCGARS/EPLRS/JTRS), and sensor network information systems/sources and those developed in the future for US national, allied, joint, and multinational (coalition) forces and agencies (**KPP**). Increment I G/ATOR shall meet GIG requirements by:

a. Adhering to Key Interface Profiles (KIPs)
b. Using Government-Off-the-Shelf (GOTS) cables and radios for G/ATOR Increment I data links.

3.5.2 Department of Defense Information Technology Standards Registry.

The G/ATOR system shall be compliant with the Department of Defense (DoD) Information Technology Standards Registry (DISR) Baseline Release 05-2.0 or later.

3.5.3 Internet Protocol.

G/ATOR Internet Protocol interfaces shall be Internet Protocol Version 6 (IPv6) compliant and interoperable with IPv4 legacy systems in accordance with DoD CIO Memorandum “Internet Protocol Version 6 (IPv6), June 9 2003.”

3.5.4 Semantic Tagging.

All G/ATOR data that will be exchanged, or has the potential to be exchanged, shall be tagged IAW DISR Baseline Baseline Registry 05-2.0 for tagged data items, and tags shall be registered IAW DOD XML Registry and Clearinghouse policy and implementation plan.

3.5.5 Information Integrity.

During information transmission, G/ATOR shall maintain and guarantee the integrity of all G/ATOR information elements to 99.99% (Threshold) / 99.999% (Objective).

3.5.6 Providing Network Management Status.

All G/ATOR information transmission hardware shall be capable of providing status changes to Network Management (NM) devices by means of an automated capability in near real time 99% (Threshold) / 99.9% (Objective) of the time.

3.5.7 Obtaining NM Status.
G/ATOR shall have the NM capability to obtain status of networks and associated assets in near real time 99% (Threshold) / 99.9% (Objective) of the time.

3.5.8 Interfaces.
G/ATOR shall be interoperable with existing and planned USMC Command and Control (C2) and Air Defense Systems and their data links as depicted in Table 1.

Table 1. G/ATOR Interfaces

System	ICD
CAC2S*	Based on CEC/TPS-59 IDD
TAOM	TAOC 191100-615J
IFF Interrogator UPX-37	Based on AN/UPX-37 Specification
GPS - DAGR	DAGR Specification
LAAD C2/GBAD OC*	Based on J Series Message via tactical radio
CTN*	Based on CEC/TPS-59 IDD
EPLRS	EPLRS Specification
*CAC2S, LAAD C2, GBAD OC and CTN are being concurrently developed with G/ATOR. Nominal interface requirements to be used as a baseline are indicated in the ICD column.	

3.5.8.1 Communication to C2.
G/ATOR shall communicate with C2 via one EPLRS (Threshold) / two EPLRS (Objective). In the objective requirement, the second EPLRS radio serves as a backup. C2 interfaces shall be established via a high-capacity digital cable or an RF connection depending on the battlefield conditions.

3.5.8.1.1 Emission Control (EMCON).
G/ATOR shall achieve EMCON within 2 seconds when commanded from Command and Control (C2).

3.5.8.2 Communication to CTN/CEC.
Increment I G/ATOR shall be interoperable with CTN via a cable connection.

3.5.8.3 Voice Communication (Command Net or Convoy Operation).
G/ATOR shall have two voice circuits (SINCGARS or equivalent).

3.5.8.4 Intra Radar Team Communication.
G/ATOR shall provide intra radar team communication via an Intra Squad Communication Set (or its equivalent).

3.5.8.5 Remote Communications.

All voice (Command Net) and Intra Radar Team Communications shall be capable of being remoted to the Operator Workstation. The radar operator / maintainer (at the Operator Workstation) shall be capable of communicating with either C2 or the radar team via the Intra Squad Communication Set headset.

3.6 Operational Environments.

3.6.1 Operating Temperature.

G/ATOR shall operate without degradation in external ambient temperatures as described in Table 2:

Table 2. External Temperature Ranges

	Threshold	Objective
Operating, Low Temperature	-40°F or -40°C	-65°F or -54°C
Operating, High Temperature	+131°F or +55°C	+131°F or +55°C
Transport, Low Temperature	-40°F or -40°C	-65°F or -54°C
Transport, High Temperature	+160°F or +71°C	+160°F or +71°C
Storage, Low Temperature	-40°F or -40°C	-65°F or -54°C
Storage, High Temperature	+160°F or +71°C	+160°F or +71°C **UNCLASSIFIED**

3.6.2 Solar Radiation.

G/ATOR shall be operated, transported and stored under solar radiation energy levels at the radar surface of not greater than 1120 W/m2 without degradation of threshold performance.

3.6.3 Altitude/Atmospheric Pressure.

G/ATOR shall be operated, transported and stored in the altitudes/atmospheric pressure conditions specified in Table 3 (all specifications are relative to Mean Sea Level):

Table 3. Altitude/Atmospheric Pressure

	Threshold	Objective
Operating, Low Altitude	0 ft	-1,300 ft
Operating, High Altitude	10,000 ft	10,000 ft
Transporting, Low Altitude	-1000 ft	-1,000 ft
Transporting, High Altitude	40,000 ft	40,000 ft
Storage, Low Altitude	-1000 ft	-1,000 ft
Storage, High Altitude	10,000 ft	10,000 ft **UNCLASSIFIED**

3.6.4 Airborne Particulates (Sand and Dust).

G/ATOR shall be stored and transported (Threshold) / operated (Objective) in the following windblown sand and dust conditions:

Sand - particle concentration of 2.2 g/m3 +/- 0.5 g/m3, particle size range of 150 to 180 micrometers, and an air velocity of 18 to 29 m/s.
Dust - particle concentration of 10 g/m3 +/-7 g/m3, particle size up to 150 micrometers, and an air velocity of 1.5 to 8.9 m/s.

3.6.5 Humidity.

G/ATOR shall be operated, transported and stored in 0 - 100% humidity.

3.6.6 Rain Intrusion.

G/ATOR shall be operated, transported and stored in conditions of rain as specified in Table 4. During the Mobility and Transport Modes, G/ATOR transit containers shall withstand transitory immersion for 5 minutes in fresh or salt water without degradation of system performance.

Table 4. Rain

	Threshold	Objective
Operating	3.9 in/hr	3.9 in/hr
Transport	4 in/hr	4 in/hr
Storage	4 in/hr	4 in/hr

3.6.7 Wind Loading.

G/ATOR shall be operated, transported, and survive in the wind and ice conditions specified in Table 5 without becoming unsafe or inoperative due to fatigue or failure. Degraded operation shall be defined as less than threshold performance due to the wind and ice conditions specified in Table 5 that may cause mechanical instability, rotational instability, non-constant rotation rate, and signal attenuation. Glaze ice shall be defined as an ice density of at least 0.85 g/cm3. De-energized G/ATOR equipment shall not be adversely affected due to the use of deicing fluids (AMS 1424 Type I) and/or anti-icing fluids (AMS 1424 Type II/III/IV).

NOTE:
The application of deicing or anti-icing fluids would not occur while the antenna is operating

Table 5. Wind

	Threshold	Objective
Normal Operation[1]	60 knots	80 knots
Degraded Operation[1]	80 knots	80 knots

Degraded Operation[2]	70 knots	80 knots
Non-Operating Antenna Free Rotating	80 knots	100 knots
Non-Operating Antenna Lowered	100 knots	100 knots
Non-Operating Transport Mode	120 knots	120 knots **UNCLASSIFIED**
[1]Glaze ice up to 0.25 inches on the antenna, 2 inches on the rest of the system [2] Glaze ice up to 0.5 inches on the antenna, 2 inches on the rest of the system		

3.6.8 Salt Fog.
G/ATOR shall be capable of being stored, transported and operated in a 5% salt laden air and spray atmosphere (normally encountered in amphibious operations) for up to 120 days without suffering corrosion damage that would render the radar inoperable when prescribed maintenance procedures are followed.

3.6.9 Electromagnetic Environment / Electromagnetic Compatibility .
G/ATOR shall have signal purity and cabinet shielding to operate without causing electromagnetic interference and spurious radiation as specified in MIL-STD-461E. Electromagnetic Environment includes, but is not limited to, descriptions given in Appendix D.

3.6.9.1 Mutually Compatible.
G/ATOR shall be mutually compatible and capable of concurrent operation with CAC2S/TAOM, and other systems (including allied and coalition systems) in the intended operational environment without electromagnetic interference, IAW MIL-STD-469B.

3.6.10 Survivability.
G/ATOR will be designed to survive in the operational environment.

3.6.10.1 Survivability Electromagnetic Pulse and High-altitude Electromagnetic Pulse.
G/ATOR shall survive, but is not required to operate through, the effects of Electromagnetic Pulse (EMP) and High-altitude Electromagnetic Pulse (HEMP) with no degradation in performance. The design for HEMP protection shall be in accordance with the requirements of MIL-STD-188-125-2. G/ATOR shall be compatible with EMP hardening requirements, including accommodations such as EMP-hardened electrical power outlets and antenna lead-ins within EMP-hardened enclosures.

3.6.10.2 Operation in a Nuclear, Biological and Chemical Environment.
G/ATOR shall be capable of being operated and maintained effectively by operators / maintainers while wearing Mission Oriented Protective Posture (MOPP) IV attire, in a biological or chemical environment.

3.6.10.2.1 Exterior Chemical Agent Resistant Coating.
G/ATOR's exterior surface shall be Exterior Chemical Agent Resistant Coating (CARC) in accordance with MIL-DTL-53072C. The camouflage pattern shall conform to published standards based upon the final physical configuration of the G/ATOR. G/ATOR shall comply with DoD directives for forest three-color camouflage patterns (3-CCP) using TM-4750-15/2-10 and IAW TM 4750-15/1A. Use of color selections and non-reflecting materials that blend into the military environment, shall apply to all externally visible components of G/ATOR for similar-sized components found in other approved DoD systems and/or equipment configurations.

3.6.10.2.2 Nuclear, Biological and Chemical Decontamination.
G/ATOR exterior surfaces shall be capable of decontamination using non-corrosive decontaminates (Threshold) / corrosive decontaminates (Objective) with no degradation in corrosion prevention and system performance. G/ATOR shall withstand the material damaging effects of biological and chemical contaminants, and be capable of rapid decontamination using standard decontaminants and procedures.

3.6.10.3 Infra-Red Signature Reduction.
G/ATOR should reduce the Infra-Red (IR) signature of the system and each individual subsystem. This includes the use of IR paints, coatings, films, thermally or electrically activated materials, and techniques for shielding G/ATOR IR signature sources from the enemy IR sensors.

3.6.10.3.1 RCS Reduction.
G/ATOR should use radar absorbent, reflecting materials or geometries to change the radar echoing properties of the system as a means of reducing its apparent RCS.

3.6.10.3.2 Laser Signature Reduction.
G/ATOR should include employment of materials, electronics, and platform design features intended to reduce the susceptibility of the platform to detection, tracking, and engagement by an adversary using laser sensors. Laser Signature Control includes the use of paints, coatings and other surface treatments.

3.6.11 Safety.
G/ATOR will minimize safety, health, or physical risks. Where risks or hazards exist, safety equipment and/or safety procedures shall be identified and provided. The design of G/ATOR shall consider human factors IAW MIL-STD-1472F. Safe-distances for Hazards of Electromagnetic Radiation to Fuel/Personnel/Ordinance (HERF/HERP/HERO) shall be determined and contained in the training, literature, operation guides (MIL-HDBK-237C) and maintenance manuals. Safe distances shall coincide with normal operating procedures and requirements.

3.6.11.1 Electrical Safety.
G/ATOR shall protect personnel from injury, and equipment damage, due to stray voltages, electrical discharges and other risks, IAW EIA 625 and MIL-STD-1686C.

3.6.11.1.1 Interlocks.
G/ATOR shall have a voltage interlock on electrical compartments that have sufficiently high levels of voltage, current or electromagnetic fields to be hazardous to personnel, IAW Guideline 1 (Safety Design Criteria – Personnel Hazards) of MIL-HDBK-454A.

3.6.11.1.2 Electrical Grounding.
G/ATOR shall provide grounding of the system components sufficient to insure that no personal injury or damage to system components results from stray voltages or static discharges.

3.6.11.2 Physical Safety.
G/ATOR shall minimize the potential for personal injury during transportation, installation, erection, disassembly, operation, and maintenance, IAW Guideline 1 (Safety Design Criteria – Personnel Hazards) of MIL-HDBK-454A and MIL-STD-882D. Equipment malfunctions shall not have a cascading effect contributing to further equipment destruction.

3.6.11.2.1 Non-skid Surface.
All exterior portions of the antenna and other structures used as a standing or climbing surface shall be covered with a non-skid finish, IAW MIL-PRF-24667A.

3.6.11.2.2 Stop Radiate Device.
G/ATOR shall have a Stop Radiate device provided at the Operator Workstations and at the radar pedestal/pallet to stop all radio frequency (RF) radiation (radar and IFF) within 0.5 seconds of device activation. Activation of this device shall place the radar in the Ready or Stand By State.

NOTE:
For personnel safety, the start and stop radiate times and device locations may be adjusted and the keep-out zone determined after the radar is designed.

3.6.11.2.2.1 Resume Operation.
From the Ready State, G/ATOR shall have the capability of resuming radiation within no more than 1 antenna rotation (Threshold) / immediately (Objective) after resetting or deactivation of the Stop Radiate device.

3.6.11.2.3 Antenna Audible Alarm.
G/ATOR shall have a 5 second duration, 110 dB output Klaxon audible alarm to warn of impending antenna rotation 10 seconds before the start of rotation. There shall be an operator disable function.

3.6.11.2.4 Antenna Interlocks.
G/ATOR shall have an antenna interlock device to stop / prevent movement and radiation during G/ATOR maintenance. G/ATOR shall have a mechanical stow to prevent antenna rotation during maintenance and reconfiguration.

3.6.11.2.5 Labels and Indicators.
G/ATOR shall have labels and indicators to warn of potential human hazards and provide aid to radar operation. Electronic assemblies / subassemblies shall have a warning plate conforming to Commercial Item Description A-A-50271 affixed to the front of the equipment with the following inscription:

DANGER: DO NOT ENERGIZE THIS EQUIPMENT
UNLESS PROPERLY GROUNDED

3.6.11.2.6 High Voltage and Laser Radiation Hazard Warning.
Components which present high voltage or laser radiation hazards shall limit inadvertent access to these hazards. If accidental contact with hazards is possible during required removal, maintenance, or testing tasks, warning labels shall be provided to alert the technician. These labels shall be placed on or adjacent to the access panel or cover whose removal permits exposure to the hazard, and should be oriented for optimum visibility when the access panel or cover is being removed.

3.6.11.3 Prime Mover Stability.
G/ATOR shall not reduce the operational stability of a similarly loaded prime mover nor create an unsafe operating environment for drivers and crew.

3.6.11.4 Lightning Protection.
G/ATOR will be capable of operation during electrical storms and provide proper safeguards for equipment and personnel.

3.6.11.4.1 Lightning Rod.
G/ATOR shall have a lightning rod and lightning arrestors IAW Chapter 3, Lightning Protection Subsystem, in MIL-HDBK-419A.

3.6.11.4.2 Signal Cables.
G/ATOR signal cables shall withstand a lightning strike having the maximum current of 12 kA reached within 8 microseconds and decaying to one-half of the peak amplitude within 10 microseconds.

3.6.11.4.3 Power Cables.

G/ATOR input power cables shall withstand a lightning strike having a maximum current of 20 kA reached within 1.0 microsecond and decaying to one-half of the peak amplitude within 40 microseconds.

3.6.11.4.4 Indirect Strike.
G/ATOR shall withstand an indirect lightning strike 262 feet (80 m) or more away from the G/ATOR.

3.6.11.4.5 Direct Strike.
G/ATOR shall have protective devices that preclude permanent damage to and / or permanent degradation of operating equipment from a direct lightning strike.

3.6.11.5 Aircraft Warning Light.
G/ATOR shall have an operator enable / disable switch to control the aircraft warning light on top of the antenna with an auxiliary power provision for illumination when the radar system is not operational. The aircraft warning light auxiliary power provision shall be wired to prevent accidental damage in the event of inadvertent antenna rotation.

3.6.11.6 Fire Extinguishers.
G/ATOR shall have appropriate fire extinguishers (Class A, B, C and D) and United States Coast Guard (USCG) approved heavy duty mounting brackets near the antenna.

3.7 Growth.
G/ATOR Increment I baseline design will provide for technology insertion and incremental growth with no equipment redesign.

3.7.1 Technology Insertion.
G/ATOR mechanical, electrical, software, and hardware systems will facilitate future upgrades and permit technology insertion with minimal impact on the existing systems. Enablers include but are not limited to the following indentured paragraphs.

3.7.1.1 Array Design Enabler.
The array design should permit form, fit and function upgrades to future transmit and receive components (Objective).

3.7.1.2 Timing Circuits Enabler.
Timing circuits should be upgradeable to not less than twice the Increment I instrumented range (Objective).

3.7.1.3 Flexible Design.
Hardware and / or software (beam scheduler, resource manager, track logic, etc.) should support future variable track update rates (Objective).

3.7.1.4 Processing Enabler.
G/ATOR computing, throughput and memory capacity shall have not less than 50% (Threshold) / 75% (Objective) reserve.

3.7.1.5 Open Card Slots.
G/ATOR shall have sufficient open card slots for computing, interface and interoperability growth.

3.7.2 Increment II Growth.

3.7.2.1 Missions.

3.7.2.1.1 Hostile Indirect Weapon Location.
G/ATOR shall be capable of detecting, tracking, and calculating the projectile impact points and location of firing platforms for hostile indirect fires while classifying the projectiles as mortars, artillery, rockets and missiles.

3.7.2.1.2 Indirect Friendly Fire.
G/ATOR shall register and adjust indirect friendly fire, locate the friendly fire platform, while simultaneously maintaining hostile surveillance for mortars, artillery and rockets. Upon detection of a hostile round, the system shall prioritize radar resources to support the location of the hostile fire.

3.7.2.2 Switching.
G/ATOR shall be capable of switching between hostile mode and registering friendly indirect fire within ten seconds.

3.7.2.3 Optimization.
G/ATOR shall be capable of automatically determining its mask angle throughout any 1600 mil azimuth selected by the operator.

3.7.2.4 Search Volume.
G/ATOR shall have the capability to operate in Close, Normal, Extended and Interleaved modes. Operating Mode refers to range specific coverage that should optimize the radars ability to detect, track, classify and calculate the point of origin and point of impact for mortars, artillery and rockets.

3.7.2.4.1 Close Mode.
Close Mode shall be defined as searching a contractor proposed fence that is above the terrain with targets penetrating the fence +/- 45 degrees (1600 mils) azimuth from antenna boresight at any range between 0.75 and 20 km from the radar.

3.7.2.4.2 Normal Mode.

Normal Mode shall be defined as searching a contractor proposed fence above the terrain with targets penetrating the fence +/- 45 degrees (1600 mils) from antenna boresight at any range between 5 and 50 km from the radar.

3.7.2.4.3 Extended Mode.
Extended Mode shall be defined as searching a contractor proposed fence above the terrain with targets penetrating the fence +/- 45 degrees (1600 mils) from antenna boresight at any range between 20 and 60 km from the radar.

3.7.2.4.4 Interleaved Mode.
Interleaved Mode is defined as switching between the Close, Normal and Extended Modes with minimal context switching time.

3.7.2.5 Azimuth Coverage.
G/ATOR shall slew in azimuth such that 6400 mil coverage (in 1600 mil sectors) is attainable.

3.7.2.5.1 Search Sector.
G/ATOR shall have the capability to acquire and track hostile and friendly projectiles through a 1600 mil search sector.

3.7.2.5.2 Operator Commanded Search Azimuth.
G/ATOR shall be capable of Operator commanded search azimuth with a search sector of +/-800 mils.

3.7.2.6 Elevation Coverage.
The elevation scan capability shall be such as to allow accurate tracking throughout all ranges and weapon types as depicted in Table 6. Of particular difficulty, are targets of high-velocity, high-angle and close range.

3.7.2.7 Range Coverage.
G/ATOR shall be capable of searching, detecting, verifying, acquiring, tracking and locating hostile indirect fire systems (**KPP**) as follows:

Table 6. Classification, Location and Accuracy Summary

Weapon	Type	Detection Ranges (Km)* (T)	(O)	Probability of Location (Acquisition)	Hostile Weapon Location (CEP_{50})**	Projectile Impact
Mortar	Light	.75-20	.5-30	Assuming no targets in track, 0.90 (Threshold); 0.97 (Objective) for at least 90% of	Less than 0.252% of range (in meters) for at least 80% (Threshold); 90% (Objective) of the	See Para PS 3.7.2.10.2
	Medium	.75-30	.5-40			
	Heavy	.75-30	.5-40			
Artillery	Light	3-30	3-60			
	Medium	3-40	3-60			

				the cases in the	cases in the shot	
Rockets	Light	10-40	6-60	the cases in the shot array with +/- 800 mils (1600 mils total) with the radar in either normal or extended range operating mode for Scenario 12 defined in Appendix C, C.3.	cases in the shot array with a minimum of +/- 800mils coverage (1600 mils total) for Scenario 12 defined in Appendix C, C.3.	
	Medium	10-50	6-60			
	Heavy	10-60	15-90			

* Aviation ranges are specified in Nautical Miles while ground weapons location uses standard measure for indirect fire support weapons which is meters (m) or kilometers (km).

** The 50% Circular Error Probable metric (CEP) is the greater of 30 m or the specified percentage of range over the full 1600 mil quadrant.

3.7.2.8 Weapon Classification.
G/ATOR shall automatically and correctly classify type (mortar, artillery and rockets) greater than 95% of the cases, and further classify the weapon by subtype (light, medium or heavy) greater than 90% of the cases.

3.7.2.9 Probability of Location (Acquisition) (KPP).
Assuming no targets in track, the G/ATOR probability of location shall exceed 0.9 (Threshold) / 0.97 (Objective) for at least 90% of the cases in the shot array, with 1600 mils total coverage, and with the radar in either the normal or extended range operating mode. The clutter environment shall be as defined in Scenario 12 Appendix C, C.3.

3.7.2.10 Accuracy.

3.7.2.10.1 Weapon Location (KPP).
G/ATOR CEP_{50} of weapon location shall be less than the greater of 30 meters, or 0.252% of range (in meters) for at least 80% (Threshold) / 90% (Objective) of cases in the shot array.

NOTE:
The clutter environment is as defined in Scenario 12 Appendix C, C.3.

3.7.2.10.2 Hostile Impact Location (KPP).
G/ATOR shall locate Hostile Impacts to the following accuracy:

a. For 80% of the cases in the shot array and in the presence of the defined environment (Scenario 12 of Appendix C, C.3), the CEP_{50} of projectile impact shall be as depicted below (where R=range and m=meters):

$$CEP_{50}\ (m) <= \sqrt{(235\ (m))^2 + (0.00073\ R\ (m))^4}$$

Note: The constant 0.00073 has the units of $m^{(-0.5)}$

b. For 90% of the cases in the shot array and in the presence of the defined environment (Scenario 12 of Appendix C, C.3), the CEP_{50} of projectile impact shall be as depicted below (where R=range and m=meters) (Objective):

$$CEP_{50}\ (m) <= \sqrt{(235\ (m))^2 + (0.00073\ R\ (m))^4}$$

Note: The constant 0.00073 has the units of $m^{(-0.5)}$

3.7.2.10.3 Friendly Fire Impact Location.
G/ATOR shall locate Friendly Fire Impacts to the same accuracy as listed in 3.7.2.10.2 for Hostile Impact Location.

3.7.2.11 Location Rate.
G/ATOR shall be capable of locating **S1** targets per minute at **S2** (Threshold) / **S3** (Objective). Acquisition and accuracy performance for each target shall be achieved within **S4**. The maximum track time per target shall be **S5**. Additionally, the radar shall be capable of tracking a minimum of **S6** targets simultaneously (See Classified Appendix H for S values).

3.7.2.12 False Report Rate.
G/ATOR shall have a false report rate of no more than **S1** (Threshold) / **S2** (Objective) in the Scenario 12 clutter environment (Appendix C, C.3). A false report shall be defined as a false detection that is synthesized into a track and a launch point is determined based on the false track (See Classified Appendix H for S values).

3.7.2.13 Detection in Clutter.
G/ATOR shall detect targets in the presence of clutter as described in Scenario 12, Appendix C, C.3 (Threshold) / Scenario 13 Appendix C, C.3 (Objective) without degrading system performance.

3.7.2.14 Search and Track in Clutter and Rainfall Environments.
G/ATOR shall search and track targets in the presence of clutter, rainfall and aircraft (as described in Scenario 13M of Appendix C, C.3) with the least amount of degradation possible (Threshold) / without degrading system performance (Objective).

3.7.2.14.1 Clutter Processing.
G/ATOR shall be capable of providing clutter processing over the entire surveillance volume.

3.7.2.14.2 Dynamic Range.
G/ATOR shall provide a dynamic range adequate to process Urban, High Relief, and Low Relief terrain clutter along with sea clutter and multipath so that the system can track projectiles to the ranges indicated in Table 6.

3.7.2.15 Data Transmission.
G/ATOR shall transmit previously acquired target data without operator intervention while stationary or on the move.

3.7.2.15.1 Time Stamp.
G/ATOR shall provide a time stamp on each track report and each sensor update.

3.7.2.16 Overlays.
G/ATOR will provide the crew with electronically displayed tactical maps and overlays.

3.7.2.16.1 Digital Terrain Elevation Data (DTED).
G/ATOR shall be capable of utilizing all current and future DTED levels to include High Resolution Terrain elevation data.

3.7.2.17 External Cue.
G/ATOR shall accept cues from and send cues to the Target Processing Center (TPC) and/or another radar system or passive sensor.

3.7.2.18 Ground Mission Definitions.
The following Ground Mission definitions apply:

1. CEP is the radius of a circle about true weapon location or projectile impact which contains 50% of the radar reports for a given weapon condition, whether from simulation or in live firing.
2. Range. In specifying CEP as a function of range, range is defined as the ground range from the radar to the hostile weapon location or friendly fire projectile impact.
3. Track is a radar function whereby an acquired target is tracked for a sufficient time for the weapon location and/or impact points to be determined.
4. Search is the process by which the radar repeatedly scans the battlefield with a single or multi-tier fence extending +/- 800 mils (+/- 45 degrees) in azimuth from the radar boresight at specified elevation above the local terrain and within a specified range.
5. Probability of Location is the Joint probability of the radar acquiring the projectile, completing a track file, propagating forward and backward to a datum level, correcting for local terrain, and simultaneously reporting the weapon location and projectile impact location.
6. Probability of Acquisition is the Joint probability of detecting, verifying and initiating track on any target within any beam at any range and must be the same within each and every beam position within the fence.

7. Scan is defined as enough pulses being transmitted at each beam position in the search fence to achieve the required probability of acquisition for hostile fire at all of the target speeds, ranges and azimuths of the possible weapon conditions in the presence of a cluttered environment.
8. Probability of Detection is the probability of a threshold crossing of a Swerling-1 target with a false threshold crossing due to noise and clutter of one in a million.
9. Probability of Verification is the probability of a threshold crossing of a Swerling-1 target with a threshold crossing from a falsely verified target of less than one per scan.
10. Falsely Verified Targets are defined as non-ground weapon targets, such as birds and insects that are detected and verified as Swerling-1 targets and proceed to track initiation.
11. Clutter Environment is as specified in Appendix C.
12. Radar Cross Section (RCS) is the equivalent size of a reflecting re-radiator in the direction of the radar at the antenna polarization. For a given projectile, RCS is a strong function of acquisition aspect angle and antenna polarization at the projectile.
13. Eclipsing Loss derives from the true target return being received during pulse transmission (during the same dwell).
14. Shot Array is a list of cases defining the identities of weapons, projectiles, and the geometry of fire with respect to the radar and its boresight.

3.7.2.19 Operator Workstation Displays.
The G/ATOR Operator Workstation will provide features and modes to allow effective employment, operation and maintenance of the radar.

3.7.2.19.1 Tactical Maps and Overlay Data.
G/ATOR shall be capable of electronically displaying tactical maps and overlays of friendly and enemy locations / boundaries and all Fire Support Coordination Measures (FSCM), over the operational radar picture.

3.7.2.20 Interface Growth.
G/ATOR Increment I shall have the capability to grow to the G/ATOR (Ground) Increment II communication interfaces as defined in 3.7.2.20.1 and 3.7.2.20.2.

3.7.2.20.1 AFATDS.
G/ATOR shall have two EPLRS radios capable of simultaneous secure multilayer digital data links (AFATDS) to Ground C2 (Threshold).

3.7.2.20.2 Voice Communications.
G/ATOR shall have two voice circuits (SINCGARS or equivalent) capable of simultaneous operation.

3.7.2.20.3 Mobile Subscriber Equipment.

G/ATOR shall have voice and digital communications over current Mobile Subscriber Equipment (MSE)(Threshold) or a Joint MSE type communication at the time of fielding (Objective).

3.7.2.21 Reconfiguration.
G/ATOR shall be capable of set up and alignment to include any required support equipment, by a team of no more than nine Marines.

3.7.2.21.1 Mobility Mode to Operational Mode.
Upon arrival at site G/ATOR shall be fully mission capable (i.e., able to communicate, acquire targets and perform survivability functions) within 10 minutes (Threshold) / 3 minutes (Objective).

3.7.2.21.2 Ready State to Operational Mode
From the Ready State, G/ATOR shall be fully operational and capable of acquiring, tracking and reporting targets within 2 seconds (Threshold) / immediately (Objective) of being commanded.

3.7.2.21.3 Operational Mode to Mobility Mode.
G/ATOR shall be reconfigured from the Operational Mode to the Mobility Mode in not more than seven minutes.

3.7.3 Increment III Growth.

3.7.3.1 Decoy System.
Increment III G/ATOR shall employ a lightweight stand-alone active decoy system as part of the Anti-radiation missile protection capability (Threshold) / that can be operated on battery power (Objective).

3.7.3.2 Mainbeam Cancellation.
G/ATOR shall have a Coherent Mainbeam Cancellation (CMBC) capability (See 3.2.8 for additional information) (Objective).

3.7.3.3 Advanced Radar Environmental Simulator.
Increment III Advance Radar Environmental Simulator (RES) shall be embedded within the G/ATOR and incorporate Distributed Interactive Simulation.

NOTE:
Distributed Interactive Simulation includes, but is not limited to, the following:

a. Missile Defense System Exerciser (MDSE) Interface Control Document (ICD), Builds 3.3, 3.4, and 4.0.
b. Joint Distributed Engineering Plant (JDEP) Distributed Interactive Simulation (DIS) Interface control Document (ICD), Version 1.0, 1 Jun 01.
c. IEEE 1278.1A, Distributed Interactive Simulation Standard dated 1998.

d. IEEE 1516-2000, HLA Standard dated Sep 00.

3.7.3.4 Combat Identification Requirements.

3.7.3.4.1 Mode 5/S Identification Friend or Foe.
G/ATOR IFF shall integrate Mode 5 (level 2) and Mode S (level 2) (Threshold) (**KPP**), Mode 5 (level 3) and Mode S (level 3) (Objective) capabilities.

3.7.3.4.2 Target Classification/Non-Cooperative Target Recognition Requirements (Increment III).
G/ATOR shall classify unknown and threat targets by target class (cruise missile, helicopter, aircraft, etc) (Threshold) (**KPP**) / by type for example, small or large aircraft (Objective) (See Classified Appendix H for additional information).

3.7.3.5 Integrated Data Environment Capability.
Increment III shall have an Integrated Data Environment (IDE) capability via an Internet (IPv6 or greater) Net Centric Enterprise Services (NCES) interface. Incorporated into the IDE should be a decision support system, such as the Coherent Analytical Computing Environment (CACE), that presents decision options, alternative courses of action, and consequence management possibilities to the decision maker. IDE should also provide for remote internet technical support including remote type IV Interactive Electronic Technical Manuals (IETM). IDE should provide for remote analysis of data performance/extraction.

3.7.3.6 Interoperability.

3.7.3.6.1 JROC/JCS Approved/Validated Integrated Architecture Behavior Model (IABM) (Increment I Enabled/Increment III Threshold).
G/ATOR shall conform to applicable JROC/JCS approved/validated DoD Integrated Architecture Behavior Model (Threshold) (**KPP**).

3.7.3.6.2 Global Information Grid.
G/ATOR shall achieve independence in the Net Centric Operational Warfare (NCOW) environment (**KPP**).

3.7.3.6.2.1 Netting.
G/ATOR shall provide consistent and continuous netting of data and tracking capability in order to improve upon the identification of air targets and minimize track data swapping (Objective).

3.7.3.6.2.2 Joint Distributed Engineering Plant and Net Centric Enterprise Services.
G/ATOR shall support Joint Distributed Engineering Plant (JDEP) and Net Centric Enterprise Services (NCES) capabilities.

3.7.3.6.3 CTN/CEC.

CTN / CEC processor and control functionalities shall be embedded in the radar.

3.7.4 Increment IV Growth / ATC Radar Mode of Operation.
G/ATOR shall meet all Federal Aviation Administration (FAA) Standards/Requirements for Air Traffic Control (ATC) system's air surveillance radar to include electromagnetic compatibility, flight inspection, check and certification. Unless otherwise specified, all performance parameters are in the nominal environment as defined in Appendix C, C.3.

3.7.4.1 Search Volume.
The range, azimuth, height and elevation coverage of this section defines a volume that shall be searched such that the Firm Track range requirements of 3.7.4.6.1 - .4 are met throughout the volume consistent with Firm Track initiation (3.7.4.6.6) and update rate (3.7.4.5).
Note: All height requirements are relative to Mean Sea Level

3.7.4.1.1 Range Coverage.
Search range coverage shall be Firm Track range plus any design dependent transition to track range (See 3.7.4.6.1 - .4 for Firm Track range requirements).

3.7.4.1.2 Azimuth Coverage.
Azimuth coverage shall be 360 degrees.

3.7.4.1.3 Height Coverage.
Search height coverage shall be Firm Track height of **S1** plus any design dependent transition to track height (See 3.7.4.4.3 for Firm Track height requirements) (See Classified Appendix H for S values).

3.7.4.1.4 Elevation Coverage.
Search elevation coverage shall be **S1** to **S2** (Threshold) / **S3** to **S4** (Objective) (See Classified Appendix H for S values).

3.7.4.2 Search Volume Revisit Period.
The Search Volume, as defined in 3.7.4.1, shall be systematically searched in a manner and rate to meet Firm Track and pop up target initiation requirements defined in 3.7.4.6.6 and 3.7.4.6.8.

3.7.4.3 Target Track
G/ATOR shall track targets with the necessary accuracies and update rates to support C2 situational awareness, Air Traffic Control and other flight operations. G/ATOR shall provide a means for tracking targets acquired in search (Non Dedicated Tracks), as well as those that are locally and remotely (C2) commanded (Dedicated Hostile / C2 Commanded Tracks).

3.7.4.3.1 Latency.
G/ATOR's design architecture shall minimize internal radar report latencies and external request processing to maximize Command and Control's decision making time line.

3.7.4.3.1.1 Radar Report Latency.
Radar Report latency should not exceed 100 ms. Radar Report latency should be defined as the time delay between the midpoint of the dwell used to make the measurement, and when the measurement data is made available at the C2 interface.

3.7.4.3.1.2 External Request Response Latency.
The G/ATOR latency to an external request should not exceed 100 ms when allowed by doctrine. External Request Response latency should be defined as the delay from the arrival of the request until G/ATOR acknowledgement is made available at the C2 Interface.

3.7.4.3.2 Firm Track

G/ATOR shall achieve the required Firm Track ranges under full track load (**S1** total tracks with **S2** Dedicated Hostile / C2 Commanded Tracks) (See Classified Appendix H for S values). Firm Track (FT) shall be defined as:

a. the single dwell detection probability at the Firm Track range is equal to or greater than 0.6, and
b. three dimensional position and rate of change information is available.

3.7.4.3.3 Probability of Firm Track.

The Probability of Firm Track (PFT) for the Air Missions shall be 0.9 (Threshold) (**KPP**) / 0.95 (Objective) for a Swerling Case 1 target with Radar Cross Section (RCS) of Types 0, 1 and 2 (see Classified Appendix A for RCS definitions) in the nominal environment. The nominal environment is defined in Appendix C, C.3.

3.7.4.3.4 Probability of Drop Track

Once a Firm Track has been initiated, the probability of drop track shall be equal to or less than one percent under the same environmental conditions in which the Firm Track was initiated.

3.7.4.4 Track Volume.

3.7.4.4.1 Range.
Firm Track range coverage shall be .5 to 70 nm (Threshold) / 100 nm (Objective).

3.7.4.4.2 Azimuth.
Azimuth coverage shall be from 0 to 360 degrees.

3.7.4.4.3 Height.
Firm Track height coverage shall be **S1** to **S2** (Threshold) / **S3** to **S4** (Objective) (See Classified Appendix H for S values).

3.7.4.4.4 Elevation.
Firm Track elevation shall be **S1** to **S2** relative to earth coordinates (See Classified Appendix H for S values).

3.7.4.4.5 Track Continuity.
Once a Type 2 or larger target is in Firm Track, it shall continue to be tracked from maximum to minimum range regardless of elevation angle (**S1** to **S2** and **S3** to **S4** (Threshold) / **S5** to **S6** (Objective)) (See Classified Appendix H for S values).

3.7.4.5 Firm Track Update Rate.
Once a Type 2 or larger target is in Firm Track, G/ATOR shall schedule sufficient radiated RF energy such that its Radar tracks are updated at least **S1** rate (See Classified Appendix H for S values).

3.7.4.6 Firm Track Range Requirements.

3.7.4.6.1 Targets Larger than Type 0.
G/ATOR Firm Track range (slant) shall be 0.5 nm to 70 nm (Threshold) / 0.5 nm to 100 nm (Objective).

3.7.4.6.2 Type 0 Targets.
G/ATOR Firm Track range (slant) shall be 0.5 nm to 70 nm (Threshold) / 0.5 nm to 100 nm (Objective).

3.7.4.6.3 Type 1 Targets.
G/ATOR Firm Track range (slant) shall be 0.5 nm to 70 nm (Threshold) (**KPP**) / 0.5 nm to 100 nm (Objective).

3.7.4.6.4 Type 2 Targets.
G/ATOR Firm Track range (slant) shall be 0.5 nm to 40 nm (Threshold) (**KPP**) / 0.5 nm to 70 nm (Objective).

3.7.4.6.5 Firm Track Range Performance in Other Than the Nominal Environment.
In the presence of rain and clutter (other than the nominal environment), the radar shall perform with the least amount of Firm Track range degradation possible (Threshold) / no degradation (Objective). See Appendix C, C.3 for additional information.

3.7.4.6.6 Firm Track Initiation.
For inbound Type 0 targets whose slant range is at least **S1** and altitude is below **S2**, Firm Track shall be achieved by **S3**. Inbound Type 1 targets whose slant range is at least **S4** and altitude is below **S5**, Firm Track shall be achieved by **S6**. Inbound Type 2 targets whose slant range is at least **S7** and altitude is below **S8**, Firm Track shall be achieved by **S9** (See Classified Appendix H for S values).

3.7.4.6.7 Slant Range Versus Elevation.
For inbound Type 0 targets whose slant range is less than **S1** and altitude is equal to or greater than **S2**, Firm Track shall be achieved by **S3**. (as they enter the Track Volume as defined in 3.7.4.4). Inbound targets shall remain in Firm Track regardless of elevation angle (targets shall be tracked through the "Cone of Silence") consistent with 3.7.4.4. Inbound Type 1 targets whose slant range is less than **S4** and altitude is equal to or greater than **S5**, Firm Track shall be achieved by **S6**. Inbound type 2 targets whose slant range is less than **S7** and altitude is equal to or greater than **S8**, Firm Track shall be achieved by **S9** (See Classified Appendix H for S values).

3.7.4.6.8 Pop-up Target.
Pop up targets entering the G/ATOR's field of view, including targets originating in the "Cone of Silence", shall transition to Firm Track in not greater than **S1** seconds (See Classified Appendix H for S values).

3.7.4.7 Other Dedicated Hostile / C2 Commanded Waveform Uses.
G/ATOR may use Dedicated Hostile / C2 Commanded Track waveforms to optimize radar resources for Non Dedicated Tracks.

3.7.4.8 External Cues.
G/ATOR's search angle shall be increased to **S1** degrees upon receipt of an External Cue (See Classified Appendix H for S values).

3.7.4.9 Track Load.
The "360 degree" and "sector" requirements shall be accomplished simultaneously, whereas the "per beam" requirement is independent.

3.7.4.9.1 360 Degree.
G/ATOR shall be capable of simultaneously tracking **S1** (Threshold) / **S2** (Objective) targets. Within the total track load, G/ATOR shall provide not less than **S3** (Threshold) / **S4** (Objective) Dedicated Hostile / C2 Commanded tracks via dedicated track beams while maintaining all other track and search functionalities and performances (See Classified Appendix H for S values).

3.7.4.9.2 Per Sector.
G/ATOR shall be capable of simultaneously tracking **S1** targets within a **S2** degree sector. Within the sector track load, G/ATOR shall provide not less than **S3** Dedicated Hostile / C2 Commanded tracks via dedicated track beams while maintaining all other track and search functionalities and performances (See Classified Appendix H for S values).

3.7.4.9.3 Per Beam.
G/ATOR shall be capable of simultaneously tracking **S1** targets per beam position (See Classified Appendix H for S values).

3.7.4.10 False Track Rate.
In the nominal environment, under maximum target loading conditions, G/ATOR's False Track Rate shall not be more than **S1** (Threshold) / **S2** (Objective) while maintaining all other performance parameters (Probability of Firm Track, Firm Track Range, Track Load, Track Volume, etc.) to at least threshold values. A false track shall be defined as an erroneous Radar Report transmitted to C2 (See Classified Appendix H for S values).

3.7.4.10.1 False Track Rate in Other than the Nominal Environments.
In other than nominal environments, the false track rate performance shall have the least amount of degradation possible as compared to the nomimal environment's False Track Rate.

3.7.4.11 Velocity.
G/ATOR shall detect, transition to track, and maintain Firm Track on all target velocities from **S1** to Mach **S2** (Threshold) / **S3** to Mach **S4** (Objective) within threshold time and update rate requirements. Mach 1 shall be defined as 1116ft/sec at sea level at a temperature of 15 degrees C (See Classified Appendix H for S values).

3.7.4.12 Target Acceleration.
G/ATOR shall detect, transition to track, and maintain Firm Track on targets accelerating up to **S1** (Threshold) / **S2** (Objective) (See Classified Appendix H for S values).

3.7.4.13 Resolution.

3.7.4.13.1 Range Resolutions.
G/ATOR shall be capable of resolving two targets of radar cross sections **S1** apart when they are separated **S2** or less range resolution cells (See Classified Appendix H for S values).

