

Paper
for
15th ICCRTS
The Evolution of C2

For the paper entitled:

“Enabling Multinational Communications with CENTRIXS”

Topics:

Topic 2: Networks and Networking

Topic 3: Information Sharing and Collaborative Processes and Behaviors

Topic 9: C2 Architectures and Technologies

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Abstract for “Enabling Multinational Communications with CENTRIXS”

Fittingly unveiled before representatives from 98 nations at the 2007 International Seapower Symposium, the nation’s new maritime strategy sets forth an imperative for increased international engagement and cooperation. Forging bonds with long-standing and new international partners will enable maritime forces to surge with both capacity *and* trust in meeting present and future security challenges.

Developing cultural, historical, and linguistic acumen among those at the tactical edge is critical to enabling effective international engagements. Activities under the auspices of Theater Security Cooperation and the Global Maritime Partnership initiative speak to the strides made in forming these bonds. Combined Task Force 151 in the Gulf of Aden and the Africa Partnership Station both exemplify the kinds of engagements enumerated in the Maritime Strategy.

Beyond these critical human and policy elements stands the necessity for network-centric technologies that enable secure partner nation communications. Given the disparate types of platforms brought forth by partner nations, this system should be platform-agnostic, cost-effective, and easily deployable.

This paper will highlight the Combined Enterprise Regional Information Exchange System (CENTRIXS) that is helping bridge these gaps. Recent examples will demonstrate its effect in facilitating the integration of partner navies, and contribution to enhancing the training regimen of U.S. forces.

“Enabling Multinational Communications with CENTRIXS”

“Maritime forces will be employed to build confidence and trust among nations through collective security efforts that focus on common threats and mutual interests in an open, multi-polar world. To do so will require an unprecedented level of integration among our maritime forces and enhanced cooperation with the other instruments of national power, as well as the capabilities of our international partners. Seapower will be a unifying force for building a better tomorrow.”¹

A Cooperative Strategy for 21st Century Seapower
October 2007

“In our efforts [to ensure the rule of law on the global commons] we cannot forget that while we are an independent and powerful Navy, we are not alone in our intentions or goals. Global Maritime Partnerships are setting the standard for international cooperation, in our globalized world and they are an important element to achieving stability in the global commons upon which we all rely.”²

Chief of Naval Operations Admiral Gary Roughead
Remarks delivered at the Surface Navy Association Symposium
January 14, 2010

Unveiled in October 2007 at the Eighteenth International Seapower Symposium, the United State’s new maritime strategy, *A Cooperative Strategy for 21st Century Seapower*, set forth the argument for increased international cooperation and engagement to meet the global challenges of the new century. During his remarks at this biennial gathering, Chief of Naval Operations Admiral Gary Roughead observed the underlying premise of this necessity, hinting at the enormous responsibility naval leaders share in safeguarding the maritime commons that bind the global system.

“Our security and our prosperity are completely linked to the security and prosperity of other nations around the world. There is a system at work everyday around the world. . . Much of that system depends on what happens in the maritime environment.”³

The Chief of Naval Operations, Admiral Gary Roughead, has emphasized the importance of communications and networking with our global maritime partners, most recently at the Surface Navy Association Symposium, as evidenced by the second quote leading off this section. This theme is reinforced continuously in multiple U.S. Navy communications media, and is highlighted by the Navy’s new “bumper sticker”, *A Global Force for Good*.

This imperative for enhanced international cooperation aligns squarely with the *National Defense Strategy* (NDS), published the subsequent year. Signed by Secretary of Defense Robert Gates, the NDS argues that strengthening and expanding alliances and partnerships will be

critical to achieving its five strategic objectives.⁴ Echoing the maritime strategy, the National Defense Strategy (NDS) makes the case for integrating new partners in the pursuit of national security interests.

Allies often possess capabilities, skills, and knowledge we cannot duplicate. We should not limit ourselves to the relationships of the past. We must broaden our ideas to include partnerships for new situations or circumstances, calling on moderate voices in troubled regions and unexpected partners. In some cases, we may develop arrangements limited to specific objectives or goals, or even of limited duration. Although these arrangements will vary according to mutual interests, they should be built on respect, reciprocity, and transparency.

