The Effects of Pushing the Digital Divide to the Fighting Hole

Subject Area Electronic Warfare (EW)

EWS 2006

The Effects of Pushing the Digital Divide to the Fighting Hole
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to
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3 February 2006

Report Documentation Page			*Form Approved* *OMB No. 0704-0188*

Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

1. REPORT DATE **03 FEB 2006**	2. REPORT TYPE	3. DATES COVERED **00-00-2006 to 00-00-2006**

4. TITLE AND SUBTITLE **The Effects of Pushing the Digital Divide to the Fighting Hole**	5a. CONTRACT NUMBER
	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) **Marine Corps University Library ,2040 Broadway Street ,Quantico,VA,22134**	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)**	**13**	

> *Transforming C4 is not an end state but a continuous process that builds on emerging operational concepts, new information technologies (IT), and new ways of horizontally fusing information across the battlespace...The opportunity to exploit this new "digital dimension" of the battlefield, once enjoyed mainly by those in senior headquarters, now must extend down to the last tactical mile, pushing "power to the edge." Assured access to the network and information is essential to successful warfighting whether forces are static or on-the-move...*[1]

> *Brigadier General John R. Thomas, USMC*

The above quotation identifies a shift in thinking for military leaders post September 11th, 2001. As society moves from the industrial age to the information age, the importance of sharing accurate and timely information throughout the asymmetric battlespace is becoming increasingly apparent. The current lessons learned from Afghanistan and Iraq have shown that, often times, it is the Platoon Leader, and not the Battalion Commander, who needs the digital communication feed from the Unmanned Aerial Vehicle (UAV) so that a critical tactical decision can be made. However, the communicators that support these modern communication architectures are currently at a disadvantage in providing the services required to support the warfighter because they do not understand the complete architecture or even how the piece they have been trained on fits into the puzzle. In an attempt to facilitate the

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[1] LtGen Robert M. Shea, "Joint C4 Campaign Plan," *CJCS Hompage,* September 2004, <http://www.jcs.mil/j6/index.html> (1 November 2005) 56.

transformation to net-centric operations, new equipment is being fielded to lower level commands. However, enlisted communicators are still operating based on their experience with specific communications systems currently used within the Marine Corps. In order to support the next-generation equipment being fielded, digital communications requires a reorganization of the communications military operational specialty (MOS) and the training curriculum afforded to communicators.

MOS STRUCTURE

The Marine Corps needs to look at how it can streamline the communications field to better employ future architectures and support the customer. Currently the Marine Corps has seven different transmission specialties, six different wire and switching specialties, and seven different data specialties that support communications.[2] In order to make more well-rounded communicators, these various specialties should be streamlined into one basically trained communicator within the three functional areas of transmission, switching, and data. For example, the communications Warrant Officers are experts in one of the three fields and can function within any of the specialties in their field. The 0620 plans all transmission

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[2] "MCO 1510.18Z Individual Training Standards System for the Communications Occupational Field (OCCFLD)06," *TECOM Homepage,* 16 May 2005, <http://www.tecom.usmc.mil/gtb/its/its.asp> (1 November 2005).

systems, the 0610 plans the switching network, and the 0650
plans all data services.

Looking specifically at the transmission MOS, in order to
create one basically trained transmission Marine, the five
current transmission specialties need to be combined. While the
0620 Warrant Officer is the duty expert on all transmission
systems and is responsible for planning, designing, and
engineering these systems into the architecture, five
additional 06XX transmission specialties are charged with
planning, installing, operating, and maintaining the system.[3]
The problem with this is that, unlike the well-rounded Warrant
Officer, Marines who work in these additional specialties
(0621/0622/0623/0627/0628) are trained specifically in their
area of transmission. Therefore, when new equipment is fielded,
Marine Corps Systems Command must decide whether to incorporate
it into one of the existing specialties or create a new MOS to
support that particular system.[4] Streamlining this functional
area alleviates this problem by producing Marines that can
operate various types of transmission equipment, regardless of
the portion of the electro-magnetic spectrum the equipment
happens to operate.

