# Dual Caliber Deployments: The Future MEU Battery

Captain Taylor N Young

Maj Seay, CG14

25 February 2009

# Report Documentation Page

*Form Approved*
*OMB No. 0704-0188*



| 1. REPORT DATE | 2. REPORT TYPE | 3. DATES COVERED |
|---|---|---|
| **25 FEB 2009** | | **00-00-2009 to 00-00-2009** |

| 4. TITLE AND SUBTITLE | 5a. CONTRACT NUMBER |
|---|---|
| **Dual Caliber Deployments: The Future MEU Battery** | 5b. GRANT NUMBER |
| | 5c. PROGRAM ELEMENT NUMBER |
| 6. AUTHOR(S) | 5d. PROJECT NUMBER |
| | 5e. TASK NUMBER |
| | 5f. WORK UNIT NUMBER |
| 7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) **United States Marine Corps,Command and Staff College, Marine Corps Combat Development,Marine Corps University, 2076 South Street,Quantico,VA,22134-5068** | 8. PERFORMING ORGANIZATION REPORT NUMBER |
| 9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) | 10. SPONSOR/MONITOR'S ACRONYM(S) |
| | 11. SPONSOR/MONITOR'S REPORT NUMBER(S) |

12. DISTRIBUTION/AVAILABILITY STATEMENT
**Approved for public release; distribution unlimited**

13. SUPPLEMENTARY NOTES

14. ABSTRACT

15. SUBJECT TERMS

| 16. SECURITY CLASSIFICATION OF: | | | 17. LIMITATION OF ABSTRACT | 18. NUMBER OF PAGES | 19a. NAME OF RESPONSIBLE PERSON |
|---|---|---|---|---|---|
| a. REPORT **unclassified** | b. ABSTRACT **unclassified** | c. THIS PAGE **unclassified** | **Same as Report (SAR)** | **12** | |

Right now a Marine Expeditionary Unit (MEU) commander is debating how to support his mission with the right mix of personnel and equipment. In the process, he will seek input from critical staff members who are considered the duty experts in their respective fields. His responsibility is to anticipate questions his commander may pose and have solutions prepared. When it comes to fires, he may find more questions than answers. Artillery battery commanders must decide now how they will employ the Expeditionary Fire Support System and Lightweight Howitzer currently available to them.

**Introduction**

In 2000, the Artillery Operation Advisory Group (AOAG) recognized that a fundamental change in the composition of the Marine Corps' ground delivered fires capability must occur to stay in synch with the vision of the future Marine Corps force. In January of that year, the AOAG published a letter stating:

> Fire support organic to Marine Forces is inadequate for today's battle and poorly postured to meet Operational Maneuver from the Sea/Ship to Objective Maneuver (OMTS/STOM) capabilities that must be in place by 2015. To get there we need a 'triad' of short, medium and long-range fire support systems that

have complimentary and mutually supporting capabilities.[1]

This triad of fires concept exists today with the introduction of the long range High Mobility Artillery Rocket System (HIMARS), medium range M777A2 Lightweight Howitzer, and the short range Expeditionary Fire Support System (EFSS). These weapon systems give the Marine artillery regiment a wide range of capabilities across the spectrum of conflict and throughout the modern battlefield. The MEU Commander, armed with these new tools, must now decide how they should be employed by the during future. Future MEU batteries must deploy with four M777A1's and four EFSS to maximize the capabilities of both weapon systems, maintain the necessary lethality, and provide the MEU commander with the most flexibility.

**Capabilities and Limitations**

Both the EFSS and M777A2 are capable of providing responsive, accurate fires, in all weather conditions, and meeting the mission of the field artillery by "[furnishing] close and continuous fire support by neutralizing, destroying, or suppressing targets that threaten the success of the supported unit."[2] Beyond its primary mission, the artillery

[1] James Pace, "Myths, Misconceptions, and Reality of the Ground Fires Triad," *Marine Corps Gazette*, June 2005 14-17.

[2] Department of the Navy, "Artillery Operations," MCWP 3-16.1, 2002. Washington D.C.

battery fills a variety of other roles. The four and four configuration[3] brings the ability to meet any mission across the continuum of force, within all kinetic phases of operations, and throughout the battle space.

A traditional MEU battery's robust motor transportation capability coupled with the large amount of Marines available for tasking make the artillery battery the unit of choice for MEU commanders to assign nontraditional missions. The MTVRs and HMMWVs the battery brings with it can significantly enhance the MEUs mobility. None of these assets are associated with an EFSS battery. Instead it utilizes the Internally Transportable Vehicle (ITV) designed to be transported internal to the V-22 Osprey. Its limited purpose is transporting the EFSS. It is not designed as a motor transportation asset that can be used by other elements of the MEU to augment their lift capability. If a battery deploys without the assets associated with a M777A2 battery, then the BLT is losing much more than lethality, they lose lift assets and flexibility.

