

Can Marine Corps c2 Systems Support Commanders?

The Future of the MARINE C2.

EWS Contemporary Issue Paper

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Current command and control (C2) systems are outpacing communications capabilities and may fail to meet Marine commanders' needs. To meet these demands, the Marine Corps needs to modernize its communications and to use a standards system known as Everything Over Internet Protocol (EOIP).

PAST COMMUNICATIONS

The Marine Corps has always been aware of the importance of reliable communications. Early Marine communications relied on visual capabilities. Flags, torches, and mirrors were used to support Marine commanders. Visual methods could cover up to 184 miles from one mountaintop to another. The systems were efficient, highly portable and required no power sources, but they were slow and often left the communicators exposed to enemy fire.¹

As technology advanced the Marine Corps shifted to analog voice communications. Analog voice communications allowed greater amounts of information to be transferred and could be used in all environmental conditions. The

¹ The Heliograph, Wikipedia, <http://en.wikipedia.org/wiki/Heliograph>

Marine Corps invested heavily with other Department of Defense agencies to provide analog capabilities. Large communications infrastructures were created. Switchboard systems similar to telephone company switchboards were placed throughout the world. Analog voice satellite constellations worked with Marine ground communications systems and allowed for global analog voice communications.² These analog voice capabilities are currently the backbone of Marine data capabilities.

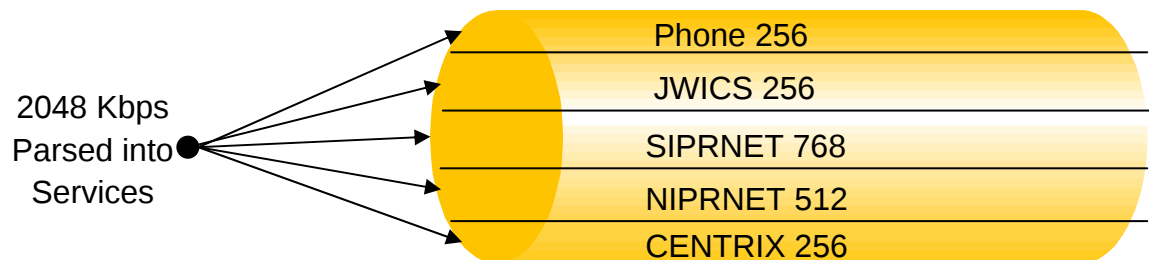
PRESENT COMMUNICATIONS

Analog communications systems designed in the 1980's will not meet the needs of commanders in the 21st century. Current technology provides a flexible "fire hose" capability but the majority of today's systems limit our flexibility to a series of individual "garden hoses". The existing garden hoses are dedicated circuits providing services such as phones, Joint Worldwide Intelligence Communications System (JWICS), Secret Internet Protocol

² Harrison Donnelly. "Information Warfighter: Leveraging Commercial Internet Protocol Technology," Military Information Technology August 2006. <http://www.military-information-technology.com/article.cfm?DocID=1587> Accessed on December 10, 2007.

Router Network (SIPRNET), Nonsecure Internet Protocol Router Network (NIPRNET), and Combined Enterprise Regional Information Exchange System (CENTRIX).³

The diagram below illustrates how 2048 kilobytes of data is typically allocated from a “fire hose” of 2048 kilo bits per second (Kbps) to smaller dedicated “garden hoses” supporting only the services they were dedicated to.



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The bandwidth utilization above is not maximized. To provide greater capabilities the “fire hose” needs to be used more efficiently. Digital systems using analog infrastructures are error prone, inefficient, and will

³ Rutka Jr., Kenneth J. “Everything over Internet Protocol,” *Special Operations Technology* November 2007. http://www.special-operations-technology.com/print_article.cfm?DocID=2247 Accessed on December 10, 2007.

⁴ Rutka Jr., Kenneth J. “Everything over Internet Protocol,” *Special Operations Technology* November 2007. http://www.special-operations-technology.com/print_article.cfm?DocID=2247 Accessed on December 10, 2007.

eventually fail to provide the services commanders' demand. The Marine Corps needs to more efficiently use bandwidth.

FUTURE COMMUNICATIONS

In the future Marine C2 systems will move from voice to data, these systems will require greater bandwidth. Doctrinal radio nets will become computer chat channels, and streams of data from the battlefield will automatically update positions of units in combat operation centers. To provide the C2 services that commanders will require the Marine Corps will have to upgrade its current communications technology and leverage the new commercial-off-the-shelf (COTS) capabilities.⁵ New technology using Everything Over Internet Protocol (EOIP) will provide greater bandwidth utilization and provide flexibility for future commanders.

