CHIPS magazine

JAN-MAR 2005

RADM Nancy Brown on the Ground in Iraq for a Six-Month Tour as the Deputy Chief of Staff for Communications and Information Systems for Multinational Forces-Iraq.

DEDICATED TO SHARING INFORMATION TECHNOLOGY EXPERIENCE

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Features

"Knowledge management is an issue that involves effectively capturing and aligning what we know in an organization to execute the mission."

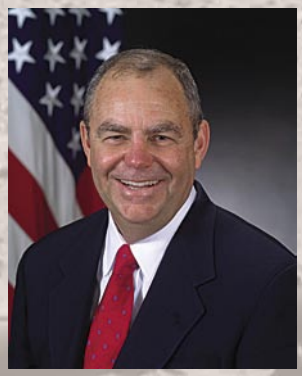
Rear Adm. Nancy E. Brown
Deputy Chief of Staff for
Communications and Infrastructure
The Joint Staff

Since the start of operations in Afghanistan and Iraq, Navy technology specialists have been an essential part of tactical planning and operations. IPs, ITs and ETs have been building a critically needed communications infrastructure and providing direct support to operational commanders.

Lt. Cmdr. Dave "Sammy" Samara in a maintenance manhole at Camp Victory, Iraq.

The Defense S&T community has had countless successes in improving warfighting technology, some recent examples include: stealth technologies; night vision; adaptive optics and lasers; the Global Positioning System; and Phased Array Radars.

Dr. Charles Holland
Deputy Under Secretary of Defense
Science and Technology



The Naval Postgraduate School celebrates 50 years in Naval computing with three articles featuring NPS advanced technology.

The world's first Cray Supercomputer, Control Data Corp.'s Model 1, No. 1, being installed at the Naval Postgraduate School in 1960.

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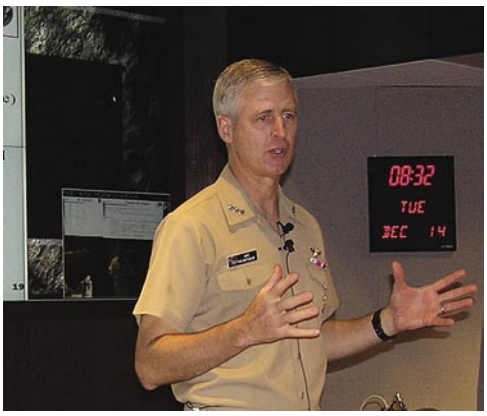
Volume XXIII Issue I

Editor's Notebook

Capt. Scot Miller, Lt. Cmdr. Dave Samara, IT2(SW) Miguel Gomez, Lt. Brian Jones, IT2 Jamone Robinson, Rear Adm. Nancy Brown, IT1(SW) Steven Schwalbe, Lt. Dale Shigekane, Lt. Cmdr. Danelle Barrett and IT2 Jeremy Headrick.

Royal Australian Navy Lt. Cmdr. Kym Fisher, Royal New Zealand Navy Lt. Cmdr. Darren Stought, Royal Canadian Navy Lt. Cmdr. Bill Walton, UK Royal Navy Lt. Cmdr. Steve Beaumont at the Trident Warrior 05 Initial Planning Conference, Dec. 14-15, 2004.



Vice Adm. James D. McArthur Jr., Commander Naval Network Warfare Command (NETWARCOM) and Delores Washburn, Trident Warrior engineer, Space and Naval Warfare Command (SPAWAR), addressing the audience at the TW05 Initial Planning Conference.

I had two unforgettable experiences in the last few months I want to share with you. The first occurred just a few days before Thanksgiving when I had the privilege of interviewing several Information Systems Technicians (ITs), Electronics Technicians (ETs) and Information Professional (IPs) Officers on the ground in Baghdad.

These technology warriors are building a network of Command, Control, Communications, Computers and Intelligence (C4I) for joint, combined and Iraqi Security Forces. They are facilitating knowledge sharing and providing secure voice, video and data services to a wide range of users. They are doing whatever needs to be done to support deployed air, ground and sea forces from 28 coalition nations and the United States.

Like all U.S. and coalition troops in Iraq and Afghanistan, they live and work in a perilous, austere environment, enduring extremes in weather conditions … far from home. Yet, they are upbeat, proud of the work they are doing in Iraq — and proud of each other. Their esprit de corps and unfailing energy are palpable. It was a joy to speak with them.

I thank them, and Rear Adm. Nancy E. Brown, Vice Director, Command, Control, Communications and Computers, J6, the Joint Staff, and Deputy Chief of Staff for Communications and Information Systems (DCS CIS) for MNF-I, for talking with CHIPS. Go to page 10 to read about the essential work they are accomplishing.

In December, I attended the exciting Trident Warrior 05 (TW05) Initial Planning Conference. Trident Warrior is the Navy's premier FORCEnet Sea Trial experiment. Trident Warrior is sponsored by the Naval Network Warfare Command (NETWARCOM). Others supporting commands include the Space and Naval Warfare Systems Command (SPAWAR), the Naval Postgraduate School, Naval Sea Systems Command (NAVSEA) and the Naval Personnel Development Command (NPDC).

About 200 participants attended, including representatives from 2nd Fleet and coalition partners from Australia, the United Kingdom, Canada and New Zealand (AUSCANNZUKUS).

The conference was held in the SPAWAR Tidewater Node of the FnCE (FORCEnet Composeable Environment) facility on the Norfolk Naval Base. Stay tuned for more information on TW05. For information about Trident Warrior 04 go to http://www.chips.navy.mil/archives/04_fall/web_pages/trident_warrior.htm. For more information about the SPAWAR Tidewater FnCE go to page 41.

Sharon Anderson

DON CIO

Putting information to work for our people

The Department of the Navy's Information Management/Information Technology (IM/IT) Workforce Management team works across the Navy-Marine Corps, Department of Defense (DoD), and federal government in developing policies, guidance, tools, and human capital strategies to shape the DON IM/IT workforce of the future. Over the last year this team has been working to address the task of how to ensure that the DON has a qualified Information Assurance (IA) workforce.

The IA workforce is key to assuring we have adequate security measures to protect and defend our information and information systems. With the increasing threat evidenced by the hundreds of daily attempts to breach our computer networks, equipping an IA workforce that is educated and trained to meet these challenges is an imperative. Throughout government, efforts are underway to address this requirement. President Bush directed the development of a **National Strategy to Secure Cyberspace** to help reduce our nation's vulnerability to attacks against our critical infrastructures or the physical assets that support them. The National Strategy includes a priority for strengthening awareness, training and education in this area.

DoD Directive 8570.1, "Information Assurance Training, Certification, and Workforce Management" levies new requirements for IA training, certification and management. To respond to this and other policy, I have chartered the DON Information Assurance Workforce Working Group (IA WWG). The group will provide DON-wide collaboration to identify and improve Enterprise policy, processes and tools that will transform the Department's future IA workforce. The DON Deputy CIOs for the Navy and Marine Corps are supporting this important initiative by offering their senior IA professionals to co-chair the IA WWG. Ramona Waters, Naval Network Warfare Command (NETWARCOM) Computer Network Defense and Navy Designated Approval Authority (DAA), and Ray Letteer, Marine Corps C4I Information Assurance and DAA, are the Navy and Marine Corps IA WWG leads. In their kick-off meeting I was most impressed by the innovative ideas and commitment evident in the entire team to apply best practices and put into place benchmarks that others will strive to achieve.

This is a challenging effort that moves us from a decentralized approach to an Enterprise perspective of how we train and manage our IA workforce. Some of the major IA WWG initiatives include:

- Improving how we deliver IA orientation and refresher awareness training
- Identifying standardized IA qualifications, training and certifications
- Developing procedures to identify and manage IA positions with trained and certified personnel

This transformational effort will sustain the objective of our DON IM/IT Strategic Plan to shape the IM/IT workforce of the future. The IA WWG – consisting of IA professionals from across the Department – will develop the recommendations to ensure we have a highly skilled IA workforce, prepared to meet the challenges of our future. I welcome IA professionals to participate in this important working group and encourage you to contact our IM/IT Workforce Management lead, Ms. Sandy Smith through the DON CIO Web site at http://www.doncio.navy.mil/.

Dave Wennergren

Interview with Rear Adm. Nancy E. Brown

Vice Director, Command, Control, Communications, and Computer Systems The Joint Staff

Rear Adm. Brown became Vice Director for Command, Control, Communications, and Computer Systems (J6), The Joint Staff, in August 2000. As the Joint Staff expert on C4, the directorate's mission is to: (1) Provide the CJCS advice and recommendations on C4 matters; (2) Support warfighters from the CINC to the shooter; (3) Lead the C4 Community; (4) Oversee support for the National Military Command System; and (5) Lead in identifying and resolving military aspects of information-based issues of national importance.

In August 2004, Rear Adm. Brown deployed to Iraq for a six-month tour as the Deputy Chief of Staff for Communications and Information Systems (DCS CIS) for the Multinational Forces-Iraq (MNF-I). Rear Adm. Brown, the highest ranking officer in the Information Professional Officer Community, leads a team of IPs and enlisted technology experts, Information Systems Technicians and Electronics Technicians, who are engaged in ground operations, rebuilding critical infrastructure and providing direct support to combat commanders. These technology warriors also provide vital communication links for the Iraqi government, coalition forces and remote operational posts.

CHIPS: Can you talk about your mission In Iraq?

Rear Adm. Brown: I'm the Deputy Chief of Staff for Communications and Information Systems (DCS CIS) for the Multinational Forces-Iraq (MNF-I). The mission of my organization is to conduct Command, Control, Communications, and Computer (C4) support of joint, combined and Iraqi Security Forces (ISF) operations in the Iraq Joint Operations Area (JOA). We plan, program, and direct headquarters, joint, coalition and ISF communications and information system networks for deployed forces across the Iraq JOA. Additionally we assure reliability of C4 systems, provide C4 policy and guidance and conduct network operations.

CHIPS: What technologies are warfighters using in Iraq?

Rear Adm. Brown: The network supporting the warfighter in Iraq is perhaps the largest and most diverse ever deployed. This network provides the full range of voice, video and data services to commanders on the ground and consists of not only new and legacy 'green' systems operated by our Soldiers, Sailors, Airmen and Marines, but also commercial systems, some operated by our military men and women, and some operated by a very capable group of contractors.

Our use of commercial technologies includes large wideband satellite terminals, more portable, very small aperture terminals (VSAT), switches, a Global System for Global Communications (GSM) cellular telephone network, voice over Internet Protocol (VoIP) solutions, mobile satellite systems, collaboration tools, optical fiber rings and microwave systems to name but a few.

Our biggest challenge and what we really need help with is information sharing. The staff is truly representative of the coalition with key positions held by representatives of all our coalition partners. The situation is further complicated by the Department of State and other governmental agency interactions that are part of our daily routine.

Current policy restrictions on information sharing with these partners and agencies coupled with the technical immaturity of cross domain solutions has driven us to multiple networks and increased complexities in an environment that deserves simplicity. Maintaining multiple networks is a strain on dollars, personnel and individual productivity.

CHIPS: What are your biggest challenges on The Joint Staff?

Rear Adm. Brown: Some of the biggest challenges on the Joint Staff have been synchronizing the Services. Each of the Services sees the world in a slightly different view, which of course drives their acquisition and fielding strategies. C4 acquisitions are as complicated as any other weapon system, like an airplane or a ship, but there are a lot more organizations involved. The challenge has been described as getting all the Services to come up to the starting line and jump off together. But it's actually much more than that, not only do the Services have to jump off together, they need to maintain lockstep so they finish together.

The systems we are acquiring today are so complex and wide reaching that all the pieces need to be acquired at the same time to realize their full potential. Using my airplane example, imagine purchasing an airplane in a fashion that one Service picks the cockpit, one Service picks the engine, another Service picks the landing gear. And then the parts are delivered in different years. That's what makes keeping all the Services synchronized so critical and such a challenge to the Joint Staff.

CHIPS: How do you evaluate the progress in tying together the command and control structure of the Navy, other Services and coalition members since you have been on the Joint Staff?

Rear Adm. Brown: Last year, DoD adopted the Joint Capabilities Integration and Development System (JCIDS) as a 'bridge' from requirements generation to actual acquisition of capabilities. JCIDS provides the framework to tie together Navy systems with

those of the other Services and allies. JCIDS provides an assurance of interoperability of programs through the use of Net-Ready Key Performance Parameters (NR-KPP), and allows the Joint Requirements Oversight Council to assess existing and proposed capabilities in light of their contribution to future joint concepts.

The ultimate objective of joint concepts is to guide the transformation of the joint force so that it is prepared to operate successfully in the next 10-20 years. To this end, we are developing the Net-Centric Joint Functional Concept which provides a joint measurement framework, describes a future Net-Centric end state, and provides the basis for military experiments and exercises. Even though JCIDS is only a little over a year old, we are already seeing the early results of this process in tying together C2 and other systems at the joint level. And we expect this will lead to synchronization of the Services to help build a stronger, more efficient joint force.

CHIPS: How close are we to an enterprise architecture across the Services?

Rear Adm. Brown: I'd say we are getting closer, but we still have a long way to go. During my time on the Joint Staff, we have made significant strides. Under the new JCIDS process, J6 stood up a Net-Centric Functional Capabilities Board (FCB) and implemented Net-Ready Key Performance Parameters that will continue to push the Services toward an overarching architecture. This enterprise will be fully populated by interoperable and complementary services and applications accessible by everyone, regardless of Combatant Command or Service. However, some of these processes take time to implement and mature. Additionally, in some cases we do not have the new net-centric replacement for certain legacy equipment.

Additionally, the Joint Operating Concepts and Joint Integrating Concepts are being developed so that everyone is on the same page and developing our Service and Joint capabilities within the same constructs. This is another effort that will bring together everyone under an enterprise architecture that will reach across all the Services, Unified Combatant Commands (COCOMs) and agencies.

CHIPS: I've heard you say that the Services should continue to innovate and explore technologies, but they need to do it smarter. What do you mean by this?

Rear Adm. Brown: Over the last two decades, the DoD share of the world's information technology research and development has decreased. Corporate America has been pouring money into developing new technologies. We, DoD, need to leverage some of the new technologies developed, but we need to do it in a fashion that protects our national security. Additionally, we need to find new and creative ways to get the technology out to the fleet faster. I feel the Navy's Commercial Technology Transfer Office is one of the ways we are addressing this problem.

CHIPS: Do you think the Services' IT dollars should be centralized?

Rear Adm. Brown: That is a sword that cuts both ways. On one hand, there would clearly be a benefit for the Services to pool their resources to ensure proper funding and fielding profiles are available to develop key Joint C4 capabilities. This particularly would be beneficial for strategic assets and complex acquisitions. The added benefit would be these programs would automatically be synchronized in development, acquisition and fielding.

Rear Adm. Nancy E. Brown and Army Maj. Gen. William H. Brandenburg, commanding general for Detainee Operations returning to Camp Victory, Baghdad from Camp Ashcroft.

On the other hand, I don't think it is necessary for all the Services' IT dollars to be centralized. The Services still need to maintain their role as 'train and equip' for the Joint Force. That way the individual Services will continue to protect their equities. If the Services' IT dollars are completely centralized the potential exists for that organization to drive DoD to a 'one size fits all' solution, which may or may not address the individual needs of the Navy or any of the other Services.

CHIPS: You were on the ground floor in the establishment of the Information Professional Officer Community. How do you evaluate its success and what future plans do you see for the community?

Rear Adm. Brown: The community is an overwhelming success as gauged by the demand from the fleet and joint communities for IP officers. IPs in every paygrade serve in key C4I billets across the fleet — 3 of 5 numbered fleet N6s, 7 of 12 Carrier Strike Groups (CSG) N6s, 3 of 3 Expeditionary Strike Groups (ESG) N6s, and 11 of 12 CSG (COMMOs), on all of the major joint staffs — and around the globe — Bahrain, Germany, Japan, Hawaii, Naples and Korea. Additionally, on the expeditionary front, there are 7 IP Individual Augmentees (IAs), (I make 8), in Iraq and 2 in Afghanistan.

Our challenges are how to keep pace with the demand and continue to provide an officer with the requisite experience and expertise. We are addressing these challenges in several ways. Three years ago when the community stood up, it had an inadequate inventory, no career path, and it lacked both training and qualification programs. It has made tremendous progress in each of these areas.

Today, there are 490 IP officers and we expect to meet our inventory

goal of 550 by the end of FY 2005. This goal is being met through lateral transfers from other communities. The community has established a sea-going career path with sea assignments at each paygrade and specific milestone sea-assignment challenges for lieutenant commanders, commanders and captains. Officers with orders to sea-going commands are routed through rigorous training courses that cover topics, such as joint and Naval C4I systems engineering, LINK architectures, combat systems, space fundamentals and knowledge management.

The training opportunities are closely related to the community's five-vector model (5VM), which is being developed by the Center for Information Technology (CIT) in San Diego as part of the larger Task Force Sea Warrior effort. The IP community is well on its way to being the first officer community to complete the job-task-analysis phase necessary to establishing a robust 5VM. The community has also worked closely with the Naval Network Warfare Command (NETWARCOM) to establish a formal qualification program.

This program has both a personal qualification standard (PQS) requirement and a continuing education requirement. The PQS is comprised of basic, intermediate and advanced level qualifications, which officers complete over the course of their careers. The continuing education piece requires officers to complete a certain number of continuing education units (CEUs) each year to maintain their technical competency. Also being developed/piloted are two courses: the IP Basic Course for new IP officers being developed by CIT and the IP Senior Officer Course (IPSOC) at the IP Center of Excellence at the Naval Postgraduate School. The first IPSOC was held in August 2004 and the next course is scheduled for March 2005. This two-week course is designed for IP commanders and captains.

The challenge to meet fleet requirements and do deliberate strength planning is best typified by example. The Littoral Combat Ship (LCS) C5I officer will be an IP officer. However, the IP community has worked closely with the Surface Line community to develop the right talent and quantity of officers for the job. This 1600 community officer will be expected to complete the Surface Warfare qualification as a young junior officer. The officer will then go to the Naval Postgraduate School in Monterey and complete a technical master's degree. After that, the officer will be sent to tactical action officer training courses, before being assigned to an LCS as a department head.

CHIPS: How do you think the challenge of knowledge sharing/management in the fleet should be approached?

Rear Adm. Brown: Knowledge management is an issue that involves effectively capturing and aligning what we know in an organization to execute the mission. It is a cultural challenge to employ knowledge sharing activities in everything we do. The thing we must hold to is that there is a direct connection between KM, readiness and effective decision making.

KM is not just an IT thing; it can be done without computers and networks. The effectiveness of KM relies on policy and tactics, techniques and procedures (TTPs) as much or more than it does on technology. As already discussed, today, policy arbitrarily restricts information sharing and that must be changed. It is also just as important to understand and have standard TTPs or the best technology in the world will not help us.

Rear Adm. Nancy E. Brown with Petty Officer Goebel cutting the cake at the Navy Birthday celebration Oct. 13, 2004.

Cmdr. Manuel Bialog, MNF-1 chaplain; Rear Adm. Nancy E. Brown; and Cmdr. Lee Thomas, Civil Engineer Corps.

The struggles that are faced in institutionalizing KM begin with people. People are the most important element of KM. People tend to share knowledge naturally in a face-to-face environment, but the challenge is to do the same thing in a distributed environment and focus the sharing of knowledge to support the mission.

This sounds simple enough, but there are a number of questions that need to be fleshed out. What mechanisms do we use to allow for knowledge reuse, mutual support, enterprise-wide learning and collaborative work? Are the policies, strategies and business rules in place for such things? Is the business value realized?

Answering those questions is the task of the knowledge manager. It is not enough for the knowledge manager to simply be the IT person who manages a portal. There is minimal value in just that alone. The KM officer must develop and foster the cultural change required to effectively share information. *The real challenge is to get the right information to the right person at the right time.* CHIPS

Rear Admiral Nancy E. Brown

Rear Adm. Nancy Brown is a 1973 graduate of Stephens College in Columbia, Mo. Following Officer Candidate School in Newport, R.I., in June 1974, the admiral reported to the Naval Communications Station, Norfolk, Va., as Communications Watch Officer, followed by Automation Officer and Personnel Officer. She then served as the Special Projects and Manpower Requirements Officer at the Naval Telecommunications Command in Washington, D.C.

After her tour in Washington, the admiral earned a Master of Science degree in communications systems management from the Naval Postgraduate School and a Master of Arts degree in National Security and Strategic Studies. She was then assigned to the Defense Commercial Communications Office. This joint tour qualified the admiral as a Proven Subspecialist in Communications and led to her designation as a Joint Specialty Officer (JSO).

Rear Adm. Brown then served as the Officer in Charge, Naval Radio and Receiving Facility Kami Seya, Japan. Returning from overseas, she went to the Joint Tactical Command, Control and Communications Agency in Washington, D.C., followed by an assignment as the executive officer at the Naval Communications Station in San Diego.

In August 1993, Rear Adm. Brown assumed command of Naval Computer and Telecommunications Station Cutler, Downeast, Maine. In August 1995, she served on the National Security Council staff at the White House.

In July 1997, she assumed command of the Naval Computer and Telecommunications Area Master Station Atlantic, a major shore command, in Norfolk, Va.

In 1999, the admiral returned to the White House as the Deputy Director, White House Military Office. While serving as the Deputy Directory, White House Military Office, she was selected for rear admiral (lower half).

In October 2000, the admiral reported to the Chief of Naval Operations as Deputy Director and Fleet Liaison, Space, Information Warfare, Command and Control (N6B). She assumed duties as Vice Director for Command, Control, Communications, and Computer Systems (J6), The Joint Staff in August 2002. Promoted to rear admiral on July 1, 2004, she is currently serving on the Multinational Forces-Iraq staff in Baghdad, as the Deputy Chief of Staff for Communications and Information Systems.

Rear Adm. Brown's decorations include the Defense Distinguished Service Medal, the Defense Superior Service Medal, the Legion of Merit (with Oak Leaf Cluster), the Defense Meritorious Service Medal (with Oak Leaf Cluster), the Meritorious Service Medal (with Oak Leaf Cluster), the Navy and Marine Corps Commendation Medal, the Navy and Marine Corps Achievement Medal, the National Defense Service Medal (with Bronze Star) and the Global War on Terrorism Expeditionary Medal.

ONE-NET

Transforming Overseas Navy Networks

ONE-NET is a Navy-wide initiative to install a common and secure IT infrastructure to OCONUS Navy locations. It is based on the Navy Marine Corps Intranet (NMCI) architecture and is designed to be interoperable with IT-21, the NMCI and the Global Information Grid (GIG) in the future.

ONE-NET incorporates a new network infrastructure, including servers and transmission lines with existing and new workstations to provide integrated information technology to the fleet. With ONE-NET, users will have standardized hardware and software, a centralized helpdesk, access to an OCONUS e-mail directory, increased information security, a standard e-mail address, and increased SIPRNET availability and remote access.

ONE-NET provides users with a standard application portfolio, referred to as the Workstation Baseline Software Configuration (Gold Disk). The WBSC contains: Windows XP Professional OS, Office XP, Internet Explorer, Adobe Acrobat Reader, Visio Viewer, Active Card Gold, Symantec Corporate Client Edition, WinZip 9.0, Roxio Easy CD Creator, Macromedia Shockwave, Flash Player 7, Quicktime Basic and DoD Install Root PKI Certificate.

The standard mailbox size for ONE-NET is 100 MB for NIPRNET and SIPRNET. The standard home drive is 850 MB. New Pentium 4/3.20 GHz desktop computers feature 512 MB memory, 3.5-inch floppy drive, a CDRW/DVD combo and two-piece stereo speaker system. Notebook users can rely on the Latitude D600, Pentium M 1.5 GHz with 512 MB of memory.

The transition to ONE-NET is being directed by the Naval Network Warfare Command. The Navy Enterprise Network or ONE-NET will affect more than three distinct theaters: Europe, the Middle East and Far East. Consolidating overseas networks will increase warfighting effectiveness by ensuring the technology infrastructure is current and under a single management source, according to Cmdr. Teresa Bandur-Duvall, deputy chief information officer for NETWARCOM. With ONE-NET, Sailors will be able to log on to a system that is reliable, and they will have a global address list to connect to people in other locations.

So far, only the Naval Support Activity (NSA) Bahrain has been cut over to ONE-NET. More than 3,000 workstations have migrated this past year under the Information Technology Support Center (ITSC) in Bahrain. This includes both the classified and unclassified side; ONE-NET now supports 73 tenant commands in the area.

Go to the ONE-NET Web site for more information at https://c4isr.spawar.navy.mil/onenet/login.cfm. To access the site, you must have PKI certification.

Based on an article in Navy NewsStand by Chief Journalist Joseph Gunder, NETWARCOM Public Affairs. CHIPS

IPs, ITs and ETs at the Tip of the Spear
Letter from Iraq

By Sharon Anderson

Since the start of operations in Afghanistan and Iraq, Navy technology specialists have been an essential part of tactical planning and operations. Information Professional Officers (IPs) and enlisted Information Systems Technicians (ITs) and Electronics Technicians (ETs) have been building a critically needed communications infrastructure and providing direct support to operational commanders.

They have excelled in ground combat communications roles that have traditionally belonged exclusively to the U.S. Army Signal Corps and Marine Corps. For three years, these dedicated technology warriors have battled hazardous combat conditions, extremes in weather, an austere living environment and long working hours as part of joint and coalition efforts to secure democracy and fight terrorism in Iraq and Afghanistan.

Almost all are volunteers motivated by their commitment to the U. S. mission and their shipmates from every Service and coalition nation.

