TECHNICAL DOCUMENT 3177
March 2004

SSC San Diego Command History Calendar Year 2003

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SSC San Diego
San Diego, CA 92152-5001

PREFACE

The Space and Naval Warfare Systems Center, San Diego (SSC San Diego), Command History for calendar year (CY) 2003 is submitted in conformance with OPNAVINST 5750.12H. The history provides a permanent record of CY 2003 activities at SSC San Diego. Although the history covers one calendar year, much of the information was only available on a fiscal year (FY) basis and is so noted in the text.

This Command History is divided into three main sections. The first section is a general introduction to SSC San Diego. The second section describes administrative highlights. The third section documents technical highlights.

Appendices to this document provide supplementary SSC San Diego information. Appendix A lists achievement awards given in CY 2003. Appendix B lists patents awarded in CY 2003. Appendices C and D provide lists of distinguished visitors hosted by SSC San Diego and major conferences and meetings at SSC San Diego, respectively. Appendix E lists acronyms used in the document.

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SECTION 1
INTRODUCTION

INTRODUCTION TO SSC SAN DIEGO

The Space and Naval Warfare Systems Center, San Diego (SSC San Diego), is a full-spectrum research, development, test and evaluation (RDT&E), engineering and fleet support center serving the U.S. Navy, Marine Corps, and other Department of Defense (DoD) and national sponsors within its mission, leadership assignments, and prescribed functions. SSC San Diego reports directly to the Commander, Space and Naval Warfare Systems Command (SPAWAR).

MISSION

SSC San Diego's formal mission is "to be the Navy's full-spectrum research, development, test and evaluation, engineering and fleet support center for command, control and communication systems and ocean surveillance and the integration of those systems which overarch multiplatforms."

LEADERSHIP AND TECHNOLOGY AREAS

Consistent with its mission, eight leadership areas are formally assigned to SSC San Diego. These leadership areas represent SSC San Diego's command, control, communications, computers, intelligence, surveillance, and reconnaissance (C^4ISR) charter and its leadership areas outside that scope—ocean engineering and marine mammals. Beyond these areas, SSC San Diego has demonstrated national and international expertise in a broad range of technology areas.

ASSIGNED LEADERSHIP AREAS

- Command, control, and communication (C^3) systems
- Command, control, and communication systems countermeasures
- Ocean surveillance systems
- Command, control, and communication modeling and analysis
- Ocean engineering
- Navigation systems and techniques
- Marine mammals
- Integration of space communication and surveillance systems

TECHNOLOGY AREAS

- Ocean and littoral surveillance
- Microelectronics
- Communications and networking
- Topside design/antennas
- Command systems
- Computer technology
- Navigation and aircraft C^3
- Intelligence/surveillance/reconnaissance sensors
- Atmospheric effects assessment
- Marine mammals
- Environmental quality technology/assessment

VISION

SSC San Diego's vision is "to be the nation's pre-eminent provider of integrated C^4ISR solutions for warrior information dominance." SSC San Diego's vision guides the Center's efforts in defining, developing, integrating, installing, and sustaining C^4ISR systems.

PROGRAMS

SSC San Diego conducts a broad range of programs that focus on integrated C^4ISR. The Center also conducts several unique programs outside its primary C^4ISR focus: Environmental Quality Technology/ Assessment, Marine Resources, Marine Mammals, Ocean Engineering, and Robotics and Physical Security. Innovative research is encouraged through the In-House Laboratory Independent Research and Independent Applied Research programs.

ORGANIZATION

Figure 1 shows SSC San Diego's organization as of 31 December 2003.

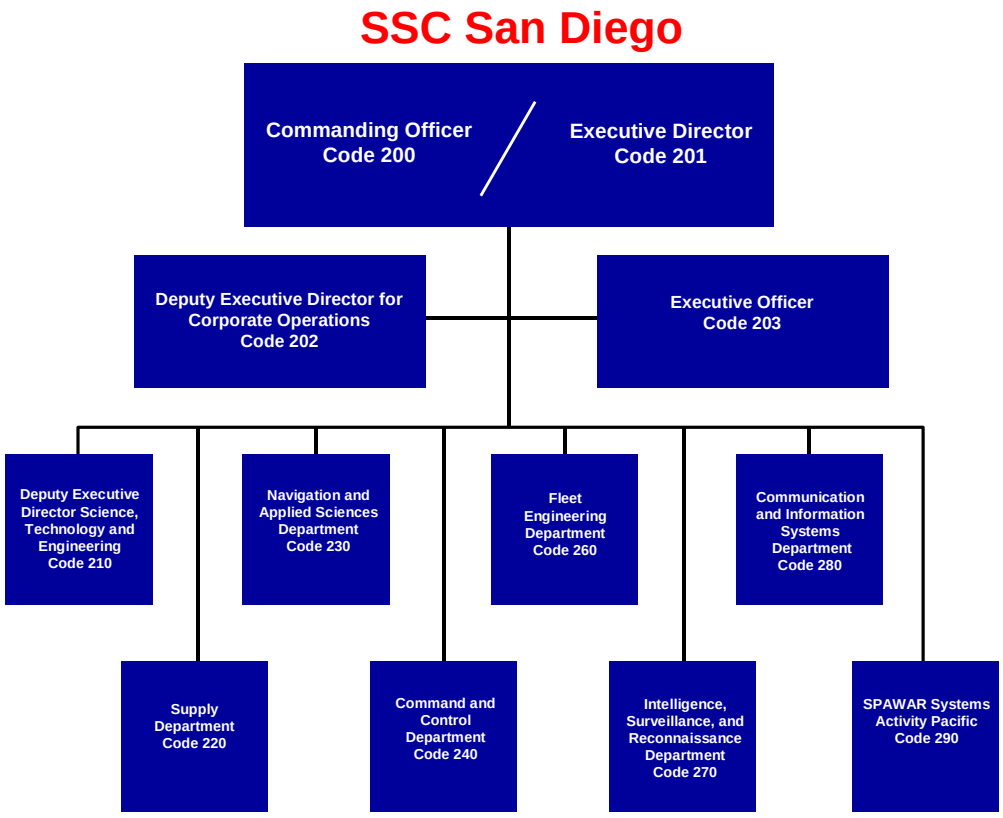

Figure 1. SSC San Diego organization.

SECTION 2
ADMINISTRATIVE HIGHLIGHTS

FUNDING

Total SSC San Diego funding in FY 2003 was $1.379B, up by 5.2% (+ $69M) over FY 2002. Table 1 shows funding by sponsor. Table 2 shows total funding by appropriation.

Table 1. Funding by sponsor, FY 2003.

Sponsor	$M (% of Total)
SPAWAR	465 (34)
DARPA	223 (16)
Other Navy	245 (18)
All Other	217 (16)
ONR	89 (6)
NAVAIR	80 (6)
NAVSEA	60 (4)
Total	1.379B

DARPA (Defense Advanced Research Projects Agency)

All Other includes Army and Air Force

ONR (Office of Naval Research)

NAVAIR (Naval Air Systems Command)

NAVSEA (Naval Sea Systems Command)

Table 2. Funding by appropriation, FY 2003.

Type	$M (% of Total)
RDTE	607 (44)
OPN	273 (20)
OMN	293 (21)
Other DoD	194 (14)
Other Navy	4 (<1)
Non-DoD	8 (<1)
Total	1.379B

OPN (Other Procurement, Navy)

OMN (Operation and Maintenance, Navy)

PERSONNEL

PERSONNEL ONBOARD

Total personnel onboard for FY 2003 was 3760. Table 3 lists number of personnel by area.

Table 3. Personnel onboard, FY 2003.

Scientists and Engineers	1928
Technicians	419
Technical Specialists	544
Administrative	437
Clerical	330
Senior Executive Service	6
Wage Grade	28
Officers	36
Enlisted	32
Total	3760

MAJOR PERSONNEL CHANGES

Dr. Bob Kolb, SSC San Diego Executive Director [1]

SSC San Diego Executive Director Dr. Bob Kolb retired 1 August 2003, with over 37 years of service to the Center and its predecessors. Before his selection as Executive Director in August 1996, Dr. Kolb served for 9 years as head of the Command and Control Department.

Dr. Kolb received his Bachelor of Science degree in electrical engineering from Montana State University. Shortly afterward, he joined Hughes Aircraft Company, serving as the company's missile technical representative at Ellington Air Force Base, Texas. A year later he returned to Montana State and earned a Master of Science degree and a Ph.D. in electrical engineering, with a specialty in control systems.

Dr. Kolb joined the staff of SSC San Diego predecessor Navy Electronics Laboratory in December 1965. His initial assignments were in application of digital control theory to pointing and tracking systems for gun mounts, missile launchers, and antennas. He contributed to the development of tracking systems for submarine sonar and surface-ship combat direction systems.

From 1971 to 1975 he headed the Decision and Control Technology Division, responsible for research and development including digital control, servomechanism design, decision sciences, analog and digital simulation, signal processing, filtering, and estimation. From 1975 to 1987 he headed the Shipboard Command and Control Systems Division, directing development of tactical data link technology, the Command and Control Processor, and the Advanced Combat Direction System.

In 1988, after 7 months service in an acting capacity, Dr. Kolb was selected to head the Command and Control Department. He was also appointed to the Senior Executive Service. He led the department

during a period of substantial growth in which the department doubled in size, from 320 to 650 civilian and military personnel and from an annual budget of $120 million to $265 million.

Department programs ranged from basic scientific research through software support, with emphasis on system engineering and integration. Programs addressed command and control, intelligence and combat direction systems, tactical data links, modeling and simulation, human-system engineering, and display technology.

Before assuming the position of Executive Director in 1996, Dr. Kolb served as Acting Deputy Executive Director for 4 months and Acting Executive Director for 2 months.

Dr. Kolb's achievements were recognized throughout his career with numerous awards, including the Lauritsen-Bennett Award in 1980, the Presidential Meritorious Rank Award in 1997, and the Distinguished Civilian Service Award in 2003.

Rod Smith, Named New Executive Director[2, 3]

Rod Smith was confirmed as SSC San Diego's Executive Director in November 2003. Smith, who previously served as head of the Command and Control Deparment, had been appointed SSC San Diego's Acting Executive Director in August 2003.

Smith attended the U.S Naval Academy, graduating in 1974 with a Bachelor of Science degree. He reported to USS *Horne* (CG 30) for duty as damage control assistant and Communications Division head. He earned his Master of Science in electrical engineering from the Naval Postgraduate School, Monterey, California. During this tour, he was accepted into the Engineering Duty Officer Program.

In 1981, Smith was assigned to the Naval Ocean Systems Center (now SSC San Diego). He became the Center's project manager for the guided missile destroyer-experimental (DDGX) class and led the command, control, and communication specification development efforts until 1983 when he became the acting head of the Ship and Shore Communications Division.

In 1984, Smith assumed the charge of Naval Electronics Engineering Activity, Guam (now SPAWAR Systems Facility Pacific, Guam). He directed numerous communication systems upgrades at facilities in the southern and western Pacific. He left active duty in 1986, accepted a reserve appointment, and subsequently retired at the rank of captain, having served as commanding officer of three units.

Joining the Center as a civilian in 1987, Smith accepted a position as deputy project manager for the Joint Tactical Information Distribution System program. He coordinated and conducted successful development of the Tactical Data Link Systems Integration Facility. He directed test and evaluation activities that included Joint Air Defense Operations/Joint Engagement Zone exercises and developmental testing of integrated Link-16. He planned and executed a command, control, communications, computers and intelligence system integration testing effort for USS *Carl Vinson* Battle Group, an event considered to be the precursor of the Battle Group System Integration Test process.

In 1993, Smith was selected as Integration and Interoperability Division Deputy for Business and subsequently assumed division head responsibilities. Smith supported the Navy International Programs Office as technical project officer for command, control, and combat systems. He also supported Technical Data Exchange Agreements for multiple North Atlantic Treaty Organization and Pacific Rim nations.

In July 1997, Smith was selected for the Senior Executive Service and named head of the Command and Control Department (Code 240).

Bob Kochanski, Head, Communication and Information Systems Department[4]

Communication and Information Systems Department Head Bob Kochanski retired on 3 October 2003 after 35 years of government service. Kochanski had served as head of Code 280 since 1998.

Kochanski received his Bachelor of Science degree in electronic engineering from the Indiana Institute of Technology. He continued his graduate work in mathematics at the University of Florida extension. Kochanski began his federal career at the Naval Training Devices Center in Orlando, Florida, where he worked in the visual simulation laboratory developing display systems, motion simulators, and analog/digital computers.

