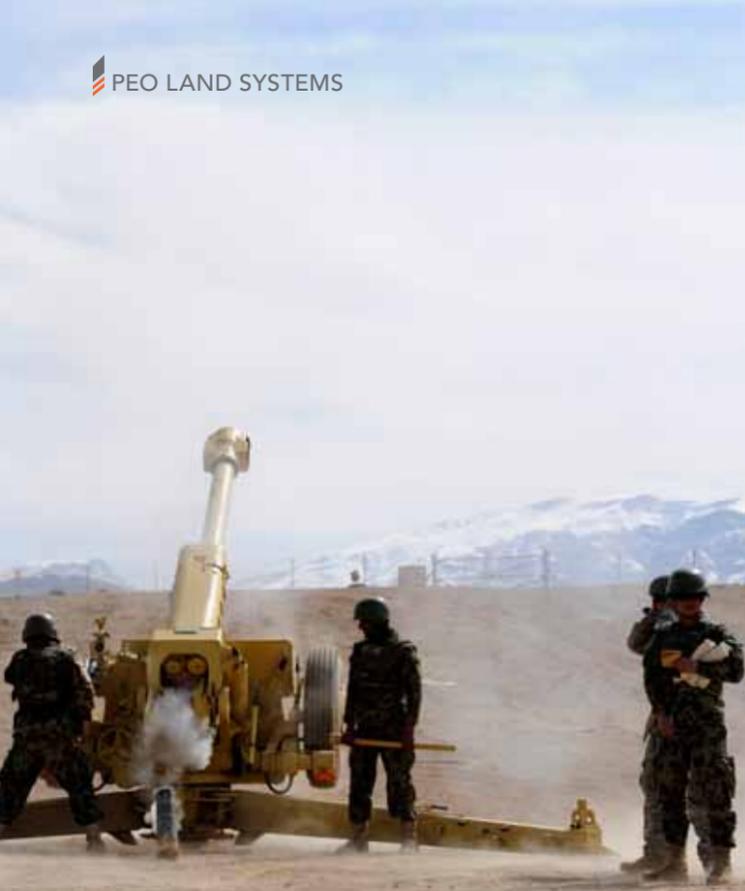


TOWED ARTILLERY SYSTEMS

BY SCOTT R. GOURLEY

2nd Marine Division

PM TAS gains an expanded portfolio of weapon systems.



// LEFT: Members of the Afghan National Army's 4th Kandak, 4th Brigade, 205th Corps, fire high-explosive munitions during a three-day live-fire exercise, Feb. 15, 2012, certifying them after 16 weeks of training on the D-30 howitzer. Although the D-30 122 mm howitzer is a Russian weapon, PM TAS is supervising reconditioning of the weapons for the Afghan National Army. **RIGHT:** A CH-53E lifts an M777 howitzer from Camp Bastion, Helmand province, Afghanistan, July 13, 2010. The M777A2's light weight has enabled Marines to locate them at remote forward-operating bases at high elevations.

// Section 2, Battery A, 2nd Battalion, 320th Field Artillery, 1st Brigade Combat Team, fires a 105 mm high-explosive round from their M119 howitzer Nov. 17, 2011, during a battery air assault raid exercise on Fort Campbell, Ky. The M119 105 mm howitzer is also managed by PM TAS.

Reminiscent of how recent program growth has brought strength and synergies to the PEO Land Systems structure, the former lightweight 155 mm element has been expanded to provide the synergies that come from a broader portfolio of towed artillery systems.

"That's much more on the Army side than on the Marine Corps side, because we are a joint program office," acknowledged Program Manager, Towed Artillery Systems (PM TAS), Keith Gooding. "However, I think there is a tremendous benefit for the Marine Corps in the fact that we are now 'plugged in' to a bigger Army artillery profile – including dealing with their 105 mm howitzers and dealing with target acquisition systems.

"In terms of other howitzers, for example, we have the M119 'legacy' systems that we deal with on the Army side and we even have a Russian D-30 howitzer program, where we are refurbishing howitzers to support the Afghan National Army," he said.

A cornerstone of the PM TAS structure remains the "Triple Seven," the M777A2 Lightweight 155 mm Howitzer that the Marine Corps is using to replace its old M198 155 mm weapons.

The system cannot only deliver long-range artillery fire in support of ground troops, but its capabilities are further enhanced with an advanced digital fire control system to precisely and accurately locate and aim the weapon as well as the ability to fire the M982 "Excalibur" precision-guided munition.

The M777A2 is capable of firing standard (unassisted) projectiles to a range of 15 miles (24 kilometers), assisted projectiles to 19 miles (30.5 kilometers), and the Excalibur munition to ranges in excess of 25 miles (40 kilometers).

As the world's first artillery weapon to make widespread use of titanium and aluminum alloys, the lightweight M777A2 can be air-lifted into remote high-altitude locations inaccessible by ground transportation and is capable of being transported by the Marine Corps' V-22 Osprey and medium-lift and heavy-lift helicopters.