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[3] "MCO 1510.18Z Individual Training Standards System for the Communications
Occupational Field (OCCFLD)06," *TECOM Homepage*, 16 May 2005,
<http://www.tecom.usmc.mil/gtb/its/its.asp> (1 November 2005).
[4] Charles D. Greer, "Manpower Training Plan for PORs," 7 November 2005,
personal email (7 November 2005).

In today's net-centric environment, commanders need communicators that can operate all types of transmission equipment as well as understand the voice and data information these systems are passing. Combining the current five specialties into one 062X field and training them accordingly would not only provide these Marines with the ability to adapt to ever-changing technologies, but would also provide them the opportunity to serve in every element of the Marine Air Ground Task Force (MAGTF). Currently, an 0623 (AN/TRC-170 operator) will never serve in an infantry battalion because the unit does not employ the AN/TRC-170 at that element of the MAGTF.[5] However, streamlining the transmission MOS would produce an 062X with basic skill sets and a complete understanding of transmission theory, who could operate anywhere within the MAGTF, and could specialize on unit specific equipment for a short duration of his career. For example, an 062X could serve his first tour with the Marine Aircraft Wing operating an AN/TRC-170, then move onto his second tour serving in the Ground Combat Element operating an AN/PRC-117.

The current trend suggests that it will not be long before the infantry battalion will require the same bandwidth as today's infantry Regiment. This requirement will necessitate

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[5] "Unit TO&E Report," *Total Force Structure Management System Homepage*, 30 September 2005, <https://tfsms-pp1.mccdc.usmc.mil/servlet/page?_pageid=57, 76&_dad=tfsmsprd_portal30&_schema=PORTAL30> (1 November 2005).

that the communicators supporting the architecture understand more complex systems. With systems such as Command and Control On-the-Move Network Digital Over-the-Horizon (CONDOR) being fielded at the company level, the transmission Marine will need to understand the transmissions and basic Internet Protocol (IP) routing set forth in figure 1.[6] This system is designed to pass voice and data communications across the battlefield to units who are no longer within line-of-sight range, are over the horizon, or are on the move.[7] Streamlining the transmission MOS will alleviate the problem of creating new specialties for new equipment and will produce a more capable communicator that can serve the MAGTF; however, the training curriculum must be updated in order for this streamlining to occur.
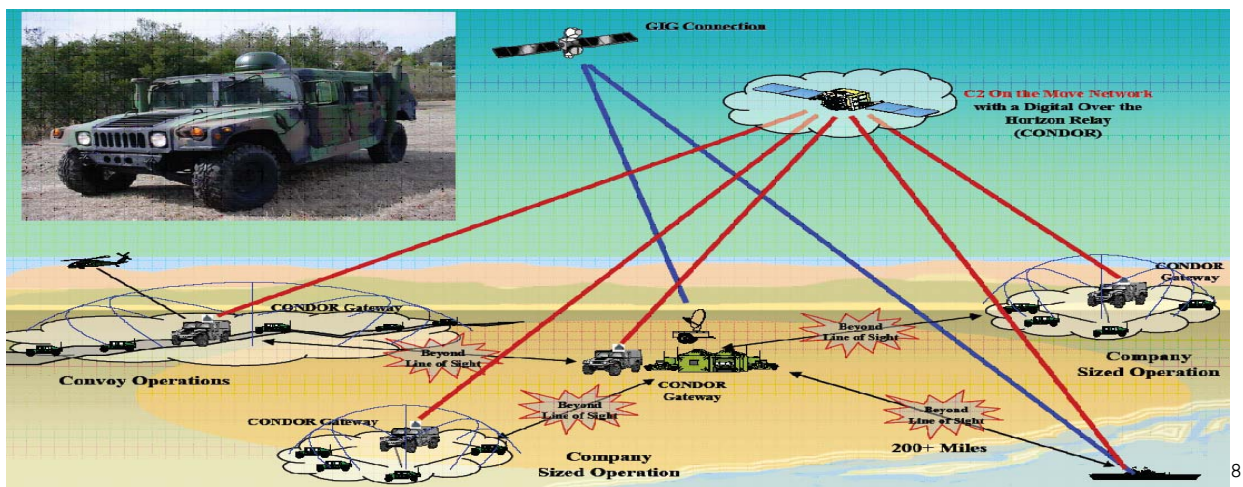

Figure 1: CONDOR Architecture

[6] "U.S. Marine Corps 2005 CONCEPTS + PROGRAMS," *USMC Hompage*, 2005, <http://hqinet001.hqmc.usmc.mil/p&r/concepts/2005/TOC1.HTM> (1 November 2005).