Some personnel are working under the leadership of Rear Adm. Nancy E. Brown, Deputy Chief of Staff for Communications and Information Systems (DCS CIS) for the Multinational Forces-Iraq (MNF-I). The MNF-I mission is to build a network of Command, Control, Communications, Computers and Intelligence (C4I) support for joint, combined and Iraqi Security Forces (ISF) operations in the Iraq Joint Operations Area (JOA). Others are working for the Joint Operations Center (JOC) or in other crucial areas.

Cooperation between players and forging partnerships are key to building communications capabilities. In addition to joint and coalition partners, personnel work with industry, the U.S. Embassy, the Iraqi Ministry of Communication, the Ministry of Defense, the Iraqi Interim Government and the Iraqi Minister of the Interior.

Concentration is focused on C4I capabilities to ensure situational awareness to shorten the decision-making cycle for the field commander. Networks and other IT capabilities are being built according to joint standards for interoperability and information sharing. Efforts have resulted in increased bandwidth, secure and non-secure voice and data capabilities, and vital command and control nodes extending services to the most remote military bases in Iraq.

Doing Whatever Needs to be Done

IT2 Jeremy Headrick is the Information Work Space manager at Camp Victory. He says he has installed IWS on more than 100 computers and trained countless people on the program since he has been in Iraq.

From left to right: Capt. Scot Miller, Lt. Cmdr. Dave "Sammy" Samara, IT2(SW) Miguel Gomez, Lt. Brian Jones, IT2 Jamone Robinson, Rear Adm. Nancy Brown, IT1(SW) Steven Schwalbe, Lt. Dale Shigekane, Lt. Cmdr. Danelle Barrett and IT2 Jeremy Headrick.

Clockwise from right: IT2 Miguel Gomez onboard a Black Hawk helicopter on a trip to the International Zone (IZ) in downtown Baghdad. IT2 Velez Charles and Lt. Dale Shigekane on the roof of Adnon Palace installing a microwave antenna to provide voice and data services to the National Joint Operations Center. Shigekane and Charles work in the U.S. Embassy in the IZ. Shigekane is the director of network operations for the the U.S. Embassy for the MNF-I Coalition Information Coalition Sharing (CIS) Forward.

He frequently flies by Black Hawk helicopter to different theater locations to install the IWS collaborative tool suite. IWS is a command and control chat tool on the coalition network, the Combined Enterprise Regional Information Exchange System or CENTRIXS. Headrick says the work he is doing is saving time, money and lives.

"Troops and field commanders can talk to each other in chat rooms, if their secure phones are not working. They can discuss troop movements …. They actually use what I do to keep them from having to travel. It is really dangerous here to move from one location to another, so there is less need for troop movement and less risk," says Headrick.

Headrick calls IWS a weapons program. All of it is Web based. "It has different chat rooms…. It is based on a very wide range of technologies. It is like AOL (America Online) with a Webcam. It is specifically for the military. We built it for ourselves."

IT2 Jamone Robinson works in the JOC as a webmaster. "I make sure there is adequate bandwidth; I consider anyone who works in the JOC to be my customer," says Robinson.

To prepare for deployment, Navy personnel spent two weeks at Fort Bliss, Texas, for weapons training. In a heightened security posture, personnel wear body armor (ballistics flak jacket with plates) and Kevlar helmets. They also carry an MCU2P chemical mask. Officers carry a 9mm weapon and ammunition with them at all times. Enlisted personnel carry an M-16 rifle with ammunition.

IT1(SW) Steven Schwalbe says being in Iraq is a challenge in itself with the heat, dust storms and daily rocket and mortar attacks by insurgents. He works in the JOC doing basic IT work using Windows XP Professional.

"We fix Microsoft Outlook problems, printer issues and we set up conference calls … whatever needs to be done."

Schwalbe has been at Camp Victory about three months. He says there are good days and bad days.

"Sometimes we wear bulletproof vests. We have to carry weapons with us and sometimes we have to wear Kevlar helmets. Basically, it's been pretty good for us here, but sometimes it can get a little hectic during the day because you don't know what's going to happen."

IT2(SW) Miguel Gomez, who is working in the knowledge management process at Camp Victory, is building a database of subject matter experts for a yellow pages/white pages directory. It will help personnel find the assistance they need by typing a query for an online search.

Lt. Brian Jones is an IP working in the Knowledge Management Division on CENTRIXS.

"The people we support are decision-makers and those who provide logistics support to the troops in the fight. We help to make our customers work smarter, more effectively and more efficiently," says Jones.

IT1(SW) Bruce Long is the Electronic Key Management System (EKMS) manager for Camp Victory. Long performs convoy duty on dangerous routes to deliver communications security (COMSEC), i.e., electronic or paper keymat for cryptographic equipment or encryption keys for secure telephones. He also stands tower watch duty along the perimeter of the camp.

IT1(SW) William Behr handles command, control, communications and computer issues for all joint, coalition and Iraqi Security Forces operations. "I support communications and information systems for 135,000 deployed air, ground and sea forces from 29 nations across Iraq," Behr says.

Behr resolves system outages and works with all the military Services and civilian contractors throughout Iraq, an area roughly the size of California.

"My customer base is the whole country of Iraq, but my more notable customers include General George W. Casey, Commanding General Multi-National Force–Iraq, Lt. Gen. Thomas Metz, Commander, Multinational Corps–Iraq (MNC-I), the JOC and the U.S. Embassy."

The JOC tracks information and intelligence for all operations in the Iraq area of responsibility. The embassy is, of course, the United States diplomatic arm in Iraq.

"For the MNF-I and the MNC-I commanders, I ensure that they able to directly communicate with the President of the United States, the Secretary of Defense and the Secretary of the Army on a weekly basis," says Behr.

Some military units have pitched in to buy satellite systems for television or Internet service. But Behr says the military

purchased a service called VBrick, a "desktop television service," which is a network video software decoder stream player that provides feeds of various news and sports networks.

"We have access to FOX News, CNN, AFN Sports, and even unmanned aerial vehicle (UAV) footage through VBrick. The program is accessible on both the SIPR and CENTRIXS networks," says Behr.

The Army DFAC or dining facility at Camp Victory. "If we did not exercise and watch what we eat, we could gain weight on this deployment. There is plenty of food to choose from in the DFAC," says Lt. Cmdr. Dave "Sammy" Samara.

A Typical Day at Camp Victory

Lt. Cmdr. Dave "Sammy" Samara is new to the IP Community. "I've been an IP since May. I spent the last 14 years flying EA-6B Prowlers…. I went to seven different schools in the San Diego area to learn the Navy C4I architecture and how Navy ships communicate. It gave me a baseline understanding of how military and specifically Navy communications work," says Samara.

Samara is the plans deputy for MNF-I CIS (Coalition Information Sharing) and the NATO 256K link action officer. The NATO network is a 256K microwave link that will provide service to about 2,500 coalition partners in the International Zone (IZ) in downtown Baghdad. It will support the NATO Training Mission Iraq, NTM-I.

Work days are long in Iraq. Samara's day starts at 4 or 5:00 a.m. "I go for a run in the dark, but I know the road. Then to the gym, which is pretty darn nice. I get cleaned up, breakfast at the huge chow hall; it's the size of a warehouse. If we did not exercise and watch what we eat, we could gain weight on this deployment. There is plenty of food to choose from in the DFAC or dining facility. In the Navy we just say chow hall, but we are in the Army over here," Samara says.

Samara has three networks to check once he gets to work: SIPRNET, NIPRNET and CENTRIXS. "We talk with people from individual units, civilians, like one of the civilian contractors who is here putting up microwave towers. Some of the contractors are prior military; some have never been in the military. You work with quite a variety of people and they are all different Services, Navy, Army, Air Force, Marines," says Samara.

Samara says the chief difference between the work Navy personnel are doing from the U.S. Army Signal Corps is in the area of tactical communications.

"Most of the signal officers deal with tactical communications. They go into an austere environment and set up wartime communications. I am working with one of those guys right now in plans, and they tend to be very engineer focused."

"What we need to do, at least in the plans department of the Force CIS, is think strategically, we need to think big picture, we need to think enterprise. We can't just do this because our battalion or our brigade or our division is out here fighting. We have got to think: How does this affect the entire country of Iraq? How does this affect the coalition in the entire country of Iraq? How does this allow an opening for continued and future expansion of the network and service to additional or different users?" says Samara.

Samara is working with a U.S. Air Force major assigned to NATO in Naples. They e-mail daily trying to nail down the requirements for Coalition Information Sharing (CIS) services .

"We discuss the microwave link and how users are going to be able to access NIPR, CENTRIXS, and if SIPR is going to be an option based on IA (Information Assurance) policies and procedures. Do they have DSN and the IDSN phone services they need? A lot of issues revolve around the fact that they are going to be moving from one building to the next and then maybe branching out to some other areas. How do we get communications to the new location?" says Samara.

"The NATO personnel are also bringing some equipment into the country, and they will need a frequency request for that, so that they can use NATO's unique services, NATO's secret and unclass networks. These are some of the complex issues we are dealing with," says Samara.

A Lasting Communications Infrastructure

Before these technology warriors came to Iraq, most of the communications infrastructure was centered in the densely populated areas, but even then service was sketchy at best. Since there are virtually no landlines, Iraqis rely on cellular phones. But there are no roaming agreements, so communication to remote areas is almost nil.

Through cooperative efforts among the three commercial cellular service providers more towers have been added. But according to an Army spokesman, towers are installed as security allows, since in some areas, progress has been hampered by insurgent activity. To help ease the problem with cellular service, the United States operates a private network, which is used by the coalition and some Interim Iraqi Government (IIG) officials.

The buildup of the cellular network will immediately benefit the Iraqi people, other parts of the communications infrastructure will be transitioned to the Iraqi people as the U.S. military leaves the country.

The coalition's objective is to leave behind a commercially-owned and maintained infrastructure capable of supporting a global reach. CHIPS

The Role of Defense Science and Technology in Software for the Warfighter

By Dr. Charles J. Holland, Deputy Under Secretary of Defense Science and Technology and Mr. Robert Gold, Associate Director for Software and Embedded Systems Office of the Deputy Under Secretary of Defense for Science and Technology

Introduction

Effective technology capability has become the key force multiplier in modern conflict. Defense Science and Technology (S&T) seeks more effective capabilities through better technologies. Accordingly, the mission of Defense S&T is to ensure that warfighters today and tomorrow have superior and affordable technology for revolutionary war-winning capabilities. The results of our S&T fuel the effort to fundamentally transform the way we conduct military operations. Advances in nanoscience and advanced materials; advanced power generation; human dimensions and psychological factors; and directed energy are changing the face of warfighting.

The Defense S&T community has already had countless successes in improving warfighting technology, some recent examples include: stealth technologies; night vision; adaptive optics and lasers; the Global Positioning System; and Phased Array Radars. Some of these technologies successfully migrated to commercial applications. The Internet, formerly the Defense Department ARPANET, is one of the most influential technologies to emerge.

The S&T community continues to drive at the challenges facing our forces today: How do we protect our forces against proliferation of missile technologies, weapons of mass destruction and improvised explosive devices? How do we fight in cities? What type of weapons do we develop? How do we protect our information management systems and infrastructure? We map these problems against the Joint Functional Concepts: Battlespace Awareness; Force Application; Command and Control; Focused Logistics; Force Protection; Joint Operations; Force Management and Net-Centric Operations to ensure our ability to conduct warfare.

To manage the S&T investment — $10 to $11 billion annually, we use the Defense S&T Reliance Process, which is a collaboration between the Director, Defense Research and Engineering (DDR&E) and the Service S&T executives. We also use the process to develop and maintain the Defense S&T Strategy, Basic Research Plan, Defense Technology Area Plan, Joint Warfighting S&T Plan and the Defense Technology Objectives. Our S&T process is influenced by many outside forces. Needs and requirements are validated by the Joint Staff, Congress and DDR&E advisory panels. Our S&T community includes participation by academic institutions, other federal agencies, industry and international partners.

In support of the technical aspects of major defense acquisition, we have institutionalized the Technology Readiness Assessment (TRA) as part of major acquisition reviews. The TRA includes identifying an acquisition program's critical technologies and evaluating those technologies against the NASA Technology Readiness Level scale. Critical technologies with insufficient maturity are identified and a mitigation plan is put into place to ensure that the development efforts mature in time for it to be incorporated into the system. More information on TRAs can be found at http://www.defenselink.mil/ddre/doc/tra_deskbook.pdf.

Lessons Learned

One area of our technology suite that permeates every aspect of defense yet remains to be a challenge is software. The Defense S&T community recognizes that most of our warfighting capability will be enabled by software, so an investment in technologies for managing and developing software is appropriate. Unfortunately, we are still recovering from the view in the late '90s that industry would take care of DoD's software needs.

To highlight some of the ways software has challenged our acquisition programs, we've put together a list of the top six challenges we face in software development today. Some of these challenges are technology related; others rest on the shoulders of program management. Some can be addressed through new tools, techniques and technologies while others require the fortitude to "do the right thing." These challenges are presented as lessons learned so that future programs can avoid these pitfalls and, if successful, return to forums like *CHIPS* to share successes.

1. Believe Your Software Cost And Schedule Estimates

One of the earliest challenges in a program, and often the biggest in terms of far-reaching implications, is having an unrealistic cost and schedule estimate as the basis for the program. Many programs obtain realistic estimates through an independent review or early indications that their estimates are risky. Regrettably, these schedules and inputs are often overridden or ignored by management.

This problem is not isolated to one sector of the military/industrial complex. Both contractor and government managers, under pressure from marketeers, resource sponsors or higher management, succumb to pressure to get the cost and schedule down, which is a good practice. Unfortunately, going too far hurts far worse than it helps because efforts to cut the budget quickly lead to one or more of the other challenges highlighted in this article. The end result is that a 10 percent challenge in cost and schedule may lead to a 200 percent growth rate when a development effort is halted and re-planned partway through because the initial plan was unexecutable.

Calibrated parametric models are reliable, early predictors of cost and schedule for a software project. Resources, both internal and external, are available to provide an independent review. For Major Defense Acquisition Programs (MDAPs), an independent estimate by the Cost Analysis Improvement Group (CAIG) is mandatory.

2. Address System Qualities and Non-Functional Requirements Early

The heady rush to provide new and innovative functionality to the warfighter can cause acquisition and development teams to over-

look non-functional requirements and system qualities. Heavy use of commercial-off-the-shelf software (COTS), where these applications cannot be adapted to a program's strategy further complicates the situation, especially during start-up and shut-down scenarios. The ability to understand the internal states of a computer system is probably the most underappreciated item in the development process until problems occur during system integration.

Information Assurance requirements were sometimes hotly debated within major warfighting platforms in the 1980s and early 1990s as to their applicability to embedded tactical systems. Today's thinking readily accepts some measure of IA as an integral part of any IT-enabled system, the question is: *How much?* The lesson here is — don't overlook IA requirements. Incorporate them from the beginning to ensure they are properly addressed.

3. Identify, Find and Solve Technical Problems

Managers are quick to address budget shortfalls by eliminating infrastructure and downsizing development teams as early as possible. But having adequate facilities to support coding, integration and testing is the primary enabler for finding problems that inevitably arise during development. Many of DoD's large acquisition programs nearing completion have suffered as a result of poor decisions in these areas. Lack of opportunities to find problems have had a detrimental impact on acquisition programs' integration and testing efforts. Indeed, the last 20 percent of problems addressed during integration are the integrator's greatest nightmare — the intermittent bug that is difficult to replicate in laboratories. These problems can be incredibly difficult to resolve without the necessary facilities and technically qualified personnel.

4. Avoid Stovepipes

Empowered interdisciplinary teams have been an excellent practice for many years now, but we don't always live up to our best practice in one area critical to software-intensive system developments — integration and test. The trickiest technical problems in software-intensive systems can only be found and solved through effective working relationships between systems engineering, information architects, software developers, ASIC (application-specific integrated circuit) designers and others as needed.

These relationships are often most effective when fostered from the beginning by establishing empowered teams. Another way to state this is: *Bring the software developers out of the closet and accept them into society.* Poor communication between software developers and systems engineers only impedes progress. Integrated teams are an excellent approach to breaking down these barriers.

We have frequently noted that when problems with hardware arise, teams are always quick to break out the models, the analyses, the test results and give the engineer face-time with the managers. When a software problem arises, no one wants to see the smoking code, or delve into the design flaw. The software "glaze" descends over the eyes of managers when software issues are discussed at program reviews. *Please, give software the same energy you would give any other program issue.*

5. Engineer And Test for Off-Nominal and Boundary Conditions

Much like system qualities and non-functional requirements, performance at the edges of the envelope is still overlooked in a complex software development. Our ability to understand and anticipate a performance envelope from a warfighting platform standpoint is pretty good although we still make mistakes. In a computer and information environment, understanding the performance envelope is extremely difficult, especially at the edge of the embedded envelope where the system context can turn seemingly minor computer anomalies into system-critical errors or safety hazards.

While we don't want to detract from engineering for the nominal, our platforms will operate in all areas of the mission space and the software, at critical times, will be expected to perform in less than ideal conditions. The difficulty is that many of these off-nominal conditions can only be tested through simulation. This means that we'll have to take the extra time to ensure our models and simulations are adequately suited for their purpose. Don't scrimp on verification, validation and accreditation (VV&A). Flawed models and simulations can mask critical system errors.

6. Monitor and Manage Critical Resources

Planning and executing any software project is critically dependent on having the right resources; however, traditional software metrics mechanisms fail to address the monitoring of all the critical resources. Most schemes address computer processing resources, data communications resources and staffing. Systems technical resources, such as frame and thread utilization, are often overlooked. Poor use of development facilities can be almost as bad as not having them, so those resources should be monitored as well.

Use of critical facilities (e.g., single board computers, computer-in-the-loop, hardware-in-the-loop) resources often becomes the most chaotic when a program gets into trouble. Moving to parallel build delivery paths to keep progress on multiple fronts, without providing new facilities, merely results in development facility overload, making every build late. In these situations, we recommend restoring order by ensuring activities on these facilities are organized.

This may mean delaying some tasks, but the chaos, if left unchecked, will only ensure that every build will deliver late. Issues with system technical resources, such as exceeding frame or thread processing timelines, can generally be addressed through a technical improvement, if there is time in the schedule to address the change. Not addressing the issue is likely to result in a performance shortfall.

Future Acquisition Challenges

DoD has many exciting agency and Department-level initiatives that carry much promise in transforming our military. The challenge for software and systems folks will be to adapt to the implications of these initiatives. Systems-of-systems (SOS) engineering has arisen to improve interoperability and efficiency. Information and enterprise architectures hold the promise of bringing organizational order to our business IT investments.

They also complement the interoperability objectives of SOS engineering. Evolutionary acquisition allows us to address complexity incrementally, rather than forcing us to produce complex solutions in one sweep. Net-centric operations are driving us to take advantage of the huge amount of data and corresponding opportunities for ad-hoc interdependency once our major systems are networked. All of these emerging trends are somewhat at odds with traditional systems and software project management methods.

Future challenges, as a result of these innovations, will impact software and systems developers at every level. Developers will be expected to perform to higher standards of quality, safety and security based on less-defined and changing requirements while the compile and run-time environments will change more frequently. Evolutionary acquisitions will create a longer-term relationship with the development staff facilitating long-term approaches in product and facility management.

Acquiring Software-Based Functionality

Defense S&T still has modest levels of research investment devoted purely to software technology, a few examples are described below.

Model Based Integration of Embedded Systems (MoBIES)

Model-based software development is an emerging technology for embedded software developers. The Defense Advanced Research Projects Agency's (DARPA) MoBIES program has combined off-the-shelf and research tools in each critical area of software development into an interoperable tool chain that automates most of the mundane tasks associated with software development. Specific development areas addressed by the MoBIES tool suite include: translation of domain needs into design models; translation of design models into run-time models; and translation of run-time models into mathematically sound, near self-evaluating code.

The combination of these tools across an open framework enables tremendous increases in productivity by replacing labor-intensive steps with an almost seamless fabric of tools to automate the delivery of code from systems-engineered needs and ideas. The MoBIES toolset requires domain-specific knowledge to customize these tools to provide specific analysis techniques. Integration technologies facilitate the hardest parts of software development, such as integration from reusable components; automated testing; verification and validation; and auto-generation of optimized runtime implementations on diverse hardware systems.

The MoBIES team also implemented their open tool suite in two different domains: vehicle control and signal processing. MoBIES development tools exceeded expectations by reducing programming staff hours from five days to two minutes to develop signal analysis code for a software programmable radio. Classification of unknown electronics signals into one of three types was conducted more efficiently by the MoBIES-based software as a result of new approaches taken by the systems engineers when working in the MoBIES environment.

Many MoBIES technologies have already transitioned to industry. MoBIES development methods were successfully demonstrated in developing software for vehicle platooning for the automotive industry in San Diego. MoBIES uses advanced technology transition methods by working directly with the OMG (Object Management Group) to document open tool integration standards and is making their developed tools available under a form of open licensing with the Escher Research Institute. Military successes include the F/A-22 and the Army's Future Combat System, with future applicability to the Joint Strike Fighter. The automotive industry has been an equal participant from program inception.

Software Protection Initiative

Through the Air Force Research Laboratory, our office sponsors the Software Protection Initiative (SPI), which is an effort to prevent the unauthorized distribution and exploitation of critical national security application software. Business objectives for this effort are:

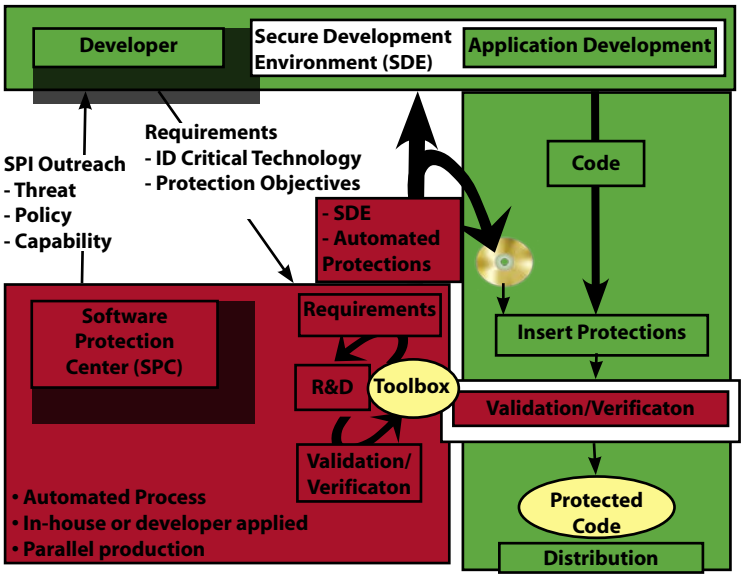
- Inserting protection measures into existing applications
- Measuring the effectiveness of current protection measures
- Researching new protection technology
- Educating the software development community on the software protection philosophy
- Highlighting the threat to high-end software and the need for protection
- Collaborating with the commercial sector on protection methods
- Researching current software protection policy and developing policy

The Air Force Research Laboratory is tasked to manage and execute the SPI with the following goals: (1) deter the acquisition of high-value DoD software by our adversaries; (2) make the exploitation of DoD software cost-prohibitive when it does leak; and (3) ensure that technology and policy protection measures are appropriately applied, balancing mission requirements with security.

SPI efforts have yielded several important technology advances to provide robust and tailored protection for DoD intellectual property in existing applications. These include the development of a Secure Development Environment (SDE) to ensure total life cycle protection in developmental applications and the development of tools to simulate the attack process and accurately measure the level of protection afforded within a given threat environment.

The SPI vision for software development and protection is shown in Figure 1. Typical developer activities are in shown in green. SPI has added the Software Protection Center (SPC), a validated set of tools to empower developers to develop code in a secure environment and apply protections. The toolbox contains a wide array of approved techniques which have a minimal impact on developers, automate the process of protection, and enable parallel implementation. For more information, please contact the AT-SPI Technology Office at (937) 477-3089 or by e-mail: AT-SPI_outreach@wpafb.af.mil.

Figure 1. An illustration of the SPI Vision



High Performance Computing

In 1992, in response to Congressional direction, DoD established the High Performance Computing Modernization Program (HPCMP) to organize and upgrade the computing infrastructure for our research facilities, test centers and laboratories. Today, the HPCMP vision is to promote a culture for DoD scientists and engineers to use advanced computational environments to solve problems. To that end, the HPCMP provides supercomputer services, high-speed network communications, and computational science expertise that enables Defense laboratories and test centers to conduct a wide range of research, development and test activities.

The HPCMP three components are: HPCMP HPC Centers, Networking and Software Application Support. The HPC centers provide the major computing resources and are further divided into Major Shared Resource Centers and Distributed Centers. The four MSRCs house the bulk of the HPCMP computing resources and provide a full range of computing capabilities including hardware, software, data storage, archiving, visualization, training and expertise in specific computational technology areas. The HPC also includes several Distributed Centers that have modest capabilities compared to the MSRCs but are more widely available to provide convenient access to users who need less capability but easier physical access.

The HPCMP Networking component provides interconnectivity between MSRCs, DCs, and DoD research and test facilities via the Defense Research and Engineering Network (DREN). Researchers and testers can access HPCMP resources remotely via the DREN. Use of the above resources is enabled by infrastructure software applications. HPCMP resources include applications that provide robust modeling, simulation and computation in HPC applications of highest impact to DoD. These products facilitate a large fraction of the DoD S&T, Developmental Test and Evaluation (DT&E) computational workload.

We enhance productivity and capability by providing training, collaboration, tool development, support for software development, technology tracking, technology transfer and outreach to users. For this year, we selected the first High Performance Computing Software Applications Institutes (HSAI) to form a group of experts to accelerate solving DoD's highest priority challenges. By employing cross-Service and multidisciplinary approaches, we hope to make further advances in research and test and evaluation. More information on the HPCMO can be found at http://www.hpcmo.hpc.mil/.