The necessity for increased cooperation extends across the spectrum of maritime operations; from conventional roles such as sea control and power projection, onto improving maritime domain awareness and providing disaster relief. Moreover, it calls for enhancing engagements with our closest allies and forging links with new partners, creating the conditions so that forces can surge with both the capacity *and* trust to seamlessly operate together. Building this trust, Admiral Roughead explains, will require both time and investment in activities and exercises that bring navies more closely together.⁵ As the maritime strategy explains, this can be under the “formal alliance structures [e.g., NATO] or more informal arrangements (such as the Global Maritime Partnership initiative).”⁶ To this end, the U.S. Navy has organized, led, and participated in a variety of bilateral and multilateral activities that cut across the scope of maritime challenges and multilateral frameworks.

Among the most prominent stands the international anti-piracy effort in the Gulf of Aden led by Task Force 151. Comprised of over 30 ships from 17 nations, this “informal” effort exemplifies the kind of activity envisioned by the maritime strategy.⁷ Particularly striking is the participation of Russia and China, two “non-traditional” partners with whom the U.S. has disagreements in other areas. Nevertheless, security and safe passage for maritime commerce through the Gulf of Aden is a mutual goal these nations agree and cooperate on.

While CTF 151 exemplifies the mantra of international cooperation put forth by the maritime strategy, participants in these efforts can contribute because they have the requisite ocean-going vessels required to operate beyond their immediate littoral regions. In the case of many nations, particularly those with nascent navies or coast guards, the prospects of participating in this type of endeavor remains elusive, despite willingness or desire. In this regard, the U.S. Navy has undertaken additional cooperation initiatives, among them Africa Partnership Station.

Launched in 2006 under the leadership of U.S. Sixth Fleet, Africa Partnership Station (APS) stands as an example of cooperative activity tailored to capacity building. Per the Commander, U.S. Naval Forces Africa, APS “is a collaborative strategy designed to help coastal nations in West and Central Africa achieve safety and security in the Gulf of Guinea.”⁸ APS has imparted training in the areas of seamanship, search and rescue, law enforcement, and small boat maintenance, among others. Ultimately, by developing the capacity of African maritime security forces, APS gives nations in the region the ability to patrol their own waters, thereby enabling their contribution to securing the maritime commons.

These examples highlight the span of cooperative activity outlined in the maritime strategy. They illustrate both the diversity of challenges in the maritime commons, as well as the spectrum of capability partner nations can bring to bear against these challenges. More to the point, while certain partners can operate with U.S. forces across the continuum of warfare, others retain more limited capability and can contribute to a narrower set of tasks. Perhaps is this nowhere best captured than by the *National Defense Strategy*:

The capacities of our partners vary across mission areas. We will be able to rely on many partners for certain low-risk missions such as peacekeeping and humanitarian assistance, whereas complex counterinsurgency and high-end conventional operations are likely to draw on fewer partners with the capacity, will, and capability to act in support of mutual goals.

As the NDS makes clear, this is far from an indictment. Rather, it is a recognition that to achieve the goals of the maritime strategy, U.S. forces must be able to leverage the relative strengths of partner nations. Ultimately, be it integrating a Japanese AEGIS destroyer into a Carrier Strike Group or developing the maritime domain capabilities of an African state, these endeavors are dedicated to enhancing maritime security and addressing challenges of mutual concern.

Successfully integrating disparate platforms into a coalition framework requires, among other things, the technology to enable secure communications among allies. Given the range of capability among allies, this system should be platform-agnostic, cost-effective, and easily deployable. The Combined Enterprise Regional Information Exchange System (CENTRIXS) stands as an example of such as a system.

CENTRIXS: Enabling Secure Partner Nation Communications

The Combined Enterprise Regional Information Exchange System (CENTRIXS) provides operational commanders with a responsive information exchange capability in a coalition environment, critical to effective command and control. The strength of CENTRIXS lies in the ability to permit highly secure communications between the U.S. and partner nations. This capability is critical to all installations and has been a focus area of Space and Naval Warfare Systems Center Pacific (SSC Pacific) for several years involving close coordination with the Fleet, CCOMs and other agencies to resolve technical issues and seek the appropriate approvals. Before delving into its specific capabilities, a brief historical overview will clarify the system's origins and significance in affecting the maritime strategy.