In 1971, Kochanski transferred to the Naval Electronics Laboratory Center (now SSC San Diego). His work included video enhancement efforts and fiber-optic communications systems. He was a member of the team that designed, assembled, and installed the first operational voice system aboard USS *Little Rock* (CLG 4). Selected to head the Fiber-Optic Systems Branch, his group was responsible for design, development, implementation, and installation of the first fully operational fiber optic transmission systems capable of handling military satellite traffic at land-based communications sites worldwide.

In 1988, Kochanski became head of the Shipboard Communications Systems Division. The division provided network system engineering leadership for the Information Technology for the Twenty-First Century effort. His team developed and implemented high-tech Navy core electromagnetics programs, digital data, and voice network communications efforts. The division led early development and installation of fiber-optic data networks aboard USS *George Washington* (CVN 73), USS *O'Bannon* (DD 987), and USS *Theodore Roosevelt* (CVN 71). They also provided an early fiber-optic voice network aboard USS *Carl Vinson* (CVN 70).

Kochanski was also appointed Navy lead for the Tri-Service Fiber-Optic and Photonic Coordinating Structure. He was responsible to the Director of Defense Research and Engineering for coordinating fiber-optic technology and system development with the Navy, Army, Air Force, Department of Energy, and National Aeronautical and Space Administration.

Kochanski received the Navy Superior Civilian Service Award for his leadership in satellite and line-of-sight communications, digital radios, antenna design, and electromagnetic capability analysis. The Center received a Software Capability Maturity Model Level 3 under his leadership, and Code 280 implemented a Periodic Project and Review Process across all SSC San Diego department projects and line organizations.

Dr. Tom Kaye, Deputy Executive Director, Science, Technology, and Engineering[5]

Deputy Executive Director, Science, Technology, and Engineering (Code 210) Dr. Tom Kaye retired at the end of September 2003. Dr. Kaye had served as head of Code 210 since 1998.

Dr. Kaye received his Bachelor of Science from the U.S. Naval Academy. He served as a naval officer for 5 years on ships in the Atlantic and the Pacific. He attended the University of Michigan and received his Master of Science and Ph.D. in physical oceanography.

Dr. Kaye joined the Center in 1979 and served in positions as systems engineer, program manager, branch head, scientist, and deputy department head. Dr. Kaye served a tour as Science Advisor to Commander, Pacific Fleet (COMPACFLT).

As head of Code 210, Dr. Kaye led development of new programs for science and technology. Code 210 develops internal research programs and cross-departmental business initiatives. Code 210 provides strategic business planning and partnering with industry, coordination with state and local government, and Naval Fleet/Force Technology Insertion Program management. The code is responsible for internal business promotion, and cross-departmental tactical business planning and execution. Code 210 provides corporate systems engineering process improvement and supports the Center's strategic planning process.

Dr. Kaye has published papers in the *Journal of the Acoustical Society of America*, *Journal of Geophysical Research*, and *Limnology and Oceanography*. He presented conference papers for the Acoustical Society of America, Armed Forces Communications and Electronics Association, Society of Photo-Optical Instrumentation Engineers/International Society for Optics, and the International Salinity-Temperature-Depth Symposium. He was awarded the Meritorious Civilian Service Award twice and is listed in *Who's Who in American Science*.

CENTER STRATEGIC PLANNING

BALANCED SCORECARD[6,7]

Several Center Strategy meetings were held in 2003 to begin the Center's introduction of the Balanced Scorecard[8] to the technical codes. The Balanced Scorecard provides the framework for translating Center strategy into operational terms for measurement and effective execution. The Balanced Scorecard will provide focus and direct entrepreneurs to business areas within the Center's mission and vision. The technical codes will cascade the plan laid out in the Balanced Scorecard Strategy Map through their organization to measure effectiveness.

On 25 February 2003, Bob Kochanski (Head, Communication and Information Systems) and Dr. Bob Kolb (SSC San Diego Executive Director) led a Center Strategy meeting to roll out the Balanced Scorecard to branch heads and supervisors in Code 280. Dr. Kolb presented the evolution of the Center's Strategic Plan, but he emphasized that strategic planning should be a continuous process. The Center has tried to follow strategic road maps through customer value analysis, a vision to performance session, and High Performance Organization seminars attended by 60% of the employees. Center initiatives have created business development boards. Teams have examined core competencies, internal communications, and corporate business processes.

On 19 March 2003, Carmela Keeney (Head, Intelligence, Surveillance, and Reconnaissance Department, Code 270) and Dr. Kolb conducted another Center Strategy meeting focusing on the Balanced Scorecard. Although the meeting was aimed at the branch heads and supervisors in Code 270, all employees were invited to attend. Immediately following, Center employees were invited to ask questions of Carmela Keeney and Dr. Kolb. See endnotes for summary.[9]

SUPPORT CODES[10]

On 19 June, an All Hands for the Center's Support Codes was conducted by SSC San Diego Commanding Officer Capt. Tim Flynn, Executive Officer Capt. Patricia Miller (Code 203), and Deputy Executive Director for Corporate Operations (Code 202) Steve Arkin. They addressed members of Codes 202, 203, Office of the Executive Director, Science, Technology, and Engineering (Code 210), Supply and Contracts (Code 220), and the Commanding Officer and Executive Director's staffs (Codes 200 and 201) on the external and internal forces expected to impact the Center's base and business operations in the near future.

External challenges ahead include Base Closure and Realignment (BRAC) in FY 2005; the stand-up of Commander, Naval Installations Command; budget adjustments and marks reducing Center general and administrative overhead; the Secretary of the Navy's Efficiency and Effectiveness Study; and anticipated Navy shore infrastructure reductions to recapitalize the Fleet and recoup the cost of war.

Internal forces include ongoing Commercial Activity (A-76) studies, feedback from the 2002 Office of Personnel Management Survey that indicated red tape caused the most dissatisfaction for 63% of the workforce (including the Support Codes), feedback from the recent Inspector General review and various audits, employee exit surveys describing the difficulty with procurement processes, and the introduction of the Balanced Scorecard to measure progress toward becoming a high-performance organization (HPO).

To address these issues, the Center is forming cross-functional teams that draw from all levels of the staff codes to re-engineer key support processes. Further restructuring around these key processes is possible. A senior management team will look at functions and process improvements. The team will form subteams to examine how functions are being performed and how to gain more efficiency by changing

processes or changing the organization. The team will estimate potential savings and efficiencies to be gained and come up with recommendations.

CENTER INITIATIVES

INTERNAL COMMUNICATIONS: SSC INSIDER[11]

Several new upgrades to the Center's Intranet were made in 2003. The goal for the "SSCInsider," the new name for the Center's Intranet, is to make it the "single" login site for all Center Intranet functions and websites. New features included the following:

- "News and Announcements" allows Center employees to make others aware of information of interest to other personnel; submissions are easily made via a form on the SSC Insider homepage.
- The "How Do I...?" section was designed to save time and effort by providing answers to common everyday tasks. Employees can submit answers to common questions for publication or submit questions for web page administrators to research.
- Employees can complete timecards and list property assets from the SSC Insider.

CAPABILITY MATURITY MODEL FOR SOFTWARE[12]

The Center's software engineering capability was reconfirmed at Maturity Level 3 by a formal, external assessment using the Software Engineering Institute's Capability Maturity Model for Software (SW-CMM). This 2-week assessment ended on 7 August.

The Center was originally assessed at SW-CMM Level 3 in October 2000. Assessments are conducted periodically to measure the software engineering capability of an organization against the SW-CMM, a five-level model of accepted industry best practices for software engineering.

A team from the Software Technology Support Center (STSC) at Hill Air Force Base (AFB), Utah, and SSC San Diego conducted the assessment. Four projects participated in the assessment:

- Joint Simulation System–Maritime (Simulation and Human Systems Technology Division, Code 244)
- Joint (Ultrahigh Frequency) Military Satellite Communication Network Integrated Control System (Radio Frequency Communications Systems Division, Code 284)
- Real-Time Targeting and Retargeting Time-Critical Strike (Tactical Systems Integration and Interoperability Division, Code 245 and G2 Software)
- Cryptologic Unified Build (Signal Exploitation and Information Management Division, Code 272).

All the projects participating in the assessment had to demonstrate that they were following organization standard processes in the development of their software. If one project failed to do that, then the Center could not retain its SW-CMM Level 3 rating.

The Center's process improvement focus is now shifting to systems engineering and project management using the Balanced Scorecard (BSC) objectives and the Capability Maturity Model Integrated (CMMI) to measure progress. The goal is to meet the BSC objective of standardized technical work processes and attain a CMMI Level 5 capability.

See also related articles in the Command and Control section (Command and Control Software Process Improvement, Joint Simulation System–Maritime (JSIMS–M) Software Process Improvement), and in the Fleet Engineering section (METMF(R) Software Process Improvement).

CENTER FOR COMMERCIALIZATION OF ADVANCED TECHNOLOGY[13]

The Center for Commercialization of Advanced Technology (CCAT) program will bring resources to match technological advances developed in the Center's laboratories with end-user applications in the commercial marketplace. CCAT is a Department of Defense (DoD)-funded partnership of government, academia, and industry. Partnering with SSC San Diego are San Diego State University Foundation and Entrepreneurial Management Center; the University of California, San Diego (UCSD) Jacobs School and UCSD CONNECT; and ORINCON Technologies, Incorporated.

Efforts in 2003 were made to provide more information to Center researchers about the potential interest by industry in their work and to encourage them to use CCAT resources to develop Cooperative Research and Development Agreements (CRADAs) or patent licensing agreements. CRADAs can provide funds for the Center's research programs. Offering new technology stimulates the local and national economy by creating jobs and offering cutting-edge technology to small and large private industries. Center technologists can contribute to the strength of the nation by contributing cutting-edge research, making the U.S. competitive in world markets.

Through CCAT, the Center has established a relationship with a match-making agency called TechLink, a DoD-supported group from Montana State University. TechLink has been tasked to review all DoD patents and try to match them with commercial companies. TechLink representatives visited the Center to learn about the different technologies and different holders of intellectual property at the Center and to become familiar with work developed here. Any CRADAs formed could provide a mechanism for SSC San Diego technologists to develop advanced prototypes and work with commercial companies to move their technologies toward commercial products.

In the past, the Center had few resources to support commercialization of technology. Financing often came out of project funds, and some sponsors emphasize commercializing technology and some do not. If it is not the sponsor's high priority, a technologist might not bother to submit a patent disclosure. CCAT can support some of the efforts that are not always directly supported by the sponsor.

CCAT can support Center technologists to participate in this process through CCAT resources. This support is a step forward in commercializing technology at the Center as Center technologists can apply to the CCAT program to pay for their time and travel to meet with a company, draft a CRADA, or initiate the licensing process.

PROJECT MANAGEMENT COUNCIL[14]

A new Project Management Council (PMC) was established by SSC San Diego Executive Director Dr. Bob Kolb at the 14 March Strategic Planning Meeting. Its formation was based on recommendations from a cross-Center Project Management (PM) Integrated Process Team. The council will strive to accomplish the following:

- Evaluate best practices, processes, tools, and guidance related to PM as applied to SSC San Diego projects.
- Identify issues concerning current or future PM practices. Represent the Center PM community.
- Recommend to the SSC San Diego Strategic Planning Board practices, tools, improvements, and guidance for implementation on SSC San Diego projects.

Initially, the council will establish end-to-end PM requirements to select tools for Center-wide PM. The council will create a PM training curriculum and define daily PM operational processes for small, medium, and large projects. PMC reports will be generated to outline actions and recommendations.

One overriding objective of the PMC is to provide project managers with an advocacy group that reports directly to senior Center leadership on PM issues and works to improve PM as a critical core competency. The PMC will give the Center's PM community an avenue to communicate their priorities and their recommendations to the Center's Strategic Planning Group.

COMMUNITY OUTREACH

SMALL BUSINESS EVENTS[15]

The Center's Small Business Office participated with local small businesses at two events: Operation Opportunity and HUBZone.

Operation Opportunity

Operation Opportunity is an annual event sponsored by the San Diego Supplier Development Council. The 2003 event included a trade fair, informational workshops, and a networking lunch.

Operation Opportunity has become an important annual small business event in the San Diego community to expand contracting opportunities for small, women-owned, minority-owned, veteran, disabled veteran-owned, and Historically Under-utilized Business Zone (HUBZone) businesses. The SSC San Diego Small Business Office (SBO) (Code 2005) chaired the event this year. The planning committee was headed by Deputy for Small Business Susan Burrows and included Kate Hamilton, also of Code 2005, who serves as president of the San Diego Supplier Development Council.