DoD's dependency on software will only grow as we demand more functionality in smaller packaging with lower power consumption. Many of the anticipated warfighting benefits from an increased reliance on networked operations and multisystems engineering will also be realized through software. In spite of our love/hate relationship with software, we still need major investments in technologies to enable us and our industry partners to synthesize the software segments of our systems in a repeatable, manageable, cost effective way resulting in software free from unintentional or malicious defects.

We cannot rely on commercial industry alone to make the advances we need. We must reinvigorate our research programs to provide the tools and techniques by which these software challenges can be met.

CHIPS

Dr. Charles J. Holland is the Deputy Under Secretary of Defense Science and Technology. In this capacity, he provides leadership to the entire spectrum of the more than $10 billion annual Defense science and technology portfolio executed through the three Services and Defense Agencies. In addition, he oversees the DoD High Performance Computing Modernization Program, the Defense Modeling and Simulation Office and the Software Engineering Institute, which provide corporate Department of Defense capabilities. His office is also responsible for validating the Technology Readiness Assessment of all major DoD programs requiring Defense Acquisition Board decisions. He is the U.S. Principal to The Technical Cooperation Program (TTCP), a cooperative defense science and technology activity with representatives from Australia, Canada, New Zealand, United Kingdom and the United States.

Over the past two decades, Dr. Holland has played a key role in federal high performance computing R&D. Recently, he served as co-lead for the Report on High Performance Computing for the National Security Community (July 2002) and led the development of the white paper DoD Research and Development Agenda for High Productivity Computing Systems (June 2001), which served as the roadmap for the current DARPA program in high-end computing. He received the Presidential Rank Award, Meritorious Executive (2000), the Society for Industrial and Applied Mathematics Commendation for Public Service Award (1999), and the Meritorious Civilian Service Award from the Secretary of Defense (2001), Air Force (1998) and the Navy (1984). He is a member of the Board of Trustees for the Consortium for Mathematics and its Applications (COMAP) and the Editorial Board of Computing in Science and Engineering. He received Bachelor of Science (1968) and Master of Science (1969) degrees in applied mathematics from the Georgia Institute of Technology and a doctorate (1972) in applied mathematics from Brown University.

Mr. Robert Gold is the Associate Director for Software and Embedded Systems, Office of the Deputy Under Secretary of Defense for Science and Technology. He has 17 years of acquisition experience and has focused on complex software-intensive system development for the last 10 years. Mr. Gold began employment with the Naval Sea Systems Command (NAVSEA) in 1986, where he served in a variety of systems engineering, software engineering and acquisition positions for submarine, surface ship and missile programs.

Mr. Gold is a member of the Professional Acquisition Workforce and is Level 3 certified in both systems engineering and program management. He holds a Bachelor of Science degree in electrical engineering and a Master of Science degree in systems engineering from Virginia Polytechnic Institute and State University.

Navy Shore-Based Oracle Enterprise License Agreement

Navy Shore-Based Oracle Enterprise License Agreement provides significant benefits including substantial cost avoidance for the Department of the Navy

The Department of the Navy (DON) established a Navy Shore-Based Oracle Database Enterprise License Agreement that was implemented Oct. 1, 2004, and will be in effect through Sept.30, 2013, to provide Navy shore-based organizations the right to use the Oracle databases. This agreement is managed by the Space and Naval Warfare Systems Center (SPAWARSYSCEN) San Diego DON Information Technology (IT) Umbrella Program Office.

This agreement consolidated existing and new Oracle Database software licenses and maintenance under a single contractual vehicle and procured the rights to use for authorized users. All DON shore-based General Fund and Working Capital activities are covered, with an exception of Marine Corps activities. Marine Corps activities are currently covered by a separate Marine Corps-wide Oracle database agreement.

Authorized users at covered activities include all Navy active duty, reserve and civilian shore-based billets not assigned to a ship. On-site and off-site contractors who access Navy systems for the purpose of supporting Navy shore-based operations are also covered.

The Navy Shore-Based Oracle Enterprise License Agreement provides significant benefits including substantial cost avoidance for the Department. It facilitates the goal of net-centric operations by allowing all shore personnel to access Oracle databases, permitting the sharing of authoritative data across the shore-based enterprise.

The agreement has a priced option that, if exercised, will enable the Department to extend these benefits to the afloat Navy. Activities covered by this agreement shall not enter into a separate Oracle database agreement to procure additional Oracle database licenses outside this agreement whenever Oracle is selected as the database. This prohibition includes software maintenance that is acquired:

a. as part of a system or system upgrade, including Application Specific Full Use (ASFU) licenses;
b. under a service contract;
c. under a contract or an agreement administered by another agency, such as an interagency agreement;
d. under a Federal Supply Schedule contract or blanket purchase agreement established in accordance with FAR 8.404(b)(4); or
e. by a contractor that is authorized to order from a government supply source pursuant to FAR 51.101.

This policy has been coordinated with the Office of the Assistant Secretary of the Navy (Financial Management and Comptroller), Office of Budget. CHIPS

Additional information about this agreement and how to use it is available from the DON IT Umbrella Program Web site at http://www.it-umbrella.navy.mil/contract/enterprise/deal/oracle/oracle.shtml/.

http://www.it-umbrella.navy.mil/

The Naval Postgraduate School Celebrates 50 Years in Computing

By Dr. Christine Cermak

Information technology pioneers from around the world gathered at the Naval Postgraduate School to celebrate 50 years of academic computing leadership and share their visions for the future. This watershed event, held Aug. 27, 2004, featured Mark Pullen, Director of George Mason University's Networking and Simulation Laboratory C3I Center; Dr. Robert Kahn, the "Father of the Internet"; Professor Peter Denning, chairman of the NPS Department of Computer Science and director of the university's Institute for Information Innovation and Superiority; and Dr. Christine Cermak, NPS Executive Director of Information Resources and chief information officer.

CHIPS celebrates with NPS by featuring three articles that highlight the NPS leadership role in pursuing advanced technologies. We will begin with an article by Dr. Christine Cermak, which traces some of the school's proud "firsts" in U.S. Naval computing.

The Naval Postgraduate School has a rich history in computing and information technology. Established in 1909 in Annapolis, Md., we will soon be celebrating our centennial year.

In 1951, NPS moved to its present location in Monterey, Calif. Almost immediately after the move to Monterey, NPS began to assume its leadership role in computing. The graduate and research programs at NPS used computing and information technology as a scientific tool, and as the subject of inquiry and experimentation. Not surprisingly, NPS was one of the first ARPANET nodes in California because the NPS faculty and students quickly recognized the value of networks and demanded connectivity.

The world's first Cray Supercomputer, Control Data Corp.'s Model 1, No. 1, being installed at the Naval Postgraduate School in 1960.

To put NPS progress in context, I thought it might be helpful to give you a quick snapshot of NPS today. We have about 450 full-time tenured and tenure-track faculty members and approximately 1,500 students. Our student body is comprised of officers from all military services and Department of Defense employees. About 33 percent of the students are foreign officers representing over 50 countries around the world.

Last year, our faculty brought in more than $95 million in research funding. As a result, NPS is considered a research-intensive university and ranks among the top 100 U.S. universities in research funding — particularly impressive when you consider our comparatively small size.

Our information technology environment is complex. We support both .edu and .mil domains; we have classified and unclassified networks, and support wireless and VoIP (Voice over Internet Protocol). Our faculty and students access supercomputers all over the United States and participate in Internet2 initiatives. Our faculty are members of National Academy committees forging recommendations about technology research, and they serve on international organizations crafting Web policies.

NPS supports about 55 gigabytes of Internet traffic daily, 110 terabytes of mainframe data and 924 gigabytes of e-mail data. Every NPS curriculum and research program uses information technology. In many cases, the technology itself is the subject of the course or the research program. The technology world has also changed, as you can see below.

√ IPv6 will increase the number of Internet addresses from 4 billion to 340 trillion.

√ A National Center for Education Statistics 2003 report noted that 75 percent of 5-year-olds use computers and about 25 percent use the Internet.

√ The number of Internet hosts grew from four in 1969 to just under 200 million today.

√ According to an Internet Domain Survey, the Internet is growing at a rate of about 40-50 percent per year. Americans, who dominated Internet use for so long, are now dropping in the percentage of total users — illustrating the true global nature of this technology.

√ A recent report to Congress compared the diffusion of technologies in the United States. From invention, it took 38 years for phones to be used in 30 percent of households. Television took 17 years. Personal computers took 13 years. Commercial Internet took less than 7 years to be used by 30 percent of U.S. households.

√ The Corporation for Education Network Initiatives in California, or CENIC, is calling for gigabit connectivity to every California educational institution, business and home by 2010. This level of connectivity is seen as integrally linked with economic development and the vitality of the state. In fact, Gartner's 2003 report on this subject estimated a $376 billion increase in gross state product and 2 million additional jobs as a result of implementing the CENIC "Gigabit or Bust" initiative.

As a result of the changes in the larger environment, we at NPS realized that we could only participate in these exciting changes through a network of strategic partnerships. Our partnership with the city of Monterey and California State University, Monterey Bay is possible by connectivity with CENIC. That, in turn, made Internet2 membership possible.

Through the vision of the City of Monterey's chief information officer, we were able to construct a local-area, high-speed network with regional Defense Department and federal partners at the Defense Language Institute, Fleet Numerical Meteorology and Oceanography Center, Naval Research Laboratory, National Weather Service and the Defense Manpower Data Center. This creative joint effort permits us even more efficient vehicles for collaborative work.

With our colleagues at CENIC, we are exploring the possibility of higher level access to California's higher education network — moving from the current Defense Research and Engineering Network (DREN) DS3 speed to gigabit and then to 10 gigabit. Technology planning at NPS today involves forging alliances with the Department of the Navy CIO, other Navy higher education institutions, the Naval Education and Training Command, our local DoD and federal agency colleagues, state agencies, national network organizations, higher education partners, and municipal and county governments.

In addition, our matrix of partnerships includes corporate associates. For example, in order to assist in our faculty's research on 10 gigabit networks, Foundry Networks donated a laboratory to the NPS Foundation that was awarded to faculty in our Information Sciences department. Sun Microsystems has provided NPS with future technology briefings and access to its senior scientists. In addition, Sun has donated equipment to the NPS Foundation that was awarded to the NPS Center for Information Security Research. Sun is an especially interesting company for those of us in universities because its roots are in higher education — its corporate name stands for Stanford University Network.

Partnerships are an intrinsic part of our technology present and future. Just as multidisciplinary work is the hallmark of 21st century higher education — collaboration is an imperative for technology planning. Sharing resources not only gives NPS a better return value in terms of technology investment dollars, but more importantly, in intellectual collaboration.

The last 50 years showed us the way to a rich future with impressive accomplishments and innovative — and sometimes risky initiatives. This history left a legacy that urges raising the bar each year.

Dr. Christine Cermak is the NPS Executive Director of Information Resources and chief information officer. CHIPS

50 Years of NPS Computing Highlights

• 1953 - Lt. Cmdr. Warren Randolph Church, the "Father of NPS Computing" and chairman of the Department of Mathematics, purchased the first electronic automatic digital computer, a National Cash Register 102A for the department.

• 1960s - Church replaced the NCR 102A with the world's first all-solid-state computer, Control Data Corp.'s CDC 1604 Model 1, No. 1. It was designed, built, tested and certified by the legendary Seymour Cray. Cray's first-born supercomputer was the first of 10 ordered by the Navy's Bureau of Ships for Operational Control Centers worldwide. • The Naval Numerical Weather Project (NANWEP) was given time on NPS' newly-minted CDC 1604 for a feasibility study. NANWEP soon got its own supercomputers. Renamed the Fleet Numerical Meteorological and Oceanographic Center, it is still collocated with NPS just a mile away. • NPS was among the first to move beyond single-user machines to multi-access timesharing.

• 1970s - NPS Professor of Computer Science, Gary Kildall, wrote the world's first high-level programming language for Intel's microprocessor, and then the first microprocessor operating system, soon to be run on nine out of 10 PCs. He soon founded Intergalatic Digital Research, later shortened to Digital Research. About the same time, IBM approached a young Bill Gates to design an operating system for its PC, and he referred them to Kildall. IBM went back to Gates when Kildall's approach didn't work out … and the rest is history. • NPS established its first Computer Science Group, and two years later it was the third California node to connect to the ARPANET. • By the end of the decade, NPS had a dedicated Department of Computer Science.

• 1980s - NPS purchased an IBM 3033AP mainframe, marking a major shift from punched cards to online terminals. • Learning Centers were set up across campus, making workstations widely available.

• 1990s – NPS implements a five-year computer infrastructure master plan, "Support of Graduate Education in the 1990s." The program purchased an AMDAHL 5995-700A and a Cray X/MP (E98) supercomputer; Sun servers to support the campus network; 150 Sun Sparc10 workstations in faculty offices and clusters throughout campus; StorageTek mass-storage silos accessible via the network; Learning Resource Centers; a Scientific Visualization Laboratory; a War Laboratory for secure classified thesis production; the first Web browser; and a robust, high-speed, flexible, centrally-managed campus network. • By the end of the decade, the speed of the NPS network had increased from 10 to 100 megabits per second. • In 1997, the AMDAHL was replaced by an IBM 9672 mainframe, followed in 1998 by a move to PC standardization implementing the Navy's Information Technology for the 21st Century (IT-21) Strategic Plan.

Introduction and sidebar by Barbara Honegger, Senior Military Affairs Journalist, NPS Public Affairs.

It's a common saying that the Department of Defense's greatest challenge is preparing to fight and win the next war with a fighting force that has been exquisitely trained and equipped — to win the last war. Defense leadership knows that the next conflict will include a major cyberspace dimension and has shown that superior battlefield awareness and coordination enables quick victories. To this end, DoD's force transformation objective changes traditional fighting forces to forces consistent with a network-centric philosophy and mode of operations.

Education plays a critical role in force transformation. It is the principal means by which the future warfighter can learn the philosophy and technology of network-centric operations. The Naval Postgraduate School has stepped up to the challenge of preparing future warfighters in numerous ways. The Computer Science Department has taken a leadership role by transforming its curriculum.

In early 2003, the NPS computer science faculty initiated a comprehensive curriculum review. We had two primary objectives: first, to emphasize a principles-oriented approach to computer science and, second, to help students learn to be participants in a culture of innovation as envisioned by the Chief of Naval Operations, Adm. Vern Clark. We tackled the first objective by developing a new framework for studying the great principles underlying all computing technology. We tackled the second objective by designing new courses to help students plan and execute transformative and military-relevant master's theses.

NPS students are professional leaders. Many are Navy commanders and lieutenant commanders, or Army and Marine Corps majors and captains with considerable experience as leaders in their Services. They are highly disciplined, pragmatic and action-oriented. They demand relevance and the simplest and most direct tools to get the job done. Their strong sense of purpose and dedication inspires the faculty to deliver a rigorous and relevant education.

Great Principles of Computing

Our main motivation for developing a principles-based approach is time: Our students have only two years to become competent computing professionals. Although many have backgrounds in computing, it's been five to 10 years since they were in school; the field has changed so much in that time and many are rusty. Some NPS students need to learn computer technology basics.

Computing is about 60-years-old as an academic field of study. The first computer science curricula in the late 1950s had four core courses and a host of technology electives. During the next 40 years, the core curriculum grew slowly and, by 1990, was organized around nine core technologies. Then in the 1990s, with the arrival of the World Wide Web and the dramatic expansion of the Internet, the number of core technologies tripled to about 30. This is far beyond the capacity of a core curriculum. Many universities and their professional societies have been struggling with ways to accommodate this large change in the number of core technologies. We felt the pressure acutely because students must finish their graduate work and thesis research within two years and return to their military duties.

Our new framework has five categories of principles of computing:

√ Computation (models of computers and processing time for computations)
√ Communication (compressing and transmitting data accurately from one site to another)
√ Coordination (the joint actions of human and computer entities to achieve complex common goals)
√ Recollection (naming, storing and retrieving data)
√ Automation (seeking computing alternatives for human cognitive tasks)

Our framework also recognizes three core practices:

√ Design (the layout and construction of computing systems that are dependable, reliable, usable, secure and safe)
√ Development (programming, systems, innovating)
√ Modeling (experiments, data analysis, modeling, prediction, simulation, validation)

The new framework has eight categories rather than 30 in a core technologies approach. It is much easier to grasp and much easier on students. We implemented the framework by creating a new first course, Great Principles of Computing Technology. We reviewed all our other courses so that their syllabi draw on the principles approach and eliminated redundancy. We also separated development (programming and systems) modeling and innovating into a computing practices segment.

We worked with the Operations Research Department to design a modeling practices course, and we created a three-quarter sequence course about innovation. With this framework we have found it is much easier for our students to understand the broad scope of the field and identify the science and engineering principles at work in each computing technology.

Many people are surprised to learn that the computer science faculty completed this change in just six months. The new curriculum was implemented in October 2003. In most public universities, major curriculum revisions take two to three years. The Naval Postgraduate School is quite agile and can change and modernize curricula within months.

I have been the designer and lead instructor in the new Great Principles course. This course has a noble purpose: to introduce the field in terms of its fundamental principles, rather than its core technologies. It serves as a roadmap for the rest of the curriculum for developing strategic, big-picture thinking about our field. The idea of getting directly at the principles of computing is very appealing to our students. For example, during my 35 years as a teacher of computing, Turing Machines (simple abstract computational devices intended to help investigate the extent and limitations of what can be computed) are looked upon as fundamental. Many of our students find them too abstract. So we are finding other ways to explain the limits of computing systems without requiring them to learn Turing Machine theory.

Innovation: A Core Practice of Computing

Let me focus on one other aspect of our new curriculum. In our review, we agreed that innovation is essential for the ongoing creation of wealth and success in businesses and organizations. Yet, most people believe that innovations are often fortuitous occurrences: that it's difficult to predict which ideas will become innovations and how valuable they will be. Therefore, it seems that there is no reliable skill set associated with innovation.

We concluded that these perceptions arise from a general misconception about the nature of innovation, especially the commonly held belief that the work of innovation means the creation of new or novel ideas. The new idea flows through a pipeline of research, development, prototyping, manufacturing and marketing, transforming it into a product or service with an economic impact. Thus, the pipeline is the path for the idea to achieve impact; the inventor is the seed that sets the whole process in motion.

But this model does not explain some of the most successful innovations around us, for example, the Internet and the Linux operating system. Neither of these exemplifies the pipeline model. Linux, for example, has been completely developed, changed and maintained by a large community of volunteers who were not seeking economic gain. Linux didn't begin with a new invention; Unix already existed. It didn't start with a research paper. It started because Linus Torvalds was concerned about making a high-quality, public-domain version of Unix available to the masses. Nobody doubts that Linux was an innovation, and yet it doesn't meet the conventional idea of what an innovation is.

The same thing is true with the World Wide Web. Tim Berners-Lee demonstrated the first browser on a NeXT computer in 1991. He invented it as a proof-of-concept for his idea of document sharing by a worldwide web of interlinked documents. In many ways, the browser was unremarkable because it used many existing technologies. Berners-Lee worked tirelessly to make his technology useful so that people could adopt it into their work. In 1994, he founded the World Wide Web Consortium, W3C, to be a forum where people could reach consensus on Web services and standards to promote the ongoing development of the Web. Berners-Lee never wavered from his conviction that the basic software for the Web should be in the public domain and free to everyone. He repeatedly turned down opportunities to start companies that would allow him to profit from his own invention.

And much the same is true of the Internet. The Internet started as ARPANET, a DoD research project aimed at facilitating resource sharing among DoD computers. During the 1980s, ARPA cooperated with the National Science Foundation, which through a lot of volunteer labor created CSNet and then NSFNET, the backbone of the modern Internet. ARPA also endorsed a consortium, the Internet Society and its Internet Engineering Task Force, which kept the software in the public domain and fostered consensus on protocols and data standards.

The bottom line is that none of these innovations fits the pipeline model. Their technologies were formed from ideas advanced from many directions, but without an identifiable inventor. Most of the work was done by volunteers who had no prospect or interest in economic gain. The real work of innovation is in changing how a community of people thinks and acts — bringing about the adoption of an idea. Although it appears that some people are much better than others at fostering changes in communities, we concluded that we can teach innovation and to do so we must differentiate it from invention.

We define innovation simply as a transformation of practices in a community. We therefore focused on setting up a course that would cultivate the practices an officer needs to effectively produce innovations. We created a three-quarter course: Technology and Transformation. The course has two main objectives: (1) Teaching students how to be self-generating innovators capable of practicing in a culture of innovation, and (2) Helping students plan and execute a transformative master's thesis; the thesis becomes a process of transformation in miniature.

As we gain experience with this framework, we are finding that more and more people are intrigued with the notion that there is a core set of personal practices of innovation. There are many books that tell how an organization can manage itself to be innovative. But there is hardly anything on what the individual must do to be able to participate effectively in a culture of innovation within an organization. This may explain why some guidelines for innovation exist in some companies but not in others: Some groups have the necessary personal practices, others do not.

Innovation as a Skillful Practice

We drew a good deal of inspiration from Peter Drucker, whose 1985 book, *Innovation and Entrepreneurship*, is a gold mine of insights into how innovation really works. It gets to the fundamental issues behind innovation and talks about how individuals and organizations can embrace this process. Drucker defines five phases in the practice of innovation: (1) locate an opportunity; (2) analyze it; (3) assess your community's receptivity; (4) maintain a focus on a simple core idea; and (5) exercise leadership.

The first phase of the innovation process is identifying an opportunity. Drucker lists seven sources of opportunities: (1) the unexpected; (2) incongruities; (3) process needs; (4) change of industry structure; (5) demographics; (6) change of mood or perception; and (7) new knowledge.

The first four show up as challenges to the internal operations of an organization; the other three are external and are subject

to competition from other organizations. We added an eighth source to the list, which we call "dead cows." This is a reference to Louis Pasteur, who organized his scientific investigation around the French cattle industry, which was being decimated by anthrax until he invented a vaccine. Major innovations can occur by showing people how to keep their cows healthy.

During phase two, the innovator analyzes the costs, risks, people, strategies and resources needed to effect the change envisioned. In phase three, listening, we meet with members of the target community to assess their degree of receptivity to the proposal and seek their feedback. This phase, which consists of a lot of listening, contrasts with the intellectual bent of the previous phase.

In phase four, focus, we execute the plan devised in phase two and vetted in phase three. This requires constant attention to the simple, central idea behind the mission and a determination to avoid being sidetracked by interesting — but nonessential ideas and opportunities. The final phase, leadership, is a commitment to excellence in product and service, a commitment to do the work needed to win acceptance of the proposal.

It's not hard to identify the skills needed to accomplish these phases: awareness, focus, persistence, listening, blending and simplicity. In addition, you need skills for: making powerful declarations and compelling offers; leading a team that will help you carry out the plan; being a constant learner; and maintaining a sense of destiny. You also need a sense that you are acting on behalf of a purpose larger than yourself.

Innovation in Network-Centric Operations

Let me give you an example that has led to a project that may produce an innovation of great value to the Navy and DoD. I discussed earlier the DoD's interest in adapting its warfighting doctrine to a highly networked world. DoD leadership has laid out plans to develop a Global Information Grid (GIG), a worldwide network capable of supporting future military operations. In this setting, military operations are called network-centric operations (NCO).

Leadership has been increasingly frustrated at what they see as painfully slow progress toward implementing the GIG. Interestingly, network engineers have also experienced frustration. They see a large number of guidance documents coming from DoD, Navy, Army and Air Force, but there is no authority that can resolve important but relatively low-level engineering ambiguities and conflicts. Everyone is frustrated — leadership because the engineers are not moving fast enough — and the engineers because leadership has not provided a method to resolve ambiguities and conflicts.

In response to this need, we proposed a new entity: W2COG or World Wide Consortium for the Grid. The W2COG is a consortium of government, industry and academic engineers working on the continuing goal of advancing networking technology to support the GIG. The W2COG aims to accelerate systems interoperability agreements between units and agencies in a highly complex environment where technical guidance can never be complete, there is no central authority and both the technology and environment are constantly changing. Strengthening GIG technology will enable more robust joint warfighting capabilities.

This consortium is modeled after the highly successful W3C. Thus, the W2COG will provide an agile, fast-response consensus process that enables the members to reach agreements on data formats, protocols, information exchange patterns, and other aspects of interoperability that are needed to enable systems connected to the GIG.

W2COG will produce recommendations, guidelines, models and tools. It will deal only with open architectures, recommendations and consensus processes, but it will not produce standards because there are other organizations tasked with that purpose. W2COG will be hosted by the NPS, just as the Massachusetts Institute of Technology (MIT) hosts the W3C.

To achieve these goals, we are working toward a strategic partnership with NCOIC, the Network Centric Operations Industry Consortium. The two consortia would share reciprocal membership rights and jointly operate the technical agenda. This partnership would create a single umbrella for government, industry and academia to work together to advance the technology for NCO.

The objective — networking to support NCO — is a moving target because it depends on military strategy, defense doctrine and information technology — all of which are constantly changing and reshaping. Current acquisition, planning and technology development systems move too slowly to enable us to close the distance to the target. Moreover, the complexity of the networking technology and inter-organizational coordination is beyond the scope of any one authority. The consortium model is the only realistic alternative with a prospect of reaching the goal.

Institutionalizing Innovation

We have learned a great deal since October 2003 when we began our new curriculum. We recently formed a group composed of Association for Computing Machinery (ACM) award winners to create a Great Principles Framework that might extend to computer science education at other universities.

We recognize that our students and alumni must become self-generating innovators. They must be leading practitioners who can continuously leverage knowledge superiority in the Navy's culture of innovation. NPS computer science graduates will be agents of change who will help the United States maintain a technological and operational advantage.