3.7.4.13.1.1 Non-Dedicated Track Resolution.
When using Non Dedicated track waveforms, G/ATOR shall employ a range resolution capability consistent with the 300 ft (Threshold) / 200 ft (Objective) range accuracy requirement (range error standard deviation).

3.7.4.13.1.2 Dedicated Track Resolution.
When using Dedicated Hostile / C2 Commanded Track waveforms, G/ATOR shall employ a range resolution capability consistent with the **S1** range accuracy requirement (range error standard deviation) (See Classified Appendix H for S values).

3.7.4.13.2 Angular Resolutions.
G/ATOR's Azimuth and Elevation resolutions shall be consistent with the antenna's beamwidth characteristics.

3.7.4.14 Radar Accuracy.
All error values listed below are within a single standard deviation with respect to true target position.

3.7.4.14.1 Non Dedicated Track.

3.7.4.14.1.1 Range.
G/ATOR Firm Track range accuracy at maximum range shall be 300 ft or less (Threshold) (**KPP**)/ 200 ft or less (Objective).

3.7.4.14.1.2 Azimuth.
G/ATOR's Firm Track azimuth cross range accuracy at 40 nm shall be **S1** (Threshold) or less / **S2** (Objective) or less (See Classified Appendix H for S values).

3.7.4.14.1.3 Height.
G/ATOR's Firm Track height accuracy at 40 nm shall be 1000 ft or less (Threshold) (**KPP**) / 500 ft (Objective) or less.

3.7.4.14.2 Dedicated Hostile / C2 Commanded Track Waveforms.

3.7.4.14.2.1 Range.
G/ATOR Firm Track accuracy at maximum range shall be **S1** or less (See Classified Appendix H for S values).

3.7.4.15 Tracker Functionality.
G/ATOR's internal tracker functionality shall support its resource management scheme and be capable of transitioning and maintaining track on maneuvering targets traveling to at least the threshold velocity (3.7.4.11) and acceleration (3.7.4.12) values.

3.7.4.15.1 Tracker Performance.
G/ATOR shall maintain a Track Quality Mapping function. G/ATOR's tracker performance shall be capable of maintaining a Track Quality sufficient to support C2 situational awareness and other ATC measures on maneuvering targets in a high clutter and / or jamming environment.

3.7.4.16 Instrumented Range and Height.
If the design's instrumented range or height values are greater than threshold requirements (**S1** and **S2**), targets larger than Type 1 shall transition to Firm Track and be reported at the greater values (See Classified Appendix H for S values).

3.7.4.17 Interoperability.
The G/ATOR shall be interoperable with the FAA Airspace System, meet all FAA standards and requirements for ATC systems, and be certifiable by the FAA.

3.7.4.17.1 Interfaces.
The G/ATOR shall employ an interface to FAA via CAC2S (Threshold) / ICAO (Objective).

4 VERIFICATION

4.1 Verification Method and Means.

The Verification Method indicates how the test objective will be verified. The following are the accepted values:

a) Analysis (A): Verification by technical evaluation using mathematical equations, graphs, diagrams and representative data. Used, for example, to verify algorithms.

   Verification by analysis includes quantitative and/or qualitative proof that items meet specific requirements by technical evaluations, charts, graphs, circuit diagrams and representative data.

b) Demonstration (D): Verification by operation, movement or adjustment of an item during performance of a function. Performance monitoring may have quantitative limits for satisfactory operation. Used, for example, to verify Graphic User Interfaces (GUIs).

   Verification by Demonstration includes the operation, movement, or adjustment of an item. The item may be instrumented and its performance monitored, but only as an indirect function in support of the demonstration. Quantitative measurements are not taken except in cases where test operators make visual measurements/counts or where simple devices such as a stopwatch are used to grossly time performance. Generally, demonstration results may be noted by a simple YES or NO. Success and failure criteria will be established for each demonstration objective.

c) Inspection (I): Verification by examination of the item (e.g., The screen SHALL be red flashing, or software code inspection).

   Verification by Inspection includes examination, review of descriptive documentation and comparison of appropriate characteristics with a predetermined standard. This method may require moving, turning, or partially disassembling an item to accomplish verification.

d) Test (T): Verification through exercising of the applicable item under appropriate conditions with instrumentation to collect/analyze/evaluate the data to ensure the requirements are met.

   Verification by test includes operation of an instrumented item and recording and evaluating the resultant quantitative data. Instrumented items under test are allowed. Acceptability of the item will be determined by pre-established quantitative criteria. Verification will be made against the required characteristics stated in the applicable specification.

4.1.1 Frequency Selection test.
The G/ATOR frequency selection requirement of 3.1.1 shall be verified by analysis and demonstration of the system operation in the electromagnetic spectrum. Threshold shall be met if the system frequency spectrum allocation request (DD-1494) is approved for Continental United States (CONUS) and Outside Continental United States (OCONUS) operations IAW DoDD 4650.1 and National and International spectrum management policies, as applicable.

4.1.2 Open Systems Architecture/Modular Open Systems Architecture (MOSA) test.
The G/ATOR Open Systems Architecture/Modular Open Systems Architecture (MOSA) requirement of 3.1.2 shall be verified by analysis, demonstration and inspection of the system design. Threshold shall be met if the analysis, demonstration and inspection of the system design verifies that the system design uses a modular open-systems approach IAW DoD Open System - Joint Task Force (OSJTF Ver 2.0), that the Increment I design provides for growth to all following Increments by providing a computer software architecture that allows for the computers, computer software and firmware to be upgraded via modular open systems architecture with the functionality of all following Increments and that the growth to future Increments requires no equipment re-design.

4.1.2.1 Closed and / or Proprietary Solutions test.
The G/ATOR closed and / or proprietary solutions requirement of 3.1.2.1 shall be verified by analysis, demonstration and inspection of the system design. Threshold shall be met if the analysis, demonstration and inspection of the system design verifies that the portions of hardware, firmware, or software that are driven to closed and / or proprietary solutions do not require additional closed hardware/firmware/software when integrating with the system.

4.1.3 Human Systems Integration (HSI) test.
The G/ATOR human systems integration (HSI) requirement of 3.1.3 shall be verified by analysis, demonstration and inspection of the system design in an operationally representative environment at a Government approved test facility. Threshold shall be met if the analysis, demonstration and inspection verify that system design considers the human factors of engineering, safety, health hazards, and personnel survivability, maximizes ease of use during combat actions, minimizes skill levels required to operate and maintain it.

4.1.4 Selection of Materials and Parts test.
The G/ATOR selection of materials and parts requirement of 3.1.4 shall be verified by analysis, demonstration and inspection of the system design in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration and inspection of the system design verify that the system is designed with materials and parts that provide the best value to the Government and as noted in 3.1.4.

4.1.4.1 Composite Materials.

4.1.4.1.1 Composite Material Structural Properties test.

The G/ATOR composite material structural properties requirement of 3.1.4.1.1 shall be verified by analysis of the G/ATOR design. Threshold shall be met if analysis verifies that B-basis, hot-wet material properties were used when determining the allowable structural composite material properties for G/ATOR design.

4.1.4.1.2 Composite Material Buckling test.
The G/ATOR composite material buckling requirement of 3.1.4.1.2 shall be verified by analysis of the G/ATOR design. Threshold shall be met if analysis verifies that when determining the allowable structural composite material properties for G/ATOR design purposes, a minimum safety design factor of 3.0 is used for buckling.

4.1.4.1.3 Composite Material Stress Allowables in Critical Joints test.
The G/ATOR composite material stress allowables in critical joints requirement of 3.1.4.1.3 shall be verified by analysis of the G/ATOR design. Threshold shall be met if analysis verifies that when determining the allowable structural composite material properties for G/ATOR critical joints, a minimum safety design factor of 4.0 is used for shear, tensile or compressive stress.

4.1.4.1.4 Composite Material Stress Allowables in General Structure test.
The G/ATOR composite material stress allowables in general structure requirement of 3.1.4.1.4 shall be verified by analysis of the G/ATOR design. Threshold shall be met if analysis verifies that when determining the allowable structural composite material properties for the G/ATOR general structure, a minimum safety design factor of 2.0 is used for shear, tensile or compressive stress in structure away from critical joints.

4.1.4.1.5 Composite Material Shielding (Electromagnetic Effects) test.
The G/ATOR composite material shielding (electromagnetic effects) requirement of 3.1.4.1.5 shall be verified by analysis and testing of the G/ATOR design at a Government approved test facility. Threshold shall be met if analysis and testing verifies that the system has proper shielding and grounding techniques in its structural design in order to ensure protection against electromagnetic effects.

4.1.4.1.6 Composite Material Grounding (Lightning Strike) test.
The G/ATOR composite material grounding (lightning strike) requirement of 3.1.4.1.6 shall be verified by analysis and testing of the G/ATOR design at a Government approved test facility. Threshold shall be met if analysis and testing verifies that the system has a sufficient grounding path to dissipate a lightning strike as defined in 3.6.11.5.4 and 3.6.11.5.5.

4.1.4.2 Corrosion Prevention and Control test.
The G/ATOR CPAC requirement of 3.1.4.2 shall be verified by analysis, inspection and testing of the system design. Threshold shall be met if the analysis, inspection and testing verifies that the system is designed to resist corrosion in operation, transport and protected storage consistent with warehouse conditions and MPS, and that all materials and processes for metallic parts conform to the applicable requirements of MIL-STD-889B(3) and MIL-HDBK-470A.

4.1.4.2.1 Negative Effects of Salt Spray test.
The G/ATOR negative effects of salt spray requirement of 3.1.4.2.1 shall be verified by analysis and inspection of the system design. Threshold shall be met if the analysis and inspection verifies that the system is capable of shipboard transportation and storage, externally and internally, for a minimum of six months without degradation that prevents mission accomplishment.

4.1.4.2.2 Protective Coatings and Surface Treatments test.
The G/ATOR protective coatings and surface treatments requirement of 3.1.4.2.2 shall be verified by analysis and inspection of the system design. Threshold shall be met if the analysis and inspection verifies that the finishes of system's machined, cast, forged and welded surfaces are the minimum required for proper operation, good appearance, and economy of manufacture, that the protective coatings and surface treatments are in IAW MIL-STD-7179, and that the protective coatings are not used in areas which lose that coating during the normal course of operation, testing, and maintenance.

4.1.5 Selection of Specifications and Standards.

4.1.6 Security test.
The G/ATOR security requirement of 3.1.6 shall be verified by analysis, demonstration and testing of the system design in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration and testing verifies that the system has safeguards to ensure US-only and sensitive information is not released to unauthorized users, from Unclassified to Secret (including NATO, Allied, and Multinational (Coalition) releasable classifications).

4.1.6.1 Information Assurance test.
The G/ATOR information assurance requirement of 3.1.6.1 shall be verified by analysis, demonstration and testing of the system design in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration and testing verifies that the system has Information Assurance Control Measures IAW DoDD 8500.1 and DoDI 8500.2 to ensure appropriate system availability, integrity, confidentiality, authentication and non-repudiation, and that sensitive information is protected.

4.1.6.1.1 Security Container test.
The G/ATOR security container requirement of 3.1.6.1.1 shall be verified by analysis and demonstration of the system's security container in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis and demonstration verifies that the system's security container is an approved security container for the storage of the classified material required for system operation.

4.1.6.1.2 Lock Points test.
The G/ATOR system's lock points requirement of 3.1.6.1.2 shall be verified by analysis and demonstration of the system's lock points in an operationally representative environment at a

Government approved and instrumented test facility. Threshold shall be met if the analysis and demonstration verifies that the system provides approved lock points and / or covers for devices that are maintained on the system for operation.

4.1.6.1.3 Classified Software test.
The G/ATOR classified software requirement of 3.1.6.1.3 shall be verified by analysis and demonstration of the system's removable media storage devices in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis and demonstration verifies that all classified software for G/ATOR is on removable media storage devices to ensure that no classified software is ever permanently installed in any G/ATOR component.

4.1.6.1.4 Public Key Infrastructure (PKI) test.
The G/ATOR public key infrastructure (PKI) requirement of 3.1.6.1.4 shall be verified by analysis, demonstration and testing of the system's information security in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration and testing verifies that G/ATOR implements PKI to ensure information security over all voice, video, and data transmission.

4.1.6.2 Anti-Tamper test.
The G/ATOR anti-tamper requirement of 3.1.6.2 shall be verified by analysis, demonstration and testing of the system's anti-tamper features, if required, in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration and testing verifies that G/ATOR provides anti-tamper features, if required, for protection of critical weapon system components and technologies in accordance with: USAF Anti-Tamper Security Classification Guide dtd 1 March 2001 and DSCA 00-07 (Guidelines for Implementation of Anti-Tamper Techniques in Weapon Systems Acquisition Programs, 3 May 2003), and DoDI S5230.28 LO and CLO Programs.

4.2 Performance.

4.2.1 Mobility.

4.2.1.1 Mobility Assets test.
The G/ATOR mobility assets requirement of 3.2.1.1 shall be verified by analysis and demonstration that the system is capable of battlefield mobility via organic MACG assets (HMMWV Family of Vehicles) in an operationally representative environment at a Government approved test facility. Threshold (KPP) shall be met if the analysis and demonstration verifies that the system is capable of battlefield mobility (as defined in 3.2.1) via organic MACG assets without degradation of system performance.

4.2.1.2 Configuration test.
The G/ATOR configuration requirements of 3.2.1.2 shall be verified by analysis and demonstration of the system prime mover and trailer requirements. Threshold (KPP) shall be

met if the analysis and demonstration verify that the system does not exceed two prime movers and two trailers. Objective shall be met if the system does not exceed one prime mover and one trailer.

4.2.1.3 Prime Mover and Trailer Modifications test.
The G/ATOR prime mover modification requirement of 3.2.1.3 shall be verified by inspection of the system on its prime mover(s) and trailer(s). Threshold shall be met if the inspection verifies that the system does not require permanent modification, as defined in 3.2.1.3, of its prime mover(s) and trailer(s).

4.2.1.4 Prime Mover Payload test.
The G/ATOR prime mover payload requirements of 3.2.1.4 shall be verified by analysis and demonstration by weighing the prime mover in the mobility mode with two man crew and their equipment, fuel, radar equipment, prime mover fuel and trailer tongue weight (if required). Threshold shall be met if the analysis and demonstration verifies that the total cargo weight does not exceed 90% of the maximum cargo weight limit.

4.2.1.5 Trailers test.
The G/ATOR requirement of 3.2.1.5 shall be verified analysis and demonstration by weighing the trailer(s) in the mobility mode, excluding the trailer tongue weight. Objective shall be met if the analysis and demonstration verifies that the trailer payload does not exceed 90% of the maximum trailer payload.

4.2.1.6 Prime Power Source Fuel Allocation test.
The G/ATOR prime power source fuel allocation requirement of 3.2.1.6 shall be verified by analysis and demonstration by measuring the prime power source fuel consumption with the system operating in an operationally representative environment and scenario at a Government approved test facility. Threshold shall be met if the analysis and demonstration verifies that the system is capable of transporting sufficient fuel to support the prime power source for 12 hours. Objective shall be met if the analysis and demonstration verifies that the system is capable of transporting sufficient fuel to support the prime power source for 72 hours.

4.2.1.7 Prime Mover Axle Weights test.
The G/ATOR prime mover axle weights requirement of 3.2.1.7 shall be verified by analysis and demonstration by weighing the prime mover individual axle weights in the mobility mode. Threshold shall be met if the analysis and demonstration verifies that the prime mover including any trailer tongue weight does not exceed the front and rear gross axle weight ratings as specified in the prime mover's System Specification.

4.2.1.8 Prime Mover Capabilities test.
The G/ATOR prime mover capabilities of 3.2.1.8 shall be verified by testing the system in its mobility mode over cross country, unimproved roads, and improved roads in an operationally representative environment at a Government approved test range. Thresholds shall be met if the testing verifies that the system is capable of negotiating 15 miles of cross country terrain at an

average speed of 15 mph, 25 miles of unimproved roads at an average speed of 25 mph, and 45 miles of improved roads at an average speed of 45 mph without any degradation in prime mover or subsequent radar system performance.

4.2.1.9 Fording Capability test.
The G/ATOR prime mover fording capability of 3.2.1.9 shall be verified by demonstrating the prime mover fording capability in the mobility mode by driving through a water course at a Government approved test site. Threshold shall be met if the demonstration verifies that the system is capable of fording 30 in. of water without any degradation in system performance.

4.2.1.10 Shock and Vibration Mobility Mode test.
The G/ATOR shock and vibration mobility mode requirement of 3.2.1.10 shall be verified by testing the system in an operationally representative environment at a Government approved and instrumented test range. Threshold shall be met if the testing verifies that the system can operate without degradation after undergoing the shock and vibration equivalent to that of the prime mover.

4.2.2 Transportability.

4.2.2.1 Air, Land, and Sea Transportability test.
The G/ATOR Air, Land, and Sea transportability requirement of 3.2.2.1 shall be verified by analysis of the system design to determine the system capability for being transported in the transport mode by Government approved air, land and sea assets. Threshold shall be met if the analysis verifies that the system in its transport mode is capable of being transported by air, land and sea assets without the need for special or unique tools and attachments, and without removal from its prime mover.

4.2.2.1.1 Air Transport.

4.2.2.1.1.1 External Lift test.
The G/ATOR external lift requirement of 3.2.2.1.1.1 shall be verified by demonstrating that the system in the transport mode can be externally transported by CH-53 and MV-22 class aircraft in no more than 4 lift loads (2 prime movers and 2 trailers) in accordance with MIL-STD-913A at a Government approved test facility. Threshold shall be met if the demonstration verifies and the system is certified for external air-lift by CH-53 and MV-22 class aircraft. Lift loads shall not exceed 10,000 pounds.

4.2.2.1.1.2 Internal C-130 Transport test.
The G/ATOR internal C-130 transport requirement of 3.2.2.1.1.2 shall be verified by demonstration of loading (drive on) and unloading (drive off) for internal transport by C-130J aircraft without disassembly in accordance with MIL-STD-1366D(1) and MIL-HDBK 1791(2). Threshold shall be met if the demonstration verifies and the system is certified for C-130J aircraft internal transport.

4.2.2.1.1.3 Safe loading / Unloading into / from C-130J test.
The G/ATOR safe loading/unloading into/from C-130J requirement of 3.2.2.1.1.3 shall be verified by demonstration of safe loading into and unloading from C-130J variant aircraft all components (Mission Essential Equipment (MEE)) IAW MILSTD-1366(D)1 and MIL-HDBK-1791(2) of G/ATOR at a Government approved facility. Threshold (KPP) shall be met if the demonstration verifies and the system is certified for loading into and unloading from C-130J variant aircraft.

4.2.2.1.2 Land Transport.

4.2.2.1.2.1 Safe loading / Unloading into / from Prime Mover test.
The G/ATOR safe loading/unloading into/from prime mover requirement of 3.2.2.1.2.1 shall be verified by demonstration of safe loading into and unloading from its prime mover all components (Mission Essential Equipment (MEE)) of G/ATOR in an operationally representative environment at a Government approved test facility. Threshold (KPP) shall be met if the demonstration verifies that the system passes all safety requirements for loading into and unloading from its prime mover all system components.

4.2.2.1.2.2 Transport by Rail and Highway test.
The G/ATOR transport by rail and highway requirements of 3.2.2.1.2.2 shall be verified by analysis of the transport mode system design and the applicable portions of MIL-STD-1366D(1), STANAG 2832 ED3(1), and STANAG 2175 ED3(2). Threshold shall be met if the analysis verifies that the transport mode system is capable of transport by rail and highway (tractor trailer) and conforms to the applicable portions of MIL-STD-1366D(1), STANAG 2832 ED3(1), and STANAG 2175 ED3(2).

4.2.2.1.3 Shipboard Transport test.
The G/ATOR shipboard transport requirement of 3.2.2.1.3 shall be verified by analysis of the transport mode system design for shipboard transportation and storage. Threshold shall be met if the analysis verifies that the transport mode system is capable of shipboard transportation and storage without degradation in system performance.

4.2.2.2 Lifting and Tie Down Provisions test.
The G/ATOR lifting and tie down provisions requirements of 3.2.2.2 shall be verified by analysis and inspection of the system design for compliance with the lifting and tie down provisions of MIL-STD-209K(1) and MIL-STD-1366D(1). Threshold shall be met if the analysis and inspection verifies that there is no interference between the prime mover's transportability handling provisions and the G/ATOR components when installed on the prime mover in the transport mode.

4.2.2.3 Shock and Vibration Transport Mode test.
The G/ATOR shock and vibration transport mode requirement of 3.2.2.3 shall be verified by demonstration, analysis, and testing of system in an operationally representative environment at a Government approved and instrumented test range. Threshold shall be met if the system

withstands the vibration and shock equivalent to the transit drop and rail impact tests (see MIL-STD-810F(3), Method 516.5, Procedures IV and VII) with no degradation in performance.

4.2.3 Reconfiguration.

4.2.3.1 Self Load and Unload test.

The G/ATOR self load and unload requirement of 3.2.3.1 shall be verified by demonstration of self off loading from/on loading to the prime mover(s) without material handling equipment in an operationally representative environment at a Government approved test facility. Threshold shall be met if the demonstration verifies that the system is capable of self off loading from/on loading to the prime mover(s) without material handling equipment.

4.2.3.2 Operation with or without Prime Mover(s) test.

The G/ATOR operation with or without prime mover(s) requirement of 3.2.3.2 shall be verified by demonstration of system operation without the prime mover(s) in an operationally representative environment at a Government approved test facility. Threshold shall be met if the demonstration verifies that the system is capable of operation without the prime mover(s) without degradation of system performance.

4.2.3.3 Terrain test.

The G/ATOR terrain requirement of 3.2.3.3 shall be verified by demonstration and testing of system operation in level and uneven terrain in an operationally representative environment at a Government approved test facility. Threshold shall be met if the demonstration verifies that the system is capable of operation in level and uneven terrain, with no more than 7 degrees of slope within the allotted reconfiguration time lines without degradation of system performance.

4.2.3.4 Antenna Leveling test.

The G/ATOR antenna leveling requirement of 3.2.3.4 shall be verified by demonstration and testing of system antenna leveling operation with and without the prime mover(s) in an operationally representative environment at a Government approved test facility. Threshold shall be met if the demonstration verifies that the system, once in place and setup, is capable of manual antenna leveling without degradation of system performance. Objective shall be met if the system is capable of automatic antenna leveling, as defined in 3.2.3.4, without degradation of system performance.

4.2.3.5 Leveling Accuracy test.

The G/ATOR leveling accuracy requirement of 3.2.3.5 shall be verified by analysis of the system design and testing of system leveling accuracy in an operationally representative environment at a Government approved test facility. Threshold shall be met if the analysis and testing verifies that the system provides a stationary leveling accuracy of 0.1 mils in each antenna axis and the leveling accuracy is maintained per the radar accuracy requirements of the SHORAD, TAOC, GWLR and ATC missions.

4.2.3.6 Special Tools test.
The G/ATOR special tools requirement of 3.2.3.6 shall be verified by demonstration of system reconfiguration without the need for special or unique tools and attachments for system operation in an operationally representative environment at a Government approved test facility. Threshold shall be met if the demonstration verifies that the system is capable of reconfiguration without the need for special or unique tools and attachments.

4.2.3.7 Reconfiguration Time Lines.

4.2.3.7.1 Mobility Mode to Operational Mode (standard dress) test.
The G/ATOR mobility mode to operational mode (standard dress) requirement of 3.2.3.7.1 shall be verified by demonstration of system reconfiguration from the mobility mode to the full operational mode (SHORAD or TAOC) in an operationally representative environment at a Government approved test facility. Threshold (KPP) shall be met if the demonstration verifies that the system is capable of reconfiguration from the mobility mode, as defined in 3.2.1, to the operational mode, as defined in 3.2.3.7, within 60 minutes by four Marines dressed in standard camouflage uniforms. Objective shall be met if the system is capable of reconfiguration within 30 minutes.

4.2.3.7.2 Mobility Mode to Operational Mode (MOPP-IV or cold weather gear) test.
The G/ATOR mobility mode to operational mode (MOPP-IV or cold weather gear) requirement of 3.2.3.7.2 shall be verified by demonstration of system reconfiguration from the mobility mode to the full operational mode (SHORAD or TAOC) in an operationally representative environment at a Government approved test facility. Threshold shall be met if the system is capable of reconfiguration from the mobility mode, as defined in 3.2.1, to the operational mode, as defined in 3.2.3.7, within 90 minutes by four Marines dressed in MOPP-IV or cold weather gear. Objective shall be met if the system is capable of reconfiguration within 45 minutes.

4.2.3.7.3 Operational Mode to Mobility Mode (standard dress) test.
The G/ATOR operational mode to mobility mode (standard dress) requirement of 3.2.3.7.3 shall be verified by demonstration of system reconfiguration from the full operational mode (SHORAD or TAOC) to the mobility mode in an operationally representative environment at a Government approved test facility. Threshold shall be met if the system is capable of reconfiguration from the full operational mode (SHORAD or TAOC), as defined in 3.2.3.7, to the mobility mode, as defined in 3.2.1, by four Marines dressed in standard camouflage uniforms within 45 minutes. Objective shall be met if the system is capable of reconfiguration within 30 minutes.

4.2.3.7.4 Operational Mode to Mobility Mode (MOPP-IV or cold weather gear) test.
The G/ATOR operational mode to mobility mode (MOPP-IV or cold weather gear) requirement of 3.2.3.7.4 shall be verified by demonstration of system reconfiguration from the full operational mode (SHORAD or TAOC) to the mobility mode in an operationally representative environment at a Government approved test facility. Threshold (KPP) shall be met if the system is capable of reconfiguration from the full operational mode (SHORAD or TAOC), as defined in

3.2.3.7, to the mobility mode, as defined in 3.2.1, by four Marines dressed in MOPP-IV or cold weather gear within 60 minutes. Objective shall be met if the system is capable of reconfiguration within 45 minutes.

4.2.4 Radar States, Features, and Modes of Operation.

4.2.4.1 Radar States.

4.2.4.1.1 System Initialization and Configuration State test.

The G/ATOR system initialization and configuration requirement of 3.2.4.1.1 shall be verified by demonstration of system initialization and configuration via the operator workstations for system operation in an operationally representative environment at a Government approved test facility. Threshold shall be met if the demonstration verifies that the system is capable of set up, initialization and verification of initialization alignments (leveling routines, self location, north alignment, time synchronization, equipment health / readiness validation), selection of radar modes of operation, and operational parameters (frequency selection / enabling, weather information input, RF blanking, EP, Optimization sectors, IFF PRF and mode enables, auto terrain mask enabled, local / remote radar control, etc) via the operator workstations within the allotted setup times and without degradation of system performance.

4.2.4.1.2 Stand By State test.

The G/ATOR stand by state requirement of 3.2.4.1.2 shall be verified by analysis of the system design for stand by state operation. Threshold shall be met if the analysis verifies that the system has a Stand By State, as defined in 3.2.4.1.2, and from which the system can perform Maintenance Mode functions, System Initialization and Configuration functions or proceed into the Ready State.

4.2.4.1.3 Ready State test.

The G/ATOR ready state requirement of 3.2.4.1.3 shall be verified by analysis of the system design for ready state operation. Threshold requirement shall be met if the demonstration verifies that the system has a Ready State, as defined in 3.2.4.1.3, and from which the system can perform Maintenance Mode functions, System Initialization and Configuration functions or proceed into the Operate State.

4.2.4.1.4 Operate State test.

The G/ATOR operate state requirement of 3.2.4.1.4 shall be verified by analysis of the system design for operate state operation. Threshold requirement shall be met if the demonstration verifies that the system has an Operate State, as defined in 3.2.4.1.4, and from which the system can transmit in any one of the Radar Modes of Operation (Single Mission Mode, Contingency Operation Mode, Combined Air Mode, Sectored Mode or User Defined Mode).

4.2.4.2 Features.

4.2.4.2.1 Radar Optimization Sectors test.

The G/ATOR radar optimization sectors requirement of 3.2.4.2.1 shall be verified by analysis, demonstration, and testing of system operation in an operationally representative environment at a Government approved and instrumented test range. Threshold shall be met if in all Operational Modes, except the Maintenance Mode, the radar provides six C2 and operator-defined Radar Optimization Sectors as specified in 3.2.4.2.1.a through f. Objective shall be met if the radar provides 12 C2 and operator-defined Radar Optimization Sectors.

4.2.4.2.1.1 Sector Definition test.
The G/ATOR sector definition requirement of 3.2.4.2.1.1 shall be verified by analysis, demonstration, and testing of system operation in an operationally representative environment at a Government approved and instrumented test range. Threshold shall be met if the system is capable of defining radar optimization sectors in azimuth and elevation in 1 degree increments, range in 1 nm increments, and height in 100 ft increments.

4.2.4.2.2 Elevation Control test.
The G/ATOR elevation control requirement of 3.2.4.2.2 shall be verified by analysis, demonstration, and testing of system operation in an operationally representative environment at a Government approved and instrumented test range. Threshold shall be met if the system has an operator selectable capability to adjust the elevation beam positions mechanically from -5 degrees (for a scan from -5 degrees to 55 degrees) to +2 degrees (for a scan from +2 degrees to +62 degrees) in .25 degree increments. Objective shall be met if the system has an operator selectable capability to adjust the elevation beam positions electronically in the same ranges and increments.

4.2.4.2.2.1 Auto Terrain Mask test.
The G/ATOR auto terrain mask requirement of 3.2.4.2.2.1 shall be verified by demonstration of system auto terrain mask in an operationally representative environment at a Government approved test facility. Threshold shall be met if the demonstration verifies that the system has an operator selectable auto terrain mask capability.

4.2.4.2.3 Time Synchronization test.
The G/ATOR time synchronization requirement of 3.2.4.2.3 shall be verified by analysis, demonstration and testing of the system capability to automatically synchronize to standard time via GPS in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration and testing verifies that the system has the capability to automatically synchronize to standard time via GPS as part of the initialization and configuration procedure, and at a minimum of every 12 hours throughout a deployment.

4.2.4.2.3.1 Time Synchronization Backup test.
The G/ATOR time synchronization backup requirement of 3.2.4.2.3.1 shall be verified by analysis, demonstration and testing of the system internal backup timing clock in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration and testing verifies that the system

internal backup timing clock is capable of maintaining G/ATOR system time to within 0.0001 seconds of UTC.

4.2.4.2.4 Self Locating test.
The G/ATOR self locating requirement of 3.2.4.2.4 shall be verified by demonstration and testing of the self locating capability in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the demonstration verifies that the system has an automatic self locating feature that accepts automatic input of location and orientation data from the G/ATOR GP Global Positioning System (GPS) receiver and accepts manual input of location and orientation data.

4.2.4.2.4.1 GPS and GPS Antenna test.
The G/ATOR GPS and GPS antenna requirement of 3.2.4.2.4.1 shall be verified by demonstration and testing of the GPS and GPS antenna capabilities in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the demonstration verifies that the G/ATOR integrated GP GPS antenna and receiver performs as well as a non-integrated GP GPS antenna and receiver equivalent, and the integrated GPS antenna requires no operator actions to deploy.

4.2.4.3 Radar Modes of Operation.

4.2.4.3.1 Single Mission Mode Test.
The G/ATOR single mission mode requirement of 3.2.4.3.1 shall be verified by demonstration of system operation in each single air mission mode, in an operationally representative environment at a Government approved test facility. Threshold shall be met if the system demonstrates operation in each of the single mission modes without degradation of system performance in any mode.

4.2.4.3.2 Combined Air Mode test.
The G/ATOR combined air mode requirement of 3.2.4.3.2 shall be verified by demonstration of system operation in the combined air mode in an operationally representative environment at a Government approved test facility. Objective shall be met if the system at a minimum simultaneously performs SHORAD and TAOC full performance air missions without degradation of system performance in any mission and the capability to transition from the Combined Air Mode to any Single Mission Mode without interrupting track continuity.

4.2.4.3.3 Sectored Mode test.
The G/ATOR sectored mode requirement of 3.2.4.3.3 shall be verified by demonstration of system operation in the sectored mode in an operationally representative environment at a Government approved test facility. Objective shall be met if the system performs individual full performance missions on a sector basis, with different missions segregated in 1 degree increments, and the system does not interrupt track continuity during transition from the Sectored Mode to any Single Mission Mode.

4.2.4.3.4 User Defined Mode test.
The G/ATOR user defined mode requirement of 3.2.4.3.4 shall be verified by demonstration of system operation in the user defined mode in an operationally representative environment at a Government approved test facility. Objective shall be met if the system demonstrates the ability to tailor / enhance radar performance, with safeguards to prevent hazardous and mission incompatible radar operations, via manual input to the operator workstation and downloading from the GP Radar Mission Planner, based on the assigned mission and battlefield threats, without degradation of system performance and the capability to transition from the User Defined Mode to any Single Mission Mode without interrupting track continuity.

4.2.4.3.5 Contingency Operation Mode test.
The G/ATOR contingency operation mode requirement of 3.2.4.3.5 shall be verified by analysis and demonstration of system operation in the contingency operation mode in an operationally representative environment at a Government approved test facility. Threshold shall be met if the analysis and demonstration verifies that the system, without C2 node connectivity, is capable of performing limited SHORAD and TAOC air control functions, such as Ground Control Intercept (GCI), with augmentation of air control personnel and radio equipment from the operational controlling unit.

4.2.4.3.6 Maintenance Mode test.
The G/ATOR maintenance mode requirement of 3.2.4.3.6 shall be verified by demonstration of system operation in an operationally representative environment at a Government approved test facility. Threshold shall be met if the G/ATOR is capable of on-line monitoring while in the Operate State, and G/ATOR is capable of Off-line dedicated failure isolation while in the Stand By and Ready States.

4.2.4.3.7 Training Mode test.
The G/ATOR training mode requirement of 3.2.4.3.7 shall be verified by demonstration of system operation in the training mode in an operationally representative environment at a Government approved test facility. Threshold shall be met if the system is capable of training mode in all G/ATOR Radar Modes of Operation (See 3.3.11).

4.2.5 Combat Identification Requirements.

4.2.5.1 Friendly Force Combat Identification test.
The G/ATOR friendly force combat identification requirement of 3.2.5.1 shall be verified by analysis, demonstration, and testing of system operation in an operationally representative environment at a Government approved and instrumented test. Threshold shall be met if the system has integrated the latest available GP Friendly Force Combat Identification (CID) devices at the time of fielding without degradation of system performance.

4.2.5.2 Identification Friend or Foe (IFF) test.
The G/ATOR identification friend or foe requirement of 3.2.5.2 shall be verified by analysis, demonstration, and testing of system operation in an operationally representative environment at

a Government approved and instrumented test range using Government approved test targets. Threshold (KPP) shall be met if the system has an Air Traffic Control Radar Beacon System, Identification Friend or Foe (IFF) MK XIIA System (AIMS) capable of operating in Modes 1, 2, 3A, 4, and C that is integrated into the G/ATOR's IFF subsystem IAW DoD AIMS 03-1000B and STANAG 4193 1, 3, & 4 (ED.1(1)).

4.2.5.2.1 IFF Antenna test.
The G/ATOR Contractor Furnished (CF) IFF antenna requirement of 3.2.5.2.1 shall be verified by analysis, demonstration, and testing of system operation in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the analysis, demonstration and testing verify that the system has a fully integrated detachable CF IFF antenna, as defined in 3.2.5.2.1, that is compatible with existing GP IFF equipment and planned upgrades (Mode 5 and S), and that supports the GP Interrogator's targets per scan and per beam capability. Objective shall be met if the analysis, demonstration and testing verify that the system has a built-in CF IFF antenna, as defined in 3.2.5.2.1, that is compatible with existing GP IFF equipment and planned upgrades (Mode 5 and S), and that supports the GP Interrogator's targets per scan and per beam capability.

4.2.5.2.2 IFF Range Selection test.
The G/ATOR IFF range selection requirement of 3.2.5.2.2 shall be verified by analysis, demonstration, and testing of system operation in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the IFF system supports an operator selectable IFF range capability independent of the Radar Mode of Operation, so that IFF Pulse Repetition Frequency (PRF) is not limited by the radar PRF.

4.2.5.2.2.1 SHORAD IFF Range Performance test.
The G/ATOR SHORAD IFF range performance requirement of 3.2.5.2.2.1 shall be verified by analysis, demonstration, and testing of system operation in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the CF IFF antenna and contractor integration of the GP IFF Interrogator supports IFF range performance up to 40 nm in the SHORAD Mode of Operation. Objective shall be met if the CF IFF antenna and contractor integration of the GP IFF Interrogator supports IFF range performance up to 200 nm in the SHORAD Mode of Operation.

4.2.5.2.2.2 TAOC IFF Range Performance test.
The G/ATOR TAOC IFF range performance requirement of 3.2.5.2.2.2 shall be verified by analysis, demonstration, and testing of system operation in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the CF IFF antenna and contractor integration of the GP IFF interrogator supports IFF range performance up to 120 nm in the TAOC Mode of Operation. Objective shall be met if the CF IFF antenna and contractor integration of the GP IFF interrogator supports IFF range performance up to 200 nm in the TAOC Mode of Operation.

4.2.5.2.3 IFF / Radar Reporting test.
The G/ATOR IFF / radar reporting requirement of 3.2.5.2.3 shall be verified by analysis, demonstration, and testing of system operation in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if paired target, radar only, and IFF only reports are processed for local display and transmitted to remote C2 via the Radar Report.

4.2.5.2.3.1 Local Operation and Reporting test.
The G/ATOR local IFF reporting requirement of 3.2.5.2.3.1 shall be verified by analysis, demonstration, and testing of system operation in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the analysis, demonstration and testing verify that the system displays IFF Modes 1, 2, 3A and C, numeric codes, and Mode 4 evaluation indicators / messages on the Operator Workstation and has provisions for Mode 4 encryption devices (stand alone or embedded), back-to-back confidence tests, and cryptographic fill.

4.2.5.2.3.2 Remote Reporting test.
The G/ATOR remote IFF reporting requirement of 3.2.5.2.3.2 shall be verified by analysis, demonstration, and testing of system operation in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if G/ATOR processes and transfers IFF Modes 1, 2, 3A and C, numeric codes, and Mode 4 evaluation indicators / messages to C2.

4.2.5.2.4 IFF Mode Interrogation test.
The G/ATOR IFF Mode Interrogation requirement of 3.2.5.2.4 shall be verified by analysis, demonstration, and testing of system operation in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if all IFF Modes (interleaved and interlaced) are command interrogated locally via Operator Workstations and remotely via C2.

4.2.6 SHORAD Mode of Operation test.
The G/ATOR SHORAD (Air Defense) requirement of 3.2.6 shall be verified by analysis, demonstration, and testing of system operation in the SHORAD Mode in an operationally representative environment at a Government approved and instrumented test range. Threshold shall be met if the system operation in the SHORAD Mode supports Command and Control situational awareness and direct weapon engagement of specified threats via the CLAWS Weapon System.

4.2.6.1 Search Volume test.
The G/ATOR search volume requirement of 3.2.6.1 shall be verified by analysis, demonstration, and testing of system operation in the SHORAD Mode in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the system operation in the SHORAD Mode meets the

Firm Track range requirements of 3.2.6.6.1 - .4 throughout the volume (defined in 3.2.6.1) consistent with Firm Track initiation (3.2.6.6.6) and update rates (3.2.6.5.1 - .3).

4.2.6.1.1 Range Coverage test.
The G/ATOR range coverage requirement of 3.2.6.1.1 shall be verified by analysis, demonstration, and testing of system operation in the SHORAD Mode in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the Search range coverage is the Firm Track range plus any design dependent transition to track range (See 3.2.6.6.1 - .4 for Firm Track range requirements).

4.2.6.1.2 Azimuth Coverage test.
The G/ATOR azimuth coverage requirement of 3.2.6.1.2 shall be verified by analysis, demonstration, and testing of system operation in the SHORAD Mode in an operationally representative environment at a Government approved and instrumented test range. Threshold shall be met if the system operation in the SHORAD Mode provides azimuth coverage of 360 degrees.

4.2.6.1.3 Height Coverage test.
The G/ATOR height coverage requirement of 3.2.6.1.3 shall be verified by analysis, demonstration, and testing of system operation in the SHORAD Mode in an operationally representative environment at a Government approved and instrumented test range. Threshold shall be met if the system operation in the SHORAD Mode provides height coverage as specified in 3.2.6.1.3.

4.2.6.1.4 Elevation Coverage test.
The G/ATOR elevation coverage requirement of 3.2.6.1.4 shall be verified by analysis, demonstration, and testing of system operation in the SHORAD Mode in an operationally representative environment at a Government approved and instrumented test range. Threshold shall be met if the system operation in the SHORAD Mode provides elevation coverage as specified in 3.2.6.1.4.

4.2.6.2 Search Volume Revisit Period test.
The G/ATOR search volume revisit period requirement of 3.2.6.2 shall be verified by analysis, demonstration, and testing of system operation in the SHORAD Mode in an operationally representative environment at a Government approved and instrumented test range. Threshold shall be met if the system in the SHORAD Mode systematically searches the search volume (as defined in 3.2.6.1) in a manner and rate to meet Firm Track and pop up target initiation requirements defined in 3.2.6.6.6 and 3.2.6.6.8.

4.2.6.2.1 Search Volume Fence test.
The G/ATOR search volume fence requirement of 3.2.6.2.1 shall be verified by analysis, demonstration, and testing of system operation in the SHORAD Mode in an operationally representative environment at a Government approved and instrumented test range. The

requirement shall be met if the system operation in the SHORAD Mode provides a search volume fence as specified in 3.2.6.2.1.

4.2.6.3 Target Track test.
The G/ATOR target track requirement of 3.2.6.3 shall be verified by analysis, demonstration, and testing of system operation in the SHORAD Mode in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the G/ATOR in the SHORAD Mode tracks targets with the necessary accuracies and update rates to support C2 situational awareness and CLAWS engagement, and G/ATOR provides a means for tracking targets acquired in search (Non Dedicated Tracks), as well as those that are locally and remotely (C2) commanded (Dedicated Hostile / C2 Commanded Tracks).

4.2.6.3.1 Latency test.
The G/ATOR latency requirement of 3.2.6.3.1 shall be verified by analysis, demonstration and testing of the system operation in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration and testing of the system operation verifies that the system design architecture minimizes internal radar report latencies and external request processing to maximize C2's decision making time line.

4.2.6.3.1.1 Radar Report Latency test.
The G/ATOR radar report latency requirement of 3.2.6.3.1.1 shall be verified by analysis, demonstration and testing of the system operation in an operationally representative environment at a Government approved and instrumented test facility. Objective shall be met if the analysis, demonstration and testing of the system operation verifies that the radar report latency, as defined in 3.2.6.3.1.1, does not exceed 100 ms.