Large prime contractors, government agencies, and nonprofit organizations gathered at the Paradise Point Resort Conference Center on 8 July to discuss and promote contracting opportunities with nearly 400 small businesses. The conference theme was “Small Business is the Key to Homeland Defense” and heavily emphasized small business participation in government and industry homeland defense opportunities.

HUBZone

On 20 August, the SBO hosted “HUBVETCON,” a specialized outreach event for HUBZone and veteran-owned small businesses. HUBZone and veteran-owned firms matching the Center's mission needs were invited to attend a targeted briefing designed to inform them of those needs and also to familiarize the Center's business managers with the potential small business partners in attendance.

Each Center technical department provided information on what it does and how small businesses can play a part. Departments represented included Navigation and Applied Sciences Department, Code 230; Command and Control Department, Code 240; Fleet Engineering Department, Code 260; Intelligence, Surveillance and Reconnaissance Department, Code 270; Communication and Information Systems Department, Code 280; and SPAWAR Systems Activity Pacific, Code 290.

Briefings were given by representatives of the Associate Administrator for Government Contracting, Small Business Administration, and the Director, Small and Disadvantaged Business Utilization, Department of Veteran Affairs, located in Washington, DC.

The SBO unveiled its new websites to assist SSC San Diego employees and contractors to find vital information regarding all types of small business contracting.

EDUCATIONAL TECHNOLOGY FAIR[16]

SSC San Diego employees represented the Center at the Educational Technology Fair (Ed Tech Fair) and offered young people hands-on experiences with SSC San Diego technology. The goal of the Ed Tech Fair is to encourage secondary students to pursue interests and careers in science and technology. The fair showcases technology from San Diego regional businesses and government agencies to county-wide high school and middle school students. It is held yearly at the Bing Crosby Hall, Del Mar Fairgrounds. It is

sponsored by the San Diego County Office of Education, San Diego City Schools, the local congressional delegation, and the San Diego Science Alliance.

SSC San Diego technologies showcased included the following:

- Speaker verification technology developed as part of the SSC San Diego Sentinel system.
- The Combat Wear Integration (COMWIN) project, which demonstrated the ability to get real-time information to a warfighter wearing a helmet antenna.

SCIENCE AND ENGINEERING FAIR[17]

Scientists and researchers from SSC San Diego volunteered as judges at this year's Greater San Diego Science and Engineering Fair held in Balboa Park. The Center was well represented by employees who showed their professionalism and commitment to community involvement. Employees also represented several professional organizations at the science fair, including the San Diego Chapter of the Human Factors and Ergonomics Society and the Armed Forces Communications and Electronics Association. Each year the Science Fair is open to 7th through 12th grade students in public, private, or parochial schools in San Diego and Imperial Counties. Students entered projects in their school's fair, and selected projects were invited to apply for admission in the Greater San Diego Science and Engineering Fair.

SHADOW DAY 2003[18]

SSC San Diego again cooperated with the San Diego Mathematics, Engineering, and Science Achievement (SDMA) Alliance by hosting seven college students for “Shadow Day 2003” on 20 November. The SDMA Shadow Day for college students supports those interested in engineering and science. It serves educationally disadvantaged students and under-represented student populations by giving them exposure to engineering and science environments. SDMA incorporates all the San Diego Mathematics, Engineering, and Science Achievement Centers from San Diego State University and University of California San Diego; and City, Cuyamaca, and Southwestern Community Colleges.

The students shadowed SSC San Diego math, science, and engineering professionals, who provided a brief tour of the facility, explained the Center’s mission, and allowed the students to see work in progress. The program provides a great opportunity for up-and-coming students to see scientific and engineering applications in their field of interest.

SECTION 3
TECHNICAL HIGHLIGHTS

NAVIGATION AND APPLIED SCIENCES

NAVIGATION SENSOR SYSTEM INTERFACE BLOCK 4.2.0[19]

The Marine Navigation Division (Code 232) delivered Block 4.2.0 of the Navigation Sensor System Interface (NAVSSI) to USS *Ronald Reagan* (CVN 76) and the Virginia Advanced Shipbuilding and Carrier Integration Center. This system is the most advanced integrated navigation system yet developed. When installed in the Voyage Management System configuration, NAVSSI will add extensive user interface and electronic navigation capabilities to the state-of-the-art, real-time navigation data fusion and distribution system aboard USS *Ronald Reagan*.

Systems such as the Ship Self-Defense System (SSDS) MK 2 use navigational information from NAVSSI to provide quick-reaction combat capability for CVN (Multi-Purpose Aircraft Carrier (Nuclear)) and LPD 17 (Amphibious Transport Dock, *San Antonio* Class) ships. NAVSSI information helps SSDS to use weapons systems such as the SLQ-32, the North Atlantic Treaty Organization (NATO) Sea Sparrow Missile Systems, and the Rolling Airframe Block 1 missile. It helps these systems defend against anti-ship missile and aircraft attack in the cluttered littoral conflict environment where reaction times are exceedingly short.

The NAVSSI program began in 1991 with an operational requirement to prevent over-the-horizon related fratricide mishaps by providing all ships with a core device to accept and process Global Positioning System (GPS) and other navigational data in real time. While this still remains a core function of NAVSSI, the system has grown so that the Navy can now incorporate certain new technologies that enable safer navigation. NAVSSI program success is largely due because it is an evolutionary acquisition (EA) program. The EA program methodology allows NAVSSI to be developed and fielded in an evolutionary fashion or, as it is commonly referred to, in blocks. Thus, platforms with the most immediate requirements can receive installations without waiting for delivery of an ultimate, all-encompassing system that will take years to develop and test.

All NAVSSI blocks start with two subsystems: the Display and Control Subsystem (DCS) and Real-Time Subsystem (RTS). The DCS provides the human–computer interface, data logging, and electronic navigation capabilities. The RTS receives, processes, and distributes position, velocity, and time data in a real-time environment to user systems throughout the ship. Individual platform configurations are then tailored to meet specific requirements.

The first NAVSSI (Block 0) system consisted of nondevelopmental item hardware and software from the Tactical Data Position Source, a personal computer-based system developed for concept demonstration of the NAVSSI function. The NAVSSI Block 1 system was derived from the same requirements as the NAVSSI Block 0 system. The primary purpose of Block 1 was to migrate the real-time subsystem to the DoD-mandated Ada programming language. This version was never released to the Fleet; instead, the Navy decided to to develop and field a Block 2 version.

The NAVSSI Block 2 upgrade modified the Block 1 system to include integration aboard aircraft carriers and to carrier-specific modifications. Block 2 was the first NAVSSI version compliant with the Defense Information Infrastructure Common Operating Environment (COE), a core requirement of the Chief of Naval Operations electronic navigation policy.

The NAVSSI Block 3 upgrade interfaced to many different systems aboard different classes of surface ships, and was a major developmental effort. The single most important enhancement added in Block 3 is the Navigation Source Integration (NSI) algorithm. NSI combines data from available sensors to generate more robust, accurate, and stable position, velocity, and attitude solutions. NSI has proven superior to

GPS and Integrated Navigation Segment (INS) in an independent test conducted on an Aegis class destroyer by the Gun Weapon System program. One of many other enhancements to Block 3 was the first integration of the U.S. Coast Guard COE Segment Command Display and Control (COMDAC) INS electronic charting software. It added the U. S. Naval Observatory-developed Celestial Navigation program and converted the NAVSSI local area network (LAN) to a Fiber Distributed Data Interface LAN.

The NAVSSI Block 4 upgrades began with migration from the Hewlett-Packard® TAC-4 (HP-UX OS) to Sun Ultra series workstations (Solaris® OS) in the DCS. There are also additional user workstations referred to as NAVSSI Remote Stations (NRS) that are essentially extensions of the DCS.
The version of COMDAC INS integrated with Block 4 provides a sophisticated electronic charting engine that includes an interface with the SPS-73 navigation radar. This engine allows for radar images to be overlaid directly on National Imagery and Mapping Agency (NIMA) Digital Nautical Charts, in addition to the other route planning and monitoring electronic navigation tools provided by COMDAC INS.

In addition to the electronic navigation functionality, the DCS contains the RTS control and display, data logging, and celestial navigation modules as well as the interface to the Global Command and Control–Maritime Track Database Manager. The RTS integrates the inputs of shipboard navigation sensors, analyzes the performance of the sensors, and distributes the best navigation solution to users as tailored to each system's requirements. This best navigation solution is derived using a tandem of the NSI and Source Selection algorithms. New Block 4 RTS interfaces include the Mk 38 and Mk 39 Clock Converter Cabinet, Digital Modular Radio, Shipboard Meteorology and Oceanography Observation System, Re-architecture NATO Sea Sparrow Missile System, Joint Tactical Terminal-Maritime, Meteorological and Oceanography SSDS, Surface Search Radar, Ship's Network, and the WSC-3 radio. When configured as a Voyage Management System (VMS), NAVSSI Block 4 adds a second DCS and a nine NRSs to the typical system. A user interface to the SPS-73 navigation radar system is added via COMDAC INS software as is an interface to the Ship Control Console all contributing to a fully automated bridge.

The next build of NAVSSI (Block 4.2.1) is now being designed and developed to meet LHD 8 platform requirements and to allow the integration of the newly emerging GAS-1 antijamming GPS antenna in addition to the ever-growing list of EA enhancements. The Japanese and Korean navies are also in the process of requesting future NAVSSI builds.

HMS *SCOTT* UPDATE[20]

The first fully operational ocean survey system (OSS) was delivered and installed aboard the (United Kingdom (UK) HMS *Scott* in 1997. In 2002, the engineering team completed an ambitious update to the OSS aboard the UK's HMS *Scott*.

The OSS on HMS *Scott* is composed of an integrated navigation subsystem, a high-resolution multi-beam sonar subsystem, and a mission control and processing subsystem (MCAPS) that generate high-accuracy bathymetric navigation charts. The OSS also includes a power distribution system that supplies U.S.-style power to the OSS and acts as an uninterrupted power source if power fails. The OSS also provides time-correlated navigation and depth data to onboard gravity systems provided by the UK Hydrographic Office (HO).

The update was accomplished in two phases. The first phase involved the overhaul and refurbishment of the hull-mounted sonar projector and hydrophone arrays and domes during a 9-week dry-dock period in Portsmouth, England. Updating the under-hull sonar arrays is completed every 5 to 7 years.

The second phase of this update spanned a 7-week period, which started out in Devonport, England, concluded in Gibraltar, and included three sea-trial test periods. This phase included installation, test, and evaluation of significant changes to the navigation, multi-beam sonar, and MCAPS subsystems. The

navigation subsystem update included a replacement navigator for the 1970s-technology ship's inertial navigation system and gyrocompass system; the Kearfott Ring Laser Gyro Navigation (RLGN) System was selected.

The new RLGN system is tightly coupled to the onboard dual GPS receiver system to provide high-accuracy position, velocity and roll, pitch and heading, or ship's attitude data. Successful incorporation of this update into the OSS required the design and development of specialized hardware interfaces to the multi-beam sonar subsystem. These special interfaces provide high-rate digital pitch data to existing sonar transmit beam-steering hardware. Specialized hardware interfaces provide digital roll data at a high data rate to the existing sonar receiver section to allow for compensation for ships motion.

The improved accuracy of the RLGN attitude data in combination with advanced sonar signal processing algorithms developed by SSC San Diego and the Computer Sciences Corporation allowed the delivery of an unprecedented 1/3-degree cross-track resolution over the entire 120-degree sonar swath width. This new parallel process produces 361, 1/3-degree depth points in addition to the standard 121, 1-degree depth-point data record. The previous 121 depth-point capability used 361 internal windows to store the interim Fast Fourier Transform or Burg Algorithm for shallow water areas, whereas the new 361-depth-point sonar process uses 541 internal windows.

Expanded processing improves sonar accuracy and resolution by providing an increased number of raw data points from which to compute depth. This new high-resolution, multi-beam sonar development was another step forward in ongoing efforts to achieve higher accuracy and finer resolution bathymetric charts, with possible expansion into new bottom classification processing and object identification capabilities.

In previous updates it was possible to temporarily retain the old navigation system onboard as a fall-back system if the replacement system did not function properly. The navigation subsystem update did not permit that luxury. Not having the old system as a backup added to the risk of this new system update. Because the OSS is such a highly integrated system, the implementation of the new RLGN systems impacted all major OSS sensor, computer processor, and control and display systems. It was therefore necessary to conduct extensive tests during an initial at-sea, pre-technical evaluation and two subsequent dedicated sea-trial test periods to verify that the new OSS equipment and computer program suite was fully operational and ready to support UK mission survey requirements.