"M777 Lightweight 155 is still a joint program – Army and Marine Corps – with the Marine Corps still the lead service," Gooding explained. "Mr. [Sean J.] Stackley, the ASN RDA [assistant secretary of the Navy for Research, Development and Acquisition] is still the milestone decision authority and Mr. [William] Taylor is still our PEO. We are currently in production and our prime contract is with BAE Systems in the United Kingdom."

As of this writing, there are 1,071 M777 howitzers on contract. That figure includes 511 for the Marine Corps, which reaches the Marine Corps Authorized Acquisition Objective (AAO), and 488 for the Army, which is a little short of the Army's AAO of 524.

Both services are "pure fleeted" with M777A2 guns (the "A2" can fire Excalibur) with the only difference between Army and Marine Corps models being that the howitzers coming off the production line for the Marine Corps do not have the run-flat tires used on Army guns.

Pointing to a key performance parameter (KPP) for the M777 as being a weight of 10,000 pounds, the external airlift of the Osprey, Gooding noted that eliminating the run-flats had saved around 120 pounds, providing "a little cushion" that had been sought by Marine Corps planners.

"In addition to the U.S. Marine Corps and Army, there are 35 M777A2 howitzers under Foreign Military Sales [FMS] for Australia, with all of those already delivered, and 37 M777 howitzers – that's in the basic 'glass and iron sights' configuration – that have also been delivered to Canada," he continued.

Subsequent to the delivery of the M777s, the Canadians equipped the guns with their own digital fire control systems.

Canada's rapid embrace of the program was also evident in the fact that the Canadians were the first to fire the M777 in the war.

According to Gooding, approximately 900 of the 1,071 currently contracted howitzers have been delivered to date with current schedules reflecting the delivery of the final guns in November 2013.

"I do not foresee any additional production from the United States at this time," he stated. "However, right now we have a Foreign Military Sales Letter of Request [LOR] from Australia for 19 additional guns. PM-TAS is currently working the LOA [Letter of Agreement] with a schedule to have these weapons on contract with BAE Systems by December 2012.

"The Australians are on a fast track," he said. "The self-propelled program was canceled in the May-June time frame. We received their LOR and we happened to have general officers meeting in Australia at that time – my Army PEO [U.S. Army Program Executive Officer Ammunition, Brig. Gen. Jonathan A. Maddux] – and Triple Seven became part of those discussions. One of the things to come out of that was a commitment by the U.S. government to expedite that LOA and to get it back within a month of our receipt of the LOR. And we're on track to get the contract work completed before the end of the fiscal year – at the end of September 2012. So those guns will extend production a bit at our delivery rate of 10 guns a month.

"The Canadians and Australians have been such big supporters of this program that we have a Memorandum of Understanding, signed by Mr. Stackley, which allows the three nations – Canada, Australia, and the U.S. – to work cooperatively in the post-FMS world. So we have international meetings once or twice a year. We have monthly IPT [Integrated Product Team] teleconferences with each of the countries where we share lessons learned and what each of us are doing with the howitzers as we move into sustainment. And that's been very helpful and successful," he added.

Describing it as "a great long-term opportunity to continue the relationship between the countries and work together with our allies to support each other," he said, "it's also an interesting dynamic, because in the U.S., we have such a huge fleet compared to the other countries. Managing the U.S. fleet, compared to the Canadians with 37 guns and the Australians with eventually 54 guns, places different nuances on how you manage the program and things like configuration management."

In addition to the FMS sales, Gooding also pointed to ongoing FMS discussions with India, describing them as "an interesting ongoing effort" that has included a loan agreement that had sent two guns over to India in the fall of 2010.

"With India and BAE Systems, we tested those guns to Indian requirements," he said. "We were out in the western plains near the border with Pakistan and we also tested them up in the Himalayan Mountains, at an elevation close to 13,000 feet and about 50 miles from the Chinese border. It's no secret that India is very concerned about their borders and protecting their borders. So that's where they wanted to test these guns."

DoD photo by Sgt Brandon M. Owen

U.S. Air Force photo by Staff Sgt. Bryan Boyette

U.S. Army photo by Sgt. Jon Heinrich



// Marines with 2nd Battalion, 10th Marine Regiment, get ready to fire the M777A2 howitzer with the Excalibur round June 17, 2011, in the Combat Center's Emerson range training area.

FMS cases aside, Gooding said that the M777 program "is very much coming to the end of production and focusing more and more on sustainment of the Triple Seven."

"We are currently under something called Interim Contractor Support [ICS]," he explained. "That's a contract with BAE Systems where they are supplying unique parts for the guns."

In parallel with the management of the unique system parts under the ICS contract, the U.S. government is using its organic supply system to manage and provide many of the "common parts" for the howitzer through the Army's TACOM at Warren, Mich., and the Marine Corps Logistics Center at Albany, Ga.

"Things like the entire cannon assembly – the gun tube, the breech, and the muzzle brake – are all supplied by Watervliet Arsenal with the spares in the organic supply system," he stated. "The optical fire control is also government furnished. We have a contract with Seiler Industries and they supply the optical fire control. The optics have a lot of common parts with the M119 series 105 mm howitzer and the legacy M198 155 mm howitzers."

Gooding said that the next step in the process will involve a competitive Performance Based Life Cycle Support (PBLCS) contract.