4.2.6.3.1.2 External Request Response Latency test.
The G/ATOR external request response latency requirement of 3.2.6.3.1.2 shall be verified by analysis, demonstration and testing of the system operation in an operationally representative environment at a Government approved and instrumented test facility. Objective shall be met if the analysis, demonstration and testing of the system operation verifies that the system latency to an external request, as defined in 3.2.6.3.1.2, does not exceed 100 ms when allowed by doctrine.

4.2.6.3.2 Firm Track test.
The G/ATOR firm track requirement of 3.2.6.3.2 shall be verified by analysis, demonstration, and testing of system operation in the SHORAD Mode in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the analysis, demonstration and testing verify that the system operation in the SHORAD Mode provides Firm Tracks as specified and defined in 3.2.6.3.2.

4.2.6.3.3 Probability of Firm Track test.

The G/ATOR probability of firm track (PFT) requirements of 3.2.6.3.3 shall be verified by analysis, demonstration, and testing of system operation in the SHORAD Mode in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold (**KPP**) shall be met if the analysis, demonstration and testing verify that the G/ATOR PFT for the Air Missions is 0.9, as specified in 3.2.6.3.3. Objective shall be met if the analysis, demonstration and testing verify that the G/ATOR PFT for the Air Missions is 0.95, as specified in 3.2.6.3.3.

4.2.6.3.4 Probability of Drop Track test.
The G/ATOR probability of drop track requirement of 3.2.6.3.4 shall be verified by analysis, demonstration and testing of system operation in the SHORAD Mode in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the analysis, demonstration and testing verify that the system operation in the SHORAD Mode provides probability of drop track that is equal to or less than one percent under the same environmental conditions in which the Firm Track was initiated.

4.2.6.4 Track Volume.

4.2.6.4.1 Range test.
The G/ATOR track range (volume) requirement of 3.2.6.4.1 shall be verified by analysis, demonstration, and testing of system operation in the SHORAD Mode in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the system operation in the SHORAD Mode provides Firm Track range coverage of 0.5 to 40 nm. Objective shall be met if the system operation in the SHORAD Mode provides Firm Track range coverage of 0.5 to 70 nm.

4.2.6.4.2 Azimuth test.
The G/ATOR track azimuth (volume) requirement of 3.2.6.4.2 shall be verified by analysis, demonstration, and testing of system operation in the SHORAD Mode in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the system operation in the SHORAD Mode provides azimuth coverage from 0 to 360 degrees.

4.2.6.4.3 Height test.
The G/ATOR track height requirement of 3.2.6.4.3 shall be verified by analysis, demonstration, and testing of system operation in the SHORAD Mode in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the system operation in the SHORAD Mode provides track height coverage as specified in 3.2.6.4.3.

4.2.6.4.4 Elevation test.

The G/ATOR track volume requirement of 3.2.6.4 shall be verified by analysis, demonstration, and testing of system operation in the SHORAD Mode in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the system operation in the SHORAD Mode provides track elevation as specified in 3.2.6.4.4.

4.2.6.4.5 Track Continuity test.
The G/ATOR track continuity requirements of 3.2.6.4.5 shall be verified by analysis, demonstration, and testing of system operation in the SHORAD Mode in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the system operation in the SHORAD Mode provides track continuity as specified in 3.2.6.4.5.

4.2.6.5 Firm Track Update Rate test.
The G/ATOR firm track update rate requirement of 3.2.6.5 shall be verified by analysis, demonstration, and testing of system operation in the SHORAD Mode in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the system operation in the SHORAD Mode provides a firm track update rate as specified in 3.2.6.5.

4.2.6.5.1 Fence Update Rate test.
The G/ATOR firm track in the fence update rate requirement of 3.2.6.5.1 shall be verified by analysis, demonstration, and testing of system operation in the SHORAD Mode in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the system operation in the SHORAD Mode provides a firm track in the fence update rate as specified in 3.2.6.5.1.

4.2.6.5.2 Above Fence Update Rate test.
The G/ATOR above the fence firm track update rate requirement of 3.2.6.5.2 shall be verified by analysis, demonstration, and testing of system operation in the SHORAD Mode in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the system operation in the SHORAD Mode provides an above the fence firm track update rate as specified in 3.2.6.5.2.

4.2.6.5.3 Dedicated Hostile / C2 Commanded Track Update Rate test.
The G/ATOR dedicated hostile/C2 commanded track update requirements of 3.2.6.5.3 shall be verified by analysis, demonstration, and testing of system operation in the SHORAD Mode in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the system operation in the SHORAD Mode meets the dedicated hostile/C2 commanded track update requirements as specified in 3.2.6.5.3.

4.2.6.6 Firm Track Range Requirements.

4.2.6.6.1 Targets Larger than Type 0 test.
The G/ATOR firm track range (slant) for larger than Type 0 targets requirement of 3.2.6.6.1 shall be verified by analysis, demonstration, and testing of system operation in the SHORAD Mode in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the system operation in the SHORAD Mode provides the firm track range (slant) of 0.5 nm to 40 nm for larger than Type 0 targets. Objective shall be met if the system operation in the SHORAD Mode provides the firm track range (slant) of 0.5 nm to 70 nm for larger than Type 0 targets.

4.2.6.6.2 Type 0 Targets test.
The G/ATOR firm track range (slant) Type 0 targets requirement of 3.2.6.6.2 shall be verified by analysis, demonstration, and testing of system operation in the SHORAD Mode in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the system operation in the SHORAD Mode provides the firm track range (slant) of 0.5 nm to 40 nm for Type 0 targets. Objective shall be met if the system operation in the SHORAD Mode provides the firm track range (slant) of 0.5 nm to 70 nm for Type 0 targets.

4.2.6.6.3 Type 1 Targets test.
The G/ATOR firm track range (slant) Type 1 targets requirement of 3.2.6.6.3 shall be verified by analysis, demonstration, and testing of system operation in the SHORAD Mode in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the system operation in the SHORAD Mode provides the firm track range (slant) of 0.5 nm to 40 nm for Type 1 targets. Objective shall be met if the system operation in the SHORAD Mode provides the firm track range (slant) of 0.5 nm to 70 nm for Type 1 targets.

4.2.6.6.4 Type 2 Targets test.
The G/ATOR firm track range (slant) Type 2 targets requirement of 3.2.6.6.4 shall be verified by analysis, demonstration, and testing of system operation in the SHORAD Mode in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold (KPP) shall be met if the system operation in the SHORAD Mode provides the firm track range (slant) of 0.5 nm to 40 nm for Type 2 targets. Objective shall be met if the system operation in the SHORAD Mode provides the firm track range (slant) of 0.5 nm to 70 nm for Type 2 targets.

4.2.6.6.5 Firm Track Range Performance in Other Than the Nominal Environment test.
The G/ATOR firm track range performance in other than the nominal environment requirement of 3.2.6.6.5 shall be verified by analysis, demonstration, and testing of system operation in the SHORAD Mode in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the system operation in the SHORAD Mode in the presence of rain and clutter (other than the nominal environment) performs with the least amount of Firm Track range degradation possible. Objective shall be met if the system operation in the SHORAD Mode in the presence of rain and

clutter (other than the nominal environment) performs with no Firm Track range degradation. See Appendix C, C.3 for additional information.

4.2.6.6.6 Firm Track Initiation test.
The G/ATOR firm track initiation requirement of 3.2.6.6.6 shall be verified by analysis, demonstration, and testing of system operation in the SHORAD Mode in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the system operation in the SHORAD Mode provides firm track initiation as specified in 3.2.6.6.6.

4.2.6.6.7 Slant Range Versus Elevation test.
The G/ATOR slant range versus elevation requirement of 3.2.6.6.7 shall be verified by analysis, demonstration, and testing of system operation in the SHORAD Mode in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the system operation in the SHORAD Mode provides slant range versus elevation as specified in 3.2.6.6.7.

4.2.6.6.8 Pop-up Target test.
The G/ATOR pop up target requirement of 3.2.6.6.8 shall be verified by analysis, demonstration, and testing of system operation in the SHORAD Mode in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the system operation in the SHORAD Mode detects and tracks pop up targets as specified in 3.2.6.6.8.

4.2.6.7 Other Dedicated Hostile / C2 Commanded Waveform Uses.

4.2.6.8 External Cues test.
The G/ATOR external cues requirement of 3.2.6.8 shall be verified by demonstration, and testing of system operation in the SHORAD Mode in an operationally representative environment at a Government approved and instrumented test range. Threshold shall be met if the system operation in the SHORAD Mode can increase the search angle, as specified in 3.2.6.8, upon receipt of an External Cue.

4.2.6.9 Track Load test.

4.2.6.9.1 360 Degree test.
The G/ATOR 360 degree track load requirement of 3.2.6.9.1 shall be verified by analysis, demonstration, and testing of system operation in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold and Objective shall be met if the system achieves the respective Threshold and Objective performance as described in 3.2.6.9.1.

4.2.6.9.2 Per Sector test.

The G/ATOR track load sector requirement of 3.2.6.9.2 shall be verified by analysis, demonstration, and testing of system operation in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the system achieves the performance described in 3.2.6.9.2.

4.2.6.9.3 Per Beam test.
The G/ATOR track load per beam requirement of 3.2.6.9.3 shall be verified by analysis, demonstration, and testing of system operation in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold and Objective shall be met if the system achieves the respective Threshold and Objective performance as described in 3.2.6.9.3.

4.2.6.10 False Track Rate test.
The G/ATOR false track rate requirement of 3.2.6.10 shall be verified by analysis, demonstration, and testing of system operation in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold and Objective shall be met if the system achieves the respective Threshold and Objective performance as described in 3.2.6.10.

4.2.6.10.1 False Track Rate in Other than the Nominal Environment test.
The G/ATOR false track rate, in other than the nominal environment, requirement of 3.2.6.10.1 shall be verified by analysis, demonstration, and testing of system operation in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the system, in other than nominal environments (including noise jamming), performs with the least amount of false track rate performance possible.

4.2.6.11 Velocity test.
The G/ATOR velocity requirement of 3.2.6.11 shall be verified by analysis, demonstration, and testing of system operation in the SHORAD Mode in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the system operation in the SHORAD Mode can detect and track targets as specified in 3.2.6.11.

4.2.6.12 Target Acceleration test.
The G/ATOR target acceleration requirement of 3.2.6.12 shall be verified by analysis, demonstration, and testing of system operation in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold and Objective shall be met if the system achieves the respective Threshold and Objective performance as described in 3.2.6.12.

4.2.6.13 Resolution.
4.2.6.13.1 Range Resolutions

The G/ATOR range resolutions requirement of 3.2.6.13.1 shall be verified by analysis, demonstration, and testing of system operation in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the analysis, demonstration and testing verify that the system achieves the range resolutions as specified in 3.2.6.13.1.

4.2.6.13.1.1 Non-Dedicated Track Resolution test.
The G/ATOR non-dedicated track resolution requirement of 3.2.6.13.1.1 shall be verified by analysis, demonstration and testing of system operation in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the analysis, demonstration and testing verify that the system, when using Non Dedicated track waveforms, employs a range resolution capability consistent with the 300 ft range accuracy requirement (range error standard deviation). Objective shall be met if the analysis, demonstration and testing verify that the system, when using Non Dedicated track waveforms, employs a range resolution capability consistent with the 200 ft range accuracy requirement (range error standard deviation).

4.2.6.13.1.2 Dedicated Track Resolution test.
The G/ATOR dedicated track resolution requirement of 3.2.6.13.1.2 shall be verified by analysis, demonstration, and testing of system operation in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the analysis, demonstration and testing verify that the system achieves the performance as specified in 3.2.6.13.1.2.

4.2.6.13.2 Angular Resolutions.
The G/ATOR angular resolutions requirement of 3.2.6.13.2 shall be verified by analysis, demonstration and testing of system operation in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the analysis, demonstration and testing verify that the system azimuth and elevation resolutions are consistent with the antenna's beamwidth characteristics.

4.2.6.14 Radar Accuracy.

4.2.6.14.1 Non-Dedicated Track.
4.2.6.14.1.1 Range test.
The G/ATOR range requirement of 3.2.6.14.1.1 shall be verified by analysis, demonstration, and testing of system operation in the SHORAD Mode in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold (KPP) shall be met if the analysis, demonstration and testing verify that the system's Firm Track range accuracy at maximum range is 300 ft or less. Objective shall be met if the analysis, demonstration and testing verify that the system's detection range accuracy at maximum range is 200 ft or less.

4.2.6.14.1.2 Azimuth test.

The G/ATOR azimuth requirement of 3.2.6.14.1.2 shall be verified by analysis, demonstration, and testing of system operation in the SHORAD Mode in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the analysis, demonstration and testing verify that the system operation in the SHORAD Mode meets the non-dedicated detection azimuth cross range accuracy threshold requirements as specified in 3.2.6.14.1.2. Objective shall be met if the analysis, demonstration and testing verify that the system operation in the SHORAD Mode meets the non-dedicated Firm Track azimuth cross range accuracy objective requirements as specified in 3.2.6.14.1.2.

4.2.6.14.1.3 Height test.
The G/ATOR height requirement of 3.2.6.14.1.3 shall be verified by analysis, demonstration, and testing of system operation in the SHORAD Mode in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold (KPP) shall be met if the analysis, demonstration and testing verify that the system operation in the SHORAD Mode provides detection height accuracy at 40 nm of 1000 ft or less. Objective shall be met if the analysis, demonstration and testing verify that the system operation in the SHORAD Mode provides Firm Track height accuracy at 40 nm of 500 ft or less.

4.2.6.14.2 Dedicated Hostile / C2 Commanded Track Waveforms.

4.2.6.14.2.1 Range test.
The G/ATOR range requirement of 3.2.6.14.2.1 shall be verified by analysis, demonstration, and testing of system operation in the SHORAD Mode in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the analysis, demonstration and testing verify that the system operation in the SHORAD Mode meets the Firm Track range accuracy at maximum range requirements as specified in 3.2.6.14.2.1.

4.2.6.15 Tracker Functionality test.
The G/ATOR internal tracker functionality requirement of 3.2.6.15 shall be verified by analysis, demonstration, and testing of system operation in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the analysis, demonstration and testing verify that the system supports a resource management scheme that is capable of transitioning and maintaining track on maneuvering targets traveling to threshold velocity (3.2.6.11) and acceleration (3.2.6.12) values.

4.2.6.15.1 Tracker Performance test.
The G/ATOR tracker performance requirement of 3.2.6.15.1 shall be verified by analysis, demonstration, and testing of system operation in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the analysis, demonstration and testing verify that the system maintains a Track Quality Mapping function, as described in Annex A of Appendix A, and is capable of

maintaining a Track Quality sufficient to support CLAWS / SLAMRAAM engagements on maneuvering targets in a high clutter and / or jamming environment**.**

4.2.6.15.2 Kill Assessment Support test.
The G/ATOR kill assessment support requirement of 3.2.6.15.2 shall be verified by analysis, demonstration, and testing of system operation in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the analysis, demonstration and testing verify that the system supports a C2 kill assessment (in support of CLAWS / SLAMRAAM intercept evaluations (MIS-PRF-54657A SLAMRAAM SSS)).

4.2.6.16 Instrumented Range and Height test.
The G/ATOR instrumented range and height requirement of 3.2.6.16 shall be verified by analysis, demonstration, and testing of system operation in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the system meets the performance described in 3.2.6.16.

4.2.7 TAOC Mode of Operation.

4.2.7.1 Search Volume test.
The G/ATOR search volume requirement of 3.2.7.1 shall be verified by analysis, demonstration, and testing of system operation in the TAOC Mode in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the analysis, demonstration, and testing verify that the system operation in the TAOC Mode provides a search volume as specified in 3.2.7.1.

4.2.7.1.1 Range Coverage test.
The G/ATOR range coverage requirement of 3.2.7.1.1 shall be verified by analysis, demonstration, and testing of system operation in the TAOC Mode in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the analysis, demonstration, and testing verify that the system operation in the TAOC Mode provides range coverage as specified in 3.2.7.1.1.

4.2.7.1.2 Azimuth Coverage test.
The G/ATOR azimuth coverage requirement of 3.2.7.1.2 shall be verified by analysis, demonstration, and testing of system operation in the TAOC Mode in an operationally representative environment at a Government approved and instrumented test range. Threshold shall be met if the analysis, demonstration, and testing verify that the system operation in the TAOC Mode provides azimuth coverage of 360 degrees.

4.2.7.1.3 Height Coverage test.
The G/ATOR height coverage requirement of 3.2.7.1.3 shall be verified by analysis, demonstration, and testing of system operation in the TAOC Mode in an operationally

representative environment at a Government approved and instrumented test range. Threshold shall be met if the analysis, demonstration, and testing verify that the system operation in the TAOC Mode provides height coverage as specified in 3.2.7.1.3.

4.2.7.1.4 Elevation Coverage test.
The G/ATOR elevation coverage requirement of 3.2.7.1.4 shall be verified by analysis, demonstration, and testing of system operation in the TAOC Mode in an operationally representative environment at a Government approved and instrumented test range. Threshold shall be met if the analysis, demonstration, and testing verify that the system operation in the TAOC Mode provides elevation coverage threshold requirement as specified in 3.2.7.1.4. Objective shall be met if the analysis, demonstration, and testing verify that the system operation in the TAOC Mode provides elevation coverage objective requirement as specified in 3.2.7.1.4.

4.2.7.2 Search Volume Revisit Period test.
The G/ATOR search volume revisit period requirement of 3.2.7.2 shall be verified by analysis, demonstration, and testing of system operation in the TAOC Mode in an operationally representative environment at a Government approved and instrumented test range. Threshold shall be met if the analysis, demonstration, and testing verify that the system operation in the TAOC Mode provides a search volume revisit period as specified in 3.2.7.2.

4.2.7.3 Target Track test.
The G/ATOR target track requirement of 3.2.7.3 shall be verified by analysis, demonstration, and testing of system operation in the TAOC Mode in an operationally representative environment at a Government approved and instrumented test range. Threshold shall be met if the analysis, demonstration, and testing verify that the system operation in the TAOC Mode provides target tracks as specified in 3.2.7.3.

4.2.7.3.1 Latency test.
The G/ATOR latency requirement of 3.2.7.3.1 shall be verified by analysis, demonstration and testing of the system operation in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration and testing of the system operation verify that the system design architecture minimizes internal radar report latencies and external request processing to maximize C2's decision making time line.

4.2.7.3.1.1 Radar Report Latency test.
The G/ATOR radar report latency requirement of 3.2.7.3.1.1 shall be verified by analysis, demonstration and testing of the system operation in an operationally representative environment at a Government approved and instrumented test facility. Objective shall be met if the analysis, demonstration and testing of the system operation verify that the radar report latency, as defined in 3.2.7.3.1.1, does not exceed 100 ms.

4.2.7.3.1.2 External Request Response Latency test.

The G/ATOR external request response latency requirement of 3.2.7.3.1.2 shall be verified by analysis, demonstration and testing of the system operation in an operationally representative environment at a Government approved and instrumented test facility. Objective shall be met if the analysis, demonstration and testing of the system operation verify that the system latency to an external request, as defined in 3.2.7.3.1.2, does not exceed 100 ms when allowed by doctrine.

4.2.7.3.2 Firm Track test.
The G/ATOR firm track requirement of 3.2.7.3.2 shall be verified by analysis, demonstration, and testing of system operation in the TAOC Mode in an operationally representative environment at a Government approved and instrumented test range. Threshold shall be met if the analysis, demonstration, and testing verify that the system operation in the TAOC Mode provides Firm Track as specified and definged in 3.2.7.3.2.

4.2.7.3.3 Probability of Firm Track test.
The G/ATOR probability of firm track (PFT) requirements of 3.2.7.3.3 shall be verified by analysis, demonstration, and testing of system operation in the TAOC Mode in an operationally representative environment at a Government approved and instrumented test range. Threshold (KPP) shall be met if the analysis, demonstration, and testing verifies that the system operation in the TAOC Mode meets PFT for the Air Missions of 0.9 as specified in 3.2.7.3.3. Objective (KPP) shall be met if the analysis, demonstration, and testing verifies that the system operation in the TAOC Mode meets PFT for the Air Missions of 0.95 as specified in 3.2.7.3.3.

4.2.7.3.4 Probability of Drop Track test.
The G/ATOR probability of drop track requirements of 3.2.7.3.4 shall be verified by analysis, demonstration, and testing of system operation in the TAOC Mode in an operationally representative environment at a Government approved and instrumented test range. Threshold shall be met if the analysis, demonstration, and testing verify that once a Firm Track has been initiated, the probability of drop track shall be equal to or less than one percent under the same environmental conditions in which the Firm Track was initiated.

4.2.7.4 Track Volume.

4.2.7.4.1 Range test.
The G/ATOR range requirement of 3.2.7.4.1 shall be verified by analysis, demonstration, and testing of system operation in the TAOC Mode in an operationally representative environment at a Government approved and instrumented test range. Threshold shall be met if the analysis, demonstration, and testing verify that the system operation in the TAOC Mode provides Firm Track range coverage from 0.5 nm to 120 nm. Objective shall be met if the analysis, demonstration, and testing verify that the system operation in the TAOC Mode provides Firm Track range coverage from 0.5 nm to 160 nm.

4.2.7.4.2 Azimuth test.
The G/ATOR azimuth requirement of 3.2.7.4.2 shall be verified by analysis, demonstration, and testing of system operation in the TAOC Mode in an operationally representative environment at

a Government approved and instrumented test range. Threshold shall be met if the analysis, demonstration, and testing verify that the system operation in the TAOC Mode provides a track azimuth coverage from 0 to 360 degrees.

4.2.7.4.3 Height test.
The G/ATOR height requirement of 3.2.7.4.3 shall be verified by analysis, demonstration, and testing of system operation in the TAOC Mode in an operationally representative environment at a Government approved and instrumented test range. Threshold shall be met if the analysis, demonstration, and testing verify that the system operation in the TAOC Mode provides a Firm Track height coverage threshold as specified in 3.2.7.4.3. Objective shall be met if the analysis, demonstration, and testing verify that the system operation in the TAOC Mode provides Firm Track height coverage objective as specified in 3.2.7.4.3.

4.2.7.4.4 Elevation test.
The G/ATOR elevation requirement of 3.2.7.4.4 shall be verified by analysis, demonstration, and testing of system operation in the TAOC Mode in an operationally representative environment at a Government approved and instrumented test range. Threshold shall be met if the analysis, demonstration, and testing verify that the system operation in the TAOC Mode provides Firm Track elevation as specified in 3.2.7.4.4.

4.2.7.4.5 Track Continuity test.
The G/ATOR track continuity requirements of 3.2.7.4.5 shall be verified by analysis, demonstration, and testing of system operation in the TAOC Mode in an operationally representative environment at a Government approved and instrumented test range. Threshold shall be met if the analysis, demonstration, and testing verify that the system operation in the TAOC Mode provides Firm Track continuity threshold as specified in 3.2.7.4.5. Objective shall be met if the analysis, demonstration, and testing verify that the system operation in the TAOC Mode provides Firm Track continuity objective as specified in 3.2.7.4.5.

4.2.7.5 Firm Track Update Rate test.
The G/ATOR firm track update rate requirement of 3.2.7.5 shall be verified by analysis, demonstration, and testing of system operation in the TAOC Mode in an operationally representative environment at a Government approved and instrumented test range. Threshold shall be met if the analysis, demonstration, and testing verify that the system operation in the TAOC Mode provides a firm track update rate as specified in section 3.2.7.5.

4.2.7.6 Firm Track Range Requirements.

4.2.7.6.1 Targets Larger than Type 0 test.
The G/ATOR targets larger than Type 0 requirement of 3.2.7.6.1 shall be verified by analysis, demonstration, and testing of system operation in the TAOC Mode in an operationally representative environment at a Government approved and instrumented test range with Government approved test targets. Threshold shall be met if the analysis, demonstration, and testing verify that the system operation in the TAOC Mode provides the firm track range (slant)

of 0.5 nm to 120 nm for targets larger than Type 0. Objective shall be met if the analysis, demonstration, and testing verify that the system operation in the TAOC Mode provides the firm track range (slant) of 0.5 nm to 160 nm for targets larger than Type 0.

4.2.7.6.2 Type 0 Targets test.
The G/ATOR Type 0 targets requirement of 3.2.7.6.2 shall be verified by analysis, demonstration, and testing of system operation in the TAOC Mode in an operationally representative environment at a Government approved and instrumented test range with Government approved test targets. Threshold (KPP) shall be met if the analysis, demonstration, and testing verify that the system operation in the TAOC Mode provides firm track range (slant) of 0.5 nm to 120 nm for Type 0 targets. Objective shall be met if the analysis, demonstration, and testing verify that the system operation in the TAOC Mode provides the firm track range (slant) of 0.5 nm to 160 nm for Type 0 targets.

4.2.7.6.3 Type 1 Targets test.
The G/ATOR Type 1 targets requirement of 3.2.7.6.3 shall be verified by analysis, demonstration, and testing of system operation in the TAOC Mode in an operationally representative environment at a Government approved and instrumented test range with Government approved test targets. Threshold (KPP) shall be met if the analysis, demonstration, and testing verify that the system operation in the TAOC Mode provides firm track range (slant) of 0.5 nm to 70 nm for Type 1 targets. Objective shall be met if the analysis, demonstration, and testing verify that the system operation in the TAOC Mode provides the firm track range (slant) of 0.5 nm to 100 nm for Type 1 targets.

4.2.7.6.4 Type 2 Targets test.
The G/ATOR Type 2 targets requirement of 3.2.7.6.4 shall be verified by analysis, demonstration, and testing of system operation in the TAOC Mode in an operationally representative environment at a Government approved and instrumented test range with Government approved test targets. Threshold (KPP) shall be met if the analysis, demonstration, and testing verify that the system operation in the TAOC Mode provides firm track range (slant) of 0.5 nm to 40 nm for Type 2 targets. Objective shall be met if the analysis, demonstration, and testing verify that the system operation in the TAOC Mode provides firm track range (slant) of 0.5 nm to 70 nm for Type 2 targets.

4.2.7.6.5 Firm Track Range Performance in Other Than the Nominal Environment test.
The G/ATOR firm track range performance in other than the nominal environment requirement of 3.2.7.6.5 shall be verified by analysis, demonstration, and testing of system operation in the TAOC Mode in an operationally representative environment at a Government approved and instrumented test range with Government approved test targets. Threshold shall be met if the analysis, demonstration, and testing verify that in the presence of rain and clutter (other than the nominal environment), the system performance in the TAOC Mode provides the least amount of Firm Track range degradation possible. Objective shall be met if the analysis, demonstration, and testing verify that in the presence of rain and clutter (other than the nominal environment), the system performance in the TAOC Mode provides no degradation of Firm Track range.

4.2.7.6.6 Firm Track Initiation test.
The G/ATOR firm track initiation requirement of 3.2.7.6.6 shall be verified by analysis, demonstration, and testing of system operation in the TAOC Mode in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the analysis, demonstration, and testing verify that the system performance in the TAOC Mode provides firm track initiation as specified in 3.2.7.6.6.

4.2.7.6.7 Slant Range Versus Elevation test.
The G/ATOR slant range versus elevation requirement of 3.2.7.6.7 shall be verified by analysis, demonstration, and testing of system operation in the TAOC Mode in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the analysis, demonstration, and testing verify that the system performance in the TAOC Mode provides firm track initiation and continuity as specified in 3.2.7.6.7.

4.2.7.6.8 Pop-up Target test.
The G/ATOR pop-up target requirement of 3.2.7.6.8 shall be verified by analysis, demonstration, and testing of system operation in the TAOC Mode in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the analysis, demonstration, and testing verify that the system performance in the TAOC Mode provides firm track initiation as specified in 3.2.7.6.8.

4.2.7.7 Other Dedicated Hostile / C2 Commanded Waveform Uses test.
The G/ATOR other dedicated hostile/C2 commanded waveform uses requirements of 3.2.7.7 shall be verified by analysis and demonstration of system operation in the TAOC Mode in an operationally representative environment at a Government approved and instrumented test range. Objective shall be met if the analysis and demonstration verify that the system operation in the TAOC Mode meets the other dedicated hostile/C2 commanded waveform uses as specified in 3.2.7.7.

4.2.7.8 External Cues test.
The G/ATOR external cues requirement of 3.2.7.8 shall be verified by analysis, demonstration and testing of system operation in the TAOC Mode in an operationally representative environment at a Government approved and instrumented test range. Threshold shall be met if the system operation in the TAOC Mode can receive and comply with external cues as specified in 3.2.7.8.

4.2.7.9 Track Load.

4.2.7.9.1 360 Degree test.
The G/ATOR 360 degree requirement of 3.2.7.9.1 shall be verified by analysis, demonstration, and testing of system operation in an operationally representative environment at a Government

approved and instrumented test range using Government approved test targets. Threshold shall be met if the analysis, demonstration, and testing verify that the system performance in the TAOC Mode provides the 360 degree track load and dedicated track beams threshold levels as specified in 3.2.7.9.1. Objective shall be met if the analysis, demonstration, and testing verify that the system performance in the TAOC Mode provides the 360 degree track load and dedicated track beams objective levels as specified in 3.2.7.9.1.

4.2.7.9.2 Per Sector test.
The G/ATOR per sector requirement of 3.2.7.9.2 shall be verified by analysis, demonstration, and testing of system operation in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the analysis, demonstration, and testing verify that the system performance in the TAOC Mode provides the sector track load and dedicated track beams as specified in 3.2.7.9.2.

4.2.7.9.3 Per Beam test.
The G/ATOR per beam requirement of 3.2.7.9.3 shall be verified by analysis, demonstration, and testing of system operation in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the analysis, demonstration, and testing verify that the system performance in the TAOC Mode provides the beam track load as specified in 3.2.7.9.3.

4.2.7.10 False Track Rate test.
The G/ATOR false track rate requirement of 3.2.7.10 shall be verified by analysis, demonstration, and testing of system operation in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the analysis, demonstration, and testing verify that the system performance in the TAOC Mode does not exceed the false track rate threshold level as specified in 3.2.7.10. Objective shall be met if the analysis, demonstration, and testing verify that the system performance in the TAOC Mode does not exceed the false track rate objective level as specified in 3.2.7.10.

4.2.7.10.1 False Track Rate in Other than the Nominal Environment test.
The G/ATOR false track rate in other than the nominal environment requirement of 3.2.7.10.1 shall be verified by analysis, demonstration, and testing of system operation in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the analysis, demonstration, and testing verify that in other than the nominal environment the system false track rate performance in the TAOC Mode has the least amount of degradation possible.

4.2.7.11 Velocity test.
The G/ATOR velocity requirement of 3.2.7.11 shall be verified by analysis, demonstration, and testing of system operation in the TAOC Mode in an operationally representative environment at a Government approved and instrumented test range. Threshold shall be met if the analysis, demonstration, and testing verify that the system performance in the TAOC Mode meets the

target velocity range threshold levels as specified in 3.2.7.11. Objective shall be met if the analysis, demonstration, and testing verify that the system performance in the TAOC Mode meets the target velocity range objective levels as specified in 3.2.7.11.

4.2.7.12 Target Acceleration test.
The G/ATOR target acceleration requirement of 3.2.7.12 shall be verified by analysis, demonstration, and testing of system operation in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the analysis, demonstration, and testing verify that the system performance in the TAOC Mode meets the target acceleration threshold level as specified in 3.2.7.12. Objective shall be met if the analysis, demonstration, and testing verify that the system performance in the TAOC Mode meets the target acceleration objective level as specified in 3.2.7.12.

4.2.7.13 Resolution.
4.2.7.13.1 Range Resolutions.
The G/ATOR range resolutions requirement of 3.2.7.13.1 shall be verified by analysis, demonstration, and testing of system operation in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the analysis, demonstration, and testing verify that the system performance in the TAOC Mode meets the range resolution requirement as specified in 3.2.7.13.1.

4.2.7.13.1.1 Non-Dedicated Track Resolution test.
The G/ATOR non-dedicated track resolution requirement of 3.2.7.13.1.1 shall be verified by analysis, demonstration, and testing of system operation in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the analysis, demonstration, and testing verify that the system performance in the TAOC Mode meets the non-dedicated track range resolution threshold level as specified in 3.2.7.13.1.1. Objective shall be met if the analysis, demonstration, and testing verify that the system performance in the TAOC Mode meets the non-dedicated track range resolution objective level as specified in 3.2.7.13.1.1.

4.2.7.13.1.2 Dedicated Track Resolution test.
The G/ATOR dedicated track resolution requirement of 3.2.7.13.1.2 shall be verified by analysis, demonstration, and testing of system operation in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the analysis, demonstration, and testing verify that the system performance in the TAOC Mode meets the dedicated hostile / C2 commanded track range resolution capability as specified in 3.2.7.13.1.2.

4.2.7.13.2 Angular Resolutions test.
The G/ATOR angular resolutions requirement of 3.2.7.13.2 shall be verified by analysis, demonstration, and testing of system operation in an operationally representative environment at

a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the analysis, demonstration, and testing verify that the system performance in the TAOC Mode meets the dedicated hostile / C2 commanded track azimuth and elevation resolutions consistent with the antenna's beamwidth characteristics.

4.2.7.14 Radar Accuracy.

4.2.7.14.1 Non-Dedicated Track.

4.2.7.14.1.1 Range test.

The G/ATOR range requirement of 3.2.7.14.1.1 shall be verified by analysis, demonstration, and testing of system operation in the TAOC Mode in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold (KPP) shall be met if the analysis, demonstration, and testing verify that the system performance in the TAOC Mode meets the non-dedicated track detection range accuracy at maximum range of 300 ft or less. Objective shall be met if the analysis, demonstration, and testing verify that the system performance in the TAOC Mode meets the non-dedicated track Firm Track range accuracy at maximum range of 200 ft or less.

4.2.7.14.1.2 Azimuth test.

The G/ATOR azimuth requirement of 3.2.7.14.1.2 shall be verified by analysis, demonstration, and testing of system operation in the TAOC Mode in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the analysis, demonstration, and testing verify that the system performance in the TAOC Mode meets the non-dedicated track detection azimuth cross range accuracy threshold level as specified in 3.2.7.14.1.2. Objective shall be met if the analysis, demonstration, and testing verify that the system performance in the TAOC Mode meets the non-dedicated track Firm Track azimuth cross range accuracy objective level as specified in 3.2.7.14.1.2.

4.2.7.14.1.3 Height test.

The G/ATOR height requirement of 3.2.7.14.1.3 shall be verified by analysis, demonstration, and testing of system operation in the TAOC Mode in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold (KPP) shall be met if the analysis, demonstration, and testing verify that the system performance in the TAOC Mode meets the non-dedicated track detection height accuracy threshold level as specified in 3.2.7.14.1.3. Objective shall be met if the analysis, demonstration, and testing verify that the system performance in the TAOC Mode meets the non-dedicated track Firm Track height accuracy objective level as specified in 3.2.7.14.1.3.

4.2.7.14.2 Dedicated Hostile / C2 Commanded Track Waveforms.

4.2.7.14.2.1 Range test.

The G/ATOR range requirement of 3.2.7.14.2.1 shall be verified by analysis, demonstration, and testing of system operation in the TAOC Mode in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the analysis, demonstration, and testing verify that the system performance in the TAOC Mode meets the dedicated hostile / C2 commanded track Firm Track range accuracy level as specified in 3.2.7.14.2.1.

4.2.7.15 Tracker Functionality test.
The G/ATOR tracker functionality requirement of 3.2.7.15 shall be verified by analysis, demonstration, and testing of system operation in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the analysis, demonstration, and testing verify that the system supports a resource management scheme that is capable of transitioning and maintaining track on maneuvering targets traveling to at least threshold velocity (3.2.7.11) and acceleration (3.2.7.12) values.

4.2.7.15.1 Tracker Performance test.
The G/ATOR tracker performance requirement of 3.2.7.15.1 shall be verified by analysis, demonstration, and testing of system operation in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the analysis, demonstration, and testing verify that the system maintains a Track Quality Mapping function and is capable of maintaining a Track Quality sufficient to support situational awareness, Ground Control Interception and other airspace control measures on maneuvering targets in a high clutter and / or jamming environment.

4.2.7.16 Instrumented Range and Height test.
The G/ATOR instrumented range and height requirement of 3.2.7.16 shall be verified by analysis, demonstration, and testing of system operation in an operationally representative environment at a Government approved and instrumented test range using Government approved test targets. Threshold shall be met if the analysis, demonstration, and testing verify that the system design's instrumented range or height values are greater than the threshold requirements, and therefore the transition to Firm Track for Type 0 and larger targets are reported at the greater values.

4.2.8 Electronic Protection test.
The G/ATOR Electronic Protection (EP) requirement of 3.2.8 shall be verified by analysis, demonstration, and testing of the system electronic protection features in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration, and testing verify that the system provides both automatic and operator selectable EP features via the Operator Workstations, and these EP features preserve the integrity and reliability of G/ATOR from the effects of Electronic Attack.

4.2.8.1 Electronic Protection Capabilities and Techniques test.

The G/ATOR EP capabilities and techniques requirement of 3.2.8.1 shall be verified by analysis, demonstration, and testing of the system electronic protection capabilities in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration, and testing verify that the system has all of the EP capabilities described in section 3.2.8.1.a through f, with 3.2.8.1.i and j enabled. Objective shall be met if the analysis, demonstration, and testing verify that the system has all of the EP capabilities described in section 3.2.8.1.a through h, with 3.2.8.1.i and j enabled.

4.2.8.2 Electronic Protection Performance.

4.2.8.2.1 Multiple Sidelobe Jamming Threats test.

The G/ATOR multiple sidelobe jamming threats requirement of 3.2.8.2.1 shall be verified by analysis, demonstration, and testing of the system's sidelobe cancellation capability in an operationally representative environment at a Government approved and instrumented test facility using Government approved test targets. Threshold shall be met if the analysis, demonstration, and testing verify that the system is capable of the threshold sidelobe cancellation requirements as specified in 3.2.8.2.1. Objective shall be met if the analysis, demonstration, and testing verify that the system is capable of the objective sidelobe cancellation requirements as specified in 3.2.8.2.1.

4.2.8.2.2 Mainbeam Jamming Threats test.

The G/ATOR mainbeam jamming threats requirement of 3.2.8.2.2 shall be verified by analysis of the system design for enabling a Coherent Mainbeam Cancellation (CMBC) capability. Objective shall be met if the analysis verifies that the Increment I system design enables CMBC capabilities for Increment III as specified in 3.2.8.2.2.

4.2.8.2.3 Sidelobe Jamming Threats test.

The G/ATOR sidelobe jamming threats requirement of 3.2.8.2.3 shall be verified by analysis, demonstration, and testing of the system's CSLC Capability capability in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration, and testing verify that G/ATOR's CSLC capabilities meet the threshold requirement as specified in 3.2.8.2.3. Objective shall be met if the analysis, demonstration, and testing verify that G/ATOR's CSLC capabilities meet the objective requirement as specified in 3.2.8.2.3.

4.2.8.2.4 Defeat Anti Radiation Threat (Decoys) test.

The G/ATOR defeat anti radiation threat (decoys) requirement of 3.2.8.2.4 shall be verified by analysis of the Increment I system design to enable implementation of decoys in Increment III without system redesign. Threshold shall be met if the analysis verifies that the Increment I system design has sufficient communications interface, space and weight allocations for implementation of an active decoy system during Increment III without redesign (Increment I Enabled).

4.2.8.2.5 Electronic Attack Identification test.
The G/ATOR electronic attack identification (EA ID) requirement of 3.2.8.2.5 shall be verified by analysis, demonstration, testing of the G/ATOR countermeasures capability in an operationally representative environment at a Government approved and instrumented test facility using Government approved countermeasures. Threshold shall be met if the analysis, demonstration, and testing verify that the system has an EA ID capability, which automatically selects and initiates appropriate radar countermeasures.

4.2.8.2.5.1 Electronic Attack Identification Reports test.
The G/ATOR electronic attack identification (EA ID) reports requirement of 3.2.8.2.5.1 shall be verified by analysis, demonstration, and testing of the Automatic EA ID and EP actions reporting capability in an operationally representative environment at a Government approved and instrumented test facility using Government approved countermeasures. Threshold shall be met if the analysis, demonstration, and testing verify that the system's Automatic EA ID and EP actions are reported to C2 and the Operator Workstation for situational awareness and / or manual override

4.2.8.2.5.2 Electronic Attack Identification Control test.
The G/ATOR electronic attack identification control requirement of 3.2.8.2.5.2 shall be verified by analysis, demonstration, and testing of the EA ID control capability in an operationally representative environment at a Government approved and instrumented test facility using Government approved countermeasures. Threshold shall be met if the analysis, demonstration, and testing verify that the system's EA ID functionality can be enabled and disabled via the Operator Workstation.

4.2.8.3 Performance in Jamming test.
The G/ATOR performance in jamming requirement of 3.2.8.3 shall be verified by demonstration, analysis, and testing of the system's performance in the Electronic Attack (EA) environment in an operationally representative environment at a Government approved and instrumented test facility using Government approved countermeasures. Threshold shall be met if the demonstration, analysis, and testing verify that the system operates, in the electronic attack environment, with the least amount of Firm Track Range performance degradation. Objective shall be met if the demonstration, analysis, and testing verify that the system operates, in the electronic attack environment, with no Firm Track Range performance degradation.

4.2.8.3.1 Coherent Sidelobe Cancellation and Coherent Mainbeam Cancellation Performance.

4.2.8.3.1.1 Attenuation of Jammers test.
The G/ATOR attenuation of jammers requirement of 3.2.8.3.1.1 shall be verified by analysis, demonstration, and testing of the system's CSLC and CMBC capabilities in an operationally representative environment at a Government approved and instrumented test facility using Government approved countermeasures. Threshold shall be met if the demonstration, analysis, and testing verify that the system's CSLC and CMBC capabilities meet the threshold requirements as specified in 3.2.8.3.1.1. Objective shall be met if the demonstration, analysis,

and testing verify that the system's CSLC and CMBC capabilities meet the objective requirements as specified in 3.2.8.3.1.1.

4.2.8.3.1.2 Response Time to Jammers test.
The G/ATOR response to jammers requirement of 3.2.8.3.1.2 shall be verified by analysis, demonstration, and testing of the system's capabilities in an operationally representative environment at a Government approved and instrumented test facility using Government approved countermeasures. Threshold requirements shall be met if the demonstration, analysis, and testing verify that the system's capabilities meet the Threshold requirements as specified in 3.2.8.3.1.2 in Appendix H.

4.2.8.3.1.3 Cancellation Effects on the Antenna Pattern test.
The G/ATOR cancellation effects on the antenna pattern requirement of 3.2.8.3.1.3 shall be verified by analysis, demonstration, and testing of the CSLC and CMBC system's effect on the antenna pattern in an operationally representative environment at a Government approved and instrumented test facility using Government approved countermeasures. Threshold shall be met if the demonstration, analysis, and testing verify that the CSLC and CMBC systems have minimized any negative effects on the antenna pattern(s).