The 7-week dockside and at-sea technical evaluation period concluded in Gibraltar in early December 2002, with a fully operational, updated OSS. This update included classroom and on-the-job training given by SSC San Diego engineers to Royal Navy personnel on the new high-performance RLGN, the new 361 depth-point multi-beam sonar, and new control, display, and processing with MCAPS system at-sea acceptance testing. The training, conducted by the SSC San Diego team under the direction of Greg Kwik, demonstrated a marked improvement over the previous system in the navigation and sonar depth data accuracies. At the conclusion of the update period, the UK MoD program sponsor, UK HO and Code 232 personnel held their annual working group meeting onboard HMS *Scott*. At this meeting OSS data was examined and UK personnel agreed that the system performance was excellent. This successful effort, completed within schedule and cost estimates, helps maintain the already excellent working relationship that exists between the UK Mod, UK HO, SSC San Diego, and supporting contractors.

The next major OSS update, planned for September/October 2003, will involve replacement of the MCAPS Hewlett-Packard® 9000 835 workstation computer systems on HMS *Scott* and at the UK HO in Taunton, UK, with state-of-the-art Hewlett-Packard Visualize J-5600 workstation computer systems. The MCAPS provides centralized control, display, and performance monitoring of the sensors and processing system equipment that make up the OSS.

These new MCAPS workstation computer systems are being configured, developed, and tested by Code 2324 engineers in the System Integration Laboratory (SIL) located in Building 1, Bayside, in preparation for installation, test, and final evaluation on board HMS *Scott* this fall. The OSS configuration in the SIL, replicates, to the maximum extent practical, the actual OSS configuration as it exists aboard HMS *Scott* and the DRS at the UK HO. As a result of the extensive development and pre-shipboard testing efforts conducted in this type of environment, the risks involved with new updates to the system are minimized, as are shipboard installation and testing time. This results in maximizing the amount of at-sea survey time for HMS *Scott*. Optimizing the amount of productive survey time minimizes the cost-per-survey mile, a very important consideration in determining the cost-effectiveness of conducting ocean survey operations.

MK6 MARINE MAMMAL SYSTEM (MMS)[21]

In early 2003, the MK6 Marine Mammal System (MMS) deployed to Bahrain in support of Operation Iraqi Freedom. The MK6 dolphins were deployed to guard against swimmers around ships or piers in Bahrain harbor. The MK6 dolphins assumed responsibilities of sea lions previously deployed in Bahrain as part of a Shallow Water Intruder Detection System (SWIDS) demonstration.

Marine Mammal Systems are expeditionary warfare assets operated by EODMU3 and Naval Special Clearance Team One (NSCT-1). Animal care, in-service engineering, and depot support are provided by SSC San Diego Biosciences Division (Code 235) personnel. Accompanied by Science Applications International Corporation support personnel, the Center team traveled to the Middle East with the MK6 animals. The team reported that the marine mammals had easy, uneventful flights. Once in the gulf, MK6 MMS integrated well with the National Security Agency Bahrain Harbor Patrol Unit (HPU). A floating enclosure, much like their permanent home in San Diego, kept them safe and comfortable when not working.

SWIDS is a prototype capability using sea lions to support waterside security forces. Commander, 5th Fleet tasked the Biosciences Division to provide a random anti-terrorism measure in Bahrain Harbor for 30 days. The sea lions patrolled near piers and ships to locate swimmers or divers that might be dangerous or pose a possible threat to the coalition forces in the area. The sea lion can attach a cuff to the leg of an unauthorized swimmer or diver to allow for intervention by security forces on the surface. The sea lions were able to inspect pier and harbor areas in spite of the turbid water, a feat that human swimmers could not do for lack of visibility. Sea lions have very effective natural underwater directional hearing and eyes well adapted to low-light conditions. The sea lions were also invaluable to HPU forces by providing unequivocal discrimination of the Waterside Security System underwater sensor man-like detections. SSC San Diego was originally tasked to provide a 30-day demonstration. However, once on station and at work, the contribution to the harbor security mission was so evident that 5th Fleet funded SSC San Diego to keep the sea lions in place until the MK6 MMS could take up their responsibilities, a 45-day extension.

The MK7 and MK8 MMS, also recently employed in the Persian Gulf, are mine-hunting systems operated by NSCT-1 personnel using dolphins. The dolphin's biosonar is unmatched by hardware sonars in detecting mines in the water column and on, or buried in, the ocean bottom. The animals place markers to create a map of a mined area for NSCT-1 dive teams. Several personnel of the Biosciences Division remained in the gulf with animals of the MK6, MK7, and MK8 systems.

The participation of MMS in mine warfare and joint service exercises since Operation Desert Storm has repeatedly demonstrated that marine mammals can provide operationally effective and highly reliable capabilities, and has validated the Navy's investment in this program. The return on that investment has been an unprecedented and historical use of MMS in Operation Iraqi Freedom.

NONLINEAR DYNAMICS[22]

The Center's Applied Research, Technology, and Sensors Branch (Code 2363) was contacted by Frost & Sullivan, a private think-tank, about Center work in noise-mediated cooperative behavior in nonlinear dynamics and its potential private sector applications. The Branch is researching Noise-Activated, Nonlinear Dynamic Sensors (NANDS).

Monitoring and controlling different environments through a network of small interconnected, adaptable, distributed, cheap, and low-energy-consuming smart sensors represents a new, important opportunity that is rapidly becoming a reality. They can be deployed in any desired quantity in air, ground, or water.

NANDS is a new family of tiny smart sensors that holds the promise of enhanced signal-processing capabilities, despite the presence of ambient noise. NANDS researchers in Britain, Italy, and the United States are exploiting the fact that such (already present) noise, ordinarily unwanted because it degrades the response of sensors constrained to operate in a linear regime, could actually increase the sensors' sensitivity and provide a simpler readout scheme for users when the full nonlinear dynamic characteristics are exploited.

Some possible applications include environmental monitoring such as climate, seismic, and traffic conditions. Residential and commercial structures could use the sensors to provide control of appliances, recording, and security functions. Medical roles for the sensors would be controlling drug deployment and sensing physical parameters. It is envisioned that later versions of these sensors could also be deployed for homeland security applications such as screening baggage for assorted chemicals and explosives via nuclear quadrupole resonance or related techniques, as well as deployment in harbors or choke points to detect unwanted intrusions. Other military applications for surveillance, detection, and classification are also being actively investigated.

The opportunities for the microsensors lie in their capability of working in environments where the noise can match, or even be somewhat larger in intensity, than the physical signal that is being monitored. Conventional research has focused on developing sensors that could avoid or cancel the noise; this is necessitated by operation of the devices in a linearized mode, often using a feedback loop to "lock" the response to a linear operating point on the input–output characteristic. In contrast, the research team members used the noise, in conjunction with the intrinsic nonlinearity, to their advantage. They achieved this advantage by allowing the sensor to operate as a free-running nonlinear dynamic system and setting various control parameters (via the physics of the system) to obtain the optimal response for a given noisefloor.

A multinational research team continues to work on the physics of this class of devices to completely understand their dynamics and optimization. The team is continuously devising new ways to enhance sensitivity and optimize the device, e.g., replacing the residence times difference by the (more sensitive to small changes in the target signal) ratio of residence times, but the proof-of-concept work has been completed and demonstrated in laboratory experiments at the University of Catania, Italy, and the Swedish Defense Research Agency (FOI), Stockholm, Sweden, using a prototype fluxgate magnetometer as the test device. While the theoretical physics marches ahead (at SSC San Diego, University of Perugia, Italy, and Warwick University, UK, the team is concurrently designing and prototyping devices that actually use the intrinsic nonlinear dynamic phenomena in a constructive way).

Individuals and corporations use Frost & Sullivan's worldwide offices to learn what interesting technologies might be available for incorporation into their product lines. Although Dr. Bulsara's technology has not been commercialized yet, numerous companies (such as Frost & Sullivan) do exist to evaluate and market innovative technology; such companies could further SSC San Diego's efforts in transferring its technology to the private sector.

COMMAND AND CONTROL

COMMAND DEPLOYABLE HEADQUARTERS[23]

A plaque presented by Raytheon Corporation recognized the SSC San Diego team responsible for the new U.S. Central Command (CENTCOM), Command Deployable Headquarters (CDHQ), now fully operational at the U.S. Air Base, Qatar. The 23 December 2002 edition of *Time Magazine* featured photographs of Secretary of Defense Donald Rumsfeld's visit to CENTCOM Commanding Gen. Tommy Franks at the deployed headquarters in Qatar.

Before September 11, a new Advanced Concept Technology Demonstration (ACTD), entitled the "Deployable Headquarters," was planned. The Joint Precision Strike Demonstration (JPSD) Project Office and SSC San Diego proposed a 3-year development program. SSC San Diego would contribute expertise and past success in developing multiple command centers and mobile command units. After September 11, the task changed.

CENTCOM needed a capability in months, not years. The ACTD became a rapid acquisition program. JPSD was chosen as the program manager, and SSC San Diego accepted the task to lead a government technology team and work with the contractors to design and build the CDHQ at a Raytheon site in St. Petersburg, Florida. On 25 September 2001, with no specific plans in place for funding, specifications, or design, an ad hoc team convened in Washington, DC to begin the task. JPSD issued a contract to their prime contractor, Raytheon, who subcontracted it to General Dynamics for delivery. An interim design process put the program in place by October, and a design of concept was delivered on 1 November 2001, when the first funding arrived.

The solid design work began in December, and the team transitioned to the Raytheon facility in St. Petersburg, Florida. Between January and July the team designed, fabricated, tested, and delivered the deployable headquarters, with SSC San Diego employees involved in all aspects of system engineering, C4I applications, safety, and testing. The team worked long hours over the 7-month period loading, integrating, configuring, documenting, and testing the software designed to replicate the functions available in CENTCOM's MacDill Air Force Base command center. The team provided special expertise in the Global Command and Control System, collaboration systems, and multimedia. The sign-off for the Center's work was 8 August, and the command center was shipped to Qatar in September, less than a year from the beginning of the program.

When completed, CDHQ was the size of a football field, supporting hundreds of people. The facility includes 100 server machines, video teleconference capabilities, over 400 laptops, and 230 watch positions. Many of the significant software applications are commercial off-the-shelf.

The CDHQ is modular so that it can be easily broken into to subcomponent parts and shipped using land, sea, or air transport. Shelter containers are 8 by 8 by 20 feet when collapsed for shipping. They can be quickly expanded to create a 20- by 20-foot office space for 16 watchstanders. Two shelters expand to 60- by 20-foot buildings for the Joint Operations Center and Command Briefing Room, each with 46 planner stations. These existing shelters were upgraded to increase their power and communications capabilities. This upgrade included networking them together with fiber-optic cables and using desktop collaboration to allow for communication from building to building.

CDHQ was designed and fielded with generators to power the computers, communications equipment, lights, and environmental controls for independent operation in hostile environments. The Joint Communications Support Element, a co-deployed unit, provides four different wide area communications networks to CDHQ, from intelligence networks to the Nonsecure Internet Protocol Router Network.

The command shelters office infrastructure provides work spaces and computers for the military staff and is equipped for secure teleconferences and potential networking with coalition partners.

The cross-Center effort included personnel from the Command and Control Department (Code 240) and the Communication and Information Systems Department (Code 280) who made major contributions to command, control, and communications requirements. The Fleet Engineering Department (Code 260) provided in-service engineering, the Intelligence, Surveillance and Reconnaissance Department (Code 270) provided automated data processing security support, and the Navigation and Applied Sciences Department (Code 230) provided safety resources.

ULCHI FOCUS LENS[24]

The Center's modeling and simulation team successfully participated in Ulchi Focus Lens 03 (UFL03), a major joint and combined arms command and control training exercise. This annual exercise is conducted by Commander, U.S./Republic of Korea Combined Forces Command. Its basic purpose is to exercise U.S. and the Republic of Korea senior officers and staffs of the Army, Navy, Air Force, and Marine Corps in the command and control of missions and tasks that might be necessary for the defense of the Republic of Korea.

UFL is a simulated exercise, with the activities of the simulated forces coupled to the command, control, communications, computers, and intelligence (C4I) systems of the commanders to be trained. UFL is the largest and most complex of this type of exercise and typically involves more than 10,000 military and government personnel. UFL03 lasted 2 weeks, concluding on 29 August. UFL03 was distributed to participants located throughout the South Korean peninsula, as well as Okinawa, Hawaii, and a number of locations stateside.

