

Warfighter Information Network – Tactical The cost and the commitment

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The cost and the commitment

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“Congress can make a General, but only communications can make him a commander.” General Omar Bradley



Dwight Eisenhower warned the country in his farewell address in January 1961:

"This conjunction of an immense military establishment and a large arms industry is new in the American experience. We must guard against the acquisition of unwarranted influence, whether sought or unsought, by the military industrial complex. The potential for the disastrous rise of misplaced power exists and will persist."¹

With the recent award of the U.S. Army's warfighter information network-tactical (WIN-T) contract to General Dynamics Corporation and Lockheed Martin, President Eisenhower's words seem ominous. While WIN-T will provide today's warfighter with information superiority and redundancy from the strategic to the tactical levels of operations, the current contract locks the U.S. Army into a proprietary system that may hamper the U.S. Army's ability to respond quickly to the changing battlefield. Instead, the U.S. Army Signal Corps should play a more active role in designing a battlefield communications architecture that would employ commercial-off-the-shelf technologies (COTS) with

¹Bartlett's Familiar quotations

common user interfaces, because it is both time and cost effective and more responsive to the changing battlefield.



Background



The U.S. Army currently projects voice and data files to satellites 23,900 miles above the earth's equator using super high frequency (SHF). In addition, fiber optic transmissions traveling at 198,000 miles per second (the speed of light) send voice and data files around the earth more than seven times in less than a second. Today, the speed of military maneuver, the complexity of the U.S. Armed Forces, and the multiple and usually simultaneous missions that must be performed, from counter-insurgency to nuclear deterrence, require greater communication coordination.² In fact, the U.S. Army depends on reliable and prompt coordination between C2 nodes (information superiority) to provide commanders a competitive advantage on current and future battlefields. However, the current U.S. Army communications systems are limited between nodes and have not kept pace with the advances in command and control (C2) systems. The U.S. Army purchased the current communications systems Mobile Subscriber Equipment (MSE) and Tritac/Digital Group Multiplexer (DGM) systems in the early 1980s, when systems were

² Command in War

designed primarily for voice communications. Consequently, these two systems provide very little bandwidth (system processing speed and speed of voice/data delivery) for voice and data files and command and control (C2) systems connectivity. The WIN-T design/concept will replace the outdated, oversized, and limited MSE and DGM systems, but it will cost much more than many in the U.S. Army and the Signal Corps anticipate.



Role



The U.S. Army's future tactical communications system (WIN-T) is expected to consist of a communications infrastructure and network nodes from the maneuver battalion (tactical communications) to the theater rear boundary (strategic communications). Furthermore, the WIN-T network is expected to provide command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR) support capabilities that are mobile, secure, survivable, seamless, and capable of supporting multimedia tactical information systems within the warfighters' battlespace.³

The author recognizes as a given that bandwidth capacity and redundancy for C2 system connectivity is the primary requirement for WIN-T or any new communications system or architecture. However, under the current contract, General

³WIN-T Concept of Operations (Draft)

Dynamics and Lockheed Martin will be managing the communications concept, the architecture, the systems integration, and the associated software. By doing this, the U.S. Army is committing itself to a passive role and a long-term, proprietary relationship with the two contractors.

Instead of allowing General Dynamics and Lockheed Martin to lead the communications design, the U.S. Army Signal Corps should play a more active role in concept/architecture design to ensure the new communications system will support the warfighter, the current Army transformation, and the changing battlefield. Refocusing the scope of the work and requirements would save valuable time and place management control with the U.S. Army Signal Corps:

- Under this plan, the Signal Corp would direct system development and focus contractors on specific points and on specific systems instead of allowing the contractors to drive the design/guard the "hen" house.
- The U.S. Army should carefully define the Brigade Combat Team (BCT's) before a common communications system is developed (The U.S. Army currently is in only the preliminary stage of the transformation into Stryker and Brigade Combat Teams.)

- The U.S. Army Signal Corps should emphasize systems integration, that is, the ability of WIN-T to connect to existing joint (Navy/Marine and Air Force systems) and commercial communications systems to ensure common interoperability.
- Instead of proprietary systems and concepts, the Signal Corps should insist on using commercial-off-the-shelf-technologies (COTS) with common user interface qualities (also allowing for upgrade).