4.2.8.3.1.4 Cancellation in the Blanker and Monopulse Channels test.
The G/ATOR cancellation in the blanker and monopulse channels requirement of 3.2.8.3.1.4 shall be verified by analysis, demonstration, and testing of G/ATOR's CSLC system in an operationally representative environment at a Government approved and instrumented test facility using Government approved countermeasures. Threshold shall be met if the demonstration, analysis, and testing verify that the CSLC system is applied to all channels (i.e. Sum, Azimuth, Difference, Elevation Difference, Diagonal Difference and Sidelobe Blanker(s)) as applicable.

4.2.8.4 Electromagnetic Interference (EMI) test.
The G/ATOR electromagnetic interference (EMI) requirement of 3.2.8.4 shall be verified by analysis, demonstration and testing of system operation in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration and testing verify that the system is isolated from the Electromagnetic Environment (EME) to operate with the least amount of degradation, IAW MIL-STD-464A. Objective shall be met if the analysis, demonstration and testing verify that the system is isolated from the EME to operate with no degradation, IAW MIL-STD-464A.

4.2.9 Operator Workstations test.
The G/ATOR operator workstations requirements of 3.2.9 shall be verified by analysis, demonstration, and inspection of system operation in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration and inspection verify that the operator workstations are the principle interface to G/ATOR and that the system has two functionally identical operator workstations that are capable of simultaneous operation.

4.2.9.1 Operator Workstations Remote Configuration test.
The G/ATOR operator workstations remote configuration requirements of 3.2.9.1 shall be verified by analysis, demonstration, and inspection of system operation in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration and inspection verify that the operator workstations are capable of being remoted not less than 500 ft using hardwire technology. Objective shall be met if the analysis, demonstration and inspection verify that the operator workstations are capable of being remoted not less than 500 ft using wireless technology.

4.2.9.2 Operator Workstations Mobility Mode Configuration test.
The G/ATOR operator workstations mobility mode configuration requirements of 3.2.9.2 shall be verified by analysis, demonstration, and inspection of system operation in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration and inspection verify that the operator workstations are capable of being mounted and powered inside the cab of the prime mover (either prime mover if two are required) to allow for mission / maintenance planning while in the Mobility Mode.

4.2.9.3 Operator Workstations Transport Mode Configuration test.
The G/ATOR operator workstations transport mode configuration requirements of 3.2.9.3 shall be verified by analysis, demonstration, and inspection of system operation in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration and inspection verify that the operator workstations are capable of being secured within G/ATOR while in the Transport Mode.

4.2.9.4 Operator Workstations Capabilities test.
The G/ATOR operator workstations capabilities requirement of 3.2.9.4 shall be verified by analysis, demonstration, and inspection of system operation in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration and inspection verify that the operator workstations have all of the capabilities as specified in 3.2.9.4.

4.2.9.4.1 Operator Workstation Functionality test.
The G/ATOR operator workstation functionality requirement of 3.2.9.4.1 shall be verified by analysis, demonstration, and testing of system operation in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration and testing verify that the operator workstations have all of the functionality as specified in 3.2.9.4.1.a through k. Objective shall be met if the analysis, demonstration and inspection verify that the operator workstations have all of the functionality as specified in 3.2.9.4.1.a through l.

4.2.9.5 Operator Workstation Contingency Capabilities test.
The G/ATOR operator workstation contingency capabilities requirement of 3.2.9.5 shall be verified by analysis, demonstration, and testing of system operation in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration and testing verify that the operator workstations have the capability to support limited air control functions as specified in 3.2.4.3.5.

4.2.9.6 Display test.
The G/ATOR display requirement of 3.2.9.6 shall be verified by demonstration, inspection and testing of system operation in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the demonstration, inspection and testing verify that the operator workstations have the capability to receive, display, select, and translate between and among IFF information, Imagery, NGA Geospatial data, and Radar Plots.

4.2.9.7 Symbology test.
The G/ATOR symbology requirement of 3.2.9.7 shall be verified by demonstration, inspection and testing of system operation in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the demonstration, inspection and testing verify that the operator workstations have the capability to display user selectable symbology in accordance with MIL-STD-2525B and International Civil Aviation Organization (ICAO) standards.

4.2.9.8 Data Conversion test.
The G/ATOR data conversion requirement of 3.2.9.8 shall be verified by demonstration, inspection and testing of system operation in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the demonstration, inspection and testing verify that the operator workstations provide the user the capability to select any single or group of Plot data, automatically convert and display between and among differing measurement systems.

4.2.9.9 Units of Measure test.
The G/ATOR units of measure requirement of 3.2.9.9 shall be verified by demonstration, inspection and testing of system operation in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the demonstration, inspection and testing verify that the operator workstations provide the user the capability to select either English or International units of measure including the Ground Mode defined mil (e.g. 6400 mils equal 360 degrees).

4.2.9.10 Coordinate System test.
The G/ATOR coordinate system requirement of 3.2.9.10 shall be verified by demonstration, inspection and testing of system operation in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the demonstration, inspection and testing verify that the operator workstations primarily display all

data to Earth Centered Earth Fixed (ECEF) coordinate system based on the WGS-84 standard or follow on, and are capable of displaying operator selectable and user defined datums.

4.3 Maintenance and Training Modes.

4.3.1 Levels of Failure and Alert test.

The G/ATOR levels of failure and alert requirements of 3.3.1 shall be verified by demonstration and testing of system operation in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the demonstration and testing verify that the system can classify the severity level of failures and alerts as specified in 3.3.1.a through e.

4.3.2 Condition Based Maintenance test.

The G/ATOR CBM requirements of 3.3.2 shall be verified by demonstration and testing of system operation in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the demonstration and testing verify that the system incorporates CBM for monitoring, measuring and prognostics on system(s), subsystem(s) and LRU(s) including the radar array structure and pallet, but excluding GP items.

4.3.2.1 Condition Based Maintenance On-line Monitoring test.

The G/ATOR CBM on-line monitoring requirements of 3.3.2.1 shall be verified by demonstration and testing of system operation in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the demonstration and testing verify that the system's implementation of CBM on-line monitoring (prognostic / diagnostic built-in-test equipment and routines) is used during Radar Modes of Operation, operates in a non-interference manner so as not to prevent the radar from performing its primary function, and provides information to the operator / maintainer either on request or as changes occur.

4.3.2.1.1 Condition Based Maintenance On-line Monitoring Performance test.

The G/ATOR CBM on-line monitoring performance requirements of 3.3.2.1.1 shall be verified by analysis, demonstration and testing of system operation in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration and testing verify that the system's implementation of CBM on-line monitoring allows the operator / maintainer to identify 100% of Level I and II failures and 95% of Level III failures without the use of separate test equipment (see TM-10510-14/1).

4.3.2.1.2 Condition Based Maintenance On-line Monitoring False Alarm Rate test.

The G/ATOR CBM on-line monitoring false alarm rate requirements of 3.3.2.1.2 shall be verified by analysis, demonstration and testing of system operation in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration and testing verify that the system's implementation of CBM on-line monitoring has a false alarm rate not greater than 5% of the identified failures (3.3.2.1.1).

4.3.2.2 Condition Based Maintenance Off-line Dedicated Troubleshooting test.
The G/ATOR CBM off-line dedicated troubleshooting requirements of 3.3.2.2 shall be verified by demonstration and testing of system operation in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the demonstration and testing verify that the system provides an off-line dedicated troubleshooting and failure isolation capability to the LRU level.

4.3.2.2.1 Condition Based Maintenance Off-line Dedicated Troubleshooting Performance test.
The G/ATOR CBM off-line dedicated troubleshooting performance requirements of 3.3.2.2.1 shall be verified by analysis, demonstration and testing of system operation in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration and testing verify that the system CBM off-line dedicated troubleshooting isolates 95% of Level I-IV failures to a single LRU. Objective shall be met if the analysis, demonstration and testing verify that the system CBM off-line dedicated troubleshooting isolates 99% of Level I-IV failures to a single LRU.

4.3.2.2.2 Condition Based Maintenance Off-line Dedicated Troubleshooting False Alarm Rate test.
The G/ATOR CBM off-line dedicated troubleshooting false alarm rate requirements of 3.3.2.2.2 shall be verified by analysis, demonstration and testing of system operation in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration and testing verify that the system CBM off-line dedicated troubleshooting has a false alarm rate not greater than 5% of the isolated failures (3.3.2.2.1)

4.3.2.3 Trend Analysis test.
The G/ATOR trend analysis requirements of 3.3.2.3 shall be verified by analysis, demonstration and testing of system operation in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration and testing verify that the system performs trend analysis that detects, localizes and reports (Level V Alerts), at the earliest possible time, the degradation of system(s), subsystem(s) and LRU(s).

4.3.2.4 Failure and Alert Reporting test.
The G/ATOR failure and alert reporting requirements of 3.3.2.4 shall be verified by analysis, demonstration and testing of system operation in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration and testing verify that the system reports failures or alerts to the operator / maintainer at the Operator Workstations, inhibits failure messages from those areas that have been disabled (operator selectable), but displays the current operational state of system(s) and subsystem(s).

4.3.2.5 Interfacing with Interactive Electronic Technical Manuals (IETM) test.

The G/ATOR interfacing with IETMs requirements of 3.3.2.5 shall be verified by analysis, demonstration and testing of system operation in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration and testing verify that the system implementation of CBM has an interface with IETM Level III. Objective shall be met if the analysis, demonstration and testing verify that the system implementation of CBM has an interface with IETM Level IV or better.

4.3.3 Antenna Auto-Calibration test.

The G/ATOR antenna auto-calibration requirements of 3.3.3 shall be verified by analysis, demonstration and testing of system operation in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration and testing verify that the system provides an antenna auto-calibration capability that maintains the array's performance and accuracy to threshold performance levels, and the antenna auto-calibration data is made available to CBM for trend analysis and reporting.

4.3.4 Antenna Auto-Compensation test.

The G/ATOR antenna auto-compensation requirement of 3.3.4 shall be verified by analysis, demonstration and testing of system operation in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration and testing verify that the system provides an antenna auto-compensation feature to correct antenna pattern errors due to element failures.

4.3.5 Performance Data Collection and Extraction test.

The G/ATOR performance data collection and extraction requirement of 3.3.5 shall be verified by analysis, demonstration and testing of system operation in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration and testing verify that the system provides a data extraction library consisting of operator and maintenance data subsets, that operate in a non interference manner and do not prevent the radar from performing its primary function. Objective shall be met if the analysis, demonstration and testing verify that the system provides a data extraction library consisting of operator, maintenance and engineering data subsets, that operate in a non interference manner and do not prevent the radar from performing its primary function.

4.3.5.1 Operator Data Subset test.

The G/ATOR operator data subset requirement of 3.3.5.1 shall be verified by analysis, demonstration and testing of system operation in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration and testing verify that the system operator data subset provides operational information necessary to recreate three deployments each of eight hours in duration including, but not limited to, radar reports, radar edits, weather information, clutter information, IFF Modes, Operator Interactions, and C2 commands.

4.3.5.2 Maintenance Data Subset test.
The G/ATOR maintenance data subset requirement of 3.3.5.2 shall be verified by analysis, demonstration and testing of system operation in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration and testing verify that the system maintenance data subset provides CBM failure detection and reporting, and system initialization and configuration parameters, with a safe data storage margin that provides storage for a minimum 30 days.

4.3.5.3 Engineering Data Subset.
The G/ATOR engineering data subset requirement of 3.3.5.3 shall be verified by analysis, demonstration and testing of system operation in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration and testing verify that the system provides engineering data points to capture data of interest, to include In-phase & Quadrature (I&Q) data, in an engineering data subset, with a safe data storage margin that provides storage for a minimum 30 minutes.

4.3.6 Preventive Maintenance.

4.3.6.1 Individual PM Task test.
The G/ATOR individual PM task requirement of 3.3.6.1 shall be verified by demonstration and testing of system operation in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the demonstration and testing verify that the allocated time to perform PM on G/ATOR does not exceed 15 minutes per task and does not prevent the rapid execution of a mission order. Objective shall be met if the demonstration and testing verify that the allocated time to perform PM on G/ATOR does not exceed five minutes per task and does not prevent the rapid execution of a mission order.

4.3.6.2 Cumulative PM test.
The G/ATOR cumulative PM requirement of 3.3.6.2 shall be verified by demonstration and testing of system operation in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the demonstration and testing verify that the cumulative time to perform PM on G/ATOR does not exceed four hours per month. Objective shall be met if the demonstration and testing verify that the cumulative time to perform PM on G/ATOR does not exceed two hours per month.

4.3.7 Corrective Maintenance test.
The G/ATOR corrective maintenance (CM) requirement of 3.3.7 shall be verified by analysis of the system design for corrective maintenance. Threshold shall be met if the analysis verifies that the system CM can be performed at organizational, intermediate and depot levels, with CM as specified in 3.3.7.

4.3.7.1 Mean Time To Repair test.
The G/ATOR mean time to repair (MTTR) requirement of 3.3.7.1 shall be verified by analysis and demonstration of the system design for corrective maintenance. Threshold shall be met if

the analysis and demonstration verify that the system MTTR, as defined and noted in 3.3.7.1, of Level I, II, III and IV failures is not greater than 30 minutes. Objective shall be met if the analysis and demonstration verify that the system MTTR, as defined and noted in 3.3.7.1, of Level I, II, III and IV failures is not greater than 15 minutes.

4.3.7.2 Maximum Time To Repair test.
The G/ATOR maximum time to repair (MaxTTR) requirement of 3.3.7.2 shall be verified by analysis and demonstration of the system design for corrective maintenance. Threshold shall be met if the analysis and demonstration verify that the system MaxTTR, as specified and noted in 3.3.7.2, of Level I, II, III and IV failures is not greater than 60 minutes at the 90th percentile.

4.3.7.3 Minimum Down Time test.
The G/ATOR minimum down time requirement of 3.3.7.3 shall be verified by analysis and demonstration of the system design for corrective maintenance. Objective shall be met if the analysis and demonstration verify that the system LRUs are capable of being replaced while the G/ATOR remains in operation.

4.3.7.4 Tools test.
The G/ATOR tools requirement of 3.3.7.4 shall be verified by demonstration and inspection of the system design. Threshold shall be met if the demonstration and inspection verify that the system is designed to use American Standard hardware and tools.

4.3.8 Refurbishment test.
The G/ATOR refurbishment requirement of 3.3.8 shall be verified by analysis of the system design. Threshold shall be met if the analysis verifies that the system is designed for a 30 year service life with COTS, GOTS and NDI refreshed at 5 year intervals, and system refurbishment at 15 year intervals.

4.3.9 Availability.

4.3.9.1 Operational Availability test.
The G/ATOR Operational Availability (Ao) requirement of 3.3.9.1 shall be verified by analysis of the system design. Threshold shall be met if the analysis verifies that the system has an Ao of 0.90, as defined in 3.3.9.1. Objective shall be met if the analysis verifies that the system has an Ao of 0.95, as defined in 3.3.9.1.

4.3.9.2 Inherent Availability test.
The G/ATOR Inherent Availability (Ai) requirement of 3.3.9.2 shall be verified by analysis of the system design. Threshold shall be met if the analysis verifies that the system has an Ai as derived from the threshold MTBOMF and MTTR.. Objective shall be met if the analysis verifies that the system has an Ai derived from the objective MTBOMF and / or MTTR .

4.3.10 Reliability.

4.3.10.1 Mean Time Between Operational Mission Failure test.
The G/ATOR mean time between operational mission failure (MTBOMF) requirements of 3.3.10.1 shall be verified by analysis and testing of the system design in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis and testing verifies that the system has an MTBOMF of not less than 500 hours, as defined in 3.3.10.1. Objective shall be met if the analysis and testing verifies that the system has an MTBOMF of not less than 720 hours, as defined in 3.3.10.1.

4.3.10.2 Mean Time Between Failures (MTBF) test.
The G/ATOR mean time between failures (MTBF) requirements of 3.3.10.2 shall be verified by analysis and testing of the system design in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis and testing verifies that the system has an MTBF of not less than 125 hours, as measured in transmitter operate time and defined in 3.3.10.2. Objective shall be met if the analysis and testing verifies that the system has an MTBF of not less than 250 hours, as measured in transmitter operate time and defined in 3.3.10.2.

4.3.10.3 Redundancy test.
The G/ATOR redundancy requirements of 3.3.10.3 shall be verified by analysis and inspection of the system design. Threshold shall be met if the analysis and inspection verifies that the system design minimizes the number of single point of failure components.

4.3.10.4 Overbuild test.
The G/ATOR overbuild requirements of 3.3.10.4 shall be verified by analysis, demonstration and testing of the system design in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration and testing verifies that the system is designed with overbuild to allow graceful degradation of system performance while maintaining threshold performance levels.

4.3.10.5 Wear Out Life test.
The G/ATOR wear out life requirements of 3.3.10.5 shall be verified by analysis of the system design. Threshold shall be met if the analysis verifies that the system electromechanical, hydraulic or mechanical items have an operating life of not less than 26280 hours. Objective shall be met if the analysis verifies that the system electromechanical, hydraulic or mechanical items have an operating life of not less than 43800 hours.

4.3.11 Training Mode.

4.3.11.1 Operator Training test.
The G/ATOR operator training requirements of 3.3.11.1 shall be verified by demonstration and testing of the system design in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the demonstration and testing verify that the system provides simulated radar tracks for local (Operator Workstation) and

remote (C2) presentation via the Embedded Simulation Capability (ESC) and / or Radar Environmental Simulator (RES).

4.3.11.1.1 Embedded Simulation Capability test.
The G/ATOR embedded simulation capability requirements of 3.3.11.1.1 shall be verified by demonstration and testing of the system design in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the demonstration and testing verify that the system ESC digitally depicts real world radar target scenarios that include Type 0, 1, & 2 Air Breathing Targets (ABTs) and Cruise Missiles (CMs) and Electronic Attack, clutter, and weather environments, and provides scenarios that contain an operator selectable target load up to the G/ATOR's maximum target load capacity.

4.3.11.1.1.1 Embedded Simulation Capability Operator Control test.
The G/ATOR embedded simulation capability operator control requirements of 3.3.11.1.1.1 shall be verified by demonstration and testing of the system design in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the demonstration and testing verify that the system ESC supports the operator / maintainer's ability to select, generate, modify, develop, record and store target sets, environments and scenarios via the Operator Workstation, supports operator selectable playback of generated scenarios in either "Simulation Only" or in "Simulation over Live" events, and marks simulated tracks as simulated.

4.3.11.1.2 Radar Environmental Simulator test.
The G/ATOR radar environmental simulator (RES) requirements of 3.3.11.1.2 shall be verified by demonstration and testing of the system design in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the demonstration and testing verify that the system RES is capable of injecting 20 or more IF test targets into the G/ATOR receive path that have the same quality and fidelity as actual Type 0, 1, and 2 Air Breathing Targets (ABTs) and Cruise Missiles (CMs).

4.3.11.1.2.1 Radar Environmental Simulator Operator Control test.
The G/ATOR radar environmental simulator (RES) operator control requirements of 3.3.11.1.2.1 shall be verified by demonstration and testing of the system design in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the demonstration and testing verify that the system RES supports the operator / maintainer's ability to select, modify (flight path) and store target sets, environments and scenarios via the Operator Workstations, supports operator selectable playback of generated scenarios in either "Simulation Only" or in "Simulation over Live" events, and marks simulated tracks as simulated.

4.3.11.2 Maintenance Training test.
The G/ATOR maintenance training requirements of 3.3.11.2 shall be verified by demonstration and testing of the system design in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the demonstration and testing

verify that the system can simulate and / or insert a minimum of 10 software and 10 hardware generated CBM reportable faults per subsystem and the fault control program resides on the Operator Workstations.

4.4 Prime Power and System Cooling.

4.4.1 Prime Power Protection and Conditioning test.

The G/ATOR prime power protection and conditioning requirement of section 3.4.1 shall be verified by analysis, demonstration, and testing of the system's prime power protection and conditioning subsystems in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration and testing verifies that the system's prime power protection and conditioning subsystems provide over/under +/- 5 percent voltage protection and over/under +/- 10 percent frequency protection capable of automatically protecting the equipment and personnel, and the protection circuits have an override capability.

4.4.1.1 Unique Components test.

The G/ATOR unique components requirement of section 3.4.1.1 shall be verified by analysis and demonstration of the system operation in an operationally representative environment at a Government approved test facility. Threshold shall be met if the analysis and demonstration verify that the system's unique power conditioning requirements are built into the G/ATOR.

4.4.1.2 Phase Indicators test.

The G/ATOR phase indicators requirement of section 3.4.1.2 shall be verified by analysis, demonstration, and testing of the system's phase indicators in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration, and testing verify that the system provides phase indicators to monitor the prime power phases.

4.4.1.3 Frequency Indicators test.

The G/ATOR frequency indicators requirement of section 3.4.1.3 shall be verified by analysis, demonstration, and testing of the system's frequency indicators in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration, and testing verify that the system provides frequency indicators to monitor the frequency of the three phase prime power.

4.4.1.4 AC Voltmeters test.

The G/ATOR AC voltmeters requirement of section 3.4.1.4 shall be verified by analysis, demonstration, and testing of the system's AC voltmeters in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration, and testing verify that the system provides AC voltmeters to monitor the input AC voltages.

4.4.1.5 DC Voltmeters test.
The G/ATOR DC voltmeters requirement of section 3.4.1.5 shall be verified by analysis, demonstration, and testing of the system's DC voltmeters in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration, and testing verify that the system provides DC voltmeters to monitor all low voltage power supplies.

4.4.1.6 Elapsed Time Meter test.
The G/ATOR elapsed time meter requirement of section 3.4.1.6 shall be verified by analysis, demonstration, and testing of the system's elapsed time meter in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration and testing verify that the system provides an elapsed time meter(s) to monitor system operating hours for each critical subsystem or area, Radar System Power Applied Time (AC input), and Transmitter Operate Time.

4.4.1.7 Uninterruptible Power Supplies test.
The G/ATOR uninterruptible power supplies (UPS) requirement of section 3.4.1.7 shall be verified by analysis, demonstration, and testing of the system's UPS in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration, and testing verify that the system provides UPS for key volatile circuitry.

4.4.1.8 Keep Alive Power test.
The G/ATOR keep alive circuitry requirement of section 3.4.1.8 shall be verified by analysis, demonstration, and testing of the system's "keep alive power" in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration, and testing verify that the system provides operator selectable "keep alive power" to key volatile circuitry via the prime mover, UPS, and / or other means to support rapid radar redeployment and reconfiguration.

4.4.1.9 Power Handling test.
The G/ATOR power handling requirement of section 3.4.1.9 shall be verified by analysis of the system design for power handling growth capacity. Threshold shall be met if the analysis verifies that the system's power conditioning and protection circuits, cables, and harnesses can handle a 50% increase in operating current.

4.4.2 Prime Power test.
The G/ATOR prime power requirement of section 3.4.2 shall be verified by analysis, demonstration, and testing of the system prime power source in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration, and testing verify that G/ATOR operates with 60 Hz (+/- 2), 4-wire, 3-phase, 120/208 volts input power of sufficient wattage to support full operation under sector blanking conditions within the temperature and altitude operating environments

4.4.2.1 Prime Power Source test.
The G/ATOR prime power source requirement of section 3.4.2.1 shall be verified by demonstration and inspection of the system prime power source in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the demonstration and inspection verify that the G/ATOR prime power source is consistent with the electrical performance characteristics of the MEP-806A Generator Set, sustainable using standard Marine Corps infrastructure, and meets the requirements as specified in 3.4.2.1.

4.4.2.1.1 Fuel Consumption Rate test.
The G/ATOR fuel consumption rate requirements of section 3.4.2.1.1 shall be verified by analysis, demonstration, and testing of the system power source fuel consumption rate in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration, and testing verify that the system power source solution does not consume more than 10 gallons of fuel per hour. Objective shall be met if the analysis, demonstration, and testing verify that the system power source solution does not consume more than 5 gallons of fuel per hour.

4.4.2.2 Parallel Operation test.
The G/ATOR parallel operation requirements of section 3.4.2.2 shall be verified by analysis, demonstration, and testing of the system power source parallel operation in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration, and testing verify that the system power source provides sufficient connector points, cabling, isolation breakers, and protection circuits to allow for the change out of generators without de-energizing the G/ATOR; parallel operations are performed with and without the prime mover(s); and the prime power source supports parallel operations with a like source and with the 60 KW Family of Tactical Generators (MEP 806A) and other suitable generators.

4.4.2.3 Backwards Compatible test.
The G/ATOR backwards compatible requirement of section 3.4.2.3 shall be verified by analysis and demonstration of the system capability to operate with the 60 KW Family of Tactical Quiet Generator Sets (MEP 806A) and other suitable generators in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis and demonstration verify that the system is capable of operating with the 60 KW Family of Tactical Quiet Generator Sets (MEP 806A) and other suitable generators without degradation of system performance.

4.4.2.4 Shore Power test.
The G/ATOR shore power requirement of section 3.4.2.4 shall be verified by analysis, demonstration, and testing of the system's capability to operate with 60 Hz (+/- 2), 4-wire, 3-phase, 120/208 volts commercial shore power in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration, and testing verify that the system is capable of operating with 60 Hz (+/- 2), 4-

wire, 3-phase, 120/208 volts commercial shore power without degradation of system performance.

4.4.3 System Cooling test.
The G/ATOR system cooling requirement of section 3.4.3 shall be verified by analysis and testing of the system's cooling capability in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis and testing verify that the G/ATOR individual cooling system(s), as defined and noted in 3.4.3, provide at least a 10% cooling margin as compared against the maximum cooling requirements, as defined in 3.4.3.

4.4.3.1 Cooling System Monitoring test.
The G/ATOR cooling system monitoring requirement of section 3.4.3.1 shall be verified by analysis, demonstration, and testing of the system's cooling system monitoring capability in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration, and testing verify that the G/ATOR provides temperature monitoring and reporting capabilities.

4.4.3.2 Shutdown Circuitry test.
The G/ATOR cooling system shutdown requirement of 3.4.3.2 shall be verified by analysis, demonstration, and testing of the system's temperature shutdown capability in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration, and testing verify that the G/ATOR provides automatic over temperature shutdown circuitry with an operator enabled override capability.

4.5 Interoperability test.
The G/ATOR interoperability requirement of 3.5 shall be verified by analysis and demonstration system connectivity in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis and demonstration verify that all of the system's connectivity is via USMC C2 systems.

4.5.1 KPPs.

4.5.1.1 Information Exchange Requirements (IERs) test.
The G/ATOR information exchange requirement of 3.5.1.1 shall be verified by analysis, demonstration, and testing of the system interfaces in an operationally representative environment at a Government approved and instrumented test facility. Threshold (KPP) shall be met if the analysis, demonstration, and testing verify that the system interfaces achieve compliance with 100% of the critical Information Exchange Requirements (IERs). Objective shall be met if the analysis, demonstration, and testing verify that the system interfaces achieve compliance with all IERs.

4.5.1.2 JROC/JCS Approved/Validated Integrated Architecture Behavior Model (IABM) test.

The G/ATOR JROC/JS approved/validated IABM requirement of 3.5.1.2 shall be verified by analysis of the system Increment I design for growth to IABM in Increment III. Threshold (KPP) shall be met if the analysis verifies that the system Increment I design enables IABM implementation in Increment III without system redesign.

4.5.1.3 Global Information Grid (GIG) test.

The G/ATOR Global Information Grid (GIG) requirement of 3.5.1.3 shall be verified by analysis, demonstration, and testing of the system interoperability with current C2 and sensor network information systems/sources and those developed in the future for US national, allied, joint, and multinational (coalition) forces and agencies in an operationally representative environment at a Government approved and instrumented test facility. Threshold (KPP) shall be met if the analysis, demonstration, and testing verify that the system interoperability with current C2 and sensor network information systems/sources supports the GIG requirements and has the potential to support those developed in the future for US National, Allied, Joint, and Coalition (multinational) forces and agencies; and G/ATOR meets GIG requirements by adhering to Key Interface Profiles (KIPs) and using Government-Off-the-Shelf cables and radios for Increment I data links as noted in 3.5.1.3.

4.5.2 Department of Defense (DoD) Information Technology Standards Registry (DISR) test.

The G/ATOR Department of Defense (DoD) Information Technology (IT) Standards Registry (DISR) requirement of 3.5.2 shall be verified by analysis of the system design for compliance with DISR Baseline Release 05-2.0. Threshold shall be met if the analysis verifies that the system design is compliant with the DISR Baseline Release 05-2.0, as noted in section 3.5.2.

4.5.3 Internet Protocol test.

The G/ATOR internet protocol (IP) requirement of 3.5.3 shall be verified by analysis, demonstration and testing of the system IP interfaces for compliance with mandated IP standards in an operationally representative environment at a Government approved test facility. Threshold shall be met if the analysis, demonstration, and testing verify that the system IP interfaces are compliant with IPv6 and interoperable with IPv4 legacy systems in accordance with DoD CIO Memorandum “Internet Protocol Version 6 (IPv6), June 9, 2003.”

4.5.4 Semantic Tagging test.

The G/ATOR semantic tagging requirement of 3.5.4 shall be verified by analysis and testing of the system data that is exchanged and the system data that has the potential to be exchanged. Testing shall be conducted in an operationally representative environment. Threshold shall be met if the analysis and testing verify that the data that is exchanged and the data that has the potential to be exchanged is tagged IAW DISR Baseline Release 05-2.0 and registered IAW DOD XML Registry and Clearinghouse Policy and Implementation Plan.

4.5.5 Information Integrity test.
The G/ATOR information integrity requirement of 3.5.5 shall be verified by analysis and testing of the system information integrity in an operationally representative environment at a Government approved test facility. Threshold shall be met if the analysis and testing verify that the system guarantees and maintains the integrity of all information elements to 99.99%. Objective shall be met if the analysis and testing verify that the system guarantees and maintains the integrity of all information elements to 99.999%.

4.5.6 Providing Network Management Status test.
The G/ATOR providing network management status requirement of 3.5.6 shall be verified by analysis and testing of the system's information transmission hardware network management status capability in an operationally representative environment at a Government approved test facility. Threshold shall be met if the analysis and testing verify that the system's information transmission hardware provide status changes to Network Management (NM) devices by means of automated capability in near real time 99% of the time. Objective shall be met if the analysis and testing verify that the system's information transmission hardware provide status changes to Network Management (NM) devices by means of automated capability in near real time 99.9% of the time.

4.5.7 Obtaining Network Management Status test.
The G/ATOR obtaining network management status requirement of 3.5.7 shall be verified by analysis and testing of the system's network management capability to obtain status of networks and associated assets in an operationally representative environment at a Government approved test facility. Threshold shall be met if the analysis and testing verify that the system's Network Management capability can obtain the status of networks and associated assets in near real time 99% of the time. Objective shall be met if the analysis and testing verify that the system's Network Management capability can obtain the status of networks and associated assets in near real time 99.9% of the time.

4.5.8 Interfaces test.
The G/ATOR interfaces requirement of 3.5.8 shall be verified by analysis and testing of the system's interoperability with the existing and planned USMC Command and Control (C2) and Air Defense Systems and their data links as depicted in Table 1 of 3.5.8. Threshold shall be met if the analysis and testing verify that the system interfaces are interoperable with the existing and planned USMC Command and Control (C2) and Air Defense Systems and their data links as depicted in Table 1 of 3.5.8.

4.5.8.1 Communication to C2 test.
The G/ATOR communication to C2 requirement of 3.5.8.1 shall be verified by analysis, demonstration, and testing of the system's information exchange systems and subsystems in an operationally representative environment at a Government approved test facility. Threshold shall be met if the analysis, demonstration, and testing verify that the system communicates with C2 via one EPLRS, and C2 interfaces are established via a high-capacity digital cable or an RF connection depending on the battlefield conditions. Objective shall be met if the analysis,

demonstration, and testing verify that the system communicates with C2 via one EPLRS and provides one additional EPLRS to be used as backup, and C2 interfaces are established via a high-capacity digital cable or an RF connection depending on the battlefield conditions.

4.5.8.1.1 Emission Control (EMCON) test.

The G/ATOR EMCON requirements of 3.5.8.1.1 shall be verified by demonstration and testing of system operation in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the demonstration and testing verify that G/ATOR achieves EMCON within 2 seconds when commanded from Command and Control (C2).

4.5.8.2 Communication to CTN/CEC test.

The G/ATOR communication to CTN/CEC requirement of 3.5.8.2 shall be verified by analysis, demonstration, and testing of the system's information exchange systems and subsystems in an operationally representative environment at a Government approved test facility. Threshold shall be met if the analysis, demonstration, and testing verify that the system's information exchange systems are interoperable with CTN via a cable connection.

4.5.8.3 Voice Communication (Command Net or Convoy Operation) test.

The G/ATOR voice communication (Command Net or Convoy Operation) requirement of 3.5.8.3 shall be verified by demonstration and testing of the G/ATOR information exchange systems and subsystems in an operationally representative environment at a Government approved test facility. Threshold shall be met if the demonstration and testing verify that the G/ATOR information exchange systems provide two voice circuits (SINCGARS or equivalent).

4.5.8.4 Intra Radar Team Communication test.

The G/ATOR intra radar team communication requirement of 3.5.8.4 shall be verified by demonstration and testing of the G/ATOR information exchange systems and subsystems in an operationally representative environment at a Government approved test facility. Threshold shall be met if the demonstration and testing verify that the G/ATOR information exchange systems support intra radar team communication via an Intra Squad Communication Set (or its equivalent).

4.5.8.5 Remote Communications test.

The G/ATOR remote communication requirement of 3.5.8.5 shall be verified by demonstration and testing of the system remote communication capability in an operationally representative environment at a Government approved test facility. Threshold shall be met if the demonstration and testing verify that all of the system's voice and intra radar team communications are capable of being remoted to the Operator Workstation, and the radar operator / maintainer (at the Operator Workstation) is capable of communicating with either C2 or the radar team via the Intra Squad Communication Set headset.

4.6 Operational Environments.

4.6.1 Operating Temperature test.

The G/ATOR operating temperature requirement of 3.6.1 shall be verified by analysis, demonstration and testing of the system's operation in low and high temperature conditions in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration and testing verify that the system has the capability to be operated, transported and stored in the low and high threshold ambient temperatures specified in section 3.6.1 (Table 2). Objective shall be met if the analysis, demonstration and testing verify that the system has the capability to be operated, transported and stored in the low and high objective ambient temperatures specified in section 3.6.1.

4.6.2 Solar Radiation test.

The G/ATOR solar radiation requirement of 3.6.2 shall be verified by analysis, demonstration and testing of the system's operation under solar radiation conditions in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration and testing verify that the system has the capability to be operated, transported and stored under solar radiation where the radiated solar energy at the radar exterior surfaces is 1120 W/m^2 without degradation of the system threshold performance levels.

4.6.3 Altitude/Atmospheric Pressure test.

The G/ATOR altitude/atmospheric pressure requirement of 3.6.3 shall be verified by analysis, demonstration and testing of the system's operation in a range of altitude and atmospheric pressure conditions in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration and testing verify that the system has the capability to be operated, transported and stored in the low and high threshold altitudes as specified in section 3.6.3 (Table 3) while maintaining all equipment seals for the specified conditions. Objective shall be met if the analysis, demonstration and testing verify that the system has the capability to be operated, transported and stored in the low and high objective altitudes as specified in section 3.6.3 while maintaining all equipment seals for the specified conditions.

4.6.4 Airborne Particulates (Sand and Dust) test.

The G/ATOR airborne particulates (sand and dust) requirement of 3.6.4 shall be verified by demonstration and testing of the system's capability to be stored and operated in wind and blowing sand and dust conditions in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the demonstration and testing verify that the system has the capability to be transported and stored in wind and blowing sand and dust environments as specified in section 3.6.4. Objective shall be met if the demonstration and testing verify that the system has the capability to be operated, transported, and stored in wind and blowing sand and dust environments as specified in section 3.6.4.

4.6.5 Humidity test.
The G/ATOR humidity requirement of 3.6.5 shall be verified by demonstration and testing of the system's operation in humid conditions in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the demonstration and testing verify that the system has the capability to be operated, transported and stored in humidity ranging from 0 to 100%.

4.6.6 Rain Intrusion test.
The G/ATOR rain intrusion requirement of 3.6.6 shall be verified by demonstration and testing of the system's operation in rainy conditions in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the demonstration and testing verify that the system has the capability to be operated, transported and stored in the threshold rainfall rates specified in section 3.6.6 and, during Mobility and Transport modes, has transit containers that are watertight and prevent intrusion under conditions of heavy rain and temporary immersion for 5 minutes in fresh or salt water without degradation of system performance. Objective shall be met if the demonstration and testing verify that the system has the capability to be operated, transported and stored in the objective rainfall rates specified in 3.6.6 (Table 4).

4.6.7 Wind Loading test.
The G/ATOR wind loading requirement of 3.6.7 shall be verified by analysis, demonstration, and testing of the system's operation in windy conditions in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration, and testing verify that the system has the capability to be operated, transported and survive in the threshold wind speeds and threshold operational conditions specified in 3.6.7 without becoming unsafe or inoperative due to fatigue or failure. Objective shall be met if the analysis, demonstration and testing verify that the system has the capability to be operated, transported and survive in the objective wind speeds and objective operational conditions specified in 3.6.7 (Table 5) without becoming unsafe or inoperative due to fatigue or failure.

4.6.8 Salt Fog test.
The G/ATOR salt fog requirement of 3.6.8 shall be verified by analysis and testing in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if analysis and testing verify that the system is capable of being stored, transported and operated in a 5% salt laden air and spray atmosphere (normally encountered in amphibious operations) for up to 120 days without suffering corrosion damage that would render the radar inoperable when prescribed maintenance procedures are followed.

4.6.9 Electromagnetic Environment (EME) / Electromagnetic Compatibility (EMC) test.
The G/ATOR electromagnetic environment (EME) / Electromagnetic Compatibility (EMC) requirement of 3.6.9 shall be verified by analysis and testing of the system's signal purity, cabinet shielding, and operation within the EME as specified in 3.6.9 at a Government approved and instrumented test facility. Threshold shall be met if the analysis and testing verify that the

system has sufficient signal purity and cabinet shielding to operate within the EME without causing electromagnetic interference and spurious radiation as specified in 3.6.9.

4.6.9.1 Mutually Compatible test.
The G/ATOR mutually compatible requirement of 3.6.9.1 shall be verified by demonstration and testing of system operation in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the demonstration and testing verify that the system is mutually compatible and capable of concurrent operation with CAC2S/TAOM and other systems in the intended operational environment (including allied and coalition systems) without electromagnetic interference, IAW MIL-STD-469B.

4.6.10 Survivability.

4.6.10.1 Survivability Electromagnetic Pulse (EMP) and High-altitude Electromagnetic Pulse (HEMP) test.
The G/ATOR survivability EMP / HEMP requirement of 3.6.10.1 shall be verified by analysis of the system design. Threshold shall be met if the analysis verifies that the system is designed to survive, but not required to operate through, the effects of EMP and HEMP with no degradation in performance and the design for HEMP protection is in accordance with MIL-STD-188-125-2.

4.6.10.2 Operation in a NBC Environment test.
The G/ATOR operation in a NBC requirement of 3.6.10.2 shall be verified by analysis and demonstration of the system design in an operationally representative environment at a Government approved test facility. Threshold shall be met if the analysis and demonstration verify that the system is capable of being operated and maintained effectively by operators, to include performing all mission critical functions, while wearing Mission Oriented Protective Posture (MOPP) IV attire, in a biological or chemical environment (that environment external to the G/ATOR).

4.6.10.2.1 Exterior Chemical Agent Resistant Coating test.

The GATOR exterior chemical agent resistant coating requirement of 3.6.10.2.1 shall be verified by analysis and inspection of the system design. Threshold shall be met if the analysis and inspection verify that the system exterior surface meets the requirements specified in 3.6.10.2.1.

4.6.10.2.2 NBC Decontamination test.
The G/ATOR NBC decontamination requirement of 3.6.10.2.2 shall be verified by analysis, demonstration and testing of the system in an operationally representative environment at a Government approved test facility. Threshold shall be met if the analysis, demonstration and testing verify that the system's exterior surfaces are capable of decontamination (as specified in 3.6.10.2.2) using non-corrosive decontaminates with no degradation in system performance. Objective shall be met if the analysis, demonstration and testing verify that the system's exterior surfaces are capable of decontamination (as specified in section 3.6.10.2.2) using corrosive decontaminates with no degradation in system performance.

4.6.10.3 Infra-Red (IR) Signature Reduction test.
The G/ATOR infra-red (IR) signature reduction requirement of 3.6.10.3 shall be verified by analysis and testing of the system design in an operationally representative environment at a Government approved and instrumented test facility. Objective shall be met if the analysis and testing verify that the system design reduces the IR signature of the system and each individual subsystem as described in 3.6.10.3.

4.6.10.3.1 RCS Reduction test.
The G/ATOR RCS reduction requirement of 3.6.10.3.1 shall be verified by analysis and testing of the system design in an operationally representative environment at a Government approved and instrumented test facility. Objective shall be met if the analysis and testing verify that the system design uses radar absorbent or reflecting materials to change the radar echoing properties as described in 3.6.10.3.1.

4.6.10.3.2 Laser Signature Reduction test.
The G/ATOR Laser signature reduction requirement of 3.6.10.3.2 shall be verified by analysis and testing of system design in an operationally representative environment at a Government approved and instrumented test facility. Objective shall be met if the analysis and testing verify that the system design includes employment of materials, electronics, and platform design features intended to reduce the susceptibility of the platform to adversary laser sensors as described in 3.6.10.3.2.

4.6.11 Safety test.
The G/ATOR safety requirement of 3.6.11 shall be verified by analysis, demonstration and inspection of the system design for safety in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration and inspection verify that the system safety equipment and/or safety procedures have been identified and provided, and the design considers human factors IAW MIL-STD-1472F. HERF/HERO/HERP shall be determined IAW MIL-HDBK-237C per 3.6.11.

4.6.11.1 Electrical Safety test.
The G/ATOR electrical safety requirement of 3.6.11.1 shall be verified by analysis and inspection of the system design for safety in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis and inspection verify that the G/ATOR protects personnel from injury, and equipment from damage, due to stray voltages, electrical discharges and other risks, in accordance with EIA 625 and MIL-STD-1686C.

4.6.11.1.1 Interlocks test.
The G/ATOR interlocks requirement of 3.6.11.1.1 shall be verified by analysis, demonstration, and testing of the system interlocks in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration, and testing verify that the system has a voltage interlock installed on every

electrical compartment that has sufficiently high levels of voltage, current or electromagnetic fields to be hazardous to personnel in accordance with MIL-HDBK-454A, Guideline 1, Safety Design Criteria – Personnel Hazards.