The wargame is supported by a confederation of computer models, the Joint Training Confederation. In this confederation, the maritime component is provided by the Center's own model: the Research, Evaluation, and Systems Analysis (RESA) naval warfare simulation. This simulation is the only maritime model certified for use in joint warfighting computer-aided command and control exercises. RESA was developed and is maintained as an element of the Joint Training Confederation in the Simulation and Human Systems Technology Division (Code 244).

The RESA model provides the Navy and joint training audience with a realistic representation of the maritime battle space via a direct connection to the real-world C4I systems. Similarly, the ground and air picture is provided by service-sponsored models: Corps Battle Simulation for the Army, and Air Warfare Simulation for the Air Force. The combined battle space picture is developed through the Global Command and Control System used by the training audience. This common operating picture of the perceived joint battle space is provided to major components of the training audience. Based on the situation assessed by this picture, the training audience formulates plans and provides directions to supporting response cells at which the simulated forces are controlled. Members of the training audience normally participate from their expected command locations aboard ship or ashore and communicate with each other using real-world systems.

The Code 244 team was supported by 15 contractors from Sonalysts, Incorporated. This team supported RESA operations in Yongsan (Seoul), Camp Casey, Chi Hae, and Okinawa during the 24-hours-per-day/ 7 days-per-week exercise operations. As in recent years, the SSC San Diego team performed flawlessly and the RESA model proved its worth as the backbone of the Joint Training Confederation. This year was the 15th year in which SSC San Diego has supported the conduct of UFL in Korea.

DISTRIBUTED ENGINEERING PLANT[25]

The Navy's Distributed Engineering Plant (DEP) Tactical Digital Information Link (TADIL) engineering team, Systems Integration Facility (SIF) team, and Tactical Communication Solutions (TCS) team installed, validated, tested, and successfully demonstrated the Gateway Virtual Host (GVH)/Gateway Virtual Terminal (GVT) capability. This effort was accomplished in the DEP during a Gateway Terminal Emulator (GTE) software upgrade to version 8.6. This critical enhancement is unprecedented in land-based interoperability testing, and the installation marked the first proof-of-concept demonstration of its kind.

During the demonstration, Navy Hawkeye air surveillance and early warning aircraft (E-2C) laboratories were configured using local GVTs at the Integrated Combat Systems Test Detachment, Surface Combat Systems Center, and Naval Air Warfare Center, Patuxent River. The Gateway Backbone connection was made via the Asynchronous Transfer Mode Tactical Digital Information Link (TADIL-J) virtual local area network (VLAN) to GVHs located in the SSC San Diego SIF laboratory. The SIF GVHs were connected to local Navy Class II ship and air Joint Tactical Information Distribution System (JTIDS) terminals, which were connected to the SIF laboratory's Radio Frequency Network (RFN). The RFN acted as the dynamic Link-16 environment.

The Navy DEP was established in 1998 to address critical fleet interoperability issues as the result of a Chief of Naval Operations directive, a Naval Sea Systems Command task force study, and the subsequent formation of the Navy Alliance. The primary mission of the DEP is battle force interoperability testing (BFIT). The Navy DEP team characterizes the interoperability of each deploying battle group using federated land-based sites and provides this information to the battle group staff along with the acquisition community. DEP testing has proven to be extremely valuable in many ways over the past 3 years. As of the spring of 2003, the DEP had executed 14 BFITs covering 23 deployed battle groups, including a multi-battle group event in support of Operation Iraqi Freedom. Fleet feedback has been very positive.

The DEP TADIL engineering team strives to continuously add increased fidelity and realism into the testing environment by introducting new capabilibities. The GVH/GVT functionality in the GTE is one such capability. The GTE is used as the connectivity and communications device for Link-16 during DEP testing across the nationwide Defense Information System Network–Local Area Network Emulation Server network. GVH/GVT adds Navy combat systems connectivity, i.e., Aegis Weapons System and Advanced Combat Direction System, to real Link-16 terminals, thereby increasing the use of hardware-in-the-loop.

This newly introduced GVH/GVT capability allows JTIDS and Multi-Functional Information Distribution System (MIDS) terminal functionality testing for such items as relative navigation (RelNav), terminal in message and terminal out message exchange, and time slot reallocation. SSC San Diego currently has a number of JTIDS terminals located in the SIF. These terminals are used for a wide variety of testing efforts and can be configured for testing with in-house radio frequency modeling equipment or can be configured to participate in live test events via the dedicated antennas in the SIF.

The Fleet will gain better hardware and software interoperability with JTIDS, MIDS, and various other link media as the result of critical capabilities such as the GVH/GVT function of the GTE. Tremendous cost savings and increased test productivity are attributable to testing functions that allow for land-based vetting of combat systems in environments such as the DEP. The DEP TADIL, SIF, and TCS teams will continue adding relevant enhancements to the interoperability testing arena as well as anticipating the future operational and tactical communications needs of the Navy.

INFORMATION OPERATIONS COMMAND AND CONTROL (IOC2) DYNAMIC NETWORK DEFENSE EXPERIMENT[26]

SSC San Diego's Information Operations Center of the Future (IOCOF) conducted the Information Operations Command and Control (IOC2) Dynamic Network Defense Experiment to assess dynamic network defense using the Embedded Firewall (EFW) while measuring impact on warfighter workload, situational awareness, and command and control capabilities. The EFW, based on research funded by the Defense Advanced Research Projects Agency (DARPA), is a Secure Computing Corporation-developed solution commercialized by the 3Com Corporation. It adds a layer of protection across the network via a policy server and Network Interface Cards. This protection allows centralized firewall management and dynamic response tailoring defense by an individual server, a workstation, or a laptop. Sponsors of this experiment included the Office of the Chief of Naval Operations (N614), Navy Warfare Development Command, DARPA, SPAWAR Program Manager for Information Warfare–Defend (PMW-161), and the SPAWAR Naval Electronic Combat Surveillance Program Office (PMW-189). All sponsors are members of the Navy Information Operations Partnership.

The IOCOF provided a highly authentic replication of a shipboard joint operations center (JOC), patterned after the Third Fleet Flagship USS *Coronado* (AGF 11). The JOC included such systems as Global Command and Control System–Maritime and Information Technology for the Twenty-First Century (IT-21) workstations. The IOCOF also incorporated a broader test bed to conduct detailed technical analysis.

The IOC2 experiment consisted of two phases. The first centered heavily on technical aspects of EFW implementation and derivation of firewall rule sets. Government and contractor personnel conducted the first phase in the IOCOF laboratory over many weeks, analyzing EFW on the IT-21 test bed and developing rule sets based on a typical shipboard environment. The second phase measured the operational impact of those rule sets. During this phase, 11 Commander, Third Fleet (COMTHIRDFLT) participants manned the JOC during five watches, over 3 consecutive days, assessing the effectiveness of EFW in a simulated afloat environment.

Working against a realistic scenario and interacting with the IOCOF White Cell, watchstanders performed roles typical of those experienced during joint task force operations afloat, while EFW defended against Red Cell attacks. The focus of these efforts was development of tactics, techniques, and procedures to aid EFW fleet transition. The benefit of using the IOCOF was defense against attacks using a realistic network and EFW rule set experimentation without jeopardizing an operational shipboard Local Area Network.

Experiment personnel accumulated over a gigabyte of electronic data during each watch and gathered metrics from participant observations and surveys. Extensive analysis will continue through January; however, initial indicators reveal EFW increased network protection while allowing JOC watchstanders to perform successfully with minimal perturbation to their normal functions. Modifications to the network, in response to mission requirements, were easily and quickly accomplished from the EFW policy server. Lab EFW implementation on operational networks also resulted in numerous lessons learned to assist fleet transition and use.

Successful execution required extensive expertise from across SSC San Diego, including the Command and Control Department (Code 240), Intelligence, Surveillance, and Reconnaissance Department (Code 270), and the Communication and Information Systems Department (Code 280).

NATIONAL IMAGERY AND MAPPING AGENCY (NIMA) SUPPORT OFFICE[27]

On 22 January, the Philadelphia National Imagery and Mapping Agency (NIMA) Support Office was contacted with a crisis requirement from the Air Force Special Operations Command. They were asked to provide two deployable Image Product Library systems to the 16th Special Operations Command in Huliburt, Florida. The NIMA Support Office received a certificate of appreciation from NIMA for their responsiveness.

The NIMA team first defined the requirements. They completed the hardware integration and installed the operating packages, classified application, and nonstandard software packages. They provided the testing and shipment of the classified system.

The initial system was delivered to the 16th Special Operations Command within 36 hours. It was immediately loaded on a waiting transport plane for its operational destination. The second system was delivered within days of the first.

The National Imagery and Mapping Agency Support Office (Code 24235) NIMA team is led by Vivian DiCristofaro. Team members are Mike Finlay, Bob Mullen, Maryann Grookett, Bob Overholt, Joe D'Ulisse, Dave Bentz, Steve Mapa, Alex Santos, and Gary Pease.

COMMAND AND CONTROL SOFTWARE PROCESS IMPROVEMENT[28]

Command and Control Department (Code 240) personnel continue to push the envelope on delivering quality products to the warfighter via expansion of process improvement capabilities. Multiple factors motivate this ongoing migration in the Advanced Concepts and Engineering Division (Code 241), the Command and Intelligence Division (242), the Simulation and Human Systems Technology Division (Code 244) and the Tactical Systems Integration and Interoperability Division (Code 245).

One primary factor is a growing realization by Code 240 project managers and customers that process improvement provides a sound framework for product development and delivery to the warfighter. Some sponsors even require projects to have a Software-Capability Maturity Model (SW-CMM) or Capability Maturity Model Integration (CMMI) Level 3 or higher capability.

Currently, 12 Code 240 projects are working to achieve or sustain an SW-CMM Level 3 or CMMI Level 2 and 3 capability. SSC San Diego must continually work to maintain its Level 3 status by being externally reassessed on regular intervals. This summer is the next date for a reassessment. Five out of twelve Code 240 projects are potential candidates for participation in the Center's forthcoming external assessment.

The assessment consists of a rigorous 2-week evaluation of how well an organization implements the guidelines of the SW-CMM. Since the SW-CMM acts as a measuring stick, the main objective of an evaluation is to determine the strengths and weaknesses of an organization's software process maturity.

Candidate projects to be assessed from Code 240 include Consolidated Reduction and Evaluation (CoRE), Joint Simulation System–Maritime (JSIMS–M), Global Command and Control Systems–Maritime (GCCS–M), Network-Centric Solutions (NCS), and Time-Critical Strike (TCS). These projects have mature enough processes to participate in the Center's screening procedure that verifies their ability to represent SSC San Diego successfully in the external assessment.

Though a Level 3 capability rating is a plus, Code 240 project managers consider that rating secondary to the benefit of process improvement initiatives.

In a different approach, JSIMS–M management and staff have used model implementation as a tool to bring their large team closer together. JSIMS–M is the second largest project at SSC San Diego and is striving to achieve a SW-CMM Level 3 capability. Using a virtual program office, JSIMS–M personnel

have instant Intranet access to program documents, artifacts, meeting agendas, meeting minutes, and schedules. This access allows a whole new level of interaction and oversight over various engineering groups in the JSIMS-M organization. (See next article for additional information about JSIMS–M.)

Several projects in Code 240 have been trailblazing the CMMI model for the Center. Of note is the Tactical Communication Solutions Branch (Code 24524) TCS. The TCS team has experienced immediate positive results in the quality of their processes and their product. CMMI has reduced risk in the product release cycle, given a team-based organization, and allowed TCS to meet the product release deadline with all elements of the release ready.

The Command, Control, Communications, Computers and Intelligence (C4I) Systems Engineering and Integration Branch (Code 24221) Theater Battle Management Core Systems (TBMCS) is also implementing the CMMI. TBMCS is unique in that it focuses on integration, delivery, and installation of Air Force products into Navy applications.

The Advanced Concepts and Engineering Division, Office of the Deputy for Business (Code 2411) Distributed Computer Technology (DCT) business area is also seeing a shift in implementation strategies. Formerly the Naval Fire Control System project, processes have been raised to the business area level to allow for consistency across the organization. DCT is also working toward Level 2 of the CMMI-software engineering/software model.

Code 245's Airborne Tactical Data Systems, the E-2C Software Support Activity for over 30 years, began process improvement implementation in 2002 at the behest of their Naval Air Systems Command sponsor (also a SW-CMM organization). The project now sees “realistic ROMs and schedules” in addition to “shared understanding and agreement of requirements by personnel and the sponsor.