Dr. Peter Denning is chairman of the Naval Postgraduate School Computer Science Department and director of the NPS Cebrowski Institute for Information Innovation and Superiority. He is one of the founders of CSNet.

John Sanders, NPS Director of University Relations, contributed to this article.

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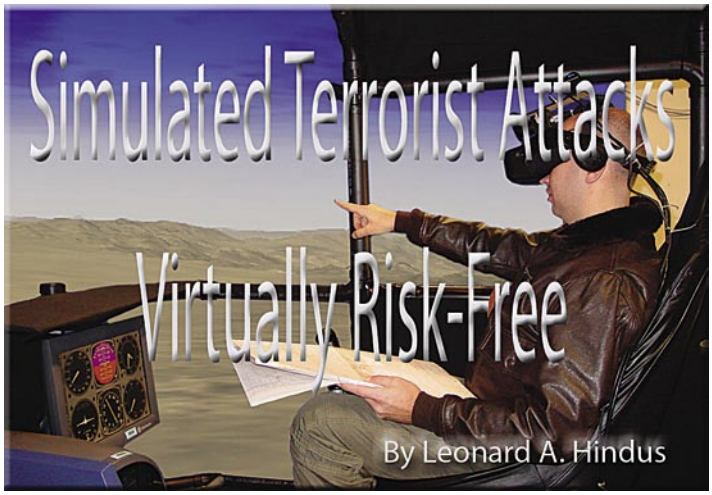


The Anti-Terrorist Force Protection Program allows the military to rehearse defensive tactics from a first-person point-of-view…

The guided missile destroyer was visiting a foreign port. The captain, a highly decorated, battle-hardened veteran, scrupulously followed Navy regulations, setting up a defensive perimeter of crewmen in motorized launches that patrolled the area 24 hours a day. Without warning, a speedboat raced toward the Naval vessel. The launches moved to intercept but were no match for the smaller craft, which was loaded with explosives. It zipped past the defenders and rammed the destroyer.

Had this been an actual attack, it would have cost the lives of countless American crewmen and inflicted millions of dollars in damage to the ship. In simulation, however, such disasters can be reversed — a luxury not afforded to ship commanders in the field. Through repeated rehearsals, a captain can adjust his defensive strategy and intercept virtual attackers before they reach their targets.

The Anti-Terrorism Force Protection Program is a 3-D simulation project developed by Dr. Don Brutzman and the SAVAGE Group (Scenario Authoring and Visualization for Advanced Graphical Environments) at the MOVES Institute (Modeling, Virtual Environments and Simulation), located at the Naval Postgraduate School in Monterey, Calif.

In this X3D XML (Extensible Markup Language) and agent-based simulation, named "the USS Cole Scenario," after a Navy ship that was attacked and damaged in the manner described above, users can rehearse various terrorist attacks with a first-person point-of-view.

"You can realistically assess defensive tactics and see what would or would not protect the ship from attack," Brutzman said. "You can replay dangerous 'what-if' scenarios and the risks are virtual."

Virtual Worlds for Smart Submarines

"We started creating virtual environments because that was the only way to test-program Autonomous Underwater Vehicles (AUVs)," Brutzman explained." Once an AUV is launched, it's on its own. If there is a flaw in the programming, there's no predicting what it might do. It is tremendously difficult to observe, communicate with and test underwater robots because they operate in a remote and hazardous environment."

To that end, Brutzman's team needed to create a realistic underwater virtual world that could comprehensively model all salient functional characteristics of the real world in real-time. This virtual world was designed from the perspective of the robot, enabling realistic AUV evaluation and testing in the laboratory. "Robots don't need imaging to navigate; people need imaging to understand the robot's logic," said Jeff Weekley, a senior designer with the MOVES Institute. "3-D, real-time graphics are our window into the virtual world."

Visualization of robot interactions within a virtual world allows sophisticated analyses of a robot's performance. Sonar visualization permits researchers to look over the robot's shoulder or even see through its eyes to understand sensor-environment interactions intuitively. "This is not a video game," Brutzman stressed, "but a real-world simulation. It not only has to look real … it has to be real." He added, "We need to model the real world in as much detail as possible." This is vital, as the Navy, wants to be sure the AUVs tested in simulation at the MOVES Institute will behave the same way in the open ocean.

NPS AUV Workbench

As a result of this research, the NPS AUV Workbench is now publicly available. A poster and self-installer can be found at http://terra.cs.nps.navy.mil/AUV/workbench.

The poster states, "The NPS AUV Workbench supports physics-based AUV modeling and visualization of vehicle behavior and sensors in all mission phases. Animation is based on vehicle-specific hydrodynamics that can be configured to model arbitrary vehicles. Models defined in X3D and VRML (*pronounced ver-mal, Virtual Reality Modeling Language, 3-D equivalent of HTML)* relying on IEEE Distributed Interactive Simulation Protocol (DIS) allow visualization across networks utilizing custom software or off-the-shelf Web browsers.

Virtual environments facilitate control algorithm development, constant testing, mission generation and rehearsal and replay of completed missions in a benign laboratory environment.

Building a Virtual World Viewer

The benefits don't stop there, though. "Once you develop tools for creating virtual environments," Brutzman said, "the applications are almost limitless." A good graphics toolkit for building a virtual world viewer has many requirements to fill. Rendered scenes need to be realistic and rapidly rendered, permitting user interaction. The tools need to be capable of running on both low-end and high-end workstations. Graphics programmers must have a wide range of tools to permit interactive experimentation and scientific visualization of real-world data sets.

The ability to read multiple data formats is also important when using scientific and oceanographic data sets. Scientific data format compatibility can be provided by a number of data function libraries that are open, portable, reasonably standardized and

usually independent of graphics tools. Viewer programs need to be capable of examining high-bandwidth information streams and large archived scientific databases.

The ability to pre-process massive data sets into useful, storable, retrievable graphics objects will be particularly important as we attempt to scale up to meet the sophistication and detail of the real world. Standardization of computer graphics and portability across other platforms, Brutzman pointed out, is also desirable but historically elusive. Simulation software should be able to take advantage of the Internet and run virtual environments remotely, according to Brutzman. "History has taught us that virtual worlds often outlast the proprietary hardware and software they were designed on." To achieve these goals, the MOVES Institute has been involved in development of several open standards. These include XMSF and X3D.

XMSF

The Extensible Modeling and Simulation Framework (XMSF) is a set of Web-based technologies, applied within an extensible framework, enabling a new generation of modeling and simulation (M&S) applications to emerge, develop and interoperate. Specific subject areas for XMSF include: (a) Web/XML, (b) Internet/networking and (c) modeling and simulation (M&S). XMSF information can be found at http://www.movesinstitute.org/xmsf/xmsf.html. XM-based Web services are sufficiently powerful for all types of modeling and simulation.

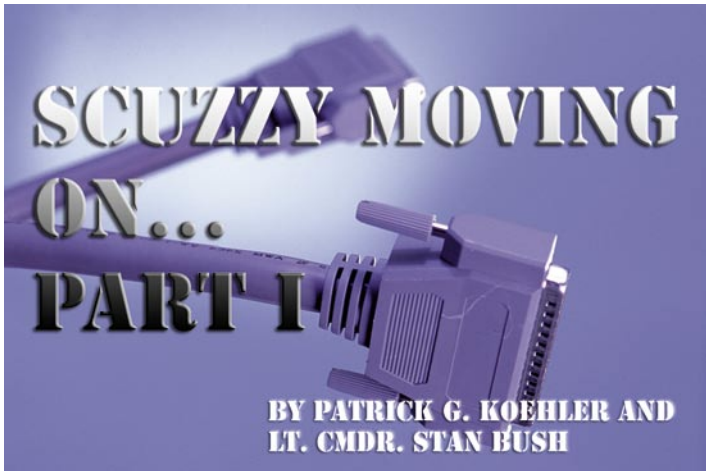
X3D

Extensible 3D (X3D) is the ISO-approved next-generation open standard for 3-D on the Web. It is an extensible standard that can easily be supported by content creation tools, proprietary browsers and other 3-D applications, both for importing and exporting. X3D not only replaces VRML but also provides compatibility with existing VRML content and browsers. Existing VRML content will be played without modification in any X3D-2 browser, and new X3D-1 and X3D-2 content can be read into existing VRML applications.

X3D addresses the limitations of VRML. It is fully specified, so content will be fully compatible. It is also extensible, which means that X3D can be used to make a small, efficient 3D animation player or to support the latest streaming or rendering extensions. It supports multiple encodings and APIs (application program interfaces), so it can easily be integrated with Web browsers through XML or with other applications. In addition to close ties with XML, X3D is the technology behind MPEG-4's 3-D support. X3D information can be found at www.web3d.org.

Don Brutzman is right. With the proper tools for creating virtual environments, the applications truly are nearly limitless.

Leonard A. Hindus is a long-time contributing editor for Advanced Imaging magazine.



Background

The small computer system interface (SCSI) standard, commonly referred to as "scuzzy," is continually evolving. To keep you informed of the latest SCSI changes, we teamed up to provide a follow-up to a SCSI article which appeared in the *CHIPS Summer 2004* edition (http://www.chips.navy.mil/archives/04_summer/Web_Pages/scuzzy.htm). This article, Part I, of a two part series, will highlight the latest SCSI technologies and standards. For example, there are new devices available such as the Ultra SPI-3 (SCSI-3 Parallel Interface) and SPI-4, and Ultra160 or Ultra320 parallel SCSI devices. The Ultra160 doubles Ultra2 SCSI's speed by as much as 160 MBps for a 16-bit data bus. It is commonly referred to as the Fast-80.

The Ultra160 uses a SPI-3 third generation parallel SCSI interface, which adds five new features: (1) Fast-80 or a data bus speed running at 80 MHz; (2) Cyclic Redundancy Check (CRC) - a common error checking protocol, which is used to ensure data integrity as a safety measure since transfer speeds were being increased, leading to the possibility of data corruption; (3) Domain Validation, which improves the robustness of the process by which different SCSI devices determine an optimal data transfer rate; (4) Quick arbitration and selection (QAS), which represents a change in the way devices determine which device has control of the SCSI bus. (This feature provides a small improvement in performance.); and (5) Packetization - reduces the overhead associated with data transfer.

The Ultra320 uses SPI-4 fourth generation interface for SCSI and has similar features of the SPI-3 except that it again doubles the speed of data transfer to 320 MBps by running the data bus speed at 160 MHz. The Ultra320 is also referred to as Fast-160.

What's New?

Early in 2003, Ultra640 was issued as a standard by the InterNational Committee for Information Technology Standards (INCITS) and called 367-2003 or SPI-5. The SPI-5 is the fifth generation of the SCSI-3 standard. SPI-5 incorporates Fast-320. Ultra640 required a new transfer mode with a 160 MHz free running clock speed to eliminate Inter-Symbol Interface (ISI) problems. Ultra640 uses paced data transfers or packetized SCSI; a free running clock; ISI pre-compensation drivers and active adapter filter receivers; skew compensation; training patterns for the adaptive active filters; and expander communications.

The Ultra640 increases speed to 640 MBps and has similar features as the Ultra320, but offers double the speed. With Ultra640, the support for single-ended interfaces has been downplayed in the SPI-5 interface so future devices may not be backward compatible. This was done to keep SCSI devices running at optimum speed rather than using a single-ended speed of 20 MBps. When you have a mixed SCSI environment on the same connection, the speed will drop to the slowest connection standard so it is a disadvantage to mix narrow with wide SCSI devices. The Ultra640 is new and one of the new adapter products in development is Tekram's DC-390U4 series SCSI adapter. It can achieve a maximum data transfer rate of 640 MBps using a 64-bit adapter even though it is advertised as using an Ultra320 adapter.

iSCSI, known as Internet SCSI, embeds SCSI-3 over TCP/IP (Transmission Control Protocol/Internet Protocol); some experts say it may eventually replace Fibre Channel. Fibre Channel is a serial data transfer architecture. The most prominent Fibre Channel standard is Fibre Channel Arbitrated Loop (FC-AL). It is designed for new mass storage devices and other peripheral devices that require very high bandwidth. Using optical fiber to connect devices, FC-AL supports full-duplex data transfer rates of 100MBps.

iSCSI can easily address both the low-end and high-end markets by using Fast or Gigabit Ethernet networks or another network medium to transfer data between SCSI devices. IBM and Hewlett-Packard along with other vendors support iSCSI. This new SCSI standard can promote: storage area network (SAN), network-attached storage (NAS), geographic distribution, data integrity, disk farms, use the existing network cable plant and a single technology for connection of storage systems within local-area networks (LANs) and wide-area networks (WANs). iSCSI will work over a WAN using standard TCP/IP to access iSCSI devices. Data can then be distributed over different networks. iSCSI's lack of built-in security is resolved by using the network security protocols, which will control data using servers, routers, virtual LANs (VLANs) or firewalls. See Figure 1 for an example of a basic iSCSI network design.

What's Next?

Serial Attached SCSI (SAS) or INCITS 376-2003 is another new standard approved by the American National Standards Institute (ANSI) that boasts a greater transmission distance with point-to-point topology using dedicated connections. SAS lowers the operating cost of SCSI with the added benefits of increased cooling, making it easy to connect devices with simplified cable connections. SAS transfer rates start at 1 GBps or 150 MBps. SAS will currently support 3 GB or 300 MBps. The next generation of SAS promises 6 GBps throughput. SAS offers double the speed of the Serial Advanced Technology Attachment (SATA).

SATA is a serial link, a single cable with a minimum of four wires creating a point-to-point connection between devices. Transfer rates for Serial ATA begin at 150 MBps. SATA offers a high data transfer speed with a lower cost than most parallel SCSI devices. SATA devices are becoming popular because of the low cost and the increased cooling capability of the small narrow, serial cable which replaces the flat 40-pin or 80-pin cable. The new SCSI standard of SAS will surpass the performance, flexibility and

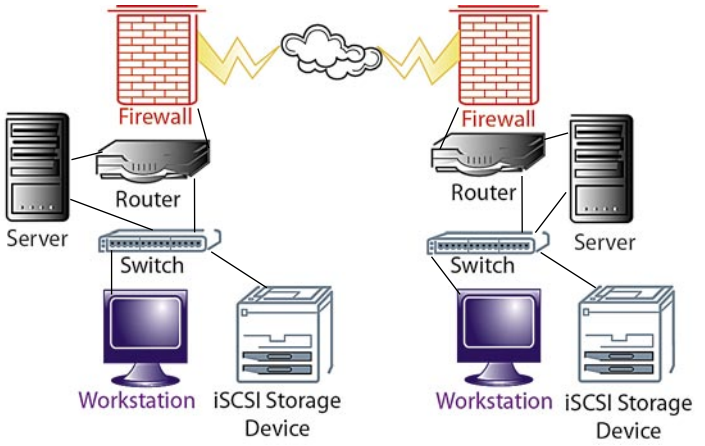


Figure 1. Example of a basic iSCSI network configuration

connectivity of SATA, but SAS and SATA devices are compatible. This compatibility offers benefits to system builders, integrators and end users. System builders can use SAS high performance features to support enterprise networks while SATA can support desktops and LANS. Integrators will have less worry since the interface standards can be interchanged, and end users will get a faster processing speed with SATA.

Where are SCSI devices used?

Parallel SCSI standards of Ultra160, Ultra320 and Ultra640, coupled with SAS will support enterprise networks and disk farms. While iSCSI devices are designed to support network storage at minimal cost using the existing cable plant, SATA-1 and 2 devices are generally used at the desktop level connecting internal hard drives or other peripherals such as optical drives. Universal System Bus (USB) v2.0 and FireWire (IEEE 1394) are external bus standards, which are primarily designed to support desktop external peripherals such as printers, mice, keyboards and external hard drives. Although they are fast and flexible supporting Plug-and-Play and hot plugging, they are comparatively inexpensive. A 1394 port can support isochronous data, delivering data at a guaranteed speed. This makes it perfect for devices that transfer high levels of data in real-time, such as video devices.

For more information go to the Technical Committee T10 (a technical committee of INCITS) Web site at **http://www.t10.org/**.

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Coalition Interoperability Achieves Unprecedented Success in RIMPAC 2004

Because of the efforts of all participating nations, interoperability and C4I connectivity made RIMPAC 2004 an unprecedented success …

By Rear Adm. D.C. Curtis and Cmdr. Dawn M. Maskell

Background

Command and Control, Communications, Computers, and Intelligence (C4I) connectivity has always been important to military planners and our coalition partners, but Rim of the Pacific 2004 (RIMPAC) made it a priority. Every other year, Commander, Pacific Fleet (CPF) conducts this multinational naval exercise in the Hawaiian area of responsibility (AOR).

This year, RIMPAC 2004, run by Commander Third Fleet (C3F), as CPF's executive agent, was conducted 29 June - 26 July 2004, with 40 ships, 8 submarines, 125 aircraft and 17,900 personnel from Australia, Canada, Chile, Japan, South Korea, the United Kingdom and the United States participating. Because of the efforts of all involved, interoperability and C4I connectivity made RIMPAC 2004 an unprecedented success.

C3F stressed C4I reliability across all spectrums during the RIMPAC planning process and made the number one C4I goal to develop the Combined Enterprise Regional Information Exchange System (CENTRIXS) in order to "strive for seamless, uninterrupted connectivity for all RIMPAC participants at sea and ashore." Commander, Cruiser Destroyer Group FIVE (CCDG-5) was chosen as the Commander, Combined Forces Air Component Commander (CFACC) to run the Coalition Air Operations Center (CAOC).

CFACC staff and CAOC watchstanders included members of the C3F and CCDG-5 staffs, U.S. reservists and coalition partners from the British Royal Navy and Canadian and Australian Air Forces. To ensure that our coalition partners, who filled roughly one-third of the CFACC and CAOC billets, would be able to fully participate in the planning and execution of the CAOC duties and support C3F's C4I goals, it was decided that CENTRIXS would be the CAOC's primary secure network. SIPRNET use was allowed by U.S. CAOC personnel if no other network was available. This commitment to CENTRIXS was a first for a RIMPAC exercise.

The challenges faced by the CFACC staff included location of the CAOC, how to establish connectivity across four networks in a multinational environment, how to provide interoperability between all warfare commanders, and how to manage the vast amounts of information (knowledge management) on the networks.

Location. The CAOC, the operational arm of the CFACC, was established using the U. S. Pacific Command's (PACOM) Contingency C4I Package (CCP). The CCP is an initial entry mobile command center facility, consisting of inter-connected tents, electrical generators and portable C4I equipment, from which the Commander, Joint Task Force (CJTF) exercises command and control over assigned forces.

The RIMPAC 2004 CAOC design was the largest footprint ever established by the CCP. The CCP is converting to the Deployable Joint Command and Control (DJC2) after RIMPAC 2004, bringing even more capability to the warfighter.

DJC2 will be tailorable to address Joint Force Commanders' command and control needs for air-, land- and sea-based operations, leveraging the Global Command and Control System (GCCS), other C2 programs, and communications and information systems consistent with the Global Information Grid (GIG) architecture.

C4I Capability. The CCP inventory provided all of the communications capability required, except CENTRIXS and the Theater Battle Management Core System (TBMCS). CENTRIXS was a new capability for the CCP. Although it was obtained for the first time by the CCP specifically in support of RIMPAC, it will be a core capability of the follow-on DJC2 system. The TBMCS server and client machines were provided by C3F and the Space and Naval Warfare Systems Command (SPAWAR).

CAOC connectivity included wireless NIPRNET and SIPRNET using National Security Agency (NSA) approved network interface cards (NIC), CENTRIXS 4-EYES, Common Operational Picture (COP) Feed/Command and Control PC, TBMCS, Defense Red Switch Network (DRSN), telephone switch, SATCOM, Ultra High Frequency-Line-of-Sight (UHF LOS), EHF, SHF and video conferencing. Of these capabilities, there were two that were a first for RIMPAC: wireless LAN and TBMCS on a CENTRIXS backbone.

Wireless NIPRNET and SIPRNET, not just for RIMPAC, but for all participating forces, were the perfect solutions for a confined space populated with lots of people. There were fewer wires strewn across the tent for local area network (LAN) connectivity, and thus, less trip hazards and broken laptops. Also since there was no cable to run, it was easier to add more computers to the wireless network and move computers between tents as the exercise progressed.

TBMCS machines were installed in the CAOC using CENTRIXS as the backbone to allow coalition interoperability. TBMCS was critical to air tasking order (ATO) development, the major product produced by the CAOC. Coalition partners were able — for the first time during RIMPAC — to have a direct, real-time impact on ATO development.

Interoperability. There were four enclaves with different coalition releasability that were used during RIMPAC 2004. The enclaves were: CENTRIXS 4-EYES (Australia,

Canada, United Kingdom, United States), CENTRIXS-JPN (Japan, United States), CENTRIXS-R (Chile, South Korea, United States) and SIPRNET. CENTRIXS-R was a special enclave developed specifically for the exercise and for those countries without access to either CENTRIXS 4-EYES or CENTRIXS-JPN.

During the first week of RIMPAC, the CFACC staff worked closely with the Commander, Combined Task Force (CCTF) staff to improve CENTRIXS interoperability, providing unprecedented coalition interoperability via C4I connectivity to SIPRNET and all three CENTRIXS enclaves. The C4I architecture is shown in Figure 1.

Initially, coalition interoperability was cumbersome. The C4I architecture was designed for the blue forces to communicate on four separate networks; only SIPRNET and CENTRIXS 4-EYES were interoperable. The task force commander's primary means of communication was SIPRNET.

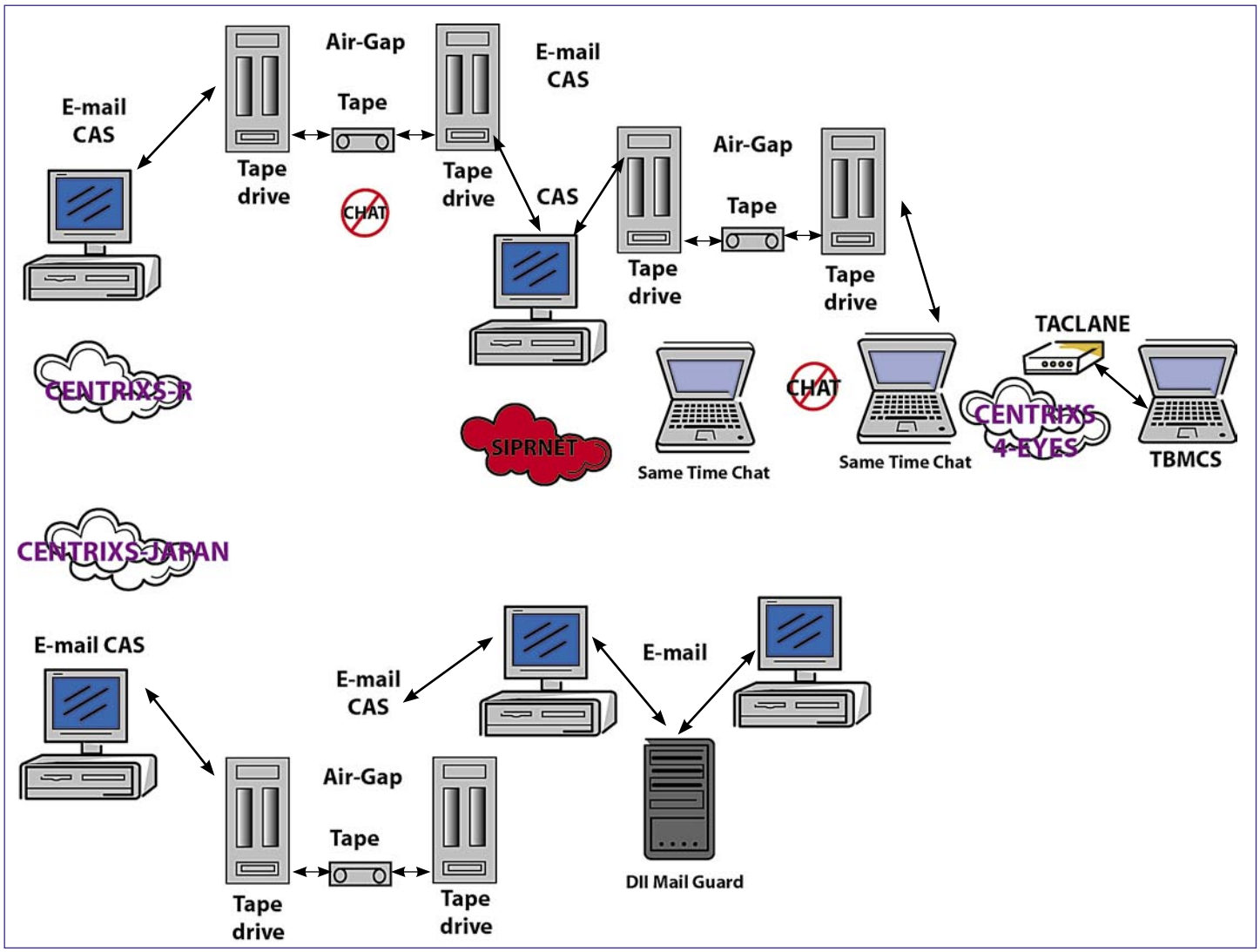
This made communications with all of his forces (whose primary and sometimes only common system was one of the CENTRIXS enclaves) extremely difficult at best. The CFACC and the majority of the blue forces communicated using CENTRIXS 4-EYES. SIPRNET and CENTRIXS 4-EYES were able to interoperate through the use of a mail guard and Web postings that replicated every 30 minutes.

The Japanese navy communicated using CENTRIXS-JPN, and the Korean and Chilean navies communicated using CENTRIXS-R. Communication on CENTRIXS-JPN and CENTRIX-R was further limited by the use of an air-gap which could send e-mails but not attachments between the four enclaves due to concerns over embedded malicious code. The initial design was very disjointed and left most of the participating nations out of the common operational picture.