Reduced Time and Cost



Ultimately, the U.S. Army will pay for hidden costs and/or see a delay in delivery given the conceptual, premature nature of the contract. The contractors for the WIN-T design/concept are expected to deliver the first prototype system for testing by 2010. After the research and development phase, the testing and approval phase would begin with the U.S. Army Signal Corps and the contractors validating the WIN-T system's supportability. The final phase would be General Dynamics' and Lockheed Martin's production of the approved system. In addition to the phases of research and development and the testing phases, the Signal Corps would be required to redesign the

officer and enlisted personnel training and doctrine concerning the installation, operation and the maintenance of the WIN-T system. While all this is taking place, the U.S. Army will be transforming the force structure into brigade combat teams introducing another variable into the already complex requirement. The cost of the WIN-T project is currently estimated at \$10 billion dollars. Because of the uncertainty associated with the Army's transformation into brigade combat teams and the changing battlefield, little specific guidance is presently available for the contractors, inevitably necessitating costly future change orders to the original plan.

Moreover, instead of leaving the design of the communications concept, the architecture, and the systems interconnectivity to General Dynamics and Lockheed Martin, the U.S. Army could save time and money by designing the concept and managing the architecture to ensure joint interoperability. While creating the design, the Signal Corps could write the doctrine concurrently (doctrine should always drive system development, not the reverse), thereby saving time and preparing the signal community for the future changes, instead of waiting for the contractors to present the plan. Furthermore, by giving (instead of waiting for) specific instructions for system design, the Signal Corp could begin retraining the officer and enlisted corps on the systems concepts, interoperability, and

connectivity. Similarly, the U.S. Army Signal Corps could control costs by carefully projecting the individual specific system requirements and by managing the bidding process for the individual systems (which will be upgradeable and have COT's attributes/common user interface qualities).



Battlefield Flexibility



Flexibility in communications is necessary to support the changing battlefield, where soldiers must be able to tailor a communications plan and the equipment employment to fit the terrain, the maneuver unit, the enemy, and the mission. In both Afghanistan and Iraq, soldiers are adapting out-of-date and insufficient communications systems to respond to the current environment. The decentralized approach to controlling the employment of communications systems that is evolving will continue, and it will require a communications system that provides a wide variety of modular, durable, and adaptable solutions that will interface with any joint/commercial communications system. For example, the commercial industry is pushing wireless communications systems for internet and telephone services. Because wireless systems provide more flexibility in communications to the user, a plan to support a maneuver unit in an urban environment would be to employ encrypted cellular phones with data ports for laptops, utilizing