4.6.11.1.2 Electrical Grounding test.
The G/ATOR electrical grounding requirement of 3.6.11.1.2 shall be verified by analysis, demonstration, and testing of the system electrical grounding in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration, and testing verify that the system's electrical grounding is sufficient to ensure that no personal injury or damage to system components results from stray voltages or static discharges of electricity.

4.6.11.2 Physical Safety test.
The G/ATOR physical safety requirement of 3.6.11.2 shall be verified by analysis, demonstration, and inspection of the system in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration, and inspection verify that the system has minimized the potential for personal injury during transportation, installation, erection, disassembly, operation, and maintenance, IAW MIL-STD-882D, and equipment malfunctions do not have a cascading effect contributing to further equipment destruction.

4.6.11.2.1 Non-skid Surface test.
The G/ATOR non-skid surface requirement of 3.6.11.2.1 shall be verified by analysis and demonstration of the system non-skid surfaces in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis and demonstration verify that all exterior portions of the antenna and other system structures used as a standing or climbing surface are covered with a non-skid finish conforming to the requirements of MIL-PRF-24667A.

4.6.11.2.2 Stop Radiate Device test.
The G/ATOR stop radiate device requirement of 3.6.11.2.2 shall be verified by analysis, demonstration, and testing of the system stop radiate mode in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration, and testing verify that a stop radiate device (e.g. switch, button etc.) is provided at the operator workstation and at the radar pedestal/pallet to stop all radio frequency (RF) radiation by both the radar and IFF equipment within 0.5 seconds of activating the stop radiate device and as noted in 3.6.11.2.2.

4.6.11.2.2.1 Resume Operation test.
The G/ATOR resume operation requirement of 3.6.11.2.2.1 shall be verified by analysis, demonstration and testing of the system capability to resume operation after deactivating the stop radiate device in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration and testing verify that the system has the capability to resume operation (radiating both radar and IFF)

within no more than 1 antenna rotation after resetting (deactivating) the stop radiate device. Objective shall be met if the analysis, demonstration and testing verifies that the system has the capability to resume operation (radiating both radar and IFF) within no more than 5 seconds after resetting (deactivating) the stop radiate device.

4.6.11.2.3 Antenna Audible Alarm test.
The G/ATOR antenna audible alarm requirement of 3.6.11.2.3 shall be verified by analysis, demonstration and testing of the system rotating mode audible alarm capability in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration and testing verify that the system has the capability to produce a 5-second, 110 dB output Klaxon audible alarm to warn personnel of impending antenna rotation 10 seconds before the antenna starts to rotate, and the audible alarm subsystem has an operator disable function.

4.6.11.2.4 Antenna Interlocks test.
The G/ATOR antenna interlocks requirement of 3.6.11.2.4 shall be verified by analysis, demonstration, and testing of the system antenna interlocks in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration, and testing verify that the system has an interlock at the antenna to stop/prevent antenna rotation and radiation while technicians or maintenance personnel are performing antenna maintenance.

4.6.11.2.5 Labels and Indicators test.
The G/ATOR labels and indicators requirement of 3.6.11.2.5 shall be verified by inspection of the system labels and indicators in an operationally representative environment at a Government approved facility. Threshold shall be met if the demonstration and inspection verify that the system labels and indicators are capable of warning personnel of potential human hazards as specified in 3.6.11.2.5.

4.6.11.2.6 High Voltage and Laser Radiation Hazard Warning test.
The G/ATOR high voltage and laser radiation hazard warning requirement of 3.6.11.2.6 shall be verified by demonstration and inspection of the system design to limit inadvertent access to these hazards in an operationally representative environment at a Government approved facility. Threshold shall be met if the demonstration and inspection verify that the system design limits inadvertent access to components that present high voltage or laser radiation hazards, that appropriate warning labels and indicators are provided and oriented for optimum visibility when the access panel or cover is being removed as specified in 3.6.11.2.6.

4.6.11.3 Prime Mover Stability test.
The G/ATOR prime mover stability requirement of 3.6.11.3 shall be verified by analysis, demonstration and testing of the system stability in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration and testing verify that G/ATOR's operational stability is not reduced when

compared to a similarly loaded prime mover, and G/ATOR does not create an unsafe operating environment for drivers and crew.

4.6.11.4 Lightning Protection test.
The G/ATOR lightning protection requirement of 3.6.11.4 shall be verified by analysis and testing of the system lightning protection at a Government approved and instrumented test facility. Threshold shall be met if the analysis and testing verify that the system lightning protection is capable of operation during electrical storms and provides proper safeguards for equipment and personnel.

4.6.11.4.1 Lightning Rod test.
The G/ATOR lightning rod requirement of 3.6.11.4.1 shall be verified by analysis and inspection of the system lightning rod and lightning arrestors. Threshold shall be met if the analysis and inspection verify that the system has a lightning rod and lightning arrestors that meet the guidelines of MIL-HDBK-419A, Chapter 3.

4.6.11.4.2 Signal Cables test.
The G/ATOR signal cables requirement of 3.6.11.4.2 shall be verified by analysis, inspection and testing of the system signal cables at a Government approved and instrumented test facility. Threshold shall be met if the analysis, inspection and testing verify that the system signal cables can withstand a lightning strike having a maximum current of 12 kA reached within 8 microseconds and decaying to one-half of the peak amplitude within 10 microseconds.

4.6.11.4.3 Power Cables test.
The G/ATOR power cables requirement of 3.6.11.4.3 shall be verified by analysis, inspection and testing of the system power cables at a Government approved and instrumented test facility. Threshold shall be met if the analysis, inspection and testing verify that the system power cables can withstand a lightning strike having a maximum current of 20 kA reached within 1.0 microsecond and decaying to one-half of the peak amplitude within 40 microseconds.

4.6.11.4.4 Indirect Strike test.
The G/ATOR indirect strike requirement of 3.6.11.4.4 shall be verified by analysis, inspection and testing of the system at a Government approved and instrumented test facility. Threshold shall be met if the analysis, inspection and testing verify that the system can withstand a lightning strike on a triggering structure, other than the G/ATOR or any component thereof, 262 feet (80 m) away from the G/ATOR.

4.6.11.4.5 Direct Strike test.
The G/ATOR direct strike requirement of 3.6.11.4.5 shall be verified by analysis, inspection and testing of the system protective devices at a Government approved and instrumented test facility. Threshold shall be met if the analysis, inspection and testing verify that the system protective devices preclude permanent damage to and/or permanent degradation of all operating equipment and devices in the event of a direct lightning strike.

4.6.11.5 Aircraft Warning Light test.
The G/ATOR aircraft warning light requirement of 3.6.11.5 shall be verified by analysis, demonstration and testing of the system aircraft warning light in an operationally representative environment at a Government approved and instrumented test facility. Threshold shall be met if the analysis, demonstration and testing verify that the system aircraft warning light is operator selectable (enable / disable switch), located on top of the antenna with an auxiliary power provision for illumination when the radar system is not operational and wired to prevent accidental damage in the event of inadvertent antenna rotation.

4.6.11.6 Fire Extinguishers test.
The G/ATOR fire extinguishers requirement of 3.6.11.6 shall be verified by analysis and inspection of the system fire extinguishers and mounting brackets in an operationally representative environment at a Government approved facility. Threshold shall be met if the analysis and inspection verify that the system is provisioned with appropriate fire extinguishers, such as Class A, B, C and D, and that United States Coast Guard (USCG) approved heavy duty mounting brackets are located near the antenna.

4.7 Growth test.
The G/ATOR growth requirement of 3.7 shall be verified by analysis of the Increment I system design for growth to future increments. Threshold shall be met if the analysis verifies that the Increment I system design provides for future technology insertion and incremental growth.

4.7.1 Technology Insertion test.
The G/ATOR technology insertion requirement of 3.7.1 shall be verified by analysis of the system design. Objective shall be met if the analysis and inspection verify that the mechanical, electrical (power and signal wiring), software, and hardware system components facilitate future upgrades and permit technology insertion with minimal impact on the existing systems.

4.7.1.1 Array Design Enabler test.
The G/ATOR array design enabler requirement of 3.7.1.1 shall be verified by analysis and inspection of the antenna array design. Objective shall be met if the analysis and inspection verify that the antenna array design permits form, fit, and function upgrades to future transmit and receive (T/R) components.

4.7.1.2 Timing Circuits Enabler test.
The G/ATOR timing circuits enabler requirement of 3.7.1.2 shall be verified by analysis and inspection of the system timing circuits design. Objective shall be met if the analysis and inspection verify that the system timing circuits are upgradeable to not less than twice the Increment I instrumented range.

4.7.1.3 Flexible Design test.
The G/ATOR flexible design requirement of 3.7.1.3 shall be verified by analysis and inspection of the hardware and/or software system design. Objective shall be met if the analysis and

inspection verify that the hardware and software systems, such as beam scheduler, resource manager, and track logic, etc., support future variable track update rates.

4.7.1.4 Processing Enabler test.
The G/ATOR processing enabler requirement of 3.7.1.4 shall be verified by analysis and inspection of the system computing, throughput, and memory design. Threshold shall be met if the analysis and inspection verify that the system computing, throughput, and memory capacity have not less than 50% reserve. Objective shall be met if the analysis and inspection verify that the system computing, throughput, and memory capacity have not less than 75% reserve.

4.7.1.5 Open Card Slots test.
The G/ATOR open card slots requirement of 3.7.1.5 shall be verified by analysis and inspection of the system open card slots. Threshold shall be met if the analysis and inspection verify that the system has sufficient open card slots for future computing, interface, and interoperability growth.

4.7.2 Increment II Growth test.
The G/ATOR Increment II growth requirement of 3.7.2 and its subparagraphs shall be verified by analysis of the Increment I system design potential for growth to Increment II performance requirements without system redesign.

4.7.2.1 Missions.

4.7.2.1.1 Hostile Indirect Weapon Location test.
See 4.7.2.

4.7.2.1.2 Indirect Friendly Fire test.
See 4.7.2.

4.7.2.2 Switching test test.
See 4.7.2.

4.7.2.3 Optimization test.
See 4.7.2.

4.7.2.4 Search Volume test.
See 4.7.2.

4.7.2.4.1 Close Mode test.
See 4.7.2.

4.7.2.4.2 Normal Mode test.
See 4.7.2.

4.7.2.4.3 Extended Mode test.
See 4.7.2.

4.7.2.4.4 Interleaved Mode test.
See 4.7.2.

4.7.2.5 Azimuth Coverage test.
See 4.7.2.

4.7.2.5.1 Search Sector test.
See 4.7.2.

4.7.2.5.2 Operator Commanded Search Azimuth test.
See 4.7.2.

4.7.2.6 Elevation Coverage test.
See 4.7.2.

4.7.2.7 Range Coverage test.
See 4.7.2.

4.7.2.8 Weapon Classification test.
See 4.7.2.

4.7.2.9 Probability of Location (Acquisition) (KPP) test.
See 4.7.2.

4.7.2.10 Accuracy.

4.7.2.10.1 Weapon Location (KPP) test.
See 4.7.2.

4.7.2.10.2 Hostile Impact Location (KPP) test.
See 4.7.2.

4.7.2.10.3 Friendly Fire Impact Location test.
See 4.7.2.

4.7.2.11 Location Rate test.
See 4.7.2.

4.7.2.12 False Report Rate test.
See 4.7.2.

4.7.2.13 Detection in Clutter test.
See 4.7.2.

4.7.2.14 Surveillance in Clutter and Rainfall Environments test.
See 4.7.2.

4.7.2.14.1 Clutter Processing test.
See 4.7.2.

4.7.2.14.2 Dynamic Range test.
See 4.7.2.

4.7.2.15 Data Transmission test.
See 4.7.2.

4.7.2.15.1 Time Stamp test.
See 4.7.2.

4.7.2.16 Overlays test.
See 4.7.2.

4.7.2.16.1 Digital Terrain Elevation Data test.
See 4.7.2.

4.7.2.17 External Cue test.
See 4.7.2.

4.7.2.18 Ground Mission Definitions.

4.7.2.19 Operator Workstation Displays test.
See 4.7.2.

4.7.2.19.1 Tactical Maps and Overlay Data test.
See 4.7.2.

4.7.2.20 Interface Growth test.
See 4.7.2.

4.7.2.20.1 AFATDS test.
See 4.7.2.

4.7.2.20.2 Voice Communications test.
See 4.7.2.

4.7.2.20.3 Mobile Subscriber Equipment test.
See 4.7.2.

4.7.2.21 Reconfiguration test.
See 4.7.2.

4.7.2.21.1 Mobility Mode to Operational Mode test.
See 4.7.2.

4.7.2.21.2 Ready State to Operational Mode test.
See 4.7.2.

4.7.2.21.3 Operational Mode to Mobility Mode test.
See 4.7.2.

4.7.3 Increment III Growth test.
The G/ATOR Increment III growth requirement of 3.7.3 and its subparagraphs shall be verified by analysis of the Increment I system design potential for growth to Increment III performance requirements without system redesign.

4.7.3.1 Decoy System test.
See 4.7.3.

4.7.3.2 Mainbeam Cancellation test.
See 4.7.3.

4.7.3.3 Advanced Radar Environmental Simulator (RES) test.
See 4.7.3.

4.7.3.4 Combat Identification Requirements.

4.7.3.4.1 Mode 5/S Identification Friend or Foe test.
See 4.7.3.

4.7.3.4.2 Target Classification/Non-Cooperative Target Recognition (NCTR) Requirements (Increment III) test.
See 4.7.3.

4.7.3.5 Integrated Data Environment (IDE) Capability test.
See 4.7.3.

4.7.3.6 Interoperability.

4.7.3.6.1 JROC/JCS Approved/Validated Integrated Architecture Behavior Model (IABM) (Increment I Enabled/Increment III Threshold) test.
See 4.7.3.

4.7.3.6.2 Global Information Grid (GIG) test.
See 4.7.3.

4.7.3.6.2.1 Netting test.
See 4.7.3.

4.7.3.6.2.2 Joint Distributed Engineering Plant and Net Centric Enterprise Services test.
See 4.7.3.

4.7.3.6.3 CTN/CEC test.
See 4.7.3.

4.7.4 Increment IV Growth / ATC Radar Mode of Operation test.
The G/ATOR Increment IV growth requirement of 3.7.4 and its subparagraphs shall be verified by analysis of the Increment I system design potential for growth to Increment IV performance requirements without system redesign.

4.7.4.1 Search Volume test.
See 4.7.4.

4.7.4.1.1 Range Coverage test.
See 4.7.4.

4.7.4.1.2 Azimuth Coverage test.
See 4.7.4.

4.7.4.1.3 Height Coverage test.
See 4.7.4.

4.7.4.1.4 Elevation Coverage test.
See 4.7.4.

4.7.4.2 Search Volume Revisit Period test.
See 4.7.4.

4.7.4.3 Target Track test.
See 4.7.4.

4.7.4.3.1 Latency test.
See 4.7.4.

4.7.4.3.1.1 Radar Report Latency test.
See 4.7.4.

4.7.4.3.1.2 External Request Response Latency test.
See 4.7.4.

4.7.4.3.2 Firm Track test.
See 4.7.4.

4.7.4.3.3 Probability of Firm Track test.
See 4.7.4.

4.7.4.3.4 Probability of Drop Track test.
See 4.7.4.

4.7.4.4 Track Volume.

4.7.4.4.1 Range test.
See 4.7.4.

4.7.4.4.2 Azimuth test.
See 4.7.4.

4.7.4.4.3 Height test.
See 4.7.4.

4.7.4.4.4 Elevation test.
See 4.7.4.

4.7.4.4.5 Track Continuity test.
See 4.7.4.

4.7.4.5 Firm Track Update Rate test.
See 4.7.4.

4.7.4.6 Firm Track Range Requirements.
See 4.7.4.

4.7.4.6.1 Targets Larger than Type 0 test.
See 4.7.4.

4.7.4.6.2 Type 0 Targets test.
See 4.7.4.

4.7.4.6.3 Type 1 Targets test.
See 4.7.4.

4.7.4.6.4 Type 2 Targets test.
See 4.7.4.

4.7.4.6.5 Firm Track Range Performance in Other Than the Nominal Environment test.
See 4.7.4.

4.7.4.6.6 Firm Track Initiation test.
See 4.7.4.

4.7.4.6.7 Slant Range Versus Elevation test.
See 4.7.4.

4.7.4.6.8 Pop-up Target test.
See 4.7.4.

4.7.4.7 Other Dedicated Hostile / C2 Commanded Waveform Uses test.
See 4.7.4.

4.7.4.8 External Cues test.
See 4.7.4.

4.7.4.9 Track Load.

4.7.4.9.1 360 Degree test.
See 4.7.4.

4.7.4.9.2 Per Sector test.
See 4.7.4.

4.7.4.9.3 Per Beam test.
See 4.7.4.

4.7.4.10 False Track Rate test.
See 4.7.4.

4.7.4.10.1 False Track Rate in Other than the Nominal Environment test.
See 4.7.4.

4.7.4.11 Velocity test.
See 4.7.4.

4.7.4.12 Target Acceleration test.
See 4.7.4.

4.7.4.13 Resolution.
4.7.4.13.1 Range Resolutions test.
See 4.7.4.

4.7.4.13.1.1 Non-Dedicated Track Resolution test.
See 4.7.4.

4.7.4.13.1.2 Dedicated Track Resolution test
See 4.7.4.

4.7.4.13.2 Angular Resolutions test.
See 4.7.4

4.7.4.14 Radar Accuracy.

4.7.4.14.1 Non-Dedicated Track.

4.7.4.14.1.1 Range test.
See 4.7.4.

4.7.4.14.1.2 Azimuth test.
See 4.7.4.

4.7.4.14.1.3 Height test.
See 4.7.4.

4.7.4.14.2 Dedicated Hostile / C2 Commanded Track Waveforms test.
See 4.7.4.

4.7.4.14.2.1 Range test.
See 4.7.4.

4.7.4.14.2.2 Azimuth test.
See 4.7.4.

4.7.4.14.2.3 Height test.
See 4.7.4.

4.7.4.15 Tracker Functionality test
See 4.7.4.

4.7.4.15.1 Tracker Performance test.
See 4.7.4.

4.7.4.16 Instrumented Range and Height test.
See 4.7.4.

4.7.4.17 Interoperability test.
See 4.7.4.

4.7.4.17.1 Interfaces test.
See 4.7.4.

5 PACKAGING.

This section is not applicable to this specification.

6 NOTES.

6.1 Summary.

The Ground/Air Task Oriented Radar (G/ATOR) is a single materiel solution for the Multi-Role Radar System (MRRS) and Ground Weapons Locating Radar (GWLR). This Performance Specification (PS) integrates the performance and functional requirements for the G/ATOR into a single consistent document that facilitates design solutions to meet program objectives. It was derived from the MRRS Operational Requirements Document (ORD) and GWLR Capability Development Document (CDD) by taking the most stringent requirement between the two documents as the basis for the G/ATOR Performance Specification.

This PS identifies the Government technical requirements for G/ATOR. It serves as a contractual basis for design at program start. The PS will be revised during development based on approved CAIV initiatives.

6.2 System Overview.

6.3 Background.

The following sections provide a background description of the Marine Air Ground Task Force (MAGTF) and the Marine Air Command and Control Systems (MACCS). The intent is to place the functional and performance requirements for G/ATOR in the appropriate context through a clear explanation of the mission.

6.3.1 Marine Air Ground Task Force (MAGTF).

The Marine Corps provides operating forces to support the Operational Forces through deployment and employment of MAGTFs. MAGTFs are the Marine Corps' combined arms forces. MAGTF elements are drawn principally from Marine Divisions (MarDivs), Marine Aircraft Wings (MAWs), Marine Logistics Groups (MLGs) (formerly Force Service Support Groups (FSSGs)), and Marine Expeditionary Force (MEF) Headquarters. MAGTFs can also be formed from the assets of the Marine Corps Reserve. MAGTFs are able to operate across the full spectrum of conflict in all levels of war, such as:

- An amphibious task force;
- Part of a Joint Multi-Service, or combined task force; and
- Single-Service command.

6.3.1.1 MAGTF Organization.

A MAGTF is structured to accomplish a specific mission and is commanded by a single commander. Regardless of size, all MAGTFs have the same structure, including:

- Command Element (CE);
- Ground Combat Element (GCE);
- Aviation Combat Element (ACE); and
- Combat Service Support Element (CSSE) capable of supporting the entire MAGTF.

The MAGTF organization is depicted by Figure 1.

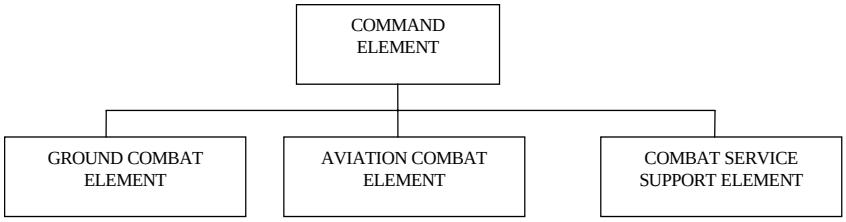

Figure 1. MAGTF Organization

6.3.1.2 Command Element (CE).
The CE is drawn from MEF Headquarters. The CE provides Command and Control (C2) for effective planning and execution of operations, and is designed to facilitate the sequencing of additional MAGTFs, as necessary.

6.3.1.3 Ground Combat Element (GCE).
The GCE is drawn from the MarDiv. The GCE conducts ground combat operations and is composed of an infantry unit that varies in size from a battalion of Marines to one or more divisions. The GCE has its own combat support units and organic combat service support capability. The mission of the Ground Combat Element (GCE) is to locate, close with, and destroy the enemy by fire and maneuver or repel the enemy's assault by fire and close combat. Task-organized GCEs draw upon the resources and units of one or more divisions, including division headquarters, infantry and artillery regiments, and separate battalions. GCE resources are integrated with those of the full MAGTF, so that the full range of combined-arms operations may be employed against the enemy. The GCE gives the MAGTF commander a decisive means of conducting maneuver, applying firepower, and providing force protection.

6.3.1.4 Combat Service Support Element (CSSE).
The CSSE is drawn from the MLG. The CSSE provides the range of combat service support functions and capabilities necessary to support the MAGTF's mission. It provides combat service support capabilities for the GCE, ACE, and CE. It is composed of supply, landing support, maintenance, transportation, general engineering, health services, and administrative services (disbursing, postal, exchange services, information systems, legal, security support, civil affairs support, and graves registration).

6.3.1.5 Aviation Combat Element (ACE).
The ACE is drawn from the MAW. The ACE conducts air operations and provides aviation support to the warfighting elements of the MAGTF. It is composed of aviation, air C2, and aviation ground support units, providing the MAGTF with the necessary assets to plan and execute the six functions of Marine aviation. The ACE may vary in size from a composite helicopter squadron to one or more MAWs. The ACE provides the MAGTF with the ability to conduct the control of aircraft and missiles, primarily using the MAW personnel and equipment.

6.3.2 Marine Aircraft Wing (MAW).

The MAGTF requires close integration of air and ground operations. Air operations of the MAGTF are conducted under a system of centralized command and decentralized control. The ACE commander exercises C2 by means of the Marine Air Command and Control Systems organic to the Marine Air Control Group (MACG). There are four MAWs, each composed of a variety of units and agencies equipped to process, evaluate, and disseminate essential elements of information used by the Tactical Air Commander (TAC) and subordinate commanders to make tactical decisions. The MAW contributes to MAGTF operations by:

- Providing the air C2 systems required to plan, supervise, and direct the execution of the six functions of Marine aviation; and
- Coordinating air operations with Joint/multi-national services as well as civil air C2 systems.

6.3.2.1 Marine Air Control Group (MACG).

The MACG of the MAW has the personnel and equipment required for establishing the bulk of the Marine Air Command and Control System. The mission of the MACG is to provide, operate, and maintain the major elements/agencies of the Aviation Combat Element (ACE). The MACG consists of a Marine Tactical Air Command Squadron (MTACS), Marine Air Control Squadron (MACS), Marine Air Support Squadron (MASS), Low Altitude Air Defense Battalion (LAAD Bn), and a Marine Wing Communications Squadron (MWCS). The following paragraphs describe the agencies that execute the MACG/MACCS mission:

6.3.2.1.1 Tactical Air Command Center (TACC).

The MTACS provides the TACC. The Marine TACC is the senior agency of the MACCS. The TACC interfaces with the MAGTF CE, the GCE's Combat Operations Center (COC), and the GCE's Fire Support Coordination Center (FSCC). Its primary function is to provide the facilities for the ACE commander and battle-staff to command, supervise, and direct MAGTF air operations through the Tactical Air Operations Center (TAOC), Direct Air Support Center (DASC), Marine Air Traffic Control Detachment (MATCD), and LAAD COC.

6.3.2.1.2 Tactical Air Operations Center (TAOC).

The MACS provides the TAOC. The TAOC is the agency responsible for positive airspace control and management. It performs the following functions:

- Detection, identification, and control of the intercept of hostile aircraft and missile intercept;
- Surveillance of assigned airspace;
- Direction, positive control, and navigational assistance for friendly aircraft;
- Direction and control of Anti-Air Warfare (AAW) operations involving aircraft and surface-to-air weapons, such as Man-Portable Air Defense System [MANPADS] and Complementary Low Altitude Weapon System/Surface Launched Advanced Medium Range Air-to-Air Missile (CLAWS/SLAMRAAM); and
- Control of assigned airspace, direction and control of the fires of assigned air defense assets (missiles and aircraft) by collecting and displaying information from its own sensors, other Marine Corps sources, and external sources.

6.3.2.1.3 Direct Air Support Center (DASC).
The MASS provides the DASC. The DASC is a procedural control agency responsible for processing immediate air requests for direction of air support (Offensive Air Support (OAS), Air Support (AS), electronic warfare (EW), and Reconnaissance [RECCE]). It functions in a decentralized mode of operation and is normally collocated with the senior GCE FSCC. However, it remains directly supervised by the Marine TACC. The DASC:

- Processes immediate Air Support Requests (ASR);
- Coordinates aircraft employment with other supporting arms;
- Manages the Tactical Air Control Party (TACP) that supports ground combat and combat service support forces; and
- Provides procedural control of assigned aircraft transiting its area of responsibility.

6.3.2.1.4 Marine Air Traffic Control Detachment (MATCD).
The MACS provides the MATCD. The MATCD is the primary terminal Air Traffic Control (ATC) agency within the MACCS. It is organized and equipped to satisfy a variety of ATC requirements for the MAGTF. The MATCD primarily provides friendly aircraft with continuous all-weather RADAR approach, departure, ground, and en-route ATC services within assigned controlled airspace. The MATCD also provides ATC services within terminal areas that interface directly with terminal and en-route ATC facilities that are part of the U.S. National Airspace System or that operate in compliance with International Civil Aviation Organization (ICAO) Standards.

In Increment I the CAC2S will have the necessary interfaces that will allow the ATC functions to be compatible and interoperable with the ATC C2. Digital information will be passed from one system to the other. The Government will monitor both procurements in order to minimize the risk. G/ATOR Increment IV will replace the AN/TPS-73 air surveillance radars.

6.3.2.1.5 Low Altitude Air Defense (LAAD).
The COC provides the tactical C2 for the LAAD battalion's headquarters. The COC supervises LAAD battalion operations, obtains and relays intelligence and combat information, and makes recommendations to the battalion commander for the employment of their weapons. LAAD battery and platoon commanders direct and control the operations of MANPADS sections from their battery Operations Centers (OCs) and platoon Command Posts (CPs). CLAWS/SLAMRAAM and LAAD sections that directly support MAGTF divisions are also provided control and cueing information via the TAOC from the command and control architecture. G/ATOR will provide fire quality data to CLAWS/SLAMRAAM via a multi-layered data network. The CAC2S/LAAD C2 will provide C2 functionality to LAAD via a communications interface. LAAD performs the following functions:

- Provide close-in, low altitude, surface-to-air weapons fires in defense of forward CEs, vital areas, and installations; and
- Provide surface-to-air weapons support for units engaged in special or independent operations.

6.3.3 Advanced Field Artillery Tactical Data System (AFATDS).

The GCE commander exercises Fire Support Coordination C2 by means of AFATDS which is employed from Marine Expeditionary Force (MEF) to Battery level. AFATDS is used to provide the commander with the ability to rapidly employ all fire support assets at his disposal. This allows him the flexibility to determine what weapon systems to employ in shaping and dominating his battlespace. AFATDS greatly enhances the interchange of tactical data between all MAGTF Tactical Command and Control Systems through the use of graphics, common operating applications and communications.

6.3.3.1 Counter Battery Radar (CBR) Platoon.

The primary mission of the CBR Platoon is to locate enemy rocket, mortar, and artillery weapons and process all acquired enemy locations in a timely manner for counterfire and intelligence purposes. A secondary mission of the CBR platoon is adjusting or registering the fires of friendly artillery. The CBR Platoon will be employed in a similar manner to the AN/TPQ-46A. The system will be forward deployed and, depending on the tactical situation, could be employed from the Marine Expeditionary Unit (MEU) to the MEF level. Generally, when employed in support of a Division, the CBR will be deployed in pairs to maintain overwatch and increase survivability. Tactical control may be delegated to the artillery battalion level or employed at the division or MEF level. The CBR platoon is normally employed as a unit and controlled by the regimental artillery commander. The Target Processing Center (TPC) is established in the regimental artillery main combat operations center (COC) or co-located with the fire support coordination center (FSCC) at the Division COC. The CBR platoon commander works closely with the regimental S2 (Intelligence) and S3 (Operations) to ensure that all CBR assets are being optimally utilized and that all counterfire and intelligence data generated by those assets are being processed correctly.

The CBR platoon commander coordinates the employment of radars operating under regimental control. The S3 designates areas that will receive radar coverage based on information obtained from the S2 and targeting cycle. Based on this guidance, the CBR platoon commander selects a sector of search and general position area for each radar section. The radar section leader selects the actual radar site. The CBR platoon commander will coordinate with the regimental S-2 and S-3 to ensure the CBR assets are being optimally employed and that all counterfire and intelligence data that is generated by the CBR is being processed correctly. The S-3 will designate the sectors of search and zones that will receive radar coverage. Based on this guidance the CBR platoon commander will select a sector of search and a general position for each of the four CBRs. The radar section leader will then select the actual site for the employment of the CBR. The radar will be sited proximate to the area of interest to allow the radar to detect targets on their ascending flight and initiate a track on those objects. This track data will be used to determine the ballistic trajectory of the projectile and calculate the hostile firing location.

In summary, the CBR performs the following tasks:

- Locating enemy indirect fire systems and generating artillery target intelligence;
- Locating enemy indirect fire systems and generating fire missions;
- Registering and adjusting friendly artillery and mortars;

- Validating the location of friendly fires; and
- Providing target intelligence and information to allow friendly forces to take force protection measures while generating fire missions to attack enemy indirect fire systems.

6.3.4 Ground/Air Task Oriented Radar.

G/ATOR is an improved performance replacement for the four existing radar systems. G/ATOR will replace the following legacy radars: AN/TPS-63, AN/TPS-73/ASR, AN/MPQ-62 and AN/TPQ-46A.

The Ground Air Task Oriented Radar (G/ATOR) Program is a single materiel solution for the Multi-Role Radar System (MRRS) and Ground Weapons Locating Radar (GWLR) radar requirements. G/ATOR will provide the ACE and the GCE with the radar sensor to support air surveillance/fire control, counter battery support and air traffic control. It is structured as an evolutionary acquisition consisting of four blocks of incremental development and production, referred to as Increments I through IV. Each block builds upon the capabilities of the preceding increments in an additive fashion and will be backward compatible with the previous Increments as practical. Increment I supports two distinct mission areas: Short Range Air Defense (TAOC) and Air Surveillance. Increment I will include Electronic Counter-Counter Measures (ECCM) capabilities; including low sidelobe antenna and Coherent Sidelobe Cancellation (CSLC). Increment I will enable the incorporation of Coherent Mainbeam Cancellation (CMBC) in Increment III. Increment II will address the Marine Expeditionary Force (MEF) Counter Fire/Targeting missions. Increment III will address the air mission requirements for Mode 5/S Identification Friend or Foe (IFF), Decoys, CMBC, Advanced Radar Environmental Simulator (RES) distributed simulation capability, Non-Cooperative Target Recognition (NCTR), Composite Tracking Network (CTN) upgrade, sensor netting, and an Integrated Data Environment (IDE) capability. Increment IV will address support of Air Traffic Control (ATC) missions. Each Increment will have a separate Milestone B (MS B) and Milestone C (MS C). The Increment I design provides for growth to all following Increments with no equipment re-design and will provide a computer software architecture that allows for the computers, computer software and firmware to be upgraded via open architecture (OA) with the functionality of all following Increments. The requirements in this document are for Increment I unless otherwise specified.

6.3.5 G/ATOR Mission.

The G/ATOR Air missions are to provide an accurate, short to medium range, 3D air surveillance picture capable of supporting TAOC, SHORAD, GWLR, ATC, and gap filler missions. The G/ATOR Ground mission is to accurately locate, track, and classify enemy indirect fire weapons systems and to register and adjust friendly fire. G/ATOR will be rugged enough to support a wide range of tactical operations in all types of weather and terrain conditions and will have the ability to deploy mission critical equipment on C-130Js in support of early entry operations.
G/ATOR Missions are described in the following paragraphs.

6.3.5.1 SHORAD (Air Defense) (Increment I).

The SHORAD mission will provide short range G/ATOR track data to weapon systems such as CLAWS/SLAMRAAM, STINGER and Ground Based Air Defense (GBAD). The data will be of sufficiently high data rate and track accuracy to support direct weapon engagement of specified threats. The Radar will be interoperable with the LAAD C2 and CLAWS/SLAMRAAM via a multi-layered Joint Data Network Subnet. Figure 2 depicts the SHORAD (Air Defense) Mission.

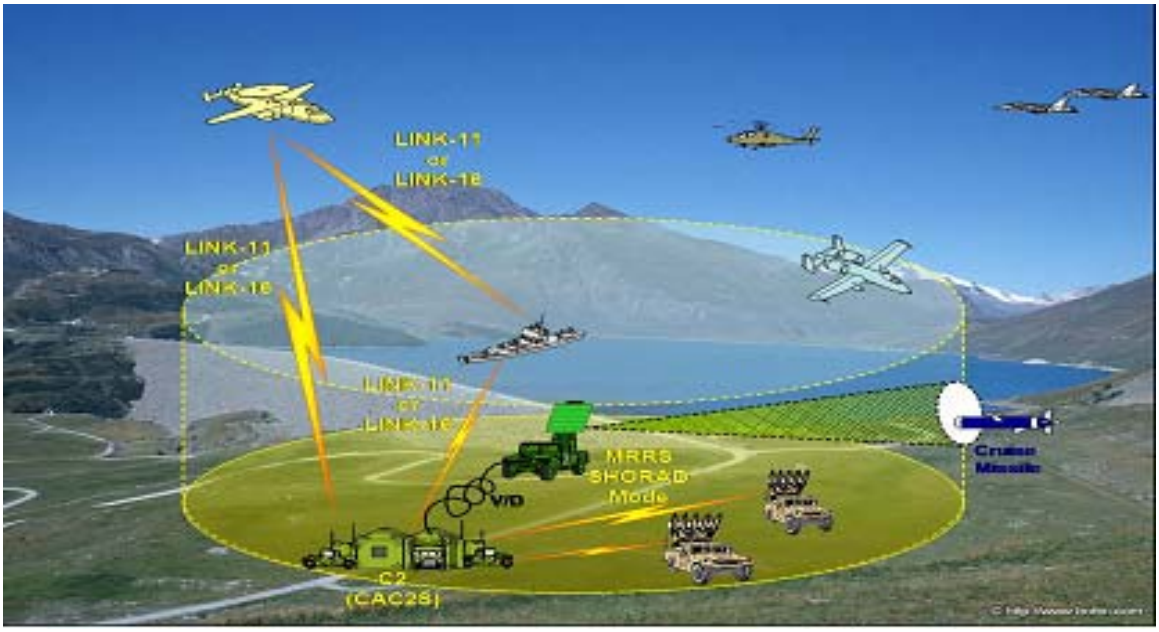

Figure 2. SHORAD (Air Defense) Mission

6.3.5.2 TAOC (Air Surveillance) (Increment I).

The TAOC mission will provide a volume search capability in support of offensive and defensive air operations. The system will be capable of deployment as an early warning and control site or to augment the long range surveillance radar.

The radar will be interoperable with the Marine Corps Common Aviation Command and Control System (CAC2S), CTN, and the legacy Tactical Air Operations Module (TAOM). Interoperability with International C2 systems will be via tactical data links broadcast by CAC2S or TAOM. Increment III will address interoperability with existing and future systems, via Net Ready, Key Interface Profiles, an upgraded Marine Corps CTN, and Joint Single Integrated Air Picture (SIAP) System Engineering Organization (JSSEO) Integrated Architecture Behavior Model (IABM). Figure 3 depicts the TAOC (Air Surveillance) mission.

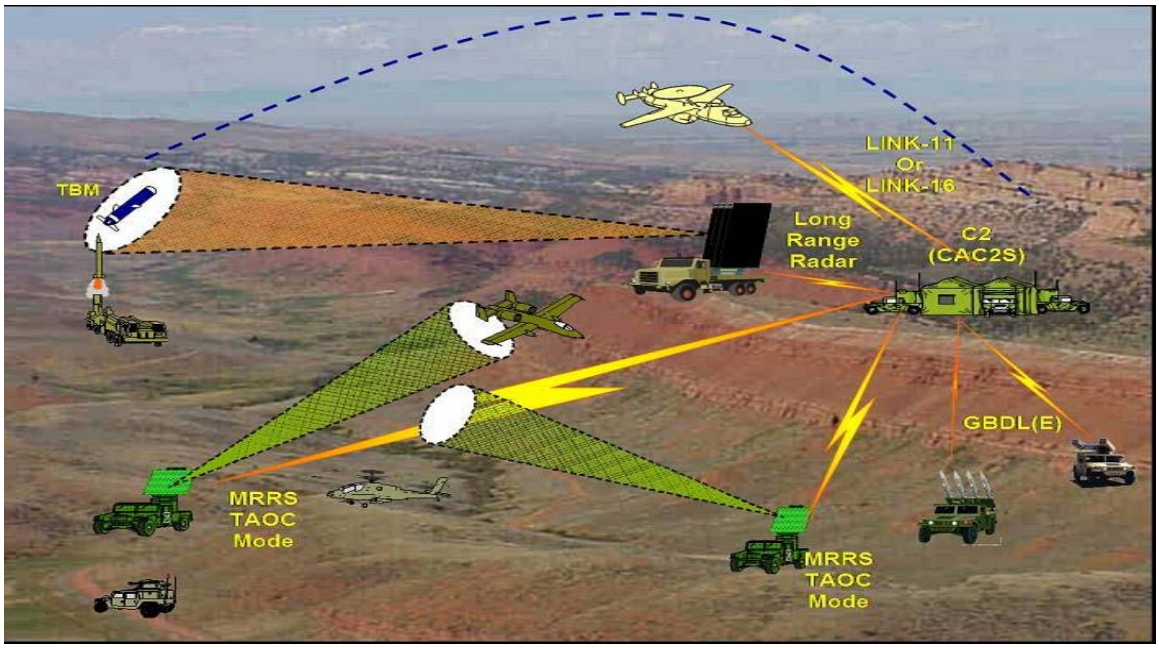

Figure 3. TAOC (Air Surveillance) Mission

6.3.5.3 ATC (Air Traffic Control) (Increment IV).

The ATC mission will facilitate the safe and expeditious movement of air traffic in the area of operations. Air traffic includes Joint force, Allied, Civilian Reserve Air Fleet, non-government organization, commercial and civilian aircraft. The system will be interoperable with the Federal Aviation Administration (FAA) Airspace System, meet all FAA standards and requirements for ATC systems, and be certifiable by the FAA.

ATC surveillance data will be data linked and correlated with surveillance data at the TAOC and Early Warning and Control (EW/C) by means of CAC2S/TAOM. This maximizes coverage of the battle space and assures surveillance data continuity in cases where other surveillance assets receive battle damage. The ATC requirements are comparable with ATC radars such as AN/TPS-73/ASR.

In addition, the System will employ an interface to FAA via CAC2S and International Civil Aviation Organization (ICAO) ATC systems to exchange data related to automated target handoff and hand-over, and aircraft flight plans. Figure 4 depicts the ATC mission.

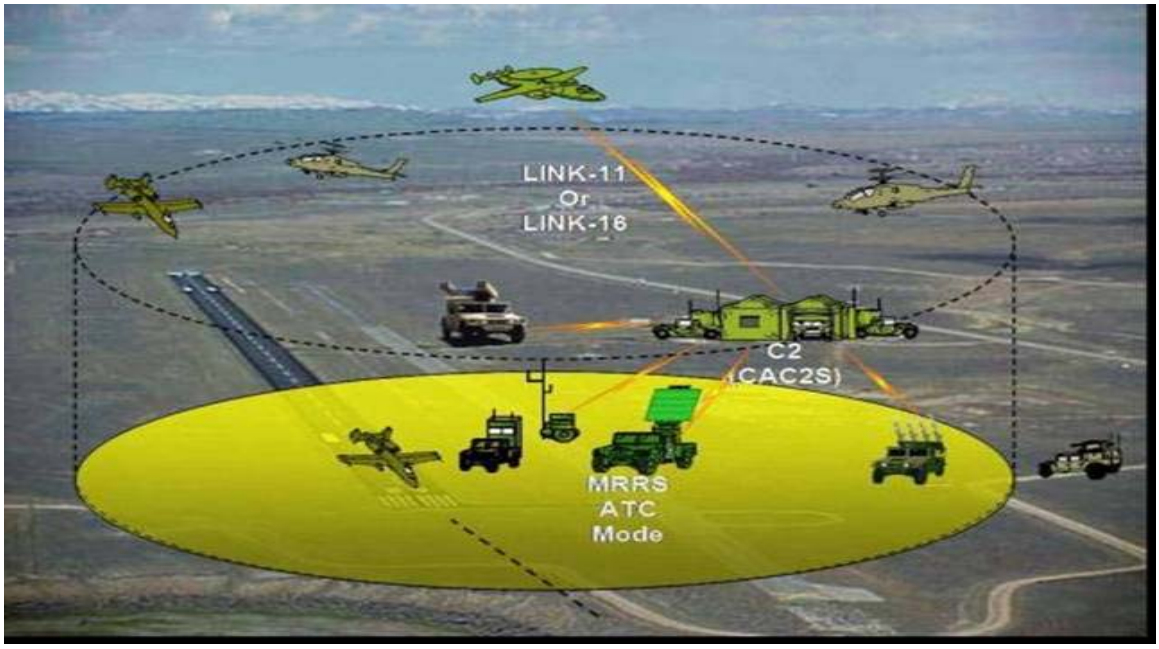

Figure 4. ATC Mission

6.3.5.4 GWLR (Counter Battery) (Increment II).

The GWLR mission is to detect, track, classify, and accurately determine the origin of enemy projectiles. The targets to be classified include mortar, artillery, and rocket threats (Appendix A). The radar will also be capable of registering and adjusting friendly indirect fire while simultaneously maintaining hostile surveillance. The radar will provide simultaneous operation against many sources across a large sector. The antenna will be commanded to automatically slew to a bearing of interest and the antenna will scan electronically about the commanded azimuth. Figure 5 depicts the Ground Weapons Locating (Counter Battery) mission.