JOINT SIMULATION SYSTEM–MARITIME (JSIMS–M) SOFTWARE PROCESS IMPROVEMENT[29]

The Joint Simulation System–Maritime (JSIMS–M) Project Team was determined to be operating at the Software Engineering Institute Software Capability Maturity Model (SEI SW-CMM) Level 3 based on an internal assessment conducted by the Systems Engineering Process Office (SEPO) in February. The achievement of an SW-CMM Level 3 rating at SSC San Diego validates that a project is using well-defined and repeatable software development processes in conformance with the 13 SW-CMM Key Process Areas (KPAs) and local SSC San Diego institutionalized processes. At the conclusion of the evaluation, SEPO representatives indicated that as one of the Center's largest projects, with over 120 members, to have achieved SW-CMM Level 3 status was most impressive.

Achievement of CMM Level 3 is an essential goal for the Center to increase productivity and quality and to minimize overall cost and schedule requirements for all software development projects.

The achievement of this goal represents the culmination of an extended effort by the JSIMS–M team, working in close coordination with personnel from SEPO.

The evaluation consisted of a careful review of JSIMS–M documented plans and processes, examination of artifacts that demonstrate those processes are being followed, and interviews of various project personnel to confirm the processes are understood and are being followed.

The project team is developing the maritime components of JSIMS as a member of an alliance of Navy, Marine Corps, Air Force, Army, and intelligence community partners. JSIMS is intended primarily to support command and control training for senior commanders and their staff in the conduct of joint force operations ranging from humanitarian assistance to major theater-level conflict.

JOINT TASK FORCE (JTF) WIDE AREA RELAY NETWORK (WARNET)[30]

The final test and checkout before deployment of Joint Task Force (JTF) Wide Area Relay Network (WARNET) took place at the end of September. It was held concurrently with the FORCEnet integrated prototype demonstration, the Expeditionary Strike Group Limited Objective Experiment, and Pacific Command, Command and Control Exercise-08. Participating in the exercise were Marine Corps and Navy assets based at sea or near Okinawa, Japan; and Army, Air Force, and Special Operations forces located in Hawaii. This test completed the overarching pre-deployment exercise (PDX) and determined that JTF WARNET should be kept aboard the military platforms for a year to fully shake out the new functionality.

A large team that included members from SSC San Diego departments, other labs, and support contractors conducted the final test and checkout.. The team ran a scenario that checked equipment and functional flow to make sure it worked successfully. Two smaller tests were conducted before that scenario: Regional Test 1, based in Hawaii in June, and Regional Test 2 in Japan. JTF WARNET is focused on the joint integrated fires and maneuver in the tactical theater.

A Communication and Information Systems Department (Code 280) team worked the communications and communications relay portions of a new digital radio, a prototype of the future Joint Tactical Radio System, which will be fielded over the next 10 years.

The next major area was the Command and Control Translator Database (C2TD) headed by the Command and Control Department (Code 240). The C2TD allows selected systems that are not designed to talk together to converse. The Army systems talk in one set of protocols and the Navy in another, but the Command and Control Translator enables transfer of the information for better situational awareness. The object model on which the C2TD is based also provides several key alerts.

Another major area was the first iteration of the Defense Collaborative Tool Suite. Based on the tests, further work needs to be done to improve the functionality of collaboration in a tactical environment where radio connectivity is not always guaranteed. The tactical environment is approximately 200 miles in diameter. All services were operating close in and trying to exchange information, put weapons on target, and use the digital radio in that environment as opposed to working up the chain of command and across via satellite pipelines in the tactical theater.

Another element was the system management that controlled the radios and routers. This element was a teaming event between SSC San Diego and the Naval Research Laboratory.

The last major functional area was position location information of disadvantaged users such as a single Humvee, helicopter, or foot soldier. Satellite national collectors provide that information, but WARNET provides the data by airborne relay in places where a satellite was not available, which was good news for the Army, Navy Seals, the Marine Corps 31st Marine Expeditionary Unit, and USS *Essex* Expeditionary Strike Group. To get JTF WARNET accredited, the Information Assurance and Engineering Division (Code 287) provided the information assurance.

Testing was another major area. Field tests were conducted for airborne relays using Humvees and commercial aircraft from Montgomery Field before tests were conducted in the operational theater with military helicopters and planes. Incremental tests took place with the regional tests and were repeated in this PDX to check the viability of deployment.

The installation part was divided into air, ground, and sea. Center personnel worked with Pax River personnel on relay installations. A Fleet Engineering Department (Code 260) team performed the installation aboard ships. Cross-Center department teams built the ground nodes, fielding the information to the Army. Marine Corps Humvees and the ground relays. The Intelligence, Surveillance, and Reconnaissance Department (Code 270) headed this work.

The Pacific Command (PACOM) team worked on the warfighter requirements and evaluated suitability for deployment. evaluation included the concept of operations, tactics, techniques and procedures with the warfighters on how they would use this capability. PACOM also worked with the other participants to build a master scenario events list. Execution required leadership from the four participating programs: JTF WARNET, the FORCEnet Integrated Prototype Demonstration, the Expeditionary Strike Group Limited Objective Experiment, and Pacific Command, Command and Control Exercise-08.

The scenario and simulation that drove the command, control, communications, computers, and intelligence systems Joint Semi-Automated Forces were built in an earlier program.

The Army has discussed the possibility of taking JTF WARNET with the 25th Infantry Division who were the users in the PDX as they deploy to Afghanistan. It is believed that USS *Essex* Expeditionary Strike Group, including the Navy and Marine Corps units based in Sasebo, Japan, will use JTF WARNET in the Western Pacific and other theaters on operational missions.

The program moves into a transition period with the Joint Tactical Radio System program manager heading the transition. The Joint Tactical Radio Program, working with the Joint Forces Command, will try to absorb the technologies into the 22 programs of record that have been recognized in the transition plan over FY 2004 and FY 2005.

C2 ENGINEERING, TIDEWATER[31]

The SPAWAR engineering team assigned a tiger team of key personnel to ensure that Command and Control (C2) Engineering, Tidewater (Code 2425) survived Hurricane Isabel. The team provided technical oversight to ensure that the facility shutdown occurred properly. They were prepared to survey and assess damage before the restart of noncritical infrastructure. The team met before the storm to determine what critical equipment should remain online, should there be a power loss. They also led a larger team of personnel in shutting down nonessential equipment so that the generator equipment was fueled and ready to support any potential crisis.

Almost the entire Code 2425 group provides support, in one form or another, to the United States Joint Forces Command (USJFCOM) J7 Directorate (Joint Force Training) at the Command's premier Joint Training, Analysis and Simulation Center (JTASC). This location is also the home of the subordinate command, the Joint Warfighting Center (JWFC).

A SPAWAR cross-Center system engineering team provides this support. This team is the model of how SPAWAR can team across the organization to provide the best support to the nation's joint warfighting community. The team consists of 15 government engineers and scientists supported by approximately 40 contractors. The government team represents SSC Charleston, with support from J50/J60, and SSC San Diego, with support from the Command and Control Department (Code 240). The team has been on-site providing engineering design, installation, and execution support since the stand-up of the facility in 1994. The team is unique in that the USJFCOM J7 has such confidence in them that they have made SPAWAR the J7 systems engineer. The SPAWAR team is its own division within the JWFC organization, known as the JWFC System Engineering Team.

Preparing for the Storm

The JTASC facility is the primary site for USJFCOM unclassified network services. Several key applications in use worldwide are resident there. The Joint Training Information Management System, Joint Digital Library, Joint Center for Lessons Learned, and several other applications and services support a worldwide training mission. The JTASC facility is directly or indirectly involved in over 17 training events per year, each event exceeding 6 months to plan and several weeks to execute. Since the JWFC System Engineering Team designed, installed, and operates all the electronic systems in use at

the JTASC facility, they are the resident subject-matter-experts for all phases of operations and troubleshooting. Meetings held early in the week of 15 September laid out a disaster plan which included:

Terminating the current training event early to allow the participants sufficient time to arrange travel before the storm arrived.

Outlining a plan to keep critical systems up, should the power be interrupted.

Reviewing the disaster recovery plan, should the facility be damaged.

The JTASC facility has a robust emergency backup power generator consisting of two 1.4-megawatt generator plants and a 1.5-megawatt critical systems, uninterrupted power supply. The generator plant can supply full building electrical loads for 2 to 3 days of run-time based on fuel consumption.

Since the hurricane was due to make landfall late in the week, it was reasonable to assume that the systems should run at least through Monday. During key facility meetings with the SPAWAR engineering team, it was determined that the best course of action was to reduce building loads so that a single generator could supply the load, thus extending the run-time to 5 or 6 days.

Hurricane Isabel began as a westward-moving tropical depression on 6 September and quickly became a full-fledged hurricane that made Category 5 status (winds greater than 125 miles per hour) on 11 September. The storm began to weaken on 16 September. When Isabel made landfall, south of Cape Hatteras, North Carolina, Isabel had a very large wind field, extending gale force winds out several hundred miles from the center of circulation. Isabel brought hurricane conditions for portions of eastern North Carolina and southeastern Virginia. Extensive storm surge and flooding occurred along the Atlantic coastlines of North Carolina and Virginia, and 6 to 12 inches of rainfall in the coastal areas.

The current casualty and damage statistics suggest that damage from Isabel may exceed $1 billion. The combination of a wet summer season, massive rainfall, and high winds produced very soggy soil conditions that led to many fallen and uprooted trees. The death toll stands at 13, with 17 more indirectly related to the storm. Dominion Virginia Power suffered a loss of service to over 1.8 million of its 2.2 million customers. Many families were without power for a week or longer. Statistics from Dominion Virginia Power indicate that more than 10,700 power poles were destroyed, and 14,600 pole cross arms were broken. About 13,000 spans of wire had to be restrung, and 7,900 transformers replaced. To their credit, they had over 12,000 employees working to restore power, many borrowed from other utilities. By the last week in September, all but a very small percentage of homes had power restored and most lives were back to normal.

The SPAWAR team is back to work. The facility ran for 7 days on the backup power systems and power was finally restored to JTASC on Wednesday, 22 September. The ability to react and pro-actively support the customer, USJFCOM J7, is a tribute to the SPAWAR cross-center system engineering team.

FLEET ENGINEERING

SSC SAN DIEGO DEPOT[32]

The Secretary of the Navy (SECNAV) designated the SSC San Diego Depot as the Center of Industrial and Technical Excellence (CITE) for Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) systems, equipment, and products.

The CITE designation is made pursuant to Section 2474 of Title 10, United States Code, requiring the services to designate all depot activities as CITEs in the recognized core competencies of the activity. The statute has SECNAV-delegated authority to enter into public–private partnerships to perform work related to the depot maintenance core competency.

CITE designation is part of a Department of Defense initiative to establish public–private partnerships to improve efficiency and effectiveness of depot maintenance operations, support lowering the overall cost of performing depot maintenance, and improve the products and services provided to the Fleet.

Included in the depot's tasking is responsibility for installing field changes and engineering change orders; system and module testing, fabrication, modification; and repair/overhaul services for many customers. The depot's technical personnel also evaluate hardware, software, and procedures for automated test equipment used to repair and overhaul modules and systems. The depot provides acquisition, technical, logistics, and maintenance support services for a wide range of multi-service communications, electronics, and cryptographic systems. Capabilities include the following:

Develop test, overhaul, and repair procedures.

Overhaul, restoration, and condition-based repair of modules and systems.

Circuit card, rack, cable, and equipment manufacturing.

Cryptographic equipment repair and overhaul.

Field change/Engineering Change Package development, retrofit, and installation.

Non-Developmental Items/Commercial Off-the-Shelf supportability.

Radiation Detection, Indication and Computation (RADIAC) and calibration service support (in accordance with American National Standards Institute-Z540/ISO 10012 standards).

C4ISR system operational verification testing.

Failure analysis and information tracking system.

System and module overhaul and test training.

Configuration management.

Certified soldering surface mount technology.

High-technology coating facility.

In 1966, SSC San Diego predecessor Naval Electronics Systems Engineering Activity, Southwest Division, established an 80-employee calibration and repair shop at the Taylor Street facility in San Diego. The depot has grown to 200 employees in a government and contractor partnership.

The SSC San Diego Depot has three locations: a 100,000-square-foot complex at OT-1, a 7,000-square-foot complex at the Naval Station, San Diego (conducting cryptographic equipment repairs), and a 4,000-square-foot complex at Battery Ashburn, Point Loma (conducting RADIAC repair and calibration).

For over 36 years, the depot's mission has been to provide cost-effective solutions, management, engineering, training, life-cycle support, and service-life extension support. The depot offers calibration, material assessments, and test, restoration, overhaul, and manufacture of communication and communication security equipment. The depot has an annual budget of over $30 million from government sponsors and Commercial Service Agreements.