The EFSS serves a unique purpose that fits a niche mission for the MEU commander. As defined by the STOM concept of operations the EFSS is the "principal indirect fire support system for the vertical assault element of the ship-to-objective

[3] The "four and four configuration" will be used to refer to a battery consisting of four EFSS systems and four M777A2 and there supporting compliment.

maneuver (STOM) force."[4] Coupled with the MV-22 Osprey this gives the MEU commander the ability to insert a ground based indirect fire support asset capable of maneuvering with dismounted forces 110 nautical miles from the Expeditionary Strike Group (ESG). This gives the MEU a great deal of tactical flexibility in executing their forced entry capability. In contrast, the M77A2 does not have the ability to be inserted by air with its prime mover the MTVR. This means that without the EFSS any ground force inserted without a beachhead, or beyond the 18km (30km with RAP) range of the M777A2 would be without an all-weather fire support asset any larger than their organic mortars.

The four and four task organization gives the MEU commander the ability to insert the EFSS with the initial assault force to provide immediate fire support then augment with howitzers as the situation allowed or dictated. By adopting the four and four configuration, the MEU commander allows himself to offset the weaknesses of either system with the unique strengths of the other.

**Lethality**

With continued advances in ammunition and fire direction, the field artillery has entered a new era of increased lethality. Both the M77A2 and EFSS have the benefit of the

[4] Daniel Lovelace, "EFSS: A case for analytic rigor." *Marine Corps Gazette*, April 2002 37-39.

latest digital fire direction control systems. These, coupled with the ability of the observer to quickly and accurately locate targets on the battlefield, lead to more accurate and responsive indirect fires.

In the near future, the need to provide massed fires to destroy area targets will be replaced with the capability to simultaneously strike multiple targets within a unit by precision guided artillery fires.[5] An important part of this development is the ability of the M777A2 to deliver precision guided munitions in the form of the M982 Excalibur round. The effectiveness of units firing these munitions has already been proven on the battlefield. These developments are what will allow a battery of only four howitzers to deliver effects equal to those of a traditional six-gun battery. The EFSS does not currently have this capability; however, programs exist to develop and acquire it. Recently, a study was done at the Naval Postgraduate School by Capt Daniel Lovelace. It shows through extensive war gaming and modeling that in absence of air support, a dual caliber battery produces the optimal lethality to support ground forces against a traditional enemy force. He concludes:

[5] Christopher Lewis, "The Future Artillery Force…Today," *Marine Corps Gazette*, July 2006 24-25.

> A total of 77,100 battles [were] simulated to provide insights over a range of assumptions and conditions … Four howitzers are sufficient to provide the required range and lethality effects in this scenario … Based on our conclusions, we provide the following recommendations. (1)Dual caliber the MEU with four M777s and two EFSS's at a minimum.[6]

His work provides compelling evidence. Capt Lovelace illustrates that the MEU commander gains more in lethality with the EFSS systems than he loses by giving up two M777A2 howitzers.

**Embark Space**

When a firing battery is identified to attach to the MEU, they will take ownership of the EFSS and its supporting equipment to train with during the work-up cycle. An EFSS battery consists of six EFSS sections. Each section is a towed 120mm mortar tube, ammunition trailer, and two vehicles. In addition, the battery has five support vehicles for a total of seventeen vehicles.[7]

The current table of organization (T/O) for a Marine artillery battery will support the firing of all six M777A2

[6] Captain Daniel Lovelace, USMC, *Comparison of Ground-based Fire Support Capabilities of the Marine Expeditionary Unit*, MSOR Thesis chaired by Thomas W. Lucas (Monterey, CA: Naval Postgraduate School, June 2007), v.

[7] Jon Swope, "EFSS Brief 1 October 2008," ELAN, 2 October 2008, <http://elan88vm/artyofec/default.aspx?RootFolder=%2fartyofec%2fShared%20Documents%2fProgram%20Updates&FolderCTID=&View=%7b63745294%2d28DD%2d463D%2d91D1%2d2C52FA867F07%7d>.

howitzers resident in a battery or all six EFSS mortars, but not all of both concurrently. An EFSS battery requires 1,529 $ft^2$ of embark space as seen in Table 1.

| | |
|---|---|
| 120mm rifle towed mortar (x6) | 63 square feet |
| ITV for towing the mortar (x6) | 50.5 square feet |
| ITV for towing the trailer (x6) | 50.5 square feet |
| Ammunition trailer (x6) | 30 square feet |
| Battery support variant (x5) | 73 square feet |
| TOTAL SQUARE FOOTAGE | 1,529 square feet |

**Table 1. Embarkation Footprint of an EFSS battery[8]**

By contrast, a traditional howitzer battery configured for a MEU deployment has a considerable larger embarkation requirement of 7,913 $ft^2$ as seen in Table 2.

| | |
|---|---|
| M777A2 Howitzer | 272 square feet[9] |
| MTVR 7-ton | 214 square feet |
| M998 HMMWV | 106 square feet |
| M-105 trailer | 96 square feet |

[8] Matt Chambliss, "Expeditionary Fire Support System: The new and improved fire support capability for the Marine Expeditionary Unit." ELAN, 22 October 2008, <http://elan88vm/commprgm/CI%20Papers%2007/Forms/AllItems.aspx> .