EOIP technology enables increased capability in communications services and provides unparalleled

⁵ Daniel Tynan, "Army Reboot" *FedTech* May 2007.
http://fedtechmagazine.com/article.asp?item_id=283 Accessed on
December 10, 2007.

efficiency of bandwidth.⁶ The diagram below illustrates how the EOIP “fire hose” of 2048 kilobytes dynamically allocated provides bandwidth to only services being used. Bandwidth is not wasted on inactive circuits.



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According to Lieutenant General Steven W. Boutelle the Army Chief Information Officer, “The use of EOIP-based networks instead of circuit-based networks greatly improves the quality and efficiency of services provided to the warfighter while decreasing the equipment size, training requirements, cost and manning requirements.”⁸ He also says that bandwidth utilization schemes like EOIP need to be

⁶Rutka Jr., Kenneth J. “Everything over Internet Protocol,” *Special Operations Technology* November 2007. http://www.special-operations-technology.com/print_article.cfm?DocID=2247 Accessed on December 10, 2007.

⁷Rutka Jr., Kenneth J. “Everything over Internet Protocol,” *Special Operations Technology* November 2007. http://www.special-operations-technology.com/print_article.cfm?DocID=2247 Accessed on December 10, 2007.

⁸Rutka Jr., Kenneth J. “Everything over Internet Protocol,” *Special Operations Technology* November 2007. http://www.special-operations-technology.com/print_article.cfm?DocID=2247 Accessed on December 10, 2007.

"Pushed across the battlefield and across the services, just like electricity was pushed across the U.S."⁹ The efficiencies in EOIP will allow us "to do things we've never been able to do before, such as converge voice, data and video. You'll be able to have voice, video and data commingled on the same data stream and unclassified, secret and top secret commingled. This was based on the successes of the Special Operations Command [SOCOM] and the Joint Communications Support Element [JCSE]."¹⁰

Future C2 applications will be collaborative tools.¹¹ Command Post of the Future (CPOF) and Adobe Connect Professional are becoming standard applications in combat operation centers. These applications allow multiple users to hold video teleconferences, while seeing and developing a single PowerPoint presentation. EOIP-based networks will

⁹ Harrison Donnelly. "Information Warfighter: Leveraging Commercial Internet Protocol Technology," Military Information Technology August 2006. <http://www.military-information-technology.com/article.cfm?DocID=1587> Accessed on December 10, 2007.

¹⁰ Harrison Donnelly. "Information Warfighter: Leveraging Commercial Internet Protocol Technology," Military Information Technology August 2006. <http://www.military-information-technology.com/article.cfm?DocID=1587> Accessed on December 10, 2007.

¹¹ Harrison Donnelly. "Information Warfighter: Leveraging Commercial Internet Protocol Technology," Military Information Technology August 2006. <http://www.military-information-technology.com/article.cfm?DocID=1587> Accessed on December 10, 2007.

pool available bandwidth and maximize this limited resource to support the future needs of our commanders'.¹²

COUNTER ARGUMENTS

The shift in communications equipment will be expensive, so opponents ask, "Why fix it?"

In response LtGen Boutelle makes an analogy to the implementation of electricity in America, "Back then, we had to invest in high power transport lines, and power lines to the edge or to every house and factory. Once you have those power lines to houses and factories, the next investment is the application-a light-bulb, a toaster, a radio or an electric motor in a factory. That's the step that we're at now in network-centric warfare, with the network as the enabler for the warfighter." America investment in electricity allowed for incredible industrial growth. The shift to EOIP networks will provide similar growth of C2 capabilities.¹³

¹² Harrison Donnelly. "Information Warfighter: Leveraging Commercial Internet Protocol Technology," Military Information Technology August 2006. <http://www.military-information-technology.com/article.cfm?DocID=1587> Accessed on December 10, 2007.

¹³ Harrison Donnelly. "Information Warfighter: Leveraging Commercial Internet Protocol Technology," Military Information Technology August 2006. <http://www.military-information-technology.com/article.cfm?DocID=1587> Accessed on December 10, 2007.

CONCLUSION

Future C2 platforms will require more capability than current communications infrastructures can provide. EOIP-based architectures will increase capabilities and more efficiently use bandwidth.¹⁴ Capt Kenneth J. Rutka, a communications officer for the 112th Special Operations Command notes, "EOIP technology is an example of communicators capitalizing on commercial solutions and integrating them into common equipment to ensure commanders on the ground have a flexible and responsive communications network." The role of communicators is to provide communications to meet the warfighter's needs. The shift to EOIP networks will provide those capabilities.

Word Count 937

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¹⁴Rutka Jr., Kenneth J. "Everything over Internet Protocol," *Special Operations Technology* November 2007. http://www.special-operations-technology.com/print_article.cfm?DocID=2247 Accessed on December 10, 2007.

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