Rooted in the efforts to interoperate during the Rim of the Pacific (RIMPAC) exercise in 1998, SSC Pacific fielded the first substantiation of CENTRIXS, termed Coalition Wide Area Network (CWAN). Use of partner nation networking technologies during RIMPAC, the largest naval exercise in the world, has been pivotal in facilitating the maritime strategy. During RIMPAC 2006, for example, participant nations successfully leveraged CENTRIXS “for exercise collaboration and data transfer requirements . . . In the past, other countries commented that the United States did too much planning and executing on the secret Internet protocol router network (SIPRNET), which other nations cannot access. Their forces, operating on different networks

and communications architecture, had to follow along.”⁹ CWAN evolved into COWAN which many partner nations still use to refer to the system. CENTRIXS was first operationally deployed in 2001 in support of Operation Enduring Freedom, providing a global information-sharing network critical to coordinating coalition efforts in the Central Command. Fielded jointly by CENTCOM and the Office of the Assistant of Defense/Command, Control, Communications and Intelligence (ASD C3I), a program management office was subsequently established the following year to expand coalition networking efforts.¹⁰

Consequently, in 2003, parallel efforts in the Pacific Theater were consolidated under the CENTRIXS umbrella to “standardize regional networks, leverage functionality, and provide standard software configurations, information assurance, and concept of operations.”¹¹ SSC Pacific had played a pivotal role in the development of coalition networking programs and capabilities. SSC Pacific worked in direct support of the Pacific Fleet N6, which served as PACOM’s Executive Agent for coalition networking.

CENTRIXS is comprised of several different security enclaves operating at the SECRET RELEASABLE level of classification based on partner nation membership and area of operational responsibility. For example the Cooperative Maritime Forces Pacific (CMFP) enclave is utilized to support Joint Maritime operations in the Pacific while the Combined Maritime Forces Central Command (CENTCOM) (CMFC), enclave comprises a different combination of partner nations to support CTF151 or other efforts in the Gulf region. Web-centric and commercial-off-the-shelf (COTS) oriented hardware and software are normally utilized on CENTRIXS. However, many COTS products are designed to assume a high bandwidth network-link is available to the end user. As previously alluded to, not all partner nations possess “high bandwidth units” capable of leveraging the full array of CENTRIXS services available to larger deck ships, yet the core requirement remains to effectively integrate navies of varying capabilities.

In response to this requirement, the SSC Pacific team which includes engineers and technicians from the CENTRIXS-Maritime (M) Program of Record Central Design Agent (CDA), Pacific Region Network Operations Center (PRNOC), and industry partners, developed a low-bandwidth, small footprint alternative; the CENTRIXS Portable Operations Kit (CPOK). The capability of the CPOK is unique in that it deploys with a low-cost satellite communications channel (an Iridium satellite phone) enabling ships without alternative data communications to maintain secure communication with other partner nation ships enhancing situational awareness and facilitating coordinated planning and execution of operations.

Iridium’s bandwidth link is only 2.4 kbps with actual raw data throughput less due to encryption overhead. However SSC Pacific, utilizing their Technology Development Center (TDC) in Pearl City Hawaii, enabled new data compression technology in order to optimize the traffic flowing across this link. As a result of the limited bandwidth only chat, email, and a geographically filtered Common Operational Picture (COP) are normally deployed with a CPOK install. However, these three applications are the cornerstone of the collaboration tool set which allow ships and headquarters to maintain 24/7 situational awareness with any other CENTRIXS enabled unit. Moreover, the appeal of the CPOK comes from its ease of use and upfront hardware costs of under \$10,000. Also, the SSC Pacific team has been pivotal in other

CENTRIXS connectivity advancements such as the use of the Internet for transport of CENTRIXS. This advancement is not explored in detail here but is of significance due to cost savings for transport while at the same time challenging leaders to evaluate the risks associated with the Internet as a command and control asset.