JOINT WARRIOR INTEROPERABILITY DEMONSTRATION (JWID) '03[33]

The Fleet Engineering Department (Code 260) provided project support to the SPAWAR Operational Experiments and Demonstrations Division (Code 056) as they hosted the Joint Warrior Interoperability Demonstration (JWID) '03 as the U.S. Navy Site. This event was held in the Center's Advanced Concepts Site (ACS) from 16–17 June. JWID is the Chairman of the Joint Chiefs of Staff annual event that enables the U.S. combatant commands and international community to investigate command, control, communications, and computer (C4) solutions that focus on relevant and timely core objectives for enhancing coalition interoperability.

With more than 20 sites around the world participating, primary coalition partners included Australia, Canada, New Zealand, United Kingdom, Spain, Germany, the North Atlantic Treaty Organization (NATO), Japan, the Republic of Korea, Singapore, and Thailand. San Diego warfighters included personnel from Canada, Germany, and New Zealand, as well as U.S. Navy active duty and reservists from 13 different commands.

Demonstrations were open to visitors on 24–26 June. Some of the high-ranking visitors attending were retired U.S. Navy Admirals Archie Clemins and Tom Elliot; Rear Adm. Axel Schimpf of the German Navy; and Ron Hooton, New Zealand Defense Force's Chief Information Officer. Also attending were members of other U.S. armed services, commands, and SPAWAR program directorates and program offices giving increased visibility to C4 and intelligence interoperability efforts.

The Defense Information Service Agency was the lead service for JWID '03. The U.S. Pacific Command, Camp Smith, Hawaii, was the host Multinational Task Force (MTF) providing leadership and guidance through the execution of a real-world scenario. The simulated operational environment was created by the host combatant command and provided the context for warfighter validation of the proposed interoperability solutions. In general, this environment consisted of a United States-led coalition operation with one MTF staff conducting simulated coalition operations at the command, component, and force execution levels. Other primary U.S. sites for JWID '03 were Naval Surface Warfare Center (NSWC), Dahlgren, Virginia, and the Air Force's Electronic Systems Group, Hanscom Air Force Base, Massachusetts. San Diego was also the host to the Coalition Forces Maritime Component Commander.

The JWID Coalition Wide Area Network (CWAN) goal is to become a multinational secure multi-releasability/security domain network with mobility among domains. The Combined Federated Battle Laboratory Network (CFBLNet) provides a permanent baseline to build on with the capability to investigate common solutions with participating coalition partners. The capability to connect this network to national networks supports information superiority and steps toward the Global Information Grid. Key technologies demonstrated at JWID '03 in San Diego included a program involving mutli-level security workstations and a number of voice and text language translators. The AUSCAN NZUKUS Multi-National Naval Task Group (MNTG) demonstrated interoperability capabilities in the low-bandwidth, high-latency environment, typical of allied and coalition operations.

In addition to the three San Diego nodes, 19 other MNTG sites were located in Australia, Canada, New Zealand, United Kingdom, and at NSWC, Dahlgren. MNTG technologies demonstrated during JWID '03 included Subnet Relay, Multicasting, Advanced Coalition Routing topologies, public key infrastructure,

Coalition Information Assurance common operating picture, Information Management via Searchbox, and air tasking order browsing and visualization via Extensible Markup Language and Internet Protocol Telephony over low-bandwidth, high-latency networks. The latest versions of Lotus Domino® and Sametime® were used as core services for web replication and distributed collaborative planning. In addition to collaboration among the five nations, collaboration sessions using Lotus Sametime® were conducted with NATO units in the Supreme Headquarters, Allied Powers, Europe bunker in Mons, Belgium.

The Special Projects and Implementation Branch (Code 2644) provided support in systems engineering, network engineering, security accreditation, planning, and execution of JWID '03. The Tactical Network Communications Branch (Code 2631) provided support for the ACS connectivity to the JWID CWAN via the Joint Integrated Communications Facility (JICF) located in OT-2. The ACS is connected to the JICF through 32-pair of fiber-optic lines enclosed in a protected distribution system. This secure connectivity provides access to a variety of satellite communication, terrestrial, and baseband systems located in the JICF. Additionally, Code 2631 maintained the CFBLNet point-of-presence in the JICF, allowing round-the-clock connectivity to the CFBLNet and the Defense Information Systems Network-Leading Edge Services. This support assisted in maintaining a 100% up status of the network connection to the CFBLNet, which was instrumental in the success of this year's JWID.

AN/TMQ-44A METEOROLOGICAL MOBILE FACILITY (REPLACEMENT)[34]

The AN/TMQ-44A Meteorological Mobile Facility (Replacement) (METMF(R)) is a lightweight weather forecasting system contained in a mobile shelter. Five METMF(R) systems are currently deployed with the Marines in Iraq, with four in direct support of ongoing operations.

Military planning has many facets that must be considered to ensure success. In an ever-changing environment, weather plays a major role in the planning and execution stages of military operations. The high-tech weapons used today require an understanding of terrain and weather conditions. Weather, airborne particulates, and ocean influences affect complex targeting systems that hurt accuracy and degrade target designators. While aircraft suffer the most drastic effects in regard to their weapon systems, ground troops are of equal concern as the air temperature can reach well over 100 degrees and the troops are susceptible to fatigue and heat-related ailments.

The METMF(R) allows the Marines to deploy weather forecasters at remote airstrips to support air and ground combat units. Especially equipped units associated with the METMF(R) Meteorological and Oceanography (METOC) support teams travel with front-line units predicting the weather for troops on the ground and their support units. The METMF(R) shelter has wheels that allow the system to be towed by support equipment to travel with the unit at the commander's discretion. This system is a vast improvement over the legacy system that consisted of four vans and required four flatbed trucks to transport them. The replacement system is fully integrated rather than a collection of stand-alone systems. All systems within the shelter are connected to the main forecaster's METOC workstation.

The METMF(R)'s software applications provide the commander with tactical decision aids for acquisition and locking on to targets with their particular weapon platforms. It supports ground force movements by reporting such things as rain, wind, and blowing sand that could impede mobility. If chemical or biological agents were used, the software applications in the van can measure wind speed, direction, and humidity to calculate how far a plume would spread out in a kill area.

While the software in the METMF(R) allows the forecaster to provide the commander with valuable information quickly, the meteorological sensors within the van provide the muscle to back it up. Weather sensors provide local temperature, pressure, humidity, visibility, wind speed and direction, and dew point.

The van has capabilities for launching weather balloons and digitally plotting charts of the atmosphere. Satellite imagery is available for identifying weather systems and determining where they are in relation to geographical boundaries and the shelter has a Doppler weather radar system.

Remote weather sensors can take readings up to 900 miles away and transmit them back to the shelter through a system called Meteorburst. The Meteorburst system transmits a signal that characteristically allows meteor dust to act as a passive repeater. When the signal is transmitted, it bounces off the meteor particles and a long-range communication link is established between the METMF(R) and remote sensors.

The van takes 6 hours to set up for operation and it takes about the same time to tear down for redeployment. One Marine Corps officer, five forecasters, two technicians, and five observers operate the van in its deployed state. Once it is on-site, it is self-contained and can operate for 30 days without resupply. The van depends heavily on the Secret Internet Protocol Router Network to send and receive information to supported units and has the capability to transmit and receive voice communication up to 300 miles in clear and secure modes.

The METOC Systems Branch (Code 2642) supports two major programs: METMF(R) and the Naval Integrated Tactical Environmental System (NITES). The METMF(R) is a Marine Corps project funded by the Navy. NITES is the Navy's meteorological forecasting system installed on all major combatants including carriers, and amphibious and command ships. The NITES system is also installed at 30 shore sites.

The METMF(R) program started in 1989 when Marine Corps weather officers compiled operational requirements and developed a Fleet Operational Needs Statement. The program originated at the predecessor organization Naval Electronic Systems Engineering, Vallejo, in approximately 1992 and moved to San Diego in 1995 when Vallejo was closed. The first system underwent thorough testing and follow-up operational tests, and was delivered to the Marines in 1998.

The shelter has been through several upgrades since initial fielding. Many modifications have come from the Marine Corps users who are encouraged to give their ideas. The software has been upgraded twice a year on a regular basis since 1998. Units in the field have deployed with METMF(R) in Norway for a very successful North Atlantic Treaty Organization exercise, Thailand, and last year to Greece. Before deployment for Operation Iraqi Freedom, the METMF(R) team performed extensive systems grooms, and provided training on system administration and technical troubleshooting to the field personnel.

METMF(R) SOFTWARE PROCESS IMPROVEMENT[35]

The Fleet Engineering Department (Code 260) supports Software Process Improvement (SPI) initiatives for better quality and productivity of software products. Code 260 is expanding SPI efforts throughout the department after a successful internal assessment in which the Joint Tactical Information Distribution System project attained a Capability Maturity Model for Software (SW-CMM) Level 3 assessment. The Meteorological Mobile Facility (Replacement) (METMF(R)) project continues to incorporate SPI initiatives.

The METMF(R) is a transportable system that provides tactical Meteorological and Oceanographic (METOC) data to the Marine Air–Ground Task Force (MAGTF) in garrison and in deployment. METOC data and environmental information are ingested, processed, displayed, and distributed by the METMF(R) system. METMF(R) provides METOC observations, meteorological satellite imagery, meteorological radar, communication interoperability, and Tactical Decision Aid support products to the MAGTF.

METMF(R) is the first SPI project that primarily uses commercial-off-the-shelf software. The METMF(R) team is using the Center's defined standard processes, as developed by the Systems

Engineering Process Office and provided in the SSC San Diego Process Asset Library at http://sepo.spawar.navy.mil. The METMF(R) team is achieving the following:

1. Documentation of plans and procedures for project management, control, and integrity.
2. Implementation of peer reviews as a key element of product assurance.
3. Accumulation and reporting of project performance metrics.
4. Establishment of software quality assurance guidelines for continuous verification of project management processes.

Process improvement at SSC San Diego will be expanding to include systems as well as software engineering in the near future as the transition is made from the Capability Maturity Model (CMM) to the Capability Maturity Model Integration (CMMI). Using this new benchmark, the total project will become the focus of process improvement.

The Fleet Engineering Department is working to implement the goals set by SSC San Diego Executive Director Dr. Bob Kolb for the next phase of process improvement:

1. Achieve the systems engineering and project management capability defined through CMMI Level 3 as a milestone to CMMI Level 5.
2. Migrate SW-CMM Level 3 capability across Center software projects.
3. Produce quality systems in shorter development cycles.
4. Reduce the costs of supporting systems throughout the life cycle.
5. Rapidly introduce new technology into the product and the systems development process and achieve successful transitions.
6. Integrate software across traditional system boundaries to provide a composite set of capabilities to the end-user.
7. Continuously improve customer satisfaction.
8. Continuously increase employee satisfaction.

Code 260 looks forward to expanding the systems engineering disciplines further within the department and beginning the transition to CMMI.

REGIONAL COMMAND CENTER[36]

The SPAWAR Lightning Bolt Award was presented to the SPAWAR Systems Activity Pacific (Code 290) Commander, Navy Region Hawaii (COMNAVREGHI) Regional Command Center (RCC) installation team. The RCC installation team provided innovative planning, design, and implementation of a new anti-terrorism/force protection (AT/FP) capability. This capability is part of a comprehensive AT/FP plan to use a protective shield in the Hawaii Area for naval bases.

The team planned and coordinated a new RCC consisting of approximately 2600 square feet of command space. They designed, procured, and installed a high-resolution, 18-foot video wall and ancillary control systems to monitor and record 46 new cameras covering the Pearl Harbor waterways, base entry gates, and the Pacific Missile Range Facility, Kauai, Hawaii.

As part of the planning process, the team designed and implemented ultra high frequency (UHF)/very high frequency, and UHF line-of-sight radios, the Pacific Mobile Emergency Radio System, secure telephones, and Area Security Operations Command and Control System terminal access. They also provided the RCC to the Regional Operational Command and Control Center to coordinate connectivity

for military 911 emergency responses and secure/non-secure video teleconferencing. All electronic devices such as overhead light dimming, cameras projected onto the video wall, briefing projections, and sound levels are now controlled by a single display touch panel at two operational locations.

Due to the world situation at the time, COMNAVREGHI and Commander Pacific Fleet requested an early completion date for this high-visibility project that originally called for a 15-month completion schedule. Although the RCC installation team was hampered by delays due to the presence of hazardous materials on-site and the procurement of equipment, they completed this $3.8 million task in less than 1 year from inception to the formal ribbon-cutting ceremony. They also accommodated the station's last minute request for changes in requirements, provided weekly status meetings and briefs, and ensured that the latest available technology was used in this project even though it meant redesigning the subsystems and returning/reordering new equipment.