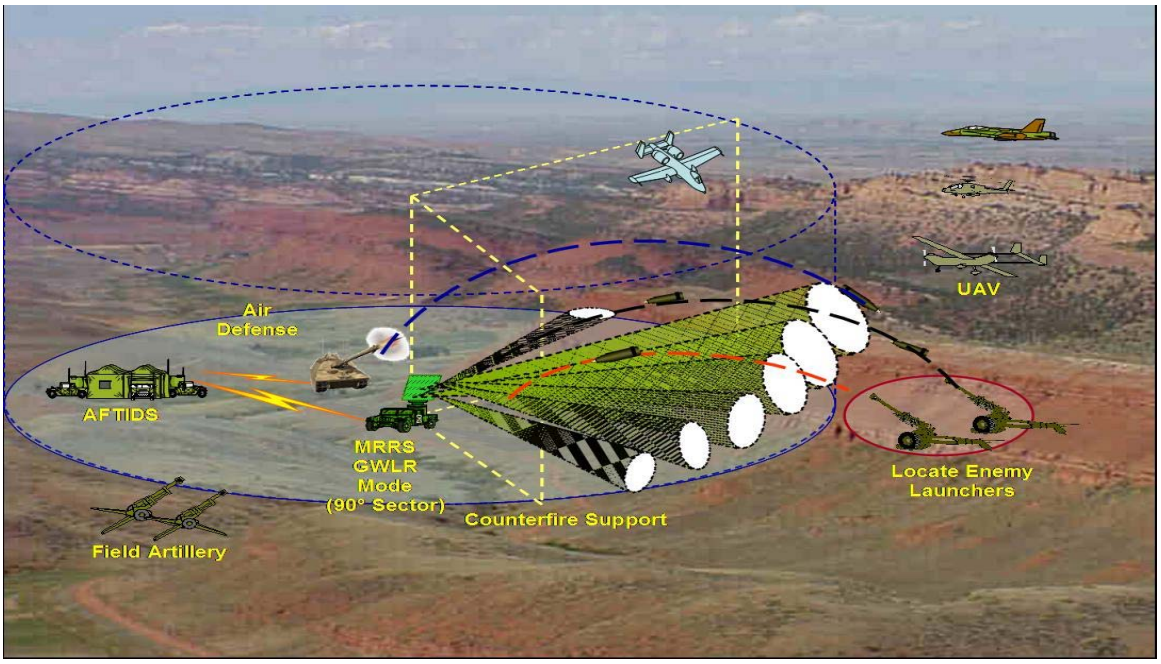

Figure 5. Ground Weapon Locating (Counter Battery) Mission.

G/ATOR Increment II is an expeditionary system that can acquire threat indirect fire systems at greater ranges than current radars to fully support the MAGTF and Expeditionary Maneuver Warfare Ground mission. Operational forces require an expeditionary system that can acquire threat indirect fire systems including mortars, artillery, rocket and missile systems. The system will be vehicle mounted and provide the MAGTF with a 6400 mil viewing capability, via a trainable stop/start mode. The principle functions of the system will be to detect, track, classify and accurately determine the origin of enemy weapons platforms. The G/ATOR will provide the commander with radar that brings a significant increase in range, accuracy and ability to deploy. Increased range and throughput will enable the radar to detect and locate weapons firing simultaneously from 10 to 25 different locations per minute. Additionally, the G/ATOR will enhance counter-fire operations with a two digital net capability and its ability to classify targets. The G/ATOR will be able to simultaneously receive situational awareness while it transmits data through AFATDS for target attack. The ability to classify targets also enhances counterfire

operations by identifying specific target types for generation of fire missions based on the unit's High Payoff Target List (HPTL). The ability of G/ATOR to classify munitions by type, along with greater accuracy, will give the commander the ability to expend only the amount and type of ammunition needed to engage the enemy target with the best results. The G/ATOR's ability to be tailored to the tactical situation through its selectable modes and mission critical configuration allows the commander greater flexibility. The G/ATOR will also be capable of registering and adjusting friendly indirect fire while simultaneously maintaining hostile surveillance.

6.3.6 Initial Capability.

The MRRS and the GWLR requirements are satisfied by G/ATOR. Increment I will develop and produce systems to satisfy the SHORAD and air surveillance missions including Identification Friend or Foe (IFF) Modes 1, 2, 3A, C and 4. Increment I will include ECCM capabilities; including low sidelobe antenna and CSLC. Increment I will enable the incorporation of CMBC in Increment III. The Increment I design will provide for growth to all following Increments with no equipment re-design and will provide a computer software architecture that allows for the computers, computer software and firmware to be upgraded via open architecture with the functionality of all following Increments.

6.3.7 Full Capability.

Increment II will develop an upgrade to the computer software and produce systems based on the Increment I baseline to meet the ground counter battery / target acquisition requirement. Increment III is to address the air mission requirements for Mode 5/S Identification Friend or Foe (IFF), Decoys, Mainbeam Cancellation, Advanced Radar Environmental Simulator (RES), Non-Cooperative Target Recognition (NCTR), CTN upgrade, sensor netting, NCES, Joint Distributed Engineering Plant and an Integration Data Environment (IDE) capability. G/ATOR will employ decoys for self protection. Increment IV will incorporate an ATC capability.

6.4 Document Overview.

6.4.1 Background.

This PS integrates the performance and functional requirements for the G/ATOR into a single consistent document that facilitates design solutions to meet program objectives.

This Performance Specification was derived from the MRRS ORD and GWLR CDD by taking the most stringent requirement between the two documents as the basis for the G/ATOR Performance Specification. MCSC derived requirements resulted from Requests for Information (RFI), point designs, trade studies and engineering analysis.

This Performance Specification is the basis for informing contractors what the Government technical requirements are for a given phase/increment of the G/ATOR system life cycle. It serves as a contractual basis for design at program start.

6.4.2 Threshold versus Objective Requirements.

Requirements have been delineated as either 'threshold' or 'objective' in this document. A threshold value represents the minimum acceptable value that meets an operational need. An objective value represents a desired performance value above the minimum threshold. If no separate objective requirement is stated, then the objective is the same as the threshold requirement. Some threshold values are additionally identified as Key Performance Parameters (KPP). Threshold parameters identified as KPP are so important that failure to meet the threshold will result in program reevaluation. See Section 4 for traceability to the ORD/CDD requirements and verification methods.

6.5 Operational Setting.

G/ATOR should be rugged enough to support tactical operations in a wide range of weather and terrain conditions.

G/ATOR SHORAD should provide general support, short range, 360 degree, air defense to vital areas and maneuvering forces for the MAGTF. G/ATOR should support Expeditionary Maneuver Warfare (EMW), Ship-to-Objective Maneuver (STOM) and Sea basing Concepts. G/ATOR should provide fire control data to the CLAWS/SLAMRAAM firing units via a multi-layered Joint Data Network (JDN) for engagement of Cruise Missiles (CMs), fixed and rotary winged aircraft, and Unmanned Aerial Vehicles (UAVs).

G/ATOR Air Surveillance should provide general support, medium range, 360 degree, air surveillance/situational awareness to the TAOC in support of MAGTF and Joint Operations. G/ATOR's mobility and transportability attributes contribute to the MACCS's ability to provide sensor coverage during initial and sustained operations ashore. Through the Navy's Cooperative Engagement Capability (CEC) and the Marine Corps CTN, G/ATOR should provide a defense in depth posture in support of the littoral operations.

G/ATOR Air Traffic Control (Increment IV) should provide dedicated direct support, short/medium range, 360 degree, air surveillance/situational awareness for the control of friendly aircraft in and around air facilities.

G/ATOR Ground (Increment II) should support contiguous Ground operations for the MAGTF with improved capabilities to be flexible enough to provide support in a traditional battlespace operation. The G/ATOR can be employed far enough from the enemy, in all directions, to acquire the enemy weapons based on Intelligence Preparation of the Battlefield (IPB) and to prevent loss of the radar to enemy action. This maximizes radar coverage and cueing time. Given the 0.75 km minimum range and the necessity to avoid conflicts with maneuvering friendly forces, G/ATOR Ground is normally employed within a friendly unit's area of operations. Employment options may change based on the tactical situation. During amphibious operations, the G/ATOR Ground may be positioned at Intermediate Staging Bases (ISBs). In general, planning ranges for the G/ATOR Ground are referenced in Table 6 - Classification, Location and Accuracy Summary.

6.5.1 Length of Deployment.

G/ATOR Air and G/ATOR Ground support the respective Air and Ground Missions. The length of a mission is 60 days. Both G/ATOR Air and Ground Missions share a common requirement for a mobile radar that can be quickly brought to the battlefield, positioned and set up to operate. As the battlefield moves forward, the G/ATOR can be quickly configured for transport, moved to its new location, and set up to operate. There are also requirements for deployments/ sustained operations lasting 72 hours up to 30 days or longer. The significance of the varying deployment time is the number of relocations and the number of transmitter operational hours required by the assigned mission.

The G/ATOR Air (SHORAD) Mission length, transport, and deployment characteristics are depicted in Figure 6. The transportability environment consists of C-130Js, CH/MH-53D/E/X, MV-22, rail and sea. The requirements follow in the key requirements section 3.

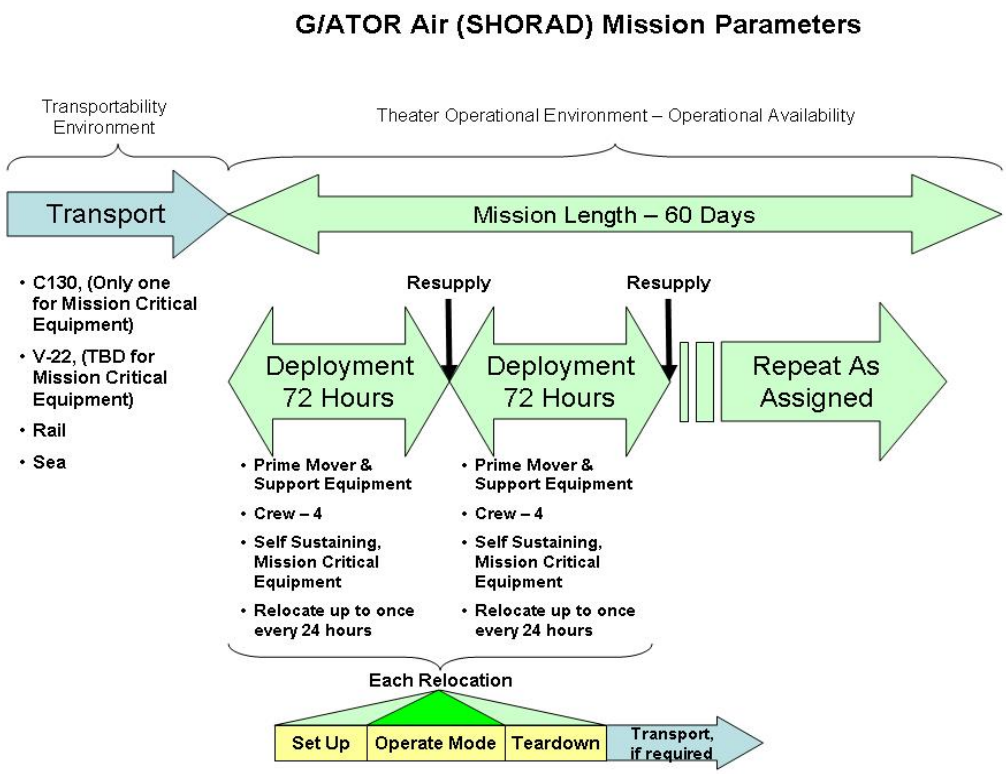

Figure 6. G/ATOR Air (SHORAD) Mission Parameters

PRF-G/ATOR

The G/ATOR Air (TAOC) Mission length, transport, and deployment characteristics are depicted in Figure 7. The mission length is 60 days. The transportability environment consists of C-130Js, CH/MH-53D/E/X, MV-22, rail and sea. The requirements follow in the key requirements section 3.

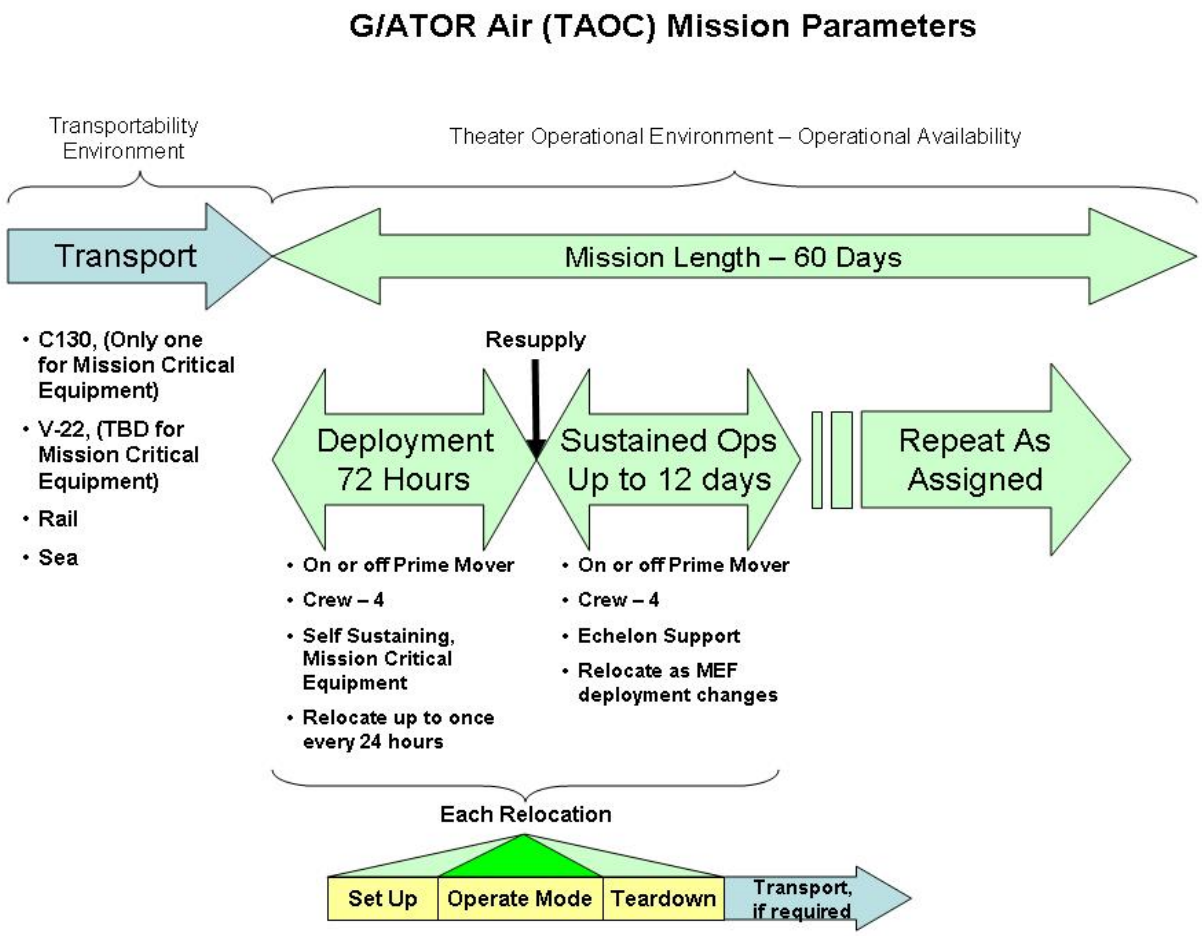

Figure 7. G/ATOR Air (TAOC) Mission Parameters

The G/ATOR Air (ATC) Mission length, transport, and deployment characteristics are depicted in Figure 8. The mission length is 60 days. The transportability environment consists of C-130Js, CH/MH-53D/E/X, MV-22, rail and sea. The requirements follow in the key requirements section 3.

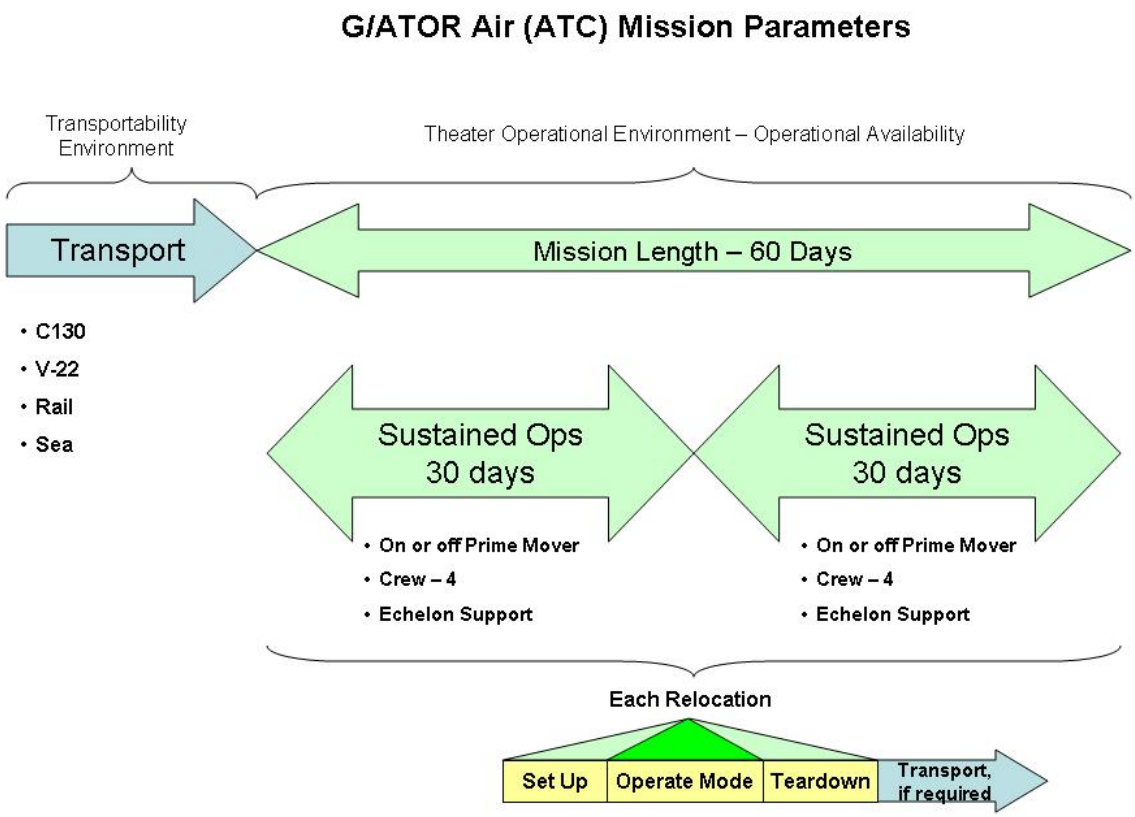

Figure 8. G/ATOR Air (ATC) Mission Parameters

PRF-G/ATOR

The G/ATOR Ground Mission length, transport, and deployment characteristics are depicted in Figure 9. The mission length is 60 days. The transportability environment consists of C-130Js, CH/MH-53D/E/X, MV-22, rail and sea. The requirements follow in the key requirements section 3.

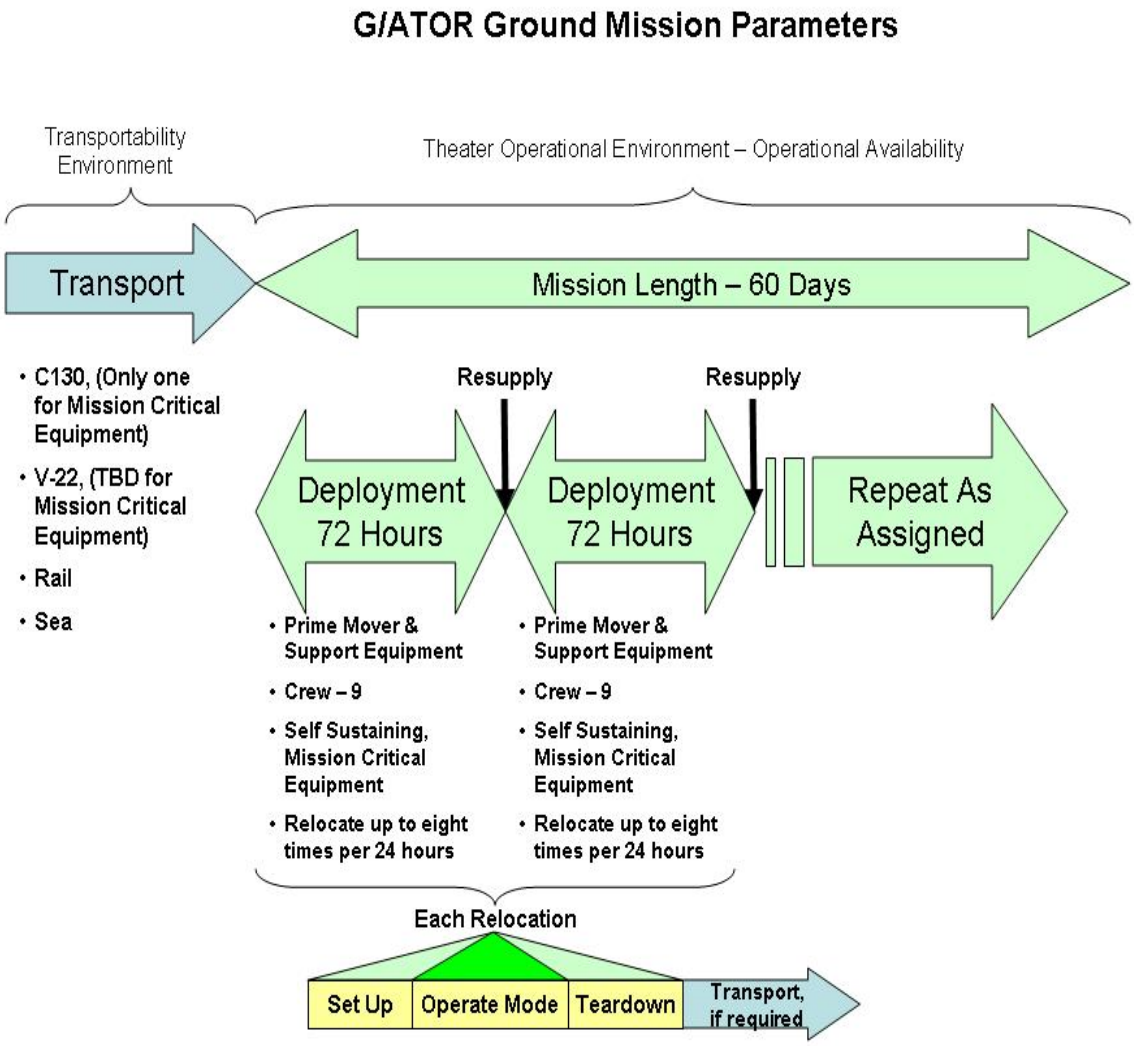

Figure 9. G/ATOR Ground Mission Parameters

6.5.2 Manning.

No additional Military Occupational Specialty (MOS) structure should be required to operate and maintain the G/ATOR. A crew of four (4) trained Radar Repairmen or Radar Technicians should assemble/disassemble, operate and maintain the G/ATOR system and system components within the Marine Corps three-level maintenance concept in accordance with applicable instructions.

6.5.2.1 System Manning.

Additional support personnel manning requirements should include MOS 1141 (Electrician), MOS 1142 (Electrical Equipment Repair Specialist), and MOS 3521 (Organization Automotive Mechanics). Military Occupational Specialties Manual, Marine Corps Order (MCO) P1200.7, identifies Marine Corps MOSs.

6.6 Proposed Equipment List for the GATOR System.

The following is an initial list of Government Property (GP) that may be required for operation of the G/ATOR system. This list is only meant to identify general equipment as the baseline for G/ATOR. This document is for information and initial planning purposes. This list is not all inclusive; the contractor shall provide a recommended list based upon their design's requirements.

Item Description	U/I	Qty	NSN	Unit Cost	Weight	Dimensions L x W x H
M1097A2 HMMWV	EA	AR	2320-01-380-8604	$61,665	5,900 lbs Curb Weight 10300 lbs Gross Vehicle Weight	190.5 x 114 x 86.0 inches
Light Tactical Trailer (LTT-HC)	EA	AR	2330-01-387-5424	$7,058	1,750 lbs Curb Weight 4,200 lbs Gross Vehicle Weight	132 x 85.6 x 42.4 inches
Advance Mobile Medium Power Set (60kw, 50/60 Hz, 3 Phase 120VAC)	EA	AR	TBD	TBD	2800 - 3000 lbs	Similar to USMC's Family of 60kw Tactical Quiet Generator (MEP 806A)
Modular Azimuth Positioning System (AN / PSN-14)	EA	AR	TBD	TBD	Less than 50 lbs	~24 x 16 x 8 inches
Radio Set X (voice capable) w/antenna, mount and vehicle remote i.e. SINCGARS (AN/VRC-92) or current version.	EA	2	5820-01-267- 9477	$24,268	~50 lbs	~10.0 x 15.7 x 3.4 inches
Radio Set Z (voice and data capable, multi band) w/Antenna and mounts i.e. EPLRS (AN/VAQ-2C (v)1)& JTRS	EA	2	5820-01-462-8411	$26,700	~50 lbs	~17.7 x 15.9 x 10.0 inches
OE-254/GRC Antennas.	EA	2		TBD	~45 lbs	~36 x 24 x 12 inches
Integrated Individual Squad Radio	EA	4	TBD	TBD	Helmet Mounted	Helmet Mounted
AN/UPX-37 IFF Interrogator	EA	1	5895-01-460-5448	$91,611	76 lbs	18 x 14.75 x 10.56 inches
IFF Encryption Devices (embedded or standalone)	TBD	AR	TBD	TBD	TBD	TBD
Computer, Digital, Ruggedized Laptop MCHS	EA	2	TBD	TBD	~13.5 lbs	~12.0 x 4.0 x 11.0 inches
Radar Environmental Simulator	EA	1	TBD	TBD	TBD	TBD
Mission Planner Application	EA	2	TBD	TBD	N/A	N/A
Friendly Force Combat Identification Device	EA	AR	TBD	TBD	TBD	TBD
DAGR	EA	2	5825-01-526-4783	$3,439	Hand Held	Hand Held

Appendix A Classified Threat Profiles.

Appendix A is a separate classified document that provides threat parameters applicable to the Fixed and Rotary Wing Aircraft, Cruise Missile (CM), Unmanned Aerial Vehicle (UAV) threat.

Appendix B Electronic Attack (EA) Environment.
Appendix B is a separate classified document that provides threat parameters applicable to the Electronic Attack (EA) threat.

Appendix C G/ATOR OPERATIONAL ENVIRONMENT.

Purpose.
The G/ATOR radar system must operate in the natural environments of the littorals. The purpose of this Appendix is to specify the environmental models to be employed, to identify the principal environmental factors affecting G/ATOR performance, to characterize the environments of concern to the G/ATOR radar system, and to delineate specific environmental scenarios.

The environmental models to be employed to characterize G/ATOR performance include:

- "Natural Environmental Models For Shipboard Radars;" Janet Stapleton et al; NSWCDD/TR-99/51; September 2001; (NEM)
- "Recommended Environmental Models For U. S. Marine Corps' Affordable Ground Based Radar (AGBR);" John H. Osborne; NSWCDD T41, 9 February 2001; AGBR
- FAA / USAF RFP for ARSR 4 Procurement Appendix; (ARSR 4)
- Low Angle Radar Land Clutter, Measurements and Empirical Models; J. Barrie Billingsley; William Andrew Publishing; Norwich, NY; 2002 (Billingsley)
- "TSC/AEGIS Clutter/Environment Model Revision of 23 October 1991;" G.C. Rose et al; TSC-W13-619; 23 October 1991; (AEGIS)

While these environmental models will provide, in aggregate, the basis for analysis of G/ATOR performance, the environmental model for G/ATOR has been tailored to USMC missions. These models are not Modeling & Simulation (M&S) tools, but rather the conceptual models upon which M&S tools can be based.

The environmental factors addressed here include RF propagation, attenuation, and clutter. RF propagation effects are those due to microwave propagation in the troposphere and are characterized by the Pattern-Propagation-Factor (PPF). Attenuation is caused by absorption and scattering by atmospheric gases, rain, and clouds. Clutter is the result of competing signal returns from the environment, including the land and sea surfaces, and from volume sources such as rain and birds.

Two types of environmental scenarios are specified here: condition scenarios and performance scenarios. Condition scenarios specify environmental conditions for a given environmental situation. In the case of the environmental situation of occurrence of rain, the specified conditions would include rain rate and height of rain profile; cloud density, altitude of cloud base, and altitude of cloud top; and relative humidity. Performance scenarios, on the other hand, specify operational conditions under which the proposed G/ATOR Radar Systems will be evaluated. As such, the performance scenarios will combine propagation, attenuation, clutter, and tactical factors such as target RCS, velocity, altitude, and radar siting.

C.1 Environmental Models.

The G/ATOR Environmental Model is tailored from several existing environmental models. The principal reference is the "Natural Environmental Models for Shipboard Radars" by Janet Stapleton and others, a report prepared jointly by NSWC Dahlgren, JHU/APL, TSC, and MIT/LL. This collection of mathematical models was intended for the shipboard radar geometry, which is similar to the geometry in which the G/ATOR will be employed, except that the G/ATOR will be looking over land towards water, instead of the reverse.

The principal source for parametric values for rain and cloud attenuation and rain backscatter, for instance, are taken directly from the Natural Environmental Models (NEM) report. A second source is the NSWC Dahlgren report: "Recommended Environmental Models for U. S. Marine Corps' Affordable Ground Based Radar (AGBR)." A third source is the FAA and USAF ARSR 4 RFP Appendix A's Radar Clutter Model. This document provides valuable modeling bases for bird / angel clutter, wind speeds, and rain rates.

The principal source for land clutter modeling is Low Angle Radar Land Clutter, Measurements and Empirical Models by J. Barrie Billingsley. Based on over a decade's worth of data collection, this reference characterizes land clutter returns for multiple terrain types.
The final major source for the G/ATOR clutter model is the AEGIS / TSC clutter model. While, like the Natural Environmental Model, this was intended for shipboard use, the principal components to be used in the G/ATOR model are the Sea Clutter Model and portions of the bird clutter model and the wind field characterization.

An important component of the G/ATOR environmental model is the set of simplifying assumptions made to facilitate analysis of the environment. While these will be delineated in C.2 – Environmental Factors – a good example is the cloud model. The distributed rainfall cloud (nimbostratus) extends from 2000 feet to 10,000 feet, and possesses constant density and temperature, even though a real nimbostratus cloud would have vertical variations in each. Average values for both cloud density and temperature are given.

C.2 Environmental Factors.

The environmental factors of RF propagation, attenuation, and clutter will be used in simulation of the G/ATOR radar system performance and will be criteria for the evaluation of proposed designs.

C.2.1 RF Propagation.

RF propagation effects of concern include refraction (See Section 1.2 of NEM) and diffraction (Section 1.3 of NEM).

The basic propagation environments defined include standard propagation and surface-based ducting. Standard propagation will be based on an effective Earth radius description of the environment, where the effective radius is defined as 4/3 (or ~ 1.33) the actual Earth radius. Surface-Based Ducting, on the other hand will be based on a tri-linear refractivity profile that exhibits standard propagation conditions above and below the inversion layer.
The effective Earth radius (or k-factor) model is only accurate for a linear refractivity profile, but the actual, exponential profile is fairly linear at lower altitudes so that for:

$$1.0 < k < 2.0 \text{ (near standard conditions)}$$

the k-factor model is reasonably accurate – therefore k=1.33 (standard conditions) is appropriate. If, however, M-units are to be used:

- Surface refractivity M (0) = 300 M-units
- k-factor outside layer = 1.33 (Standard Propagation) => +38 M-units/kft

For surface-based ducting, the refractivity profile is specified as a tri-linear function in M-units (modified index of refraction units), with the following parameters:

- Surface refractivity M (0) = 300 M-units
- k-factor outside layer = 1.33 (Standard Propagation) => +38 M-units/kft
- Height of layer bottom = 500 ft
- Height of layer top = 1000 ft
- M-Deficit across layer = 50 M-units

Figure C-1 plots M-units versus altitude for standard propagation, and Figure C-2 plots M-units versus altitude for the surface-based duct defined above.

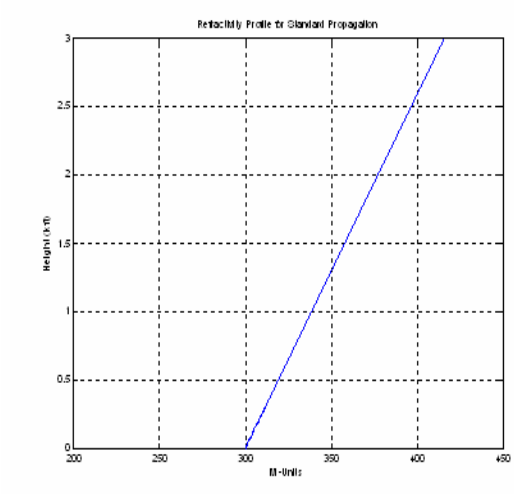

Figure C-1. Standard Propagation

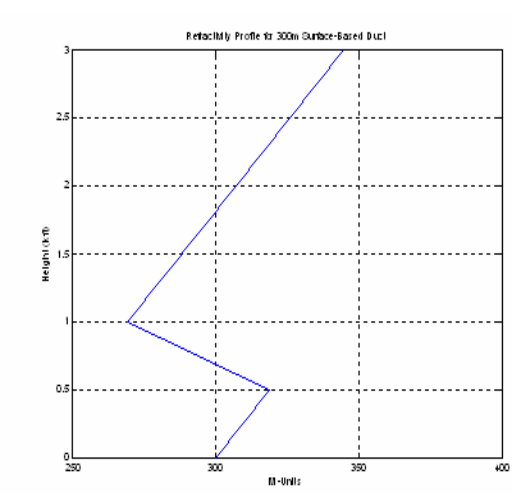

Figure C-2. Surface-Based Duct

The M&S tool to be employed to determine Pattern Propagation Factor (PPF) is TEMPER (Tropospheric Electromagnetic Parabolic Equation Routine), Version 3.1, the latest version in general release. TEMPER was developed by the Johns Hopkins University Applied Physics Laboratory (JHU/APL). TEMPER is a full Parabolic Wave Equation (PWE) model which computes the complex field, i.e. phase and amplitude, as it marches in range over both sea and land. It handles surface roughness effects over the ocean and variable terrain over land.[1]

TEMPER should be run over land with the following uniform surface properties for simplicity:[2]

Radar Frequency Band	**Land**[1]			**Sea**		
	Permitivity (Dimensionless)	Conductivity (mhos/m)	Surface Roughness (m)	Permitivity (Dimensionless)	Conductivity (mhos/m)	Surface Roughness (m)
L	15	0.068	1	70	5.42	1
S	15	0.27	1	68	7.5	1
C	14.7	0.67	1	64.6	10.3	1
X	11.8	1.64	1	53.4	17.0	1

Note: When TEMPER is run over land for the scenarios called out in section 3.0 of this Appendix, it should be run in the Hybrid mode or else roughness will be ignored. The alternative, if TEMPER is unavailable, is APM. APM (Advanced Propagation Model) was developed by Amalia Barrios, at SPAWAR (SSC-SD), and is now available over the SPAWAR web site. APM is a hybrid PWE model, so termed because it employs ray optics to compute the

[1] "A Comparison of Electromagnetic Parabolic Equation Propagation Models Used by the U.S. Navy to Predict Radar Performance," Boyer, Donald and Huong Pham, ACES Conference Proceedings, March 2000.
[2] Differing terrain types exhibit differing dielectric and physical properties. These differences are to be ignored here.

PPF or path loss close to the radar. Beyond this region the PPF or loss is computed with the PWE technique. An extended optics technique is used above the PWE region. Using this hybrid method significant execution time savings occur. APM operates over terrain as well as ocean, but it does not attempt to model surface roughness anywhere. APM executes about ten times as quickly as the non-hybrid models such as TEMPER. If an antenna height of more than 100 meters is specified, then APM resorts to a full PWE method.[3]

[3] Op cit 1

C.2.2 Weather Attenuation.

Attenuation of radar signals in the atmosphere is due to absorption and scattering (Section 1.4 of NEM) by the atmosphere, rain, and clouds.

C.2.2.1 Precipitation Environment.

The precipitation model for G/ATOR consists of a distributed rain field with a 1mm/hr rainfall rate throughout the entire coverage area of the G/ATOR radar system along with embedded storm cells.

C.2.2.2 Rain.

The distributed rain (stratiform precipitation) model employs a 1 mm/hr rainfall rate to represent uniform light rain. For simplicity's sake, the rainfall rate is constant with altitude and equal to the surface rainfall rate. The entire column of rain is at a constant temperature from top to bottom. Additionally, "Bright Band" effects are to be ignored – i.e. no melting-snow enhanced-returns as snow melts while falling through the 0°C altitude. To compensate for the lack of a "Bright Band" and non-consideration of rain drops entrained by updrafts, the rain will originate from the cloud tops (10 kft). Additionally, temperature corrections with altitude, while not specified in NEM, are sometimes employed in rain attenuation, but are to be ignored.

The 1 mm/hr distributed rain is based on ARSR 4 and on the Surface Meteorological Study (SMS).[4] 1 mm/hr is typical of stratiform rain and a gap in observed rainfall rates was apparent during the SMS's 14,000,000+ observations, with relatively few observations producing readings between 1 mm/hr (stratiform systems) and 25 mm/hr (cellular systems).

Distributed Rain Condition Scenario:

- 1.0 mm/hr uniform rain rate throughout G/ATOR surveillance volume (ARSR 4)
- 10 kft cloud top (AEGIS)
- Assume uniform rain rate from top of cloud
- Relative humidity 100% within & beneath cloud (i.e. from 0 to 20,000 ft)
- Ignore:
  - Temperature corrections
  - "Bright Band"

An embedded cellular system at 4 mm/hr is specified as an excursion, with a diameter of 10 nm centered on the radar. This cell extends to 20,000 ft altitude and has a constant rate rainfall both horizontally throughout the cell and vertically to the cloud top.

Cellular Rain Condition Scenario:

- 4.0 mm/hr uniform rain rate throughout G/ATOR surveillance volume within 5 nm of the G/ATOR radar system and centered above the radar
- 20 kft cloud top

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[4]. Surface Meteorological Summary (SMS) Program, Revision 1.01, October 17, 1990, Naval Ocean Systems Center, San Diego

- Assume uniform rain rate from top of cloud
- Relative humidity 100% within & beneath cloud (i.e. from 0 to 20,000 ft)
- Ignore:
  - Temperature corrections
  - "Bright Band"

C.2.2.3 Clouds.

Cloud attenuation is a major contributor to the attenuation of microwave radiation by weather. In order to determine the effects of clouds with some precision, the clouds must be properly characterized. The principal parameter of a cloud affecting attenuation is its water density. Typical stratiform rain clouds, nimbostratus, have an average density of approximately 0.25 gm/m^3 while cellular rain clouds, cumulonimbus, may be 1.0 gm/m^3 and above. Temperature effects are more important for clouds than for rain, so average temperatures are specified for the nimbostratus cloud(s) of 10^oC and the cumulonimbus of 0^oC.

Cloud vertical profiles for density are constant at the average values, as similarly, their vertical profiles for temperature are constant at their average temperatures.

Distributed Rain Cloud Condition Scenario (for 1 mm/hr rainfall rate):
- 2 kft cloud base
- 10 kft cloud top
- 0.25 gm/m^3 density
- 10 ^oC average temperature

Cellular Rain Cloud Condition Scenario (for higher rainfall rates):
- 2 kft cloud base
- 20 kft cloud top
- 1.0 gm/m^3 density
- 0 ^oC average temperature

C.2.2.4 Rain and Cloud Attenuation Coefficients.

The one-way attenuation coefficient for rain is given by:

$\gamma_R = k\, r^{\alpha}$ from Section 1.4.1 in NEM
where: r = rain rate in mm/hr,
and k and α are from Table 1.4.1-1 in NEM

But when r = 1, then: $\gamma_R = k$

The one-way attenuation coefficient for clouds is given by:

$A = b\, W\, f^{1.93}$ from Section 1.4.4 in NEM
where: W = water density of the cloud
and f = frequency in GHZ
and b = function of temperature

Table C-1 gives rain and cloud attenuation coefficients as a function of frequency. Note that these coefficients are given in dB/nm – NEM uses dB/km.

Table C-1. Sample Rain & Cloud Attenuation Coefficients for Distributed Rain System

Freq. (GHz)	Rain Attenuation (dB/nm)		Cloud Attenuation (dB/nm)	
	1 mm/hr	4 mm/hr	1 mm/hr (10°C)	4 mm/hr (0°C)
1	$6.77\ (10)^{-5}$	$2.37\ (10)^{-4}$	$3.80\ (10)^{-4}$	$5.09\ (10)^{-4}$
2	$2.82\ (10)^{-4}$	$1.00\ (10)^{-3}$	$1.43\ (10)^{-3}$	$1.90\ (10)^{-3}$
3	$7.09\ (10)^{-4}$	$3.13\ (10)^{-3}$	$3.14\ (10)^{-3}$	$4.20\ (10)^{-3}$
4	$1.13\ (10)^{-3}$	$5.26\ (10)^{-3}$	$5.47\ (10)^{-3}$	$7.40\ (10)^{-3}$
5	$2.01(10)^{-3}$	$1.17\ (10)^{-2}$	$8.43(10)^{-3}$	$1.14\ (10)^{-2}$
6	$3.02\ (10)^{-3}$	$1.82\ (10)^{-2}$	$1.13(10)^{-2}$	$1.62\ (10)^{-2}$
7	$5.12\ (10)^{-3}$	$3.35\ (10)^{-2}$	$1.61(10)^{-2}$	$2.18\ (10)^{-2}$
8	$7.76\ (10)^{-3}$	$4.89\ (10)^{-2}$	$2.09\ (10)^{-2}$	$2.82\ (10)^{-2}$
9	$1.35\ (10)^{-2}$	$7.56\ (10)^{-2}$	$2.62\ (10)^{-2}$	$3.54\ (10)^{-3}$
10	$1.74\ (10)^{-2}$	$1.02\ (10)^{-1}$	$3.21\ (10)^{-2}$	$4.34\ (10)^{-3}$

C.2.2.5 Atmospheric (Gaseous) Attenuation.