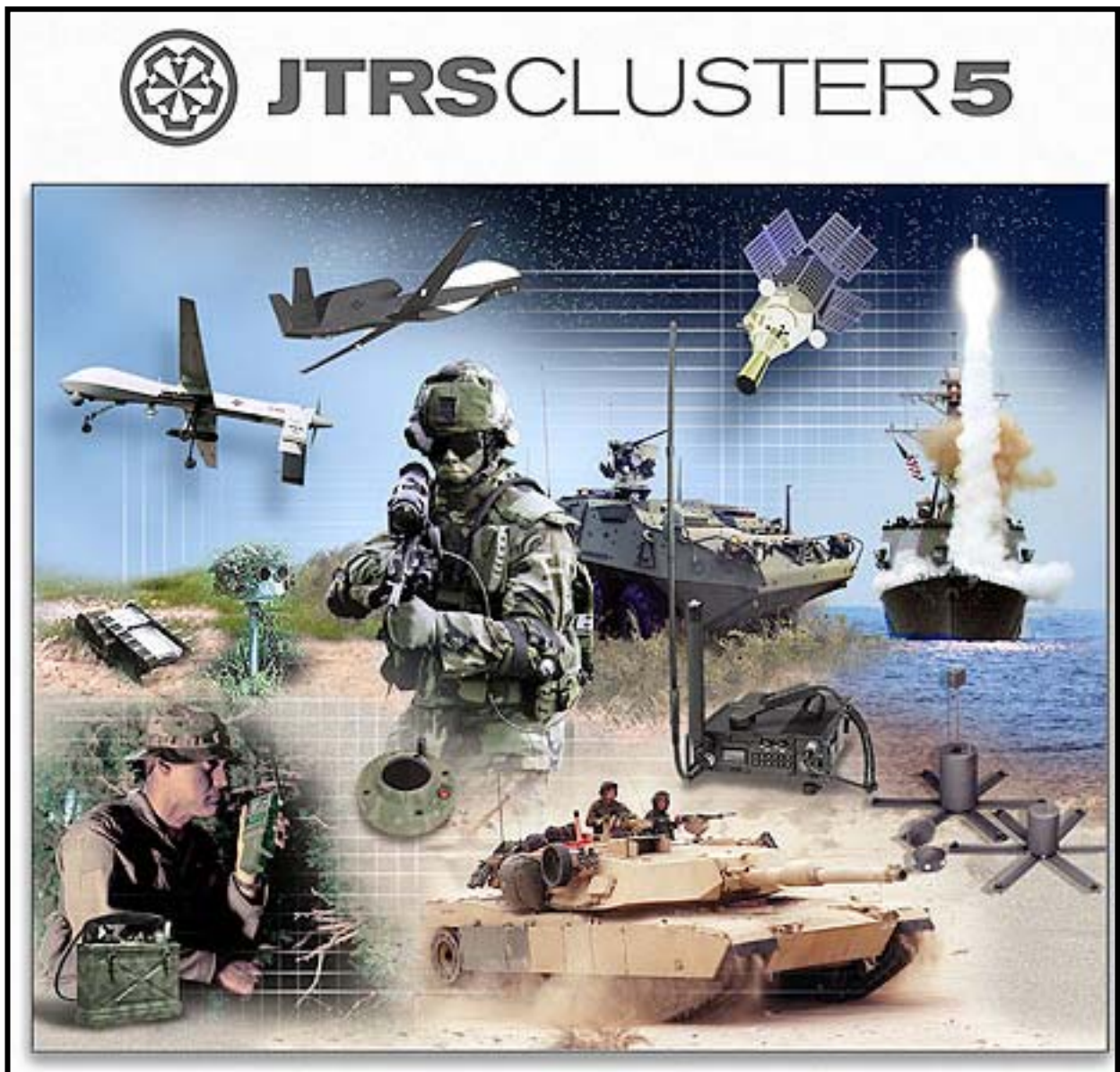
the existing medium level military satellite systems (Iridium phone support satellites) which could also interface with current joint military systems or commercial communications systems to ensure redundancy. Unfortunately, because the U.S. Army Signal Corps is not designing the communications architecture or giving specific guidance to the contractors on equipment specifications⁴, proprietary systems and designs will be developed which will prove to be inflexible concerning installation, upgrade, and interoperability.

Conversely, in the commercial communications world, collaboration for software design has become the standard for development and upgrade. Thomas Friedman, in the book, The World is Flat states, "The old top-down [proprietary] model is broken 'I develop something and then throw it over the wall to you, and you find the bugs and throw it back; [then] I patch it and then sell a new version.'"⁵ Granted the U.S. Army cannot open the door and invite a public collaboration. However, building a collaborative team (user participation) that will establish foundational principals would keep the new communications system(s) relevant for decades. Adapting existing commercial and military technologies, like the newer satellite communications nodes (e.g., Triband Satellite Terminal, SMART-T, Phoenix

⁴ WIN-T Concept of Operations (Draft)

⁵ The World is Flat

Terminal etc.), the high capacity line of sight (HCLoS) and joint tactical radio system (JTRS) (see figure below), data systems like Cisco and VOIP (Voice over Internet Protocol) packages and other innovations into a mobile, hardened architecture is the solution to “reinventing a [proprietary] wheel.”





Opposing Views



As military manpower is redirected to operating forces, more and more work is outsourced to government contractors. Forces driving the outsourcing oppose any proposals that would weaken the WIN-T contract's momentum:

1. "WIN-T may take longer to develop, but it will come with contractors to support the system, technical support, and a concept that will provide enough bandwidth and redundancy for every C4ISR support system on the battlefield."

Counterpoint: Because of the proprietary nature of the contract, the U.S. Army will not receive the schematics for the systems, and the equipment will most likely come with only a one-year warranty. Consequently, the Army will be required to amend the existing contract with General Dynamics and Lockheed Martin to make all future system repairs. Moreover, contractors will provide general guidance for employment of the systems; however Soldiers will be responsible for detailed planning, employment, and field expedient repair (engineering, repair, fabrication and installation "on-the-move") in unusual and combat situations without the benefit of the schematics. While General Dynamics and Lockheed Martin's WIN-T concept will provide redundancy and bandwidth for C4ISR systems, tech support

will prove costly in the short-term and even costlier in the long-term.