"We have a solicitation out on the street. The timeline is for industry to respond by the middle of December of this year and we are looking to award that contract in March 2013," he said.

"The current ICS contract very much mimics what we would do in Performance Based Life Cycle Support [PBLCS]," he acknowledged. "But we don't have all of the 'contractual metrics' in that contract. So the PBLCS is going to take us that next step as we move into sustainment in terms of metrics of supporting weapon systems in the field. But it's been very successful to date. The readiness has been way up over 95 percent for the fleet and spare parts have been getting out to the weapon systems in Afghanistan. There are a lot more Army guns than Marine Corps guns in Afghanistan right now. But the ability to support those guns in the war and also to support all of the CONUS [Continental United States] guns that we have has been very successful. And I think PBLCS is going to push us that much further in terms of support and sustainment for the weapon system."

Another evolutionary effort surrounding the M777 involves plans to "refresh" its digitized fire control system.

Describing it as "that leap-ahead technology provided to towed artillery," Gooding said, "the digital fire control has really transformed how we are seeing Marines use artillery. Having the embedded capability of the Excalibur precision round, which has been used very effectively in Afghanistan."

As an example of this effective use, he highlighted a February 2012 fire mission in Afghanistan during which a Marine Corps M777 at Forward Operating Base Zeebrugge, fired an M982 Excalibur round on insurgents

Lance Cpl. Sarah Dietz

in Kajaki, located in neighboring Musa Qala district.

The round traveled a "record" range of more than 22 miles (36 kilometers) to kill a team of Taliban fighters.

"It was extraordinary for us to see precision artillery used at those sorts of ranges," Gooding said. "When you look at the pictures from Afghanistan and see the locations of the guns and the surrounding terrain that they are firing over – with the U.S. ability to helicopter this weapon system in – you realize that we couldn't do that with the '198. But we can get the Triple Seven over the mountains and into these operating bases where there aren't any roads. It's just extraordinary that we're able to do that. And this is what the weapon system was designed for – to do exactly what it's doing in Afghanistan."

Gooding said that future plans surrounding the digitized fire control system focus on addressing issues of obsolescence of electronics.

"In your laptop computer or your television or your DVR, you're dealing with obsolescence every couple of years," he said. "So as we move forward in sustainment of the Triple Seven we're looking at the refresh of the electronic components. It's not that the system out there is bad. It's just that the system was designed in the late '90s and now we are starting to look at the fact that there are some components we can't get anymore from the third-, fourth-, or fifth-tier supply chain. We're also seeing incredible cost reductions for some line replaceable units [LRUs] like displays on the guns. So refreshing the electronics can be an opportunity to save money for the units as we move forward with qualifying new LRUs for the weapon system."

Gooding added that the process would also benefit from being co-located with other Army programs at Picatinny Arsenal, N.J.

"The Army here went through the digital fire control effort on their self-propelled M109A6 Paladin howitzers," he stated. "And we can draw from the lessons learned on Paladin and their digital fire control in terms of understanding that with the electronics there is an ongoing refresh that you constantly need to be looking at for sustainment – looking at the different LRUs and upgrading them when it's applicable. So that's something we're looking at for both the Marine Corps and the Army."

Another area of synergy between the services stems from the fact that the Army M119 will also soon receive its own digitized

fire control package and the ability to apply lessons from that effort to the M777 digital refresh package provides additional performance and cost advantages.

"Those are just some of the synergies of having the towed platforms under one program office. The technical benefits coming out of one Army program can be applied to Triple Seven to support both the Army and the Marine Corps," Gooding said.

Along with the cannon systems, PM TAS is also addressing a number of related target acquisition and ancillary equipment programs.

"The Improved Positioning and Azimuth Determining System [IPADS] is a piece of survey gear," Gooding explained. "We're not a true joint program on this, but the Marine Corps also uses IPADS and the Army and Marine Corps work hand in hand on issues like contracting and engineering support. So the two services are tied at the hip on IPADS."

"I'm working to try to be more proactive in the target acquisition community in terms of the howitzers," he continued. "A lot of the ancillary gear that we use on the howitzers tends to fall below 'the cut line' in terms of supportability, with an example of that being the muzzle velocity sensor system chronograph used on the howitzer. We had some problems with that so what we did in the program office was to create a common buy between the Army and the Marine Corps and incorporated the M119 105 howitzer with the same chronograph. Incorporating both Marine Corps M777s and Army M119s not only lowered unit costs but lessened the training footprint for Army soldiers who might shift between M777 and M119 and allowed us to do some life cycle savings. Another thing we did was, instead of making the chronograph a stand-alone item, we made it a Component of the End Item [COEI]. So now it falls under the umbrella of the howitzer and, with respect to funding, I can now use howitzer funding to support the chronograph in the field. That gives us a lot of leverage and allows us to look at the chronograph as almost another line replaceable unit," he said.

"We're also looking at things like aiming circles, gunner's quadrants, and other ancillary pieces of gear," Gooding concluded. "We're not building an empire here. For us, it's all about trying to support the artillery. And having a common forum for the different pieces of support equipment helps in that important role."

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