[9] Department of the Army, "Operator's Manuel for Howitzer, Medium, Towed: 155-MM, M-777 (NSN 1025-01-445-0991) and Howitzer, Medium, Towed: 155MM- M777A1 (NSN TBD)", Unknown, F-2.

| | |
|---|---|
| M-101 trailer | 123 square feet |
| M-149 water bull | 92 square feet |
| TOTAL SQUARE FOOTAGE | 7,913 square feet |

**Table 2 Embarkation Footprint of a MEU artillery battery[10]**

This data shows that to take both a full contingent of howitzers and EFSS would require 9,442 $ft^2$ of embarkation space for the equipment alone. By removing two M777A2 gun sections (two M777A2, four MTVRs, and two M-101 trailers) the battery frees up 1,646 $ft^2$, enough for an entire EFSS battery plus an additional 117$ft^2$. By adopting the four and four configuration, the MEU frees up 475 $ft^2$ over the traditional six howitzer battery. Space is one of the most valuable commodities that a MEU commander has. The four and four configuration maximizes the space available while allowing for great mission flexibility.

**Counter Arguments**

By taking four M777A2 howitzers and four EFSS, the battery is embarking more weapon systems than they can man at one time. If called upon to fall in on all of the howitzers or all of the EFSSs only, the battery would have excess Marines with no clear task. The importance of the four and four configuration lies in the ability to task organize into a howitzer heavy (4 M777A2 and 2 EFSS) or EFSS heavy (4 EFSS and 2 M777A2) configuration if

[10] Chambliss, 7.

necessary, while always retaining the critical lethality of a four howitzer battery. Any Marines not operating a gun can be utilized as additional security for the battery during the EFSS insert, or as an additional security element within the howitzer battery position. Those extra gun crews would also provide the ability to conduct twenty-four hour operations without taking a gun out of action.

Another consideration is the lack of redundancy in Class V (ammunition) and Class IX (repair parts) of the M777A2 and the EFSS. No redundancy exists in either class between the EFSS and M777A2. This also applies to Class IX supplies associated with the ITV and MTVR. The MEU will be forced to embark an additional volume of Class IX onboard to conduct maintenance and repairs. However, the additional space required will be partially offset by the added space created in embarking the four and four battery.

**Conclusion**

The future of fire support is robust for the MEU commander. The deployment of a MEU battery with four M777A2 and four EFSS takes full advantage of the system's strengths while retaining its flexibility without degrading lethality. Artillery officers have a responsibility to understand the capabilities, limitations, and requirements of these new weapon systems. In

doing so, they can create an appropriate balance that cover each other’s shortfalls and compliment their strengths.

Word Count: 1872

## Bibliography

Chambliss, Matt. "CI Papers 07." *ELAN.* October 22, 2008. http://elan88vm/commprgm/CI%20Papers%2007/Forms/AllItems.aspx (accessed November 14, 2008).

Department of the Army. *Operator's Manual for Howitzer, Medium, Towed: 155-MM, M-777 (NSN 1025-01-445-0991) and Howitzer, Medium Towed: 155MM-M777A1 (NSN TBD).* Washington D.C.: Department of the Army.

Department of the Navy. *Artillery Operations MCWP 3-16.1.* Washington D.C., 2002.

—. *Fire Support in Marine Air-Ground Task Force Operations FMFM 2-7.* Washington D.C.: Department of the Navy, 1991.

Lewis, Christopher. "The Future Artillery Force...Today." *Marine Corps Gazette,* July 2006: 24-25.

Lovelace, Daniel. "Comparison of Ground-based Fire Support Capabilities of the Marine Expeditionary Unit." *MSOR Thesis chaired by Thomas W. Lucas.* Montery, CA: Naval Post Graduate School, June 2007.

—. "EFSS: A case for analytic rigor." *Marine Corps Gazette,* April 2002: 37-39.

Pace, Col James. "Myths, Misconceptions, and Reality of the Ground Fires Triad." *Marine Corps Gazette,* June 2005: 14-17.

Swope, Jon. "Artillery OFEC." *ELAN.* October 2, 2008. http://elan88vm/artyofec/default.aspx?RootFolder=%2fartyofec%2fShared%20Documents%2fProgram%20Updates&FolderCTID=&View=%7b63745294%2d28DD%2d463D%2d91D1%2d2C52FA867F07%7d (accessed November 14, 2008).