However, because of the efforts of CFACC, C3F, CPF and SPAWAR personnel, military and civilian alike, interoperability was established before the first operational week of the exercise ended. An air-gap, replication and a Defense Information Infrastructure (DII) mail guard were used to move information across enclaves.

The air-gap required an e-mail to be sent to the CCTF watch who physically transferred the data between each enclave. E-mail had a formatted header to ensure proper delivery. Air-gap personnel transferred the data to disk, virus scanned the disk, ensured proper classification, and

Figure 1. RIMPAC 2004 C4I Architecture



Inside one of the operations tents used during RIMPAC 2004. RIMPAC is the largest international maritime exercise in the waters around the Hawaiian Islands. RIMPAC is intended to enhance the tactical proficiency of participating units in a wide array of combined operations at sea, while enhancing stability in the Pacific Rim region.

There were four enclaves with different coalition releasability that were used during RIMPAC 2004. The enclaves were: CENTRIXS 4-EYES (Australia,Canada, United Kingdom, United States), CENTRIXS-JPN (Japan, United States), CENTRIXS-R (Chile, South Korea, United States) and SIPRNET.

then transferred the data to the proper enclave either as an e-mail or Web posting. This was a time consuming process, but it allowed interoperability.

Replication occurred every 30 minutes between SIPRNET and CENTRIXS 4-EYES Web sites via an air-gap at the Pacific Regional Network Operations Center, located at the Naval Computer and Telecommunications Area Master Station (NCTAMS) Pacific. Replication was transparent to users. The DII mail guard allowed e-mails with or without attachments to be sent directly between SIPRNET and CENTRIXS 4-EYES with no human intervention.

The only requirement was for each account on both SIPRNET and CENTRIXS 4-EYES to be given proper permissions to use the DII mail guard. The ability of the CFACC and RIMPAC forces to have a better common operational picture through this interoperability was unprecedented.

One feature of CENTRIXS that was not able to be used to its full capacity to enhance interoperability in RIMPAC was chat. There was chat capability within, but not between each enclave. Because the enclaves were not connected, unless a user was using SIPRNET, not all blue forces were able to participate in a particular chat session. Therefore, CENTRIXS chat was not used extensively, since the majority of forces could not participate. This is not reflective of real-world operations where all units in a common operation are communicating on the same circuit, and chat is the primary collaborative tool. Cross-domain chat solutions are being developed and tested, which will some day eliminate this barrier to interoperability.

Knowledge Management. Once connectivity was established, the other challenge to interoperability was knowledge management. We had to manage the presentation and location of the information on Web sites on four enclaves, accessed by users who did not share English as a common first language.

A Web site is crucial to maintaining command and control, situational awareness and the common operational picture. Web posting was accomplished using two methods: posting a file to a CENTRIXS 4-EYES Web site; or sending an e-mail with the attachment to be posted to CENTRIXS-JPN or CENTRIXS-R to an air-gap watch at CCTF.

A considerable amount of time was spent by CAOC personnel managing the CFACC Web site, drafting e-mails in the proper format for the CCTF air-gap and monitoring the correct posting of data by air-gap. This procedure was time intensive. Posting must be timely, the site properly managed, and the data must be easy to find on the Web site in order for the data to get to the right warfighter, at the right time.

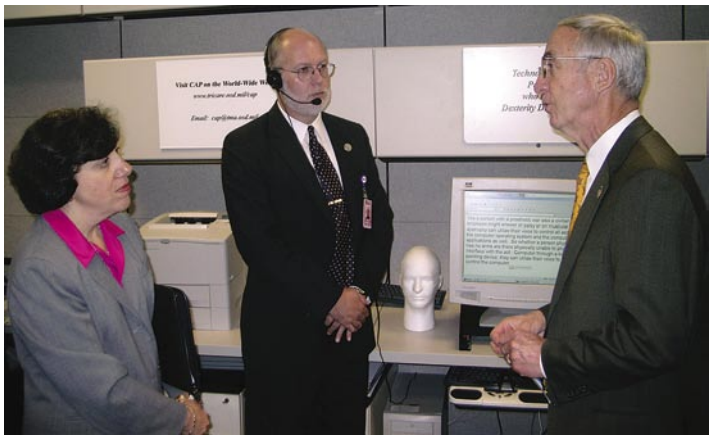
The major success of C4I connectivity and interoperability during RIMPAC 2004 was due to the efforts of all involved. In the end, the commanders had a better understanding of the operational situation and were better able to manage the battlespace to provide decisive leadership.

RIMPAC 2004 proved that coalition communications, namely CENTRIXS, can support a joint, coalition and combined task force, as well as standing and emerging partners.

Rear Adm. Curtis' decorations include the Legion of Merit, Defense Meritorious Service Medal, Meritorious Service Medal, Navy Commendation Medal, Navy Achievement Medal and other awards. He holds a Master of Science in administration from Central Michigan University and is a graduate of the National Defense University. In February 2004, Rear Adm. Curtis reported to his current position as Commander, Carrier Strike Group Eleven/Commander, Nimitz Strike Group.

Cmdr. Dawn M. Maskell is the CCSG-11 Deputy Information Warfare Commander and Deputy Flag C5I. CHIPS

SECNAV Visits DoD's Assistive Technology Center



Secretary England and Ms. Dinah Cohen discussed reasonable accommodation during the Secretary's visit to CAPTEC. The Secretary viewed a demonstration of voice recognition for people with dexterity disabilities given by Michael Young (center), CAPTEC Manager.

From left to right: Mr. James C. Reardon, chief information officer for the Military Health System, Ms. Dinah Cohen and Secretary England with members of the CAP team: Natalie Timmons, Michael Young, Mark Rew, Derek Shields and Claudette Tan.

Director of the Navy Marine Corps Intranet, Rear Adm. James B. Godwin III discussed assistive technology with Claudette Tan. The admiral viewed a demonstration of assistive technology for blind employees during his visit to CAPTEC on Nov. 3, 2004. Ms. Tan, CAP Visual Support Team member, explained the Braille and speech output devices available to Navy employees and servicemembers for use within the NMCI environment. The admiral expressed his commitment to the CAP-NMCI partnership.

The Honorable Gordon R. England, Secretary of the Navy, visited the Computer/Electronic Accommodations Program (CAP) Technology Evaluation Center (CAPTEC) at the Pentagon Sept. 28, 2004. Ms. Dinah Cohen, CAP Director, and five members of the CAP staff hosted a tour for the Secretary that included an overview of CAP and demonstrations of assistive technology. Focus was placed on the progress that has been made over the past year to integrate assistive technologies into the Navy Marine Corps Intranet (NMCI). Today, over 20 items have been certified for use on the NMCI. These technologies are now being used by Navy and Marine Corps employees with disabilities working within the NMCI environment.

Ms. Cohen also spoke with Secretary England about the work CAP has been doing for wounded servicemembers returning from Operation Iraqi Freedom and Operation Enduring Freedom. Some of the actions for this initiative include:

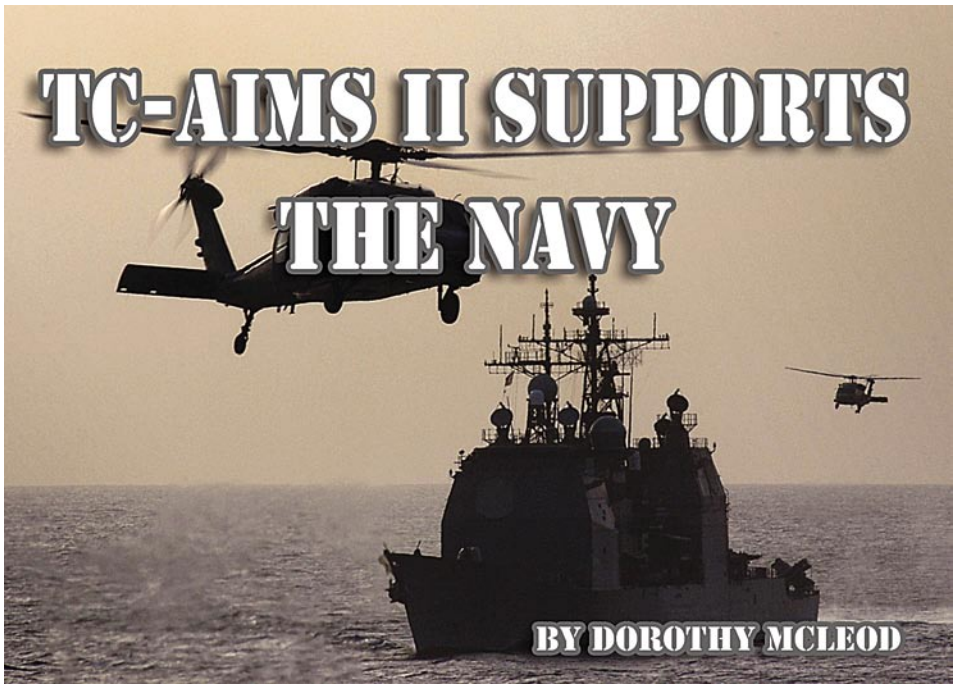
- Assistive technology for Military Treatment Facilities (MTFs) for patients to use during their recovery and rehabilitation process
- Needs assessments for wounded servicemembers (either at the hospital or at CAPTEC)
- Assistive technology to use in the workplace for wounded servicemembers who remain on active duty or transition to a federal government position

CAP started this initiative with a pilot program at Walter Reed Army Medical Center. Strengthened by early successes and expanding partnerships, program services are now being expanded to support Sailors and Marines with disabilities at Bethesda Naval Hospital and at MTFs throughout the country. Secretary England was pleased to hear about the expansion and offered his support to CAP.

NMCI Director Pledges Commitment to Accessibility

Rear Adm. James B. Godwin, Director of NMCI, visited CAPTEC on Nov. 3, 2004, to learn first hand about assistive technologies for employees with disabilities. The admiral expressed his commitment to the CAP/NMCI partnership and said that he looks forward to implementing new technologies and processes to ensure full access to the information environment for all Navy and Marine Corps personnel with disabilities. CHIPS

To learn more about CAP and the NMCI and Wounded Service Members Initiatives, please visit the CAP Web site at http://www.tricare.osd.mil/cap/programs/programs_wsm.cfm/.



OIF Deployment Support

TC-AIMS II, or the Transportation Coordinators' - Automated Information for Movements System Version II, is a Department of Defense directed, Major Automated Information Systems (MAIS) joint program, which directly supports the DoD mission areas of mobility and sustainment. It consolidates unit movement and installation transportation functionality into a single joint automated system.

The U.S. Navy is using TC-AIMS II to deploy troops and equipment in support of the war on terrorism in Operation Iraqi Freedom (OIF). Navy expeditionary forces used TC-AIMS II to support deployments to the Southwest Asia area of responsibility. The system provided deployment planning support and produced the required transportation documentation for two Seabee Battalions, or the Naval Mobile Construction Battalions (NMCBs), one Seabee Regiment, one Mobile Inshore Undersea Warfare unit, one Inshore Boat Unit, three reserve Cargo Handling Battalions and a portion of the Reserve Navy Supply Support Battalion.

Exercise Support

TC-AIMS II was used to support the Amphibious Construction Battalion TWO (ACB II) deployment to Honduras for exercises Joint Logistics Over-The-Shore (JLOTS 04) and New Horizon. In total, the system prepared transportation documentation and provided in-transit visibility from origin to destination, or as the Army says, "from fort to foxhole" for more than 3.2 million pounds of equipment and supplies by sea and 300,000 pounds of equipment, supplies and 437 troops by air.

The Road Ahead

TC-AIMS II Block 2, which is anticipated to begin fielding in the first quarter of FY 2005, will introduce Navy users to the Transportation Information Systems (TIS) Enterprise, also known as the Central Management Facility (CMF). The TIS Enterprise is owned and operated by the TIS-Joint Program Management Office (TIS-JPMO). The TIS-JPMO is the TC-AIMS II Army developer and hosts the Web-accessible TC-AIMS II. These enterprise services will be provided by the TIS-JPMO to our Navy TC-AIMS II users at no cost.

Since the TIS Enterprise was established two years ago, the user community has grown by about 300 percent. To ensure enough available bandwidth, the TIS JPMO acquired a full duplex 100 Mbps Transparent Lan Service (TLS) circuit to accommodate the increase in demand.

Navy TC-AIMS II users will be able to perform all of the deployment support activities currently available on their semi-ruggedized, deployable laptop computers, but they will have the added ability to share information with other units. For example, a Seabee Battalion will be able to create a movement plan on the enterprise that can be accessed by its regiment embarkation support staff.

Equally as important, users will be able to easily update their data, such as, unit deployment lists or movement plans between the enterprise and stand-alone platforms. Users will also be able to obtain software and reference table upgrades from the enterprise for deployable laptops.

Another powerful tool that the enterprise configuration will bring to bear is a shadowing capability that allows the TIS help desk personnel to literally follow along with a user on the enterprise to resolve issues more quickly and efficiently.

The next scheduled increment of TC-AIMS II, Block 3, is currently in development and will offer automation for theater movement control, convoy operations in theater (including route deconfliction) and map graphics. Block 3 development is anticipated to conclude in early FY 2006.

The Space and Naval Systems Center Norfolk is the TC-AIMS II technology integrator for the Navy and has also provided technical support to the TC-AIMS Navy Program Office at the Naval Operational Logistics Support Center (NOLSC), headquartered in Norfolk, Va.

For more information go to the TC-AIMS II Web site: https://www.tis.army.mil/.

Navy TC-AIMS II Program Office Contacts:

Navy Program Manager:
Ms. Dorothy McLeod

Functional Lead:
Mr. Larry Hubbard

Technical Lead:
Mr. Eric Brown

Ms. Dorothy McLeod is the TC-AIMS II Navy Program Manager. She is a recipient of the Emerald Award presented by the 3rd Annual Women of Color (WOC) Conference for lifetime professional achievement in the field of engineering and technology. CHIPS

DON eGov Awards Fall 2004

By Jim Knox, DON CIO Enterprise Transformation Team

On Sept. 28, 2004, the Department of the Navy Chief Information Officer, Mr. David Wennergren, accompanied by the former DON Deputy CIO (Marine Corps), Brig. Gen. John Thomas and former DON Deputy CIO (Navy), Rear Adm. Robert Reilly, presented seven 2004 DON eGov Awards to Navy and Marine Corps program teams. The winning efforts are listed below:

Joint Task Force (JTF) 519 Operational and Training Web sites. Managed by U.S. Pacific Fleet and sponsored by the Space and Naval Warfare Systems Command (SPAWAR), this effort provides the JTF with an unmatched ability to train, plan, develop and execute Joint warfighting missions.

Marine Corps Equipment Readiness Information Tool (MERIT). MERIT, developed by the Marine Corps Logistics Command and the Marine Corps Systems Command, drastically reduces the effort required to gather readiness information and provides the Marine Corps with a common operating picture of Marine Corps' Equipment Readiness.

The Marine Corps Network Operations and Security Command (MCNOSC) Forward Element deployed during Operation Iraqi Freedom. The MCNOSC Forward Element, through its theater level, enterprise IT management of the Marine Forces component to the U.S. Central Command, provided mission critical reach-back linkage to the Marine Corps Enterprise Network and significantly improved the combat mission effectiveness of Marine Forces in support of Operation Iraqi Freedom.

eTasker System. Developed by NAVSEA Program Executive Officer (PEO) Submarines, eTasker is a Web-based, action item tasking and tracking system. It has already replaced 27 legacy systems and is scheduled to replace 13 additional applications. In part, by adopting eTasker the USS Texas (SSN 775) will be the first submarine in history to be digitally-certified and paperless.

NAVFAC Applications Rationalization and Management. The Naval Facilities

Above the MCNOSC Forward Element with Mr. David Wennergren (front row, fourth from left), Brig. Gen. John Thomas (front row, third from right) and Rear Adm. Robert Reilly (back row, second from left).

Above the JEWLS Team with Brig. Gen. John Thomas (far left), Rear Adm. Robert Reilly (second from left) and Mr. David Wennergren (far right).

Above the NAVFAC Applications Rationalization and Management Team with Mr. David Wennergren (second from right) and Brig. Gen. John Thomas (far right) and Rear Adm. Robert Reilly (fourth from right).

Claudia Linnens and the NAVSEA eTasker Team receiving a DON eGov award from Rear Adm. Robert Reilly.

Engineering Command Team, through establishing standards and applying those standards in a rigorous decision process, reduced its portfolio of applications from over 33,000 to 796 to greatly ease NMCI transition. To date, four other Echelon II commands have applied NAVFAC's methodology for their rationalization and portfolio efforts.

Joint Expeditionary Warfare Logistics System (JEWLS). JEWLS, developed in partnership among the Naval Facilities Expeditionary Logistics Center, the Naval Facilities Engineering Service Center and the DON eBusiness Operations Office, integrates Navy legacy logistics systems with the Marine Corps' Common Logistics Command & Control System in support of the Naval Construction Forces. The end result is improved visibility of personnel, supplies, equipment inventory information and equipment readiness status across the battlespace.

Speed to Capability Approval, Management and Planning Process (SCAMP). The SCAMP Team, composed of representatives from PEO C4I and Space, SPAWAR and the DON eBusiness Operations Office, reengineered an overarching business process that includes standards, guidance and a Web-based supporting toolset. The first set of projects to use the SCAMP process were approved, on average, 41.5 percent more quickly than the existing norm, very close to its goal of reducing the time to field information system upgrades and implementations by 50 percent.

SPAWAR Charleston Completes Largest DoD Web Site Consolidation

By Tonya Lobbestael

The Commander Navy Reserve Force (CNRF) has a new Web site based on Microsoft's Content Management Server (CMS). The site was designed to consolidate over 550 Reserve Web sites scattered across the country. According to Microsoft, it is the largest Department of Defense (DoD) implementation of CMS.

SPAWAR Systems Center Charleston worked together with the Navy Reserve Force to field the new Web site and set out to solve a myriad of problems associated with the existing Web sites.

Can you imagine trying to search 550 individual Web sites for information or the cost of maintaining the hardware, software, security and training required to operate all of these sites? Ask Hank Winter, SPAWAR's System Architect and Program Manager for the new CMS System.

"We not only wanted to save the taxpayer money, we also wanted to make it easy for the Force to get information out onto the Web site easily." The Force now has a consolidated source of information or a "one-stop-shop" and presents a single organizational identity that helps both the public and the Navy Reservist.

With 550 individual Web sites making up the Reserve Force Web Enterprise, it was clear that a cost savings would be realized early on by consolidating security, search, labor, training and equipment. It is estimated that the Navy Reserve Force enjoys an annual cost savings of over $9 million each year by using the new CMS system.

The Navy Reserve Web Site (NRWS) is a two-tiered public and private network that incorporates a public side that is accessible to anyone through the Internet and a private side that is accessible only to members of the Navy Reserve Force via a secure login.

The site has a capacity of supporting 3,000 commands and is currently supporting over 640 commands and 65,000 private subscribers. According to Winter, the site is busy. In the past six months, the site has logged over 640,000,000 page views.

"We are also trying to make it as easy as possible to access the site while maintaining a high security posture. Recently, we have added a Common Access Card (CAC) sign-in where users only have to present their CAC certificate to sign on to the site. The CAC PIN is easier to remember than complex passwords and difficult user IDs," says Winter.

The CMS was designed with each Navy Reserve Center and unit in mind. Each command has content authors and editors that create their own pages and content using common Navy Marine Corps Intranet (NMCI) desktop tools such as Microsoft Word. No programming or HTML skills are required. Users just cut, copy and paste into the online template.

The old way of doing business required that content owners rely on a webmaster to post their information. "There could be a significant bottleneck because users had to rely on a single individual to post the information. Sometimes, the interpretation of this information could be jumbled in the process," says Winter.

The current system has really empowered doctors, aviators and others to manage their content. There are also checks and balances because each command must have an editor who approves a page prior to posting and a command administrator who validates user accounts. Currently there are about 1,200 authors and editors that update pages daily.

Capt. Mark Krause, the chief information officer for the CNRF, spearheaded the consolidation effort and outlined several significant requirements SPAWAR had to meet. First, the project had to be finished within four months, secondly, all 550 sites had to be consolidated.

Initially, Winter felt the task might be overwhelming because his team consists of himself and two contractors. "Having such a small team and a short delivery schedule pushed us to automate as much as possible and caused our thought processes to be more creative to save both labor and time. SSC Charleston initially had to architect the equipment, modify and develop software, and test and evaluate the NRWS to field it in such a short time frame," says Winter.

According to Winter, there were two keys to the successful launch of the site. Both contractors on the team, Luis Vega and Richard Floyd of CSSI Inc., are Microsoft Certified Application Developers and are trained to meet the development challenges that lay ahead. The other key was bringing Microsoft in as a consultant at the beginning of the project to assist with implementation of the CMS.

A major upgrade that included hardware and software upgrades, security enhancements and significant design changes was completed in May 2004. The site is hosted on a fault-tolerant server farm comprised of 18 servers and a Google Search Appliance.

The system now uses Microsoft's .NET Framework which allows future building of applications that can be tied into the CMS system. The Reserves also established a centralized help desk that is operated by reservists. SSC Charleston provides technical support. Future plans include moving the entire system to the NMCI within the next several years and to transfer responsibility for NRWS to the CNRF Web Services Team.

Ms. Lobbestal is the former editor of the SPAWAR Charleston Chronicle. Hank Winter is the SPAWAR System Architect and Program Manager for the CMS System. CHIPS

TRANSFORMATIONAL COMMUNICATIONS

By the DON CIO Spectrum/Telecommunications Team

It is unlikely that more than a few *CHIPS* readers who use the Internet at home would tolerate yesteryear's slow speed modems if faster alternatives existed. For many businesses, using the Internet to research information, exchange technical details, transmit e-mail, and even chat globally with colleagues using Voice over Internet Protocol (VoIP) are both routine tasks and competitive necessities. Consequently, the growth of digital subscriber lines (DSL), cable loops, wireless fidelity (WiFi) hot spots and satellite Internet service to provide expanded, faster information exchange to businesses, schools and homes is explosive.

Likewise, the warfighters' demand for robust communication and near-real time transfer of data and video between battlefields creates a need for unencumbered and expanded tactical bandwidth. Laboratories, industry and academia are responding with capable solutions that will enable net-centric warfare and the Global Information Grid (GIG).

Emerging electromagnetic spectrum technology will employ greater efficiencies, thereby reducing the bandwidth required for advanced communications. Figure 1 shows a summary of bandwidth used in major military operations since 1991.

The dilemma of bandwidth availability was posed to the Defense Science Board, Department of Defense (DoD) agencies, and after Sept. 11, 2001, to non-DoD federal agencies for resolution. One interoperable solution termed "Transformational Communications" was proposed. Simply stated, it is a concept aimed to create a communications network for the intelligence agencies, space agencies and military services based on a single architecture.

A Transformational Communications Office (TCO) was established in 2002 to "coordinate, synchronize and direct implementation of a Transformational Communications Architecture." A study by the TCO led to development of the Transformational Communications Architecture (TCA), version 1.0, in October 2003. The TCA defines a long-term view for transition, emphasizing Internet Protocol (IP) driven interoperability as the enabler for new communication solutions. TCA seeks to assure information dominance through improved, shared battlefield awareness; robustly networked GIG elements; time-critical targeting; and enhanced regulatory and spectrum coordination.

The TCA documents the next generation communications capability for a global end-to-end, seamless system as a part of the GIG. This communication concept aims to leverage a combination of optical and radio frequency (RF) technologies. Based on various open standards, it will connect people and systems with high reliability, redundancy and responsiveness.

The foundations of the architecture are the Joint Tactical Radio System (JTRS) and the Transformational Communications System Military Satellite Communications (MILSATCOM). This Internet-like transport architecture between space, air, ground and sea nodes will culminate in a flexible enterprise warfighting environment.

The TCA is comprised of four segments of merged DoD, Intelligence Community (IC) and NASA infrastructure. The terrestrial infrastructure segment, network and management segment and terminal segment are composed mainly of earth-bound assets. The fourth is the space segment where assets of NASA, DoD and the IC will interoperate.

The terrestrial infrastructure segment plans interfaces to NASA and national special purpose networks, other DoD networks and teleports, and even commercial systems. It will utilize RF communication ground stations for satellite uplink and downlink. Gateway terminals will receive high capacity downlinks from relay and DoD-protected satellites. Within the United States, these gateways connect via standard optical interface and fiber to the GIG, NASA's Information Systems Network and other associated terrestrial high-speed networks. Teleports will connect MILSATCOM satellites not otherwise connected by cross-links. These teleports will also be connected via a standard optical interface and fiber to the GIG-Bandwidth Expansion (BE).

The network operations and management segment is the portion of the TCA that connects some of the ground networks of DoD, IC and NASA. It supports peering across these separately procured enclave systems so that resource sharing and fault tolerance can be supported. Network operations and management will provide the monitoring and control of gateway terminals, teleports and communications payloads that are working as network resources.

The terminal segment is composed of end users, ground stations, and space and airborne intelligence, surveillance and reconnaissance (ISR) terminals. It will perform the RF handling, waveform communications processing, and network and security protocols associated with MILSATCOM services. Standardized interfaces will become the entry point for applications and equipment to attach to the TCA. This segment will consist of a combination of legacy, programmed and proposed replacement terminals.

Emerging electromagnetic spectrum technology will employ greater efficiencies, thereby reducing the bandwidth required for advanced communications.

The space segment will be the subject of a future article. However, for quick reference this area integrates assets of TCA SATCOM for mobile/tactical users and global intelligence via optical cross links and extremely high-frequency RF links. The space segment will extend the GIG to users without fiber connection providing improved connectivity and data transfer capability resulting in a revolutionary change in satellite communications for the warfighter.