The development of the CPOK portends a huge leap in moving the tenets of cooperation and engagement espoused by the maritime strategy; the ability to successfully network with resource challenged navies and integrating them into a true multinational setting. The CPOK was first deployed in the 2006 South East Asia Cooperation Against Terrorism (SEACAT) exercise. The CPOK has significantly facilitated communications between smaller partner nation ships and headquarters, and for the first time, achieved Navy-to-Navy communications between the U.S. and four South East Asian partner nations.

The CPOKs have been deployed to support other multi-national and bi-lateral training events and proven a great vehicle for quickly and easily exposing partner nation commands and operators to the benefits of a secure coalition network. The CPOK remains the cornerstone of small deck, afloat units and headquarters in many exercises and real world operations due to the ease of use and low cost of connectivity. The ability to integrate multinational units of all types under a reliable communications network is a critical technological enabler of the maritime strategy. It has also proven a valuable component in the training of U.S. forces.

CENTRIXS Deployed: Enabling the DESI

While a variety of examples can be drawn to showcase its contributions to enabling coalition operations and augmenting U.S. proficiency, the case of the Diesel Electric Submarine Initiative is particularly noteworthy. Not only did CENTRIXS help facilitate an opportunity to forge international bonds, but it contributed to a critical piece of the U.S. Navy's training regimen. In support of the 2009 iteration of DESI held in San Diego, personnel from SSC Pacific implemented this vital communications component on the Peruvian submarine BAP *Arica*.

Begun in 2001 under the auspices of U.S. Fleet Forces Command, DESI grew out of a necessity for realistic anti-submarine warfare against the emerging threat of conventional submarines. Relatively inexpensive, these vessels constitute a threat entirely out of proportion to their cost and numbers. Over the last several years, the numbers of conventionally powered submarines has proliferated, with over 370 submarines spread out across 39 countries, many of these in the Pacific Rim region, and many of them in the hands of nations who are potential rivals of the United States.¹² Without diesel-electric submarines of its own, the U.S. Navy has turned to partner nations to provide a credible, realistic opposition force. The demand for training against diesel-electric submarines has increased and become a key element of strike group ASW training certification.¹³ Conducted in both the U.S. East and West Coasts, DESI primarily includes South American navies as its participants, namely Brazil, Chile, Colombia, and – most recently – Peru.

Shortly upon arrival to Naval Submarine Base, Point Loma, Team SPAWAR personnel from SSC Pacific successfully installed the CENTRIXS Portable Operations Kit on the Peruvian submarine, BAP *Arica* (SS-36), as well as installing a second CPOK at the Peruvian Navy's Submarine Headquarters in Callao, Peru. Each installation took approximately two days to

complete and train, demonstrating both the mobility and flexibility with which the deployable systems can be installed. The team coordinated closely with U.S. Naval Forces Southern Command (NAVSOUTH), Commander, Submarine Force U.S. Pacific Fleet (COMSUBPAC), Commander, Submarine Squadron Eleven (COMSUBRON 11) and the U.S. Embassy in Peru prior to the install to ensure operational objectives and logistic challenges would be met and resolved.

Over the course of its tour in San Diego, the BAP *Arica* used CENTRIXS to communicate with the Peruvian Submarine Headquarters as well as Commander, U.S. Submarine Pacific Fleet (COMSUBPAC) Headquarters in Hawaii via *secure* chat and email. The utility of the CPOK and CENTRIXS was so high and deemed so successful that the Peruvian Navy requested to retain the system during the submarine's transit home where both systems were then retrieved. This is the second time CENTRIXS has been utilized on a diesel electric boat. The first was the Chilean Submarine, CS *Simpson*, in September 2008 while participating in the DESI program where the SSC Pacific team was able to successfully interface the CPOK with a different satellite communications system. This year's efforts also mark the first partner nation submarine headquarters to be enabled with CENTRIXS.

