Marine Corps
Tactical Systems Support Activity

New Ground Radios for the United States Marine Corps

Overview
Presented By
Martin Moore
Allan Su

DISTRIBUTION STATEMENT A. Approved for public release. Distribution is unlimited.
MCTSSA Radio Frequency Communications (RF) Lab

Facility Description
• Self-contained, environmentally-controlled lab facility with ample floor space, power distribution and network connectivity for evaluation of tactical communications systems
• Controlled radio signal distribution
• RF test and measurement equipment
  • Collocated outdoor antenna site
  • DAMA/IW/ Dedicated tactical satellite simulator
  • Connectivity to other MCTSSA labs (GCE, 57 Lab, VSAT Lab, and NGEN Building.

Capabilities
• Test, troubleshoot, experiment with fielded and developmental tactical communications systems in networks of up to 60 (VHF/UHF) radios
• Test ground-to-ground, ground-to-air and tactical satellite radios including Software Defined Radio.
  • Provide controlled, instrumented tactical radio channels for C2 systems under test, such as AFATDS, CAC2S
  • Provide instrumented base station for mobile radios or other mobile systems under test
  • Evaluation of antennas through software modeling and electromagnetic measurement

Benefits
• Employ large numbers of radios in small space with minimum manpower while providing realistic signal effects caused by real distance and terrain
• Contain and control radio signal emanations to eliminate interference and preserve limited RF spectrum
• Reduce risk in fielding frequently changing radio software
• Replicate and resolve technical problems reported by Operating Forces
• Assist in tactical radio network planning

Accomplishments
• AN/PRC-117G Developmental Test
• MUOS Developmental Test
• Firmware Testing
  • Recurring radio software tests as part of tactical radio configuration management plan
  • SOT Testing and LFOC support

DISTRIBUTION STATEMENT A. Approved for public release. Distribution is unlimited.
United States Marine Corps
Mobile User Objective System (MUOS) Tactical Radio

DISTRIBUTION STATEMENT A. Approved for public release. Distribution is unlimited.
MUOS Introduction

• Mobile User Objective System (MUOS) is an ultra-high frequency (UHF) satellite communications (SATCOM) program
  - Four satellites in geosynchronous earth orbit with one on-orbit spare, and a fiber optic terrestrial network connecting four ground stations
  - Data rates of up to 384 kbps (limited to 64 kbps by current radio hardware)
  - Priority-based access to voice, data, and video, on demand

• Employs direct sequence spread spectrum WCDMA waveform leveraged from 3G commercial mobile technologies
  - Adaptive power control to provide the required quality of service to each user while simultaneously maximizing system capacity
  - IPv4/IPv6 provides global roaming connectivity to the DoDIN*
  - Designed for significant future growth as capacity demand increases

* DoDIN: Department of Defense Information Network
The MBR II Family of Systems (FoS) includes the RT-1949C/D (Firmware v4.5.0B MUOS Capable) as the basic functional component for all configurations. The AN/PRC-117G(V)2(C) includes two antenna kit configurations that support MUOS: 1. At-the-Pause for stationary operations, 2. Dismounted for On-the-Move. The AN/VRC-114(V)1 antenna kit reuses the existing X-Wing antenna with an inline diplexer.
AN/PRC-160 High Frequency Radio (Manpack)

Marine Corps Employment: Beyond Line of sight (BLOS) to provide long range Voice and data communications even in jammed and challenging environments

Common Uses: Chat, FTP, data transmission, and Situation Awareness (PLI via GPS)

Additional Features: Internet Protocol (IP)

Modernized Crypto: Yes

DISTRIBUTION STATEMENT A. Approved for public release. Distribution is unlimited.
AN/PRC-160 High Frequency Radio Characteristics

Frequency Range 1.5-59.999 MHz
Power Output 1.5 to 20 Watts
Net Presets: 75
Weight: 9 lbs w/battery
Crypto Classification: Up to Top Secret
Data Transmission: Data rates of up to 120 kbps (bandwidths from 3 kHz to 24 kHz)
GPS: Embedded and External
Additional Features: Frequency Hopping
AN/PRC-158 Multi Channel Radio Manpack

**Marine Corps Employment:** Line of sight (LOS) and Satellite communications to provide long range voice and data communications

**Common Uses:** Chat, FTP, data transmission, and Situation Awareness (PLI via GPS)

**Additional Features:** Internet Protocol (IP), Cross-banding and Retrans Capable

**Modernized Crypto:** Yes

DISTRIBUTION STATEMENT A. Approved for public release. Distribution is unlimited.
AN/PRC-158 Multi Channel Radio Manpack

**Frequency Range**: 30 to 2,500 MHz (2.5 GHz)

**Power Output**: Up to 20 Watts

**Net Presets**: 99

**Weight**: 12.7 lbs w/battery

**Crypto Classification**: Up to Top Secret

**Data Transmission**: Data rates of up to 64 kbps (bandwidths waveform dependent)

**GPS**: Embedded

**Additional Features**:

DISTRIBUTION STATEMENT A. Approved for public release. Distribution is unlimited.
Waveforms

- Adaptive Network Wideband Waveform (ANW2)
- SINCGARS
- Integrated Waveform (SatCom)
- DAMA (SatCom)
- Very High Frequency/Ultra High Frequency Line of Sight (VULOS)
- Havequick (Air-to-Ground)
- Saturn (Air-to-Ground)
- Mobile User Objective System (MUOS)
AN/PRC-158 Multi-Channel Radio Manpack

Frequency Ranges:
30 MHz-2.5 GHz
Narrowband (NB):
VHF: 30-225MHz
UHF: 225-520 MHz, 762-874 MHz
SATCOM:
TX: 243-270 MHz
RX: 292-318 MHz
Wideband (WB):
UHF: 225-520 MHz
L-BAND: 762 MHz-2.5 GHz

DISTRIBUTION STATEMENT A. Approved for public release. Distribution is unlimited.
QUESTIONS?