Military services are moving toward multi-band and smaller aperture terminals to help integrate satellite communication into weapons platforms with little impact on the overall structure. The space segment will extend the GIG to users without fiber connections, providing improved connectivity and data transfer capability, resulting in a revolutionary change in satellite communications for the warfighter.

In order to ensure TCA component interoperability with the GIG Integrated Architecture, this effort and its sub-elements will participate in GIG end-to-end test bed and systems engineering activities. Elements of the net-centric GIG with which TCA will be interoperable include, but are not limited to, Information Assurance, Network Operations and Information Dissemination Management.

The insatiable demand for battlefield bandwidth has no apparent cessation. In its current configuration, a single Global Hawk UAV requires 500Mbps bandwidth — which equates to 500 percent of the total bandwidth of the entire U.S. military used during the 1991 Gulf War. In summary, the advantages presented by the Transformational Communications Architecture include:

Improved Interoperability – TCA allows a much greater number of users to freely and quickly interact with the full implementation of IP on DoD platforms. TCA transport interoperability features can enable future IC, NASA and DoD information sharing and collaboration, within the information architecture level.

High Protected Data Rates – In the pre-TCA environment, many users with requirements for protected services received service that did not offer protection. TCA provides levels of anti-jamming protection to more and smaller units at higher data rates. New nulling multibeam antennas will allow users to operate geographically closer to sources of jamming. A one-foot antenna is projected with the capability to transmit at least 12 Mbps and receive at least 1 Mbps of protected data. This reduction in user terminal antenna size provides a new "communications on the move" capability for more agile and lethal forces.

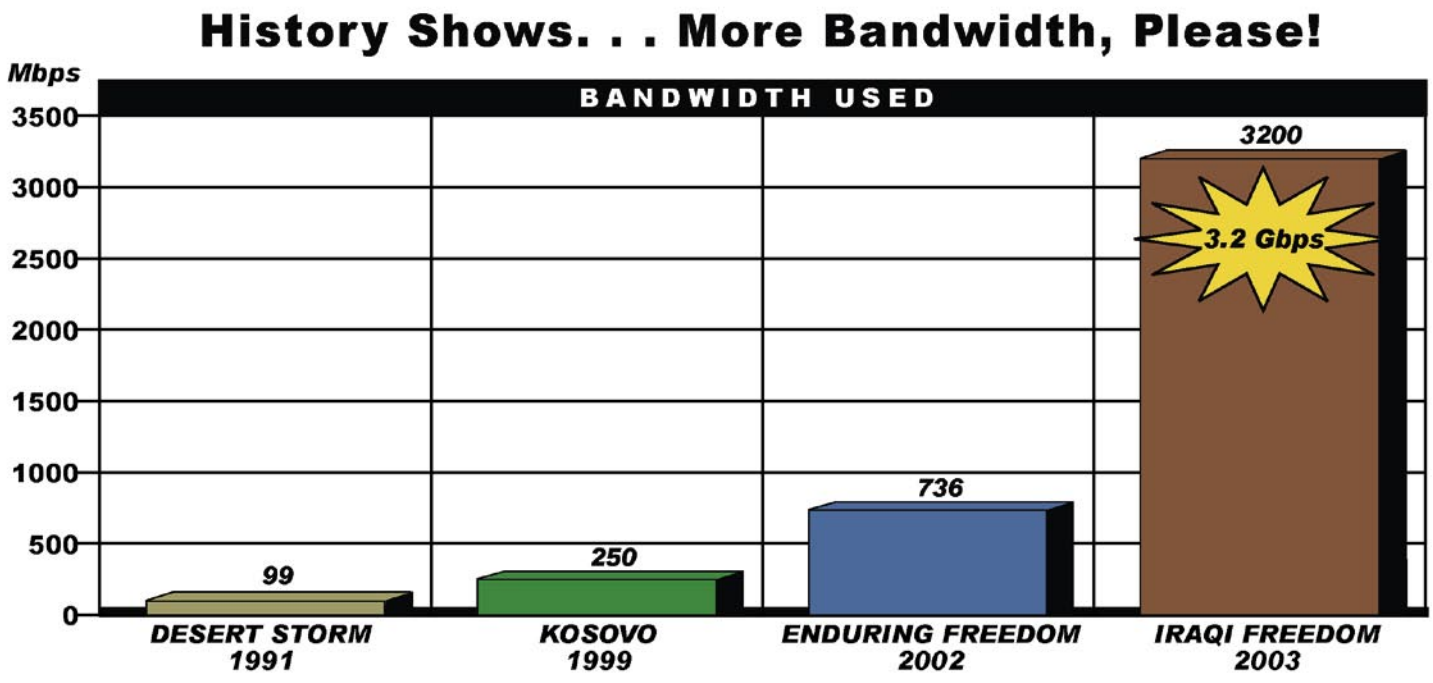
Quicker Data Access – Under TCA, the space and terrestrial network for DoD users will employ common IP network protocols. Data access, applications, and development tools will enhance the information architecture, which rides on the TCA transport architecture.

Larger Numbers of User Terminals – A single architecture deploying fully software programmable terminals will reduce costs for DoD users. It is expected that terminals will be more cost effective, enabling communications with lower echelons of warfighters.

Persistent ISR – Both space-borne and airborne ISR for the DoD and IC can be operated in a continuous mode because TCA resources will have more capacity and access to transfer data from these platforms to analysis centers.

For more information, contact the DONCIO Spectrum/Telecommunications Team at DONSPECTRUMTEAM@ navy.mil. CHIPS

Figure 1.



MWRNet Supporting Deployed Servicemembers

By Jim Condon and Jim Scott

The first generation of the Operation Iraqi Freedom (OIF) MWRNet Program was executed in September 2003 when the Combined Joint Task Force – 7 (CJTF-7) Commander approached the Space and Naval Warfare Systems Center Charleston's European Office (SPAWAR Europe), in search of engineering, installation and program management of a large Internet Protocol (IP) voice and data satellite network. The network was to be used for Morale, Welfare and Recreation (MWR) by servicemembers deployed to Iraq in support of Operation Iraqi Freedom (OIF). At that time, no one knew how critical an asset this network would become.

Servicemembers and civilian contractors using the MWRNet at one of the 180 Internet Cafes in the Iraqi theater of operations.

Today, the SPAWAR MWRNet program supports 140,000 deployed forces from all Services supporting operations in Iraq, Kuwait and soon in Afghanistan. Each Soldier, Sailor, Airman and Marine deployed in the Iraqi theater may also wear the titles of mother, father, son, daughter, brother, sister, friend, student, business professional, etc., which reflect other responsibilities in addition to military service.

The MWRNet program provides facilities for servicemembers to access the Internet, send and receive e-mail, download content, access educational resources and make low-cost telephone calls around the globe. SPAWAR Europe delivers the speed-to-capability that the deployed Joint Warfighter demands. Our reputation has become the hallmark of SPAWAR operations in Europe and worldwide.

Over the last year, SPAWAR Europe thoroughly analyzed the program and designed the OIF Generation-II MWRNet to provide increased bandwidth, better network throughput, decreased latency, expanded user services and improved operations and maintenance. While much of the Gen-II network is not revolutionary in nature, the end result is an improved user experience at the nearly 180 nodes in the network. Perhaps one of the best results comes in the form of a significant reduction on the financial burden of the senior Department of Defense (DoD) command in Iraq, the Multinational Forces Iraq (MNF-I) and the increased benefits to the individual servicemember.

The Gen-II network provides double the bandwidth of the Gen-I network at a savings of several million dollars to the government. Deployed servicemembers, who average 14 million minutes of calling on the network per month, benefit from a 15 percent reduction in per-minute calling charges. That equates to an estimated $1.2 million in annual savings to servicemembers to stay in contact with the outside world.

The OIF MWRNet represents a new way of maintaining the weapons systems known as Soldiers, Sailors, Airmen and Marines, as well as the civilians who work beside them daily in hostile environments.

Our work in OIF is a breakthrough in operations in terms of providing technology to deployed forces in a way that sets the standard for operations of the future. MNF-I leadership recognizes the importance and value of taking care of the personal lives of its warriors and continues to invest in the tools to reduce the stress of servicemembers serving so far from home.

SPAWAR Europe is proud to be a vital part of such an important program supporting the Global War on Terror, and we will continue to upgrade the technologies involved while reducing costs to both the government and the servicemembers who benefit from the program.

Installation of a ruggedized antenna for the MWRNet upgrade.

SPAWAR Europe
Knowledge in Action
https://www.eur.spawar.navy.mil
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Jim Condon is the SPAWAR Europe Senior Manager. Jim Scott is the SPAWAR Europe Chief Engineer.

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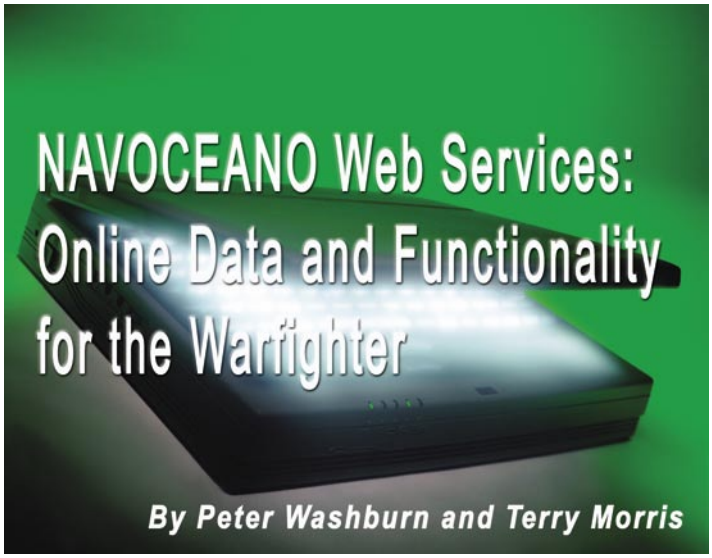

We maximize America's Sea Power by applying relevant oceanographic knowledge across the full spectrum of warfare.

Naval Oceanographic Office
Mission Statement

For more than 170 years, NAVOCEANO has provided tactical environmental information and services to the U.S. Navy. By providing documentation, analysis, databases and data processing, NAVOCEANO serves the mission of the warfighter. A key to this success has been our ability to adapt to meet the dynamic needs of the warfighter.

The Department of Defense (DoD) is currently undergoing a transformation to a new Net-Centric architecture that takes advantage of Web-based technologies in order to maintain warfighters' information superiority on the changing battle spaces of today's world. The key objectives of the DoD Net-Centric strategy are (1) ensuring that tactical data are visible, available and usable to accelerate decision making; (2) tagging all data with metadata (data about data) to facilitate data discovery by users; (3) posting all data to shared spaces to provide access to all users except when limited by security, policy or regulations; and (4) advancing the DoD interoperability from point-to-point interfaces to enable many-to-many data exchanges.

A major contributor to the DoD's ability to more rapidly plan and execute operations is the increasing use of Information Management and Information Technology (IM/IT). Environmental databases and environmental prediction systems must be easily accessible to our customers through state-of-the-art IM/IT systems. To meet this challenge, NAVOCEANO has endeavored to become fully integrated in the Navy Marine Corps Portal (NMCP), FORCENet and a full participant in Net-Centric Warfare. Web services are crucial to the effective transfer of tactical data and increased system functionality.

NAVOCEANO's Strategic Plan includes objectives such as: (1) developing methods of employing NAVOCEANO assets to impact operational time scales; and (2) assuring responsiveness and impact to operational needs. Migration to Web services is one way to achieve these objectives, making the vast amount of data, information, and oceanographic knowledge at NAVOCEANO visible in the Net-Centric Warfare arena.

What is a Web service?

A Web service, according to the World Wide Web Consortium, is a software system designed to support interoperable machine-to-machine interaction over a network. It has an interface described in a machine-processable format called WSDL or Web Service Definition Language. Other systems interact with the Web service in a manner prescribed by its description using Simple Object Access Protocol or SOAP messages, typically conveyed using HTTP with an XML serialization in conjunction with other Web-related standards. A Web service allows the free exchange of data and functionality between Web-based applications, thereby providing data and support to users. The result is faster delivery of accurate, more consistent information for the user.

The NAVOCEANO Web Services Working Group (NWSWG) was established in 2003 to begin the transformation process to Net-Centric Warfare. The NWSWG is chartered to develop Web services for NAVOCEANO environmental models, databases and software applications. The NWSWG provides a focal point for NAVOCEANO's efforts to develop robust Web Services in support of Net-Centric Warfare. When these Web services are fully established, NAVOCEANO will be able to provide relevant data and analysis to the warfighter, allowing the warfighter to exploit environmental advantages or mitigate environmental problems, thus bringing power to the edge.

The heart of NAVOCEANO Web Services is the Joint Meteorology and Oceanography (METOC) Data Services Framework (JMDSF).

The heart of NAVOCEANO Web Services is the Joint Meteorology and Oceanography (METOC) Data Services Framework (JMDSF). Early in the development of Web Services, NAVOCEANO realized the need for a framework that would unify all the services. This framework would allow one service to call or interact with another service, which meant there had to be a way to share data in a consistent manner. In order to provide robust support, this framework is based on the Joint METOC Broker Language (JMBL), which is based upon the Joint METOC Conceptual Data Model (JMCDM).

The JMDSF is a robust toolkit for deploying data-oriented services (DOS) to securely deliver geospatial information consistent with the JMBL specification. These enterprise services facilitate deployment of data-oriented services to computers linked together by a proxy server. The framework provides services for analyzing JMBL requests, determining the best data-oriented services for answering them, passing requests to data-oriented services, collecting responses with return values, and returning the results to the requester. The JMDSF will be the key to establishing a single access point for all METOC data.

The Joint METOC Interoperability Board (JMIB), chartered by the Navy and Air Force, was tasked with addressing interoperability issues.

Why JMBL?

Joint military operations often reveal a lack of interoperability between Navy and U.S. Air Force METOC systems. The JMCDM, a logical data model, was created in 1995 to integrate the geophysical data requirements of all DoD components. The JMCDM and its supporting encyclopedia are a subset of the DoD Enterprise Data Model. The Joint METOC Interoperability Board (JMIB), chartered by the Navy and Air Force, was tasked with addressing interoperability issues. The Data Standards Working Group, chartered by JMIB, established the JMBL. The JMBL schema provides an XML representation of the JMCDM and establishes a single interface for requesting and retrieving METOC data.

NAVOCEANO is establishing a data service layer, a business logic layer, a tool set layer, and an application/User Facing Service layer that use the JMDSF as the backbone to tie them all together. All development is J2EE compliant and uses the standard Web services protocols such as XML, SOAP, etc. This simplifies the integration and deployment of new services and applications.

The primary objective is to meet the needs of the warfighter. Getting relevant information to the warfighter within the time constraints of the decision cycle is critical. Current data systems may require a warfighter to visit two or three different sites to get three or four different sets of information that still need to be processed to get the final answer. Processing may be complicated if the data sets are all in different or incompatible formats, as is too often the case.

Each data set has its own interface that the warfighter needs to learn and understand how to use. The warfighter must know in advance where the information resides. Any new information or tools that may have become available after the predeployment training took place are effectively not available. These issues are by themselves difficult to resolve, but when they are all piled together, the proverbial needle in the haystack scenario comes to mind.

How does the JMDSF help solve these issues?

The JMDSF provides the warfighter with a single interface that can access all METOC data and information. This JMDSF is responsible for recording where the actual authoritative data resides, relieving the warfighter of this concern. Because the JMDSF is built upon the JMBL standard, which is also being adopted by the Air Force, it can access all METOC data. This single interface also simplifies training the warfighter (one interface to all the data and information).

Information is returned in a single standard JMBL-formatted response. The data can be sent directly to the requester in several different formats (using transformation services), not just the native format of the database, or the requester can view and overlay multiple data sets (using mapping and plotting services). This approach greatly reduces formatting issues that occur when trying to manipulate multiple data sets. The warfighter requires only a Web browser to access data from Web Services. No additional software or plug-ins are required. All METOC data and services integrated into the framework can now be accessed from anywhere — power to the edge.

The same standards within the JMDSF that benefit the warfighter help make the software developer's task easier. The JMDSF provides a robust toolkit with application program interfaces (APIs) that allow Tactical Decision Aid (TDA) developers to tie into multiple data sets using the same standard JMBL request and response structures. The TDA developer can send a single request to a single interface to get multiple data sets that may reside in several different places, using Web services standard protocols. Again, the Web services response always employs the same standard JMBL structure. This procedure greatly reduces the development time for integrating new data sets.

Having Web services integrated into the JMDSF allows developers to reuse different Web services instead of having to write a new application each time.

Having Web services integrated into the JMDSF allows developers to reuse different Web services instead of having to write a new application each time. The theory of software developers employing a common environment for reusing program code has not been embraced by many, as industry had anticipated. Software developers have not been comfortable with this scenario. The difference is that reusing a Web service does not equate to having to place lines of someone else's code into an application and hoping it will work. The service being reused has already been tested and is operational in the environment the developer needs. The comfort level of using a Web service that has already been proven to work is much greater.

As a case in point, NAVOCEANO has integrated a new map service into a legacy application. This same map service is also being integrated into several other Web services currently in development. This has dramatically reduced development time for new Web services, as well as allowed NAVOCEANO to tie in some legacy applications. In the past, data providers have had to focus on several issues, such as data collection, quality control, data storage management and a means for the end user to retrieve data.

The retrieval method could be as simple as a File Transfer Protocol (FTP) push or as intricate as a Graphical User Interface (GUI). Data providers were responsible for end-to-end delivery of their data. Of course, different customers wanted data in different formats and resolutions, depending on their needs. Data providers had to store data in many different formats and sometimes provided several different GUIs for different customers.

The JMDSF provides tools to help data providers integrate their data sets into the framework. For some data formats, the API

is already written, and only some configuration settings are required to integrate the data set into the framework. In other cases, the provider may need to prepare a data extractor, which can be tied into the framework as a data handler. Once the data handler is integrated into the JMDSF, it inherits the interoperability of JMBL.

Also, there is a built-in delivery mechanism that will allow an end end user to acquire data using Web services. The data provider does not have to know anything about Web services to receive this benefit.

Other services and software applications can be called to display, transform, plot and even overlay the data. The data provider need only be concerned with maintaining the data in one format and keeping it as current and up-to-date as possible. They can focus on what they do best and allow the framework to provide customer support services.

NAVOCEANO Web Services will be comprised of the following-Application Services:

- Catalog Services
- Data Transformation Services
- Data-Oriented Services (DOS)
- Joint Meteorology and Oceanography (METOC) Data Services Framework (JMDSF) Map Services
- Model/Algorithm Services
- Plotting Services
- Request For Product (RFP) Services
- Security Services

A single Web application may access several Web services after being accessed by the user.

Application services will be comprised of Web applications and utilities from the Geophysics Fleet Mission Program Library (GFMPL). Already completed and online are METOC Product and Services Catalog; Solar/Lunar Almanac Predictions (SLAP); Surf Forecasting (SURF); Tidal Predictions (TIDES); Wind Conversion; Pressure Altitude/Density Altitude (PADA), Pilot Balloon (PIBAL); Temperature Utility (TEMP UTIL); and Unit Conversion. Services for the Navy's Oceanographic and Atmospheric Master Library (OAML) and various modeling/forecasting data assets are available now.

A number of enhancements are planned for NAVOCEANO Web Services, which include ingest capabilities for near-real-time acoustic data in support of Anti-Submarine Warfare (ASW) and Mine Warfare (MIW). A new METOC Product and Services Catalog is in development that will provide discovery, visualization and acquisition of all METOC products and services integrated in the JMDSF. The Global Ocean Data Environmental Support Service (GODESS) and a data archiving service will also be provided.

What does the future hold?

NAVOCEANO is currently working with the Air Force Weather Agency, Fleet Numerical Meteorology and Oceanography Center, and the Space and Naval Warfare Systems Command to establish an integrated solution for all METOC data. The end result will transform all METOC applications and information into Net-Centric capabilities.

NAVOCEANO is currently working with the Air Force Weather Agency, Fleet Numerical Meteorology and Oceanography Center, and the Space and Naval Warfare Systems Command to establish an integrated solution for all METOC data. The end result will transform all METOC applications and information into Net-Centric capabilities.

In the future, architectures will change from request/response to event driven. Messaging systems will become smart enough to send messages to different Web services based on content. As data directly affecting the battle space changes, Tactical Decision Aids and other decision aids will be updated automatically. There are already indications of this occurring in industry with the arrival of the Enterprise Service Bus and the Event Driven Architectures.

In order for the Navy to benefit from these emerging technologies, a firm foundation must be laid. Adoption of Web services, a common data exchange format, and an adaptable framework to support these technologies provides such a foundation. The result will be integration of environmental data into on-scene decision aids, within the bounds of the tactical decision cycle. The warfighter will get the answer, when and where it is needed.

Peter Washburn and Terry Morris work in the Naval Oceanographic Office Systems Integration Division.

CHIPS

Navy/Marine Cash- Next Generation ATMs-at-Sea

By Cathy Partusch, NAVSUP Corporate Communications Director

Naval Supply Systems Command (NAVSUP), Navy Family Support, in partnership with the Financial Management Service (FMS), a bureau of the Department of the Treasury, announces the roll out of the Navy/Marine Cash™ financial system on 160 Navy ships through FY 2008.

Beginning in April 2001, as an evolution of NAVSUP's ATMs-at-Sea program, the Navy/Marine Cash initiative began on the USS Rentz (FFG 46), followed later that fall on the USS Bonhomme Richard (LHD 6). Navy/Marine Cash was a highly successful pilot program deployed on eight U.S. Navy ships from 2001 to 2003. The new financial cash management system allows afloat Sailors and Marines to conduct personal banking and purchasing electronically while deployed.

The system consists of an electronic purse on a commercial debit card, which uses both stored-value chip and magnetic strip technology. Navy/Marine Cash reduces the need for cash on board ship. Personnel can use the cards in the Ship's Store, Post Office, vending machines and for Morale, Welfare and Recreation (MWR).

Using a commercial PIN-protected debit card, Navy/Marine Cash provides 24/7 access to pay and allowances on and off the ship. Afloat personnel are able to receive electronic pay, access home bank and credit union accounts, transfer and withdraw funds, and make purchases, both on ship and ashore via satellite capability. A summary of security features includes:

√ Navy/Marine Cash magnetic strip and e-purse are protected by an encrypted PIN.

√ When reported lost or stolen, cards are placed on a "hot list" throughout the financial network within 24 hours and are electronically blocked at the server level.

√ The maximum dollar amount that can be placed on the chip is $1,000.

√ The maximum amount that can be transferred from your home to your Navy/Marine Cash account each day is $400.

√ Entering a PIN incorrectly three times blocks the card, only the Disbursing Office can unblock.

√ Cardholders can check balances online.

√ Customer Service Center with hotline numbers for cardholders, Disbursing Office, Ship's Store, etc.

On board ship, cashless ATMs are used to verify card funds, transfer funds to and from the Navy/Marine Cash card chip and magnetic strip and authenticate PINs. Purchases are made using point of sale devices and vending machine card readers that access the card's chip.

Once ashore, funds can be accessed by the magnetic strip to withdraw funds from over 900,000 automatic teller machines (ATMs) worldwide to make purchases from more than 32 million merchants.

In 2004, 31 additional ships, have had the Navy/Marine Cash system installed. To date, a total of 40 ships have successfully implemented the new cashless system. More than 28,652 active Navy/Marine Cash cards are currently issued with $105,578,471 million processed since the program's inception with over 11 million transactions passing through the system in the form of transfers, vending and store purchases and ATM withdrawals.

Navy/Marine Cash is one of the key initiatives of NAVSUP's Afloat Supply Department of the Future. The system provides the convenience and ease of living cash-free to Navy, Marine and other assigned personnel aboard ship. It also frees shipboard disbursing and retail offices from labor-intensive payment and reporting processes.

Additional program stakeholders include the Marine Corps, Defense Financial Accounting Service (DFAS), and JP Morgan Chase, a financial agent, appointed by the Department of the Treasury for Navy/Marine Cash.

This is a rewarding and challenging private/public venture which provides our afloat supply operation with a robust financial cash management system," said Barbara C. Straw, director of NAVSUP's Disbursing Division.

"The system delivers greater efficiencies, promotes flexibility and interoperability between both DoD and other government agencies, and most importantly, improves the quality of life of our Sailors and Marines," said Straw. CHIPS

Sailors using the Navy/Marine Cash financial system on board ship.

SPAWAR Charleston's Tidewater Node of the FORCEnet Composeable Environment

By Sandy Mieczkowski

The Space and Naval Warfare Systems Center Charleston has designed a Tidewater Node of the FORCEnet Composeable Environment (FnCE) strategically located on the Norfolk Naval Base. The facility is close to major commands, such as the Combined Fleet Forces Command, Naval Network Warfare Command, Fleet Information Warfare Command, U.S. Joint Forces Command, Allied Command Atlantic and numerous fleet support commands.

The Tidewater FnCE Node is a state-of-the-art multifunctional, multimedia advanced collaborative engineering environment center that fully supports the FORCEnet concept of operations and SPAWAR's implementation objectives. The facility acts as a FORCEnet portal networked with the entire SPAWAR claimancy. It also provides collaborative connectivity with all SPAWAR enterprise labs.

SPAWAR's mission for this environment is to expedite the efficient exchange of information (voice, video and data) with flag officers, key developers and fleet customers so the Navy can capitalize on information superiority to generate transformational combat effectiveness to the warfighter. SPAWAR is helping the Navy communicate and share critical information through exercise planning, mission planning, monitoring, simulations and advanced concept technology demonstrations (ACTDs). Typical projects suited for the facility include:

- FORCEnet requirements analysis, demonstrations and briefings
- Exercise planning, monitoring and simulation
- ACTDs
- Flag-level technical collaboration and planning
- Human Systems Integration (HSI) testing and demonstrations
- Mission planning and rehearsals

The FnCE has held three successful conferences and a host of other briefings/demonstrations since its completion in October 2004. The initial conferences held in November 2004 included the SPAWAR Knowledge Management/Knowledge Discovery (KM/KD) Conference and the Trident Warrior 05 (TW05) Objectives Development Workshop.