CENTRIXS constitutes a critical component for this type of training exercises, enabling the requisite interoperability to maximize participant experience. Be it training in humanitarian assistance or ASW training scenarios, CENTRIXS allows for seamless integration and exchange among participants, improving their quality and outcome.¹⁴ Vice Admiral William Burke, while service as Commander, Task Force 73 during CARAT 2007, credited this technology with taking training exercises "to a more challenging level," noting that "with CENTRIXS . . . we have an opportunity to reach new heights in combined command and control."¹⁵

Conclusion

"We will win – or lose – the next series of wars in our nation's laboratories."¹⁶

Admiral James Stavridis

SOUTHCOM Commander

"Deconstructing War"

U.S. Naval Institute Proceedings December 2005

SSC Pacific, in conjunction with Commander, Pacific Fleet, and other naval organizations, has managed and executed over fifty individual installs and removals in each of the past three years, thus providing a critical element in coalition operations, and affirming the capability of this technology. As highlighted by its contribution to DESI, CENTRIXS has helped foster interoperability of U.S. and partner nations, providing the requisite information exchange capability to enable coalition operations. Enabling these kinds of exercises and operations not only enhances the capability of U.S. naval forces, but fosters the trust and cooperation prescribed in the nation's maritime strategy.

As the U.S. Navy looks ahead, with the need for the Global Maritime Partnership of navies united to ensure the rule of law on the global commons increasing, the technical challenges of networking navies together at sea will only become more complex, as navies of different – often

vastly different – levels of technology development create “on the fly” naval partnerships to deal with issues like piracy as well as disaster relief and humanitarian assistance efforts. And while some have criticized CENTRIXS as not being up to the task of netting these larger and more complex naval coalitions,¹⁷ the bedrock technology behind CENTRIXS – as well as the tactics, techniques and procedures that have evolved between and among these nations working together on the global commons – will likely form the basis of what evolves “Beyond CENTRIXS.”

In his 2010 Guidance, Executing the Maritime Strategy, CNO Admiral Gary Roughead puts a punctuation mark on the importance of the Global Maritime Partnership when he notes; “We will continue to operate with our international partners in maritime task forces and in bilateral and multi-lateral exercises and operations.”¹⁸ And in seeking to ensure the success of these partnerships, the CNO and all of Navy leadership is likely to look to Navy laboratories to solve the significant technical challenges of networking these partnerships. The DESI initiative should serve as a primary example of how Navy laboratories can do just that.

ENDNOTES

¹ Department of the Navy, *A Cooperative Strategy for 21st Century Seapower* (Washington D.C.: Department of the Navy, 2007). Accessed at www.navy.mil/maritime/MaritimeStrategy.pdf

² Admiral Gary Roughead, “Remarks as Delivered at the Surface Navy Association Symposium Banquet (Washington D.C.: January 14, 2010). Accessed at: <http://www.navy.mil/navydata/people/cno/Roughead/Speech/100115%20CNO%20remarks%20at%20SNA%20Symposium.doc>

³ John Hattendorf and John W. Kenney, Ed. *Eighteenth International Seapower Symposium: Report of the Proceedings 17 – 19 October, 2007* (Newport, R.I.: July 2009). Note: The 18th ISS was the largest gathering of international maritime leaders to date, only superseded most recently at the 19th ISS.

⁴ Department of Defense, *National Defense Strategy* (Washington D.C.: Department of Defense, 2008). Accessed at <http://www.defense.gov/news/2008%20National%20Defense%20Strategy.pdf> The five strategic objectives outlined in the NDS are: Defend the Homeland; Win the Long War; Promote Security; Deter Conflict; Win our nation’s wars. To achieve these objectives, the NDS specifies the following: Shape the choices of key states; Prevent adversaries from acquiring or using WMD; Strengthen and expand alliances and partnerships; Secure U.S. strategic access and retain freedom of action; Integrate and unify our efforts: A new “Jointness.”

⁵ *Eighteenth International Seapower Symposium: Report of the Proceedings 17 – 19 October, 2007*. During his remarks at the 18th International Seapower Symposium, Admiral Roughead noted that “Key to all of this is trust. And we believe trust cannot be surged. Trust is not something that has a switch that you turn on and off. Trust is something that must be built over time and trust is built through discussions, activities, and through exercises, through initiatives that each of us may undertake and bring others into. It is built on seeking opportunities to work more closely together.”

⁶ *A Cooperative Strategy for 21st Century Seapower*.