[7] *MARCORSYSCOM Homepage,* 19 October 2005, <http://www.marcorsyscom. usmc.mil/sites/pmcomm/condor.asp> (1 November 2005).

[8] Kevin J. Smith, "Marine Corps Communications Strategy to Support MAGTF C2," *Google Hompage*, 27 September 2005, <http: www.google.com> (1 November 2005).

TRAINING

ENTRY LEVEL

Rather than training Marines on specific transmission equipment currently used by the Marine Corps, the curriculum must concentrate more on theory and the information being passed over these systems. This change will produce a communicator that can employ all types of transmission media as well as effectively manipulate and troubleshoot the system. It is more important for the Marine to understand the basic transmission theory and what negatively or positively effects the equipment than the mere equipment itself. For instance, it is imperative that a transmission Marine understand radio frequency theory, antenna theory, and the affects of the atmosphere, terrain, and bandwidth on transmission systems. It is not as important that he master the operation of an AN/PRC-119. The curriculum must also address the basics of what type of information (voice/data) the equipment is passing, so that the communicator can understand how to provide a better service to the warfighter.

The information age has brought technology, such as the Internet Protocol (IP), to the forefront. It is incumbent upon the leaders of the communications community to ensure the Marines understand the basics of this technology. As the military moves further into this net-centric environment, the systems being fielded are designed to pass IP packets. Areas

from this technology that must be stressed are the Open Systems Interconnect (OSI) model, interfacing, basic routing/switching and IP addressing. Having this level of understanding of the technology allows the Marine to better troubleshoot, fix, or create new solutions to problems within the transmission system.

Once this basically trained transmission Marine arrives in the Fleet Marine Force (FMF), he or she must undergo on-the-job training and a basic qualification process on the specific equipment being employed by that unit. This is the period of the Marine's career where he or she would learn to operate a specific piece of equipment for his or her tour. The process should be similar to pilots maintaining qualifications on their respective aircraft. It is imperative that this qualification be tied to the unit's readiness report to ensure compliance and success of the ongoing training of that communication section and parent unit.

MID LEVEL

Functional area chiefs must truly understand the architecture being used to properly manage the Marines employing it. The current 0629 Radio Chief's primary responsibility is to oversee the planning and managing of the Marines that install transmission systems.[9] Currently however, if an 0629 spent the

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[9] "MCO 1510.18Z Individual Training Standards System for the Communications Occupational Field (OCCFLD)06," *TECOM Homepage,* 16 May 2005, <http://www.tecom.usmc.mil/gtb/its/its.asp> (1 November 2005).

majority of his career specializing in single channel radio,
there is no course which teaches him the architectural overview
to appreciate the planning considerations of the other two
functional areas of digital switching and data services, which
he is now required to understand. Because Radio Chiefs need to
provide solutions to complex problems that arise when their
Marines are interfacing with the other functional areas, a
system chief's course must be added to the career progression of
communicators. In order to provide the most effective
architecture for the services being supported, the curriculum
must stress the importance of equipment strings and redundancy,
as well as basic capabilities and limitations of the other
functional area systems and circuits. This is the point in the
communications Staff Non-Commissioned Officer's (SNCO) career at
which it is essential for him to begin learning about the other
pieces of the architecture and how they relate to his respective
functional area. For example, they must be able to effectively
troubleshoot the transmission piece of the architecture by
understanding the other functional areas of switching and data
as seen in figure 2.[10]

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[10] "Architectures," *System Engineering & Integration Hompage,* 27 December
2004, <https://www.marcorsyscom.usmc.mil/sites/sei/C4ISRArchitecture.asp> (1
November 2005).