The SPAWAR KM/KD Conference incorporated a diverse assembly of local, state and federal government representatives, academia and industry subject matter experts from the local area and throughout the United States. State Senators Nick Rerras (R-VA) and Yvonne B. Miller (D-VA) were honored guests at this event. Mr. Ron Lowder of the SPAWAR Tidewater Account Management Office spearheaded the conference and will continue a series of KM/KD conferences to be held in the Tidewater FnCE Node.

The TW05 Objectives Development Workshop was the first major TW05 planning event to utilize SPAWAR's FnCE Node capabilities. TW05 is the third major FORCEnet Sea Trial experiment in NETWARCOM's Trident Warrior series, which is the Navy's annual FORCEnet Sea Trial event. The second TW05 event hosted in the FnCE Node was the Initial Planning Conference held in December 2004. It has been the largest conference held to date with nearly 200 attendees, and it was the first to take advantage of the FnCE's cutting-edge command and control capabilities.

The Tidewater FnCE Node will continue to be the vital TW05 planning environment throughout 2005. Future TW05 planning events will include a mid-planning conference in May. TW05 will utilize the FnCE node in a distributed technology test in July, and again in August, when it will be a significant part of a cognitive wargame. The FnCE Node will be the location of the final TW05 planning conference in October and will provide exercise control during TW05 execution in December 2005. The FnCE Node has proven to be a perfect match for FORCEnet planning and development.

Tidewater FnCE Node features include:

- 5,500 square feet of a state-of-the-art, collaborative environment
- Seating capacity for more than 150
- A 2x6 cube Barco Display Wall able to display hundreds of images from various sources simultaneously
- PRI connectivity for multiple video teleconferences (VTCs)
- NIPRNET connectivity
- Extensive cabling infrastructure for ease of reconfigurability
- Mobile equipment cabinets
- Audio-video broadcast network streaming capability
- Four 61-inch plasma screens with simulated display capabilities
- Video overlay Smart Boards for each of the plasma screens
- Extensive audio/video switching and distribution network
- High-quality sound reinforcement and distribution
- Real-time webcasting for demonstrations and presentations
- DREN connectivity
- T-3 data connectivity
- Attention to Advanced Human Factors:
  - Articulating table, high-performance lighting, 24-hour chairs

Within the next six months we will be adding modular security barriers to maximize the reconfigurability of the facility to accommodate concurrent events. SIPRNET and enhanced video collaboration capability will also be added further enhancing the technological features of the SPAWAR Tidewater FnCE Node.

Mr. Rick Paquin is the project manager for the SPAWAR Tidewater FnCE Node. Paquin is also the FORCEnet Engineering and Technology Support Branch Head for SPAWAR Charleston. Sandy Mieczkowski is the deputy project manager for the SPAWAR Tidewater FnCE Node.

CHIPS

The Lazy Person's Guide to Telecommunications Management

By Retired Air Force Major Dale J. Long

It's winter, and amid the bright, snow-covered landscape surrounding my home in Vermont, this young man's fancy turns to thoughts of what we pay just to keep the lights on, the phone working and enough heat inside the house to keep ice off the inside of our living room windows.…

Because telecommunications management has recently become a hot issue, this article will address various aspects of managing enterprise voice telecommunications services. It will focus on managing traditional phone services: dial tone, long distance and voice mail.

Mission Needs

Managing telephone systems is not the primary mission of most government agencies. We provide phones to our employees as a means of communication. Theoretically we acquire, own, lease, administer and maintain these systems because it is either more economical, efficient or secure than having someone else do it for us. We may get certain bundled services, like long-haul communication circuits or long-distance service though the Defense Information Systems Agency (DISA) or Government Services Administration (GSA), but we can set up and manage our own private branch exchanges (PBXs) and other telephone infrastructure within our own facilities.

The two main capabilities that constitute basic voice telephone service are local and long-distance calling. I mention them separately because, for management purposes, they represent different cost centers in our telecommunication accounts. Local phone service is generally provided by a commercial local exchange carrier (LEC) or a government agency acting as a LEC, like GSA. Long distance service is provided to most government agencies by commercial carriers through the GSA Federal Technology Services (FTS) program.

Traditionally, local service costs have been more predictable. The local phone company gives you a certain number of lines at a consistent cost. Long-distance services vary depending on the amount of use. However, LECs in many states now appear to be transitioning to a fee structure based on message units. They lower the cost per line, but then add in usage charges. Having your monthly cost per line go from $20 a month to $8 a month plus message unit charges may sound good but since phone companies are in the business of making money, I'm willing to bet that the total message unit charges they get will make up the difference.

The trick to reducing costs in this new environment is to know at least as much about your calling habits as the phone company. There are call detail reporting applications that can help with this, but to take advantage of them you need to scale them across the entire organization.

Other Services

The most common service most people are familiar with beyond basic dial tone is voice mail. Voice mail may be provided either as part of the contracted service provided by the LEC or by leased or purchased equipment installed in your facilities.

More advanced telephony services may include: (1) Automatic Call Distributor (ACD) systems that route calls in an office based on pre-programmed options; (2) Call Detail Reporting (CDR) systems that monitor and report on system use; (3) Interactive Voice Recognition (IVR) auto-attendant systems capable of responding to voice input; (4) Call recording systems; (5) Directory systems that allow callers to navigate through and find specific people or offices; (6) Group paging systems that allow mass notification of office personnel through the phones; and (7) Configuring phones to act as intercom systems.

Providing advanced services requires installation of a PBX and related equipment. This costs money. In fact, every service I have listed adds in some way to the cost of providing phone service. But before we get into a discussion of cost management, there is one more concept to cover.

Service Levels

The main drivers for the overall cost of any system are the expectations of its users. When people look for a car, they have a good idea of what performance, comfort or safety levels they are looking for. All of my customers have very definite ideas of what they expect from their phones, and most of them are fairly similar. The want local and long-distance calling, voice mail and a predictable cost each month so they know how much to budget for the fiscal year. There are some people with higher expectations who want or need more advanced features, but the three I've listed are the standards of telephone service.

From a management standpoint I find it useful to describe service levels in terms of maturity that describe both functionality the customer will notice and capabilities that help us manage systems. A change in service level is usually based on one of two factors: functionality or control. The first is a customer perception; the second reflects our ability to manage the system. With that in mind, here are my six service levels for voice telephony:

Given a choice between evolutionary or revolutionary change, I tend toward evolution. That does not mean we have to wait 10 years before we move to VoIP. I prefer to change things one variable at a time instead of all at once.

Level 1: Basic Dial Tone. Users can make and receive calls. Service may be provided by commercial analog lines or via centrex (central office exchange service, provided by a switch managed at the provider's central office). This level may include voice mail but only on an individual line basis.

Level 2: Customizable Service. This level of service may include voice mail, ACD or other advanced services provided by a PBX.

Level 3: Standardized Systems. The difference between Level 2 and Level 3 is in the architecture used to provide the service. At this level, at least 80 percent of service is provided by installed equipment that conforms to an enterprise standard for make, model and system configuration. Software installed on individual switches should be standardized at this level to reduce training requirements for operating and maintaining systems.

Level 4: PBX with IP-based Management. In addition to advanced user services, this level includes the ability to audit and manage digital PBXs that are connected via Internet Protocol via the organizational intranet. This is the first level at which telephone services can be considered as part of the enterprise IT architecture. Voice calls at this level are still processed within the systems as circuit-switched calls, not Voice over Internet Protocol (VoIP).

IP connectivity is only used to audit, inventory and administer attached PBXs. PBX software installed on all IP capable switches should be consistent across the networked PBXs to facilitate remote maintenance and administration of the nationwide switch infrastructure. Particular care should be taken to ensure that the PBX and its attendant devices do not introduce any security vulnerabilities into the data network. This level may also include connecting digital PBXs via IP trunk lines. This is an intermediate step that could be part of a migration strategy to Level 5.

Level 5: Voice over IP. Telephone service at this level will be via packet-switched transport provided by local/metropolitan area networks and the organizational intranet. Telephone sets will each have a unique IP address in the same manner as desktop personal computers (PCs) and will be connected to the network either through a desktop system or directly via Ethernet. VoIP systems should be based on open standards that allow the connection of any telephone set compatible with International Telecommunication Union standard H.323.

Individual system implementations at this level will use packet-switched local or metropolitan area networks. When these systems are connected via the ICE (Information and Content Exchange) wide-area network, users may log in to any telephone on the VoIP network and receive calls directed to their primary work number. VoIP systems will still route calls outside of organizational networks via traditional telecommunications carriers.

Level 6: Complete Service Portability. At this level, users have one phone number that follows them wherever they go through the use of a portable IP telephone (or computer-based software phone). These devices will be capable of interfacing with personal computers (via Bluetooth or similar technology), wireless Ethernet networks and commercial cellular phone networks. Calls placed to a user's phone number will be delivered to the user via the network when within range or by commercial cellular network if not.

The hard part about service levels is once you reach Level 2, the vast majority of your users are satisfied. If they have dial tone, long-distance dialing and voice mail, they probably have everything they want. The average user will not see much difference between Level 2 and Level 4 and may actually find their initial experiences more frustrating at Levels 5 and 6. However, the intermediate levels are important if your goal is to develop some idea of what the cost is to provide phone service to your organization, particularly if you want to track how people use the system.

One of the great debates in telecommunications today is how to get to Level 5 (VoIP). The choice is between evolution and revolution. One faction, led by traditional PBX vendors, recommends gradually migrating from traditional PBXs to VoIP over a period of years by gradually introducing IP management, IP trunking and network upgrades. Their rationale is that your current systems are already providing a sufficient level of service, so there is no need to make hasty changes that might negatively affect your users. On the other side, network technology companies are telling us to just rip out our old systems and completely replace them with VoIP gear immediately.

Granted, neither side in the debate is completely without vested interest. Traditional PBX manufacturers make a lot of money supporting their installed base. For the direct-to-VoIP camp, installing VoIP as a wholesale replacement usually means also investing in a significant upgrade to your network. There are billions of dollars at stake for both sides, so they will naturally state their positions as strongly as possible. That simply makes it even more important for us to examine their claim and focus on what's in it for us in terms of functionality and control.

Given a choice between evolutionary or revolutionary change, I tend toward evolution. That does not mean we have to wait 10 years before we move to VoIP. I prefer to change things one variable at a time instead of all at once. If you make an incremental change like introducing IP trunking or adding VoIP at a single location and something goes wrong you can focus on that one area and fix it. My observation of organizations that have tried to take a shortcut directly to VoIP is that many tried with either a poor understanding of the service issues or insufficient network infrastructure to support the additional traffic load. Yes, there have been some well-publicized successes with straight-to-VoIP conversions, but that may be less an indicator of superior technology than a reflection of the tendency to spotlight victories and try to quietly sweep mistakes under the rug.

On the other hand, I haven't met anyone yet who has expressed regret at trying an evolutionary approach using hybrid systems that build on the existing infrastructure.

Organization, Know Thyself

Before you can plan to go someplace, you need to know where you are. Any system of management, telecommunications or otherwise, needs a way to assess the current state of what is being managed. For telecommunications, this means developing and maintaining a comprehensive inventory of the telecommunication equipment and services associated with your organization. How successful we are at the inventory process will depend on answering four basic questions: (1) Where do we have service? (2) What services do we have? (3) What resources are we using to provide service? (4) How much does our service cost?

The answer to the "where" question would be a list of all of our operating locations. For any given location, we should be able to identify telecommunication services (dial tone, long distance, voice mail, cellular service, etc.) and trends in usage (the volume and types of traffic that networks carry). Resources would include any equipment (switches, instruments, cellular phones, cabling, etc.) owned or leased at those facilities. Assessing costs will include counting capital investment in equipment and recurring costs associated with paying periodic bills.

Cost assessment is where intermediate service levels 3 and 4 start coming into play. While they may not affect the user experience significantly, having a consistent infrastructure with central oversight should simplify maintenance and administration. For example, most organizations typically use one brand of router across their enterprise data network.

Now imagine what managing that network would be like if there were 21 different routers produced by nine different vendors with different versions of the basic operating software on the equipment from each vendor. That's what an organizational PBX infrastructure looks like if you treat every phone system installation as a building utility instead of part of an enterprise architecture.

Standardizing equipment across the board simplifies system administration and maintenance. Being able to interrogate your PBXs centrally via IP will help in understanding what's going on in your phone systems, particularly for validating your billing across the organization. It is important to define technical reference models (TRMs) for each of the service levels described above.

These TRMs should specify the make and model of the equipment, what software applications are part of the system and how they are configured, just like we do for networks. This includes the make and model of the switches/PBXs you want to use, the number of line cards needed to support the number of users the system supports, the make and model of the voice mail system, and the software applications associated with the system.

For example, let's say my assessment is that my agency is at Level 2 because that's the level of service we are providing at most of our locations. There are some Level 5 VoIP systems that exist for various reasons, but with one exception we are replacing them with traditional PBXs. Unfortunately, we cannot support VoIP with the networks we have currently, but we could support IP-based management. We set our target architecture at Level 4. Based on our inventory, we know we could connect about 23 percent of our current switches via IP and we will need to replace the rest.

The problem is that phone switches, if properly installed, last a long time. In our case, our switches are averaging between six to eight years, with one still chugging along after 18 years. Any new installations should not only support our immediate goal of IP-based management, but should also be convertible to VoIP when the rest of our infrastructure is ready.

In summary, decide what level of service you need, determine what technology will get you there, start modifying and installing it, and manage the system consistently across the organization. This is really no different than what we learned about managing local and wide-area networks over the last 15 years. We are just applying it to a different service.

Star Trek Achieved!

Having given you several cautions earlier on moving too quickly to VoIP, I will now pivot 180 degrees and talk about a VoIP success story I would like to see in my office tomorrow. I am happy to report that the *Star Trek* telephone system of the future has probably already beamed down at a mall somewhere near you. A company named Vocera is producing badge-sized, voice-activated, clip-on phones and associated server software that handles voice recognition and call routing. Apple Computer and Best Buy are both reportedly using them in their stores. Early adopters of this technology include hospitals, which are replacing traditional paging systems with Vocera's badges.

The system is currently based on 802.11b wireless Ethernet, but the company eventually plans to move to 802.11g (five times the bandwidth of 802.11b) with 802.11i wireless security protocols. On the usability side, you have to program the system if you want to call John Smith by just tapping the button and saying, "Vocera, call John Smith." Vocera's software allows individual users to enter their call lists into their account on the server via their desktop PC. Dialing an outside line involves telling the system to give you an outside line and then speaking the number.

I have experienced IVR in various commercial auto-attendant services, but this is the first time I have seen it applied to dialing a number on a portable phone. As with anything that is simple to use, great thought must go into the development. The fact that these phones are actually in production, in use and apparently useful may be the bow wave of a wireless VoIP future.

Until next time, Happy Networking!

Long is a retired Air Force communications officer who has written regularly for CHIPS since 1993. He holds a Master of Science degree in Information Resource Management from the Air Force Institute of Technology. He is currently serving as a telecommunications manager in the U.S. Department of Homeland Security.

Enterprise Software Agreements Listed Below

The **Enterprise Software Initiative (ESI)** is a Department of Defense (DoD) initiative to streamline the acquisition process and provide best-priced, standards-compliant information technology (IT). The ESI is a business discipline used to coordinate multiple IT investments and leverage the buying power of the government for commercial IT products and services. By consolidating IT requirements and negotiating Enterprise Agreements with software vendors, the DoD realizes significant Total Cost of Ownership (TCO) savings in IT acquisition and maintenance. The goal is to develop and implement a process to identify, acquire, distribute and manage IT from the enterprise level.

In September 2001, the ESI was approved as a "quick hit" initiative under the DoD Business Initiative Council (BIC). Under the BIC, the ESI will become the benchmark acquisition strategy for the licensing of commercial software and will extend a Software Asset Management Framework across the DoD. Additionally, the ESI was incorporated into the Defense Federal Acquisition Regulation Supplement (DFARS) Section 208.74 on Oct. 25, 2002, and DoD Instruction 500.2 in May 2003.

Unless otherwise stated authorized ESI users include all DoD components, and their employees including Reserve component (Guard and Reserve) and the U.S. Coast Guard mobilized or attached to DoD; other government employees assigned to and working with DoD; nonappropriated funds instrumentalities such as NAFI employees; Intelligence Community (IC) covered organizations to include all DoD Intel System member organizations and employees, but not the CIA nor other IC employees unless they are assigned to and working with DoD organizations; DoD contractors authorized in accordance with the FAR; and authorized Foreign Military Sales.

For more information on the ESI or to obtain product information, visit the ESI Web site at http://www.don-imit.navy.mil/esi.

Software Categories for ESI:

Business and Modeling Tools

BPWin/ERWin

BPWin/ERWin - Provides products, upgrades and warranty for ERWin, a data modeling solution that creates and maintains databases, data warehouses and enterprise data resource models. It also provides BPWin, a modeling tool used to analyze, document and improve complex business processes.

Contractor: ***Computer Associates International, Inc.*** (DAAB15-01-A-0001)

Ordering Expires: 30 Mar 06

Project Management:
David Bahary

Web Link: https://ascp.monmouth.army.mil/scp/contracts/compactview.jsp

Collaborative Tools

Envoke Software (CESM-E)

Envoke Software - A collaboration integration platform that provides global awareness and secure instant messaging, integration and interoperability between disparate collaboration applications in support of the DoD's Enterprise Collaboration Initiatives.

Contractor: ***Structure Wise*** (DABL01-03-A-1007)

Ordering Expires: 4 Sep 05

Project Management: David Bahary

Web Link: https://ascp.monmouth.army.mil/scp/contracts/compactview.jsp

Click to Meet Software (CT-CTM)

Click to Meet Software - Provides software license and support for Click to Meet collaboration software (previously known as CUSeeMe and MeetingPoint), in support of the DoD's Enterprise Collaboration Initiatives. Discounts range from 6 to 11 percent off GSA Schedule prices.

Contractor: ***First Virtual Communications, Inc.*** (W91QUZ-04-A-1001)

Ordering Expires: 05 Nov 08

Project Management:
David Bahary

Web Link: https://ascp.monmouth.army.mil/scp/contracts/compactview.jsp

Database Management Tools

IBM Informix (DEAL-I/D)

IBM Informix - Provides IBM/Informix database software licenses and maintenance support at prices discounted 2 to 27 percent off GSA Schedule prices. The products included in the enterprise portion are: IBM Informix Dynamic Server Enterprise Edition (version 9), IBM Informix SQL Development, IBM Informix SQL Runtime, IBM Informix ESQL/C Development, IBM Informix ESQL/C Runtime, IBM Informix 4GL Interactive Debugger Development, IBM Informix 4GL Compiler Development, IBM Informix 4GL Compiler Runtime, IBM Informix 4GL RDS Development, IBM Informix 4GL RDS Runtime, IBM Informix Client SDK, IBM Informix Dynamic Server Enterprise Edition (version 7 and 9), and IBM Informix D.M. Gold Transaction Processing Bundle.

Contractor: ***IBM Global Services*** (DABL01-03-A-0002)

Ordering Expires: 30 Sep 05

Project Management:
Diane Grim

Web Link: https://ascp.monmouth.army.mil/scp/contracts/compactview.jsp

Microsoft Products

Microsoft Database Products - See information provided under Office Systems below.

Oracle (DEAL-O)

Oracle Products - Provides Oracle database and application software licenses, support, training and consulting services. Inventory exists for Navy customers, contact Navy Project Managers below for further details.

Contractors: ***Oracle Corp.*** (DAAB15-99-A-1002)
Northrop Grumman – authorized reseller
DLT Solutions – authorized reseller
Mythics, Inc. – authorized reseller

Ordering Expires: 28 Feb 05
Project Management:
Diane Grim

Web Link: https://ascp.monmouth.army.mil/scp/contracts/compactview.jsp

www.it-umbrella.navy.mil

Special Note to Navy Users: The Department of the Navy (DON) established a Navy Shore-Based Oracle Database Enterprise License Agreement that was implemented Oct. 1, 2004 effective through Sept. 30, 2013, to provide Navy shore-based organizations the right to use the Oracle databases. This agreement is managed by the Space and Naval Warfare Systems Center (SPAWARSYSCEN) San Diego DON Information Technology (IT) Umbrella Program Office. This agreement consolidated existing and new Oracle Database software licenses and maintenance under a single contractual vehicle and procured the rights to use for authorized users. All DON General Fund and Working Capital activities are covered, with an exception of Marine Corps activities. Marine Corps activities are currently covered by a separate Marine Corps-wide Oracle database agreement.

Authorized users at covered activities include all Navy active duty, reserve and civilian shore-based billets not assigned to a ship. On-site and off-site contractors who access Navy systems for the purpose of supporting Navy shore-based operations are also covered. This Navy Shore-Based Oracle Database Enterprise License Agreement provides significant benefits including substantial cost avoidance for the Department. It facilitates the goal of net-centric operations by allowing all shore personnel to access Oracle databases, permitting the sharing of authoritative data across the shore-based enterprise. The agreement has a priced option that, if exercised, will enable the Department to extend these benefits to the afloat Navy. Activities covered by this license agreement shall not enter into separate Oracle database agreements or procure additional Oracle database licenses outside this central agreement whenever Oracle is selected as the database. This prohibition includes software maintenance that is acquire:

a. as part of a system or system upgrade, including Application Specific Full Use (ASFU) licenses;
b. under a service contract;
c. under a contract or agreement administered by another agency, such as an interagency agreement;
d. under a Federal Supply Schedule contract or blanket purchase agreement established in accordance with FAR 8.404(b)(4); or
e. by a contractor that is authorized to order from a Government supply source pursuant to FAR 51.101.

This policy has been coordinated with the Office of the Assistant Secretary of the Navy (Financial Management and Comptroller), Office of Budget.

Navy Project Management:
Peggy Harpe
Barbara Johnson

Web Link: http://www.it-umbrella.navy.mil/contract/enterprise/deal/oracle/oracle.shtml

Sybase (DEAL-S)

Sybase Products - Offers a full suite of software solutions designed to assist customers in achieving Information Liquidity. These solutions are focused on data management and integration, application integration, Anywhere integration, and vertical process integration, development and management. Specific products include but are not limited to Sybase's Enterprise Application Server, Mobile and Embedded databases, m-Business Studio, HIPAA (Health Insurance Portability and Accountability Act) and Patriot Act Compliance, PowerBuilder and a wide range of application adaptors. In addition, a Golden Disk for the Adaptive Server Enterprise (ASE) product is part of the agreement. The Enterprise portion of the BPA offers NT servers, NT seats, Unix servers, Unix seats, Linux servers and Linux seats. Software purchased under this BPA has a perpetual software license. The BPA also has exceptional pricing for other Sybase options. The savings to the government is 64 percent off GSA prices.

Contractor: ***Sybase, Inc.*** (DAAB15-99-A-1003); (800) 879-2273; (301) 896-1661

Ordering Expires: 15 Jan 08

Authorized Users: Authorized users include personnel and employees of the DoD, Reserve components (Guard and Reserve), U.S. Coast Guard when mobilized with, or attached to the DoD and nonappropriated funds instrumentalities. Also included are Intelligence Communities, including all DoD Intel Information Systems (DoDIIS) member organizations and employees. Contractors of the DoD may use this agreement to license software for performance of work on DoD projects.

Project Management:
David Bahary

Web Link: https://ascp.monmouth.army.mil/scp/contracts/compactview.jsp

Enterprise Architecture Tools

Rational Software (AVMS-R)

Rational Software - Provides IBM Rational software licenses and maintenance support for suites and point products to include IBM Rational RequisitePro, IBM Rational Rose, IBM Rational ClearCase, IBM Rational ClearQuest and IBM Rational Unified Process.

Contractor: ***immixTechnology,*** (DABL01-03-A-1006); (800) 433-5444

Ordering Expires: 25 Aug 05

Project Management:
David Bahary

Web Link: https://ascp.monmouth.army.mil/scp/contracts/compactview.jsp

Popkin (AMS-P)

Popkin Products and Services - Includes the System Architect software license for Enterprise Modeling and add-on products including the Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR) Extension, which provides specific support for the U.S. Department of Defense Architecture Framework (DoDAF), Envision XML, Doors Interface and SA Simulator as well as license support, training and consulting services. Products vary from 3 to 15 percent off GSA pricing depending on dollar threshold ordered.

Contractor: ***Popkin Software & Systems, Inc.*** (DABL01-03-A-0001); (800) 732-5227, ext. 244

Ordering Expires: 13 Apr 05

Project Management:
David Bahary

Web Link: https://ascp.monmouth.army.mil/scp/contracts/compactview.jsp

Enterprise Management

CA Enterprise Management Software (C-EMS)

Computer Associates Unicenter Enterprise Management Software - Includes Security Management, Network Management, Event Management, Output Management, Storage Management, Performance Management, Problem Management, Software Delivery and Asset Management. In addition to these products there are many optional products, services and training available.

Contractor: ***Computer Associates International, Inc.***
(W91QUZ-04-A-0002); (800) 645-3042

Ordering Expires: Effective for term of the GSA FSS Schedule

Project Management:
Diane Grim

Web Link: https://ascp.monmouth.army.mil/scp/contracts/compactview.jsp

Citrix

Citrix - Provides a full range of Metaframe products including Secure Access Manager, Conferencing Manager, Password Manager, Access Suite & XP Presentation Server. Discounts range from 2-5 percent off GSA Schedule pricing plus spot discounts for volume purchases.