⁷ Ian Graham, “Multinational Forces Keep Pirates at Bay,” American Forces Press, Accessed at: http://www.navy.mil/search/display.asp?story_id=48273 Aside from the U.S., participants included China, Russia, India, Malaysia, South Korea, the European Union and NATO.

⁸ Official Website of Africa Partnership Station, Accessed at: <http://www.c6f.navy.mil/about%20us.html>

⁹ Boland, Rita, “Connecting in the Pacific,” *SIGNAL Magazine*, November 2006. Accessed at: http://www.afcea.org/signal/articles/templates/SIGNAL_Article_Template.asp?articleid=1215&zoneid=30

¹⁰ Carter, Bard and Harlor, Deb “Combined Operations Wide Area Network (COWAN)/Combined Enterprise Regional Information Exchange System (CENTRIXS),” *SSC San Diego Biennial Review 2003* (San Diego, CA, 2003).

¹¹ *SSC San Diego Biennial Review 2003*. Specific SSC Pacific efforts subsumed under CENTRIXS included Combined Operations Wide Area Network (COWAN), and a PACOM intelligence sharing program known as Pacific Bilateral Intelligence Information Exchange. Since 1998, SSC Pacific have provided critical support in the area of coalition networks to the Pacific Command, and specifically the U.S. Pacific Fleet. In support of the Rim of the Pacific Exercises 1998 (RIMPAC 1998), SSC Pacific personnel developed the first Coalition Wide Area Network (CWAN). With subsequent improvements proved over the course of RIMPAC 2000 and other exercises, CWAN was renamed COWAN-A, which provided mail guard between SIPRNET and coalition networks. SSC Pacific supported PACFLT N6, which had been assigned as PACOM’s Executive Agent for coalition networking.

¹² *National Defense*: “Diesel-Electric Submarines, the U.S Navy’s Latest Annoyance,” April 2008. Accessed at: <http://www.nationaldefensemagazine.org/ARCHIVE/2008/APRIL/Pages/AntiSub2301.aspx>

¹³ Jason Reagle, “DESI: Seven Years of U.S. Diesel Electric Submarine Partnerships,” *Undersea Warfare*, Summer 2008. Accessed at http://www.navy.mil/navydata/cno/n87/usw/usw_summer_08/desi.html

¹⁴ During the 2009 Singapore phase of the Cooperation Afloat Readiness and Training (CARAT) exercise, CENTRIXS helped “increase communications interoperability to a level above previous Singapore-U.S. exercises.” This included air, surface, and sub-surface training scenarios. See, *Defence Talk*, “Singapore-US Training Achieves New Standards During CARAT,” June 2009. Accessed at: <http://www.defencetalk.com/singapore-us-training-achieves-new-standards-during-carat-20037/>

¹⁵ Bailey, Jessica M., “CENTRIXS Provides Vital Communications,” June 2007. Accessed at: http://www.navy.mil/search/display.asp?story_id=30603. One Royal Malaysian Navy officer echoed the sentiments of VADM Burke, “By using CENTRIXS, the communication process with the various forces and CARAT headquarters runs smoothly, confusion is eliminated. It makes the communications network more reliable, valid and practical.” Vice Admiral William R. Burke serves today as Deputy Chief of Naval Operations for Fleet Readiness

and Logistics, N4. In 2007, as Rear Admiral Burke, he led Task Force 73 – 7th Fleet’s Logistic Force composed of fleet support vessels.

¹⁶ James Stavridis, “Deconstructing War,” *U.S. Naval Institute Proceedings*, December 2005.

¹⁷ See Gordon Van Hook, “How to Kill a Good Idea,” *United States Naval Institute Proceedings*, October 2007, p. 34 for an operational perspective on the CENTRIXS system. Captain Van Hook notes the limitations of CENTRIXS, stating: “We must move beyond limited approaches to link a few secure common systems with software applications like CENTRIXS, and get to a fully integrated regional picture from ports to harbors and into the commons.”

¹⁸ Admiral Gary Roughead, *CNO Guidance 2010*, Accessed at: <http://www.navy.mil/features/CNOG%202010.pdf>