TOP LEVEL

Tying the curriculum together should be the instruction of the Communications Chiefs. The fist time enlisted Marines begin to assist the Communications Officer in planning the entire architecture is at the Command and Control, Communications, and Computers (C4) planners course (C4PC).[11] Currently, however, most Master Sergeants who attend this course have a difficult time learning the planning aspect due to the fact that they are trying to learn the architecture as well. By implementing the streamlining process and adjusting the low and mid-level training curriculum, this time spent at the C4PC would focus on tying together the pieces of the architecture and how to successfully write the entire communications plan. This
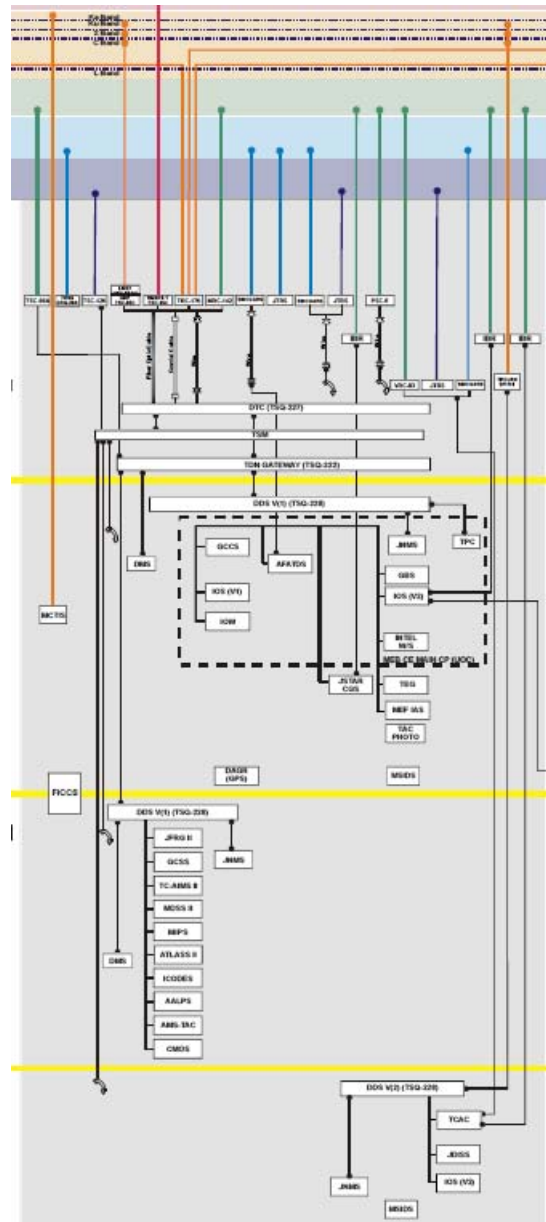

Figure 2: MEB Level Architecture

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[11] *Communications School Hompage,* <http://www.tecom.usmc.mil/cs/c4pc/c4pc.html> (11 December 2005).

training will produce a Communications Chief who has the same basic communications knowledge as the Communications Officer.

<div align="center">**CONCLUSION**</div>

The current warfighting structure and technology have forced the military into a transformation that is essential to fighting in the 21st century. Brigadier General Lawrence, the Central Command J-6, said it best in a recent interview with SIGNAL magazine:

> In terms of potential, I see the fundamental technologies associated with Internet Protocol (IP) traffic routing as having the greatest impact on CENTCOM both near- and mid-term. The current migration toward IP-based networks and the extension of the Defense Information System Network (DISN) and data services down to the lowest tactical echelon set the conditions for this. Additionally, proliferation of wireless networks and devices and the technical characteristics of the Transformational Communications Architecture are best realized with the convergence of voice, data and video into a common IP environment.[12]

Pushing the digital divide down to the fighting hole requires the communications field to streamline the MOS within the three functional areas of transmission, digital switching, and data

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[12] Brig. Gen. Susan S. Lawrence, "Input," *SIGNAL*, November 2005 104.

services and adjust the training curriculum to produce better well-rounded communicators in order to support the commander. This will not be an easy task and it will be an ever-changing process, but it is crucial that the transition begin now so that the Marine Corps can keep pace with today's technology and be prepared to adapt to tomorrow's battlefield.

Word Count: 1996

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