Contractor: ***Citrix Systems, Inc.***
(W91QUZ-04-A-0001);(301) 280-0809

Ordering Expires: 23 Feb 08

Project Management:
Diane Grim (732) 427-6723 (DSN 987) (diane.grim@us.army.mil)

Web Link: https://ascp.monmouth.army.mil/scp/contracts/compactview.jsp

Merant Products

Merant Products - Includes PVCS Change Management Software used to manage change processes in common development environments, release procedures and practices across the enterprise. All software assets can be accessed from anywhere in the enterprise. All changes can be entered, managed and tracked across mainframes, Unix or Windows platforms. The PVCS family also includes products to speed Web site development and deployment, manage enterprise content, extend PVCS to geographically dispersed teams and integrate PVCS capabilities into custom development workbenches.

Contractor: ***Northrop Grumman*** (N00104-03-A-ZE78); (703) 312-2543

Ordering Expires: 15 Jan 06

Project Management:
Peggy Harpe

Web Link: http://www.serena.com

Microsoft Premier Support Services (MPS-1)

Microsoft Premier Support Services - Provides premier support packages to small and large-size organizations. The products include Technical Account Managers, Alliance Support Teams, Reactive Incidents, on-site support, Technet and MSDN subscriptions.

Contractor: ***Microsoft*** (DAAB15-02-D-1002); (960) 776-8283

Ordering Expires: 30 Jun 05

Project Management:
Diane Grim

Web Link: https://ascp.monmouth.army.mil/scp/contracts/compactview.jsp

NetIQ

NetIQ - Provides Net IQ systems management, security management and Web analytics solutions. Products include AppManager, AppAnalyzer, Mail Marshal, Web Marshal, Vivinet voice and video products, and Vigilant Security and Management products. Discounts are 10-18 percent off GSA Schedule pricing for products and 5 percent off GSA Schedule pricing for maintenance.

Contractors: ***NetIQ Corp.*** (W91QUZ-04-A-0003)
Northrop Grumman - authorized reseller
Federal Technology Solutions, Inc. - authorized reseller

Ordering Expires: 5 May 09

Project Management:
Diane Grim

Web Link: https://ascp.monmouth.army.mil/scp/contracts/compactview.jsp

Telelogic Products

Telelogic Products - Offers development tools and solutions which assist the user in automation in the development life cycle. The major products include DOORS, SYNERGY, and TAU Generation. Licenses, maintenance, training and services are available.

Contractors:
Bay State Computers, Inc. (N00104-04-A-ZF13); Small Business Disadvantaged; (301) 306-9555, ext. 117
Northrop Grumman Computing Systems, Inc. (N00104-04-A-ZF14); (240) 684-3962

Ordering Expires: 29 Jun 07

Project Management:
Peggy Harpe

Web Link: http://www.it-umbrella.navy.mil/contract/enterprise/telelogic/telelogic.shtml

Enterprise Resource Planning

Digital Systems Group

Digital Systems Group - Provides Integrated Financial Management Information System (IFMIS) software that was designed specifically as federal financial management system software for government agencies and activities. The BPA also provides for installation, maintenance, training and professional services.

Contractor: ***Digital Systems Group, Inc.*** (N00104-04-A-ZF19); (215) 443-5178

Ordering Expires: 23 Aug 07

Project Management:
Peggy Harpe

Web Link: http://www.it-umbrella.navy.mil/contract/enterprise/erp_software/dsg/dsg.shtml

Oracle

Oracle - See information provided under Database Management Tools on the first page of contracts.

PeopleSoft

PeopleSoft - Provides software license, maintenance, training and installation and implementation technical support.

Contractor: ***PeopleSoft USA, Inc.*** (N00104-03-A-ZE89); (301) 581-2212

Ordering Expires: Effective for term of the GSA FSS Schedule

Project Management:
Steve Thompson

Web Link: http://www.it-umbrella.navy.mil/contract/enterprise/peoplesoft/peoplesoft.shtml

SAP

SAP Software - Provides software license, installation, implementation technical support, maintenance and training services.

Contractor: ***SAP Public Sector & Education, Inc.*** (N00104-02-A-ZE77); (202) 312-3571

Ordering Expires: Effective for term of the GSA FSS Schedule

Project Management:
Linda Greenwade

Web Link: http://www.it-umbrella.navy.mil/contract/enterprise/sap/sap.shtml

ERP Systems Integration Services

ERP Systems

ERP Systems Integration Services - Provides the procurement of configuration, integration, installation, data conversion, training, testing, object development, interface development, business process reengineering, project management, risk

management, quality assurance and other professional services for COTS software implementations. Ordering under the BPAs is decentralized and is open to all DoD activities. The BPAs offer GSA discounts from 10 percent to 20 percent. Firm fixed prices and performance-based contracting approaches are provided to facilitate more efficient buying of systems integration services. Five BPAs were competitively established against the GSA Schedule. Task orders must be competed among the five BPA holders in accordance with DFARS 208.404-70 and Section C.1.1 of the BPA. Acquisition strategies at the task order level should consider that Section 803 of the National Defense Authorization Act for 2002 requirements were satisfied by the BPA competition.

Contractors:
Accenture LLP (N00104-04-A-ZF12); (703) 947-2059
BearingPoint (N00104-04-A-ZF15); (703) 747-5442
Computer Sciences Corp. (N00104-04-A-ZF16); (856) 252-5583
Deloitte Consulting LLP (N00104-04-A-ZF17); (703) 885-6020
IBM Corp. (N00104-04-A-ZF18); (301) 803-6625

Ordering Expires: 03 May 09

Project Management:
Linda Greenwade

Web Link: http://www.it-umbrella.navy.mil/contract/enterprise/erp_services/erp-esi.shtml

Information Assurance Tools

Network Associates, Inc.

Network Associates, Inc. (NAI) - This protection encompasses the following NAI products: VirusScan, Virex for Macintosh, VirusScan Thin Client, NetShield., NetShield for NetApp, ePolicy Orchestrator, VirusScan for Wireless, GroupShield, WebShield (software only for Solaris and SMTP for NT), and McAfee Desktop Firewall for home use only.

Contractor: ***Network Associates, Inc.*** (DCA100-02-C-4046)

Ordering Expires: Nonexpiring. Download provided at no cost; go to the Antivirus Web links below for antivirus software downloads.

Project Management: Dawn Lawson

Web Link: http://www.don-imit.navy.mil/esi/

Antivirus Web Links: Antivirus software available for no cost download includes McAfee, Symantec and Trend Micro Products. These products can be downloaded by linking to either of the following Web sites:

NIPRNET site: http://www.cert.mil/antivirus/av_info.htm
SIPRNET site: http://www.cert.smil.mil/antivirus/av_info.htm

Symantec

Symantec - This protection encompasses the following Symantec products: Symantec Client Security, Norton Antivirus for Macintosh, Symantec System Center, Symantec AntiVirus/Filtering for Domino, Symantec AntiVirus/Filtering for MS Exchange, Symantec AntiVirus Scan Engine, Symantec AntiVirus Command Line Scanner, Symantec for Personal Electronic Devices, Symantec AntiVirus for SMTP Gateway, Symantec Web Security (AV only) and support.

Contractor: ***Northrop Grumman Information Technology*** (DCA100-02-C-4049)

Ordering Expires: Nonexpiring. Download provided at no cost; go to the Antivirus Web links below for antivirus software downloads.

Project Management:
Dawn Lawson

Web Link: http://www.don-imit.navy.mil/esi/

Antivirus Web Links: Antivirus software available for no cost download includes McAfee, Symantec and Trend Micro Products. These products can be downloaded by linking to either of the following Web sites:

NIPRNET site: http://www.cert.mil/antivirus/av_info.htm
SIPRNET site: http://www.cert.smil.mil/antivirus/av_info.htm

Trend Micro

Trend Micro - This protection encompasses the following Trend Micro products: InterScan Virus Wall (NT/2000, Solaris, Linux), ScanMail for Exchange (NT, Exchange 2000), TMCM/TVCS (Management Console - TMCM W/OPP srv.), PC-Cillin for Wireless, Gold Premium support contract/year (PSP), which includes six POCs.

Contractor: ***Government Technology Solutions*** (DCA100-02-C-4045)

Ordering Expires: Nonexpiring. Download provided at no cost; go to the Antivirus Web links below for antivirus software downloads.

Project Management:
Dawn Lawson

Web Link: http://www.don-imit.navy.mil/esi/

Antivirus Web Links: Antivirus software available for no cost download includes McAfee, Symantec and Trend Micro Products. These products can be downloaded by linking to either of the following Web sites:

NIPRNET site: http://www.cert.mil/antivirus/av_info.htm
SIPRNET site: http://www.cert.smil.mil/antivirus/av_info.htm

Xacta

Xacta - Provides Web Certification and Accreditation (C&A) software products, consulting support and enterprise messaging management solutions through its Automated Message Handling System (AMHS) product. The software simplifies C&A and reduces its costs by guiding users through a step-by-step process to determine risk posture and assess system and network configuration compliance with applicable regulations, standards and industry best practices, in accordance with the DITSCAP, NIACAP, NIST or DCID processes. Xacta's AMHS provides automated, Web-based distribution and management of messaging across your enterprise.

Contractor: ***Telos Corp.*** (F01620-03-A-8003); (703) 724-4555

Ordering Expires: 31 Jul 08

Project Management:
Duane Haughton

Web Link: http://esi.telos.com/contract/overview/

SecureInfo

SecureInfo - Enterprise Vulnerability Remediation (EVR) software allows IT managers the ability to automatically identify, track and correct vulnerability-related IT security material weaknesses. EVR distributes intelligence to the devices attached to the network to easily and quickly identify machines that require security fixes. With a single click of the mouse, administrators can confidently deploy patches that have been tested and approved to only the machines that need them.

Risk Management System (RMS) software offers organizations a highly automated certification and accreditation process that is customizable to meet the security requirements of enterprise networks. By utilizing extensive questionnaires, integrating specific requirements to exact standards and providing a straightforward intuitive user environment, RMS addresses the challenges experienced by C&A specialists throughout each individual phase including: security policies; test plans; security procedures; system posture and reports; and management documentation.

Contractor: ***SecureInfo Corp.*** (FA8771-04-A-0301); (210) 403-5610

Ordering Expires: 19 Mar 09

Project Management:
Duane Haughton

Web Link: http://www.don-imit.navy.mil/esi/

Office Systems

Adobe

Adobe Products - Provides software licenses (new and upgrade) and maintenance for numerous Adobe products, including Acrobat (Standard and Professional), Approval, Capture, Distiller, Elements, After Effects, Design Collection,

Digital Video Collection, Dimensions, Frame Maker, GoLive, Illustrator, PageMaker, Photoshop and other Adobe products.

Contractors:
ASAP (N00104-03-A-ZE88); Small Business; (800) 248-2727, ext. 5303
CDW-G (N00104-03-A-ZE90); (877) 890-1330
GTSI (N00104-03-A-ZE92); Small Business; (800) 942-4874, ext. 2224

Ordering Expires: 30 Sep 05

Project Management: Steve Thompson

Web Link: http://www.it-umbrella.navy.mil/contract/enterprise/adobe/adobe-ela.shtml

CAC Middleware

CAC Middleware - Provides Common Access Card middleware.

Contractors:
Datakey, Inc. (N00104-02-D-Q666) IDIQ Contract for DATAKEY products; (301) 261-9150
Spyrus, Inc. (N00104-02-D-Q669) IDIQ Contract for ROSETTA products; (408) 953-0700, ext. 155
Litronic, Inc. (N00104-02-D-Q667) IDIQ Contract for NETSIGN products; (703) 905-9700

Ordering Expires: 6 Aug 05

Project Management: Steve Thompson

Web Link: http://www.it-umbrella.navy.mil/contract/middleware-esa/index-cac.shtml

Microsoft Products

Microsoft Products - Provides licenses and software assurance for desktop configurations, servers and other products. In addition, any Microsoft product available on the GSA Schedule can be added to the BPA.

Contractors:
ASAP (N00104-02-A-ZE78); Small Business; (800) 248-2727, ext. 5303
CDW-G (N00104-02-A-ZE85); (847) 968-9429
Hewlett-Packard (formerly Compaq) (N00104-02-A-ZE80); (800) 535-2563 pin 6246
Dell (N00104-02-A-ZE83); (800) 727-1100 ext. 37010 or (512) 723-7010
GTSI (N00104-02-A-ZE79); Small Business; (800) 999-GTSI or (703) 502-2431
Softchoice (N00104-02-A-ZE81); Small Business; (877) 333-7638 or (703) 469-3899
Softmart (N00104-02-A-ZE84); (610) 518-4000, ext. 6492 or (800) 628-9091 ext. 6928
Software Spectrum, Inc. (N00104-02-A-ZE82); (800) 862-8758 or (509) 742-2308

Ordering Expires: 26 Jun 05

Project Management: Linda Greenwade

Web Link: http://www.it-umbrella.navy.mil/contract/enterprise/microsoft/ms-ela.shtml

Netscape Products

Netscape Products - Netscape Communicator Client and a number of the Netscape Server products for use across DoD. Available for download at no cost. Customers must choose between the commercial version and the Defense Information Infrastructure Common Operating Environment (DII COE) Segmented Versions.

Licensed software products available from the Defense Information Systems Agency (DISA) are commercial versions of the software, not the segmented versions that are compliant with the DII COE standards. The segmented versions of the software are required for development and operation of applications associated with the DII COE, the Global Command and Control System (GCCS) or the Global Combat Support System (GCSS).

If your intent is to use a licensed product available for download from the DoD Download site to support development or operation of an application associated with the DII COE, GCCS or GCSS, you must go to one of the Web sites listed below to obtain the DII COE segmented version of the software. You may not use the commercial version available from the DoD Download site.

If you are not sure which version (commercial or segmented) to use, we strongly encourage you to refer to the Web sites listed below for additional information to help you to make this determination before you obtain the software from the DoD Download site.

DII COE or GCCS users: Common Operating Environment Home Page
http://disa.dtic.mil/coe

GCSS users: Global Combat Support System
http://www.disa.mil/main/prodsol/gcss.html

Contractor: ***Netscape***

Ordering Expires: Mar 05 – Download provided at no cost.

Project Management:
Rick Reinhardt

Web Link: http://dii-sw.ncr.disa.mil/Del/netlic.html

WinZip

WinZip - This is an IDIQ contract with Eyak Technology, LLC, an "8(a)" Small Disadvantaged Business (SDB)/Alaska Native Corporation, for the purchase of WinZip 9.0, a compression utility for Windows. Minimum quantity order via delivery order and via Government Purchase credit card to Eyak Technology, LLC is 1,250 WinZip licenses. All customers are entitled to free upgrades and maintenance for a period of two years from original purchase. Discount is 98.4 percent off retail. Price per license is 45 cents.

Contractor: ***Eyak Technology, LLC*** (W91QUZ-04-D-0010)

Authorized Users: This has been designated as a DoD ESI and GSA SmartBUY Contract and is open for ordering by all United States federal agencies, DoD components and authorized contractors.

Ordering Expires: 27 Sep 09

Project Management:
David Bahary

Web Link: https://ascp.monmouth.army.mil/scp/contracts/compactview.jsp

Operating Systems

Novell

Novell Products - Provides master license agreement for all Novell products, including NetWare, GroupWise and ZenWorks.

Contractor: ***ASAP Software*** (N00039-98-A-9002); Small business; (800) 883-7413

Ordering Expires: 31 Mar 07

Project Management:
Peggy Harpe

Web Link: http://www.it-umbrella.navy.mil/contract/enterprise/novell/novell.shtml

Sun (SSTEW)

SUN Support - Sun Support Total Enterprise Warranty (SSTEW) offers extended warranty, maintenance, education and professional services for all Sun Micro-

systems products. The maintenance covered in this contract includes flexible and comprehensive hardware and software support ranging from basic to mission critical services. Maintenance covered includes Sun Spectrum Platinum, Gold, Silver, Bronze, hardware only and software only support programs.

Contractor: ***Dynamic Systems*** (DCA200-02-A-5011)

Ordering Expires: Dependent on GSA Schedule until 2011

Project Management: Dawn Lawson

Web Link: http://www.ditco.disa.mil/hq/contracts/sstewchar.asp

Research and Advisory BPAs
Listed Below

Research and Advisory Services BPAs provide unlimited access to telephone inquiry support, access to research via Web sites and analyst support for the number of users registered. In addition, the services provide independent advice on tactical and strategic IT decisions. Advisory services provide expert advice on a broad range of technical topics and specifically focus on industry and market trends. BPA listed below.

Gartner Group (N00104-03-A-ZE77); (703) 226-4815; Awarded Nov 02; one-year base period with three one-year options.

Ordering Expires: Gartner Group: Nov 06

Authorized Users:
Gartner Group: All DoD components and their employees, including Reserve Components (Guard and Reserve); the U.S. Coast Guard; other government employees assigned to and working with DoD; nonappropriated funds instrumentalities of the DoD; DoD contractors authorized in accordance with the FAR and authorized Foreign Military Sales (FMS).

Project Management:
Peggy Harpe

Web Link: http://www.it-umbrella.navy.mil/contract/r&a/gartner/gartner.shtml

Section 508 Tools

HiSoftware 508 Tools

HiSoftware Section 508 Web Developer Correction Tools - Includes AccRepair (StandAlone Edition), AccRepair for Microsoft FrontPage, AccVerify for Microsoft FrontPage and AccVerify Server. Also includes consulting and training support services.

Contractor: ***HiSoftware, DLT Solutions, Inc.*** (N00104-01-A-Q570); Small Business; (888) 223-7083 or (703) 773-1194

Ordering Expires: 15 Aug 07

Project Management:
Linda Greenwade

Web Link: http://www.it-umbrella.navy.mil/contract/508/dlt/dlt.shtml

Warranty: IAW GSA Schedule. Additional warranty and maintenance options available. Acquisition, Contracting and Technical fee included in all BLINS.

ViViD Contracts
N68939-97-D-0040
Contractor: Avaya Incorporated
N68939-97-D-0041
Contractor: General Dynamics

ViViD provides digital switching systems, cable plant components, communications and telecommunications equipment and services required to engineer, maintain, operate and modernize base level and ships afloat information infrastructure. This includes pier side connectivity and afloat infrastructure with purchase, lease and lease-to-own options. Outsourcing is also available. Awarded to:

Avaya Incorporated (N68939-97-D-0040); (888) VIVID4U or (888) 848-4348. Avaya also provides local access and local usage services

General Dynamics (N68939-97-D-0041); (888) 483-8831

Modifications

Latest contract modifications are available at http://www.it-umbrella.navy.mil

Ordering Information

Ordering Expires:
26 Jul 05 for all CLINs/SCLINs
26 Jul 07 for Support Services and Spare Parts

Authorized users: DoD and U.S. Coast Guard

Warranty: Four years after government acceptance. Exceptions are original equipment manufacturer (OEM) warranties on catalog items.

Acquisition, Contracting & Technical Fee: Included in all CLINs/SCLINs

Project Management:
Barbara Johnson
Ted Wolken

Assistant Technical Lead: Avaya
Patrick Koehler

Assistant Technical Lead: General Dynamics
John McLaurin Jr.

Direct Ordering to Contractor

SSC Charleston Order Processing: como@mailbuoy.norfolk.navy.mil

Web Link: http://www.it-umbrella.navy.mil/contract/vivid/vivid.shtml

TAC Solutions BPAs
Listed Below

TAC Solutions provides PCs, notebooks, workstations, servers, networking equipment and all related equipment and services necessary to provide a completely integrated solution. BPAs have been awarded to the following:

Control Concepts (N68939-97-A-0001); (800) 922-9259

Dell (N68939-97-A-0011); (800) 727-1100, ext. 61973

GTSI (N68939-96-A-0006); (800) 999-4874, ext. 2104

Hewlett-Packard (N68939-96-A-0005); (800) 727-5472, ext. 15515

Ordering Expires:
Control Concepts: 03 May 07 (includes two one-year options)
Dell: 31 Mar 05 (includes two one-year options)
GTSI: 1 Apr 05 (includes two one-year options)
Hewlett-Packard: 8 Oct 05 (includes two one-year options)

Authorized Users: DON, U.S. Coast Guard, DoD and other federal agencies with prior approval.

Warranty: IAW GSA Schedule. Additional warranty options available.

Project Management:
Sandy Sirbu

SSC Charleston Technical Support:
Doris Bohenek

Web Links

Control Concepts
http://www.it-umbrella.navy.mil/contract/tac-solutions/cc/cc.shtml

Dell
http://www.it-umbrella.navy.mil/contract/tac-solutions/dell/dell.shtml

GTSI
http://www.it-umbrella.navy.mil/contract/tac-solutions/gtsi/gtsi.shtml

Hewlett-Packard
http://www.it-umbrella.navy.mil/contract/tac-solutions/HP/HP.shtml

Department of the Navy Enterprise Solutions BPA

Navy Contract: N68939-97-A-0008

The Department of the Navy Enterprise Solutions (DON ES) BPA provides a wide range of technical services, specially structured to meet tactical requirements, including worldwide logistical support, integration and engineering services (including rugged solutions), hardware, software and network communications solutions. DON ES has one BPA.

Computer Sciences Corp. (N68939-97-A-0008);
(619) 225-2412; Awarded 7 May 97; Ordering expires 31 Mar 06, with two one year options

Authorized Users: All DoD, federal agencies and U.S. Coast Guard.

Project Management:
Sandy Sirbu

Web Link: http://www.it-umbrella.navy.mil/contract/don-es/csc.shtml

Information Technology Support Services BPAs

Listed Below

The Information Technology Support Services (ITSS) BPAs provide a wide range of IT support services such as networks, Web development, communications, training, systems engineering, integration, consultant services, programming, analysis and planning. ITSS has four BPAs. They have been awarded to:

Lockheed Martin (N68939-97-A-0017); (240) 725-5012; Awarded 1 Jul 97;
Ordering expires 30 Jun 05, with two one-year options

Northrop Grumman Information Technology
(N68939-97-A-0018); (703) 413-1084; Awarded 1 Jul 97;
Ordering expires 11 Feb 05, with two one-year options

SAIC (N68939-97-A-0020); (703) 676-2388; Awarded 1 Jul 97; Ordering expires 30 Jun 05, with two one-year options

TDS (Small Business) (N00039-98-A-3008); (619) 224-1100;
Awarded 15 Jul 98; Ordering expires 14 Jul 05, with two one-year options

Authorized Users: All DoD, federal agencies and U.S. Coast Guard

Project Management: Sandy Sirbu

Web Links

Lockheed Martin
http://www.it-umbrella.navy.mil/contract/itss/lockheed/itss-lockheed.shtml

Northrop Grumman IT
http://www.it-umbrella.navy.mil/contract/itss/northrop/itss-northrop.shtml

SAIC
http://www.it-umbrella.navy.mil/contract/itss/saic/itss-saic.shtml

TDS
http://www.it-umbrella.navy.mil/contract/itss/tds/itss-tds.shtml

The U.S. Army Maxi-Mini and Database (MMAD) Program

Listed Below

The MMAD Program is supported by two fully competed Indefinite Delivery Indefinite Quantity (IDIQ) contracts with IBM Global Services and GTSI Corp. The program is designed to fulfill high and medium level IT product and service requirements of DoD and other federal users by providing items to establish, modernize, upgrade, refresh and consolidate system environments. Products and manufacturers include:

	IBM Global Services	GTSI
Servers (64-bit & Itanium)	IBM, HP, Sun	Compaq, HP
Workstations	HP, Sun	Compaq, HP
Storage Systems	IBM, Sun, EMC, McData, System Upgrade, Network Appliances	HP, Compaq, EMC, RMSI, Dot Hill, Network Appliances
Networking	Cisco, WIMAX Secure	Cisco, 3COM, HP, Enterasys, Foundry, Segovia

Ancillaries include network hardware items, upgrades, peripherals and software. Services include consultants, managers, analysts, engineers, programmers, administrators and trainers.

MMAD is designed to ensure the latest products and services are available in a flexible manner to meet the various requirements identified by DoD and other agencies. This flexibility includes special solution CLINs, technology insertion provisions, ODC (Other Direct Cost) provisions for ordering related non-contract items, and no dollar/ratio limitation for ordering services and hardware.

Latest product additions include WiMAX Secure Wireless Networking and Dolphin-Search Datamining Software.

Awarded to:
GTSI Corp. (DAAB07-00-D-H251); (800) 999-GTSI
IBM Global Services-Federal (DAAB07-00-D-H252); CONUS:
(866) IBM-MMAD (1-866-426-6623) OCONUS: (703) 724-3660 (Collect)

Ordering Information

Ordering: Decentralized. Any federal contracting officer may issue delivery orders directly to the contractor.

Ordering Expires:
GTSI: 25 May 06 (includes three option periods)
IBM: 19 Feb 06 (includes three option periods)

Authorized Users: DoD and other federal agencies including FMS

Warranty: 5 years or OEM options

Delivery: 35 days from date of order (50 days during surge period, August and September)

No separate acquisition, contracting and technical fees.

Project Management:
Brian Rieth

Steve Thompson

Web Link

GTSI and IBM: https://ascp.monmouth.army.mil/scp/contracts/compactview.jsp

Thanks to our customers for 16 great years!

The DON IT Umbrella Program offers a full range of IT services and solutions to meet any requirement, including software, hardware, information assurance, project management, security, engineering, training, data warehousing, consulting and research.

PROGRAM FEATURES

New! The Navy Shore-Based Oracle Database License Agreement allows Navy shore-based organizations the right to use Oracle databases. This agreement consolidates existing and new Oracle Database software licenses and maintenance under a single contractual vehicle. This agreement provides significant benefits including substantial cost avoidance for the Department of the Navy. Go to page 17 for more information.

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