This final form of atmospheric attenuation is due to absorption by molecular oxygen and gaseous water vapor. As a note: the attenuation coefficients are additive. It is addressed in Section 1.4.2 of NEM. The principal requirement is that the correct relative humidity be specified, 50% in clear or non-precipitating condition scenarios, and 100% below the cloud tops and 50% above them in precipitating condition scenarios.

C.2.3 Clutter.

The G/ATOR clutter model consists principally of five components: two surface clutter models, land clutter and sea clutter, two volume clutter models, rain backscatter and birds / angels, and a wind velocity model, which will defined as part of the rain backscatter model.

C.2.3.1 Land Clutter.

The G/ATOR land clutter model is the Billingsley land clutter model, which is a comprehensive, empirical model based on many years of observation. The model provides land clutter information in the context of Weibull statistics and is parameterized in terms of depression angle. For a discussion of depression angle versus the more conventional grazing angle, see Billingsley, Section 1.4.5.

Three main categories of parameters are important to modeling land clutter. The first category is radar descriptive and includes parameters such frequency and spatial resolution. The second is descriptive of the clutter geometry, and includes range and depression angle. The third is descriptive of the terrain within the clutter patch, and includes terrain type (or classification) and terrain relief.[5] Table C-2 provides the basic model parameters (Table 4.2 in Billingsley, P295). Once the terrain type, terrain relief, and depression angle are known, the model yields the Weibull mean backscatter reflectivity (RCS / unit area illuminated) and the spatial statistics in the form of a Weibull Spread Factor. The reflectivity is returned as a function of the frequency band, with a notable omission at C-Band. Since the S-Band and X-Band entries are the same in all but 5 of the 27 cases, the C-Band "entries" are either exact or simple to interpolate. The Weibull Spread Factor is a function of the resolution area – linear interpolation is to be used to determine the spatial statistics.

The non-site-specific performance scenarios detailed in Section 3 will employ the land clutter model with flat terrain, which means no gross terrain masking - only the microshadowing inherent in the Weibull clutter statistics. That implies no propagation effects due to terrain relief, such as masking, diffraction, etc**.** Microshadowing is the blockage of the radar lines of sight to low-lying, shadowed terrain cells whose returns, as a result, are at the noise level of the radar receiver.[6]

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[5]Billingsley, P294
[6]Billingsley, P21

The clutter returns from land are assumed to be proportional to the product of the RCS of the clutter patch and the PPF to one meter above the clutter patch. The PPF to one meter above the clutter patch is to be used under all propagation conditions, including standard.

The spectral response of land clutter is as specified in Section 6.2 of Billingsley. It consists of a DC component and an AC component with exponential characteristics. The overall expression, the exponential parameter, and the AC/DC ratio, are given in Equations (6.1) through (6.4) in the same text. In the absence of trees, which are not required for this procurement, the land clutter can be considered to consist of a DC component in its entirety.

Table C-2. Land Clutter Model

Multifrequency Weibull Parameters of Land Clutter Amplitude distributions (Reproduced from Billingsly's Table 4.2):

Terrain Type	Depression Angle (deg)	$\overline{\sigma_w^\circ}$ (dB)					a_w	
		Frequency Band					Resolution (m^2)	
		VHF	UHF	L	S	X	10^3	10^6
Rural/Low- Relief								
(a) General rural	0.00 to 0.25	-33	-33	-33	-33	-33	3.8	2.5
	0.25 to 0.75	-32	-32	-32	-32	-32	3.5	2.2
	0.75 to 1.50	-30	-30	-30	-30	-30	3.0	1.8
	1.50 to 4.00	-27	-27	-27	-27	-27	2.7	1.6
	> 4.00	-25	-25	-25	-25	-25	2.6	1.5
(b) Continuous forest	0.00 to 0.30	-45	-42	-40	-39	-37	3.2	1.8
	0.30 to 1.00	-30	-30	-30	-30	-30	2.7	1.6
	> 1.00	-15	-19	-22	-24	-26	2.0	1.3
(c) Open farmland	0.00 to 0.40	-51	-39	-30	-30	-30	5.4	2.8
	0.40 to 0.75	-30	-30	-30	-30	-30	4.0	2.6
	0.75 to 1.50	-30	-30	-30	-30	-30	3.3	2.4
(d) Desert, marsh, or grassland (few discretes)	0.00 to 0.25	-68	-74	-68	-51	-42	3.8	1.8
	0.25 to 0.75	-56	-58	-46	-41	-36	2.7	1.6
	>0.75	-38	-40	-40	-38	-26	2.0	1.3
Rural/High Relief								
(a) General rural	0 to 2	-27	-27	-27	-27	-27	2.2	1.4
	2 to 4	-24	-24	-24	-24	-24	1.8	1.3
	4 to 6	-21	-21	-21	-21	-21	1.6	1.2
	> 6	-19	-19	-19	-19	-19	1.5	1.1
(b) Continuous forest	any	-15	-19	-22	-22	-22	1.8	1.3
(c) Mountains	any	-8	-11	-18	-20	-20	2.8	1.6
Urban								
(a) General urban	0.00 to 0.25	-20	-20	-20	-20	-20	4.3	2.8
	0.25 to 0.75	-20	-20	-20	-20	-20	3.7	2.4
	>0.75	-20	-20	-20	-20	-20	3.0	2.0
(b) Urban, observed on open low-relief terrain	0.00 to 0.25	-32	-24	-15	-10	-10	4.3	2.8
Negative Depression Angle								
(a) All, except mountains and high-relief continuous forest	0.00 to 0.25	-31	-31	-31	-31	-31	3.4	2.0
	0.25 to 0.75	-27	-27	-27	-27	-27	3.3	1.9
	>0.75	-26	-26	-26	-26	-26	2.3	1.7

C.2.3.2 Sea Clutter.

The G/ATOR Sea Clutter Model is derived from the AEGIS Sea Clutter Model. This model underwent a VV&A process and was accredited for the AN/SPY-1 DT/OT Land-Based Test Events, in order to test shipboard radar at a land-based test site (CSEDS, Moorestown, NJ). Additionally, the AEGIS Sea Clutter Model is more appropriate than the model in NEM, because it employs a log-normal distribution for the local mean reflectivity instead of a Weibull distribution, which appears to be invalid above C-Band. The mean values of global and local reflectivities are very close to each other, however, if the surface is specified by wave heights as opposed to sea states.

The AEGIS Sea Clutter model characterizes sea surface global mean reflectivity as a function of sea state (SS - number), grazing angle (ϕ, radians), polarization, wavelength (λ, feet) and wind aspect (θ, radians). This global mean reflectivity yields a local mean reflectivity, selected from a log-normal distribution with mean of the global mean and a log standard deviation related to resolution cell size. This leads to an instantaneous reflectivity coefficient with a mean value equal to the local mean reflectivity and exponential (Rayleigh amplitude) distribution.

The Global Mean Reflectivity for Sea State 5 (the only sea state required) is described by a wind speed factor (Gw), a wind aspect factor (Gu), and a low angle factor (Ga). They are defined below for sea states 3 and 5:

$Gw = 1.6^{A}$ for sea state 5 and $Gw = 1.25^{A}$ for sea state 3,

where $A = 2.63 * A_1 / (A_2 * A_3 * A_4)$

And $A_1 = [1 + (\lambda / 0.03)^3]^{0.1}$

$A_2 = [1 + (\lambda / 0.1)^3]^{0.1}$

$A_3 = [1 + (\lambda / 0.3)^3]^{Q/3}$

$A_4 = 1 + 0.35 * Q$

$Q = \phi^{0.6}$

$Gu = [1.0 - 0.6 * \sin^2(\theta)] * \exp [0.3 * \cos(\theta) * \exp(-\phi / 0.17) / (\lambda^2 + 0.005)^{0.2}]$

$Ga = \sigma_\varepsilon^{1.5} / (1 + \sigma_\varepsilon^{1.5})$, where $\sigma_\varepsilon = 35.9 * (\phi / \lambda)$

For Horizontal Polarization, the Global Mean Reflectivity for Sea State 5 is:

$\sigma_{hh}^0 = (1.7E\text{-}5) * \phi^{1/2} * Gw * Ga * Gu / (\lambda + 0.05)^{1.8}$

The Vertical Polarization Correction for Sea State 5 is:

C_{vv} (dB) $= 7.87 + 1.09 * \ln(\lambda) + 1.27 * \ln[\sin(\phi) + 0.0001]$

For Vertical Polarization, the Global Mean Reflectivity is:

σ_{vv}^0 (dB) $= \sigma_{hh}^0$ (dB) $+ C_{vv}$

The Local Mean Reflectivity Coefficient (σ_m): The mean value pertaining to a given resolution cell, selected from a log-normal distribution with mean σ^0 and (log) standard deviation:

σ_l = MAX [16 – 2.1*$\log_{10}$ (Ac), 3], where Ac (m^2) is the resolution cell area.
Instantaneous Reflectivity Coefficient (σ_i): Exponentially distributed with Rayleigh amplitude and mean σ_m.

Spatial correlation: σ_i and σ_m are independent from cell to cell, while σ^0 is a slowly varying function of grazing angle (or range) and wind aspect, as above.

Frequency correlation: σ_i is independent when using frequency agility and the frequency steps are greater than $1/\tau_c$, where τ_c is the range resolution in time units.

The spectral shape of Sea Clutter is Gaussian with a mean velocity of 1.4 m/sec for sea state 5 and 1.0 m/sec for sea state 3, and a standard deviation of 1 m/sec for sea state 5 and 0.5 m/sec for sea state 3, in the direction of the wind. These values should be decreased by cos (θ) [wind aspect angle] to account for the azimuthal difference between the beam electrical boresight and the wind direction.

Sea spike modeling, while a part of both the-updated AEGIS model and the NEM model, should be ignored, for implementation reasons. The AEGIS version is too processing-intensive to be used easily to generate significant numbers of spikes and therefore have significant effects on resource loading. The numbers of spikes generated by the NEM version produces way too few spikes to have significant effects on resource loading.

The method presented in this section has been excerpted from Section 2.4.4 of the "Natural Environmental Models For Shipboard Radars" referred to in Purpose above and applies to a non-standard atmosphere, such as subrefractive conditions, surface-based ducts, and evaporation ducts. The method described here[7] is based on the assumption that the equations presented above apply to "standard atmosphere" conditions. The method removes the standard-atmosphere propagation factor from the normalized radar cross section, and substitutes the propagation factor for the specific propagation condition of interest. This results in an adjusted value of the sea clutter reflectivity, $\sigma^\circ_P(\psi(R))$, that is calculated as follows:

$$\sigma^\circ_P(\Psi(R)) = \frac{\sigma^\circ(\Psi(R))}{F_S^4(\Psi(R))} F_P^4(\Psi(R_P)) \quad (m^2/m^2)$$

Where $\sigma^o(\psi)$ the normalized radar cross section is determined under standard-atmosphere conditions (Section 2.1) at the grazing angle ψ, and $F_s^4[\psi(R)]$ is the propagation factor for a standard atmosphere, evaluated at the range, R, which corresponds to the grazing angle ψ. $F_P^4[\psi(R_P)]$ is the propagation factor for the non-standard atmosphere evaluated at the range, R_P, which corresponds to the grazing angle ψ. The propagation factors are to be calculated using a high fidelity propagation code such as TEMPER. Both $F_s^4[\psi(R)]$ and $F_P^4[\psi(R_P)]$ are evaluated

[7] Reilly, J.P. and G.D. Dockery, "Influence of Evaporation Ducts on Radar Sea Return," IEEE Proceedings, Vol 137, Pt F, No. 2, PP 80-88, 1990

at the effective scattering height of the sea, which is 4 feet at Sea State 5, and 1 foot at Sea State 3. $F_s^4[\psi(R)]$ is calculated assuming an omni-directional antenna pattern, while $F_P^4[\psi(R_P)]$ must generally include actual antenna pattern effects.

The grazing angle ψ for non-standard atmospheric conditions may be determined using a combination of geometric optics and spectral estimation methods. This methodology has been incorporated in TEMPER, which is designed to produce grazing angles for use in the AEGIS or similar sea clutter model.

C.2.3.3 Rain Clutter

The clutter return / backscatter from rain precipitation is equal to the product of the backscatter coefficient or normalized RCS (RCS / unit volume) and the volume of the radar's resolution cell. The volume of the resolution cell is determined by the beamwidth(s) (if different) and range cell size of the radar. (NEM Sec 2.2.2 / 2.2.3)

The mean value of the rain precipitation backscatter coefficient (normalized RCS) for a particular resolution cell is given by:

$\delta^0 = K f^4 r^{1.6}$ from Section 2.2.3.1 in NEM

where: f = frequency in Hz

and $K = 7\ (10)^{-48}$ for f <= 6.0 GHz,

$13\ (10)^{-48}$ for f = 35 GHz

Interpolate for 6.0 GHz < f < 35 GHz

Linear interpolation of K vs. log f

and r = rain rate (mm/hr)

The rain clutter condition scenarios to be considered include the two rain rates specified in C.2.2.2, 1 mm/hr and 4 mm/hr (cell), and a displaced thunderstorm well away from the radar's site. The displaced thunderstorm has a rain rate of 50 mm/hr (cell) between the radar and the target.

Table C-3. Sample Rain Backscatter Coefficients for Several Rain Rates

Frequency (GHz)	K	Rain Backscatter Coefficients		
		1 mm/hr (m^2/m^3)	4 mm/hr (m^2/m^3)	50 mm/hr (m^2/m^3)
1	$7\ (10)^{-48}$	$0.70\ (10)^{-12}$	$6.43\ (10)^{-12}$	$3.66\ (10)^{-10}$
2	$7\ (10)^{-48}$	$1.12\ (10)^{-10}$	$1.03\ (10)^{-9}$	$5.85\ (10)^{-8}$
3	$7\ (10)^{-48}$	$5.67\ (10)^{-10}$	$5.21\ (10)^{-9}$	$2.96\ (10)^{-7}$
4	$7\ (10)^{-48}$	$1.79\ (10)^{-9}$	$1.64\ (10)^{-8}$	$9.36\ (10)^{-6}$
5	$7\ (10)^{-48}$	$4.38\ (10)^{-9}$	$4.03\ (10)^{-8}$	$2.80\ (10)^{-5}$
6	$7\ (10)^{-48}$	$9.07\ (10)^{-9}$	$8.33\ (10)^{-8}$	$4.74\ (10)^{-5}$
7	$7.5\ (10)^{-48}$	$1.80\ (10)^{-8}$	$1.65\ (10)^{-7}$	$9.41\ (10)^{-5}$
8	$8.0\ (10)^{-48}$	$3.28\ (10)^{-8}$	$3.01\ (10)^{-7}$	$1.71\ (10)^{-5}$
9	$8.4\ (10)^{-48}$	$5.51\ (10)^{-8}$	$5.06\ (10)^{-7}$	$2.88\ (10)^{-5}$
10	$8.8\ (10)^{-48}$	$8.80(10)^{-8}$	$8.08\ (10)^{-7}$	$4.60\ (10)^{-4}$

The displaced thunderstorm's rain rate was selected to correspond to conditions of severe environmental effects (10 dB rain attenuation), which occur within the line-of-sight of a ground-based radar at middle latitudes (New England) approximately 80 hours / year or 1% of the time.[8] These conditions, however, lead to flight regimes that are extremely dangerous to fly through, especially at very low altitudes. This thunderstorm is embedded in the overall rain field to be flown around, closely enough that at least 50% of the azimuthal extent of the radar's search beam containing the target (threat) illuminates the thunderstorm's cylindrical volume. Assume no radial variation in rain rate (50 mm/hr everywhere) within the 1 nm diameter of the cylindrical storm cell.

For the distributed rain (1 mm/hr rain rate) and the lighter storm cell (4 mm/hr rain rate), the clutter spectra are driven by a surface mean wind speed (magnitude) of 10 kts. (ARSR 4) The FAA wind model was chosen because both AEGIS (25 kts) and NEM (23.3) specify wind speeds (equivalent to a Sea State of 5) that are very high for stratiform rain. The mean wind speed increases linearly to 20 kts at 20 kft.

For the thunderstorm cell (50 mm/hr), the mean surface wind speed is 20 kts and wind speed increases linearly to 40 kts at 20 kft. (ARSR 4)

For all three precipitation condition scenarios, the instantaneous backscatter coefficient (δ) is exponentially distributed (Rayleigh amplitude) with mean δ^0. (AEGIS)

Frequency correlation of δ: δ is independent from pulse to pulse (or sub-pulse to sub-pulse) under frequency agility when the frequency steps are greater than $1/\tau_c$, where τ_c is the range resolution cell size in time units. (AEGIS)

For all three cases the spectral shape of the clutter is Gaussian, with mean values specified above. The standard deviations (σ) have a constant turbulence component (σ_t) and an additive wind shear component (σ_g) that is a function of the vertical extent of the resolution cell: (AEGIS)

$$\sigma^2 = \sigma_t^2 + \sigma_g^2$$

where: $\sigma_t = 2$ kts

$\sigma_g = 0.42\ k\ h$ kts

where: $k = 0.95$ kts / kft

h = vertical extent in kft

[8] "Frequency of Occurrence of Rain Attenuation of 10 dB or Greater at 10 GHz;" Austin, P.M.; MIT/LL; December 1966

C.2.3.4 Bird Clutter

The bird clutter model treats three classes of birds: light migratory birds (such as sparrows), heavy migratory birds (such as ducks), and sea birds (such as sea-gulls). While migratory birds are present only seasonally, sea birds are always present in the littorals. Individual birds produce point returns. (AEGIS)

The RCS of individual birds is given by type in Table C-4. For multiple birds in a resolution cell, the mean RCS is equal to the sum of their individual RCS values:

$$\sigma = \Sigma\, \sigma_i$$

The instantaneous RCS is constant for a single bird in a resolution cell; exponentially distributed (Rayleigh amplitude) for multiple birds with a mean σ.

The spectral shape is Gaussian. The mean velocity, which is vectorially added to the wind velocity, is 30 kts for migratory birds and 25 kts for sea birds. The standard deviation of velocity distribution is 5 kts for all three types of birds. These are also given in Table C-4.

Table C-4. Bird Clutter

Bird Type	Mean RCS (dBsm)	Minimum Altitude (kft)	Maximum Altitude (kft)	Mean Velocity (kts)
Light Migratory	-35	5	10	30 (NEM)
Heavy Migratory	-25	1	5	30 (NEM)
Sea Birds	-25	-	1	25

The extent of bird clutter is over all ranges and azimuths (see Table C-4 for altitude bands). Flights of birds of a given class fly within a 1 kft altitude band in sizes and numbers as given in Table C-5. The total numbers of birds given in the table are not necessarily visible to the radar. Unless otherwise stated in a performance scenario, standard propagation is used in calculating return power.

Table C-5. Distributions of Bird Flights

Bird Type	Flight Sizes						Total # Birds (R < 100 nm)
	1	5	10	20	50	100	
Light Migratory		10%	20%	40%	20%	10%	180,000
Heavy Migratory	20%	50%	30%				2000
Sea Birds	50%	50%					1000

C.3 Performance Scenarios

Performance scenarios specify operational conditions under which the proposed G/ATOR Radar Systems will be evaluated. As such, the performance scenarios combine propagation, attenuation, clutter, and tactical factors such as target RCS, velocity, altitude, and radar siting. The performance scenarios will be employed to analyze the G/ATOR radar system in terms of probability of detection and false alarm counts. Since the scenarios are functional in nature, they may not fully exercise all of the techniques necessary to meet the performance requirements set forth in the performance specification.

The performance scenarios are to be regarded as extending over 360° in azimuthal extent. They are not to be treated as single rays / planes, nor even as limited sectors. The exceptions are scenario 2, which calls out a shoreline scenario where the radar system "sees" two 180° sectors: one of a sea state 5 and one of flatlands, and Scenario11, also a shoreline scenario with sea state 3.

The nominal environment includes rural and mountain clutter in a standard propagation environment and is defined as follows:

- Propagation: The propagation conditions are defined as Standard Propagation (see section 2.1)
- Volume Clutter: The nominal environment contains no volume clutter.
- Surface Clutter: The nominal environment contains narrowband terrain clutter to the range of 50 nm. It contains no clutter beyond 50 nm.
    - Clutter Reflectivity: To 10 nm the clutter reflectivity corresponds to that of General Rural / Low Relief. From 10 nm to 50 nm it corresponds to that of mountain clutter. (See Table C-2 for both.)
    - Clutter Height Profile: The clutter relief is as per the specified environment – i.e., General Rural low relief to 10 nm, and high relief mountains beyond. The clutter environment is to be treated as non-site-specific.
- Mountain clutter will be patchy and will be treated according to the TSC/AEGIS Clutter/Environment Model Revision 23 October 1991 (See Page C-2.) It is summarized here as follows:
    - Clutter patches will each be sized at 5 Deg by 5 nm;
    - The probability that a given patch is shadowed is the probability that a uniformly distributed random number between 0 and 1 is less than $P_s(R) = \left(1 - e^{-R/b}\right) / \left(1 - e^{x/b}\right)$, where
        - R is the range to the target
        - x = 180 nm is the distribution cut-off range, and
        - b = 40 nm (It is the mean of the corresponding Probability Density Function (PDF) when the cut-off range, x, is infinite.)

Although the distribution is defined with a cut-off range of 180 nm – as per AEGIS – the maximum range to clutter will be as specified elsewhere in the PS.
Temporal correlation of mountain clutter patches will be unity: i.e., once a patch has been found to be visible for a certain scenario, it will remain visible throughout the

entire scenario. If it is not, it will remain in shadow. The distribution of clutter patches could change if the radar changes locations.

Spatial correlation in azimuth is defined as follows:

- The patches are uncorrelated in range
- The patches are correlated in azimuth as follows: If a random draw produces a visible patch, then the probability of shadowing for the next draw, proceeding in an azimuth ring, is

  $$P_s' = K1 \bullet P_s,$$

  where P_s is as given above. If a random draw produces a shadowed patch, then the probability of shadowing for the next draw is

  $$P_s' = 1 - K1 \bullet (1 - P_s),$$

  and $K1 = 0.7$. The initial draw uses P_s.

The mountain scenario consists not only of one specific randomly generated scenario. It includes any randomly drawn mountain patch scenario that obeys the above statistics.

The shadowing model represents the sum total of the propagation effects due to the high mountain relief. The propagation to targets or to any specific clutter patch should be produced using the appropriate propagation conditions computed over flat terrain, e.g., Standard Propagation conditions should simply correspond to 4/3 Earth. (This is so formulated in order to simplify the analysis and obviate the need to include site specific particulars in the study of each scenario.) All targets analyzed will be considered to be outside of mountain shadow – i.e., potentially visible.

- Clutter Statistics: The clutter statistics correspond to that of mountain clutter (see Table C-2).

Table C-6 describes the performance scenarios.

Table C-6. Air Mode Performance Scenarios

Case	Scen. No	Threat σ (Type)	Threat Alt (m)	Environment	Prop	Site[2]	Plot (Y/N)
1	1a	0	7000	Rural + Mountain	STD	High	Y
2	1a	0	7000	Rural+Mountain	SBD	High	Y
3	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5	1c	0	High Diver[1]	Rural+Mountain	STD	High	Y
6	1c	0	High Diver[1]	Rural+Mountain	SBD	High	N
7	1c	2	High Diver[1]	Rural+Mountain	STD	High	Y
8	1c	2	High Diver[1]	Rural+Mountain	SBD	High	Y
9	1d	1	1000	Rural+Mountain	STD	High	Y
10	1d	1	1000	Rural+Mountain	SBD	High	Y
11	1d	1	1500	Rural+Mountain	STD	High	Y
12	1d	1	1500	Rural+Mountain	SBD	High	Y
13	1e	2	100	Rural+Mountain	STD	High	Y
14	1e	2	100	Rural+Mountain	SBD	High	Y
15	1e	2	500	Rural+Mountain	STD	High	Y
16	1e	2	500	Rural+Mountain	SBD	High	Y
17	1e	2	1000	Rural+Mountain	STD	High	Y
18	1e	2	1000	Rural+Mountain	SBD	High	Y
19	1f	2	100	Rural+Mountain+Bird[3]	STD	High	Y
20	1f	2	100	Rural+Mountain+Bird[3]	SBD	High	Y
21	1f	2	500	Rural+Mountain+Bird[3]	STD	High	Y
22	1f	2	500	Rural+Mountain+Bird[3]	SBD	High	Y
23	1f	2	1000	Rural+Mountain+Bird[3]	STD	High	Y
24	1f	2	1000	Rural+Mountain+Bird[3]	SBD	High	Y
25	2a	0	15	Sea – SS5 Upwind 20kts	STD	Low	Y
26	2a	0	15	Sea – SS5 Upwind 20kts	SBD	Low	Y
27	2a	0	15	Sea – SS5 Crosswind 20kts	STD	Low	Y
28	2a	0	15	Sea – SS5 Crosswind 20kts	SBD	Low	Y
29	2a	0	15	Flatlands	STD	Low	Y

Case	Scen. No	Threat σ (Type)	Threat Alt (m)	Environment	Prop	Site[2]	Plot (Y/N)
30	2a	0	15	Flatlands	SBD	Low	Y
31	2b	2	15	Sea – SS5 Upwind 20kts	STD	Low	Y
32	2b	2	15	Sea – SS5 Upwind 20kts	SBD	Low	Y
33	2b	2	15	Sea – SS5 Crosswind 20kts	STD	Low	Y
34	2b	2	15	Sea – SS5 Crosswind 20kts	SBD	Low	Y
35	2b	2	15	Flatlands	STD	Low	Y
36	2b	2	15	Flatlands	SBD	Low	Y
37	3a	0	500	Urban (on open, low relief)	STD	High	Y
38	3b	2	500	Urban (on open, low relief)	STD	High	Y
39	3c	0	3000	Urban (on open, low relief)	STD	High	Y
40	3c	0	3000	Urban (on open, low relief)	STD	Low	Y
41	3d	2	500	Urban (on open, low relief)	STD	High	N
42	3d	2	500	Urban (on open, low relief)	STD	Low	N
43	3e	2	500	Urban (on open, low relief) + Birds	STD	High	Y
44	3e	2	500	Urban (on open, low relief) + Birds	STD	Low	Y
45	3f	2	500	Urban (on open, low relief) + Birds+Discretes[4]	STD	High	Y
46	3f	2	500	Urban (on open, low relief) + Birds+Discretes[4]	STD	Low	Y
47	4a	0	50	Flatlands	STD	High	Y
48	4b	2	50	Flatlands	STD	High	Y
49	5a	0	50	HR Rural	STD	High	Y
50	5a	0	50	HR Rural	SBD	High	Y
51	5b	2	50	HR Rural	STD	High	Y
52	5b	2	50	HR Rural	SBD	High	Y
53	6a	0	50	LR Rural	STD	High	N

Case	Scen. No	Threat σ (Type)	Threat Alt (m)	Environment	Prop	Site[2]	Plot (Y/N)
54	6a	0	50	LR Rural	SBD	High	N
55	6b	2	50	LR Rural	STD	High	N
56	6b	2	50	LR Rural	SBD	High	N
57	7a	0	3000	LR Rural+Rain (1mm/hr dist. + 4mm/hr cell)	STD	High	N
58	7b	2	3000	LR Rural+Rain (1mm/hr dist. + 4mm/hr cell)	STD	High	Y
59	8a	0	15000	No Clutter + Rain(1mm/hr dist. + 4mm/hr cell)	STD	High	N
60	8b	2+7dB	15000	No Clutter + Rain (1mm/hr dist. + 4mm/hr cell)	STD	High	N
61	9	0	3000	Mountains + Rain (1mm/hr dist. + 4mm/hr cell)	STD	High	Y
62	10	0	5000	HR Rural + Rain (1mm/hr dist. + 4mm/hr cell)	STD	High	N
63	11	0	7000 over land, 100 over sea	Low Land + Sea Composite (see description below)	STD	High	Y
64	11	0	7000 over land, 100 over sea	Mountains Composite (see description below)	STD	High	Y

Key to Table: HR = High relief
LR = Low relief
STD = Standard Propagation
SBD = Surface Based Duct
Low Site = Base of the radar 100 ft above MSL, within 0.5 nm of the shoreline with no masking of the sea surface by the land
High Site = Base of the radar 200 ft above the surrounding (flat) terrain

Case	Scen. No	Threat σ (Type)	Threat Alt (m)	Environment	Prop	Site[2]	Plot (Y/N)

[1]High Diver Trajectory: approaching from long range at 17,000 m (approximately 56,000 ft) and diving toward the radar at a 60 degree diving angle, beginning at the range appropriate for such maneuver.

[2]The antenna height is determined relative to MSL, and determines visibility relative to the flat land horizon. Mountain clutter will be observed all the way to 50 nmi. Therefore, the mountain clutter patches will be sufficiently high to be seen at that range. Urban clutter will consist of buildings and other man made artifacts. They will rise to heights up to 30 ft beneath radar antenna at the low site, and 130 ft beneath the antenna at the high site.

[3] The bird clutter added to Cases 19 - 24 is defined in Appendix C Tables C4 and C-5. The requirement is for detection range to degrade gracefully with the minimum degradation possible.

[4] The discrete clutter objects of Cases 45 and 46 consist of one 30 and one 40 dBsm object at 1 km, and one 30 and one 40 dBsm object at 2 km, with all four objects separated in azimuth by at least 10 degrees. The height will be, at least, 60 ft above the ground, and will be such as to be illuminated by the Horizon Search main beam. The requirement is for detection range to degrade gracefully, with the minimum degradation possible.

In Scenario 2, refer to C.2.3.2 for sea clutter characteristics. For SS5, the RMS surface displacement is 2.16 ft, which is equivalent to a significant wave height ($h_{1/3}$) of 8.65 ft.
The composite scenario (11) is described in Figure C-3 as follows:

- The radar is located 2 nm from the sea shore, surrounded by flatland (desert, marsh, etc.) 50 miles across the water, there is low land (desert, marsh, etc.) as shown.
- Away from the water, beginning 30 nm away from the radar, across a 180 degree sector there are mountains. The mountains are distributed in patches according with the patch size and shadowing statistics given for Scenario 1. Contrary to Scenario 1, the random draws for the visible patches have been performed in advance in this scenario and the patch locations are shown in Figure C-3.
- There is also an urban clutter patch occupying a 15 degree sector between the ranges of 10 nm and 15 nm, from the shoreline, in a direction perpendicular to the shoreline, as shown in the same figure.
- For SS 3, the RMS surface displacement is 0.98 ft, which is equivalent to a significant wave height ($h_{1/3}$) of 3.92 ft. Refer to C.2.3.2 for sea clutter characteristics.
- For case 63, the target is approaching from the West.
- For case 64, the target is approaching from the East.

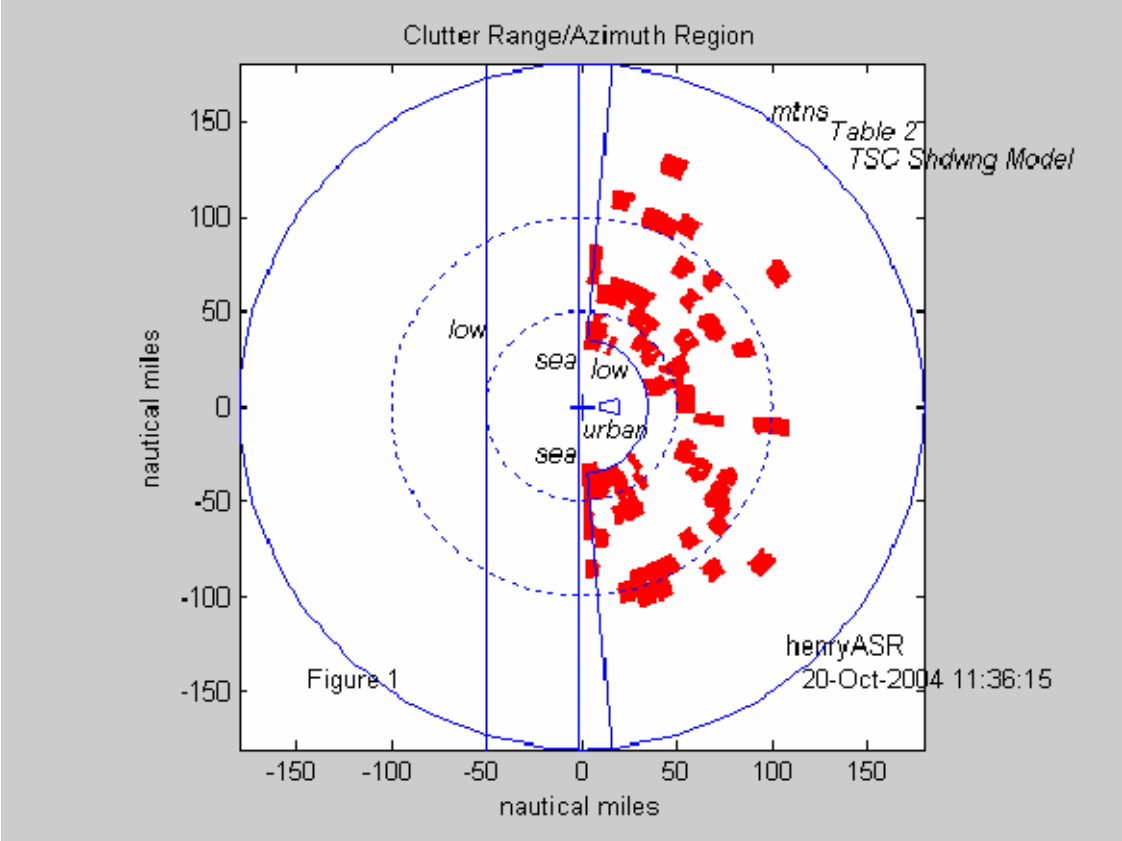

Figure C-3: Composite Scenario 11 Layout

Table C-7 defines the range (nautical miles) and bearing (degrees) from the radar to the center of the visible mountain clutter patches given in Scenario 11 (Mountain Clutter Patch Locations and Plots). Zero degrees is due East. The patches are +/- 2.5 degrees wide and +/- 2.5 nautical miles in length.

Table C-7. Mountain Clutter Patch Locations and Plots (Scenario 11)

Mountain Clutter Patch Locations & Plots for Scenario 11							
Theta Degrees	**Range Nm**	**Theta Degrees**	**Range Nm**	**Theta Degrees**	**Range Nm**	**Theta Degrees**	**Range Nm**
-86.000	30.00	-46.00	30.00	14.00	30.00	49.00	80.00
-86.00	35.00	-46.00	80.00	14.00	40.00	54.00	45.00
-86.00	40.00	-41.00	40.00	14.00	55.00	54.00	55.00
-86.00	50.00	-41.00	80.00	19.00	30.00	54.00	80.00
-86.00	60.00	-41.00	85.00	19.00	45.00	59.00	45.00
-86.00	80.00	-41.00	115.00	19.00	80.00	59.00	50.00
-81.00	35.00	-36.00	40.00	24.00	40.00	59.00	55.00
-81.00	50.00	-36.00	75.00	24.00	45.00	59.00	65.00
-81.00	60.00	-36.00	80.00	24.00	55.00	59.00	100.00
-76.00	35.00	-31.00	40.00	29.00	45.00	64.00	40.00
-76.00	50.00	-31.00	60.00	29.00	55.00	64.00	55.00
-76.00	90.00	-31.00	75.00	29.00	70.00	64.00	95.00
-71.00	30.00	-26.00	50.00	34.00	35.00	69.00	30.00
-71.00	35.00	-26.00	60.00	34.00	40.00	69.00	40.00
-71.00	50.00	-26.00	75.00	34.00	55.00	69.00	50.00
-71.00	85.00	-26.00	80.00	34.00	70.00	69.00	55.00
-71.00	95.00	-21.00	50.00	34.00	115.00	69.00	95.00
-66.00	30.00	-21.00	55.00	39.00	35.00	69.00	125.00
-66.00	40.00	-21.00	75.00	39.00	40.00	74.00	30.00
-66.00	50.00	-16.00	55.00	39.00	115.00	74.00	50.00
-66.00	85.00	-6.00	30.00	44.00	35.00	74.00	55.00
-66.00	95.00	-6.00	55.00	44.00	40.00	74.00	110.00
-61.00	30.00	-6.00	60.00	44.00	45.00	79.00	30.00
-61.00	35.00	-6.00	85.00	44.00	60.00	79.00	35.00
-61.00	45.00	-6.00	95.00	44.00	70.00	79.00	50.00
-61.00	50.00	-1.00	30.00	44.00	80.00	79.00	100.00
-61.00	85.00	-1.00	45.00	44.00	85.00	84.00	30.00
-56.00	95.00	4.00	45.00	44.00	115.00	84.00	60.00
-51.00	40.00	4.00	55.00	49.00	35.00	84.00	65.00
-51.00	80.00	9.00	30.00	49.00	45.00	84.00	70.00
-51.00	100.00	9.00	45.00	49.00	55.00		
-46.00	30.00	14.00	30.00	49.00	80.00		
-46.00	80.00	14.00	40.00	54.00	45.00		

Mountain Clutter Patch Locations & Plots for Scenario 11							
Theta Degrees	**Range Nm**	**Theta Degrees**	**Range Nm**	**Theta Degrees**	**Range Nm**	**Theta Degrees**	**Range Nm**
-41.00	40.00	14.00	55.00	54.00	55.00		
-41.00	80.00	19.00	30.00	54.00	80.00		
-41.00	85.00	19.00	45.00	59.00	45.00		
-41.00	115.00	19.00	80.00	59.00	50.00		
-36.00	40.00	24.00	40.00	59.00	55.00		
-36.00	75.00	24.00	45.00	59.00	65.00		
-36.00	80.00	24.00	55.00	59.00	100.00		
-31.00	40.00	29.00	45.00	64.00	40.00		
-31.00	60.00	29.00	55.00	64.00	55.00		
-31.00	75.00	29.00	70.00	64.00	95.00		
-26.00	50.00	34.00	35.00	69.00	30.00		
-26.00	60.00	34.00	40.00	69.00	40.00		
-26.00	75.00	34.00	55.00	69.00	50.00		
-26.00	80.00	34.00	70.00	69.00	55.00		

Table C-8 defines Ground Mode performance scenarios that will be used to evaluate the radar in a variety of environments.

Clutter Scenario 12: (Simultaneous sea clutter, volume clutter and multipath for Sea State-1, smooth sea, and rainfall attenuation).

- The radar and the weapons are at sea level.
- Multipath is defined as the interference between the direct and indirect paths for each track update. The computation of multipath interference follows standard practice, as in L. V. Blake, Radar-Range Performance Analysis, Artech House, 1986. The ray-path focus at the radar is the center of the erected antenna at sea level. Both specular and diffuse scattering should be included.
- Sea clutter is also included, consistent with Blake's sea-clutter model for Sea State 1.
- Rainfall is 1 mm/hr, using the rain attenuation model from Stapleton et al., "Natural Environmental Models for Shipboard Radars," Dahlgren Division of the Naval Surface Warfare Center, NSWCDD/TR-99/l 51, Sept. 2001, except that rainfall is to be homogeneous from the surface to 3.5 km altitude out to the horizon.
- For rain clutter, the wind magnitude is adjusted for altitude according to the NWSC model. Additionally, the appropriate component is scaled according to the shot array case and local wind direction.

Clutter Scenario 13: (Simultaneous ground clutter, rainfall, and wind.)

- The radar and the weapons are at sea level.
- Ground clutter is specified as having a Weibull amplitude distribution with a median reflectivity of -30 dB m2/m2 and a 90th percentile reflectivity of -20 dB m2/m2.
- The power spectral density of continuous forest ground clutter is taken from Billingsley, "Exponential decay in wind blown radar ground clutter Doppler spectra: multi-frequency measurement and model," MIT Lincoln Laboratory, TR-997, July 1996. (DTIC AD A31 399) with a ground wind speed of 20 meters/sec.
- The wind direction is taken as 45 degrees with respect to the direction towards the antenna boresight (at the boresight) adjusted appropriately for each case in the shot array.
- The rainfall rate is assumed to be 4 mm/hr and homogeneous from the surface to 3.5 km altitude out to the horizon. For rain clutter the wind magnitude is adjusted according to altitude according to the NWSC model, and the appropriate component scaled according to the case and local wind direction.
- In all cases, the wind is used to define clutter conditions and is assumed NOT to influence the projectile.

Clutter Scenario 13M: (Scenario 13 plus Birds and Aircraft)

- Bird clutter as defined by PS Appendix C, Tables C-4 and C-5.
- Five hundred Type 0 aircraft; uniformly distributed in range out to 120 nm, from ground to 40,000 ft. altitude, over 360° (6400 mils) in azimuth. Aircraft speed is uniformly distributed from 200 knots to Mach 1. Aircraft direction is uniformly distributed.