2. "External development of the future communications system will allow the U.S. Army Signal Corps to focus on existing communications issues and challenges."

Counterpoint: The U.S. Army is paying a heavy price for the research and development of a proprietary system. WIN-T's primary focus is redundancy and bandwidth capacity for C4ISR systems. The U.S. Army can develop the concept/system that will support this requirement and give specific guidance to contractors for systems design, saving both time and money.

3. "Why buy systems with common interface qualities/COT's and allow the users to build the networks to support the changing battlefield, when the U.S. Army can buy the right system and not have to struggle with planning for each situation."

Counterpoint: More planning is required to deal with a comprehensive proprietary system instead of a COT's system. Proprietary systems do not interface well with older systems, newer technology, and do not adapt well to a changing battlefield. The issue is not the communication system itself, but rather the scale of the design/concept of the communication system and its adaptability and flexibility-its ability to

interface properly with the current communications systems and tomorrow's communications systems.



Conclusion



Contractors like General Dynamics and Lockheed Martin have done an outstanding job of fielding, upgrading, and maintaining the current communications systems. However, Soldiers are adapting the current communications architectures (with insufficient systems) in Afghanistan and Iraq with amazing success. WIN-T, in the initial stages, will prove to be the latest and the greatest *gadget*, but other less costly, more flexible options exist. Instead the U.S. Army appears to be buying into individuality and an ideology of contracting.

Word Count: 1948

Appendix A

Warfighter Information Network-Tactical Design/Concept

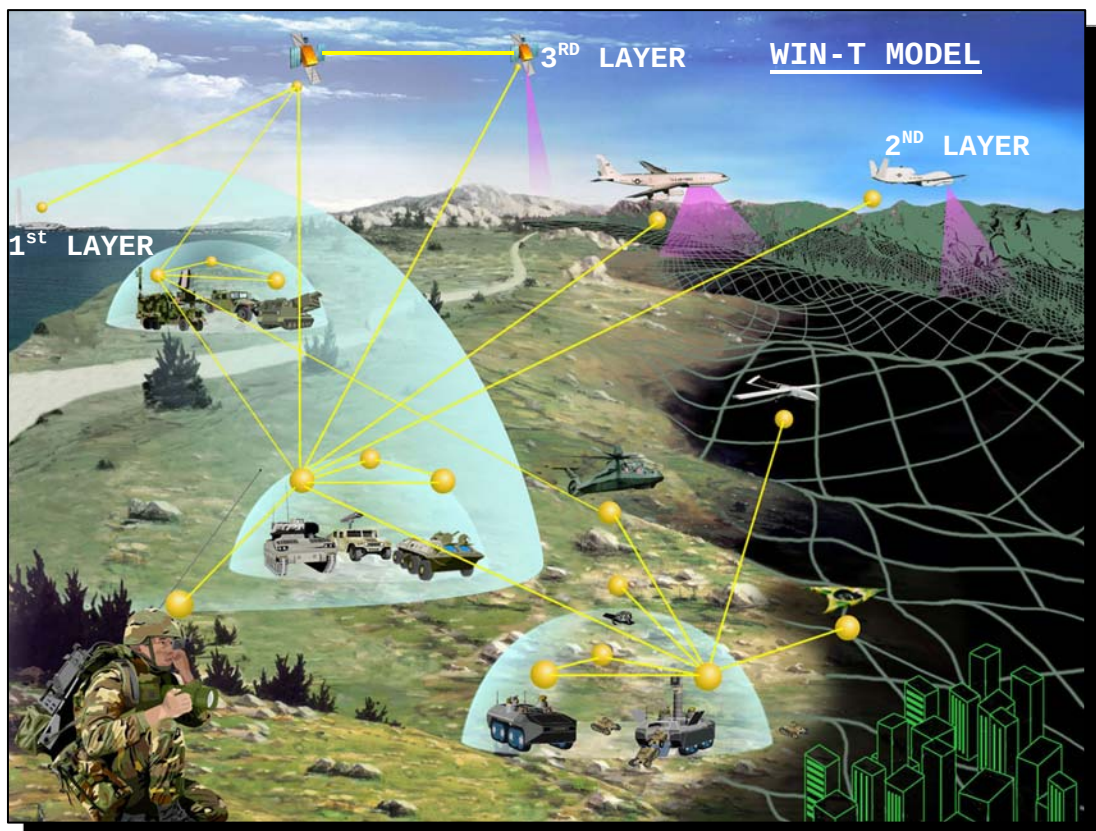
A Closer Look at WIN-T's Concept of Redundancy...

The WIN-T design/concept will replace the outdated, oversized, and limited MSE and DGM equipment. The first (highest) layer of redundancy is the space layer. The space layer will interface with the satellite nodes, specifically systems like the SMART-T (EHF Band) satellite system or the Tri-band (SHF to Ka Band) satellite system (TST). In addition to the advances in satellite nodes, modern day geosynchronous satellite systems like the MILSTAR (military satellites) are able to transmit voice and data communications to other geosynchronous satellites, creating global relays.

The second layer of redundancy created by WIN-T will be the airborne layer. The airborne communications layer will utilize manned and unmanned aerial vehicles carrying communications payloads acting as retransmission stations. Aerial communications relays will retransmit radio frequencies like the very high frequency (VHF) LOS signals supporting the maneuver battalion, which would normally refract in an urban environment, to other C2 nodes. At higher altitudes, U.S. Army forces will rely on joint aerial platforms such as mid-altitude airships, aerostats, or the Global Hawk to provide coverage to a wider

area. High-altitude aerial vehicles will also route traffic to the space layer.

The third layer of redundancy in communications is the terrestrial communications layer. This layer interconnects all ground-based elements and is especially critical for interconnecting highly mobile tactical units. Line-of-sight (LOS) wireless links interconnect dispersed tactical elements (high-capacity LOS-HCLOS Radio) and are further extended by the automatic routing capability of the joint tactical radio system (JTRS) with linkage to the airborne and space layers. WIN-T's higher bandwidth and redundancy in communications will support data networks, voice switching nodes, and C2 systems that will enable commanders to make and implement superior decisions faster than their opposition, equaling information superiority on the battlefield (see figure below for the WIN-T theory of connectivity).



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Appendix B

The U.S. Army's History of "Bad Communications Contracts"

The constant search for information superiority has left the U.S. Military and the U.S. Army with a long history of over budget and proprietary communications systems design. For example, in the 1960's, the U.S. Army partnered with Australia, Canada, and the United Kingdom in a joint development of an analog communications system called the Mallard system. On 5 June 1969, the Mallard project moved to phase two of project development awarding a contract to Iranian Gendarmerie

⁶ WIN-T Information Brief

Communications.⁷ The project seemed to be progressing well until suddenly, the U.S. military pulled out in late 1969 and left the remaining nations with nine years of work and no equipment or future plans for design. Because the U.S. military abruptly withdrew from the plan, the remaining nations withdrew, losing millions as well.⁸ The Mallard system did not meet all of the objectives, for which the U.S. military was searching and did not allow for system expansion or upgrade because of the proprietary design. The U.S. Army's current communications system (MSE) eventually made it to production and is in use today, however the contract almost became a "Mallard Contract." Janes Military Communications experts uncovered a few of the MSE contracting disputes:

The U.S. Army's current communications system, the MSE communications system, designed by GTE, originally began with a one-billion-dollar price tag and later blossomed into a \$4.3 billion-dollar venture. MSE, as purchased in 1982, was to provide communications to forward units, but in 1983 the U.S. Army decided to change the architecture to

⁷Fort Monmouth Message, 1965 www.monmouth.army.mil/historian/pubupdates/Partial_Monmouth_Message_Index_1960s.doc

⁸ Janes Military Communications 1990 - 1991, p. 831.

support brigade and below echelons, costing taxpayers an extra \$3.3 billion dollars [because of a lack of foresight]. In addition, GTE was unable to field the requirements of the new brigade and below communications system and the U.S. Army restarted the contracting process looking for new bids. Later the U.S. Army paid GTE, now subcontracting to a French company, another \$1.5 billion dollars to finish the project.⁹

MSE equipment has been upgraded (increasing bandwidth) numerous times since it was fielded in 1982; however, only the contractors are able to upgrade the MSE systems because the schematics for design will not be released to the U.S. Army Signal Corps, making the MSE system a very costly proprietary contract.

⁹ Janes Military Communications 1990 - 1991, p. 831.

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