Table C-8. Ground Mode Performance Scenarios

Scenario #	Threat Shot Array Case No.	Environment	Prop	Site
12	9-176, 209-224, and 241-252	Simultaneous sea clutter and multipath for Sea State 1, smooth sea, 1 mm (cell) /hr rain (homogeneous from the surface to 3 km altitude)	STD	Radar Sea Level (add antenna height) Weapon launcher/gun is at sea level
13	9-176, 209-224, and 241-252	Simultaneous ground clutter, Wind and Rain (4 mm/hr and homogeneous from the surface to 3 km altitude)	STD	Radar Sea Level (add antenna height) Weapon launcher/gun is at sea level
13M	9-176, 209-224, and 241-252	Scenario 13 plus Bird Clutter and Airplanes	STD	Radar Sea Level (add antenna height) Weapon launcher/gun is at sea level

Appendix D. EME Environment

Table D-1.Selected EME Transmitter Characteristics

J/F 12	Nomenclature	Abbreviated Nomenclature	Tuning Range (MHz)	Power (kW)	Power (dBm)	System Losses (dB)	Spurious Attenuation (dB)	Antenna Gain (dBi)	
								Mainbeam	Sidelobe
1057	AN/TPS-32	AN/TPS-32	2900-3100	1700	92	3	45	41.5	22.0
3184	AN/SPN-43	AN/SPN-43	3590-3700	1000	90	3	60	32	9
3215	AN/SPS-59(V)1	AN/SPS-59	9345-9405	10	70	3	60	28	N/A
3565	AN/TPQ-36	AN/TPQ-36	9370-9990	31	75	3	85	42.2	22.0
3834	AN/TPS-63	AN/TPS-63	1250-1350	100	80	3	90	32.5	9.4
4150/2	AN/TPN-22	AN/TPN-22	9000-9200	120	81	3	60	40	N/A
4447	AN/TSC-93	AN/TSC-93	7900-8400	0.2	53	3	90	45.2	24.0
4480	AN/TRC-170(V)2	AN/TRC-170	4400.0-4999.9	8.1	69	3	80	44.5	18.0
4955	RT-1293/SPS-67(V)1	AN/SPS-67	5450-5825	0.38	56	3	53	30	9
5429	EL-M 2106	AN/UPS-3	1215-1300	0.15	52	3	65	22	3
5710/4	NEXRAD AN/WSR-88D	AN/WSR-88D	2700-3000	700	88	3	80	45.8	17.3
6082	AN/TPS-73	AN/TPS-73	2700-2900	14.5	72	3	80	34.0	9.2
6461	AN/GRC-408U	AN/GRC-408U	1350-1850	0.003	35	3	60	20.3	6.3
6534	AN/UPQ-3(A) Air	AN/UPQ-3(A) Air	10150-10425	0.070	48	3	60	22	10
6534	AN/UPQ-3(A) Ground	AN/UPQ-3(A) Ground	9750-9950	0.070	48	3	60	42	20
6804	AN/TSQ-190(V) C-Band	AN/TSQ-190 C-Band	3625-4200	0.05	47	3	50	48.5	15.6
6804	AN/TSQ-190(V)4 X-Band	AN/TSQ-190 X-Band	7900-8400	0.35	55	3	50	50	18
6992	AN/TPS-59	AN/TPS-59	1222.32-1392.56	45	77	3	70	37.0	9.5
7373	AN/TPS-76	AN/TPS-76	5300-5700	250	84	3	36	44.5	19.5
7456	LST-8000(V)T C-Band	LST-8000 C-Band	5845-6425	0.4	56	3	65	49	39
7456	LST-8000(V)T X-Band	LST-8000 X-Band	7900-8400	0.4	56	3	65	49	39
7547	AN/SPS-73(V)	AN/SPS-73	9380-	25	74	3	70	31	9

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J/F 12	Nomenclature	Abbreviated Nomenclature	Tuning Range (MHz)	Power (kW)	Power (dBm)	System Losses (dB)	Spurious Attenuation (dB)	Antenna Gain (dBi)	
								Mainbeam	Sidelobe
			9440						
7652	RT-1802	AN/SRC-57	1350-1850	0.1	50	3	60	7.33	2.0
7723	AN/TSC-1XX TIGDL	TIGDL	9750-9950	0.0005	37	3	52	42	22
7771	PTD7546	MDSS II	2400-2500	0.0001	20	3	40	9	5
-	AN/TPS-79	AN/TPS-79	2700-2900	25	74	3	60	54	N/A
	AN/SPY-1D(V) AN/SPS-49 AN/SPY-3 VN-1 AN/SPY-3 Periscope Mode AN/SPS-48E GBR-TMD (THAAD) AN/SPS-59(V)1 AN/MPQ-53 AN/SPQ-9B AN/MPQ-52X AN/MPQ-52L		See Classified Supplement						

Table D-2. Selected EME Receiver Characteristics

J/F 12	Nomenclature	Abbreviated Nomenclature	Tuning Range (MHz)	Sensitivity (dBm)	S/N (dB)	Spurious Attenuation (dB)	Antenna Gain (dBi)	
							Mainbeam	Sidelobe
1057	AN/TPS-32	AN/TPS-32	2900-3100	-107	1.6	50	41.5	22.0
3184	AN/SPN-43	AN/SPN-43	3590-3700	-110	3.0	60	32	9
3215	AN/SPS-59(V)1	AN/SPS-59	9345-9405	-97	3.0	40	28	N/A
3565	AN/TPQ-36	AN/TPQ-36	9370-9990	-107	9.0	74	42.2	22.0
3834	AN/TPS-63	AN/TPS-63	1250-1350	-113	0.0	90	32.5	9.4
4150/2	AN/TPN-22	AN/TPN-22	9000-9200	-98	6.0	80	40	N/A
4447	AN/TSC-93	AN/TSC-93	7900-8400	-126	9.0	80	42.5	24.0
4480	AN/TRC-170(V)2	AN/TRC-170	4400.0-4999.9	-110	24.4	130	44.5	18.0
4955	RT-1293/SPS-67(V)1	AN/SPS-67	5450-5825	-102	30.0	80	30	9
5429	EL-M 2106	AN/UPS-3	1215-1300	-115	10.0	103	22	3
5710/4	NEXRAD AN/WSR-88D	AN/WSR-88D	2700-3000	-115	0.0	60	45.8	17.3
6082	AN/TPS-73	AN/TPS-73	2700-2900	-120.5	6.6	80	34.0	9.2
6461	AN/GRC-408U	AN/GRC-408U	1350-1850	-93	14.7	80	20.3	6.3
6534	AN/UPQ-3(A) Air	AN/UPQ-3(A) Air	9750-9950	-105.7	3.6	100	25	12
6534	AN/UPQ-3(A) Ground	AN/UPQ-3(A) Ground	10150-10425	-88.1	13.2	60	20	7
6804	AN/TSQ-190(V) C-Band	AN/TSQ-190 C-Band	3625-4200	-90	6.2	90	45.2	14.4
6804	AN/TSQ-190(V)4 X-Band	AN/TSQ-190 X-Band	7250-7750	-90	6.2	80	50.5	18
6992	AN/TPS-59	AN/TPS-59	1222.32-1392.56	-98.44	10.5	80	37.0	9.5
7178	AN/TMQ-41	AN/TMQ-41	1660-1700	-107	10.5	50	16	4
7373	AN/TPS-76	AN/TPS-76	5300-5701	-109	6.3	60	44.5	19.5
7456	LST-8000(V)T C-Band	LST-8000 C-Band	3625-4200	-91	29.7	65	38.5	36.0
7456	LST-8000(V)T X-Band	LST-8000 X-Band	7250-7750	-90	30.3	60	43	36
7547	AN/SPS-73(V)	AN/SPS-73	9380-	-97	0.5	60	31	9

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J/F 12	Nomenclature	Abbreviated Nomenclature	Tuning Range (MHz)	Sensitivity (dBm)	S/N (dB)	Spurious Attenuation (dB)	Antenna Gain (dBi)	
							Mainbeam	Sidelobe
			9440					
7652	RT-1802	AN/SRC-57	1350-1850	-84	21.9	80	7.33	2.0
7723	AN/TSC-1XX TIGDL	TIGDL	10150-10430	-87.8	11.8	60	42	22
7771	PTD7546	MDSS II	2400-2500	-76	19.9	50	9	5
7908	L3VNTXL-2A	Dragon Eye Data/Video Link	1710-1850	-84.2	12.0	60	10	5
-	AN/TPS-79	AN/TPS-79	2700-2900	-113	Unk	60	40	N/A
	AN/SPY-1D(V) AN/SPS-49 AN/SPY-3 VN-1 AN/SPY-3 Periscope Mode AN/SPS-48E GBR-TMD (THAAD) AN/SPS-59(V)1 AN/MPQ-53 AN/SPQ-9B AN/MPQ-52X AN/MPQ-52L		See Classified Supplement					

Appendix E GLOSSARY

Architecture	The organizational structure of a system or component, their relationships, and the principles and guidelines governing their design and evolution over time. *(IEEE 610.12)*
Availability	A measure of the degree to which a system is in an operable and committable state at the start of a mission, given a random point in time.
Commercial Item	(CI) The CI definition can be found in *Federal Acquisition Regulation (FAR) Subchapter A general, Part 2, 2.101 Definitions at http://www.arnet.gov/far/*
Closed interfaces	Privately controlled system/subsystem boundary descriptions that are not disclosed to the public or are unique to a single supplier. *(OSJTF 2004)*
De jure standard	A standard that has been officially approved by a recognized standards body. *(OSJTF 2004)*
De facto standard	A standard that is widely accepted and used but that lacks formal approval by a recognized standards organization. *(FED-STD-1037C)*
Deployment	For reliability, maintainability, and availability calculations, a deployment is: 72 hour periods of operation within a mission period for the SHORAD and Ground, TAOC (72 hrs to 12 days) mission sets and a 30 day period of operation for the ATC mission set.
Detail Specification	A specification that specifies traceable design requirements, such as materials to be used, how a requirement is to be achieved, or how an item is to be fabricated or constructed. A specification that contains both performance and detail requirements is still considered a detail specification. *(OSJTF 2004)*
Domain	A Domain is a grouping of related items within a certain area of interest. DoD domains include Operational Domains (e.g., Joint strike, strategic deterrence) and Functional Domains (e.g., communications, navigation,

	fire control). *(TRI-SERVICE Open Systems Architecture Working Group)*
Inherent Availability (Ai):	Availability of a system with respect only to operating time and corrective maintenance. It ignores standby and delay times associated with preventive maintenance as well as administrative and logistics down time. *(OPNAVINST 3000.12A)*
Interface standard	A standard that specifies the physical or functional interface characteristics of systems, subsystems, equipment, assemblies, components, items or parts to permit interchangeability, interconnection, interoperability, compatibility, or communications. *(MIL-STD-962D draft dated 01 Aug 2003)*
Interoperability	The ability of two or more systems or components to exchange data and use information. *(IEEE STD 610.12)*
Intra-operability	The ability to (1) interchange and use information, services and/or physical items among components within a system (platform, program or domain) and (2) support the common use of components across various product lines. *(OSJTF 2004)*
Level of openness	The lowest level (e.g., system, subsystem or component) at and above which the buyer defines critical interfaces and requires conformance of these interfaces to open standards. There most likely will be multiple levels of openness in any given system because of the variety of subsystems and components. The level of openness changes as requirements evolve and influences the extent to which the buyer can: (1) use multiple suppliers (2) insert new technology *(3)* accomplish shop repairable unit (SRU) maintenance (i.e. “swap box” repair), and *(4)* assign the control on design, interfaces, repair, and implementation to the contractor. *(OSJTF 2004)* *(5)*
Maintainability	Maintainability is defined as the ability of an item to be retained in, or restored to, specified conditions when maintenance is performed by personnel having specified

skill levels, using prescribed procedures and resources at each prescribed level of maintenance.

Maintenance Stand Down — For reliability, maintainability, and availability calculations, maintenance stand down is a period of 8 hours between missions that scheduled preventive and corrective maintenance and system reconstitution can occur. After this action is performed, the team and equipment will be capable of conducting another mission. An annual maintenance stand down is also performed once a year for a period of 48 hours.

Market Acceptance — Market acceptance means that an item has been accepted in the market as evidenced by annual sales, length of time available for sale, and after-sale support capability. *(OSJTF 2004)*

Maximum Time To Repair (MaxTTR). That time below which a specified percentage of all corrective maintenance tasks must be completed. MaxTRR is used as an "on-system" maintainability parameter; it is not used for the off-system repair of replaced components.

Mask Angle — The vertical angle from the radar to the top of the mask, or screening crest, at a given azimuth. For a given sector of search, the lowest mask angle and the highest mask angle are calculated and entered in the radar computer during its initialization procedures.

Mean Down Time (MDT) — The average time a system is unavailable for use due to either corrective or preventive maintenance. Time includes the actual repair time, including fault detection, fault isolation, removal and replacement of failed components, and verification that the fix restored proper operation (i.e., MTTR) and all delay time(s) associated with arrival of a qualified repairman, with necessary technical publications, support equipment, and appropriate replacement parts, etc (i.e., MLDT). *(OPNAVINST 3000.12A)*

Mean Down Time for Documentation (MDTD): The average downtime per maintenance action to obtain documentation needed for fault location/isolation, maintenance and checkout. *(OPNAVINST 3000.12A)*

Mean Down Time for Other Reasons (MDTOR): The average downtime per maintenance action for reasons not otherwise identified. *(OPNAVINST 3000.12A)*

Mean Down Time for Training (MDTT): The average downtime per maintenance action due to lack of training. *(OPNAVINST 3000.12A)*

Mean Logistics Delay Time (MLDT): The average time a system is unavailable due to logistics system delays associated with the maintenance action (i.e., obtaining required parts (MSRT) or other logistics resources (MAdmDT, MOADT) and other delays) where: *(OPNAVINST 3000.12A)*

Mean Supply Response Time (MSRT): Is the average portion of down time awaiting receipt of a spare component (both from onboard and from off ship). MSRT is the single greatest driver in MLDT. *(OPNAVINST 3000.12A)*

Mean Administrative Delay Time (MAdmDT): The average period of down time awaiting logistics resources other than spare parts. It includes time awaiting qualified maintenance personnel, support equipment, technical data, training, facilities, etc. Examples are Mean Down Time for Documentation (MDTD), Mean Down Time for Training (MDTT), and Mean Down Time for Other Reasons (MDTOR).

Mean Outside Assistance Delay Time (MOADT): The average time awaiting maintenance teams from other locations - depot repair teams and general support teams who travel to operating sites to perform maintenance are examples. *(OPNAVINST 3000.12A)*

Mean Time Between Failures (MTBF): For a particular interval, the total functional life of a population of an item divided by the total number of failures within the population. The definition holds for time, rounds, miles, events, or other measures of life unit. *(OPNAVINST 3000.12A)*

Mean Time Between Maintenance (MTBM): One of the basic measures of reliability for repairable fielded systems, it is the average time between all system maintenance actions, including both corrective and preventive maintenance actions whether scheduled or unscheduled. *(OPNAVINST 3000.12A)*

Mean Time Between Mission Critical Failures (MTBMCF):	*see Mean Time Between Operational Mission Failures.*
Mean Time Between Operational Mission Failures. (MTBOMF):	MTBOMF measures reliability as it relates to the overall mission of the equipment or system being tested and is the total operating time divided by the number of operational mission failures. MTBOMF is the figure used in the calculation of overall mission reliability (R).
Mean Time To Repair (MTTR)	A basic technical measure of maintainability - the average elapsed time (clock hours) for corrective maintenance. *(OPNAVINST 3000.12A)* The Repair Time is the total number of clock-hours of corrective, on-system, active repair time due to all corrective maintenance. This includes testing times for fault detection, isolation and verification of corrective action.
Militarized	Items which are designed and manufactured to military requirements. *(MIL-STD-2036B)*
Mission	For reliability, maintainability, and availability calculations, a mission is a 60 day (1440 hour) period of operation.
Mission Critical Failure	*see Operational Mission Failure.*
Mission Reliability:	A measure of the ability of an item to perform its required mission critical functions for the duration of a specified mission. Can also be stated as the probability that a system can complete its required operational mission without an operational mission failure. *(OPNAVINST 3000.12A)*
Modular	Pertaining to the design concept in which interchangeable units are employed to create a functional end product. *(FED-STD-1037C)*
Module	An interchangeable item that contains components. In computer programming, a program unit that is discrete and identifiable with respect to compiling, combining with other modules, and loading is called a module. *(FED-STD-1037C)*

Near Real Time	Near real time is defined by ANS T1.523-2001 Telecom Glossary 2000 as, Timeliness of data or information which has been delayed by the time required for electronic communication and automatic data processing.
Non Developmental Item	(NDI) The NDI definition can be found in *Federal Acquisition Regulation (FAR) Subchapter A general, Part 2, 2.101 Definitions at http://www.arnet.gov/far/*
Non-Government Standard	(NGS) A standardization document developed by a private sector association, organization or technical society which plans, develops, establishes, or coordinates standards, specifications, handbooks, or related documents. The term does not include standards of individual companies. *(DoD 4120.3-M)*
Open Specifications	Public specifications that are maintained by an open, public consensus process to accommodate new technologies over time and that are consistent with international standards. *(IEEE POSIX 1003.0/D15)*
Open Standards	Widely accepted and supported standards set by recognized standards organization or the commercial market place. These standards support interoperability, portability, and scalability and are equally available to the general public at no cost or with a moderate license fee. *(OSJTF 2004)*
Open System	A system that implements sufficient open standards for interfaces, services, and supporting formats to enable properly engineered components to be utilized across a wide range of systems with minimal changes, to interoperate with other components on local and remote systems, and to interact with users in a style that facilitates portability. An open system is characterized by the following: - well defined, widely used, non-proprietary interfaces/protocols, and - use of standards which are developed/adopted by recognized standards bodies or the commercial market place, and - definition of all aspects of system interfaces to facilitate new or additional systems capabilities for a wide range of applications, and

- explicit provision for expansion or upgrading through the incorporation of additional or higher performance elements with minimal impact on the system.

(OSJTF 2004)

Open Systems Approach	The open systems approach is an integrated business and technical strategy to (1) choose commercially supported specifications and standards for selected system interfaces (external, internal, functional, and physical), products, practices, and tools, and (2) build systems based on modular hardware and software design. In order to achieve an integrated technical and business strategy, an integrated product team (IPT) process is needed that involves all interested parties, e.g. engineering, logistics, finance, contracting, industry, etc. Selection of commercial specifications and standards will be based on: - those adopted by industry consensus based standards bodies or de facto standards (those successful in the market place); - market research that evaluates the short and long term availability of products; - a disciplined systems engineering process that examines tradeoffs of performance, - supportability and upgrade potential within defined cost constraint; and - allowance for continued access to technological innovation supported by many customers and a broad industrial base. *(OSJTF 2004)*
Open Systems Architecture	(OSA) An architecture produced by an open systems approach and employing open systems specifications and standards to an appropriate level. *(OSJTF 2004)*
Open system-based CI	The commercial items that use open standards as their primary interface standards and are selected based on performance, cost, industry acceptance, long term availability and supportability, and upgrade potential. *(OSJTF 2004)*
Open system-based NDI	The non-developmental items that use open standards as their primary interface standards and are selected based on performance, cost, industry acceptance, long term

	availability and supportability, and upgrade potential. *(OSJTF 2004)*
Open Systems Strategy	An open systems strategy focuses on fielding superior warfighting capability more quickly and more affordably by using multiple suppliers and commercially supported practices, products, specifications, and standards, which are selected based on performance, cost, industry acceptance, long term availability and supportability, and upgrade potential. *(OSJTF 2004)*
Operational Architecture	A description (often graphical) of the operational elements, assigned tasks, and information flows required accomplishing or supporting the warfighting function. It defines the type of information, the frequency of exchange, and what tasks are supported by these information exchanges. *(The Joint Technical Architecture, Version1.0 August 22, 96)*
Operational Availability (Ao):	The Ao of a system is the probability that the system is capable of performing its specified function when called for at a random point in time. It is Navy policy that Ao is the primary measure of materiel readiness for weapon systems and equipment. It is the quantitative link between readiness objectives and supportability. (OT&E Definition: Ao is either the total uptime divided by the total calendar time (uptime plus downtime) for continuous operating systems, or the number of systems that are ready, divided by the number possessed (e.g., the number of times the system was available, divided by the number of times the system was required) for on-demand systems.) *(OPNAVINST 3000.12A)*
Operational Mission Failure:	A hardware or software fault not correctable in 30 minutes (Threshold) / 10 minutes (Objective), which prevents the accomplishment of G/ATOR-supported Mission task. This includes the prevention of transmission of G/ATOR measurement data, reception of C2 commands, and any related failure (hardware or software) that precludes accomplishment of a G/ATOR-supported Mission task.
Portability	The ease with which a system, component, data, or user can be transferred from one hardware or software environment to another.

Proprietary Specifications	Specifications which are exclusively owned by a private individual or corporation under a trademark or patent, the use of which would require a license. *(OSJTF 2004)*
Real Time	Real time systems require events, data, and information to be available in time for the system to perform its required course of action. Real time operation is characterized by scheduled events, data, and information meeting their acceptable arrival times. *(OSJTF 2004)*
Real Time Systems	Systems that provide a deterministic response to asynchronous inputs.
Reference Model	A generally accepted abstract representation that allows users to focus on establishing definitions, building common understandings and identifying issues for resolution. For Warfare and Warfare Support Systems (WWSS) acquisitions, a reference model is necessary to establish a context for understanding how the disparate technologies and standards required to implement WWSS relate to each other. A reference model provides a mechanism for identifying the key issues associated with applications portability, modularity, scalability and interoperability. Most importantly, Reference Models will aid in the evaluation and analysis of domain-specific architectures. *(TRI-SERVICE Open Systems Architecture Working Group)*
Reliability	Reliability is defined as the probability that a system will perform its intended function for a specified period of time.
Relocation	An action taken by the G/ATOR team to reconfigure the system from the operational mode to the transportation mode, move the system to a new location, and reconfigure back to the operational mode. For reliability, maintainability, and availability calculations, this action requires 4 hours for the Air modes and 30 minutes for the Ground mode.
Resupply	For reliability, maintainability, and availability calculations, the ground, SHORAD, and TAOC missions conduct resupply between deployments. This is to refuel and resupply the team with food and water, allowing it to conduct another deployment. During the ATC mission,

	resupply is conducted on site, with the system operational.
Scalability	The capability to adapt hardware or software to accommodate changing work loads. *(OSJTF 2004)*
Screening crest	Firefinder radar hill requirement
Specification	A document that prescribes, in a complete, precise, verifiable manner, the requirements, design, behavior, or characteristics of a system or system component. *(IEEE P1003.0)*
Standard	A document that establishes uniform engineering and technical requirements for processes, procedures, practices, and methods. Standards may also establish requirements for selection, application, and design criteria of material. *(DoD 4120.3-M)*
Standards Based Architecture	An architecture based on an acceptable set of open standards governing the arrangement, interaction, and interdependence of the parts or elements that together may be used to form a Weapons Systems, and whose purpose is to insure that a conformant system satisfies a specified set of requirements. *(OSJTF 2004)*
Sustained Operations	For reliability, maintainability, and availability calculations, a sustained operation is the same as a deployment except for less relocations, resupply performed during operations, and more transmitter operational time. This is primarily used in the ATC mission set.
System	Any organized assembly of resources and procedures united and regulated by interaction or interdependence to accomplish a set of specific functions. *(FED-STD-1037C)*
System Architecture	A description, including graphics, of systems and interconnections providing for or supporting warfighting functions (C4ISR ITF Integrated Architecture Panel, 18 December 1995). The SA defines the physical connection, location, and identification of the key nodes, circuits, networks, warfighting platforms, etc., and specifies system and component performance parameters. It is constructed to satisfy Operational Architecture

	requirements per standards defined in the Technical Architecture. The SA shows how multiple systems within a subject area link and interoperates, and may describe the internal construction or operations of particular systems within the architecture. (C4 Chiefs Consensus SA Definition, 12 January 1996, as modified at the suggestion of the USD(A&T) community). *(The Joint Technical Architecture, Version1.0 August 22, 96)*
Technical Architecture	A minimal set of rules governing the arrangement, interaction, and interdependence of the parts or elements whose purpose is to ensure that a conformant system satisfies a specified set of requirements. The technical architecture identifies the services, interfaces, standards, and their relationships. It provides the technical guidelines for implementation of systems upon which engineering specifications are based, common building blocks are built, and product lines are developed. *(The Joint Technical Architecture, Version1.0 August 22, 96)*
Technical Reference Model	(TRM) A target framework and profile of standards for the DoD computing and communications infrastructure. *(OSJTF 2004)*
Transmitter Operational Time	Transmitter Operational Time (TOT) is the percentage of time a transmitter is expected to be on and operational during a mission. (1440 hrs) when relocate and maintenance stand down times are factored in. The two extreme examples are the Ground mission with a TOT of 88.33% and the ATC mission with a TOT of 99%.
Weapons System	A combination of one or more weapons with all related equipment, materials, services, personnel and means of delivery and deployment (if applicable) required for self sufficiency. *(JCS Pub 1-02)*

Appendix F ACRONYMS

Acronym	Definition
AAR	Association of American Railroads
AAW	Anti-Air Warfare
ABT	Air Breathing Threat
ADC	Analog to Digital Converter
ADCP	Air Defense Communications Platform
ADM	Advanced Demonstration Model
ADPE	Automated Data Processing Equipment
AFATDS	Advanced Field Artillery Tactical Data System
ANSI	American National Standards Institute
AOA	Analysis of Alternatives
ARM	Anti-Radiation Missile
ASQ	American Society for Quality
ASR	Air Surveillance Radar
ATC	Air Traffic Control
ATDL	Army Tactical Data Link
BDZ	Base Defensive Zone
BIT	Built In Test
BITE	Built In Test Equipment
C2	Command and Control
CAC2S	Common Aviation Command and Control System
CACE	Coherent Analytical Computing Environment
CBM	Conditional Based Maintenance
CBR	Counter Battery Radar
CCA	Circuit Card Assembly
CDD	Capability Development Document
CEC	Cooperative Engagement Capability
CEP	Cooperative Engagement Processor
CEP	Circular Error Probable
CFFZ	Call For Fire Zone
CFZ	Critical Friendly Zone
CID	Combat Identification
CIF	Clutter Improvement Factor

Acronym	Definition
CLAWS	Complimentary Low Altitude Weapon System
CM	Corrective Maintenance
CM	Configuration Management
CM	Cruise Missile
CMBC	Coherent Mainbeam Cancellation
CMIS	Configuration Management Information System
CAN	Computer Network Attack
CND	Computer Network Defense
COC	Combat Operations Center
COMPUSEC	Computer Security
COMSEC	Communications Security
CONUS	Continental United States
COP	Common Operational Picture
CRD	Capstone Requirements Document
CSLC	Coherent Sidelobe Cancellation
CTN	Composite Tracking Network
DASC	Direct Air Support Center
DECM	Deceptive Electronic Countermeasures
DIA	Defense Intelligence Agency
DISA	Defense Information Systems Agency
DISR	DoD Information Technology Standards Registry
DITSCAP	DoD Information Technology Security Certification and Accreditation Process
DMS	Defense Message System
DMSMS	(DoD) Diminishing Manufacturing Sources and Material Shortages
DTED	Digital Terrain Elevation Data
DTIC	Defense Technical Information Center
DTUC	Design To Unit Cost
E3	Electromagnetic Environmental Effects
EA	Electronic Attack
ECCM	Electronic Counter Countermeasures
ECM	Electronic Countermeasures
ECP	Engineering Change Proposal
ECU	Environmental Control Unit

Acronym	Definition
EIA	Electronic Industries Alliance
EMC	Electromagnetic Compatibility
EMCON	Emission Control
EME	Electromagnetic Environment
EMI	Electromagnetic Interference
EMP	Electromagnetic Pulse
EMRH	Electromagnetic Radiation Hazard
EMRO	Electromagnetic Radiation Operational
EMSEC	Emission Security
EMV	Electromagnetic Vulnerability
EMW	Expeditionary Maneuver Warfare
EP	Electronic Protection
EPLRS	Enhanced Position Location Reporting System
ERP	Effective Radiated Power
ESD	Electrostatic Discharge
EW	Electronic Warfare
EW/C	Early Warning and Control
FAA	Federal Aviation Administration
FAR	False Alarm Reduction
FMECA	Failure Mode, Effects and Criticality Analysis
FOM	Figure of Merit
FSC	Fire Support Coordinator
FSCM	Fire Support Coordination Measures
FTI	Firm Track Initiation
G/ATOR	Ground/Air Task Oriented Radar
GBDL	Ground Based Data Link
GCCS	Global Command and Control System
GCI	Ground Control Intercept
GCSS-MC	Global Combat Support System - Marine Corps
GP	Government Property
GIG	Global Information Grid
GLCM	Ground Launched Cruise Missile
GWLR	Ground Weapons Locating Radar

Acronym	Definition
HARM	High-speed Anti-Radiation Missile
HEMP	High-altitude Electromagnetic Pulse
HERF	Hazard of Electromagnetic Radiation to Fuels
HERO	Hazard of Electromagnetic Radiation to Ordnance
HERP	Hazard of Electromagnetic Radiation to Personnel
HSI	Human Systems Integration
HMMWV	High Mobility Multipurpose Wheeled Vehicle
HPTL	High Payoff Target List
IABM	Integrated Architecture and Behavior Models
IADS	Integrated Air Defense System
IAW	In Accordance With
ICAO	International Civil Aviation Organization
ICD	Initial Capability Document
ID	Identification
IDE	Integration Data Environment
IEEE	Institute of Electrical and Electronics Engineers
IER	Information Exchange Requirement
IETM	Interactive Electronic Technical Manuals
IEW	Intelligence and Electronic Warfare
IFCS	Integrated Fire Control System (Army)
IFF	Identify, Friend or Foe
IHM	Integrated Health Monitor
IKPT	Instructor and Key Personnel Training
ILS	Integrated Logistics Support
IMS	Inertial Measuring System
IO	Information Operations
IOM	Install/Operate/Maintain
IPB	Intelligence Preparation of the Battlefield
IPS	Integrated Parts Selection
IR	Infrared
ISB	Intermediate Staging Base
ISO	International Organization for Standardization
J/N	Jamming-to-Noise Ratio

Acronym	Definition
JCS	Joint Chiefs of Staff
JDEP	Joint Distributed Engineering Plant
JEDMICS	Joint Engineering Data Management Information Control System
JFC	Joint Force Commander
JITC	Joint Interoperability Test Command
JNR	Jamming-to-Noise Ratio
JROC	Joint Requirements Oversight Council
JTDL	Joint Tactical Data Link
JTRS	Joint Tactical Radio System
KPP	Key Performance Parameter
LAAD	Low Altitude Air Defense
LACM	Land Attack Cruise Missile
LE	Lightning Effects
LORA	Level Of Repair Analysis
LRU	Lowest Replaceable Unit
LSA	Logistics Support Analysis
MACCS	Marine Air Command and Control Systems
MACG	Marine Air Control Group
MACS	Marine Air Control Squadron
MAGTF	Marine Air Group Task Force
MAM	Maintenance Assist Module
MaxTTR	Maximum Time To Repair
MCAIMS	Marine Corps Automated Instructional Management Systems
MCCDC	Marine Corps Combat Development Command
MCCES	Marine Corps Communication-Electronics School
MCHS	Marine Corps Common Hardware Suite
MCLB	Marine Corps Logistics Base
MCPIDS	Marine Corps Publications Information Data System
MCPP	Marine Corps Planning Process
MCTSSA	Marine Corps Tactical Systems Support Activity
MDT	Mean Down Time
MDTT	Mean Down Time for Training
MEARS	Multi-user Engineering Change Proposal Automated Review System

Acronym	Definition
MEF	Marine Expeditionary Force
MEU	Marine Expeditionary Unit
MHE	Material Handling Equipment
MLDT	Mean Logistics Delay Time
MLG	Marine Logistics Group
MNFS	Maximum No-fire Stimulus
MNS	Mission Need Statement
MOPP	Mission Oriented Protective Posture
MOS	Military Occupational Specialty
MOSA	Modular Open Systems Approach
MPI	The Master Painters Institute
MRB	MROC Review Board
MROC	Marine Corps Requirements Oversight Council
MRRS	Multi-Role Radar System
MSE	Mobile Subscriber Equipment
MSG	Meteorological Systems Group
MSL	Mean Sea Level
MTACCS	Marine Tactical Command and Control System
MTBF	Mean Time Between Failure
MTBM	Mean Time Between Maintenance
MTBMCF	Mean Time Between Mission Critical Failure *see MTBOMF*
MTBOMF	Mean Time Between Operational Mission Failure
MTI	Moving Target Indicator
MTTR	Mean Time To Repair
MWS	Master Work Schedule
NATO	North American Treaty Organization
NBC	Nuclear, Biological, Chemical (warfare)
NCES	Net Centric Enterprise Services
NCTI	Non-Cooperative Target Identification
NCTR	Non-Cooperative Target Recognition
NF	Noise Figure
NGA	National Geospatial-Intelligence Agency, formerly NIMA
NIMA	National Imagery and Mapping Agency, see NGA

Acronym	Definition
NSC	National Systems Cueing
OA	Operational Architecture
OAS	Offensive Air Support
OEM	Original Equipment Manufacturer
OEO	Operational Expeditionary Operations
OMF	Operational Mission Failure
OMFTS	Operational Maneuver From the Sea
OPSEC	Operations Security
ORD	Operational Requirements Document
OSA	Open System Architecture
OS-JTF	Open Systems - Joint Task Force
PD	Probability of Detection
PE	Probable Errors
PEI	Primary End Item
PFT	Probability of Firm Track
PKI	Public Key Infrastructure
PM	Preventive Maintenance
POL	Petroleum, Oils, or Lubricants
PPLI	Precision Position Location Identification
PPF	Pattern-Propagation-Factor
PPP	Program Protection Plan
PRF	Pulse Repetition Frequency
RCS	Radar Cross Section
RES	Radar Environmental Simulator
RF	Radio Frequency
ROE	Rules of Engagement
RSTA	Reconnaissance, Surveillance and Target Acquisition
SA	Situational Awareness
SAE	Society of Automotive Engineers
SCORM	(DoD) Standard Content Object Reference Model
SHORAD	Short Range Air Defense
SIAP	Single Integrated Air Picture
SIJ	Stand-In-Jamming

Acronym	Definition
SINCGARS	Single Channel Ground and Airborne Radio System
SNR	Signal-to-Noise Ratio
SOA	Sustained Operations Ashore
SOJ	Stand-Off Jammer
STC	Sensitivity Time Control
STOM	Ship To Objective Maneuver
T/O	Table of Organization
T/R	Transmit/Receive
TADIL	Tactical Digital Information Link
TAOC	Tactical Air Operations Center
TAOM	Tactical Air Operations Module
TBM	Tactical Ballistic Missile
TCN	Tactical Component Network
TEMP	Test and Evaluation Master Plan
TEMPER	Tropospheric Electromagnetic Propagation Equation Routine
TETS	Third Echelon Test Set
TFSMS	Total Force Structure Management System
TLDD	Tactical Logistics Digitization Data
TM	Technical Manual
TMD	Tactical Missile Defense
TMDE	Test Measurement and Diagnostic Equipment
TORA	Technology Obsolescence and Risk Assessment
TPC	Target Processing Center
TQG	Tactical Quiet Generator
TRITAC	Tri-service Tactical Network
TRM	Technical Reference Model
TTF	Transformation Task Force
TWS	Track While Scan
UAV	Unmanned Aerial Vehicle
USIGS	United States Imagery and Geospatial Information Service
VMAP	Vector Map (terrain database)
WARM	Wartime Reserve Mode
WWSS	Warfare and Warfare Support Systems

Appendix G Information Exchange Requirements (IERs)

The G/ATOR shall be interoperable with existing and planned USMC Command and Control (C2) and Air Defense Systems. (OV-3)

Table G-1. Information Exchange Requirements Matrix

Rationale UJTL #	Event	Information Characterization	Sending Node	Receiving Node	Critical	Format	Timeliness	Classification	Remarks
TA 5.1	Position and Timing Report	Other Specified – GPS Location Report	NAVSTAR/ GPS Satellite	G/ATOR Multi-Role Radar System	Y	SAASM	1 sec.	Unclass	Provide positional data for navigation/ synchronization.
OP 2.2.5	Collect Target Information	Situational Awareness - Local Track Update	G/ATOR	USMC C2 Node	Y	Binary IAW IDD	2 sec	Unclass	
TA 5.1	Acquire and Communicate Information	Situational Awareness	G/ATOR	USMC C2 Node	Y	Binary IAW IDD	2 sec	Unclass	
TA 5.2.1	Local Track Report	Situational Awareness - Local Track Update	G/ATOR	USMC C2 Node	Y	Binary IAW IDD	2 sec	Unclass	Local tracks initiated by radar. Via SINCGARS/JTRS
	Special Alert Message	Situational Awareness - Local Track Update	G/ATOR	USMC C2 Node	Y	Binary IAW IDD	1 sec	Class (Level TBD)	Priority target message. Via SINCGARS/JTRS
	System Parameter Message	System Status Information	G/ATOR	USMC C2 Node	Y	Binary IAW IDD	1 sec	Unclass	Report systems status SINCGARS/JTRS
5.1.11	Provide Positive ID	Situational Awareness "Friendly Aircraft"	G/ATOR	USMC C2 Node	Y	Binary IAW IDD	1 sec	Unclass	
TA 6.5	IFF Data	Situational Awareness - Track IFF Update "Interrogate Aircraft"	G/ATOR	USMC C2 Node	Y	Binary IAW IDD	2 sec.	Unclass	IFF data is correlated with the composite track and distributed to network participants.
	Voice Data		G/ATOR	USMC C2 Node	N	Binary IAW IDD	N/A	Unclass	Allows voice communication between radar and C2

Rationale UJTL #	Event	Information Characterization	Sending Node	Receiving Node	Critical	Format	Timeliness	Classification	Remarks
									node via fiber optic interface
	Voice Data		USMC C2 Node	G/ATOR	N	Binary IAW IDD	N/A	Unclass	Allows voice communication between radar and C2 node via fiber optic interface
	Target Classification Message	Situational Awareness "Friendly Aircraft"	G/ATOR	USMC C2 Node	Y	Binary IAW IDD	2 Sec	Class (Level TBD)	Threat classification data
OP 2.2.5	Collect Target Information	Situational Awareness - Local Track Update	G/ATOR	USMC CTN Node	Y	Binary IAW IDD	2 sec	Unclass	
TA 5.1	Acquire and Communicate Information	Situational Awareness	G/ATOR	USMC CTN Node	Y	Binary IAW IDD	2 sec	Unclass	
TA 5.2.1	Local Track Report	Situational Awareness - Local Track Update	G/ATOR	USMC CTN Node	Y	Binary IAW IDD	2 Sec	Unclass	Local tracks initiated by organic sensors that are distributed to other participants for track association.
5.1.11	Provide Positive ID	Situational Awareness	G/ATOR	USMC CTN Node	Y	Binary IAW IDD	1 sec	Unclass	5.1.11
TA 6.5	IFF Data	Situational Awareness - Track IFF Update "Interrogate Aircraft"	G/ATOR	USMC CTN Node	Y	Binary IAW IDD		Unclass	IFF data is correlated with the composite track and distributed to network participants **UNCLASSIFIED**

Appendix H Classified PS

Appendix H is a separate classified document that provides threat parameters applicable to Performance Specification.

Identification and Assertion of Use, Release, or Disclosure Restrictions

Technical Data/Computer Software to be Furnished with Restrictions*	Basis for Assertion**	Asserted Rights Category***	Name of Person Asserting Restrictions****
[redacted]	[redacted]	[redacted]	Northrop Grumman Corporation
[redacted]	[redacted]	[redacted]	Northrop Grumman Corporation
[redacted]	[redacted]	[redacted]	Northrop Grumman Corporation
[redacted]	[redacted]	[redacted]	Northrop Grumman Corporation
[redacted]	[redacted]	[redacted]	Northrop Grumman Corporation
[redacted]	[redacted]	[redacted]	Northrop Grumman Corporation
[redacted]	[redacted]	[redacted]	Northrop Grumman Corporation
[redacted]	[redacted]	[redacted]	Northrop Grumman Corporation
[redacted]	[redacted]	[redacted]	Northrop Grumman Corporation
[redacted]	[redacted]	[redacted]	Northrop Grumman Corporation
[redacted]	[redacted]	[redacted]	Northrop Grumman Corporation
[redacted]	[redacted]	[redacted]	Northrop Grumman Corporation
[redacted]	[redacted]	[redacted]	Northrop Grumman Corporation
[redacted]	[redacted]	[redacted]	Northrop Grumman Corporation

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[redacted]	[redacted]	[redacted]	Northrop Grumman Corporation
[redacted]	[redacted]	[redacted]	Northrop Grumman Corporation
[redacted]	[redacted]	[redacted]	Northrop Grumman Corporation
[redacted]	[redacted]	[redacted]	Northrop Grumman Corporation
[redacted]	[redacted]	[redacted]	Northrop Grumman Corporation
[redacted]	[redacted]	[redacted]	Northrop Grumman Corporation
[redacted]	[redacted]	[redacted]	Northrop Grumman Corporation
[redacted]	[redacted]	[redacted]	Northrop Grumman Corporation
[redacted]	[redacted]	[redacted]	Northrop Grumman Corporation
[redacted]	[redacted]	[redacted]	Northrop Grumman Corporation
[redacted]	[redacted]	[redacted]	Northrop Grumman Corporation
[redacted]	[redacted]	[redacted]	Northrop Grumman Corporation
[redacted]	[redacted]	[redacted]	Northrop Grumman Corporation

Identification and Assertion of Use, Release, or Disclosure Restrictions

Technical Data/Computer Software to be Furnished with Restrictions*	Basis for Assertion**	Asserted Rights Category***	Name of Person Asserting Restrictions****
[redacted]	[redacted]	[redacted]	Northrop Grumman Corporation
[redacted]	[redacted]	[redacted]	Northrop Grumman Corporation
[redacted]	[redacted]	[redacted]	Northrop Grumman Corporation
[redacted]	[redacted]	[redacted]	Northrop Grumman Corporation
[redacted]	[redacted]	[redacted]	Northrop Grumman Corporation
[redacted]	[redacted]	[redacted]	Northrop Grumman Corporation
[redacted]	[redacted]	[redacted]	Northrop Grumman Corporation
[redacted]	[redacted]	[redacted]	Northrop Grumman Corporation
[redacted]	[redacted]	[redacted]	Northrop Grumman Corporation
[redacted]	[redacted]	[redacted]	Northrop Grumman Corporation
[redacted]	[redacted]	[redacted]	Northrop Grumman Corporation
[redacted]	[redacted]	[redacted]	Northrop Grumman Corporation
[redacted]	[redacted]	[redacted]	Northrop Grumman Corporation
[redacted]	[redacted]	[redacted]	Northrop Grumman Corporation
[redacted]	[redacted]	[redacted]	Northrop Grumman Corporation
[redacted]	[redacted]	[redacted]	Northrop Grumman Corporation

Technical Data/Computer Software to be Furnished with Restrictions*	Basis for Assertion**	Asserted Rights Category***	Name of Person Asserting Restrictions****
[redacted]	[redacted]	[redacted]	[redacted]

Identification and Assertion of Use, Release, or Disclosure Restrictions

"Identification and Assertion of Use, Release, or Disclosure Restrictions"

The following is provided in conformance to the requirements of DFARS 252.227-7017 at K.1 of RFP M67854-05-R-2000.

As part of this contract, Sensis Corporation asserts for itself that the Government's and Northrop Grumman's rights to use, release, or disclose the following computer software should be restricted:

Technical Data/Computer Software to be Furnished With Restrictions*	Basis for Assertion**	Asserted Rights Category***	Name of Person Asserting Restrictions****
[redacted]			

*For technical data (other than computer software documentation) pertaining to items, components, or processes developed at private expense, identify both the deliverable technical data and each such item, component or process. For computer software or computer software documentation identify the software or documentation.

**Generally, development at private expense, either exclusively or partially, is the only basis for asserting restrictions. For technical data, other than computer software documentation, development refers to development of the item, component, or process to which the data pertain. The Government's rights in computer software documentation generally may not be restricted. For computer software, development refers to the software. Indicate whether development was exclusively or partially at private expense. If development was accomplished not at private expense, or for computer software documentation, enter the specific reason for asserting restrictions.

***Enter asserted rights category (e.g., government purpose license rights from a prior contract, rights in SBIR data generated under another contract, limited, restricted or government purpose rights under this or a prior contract, or specifically negotiated licenses).

****Corporation, individual, or other person, as appropriate.

Date May 17, 2006

Printed Name and Title [redacted]

Signature