Visitors to the new RCC since activation have included admirals, generals, Congressional representatives, and local state representatives. Based on the comments and feedback provided by the staff of COMNAVREGHI, the superior workmanship and professionalism demonstrated by the RCC installation team is truly noteworthy. They maintained a distinguished level of resourcefulness, teamwork, and dedication throughout the course of the project.

INTELLIGENCE, SURVEILLANCE, AND RECONNAISSANCE

FILTER AGENT[37]

Filter Agent (FA) officially passed operational readiness testing, which is a major milestone for the project. FA is a software tool that provides tactical operators with a rapid and uncomplicated method for setting filters on tactical receivers to exploit national broadcast data. These tactical receivers are equipped with filtering mechanisms because the data broadcasts contain so much data that the information becomes useless to the end-user.

In tactical display systems such as the Global Command and Control System–Maritime (GCCS–M), filtering reduces the clutter from the track picture, which allows tactical operators to work more effectively. It eliminates unwanted data and prevents operator information overload from occurring. It allows the user to view only the data that are relevant to current requirements. Filtering also increases system efficiency by decreasing unnecessary CPU use and freeing needed resources such as memory and input/output.

Filtering mechanisms used by different tactical receivers have not changed significantly from those used in the early 1980s, despite the expanding data types and the increase in the volume of information currently on different broadcasts. These broadcast services include the Tactical Data Distribution System, Tactical Information Broadcast Service, and Tactical Data Information Exchange System Link B. Current tactical receivers provide users with the capability to filter unique contact information specific to their mission and interest areas. These tactical receivers have filter mechanisms that are complex and difficult to operate. Furthermore, the filtering mechanisms were designed primarily for trained intelligence analysts. The nonexpert user does not possess the required in-depth knowledge to understand the national data or the filtering requirements.

FA was developed by the Joint Tactical Information Systems (Code 2734) to address these problems. It was initially submitted as a Merit Proposal by Product Team l Leader Greg Settelmayer and was funded for development in FY 2000 and FY 2001.

FA is designed with the user perspective in mind. Tactical operators demand simplicity and ease of execution. FA allows sophisticated filters to be created without requiring the operator to have a detailed knowledge of signal intelligence, electronic intelligence, or other types of intelligence data. The operator is insulated from the specific filter format details of the filtering system. The operator characterizes information requirements by categories such as platform weapon, geographic area, and mission. This user specification is translated into filter elements that will be used to set device-specific filters on various external tactical terminals that provide for filtering and distribution of contacts.

A Java®-based program that can run on Microsoft Windows® and Solaris® platforms, FA has a flexible design to allow interfaces with different tactical terminal filtering systems. In the first year of development, FY 2000, an interface was provided to operate with the Universal Parser Segment (UPS), the Tactical Receiver Segment (TRS), and the Commanders Tactical Receiver (CTT) via UPS. In FY 2001, the Joint Tactical Terminal (JTT) interface was created.

The team did an outstanding job by addressing a serious operational issue on schedule and within budget. The FA application is really four different products combined into one. It works in the Unix and personal computer environments and is developed for operation using either a stand-alone computer or a system attached to the common operating environment (COE). They overcame many obstacles to achieve this and time was always a critical factor. Additionally, FA is a Software Process Improvement project and the processes implemented by the team contributed significantly to the success of the software.

FA assists the novice operator in creating filters by providing an operational wizard to allow the configuration of a tactical terminal without detailed knowledge of its filter operations. The expert user can use FA to set complex filtering schemes in a fraction of the time that it would take to use the tactical terminal's filter setting mechanism. FA can send queries via the Secret Internet Protocol Router Network to gain access to external order of battle databases such as the Modernized Integrated Database. This concept can maximize the usefulness of existing and future tactical terminals such as the CTT, TRS, UPS, JTT, and Multi-Mission Advanced Tactical Terminal (MATT).

The recent capability to operate with the JTT is accomplished by passing filter specifications to the Tactical Control Client Handler, which will, in turn, set the filters on the JTT. The developers are also working toward a version for COE 4.X architecture. When completed, FA will be a COE Level 7-compliant segment.

HIGH PERFORMANCE COMPUTING (HPC)[38]

In April and May, the High Performance Networking and Computing Initiative Group (HPCNIG) hosted four MATLAB® courses at no cost to the Center. (MATLAB provides researchers with a simple prototyping language and easy access to the essential building blocks included in the universally recognized LINPACK and EISPACK computation packages.) These courses were taught by a team of professors from Ohio State University through the auspices of the DoD High Performance Computing Modernization Program's (HPCMP) Programming Environment and Training (PET) Program. The four courses were 2-day introductory courses, a 1-day advanced signal processing course, and a 1-day advanced image processing course. Ninety scientists and engineers (including 15 New Professionals (NPs), a Summer Faculty Professor, and visitors from other DoD centers) attended these four intensive hands-on MATLAB courses this year.

The benefits of the HPCMP PET Program have been significant to the DoD HPC user community and to the SSC San Diego technical community, as evidenced by the participation in the MATLAB® courses over the past 4 years. Through these courses, scientists and engineers, and NPs, have improved on and advanced their numerical computation and signal and image processing skills to enable them to solve the increasingly complex and challenging problems encountered in the primary mission areas of command and control, communication, surveillance, and navigation and applied sciences.

All four 2003 courses were held at the University of California, San Diego (UCSD) Extension, Sorrento Mesa Training Facility. Through the generosity of UCSD Extension, fees were waived for the use of the 30-seat Training Facility for the four MATLAB courses held in April and May.

The MATLAB courses attended by the SSC San Diego technical community at UCSD Extension were given by two distinguished and dedicated teachers from Ohio State University's Electrical Engineering Department: Professors Stan Ahalt and Ashok Krishnamurthy. Professors Ahalt and Krishnamurthy were supported in instructions and teaching by Dr. Juan Carlos Chaves, on-site signal and image processing lead at the Army Research Laboratories (ARL) Major Shared Resource Center (MSRC), Aberdeen Proving Ground, Maryland.

SPARTAN SCOUT[39]

On 17 April, SSC San Diego Commanding Officer Capt. Tim Flynn signed a Memorandum of Cooperation and Collaboration (MOC) between the Center and Naval Undersea Warfare Center (NUWC) to provide an Advanced Concept Technology Demonstration (ACTD) for the Spartan Scout program. The existing Spartan Scout unmanned surface vehicle (USV) is a boat that is 7 meters long. It has high endurance, long range, and loitering capabilities, and transit speeds from 28 to 50 knots. It can handle a

payload up to 3200 pounds. The Spartan Scout can operate in night operations and inclement weather, including higher sea states than are safe for manned operations. It has multi-mission capability with multiple methods for deployment, including surface ship deployment, launch from a shore station, or through an airlift or airdrop.

The Spartan Scout system objectives are for reliable command, control, and data communications. The design goals of the Spartan Scout core system will be communications link independence, a common mission module interface, commercial off-the-shelf components, and a distributed architecture. There should be open source software with minimal effort to exchange mission models.

The ACTD will demonstrate improved capabilities in performing intelligence, surveillance, and reconnaissance (ISR), precision strike, littoral surface warfare anti-terrorism (AT), and force protection (FP). These objectives could fill a capability that the Fleet needs for conducting critical missions such as preparing the water space for amphibious and sealift operations. It could minimize or eliminate unnecessary risk to personnel and capital assets. The new Spartan Scout should demonstrate a cost-effective, potentially expendable asset as a force leveler or multiplier. It could provide port protection when launched or operated from shore.

Specific areas of cooperation and collaboration to develop the future system include the command, control, and communications (C3) architectures, electromagnetic interference, display technology, autonomy, high-bandwidth communications, and interoperability. Spartan Scout will be investigated as a communications relay for beyond line-of-sight and over-the-horizon operations. Use of deployable antisubmarine warfare (ASW) systems for development of mission modules for Spartan Scout will be studied. There will be an investigation of enhanced intelligence, surveillance, and reconnaissance (ISR) systems, including electronic surveillance and signal intelligence models for use by Spartan Scout.

The Spartan Scout should be interoperable with joint and coalition forces. The future system should take advantage of other joint emerging technologies to achieve interoperability with Army and coalition partners, and to achieve maximum cost efficiencies and eliminate duplication of efforts. It should use communication systems that are off-the-shelf, previously tested, and known to integrate with current and future Navy systems.

It will be forward-positioned into the Navy's future netted battle space. From one operator's workstation the new system will leverage the Tactical Control System for USV control to enable interoperability between unmanned aerial vehicles (UAVs) and other USVs. The UAV could act as a relay for the USV.

The Spartan Scout will offer relay advantages by using other Navy and joint platforms, providing relay with multiple platforms, and possessing high bandwidth. No separate bases of operation or communication systems will be needed, and it will be compatible with the next generation of Navy communications systems.

Cooperation between the Center and NUWC will focus on near-term and long-term efforts. SSC San Diego will be involved in ongoing development efforts, including participation on core systems and ISR and FP product teams, and C3 and autonomy working groups. Long-term efforts will include leveraging investments in strategic science and technology initiatives for unmanned vehicle concept development. These initiatives will result in the joint development of proposals to prospective sponsors for other unmanned vehicles.

KNOWLEDGE AMPLIFICATION BY STRUCTURED EXPERT RANDOMIZATION (KASER)[40]

Processing knowledge is abstract and dynamic. As future knowledge management applications attempt to mimic human decision-making processes, a language or languages are needed to provide developers with the necessary tools to achieve these goals. Proximity to a concept and a gentle shove are often all that is

needed to make a discovery and that is the reason for the drive to develop languages of ever-higher levels. Knowledge Amplification by Structured Expert Randomization (KASER) is a third-generation, creative system for knowledge acquisition. The developers of KASER are Dr. Stuart Rubin, Joint Tactical Information Systems (Code 2734); James Boerke, Advanced Command Center Engineering (Code 244206); and Robert Rush, Intelligence Systems (Code 2733). They recently filed a patent on this technology.

The KASER was a study to capture the bounds of human reasoning. It uses qualitative fuzzy reasoning. KASER collects the knowledge that people have and applies it to cognition, which is the process of knowing in the broadest sense, including perception, memory, and judgement. Conventional systems, known as expert systems, are “brittle” or “crisp,” meaning that anomalous information will be rejected out-of-hand.

KASER computes using words and phrases. It possesses a capability for delivering metaphor-based explanations. A metaphor is a figure of speech containing an implied comparison in which a word or phrase ordinarily and primarily used for one thing is applied to another.

This capability is useful in explaining its creative suggestions and serves to augment the capabilities provided by the explanation subsystems of expert systems.

In principle, KASER can capture and otherwise represent much of the domain knowledge possessed by a human being. It can predict a likelihood of error through incorporation of a simple history function, and reason through a gradient descent or ordered search algorithm that minimizes error. Capable of deductive, inductive, and mixed derivations, its qualitative creativity is realized using a tree-search mechanism.

A conventional system cannot match similarities. Given the KASER’s dynamic tree structure, the relation of these concepts allows for computing with words, and makes those things definable in terms of each other. The system achieves creative reasoning by using a declarative representation of knowledge consisting of object trees and inheritance. KASER introduces the use of single inheritance declarative object trees into an expert system. Such trees facilitate the capture of object-oriented semantic relations among rule predicates and serves the processes of metaphorical explanation as a consequence.

KASER evolves over time and learns, somewhat as humans do, to become more correct with experience. This system differs from a conventional expert system where one can merely correct and/or append rules. KASER also differs from fuzzy logic in that fuzzy logic works strictly with numerical estimates. KASER can accept generalizations and actually learns qualitative boundaries and becomes more capable of reasoning in a fuzzy sort of way. In a conventional system, decision-making and recommendations cannot be made if information differs from that which is programmed.

KASER recognizes similarities in supplied information, can recommend courses of action, and has a symbolic learning capability. An accelerated capability to learn is dependent on the particulars of the selected application domain. For example, application domains such as the game of chess (battle management) exhibit a high degree of symmetry that allows for the greater amplification of supplied knowledge. Conversely, application domains such as the game of craps (Enterprise Resource Planning and/or Navy Marine Corps Intranet), played with two dice, exhibit no predictable pattern, unless the dice are loaded. In this case, the KASER presents no advantage over conventional expert systems.

Many future esoteric applications for the KASER might include modeling dolphin behavior, interpreting their chirping echolocation, and simulating their laminar flow mechanisms; providing scenarios for decision-making in military command center applications (e.g., the Command Center of the Future); analyzing sensor data in a search for hidden underground facilities; interpreting verbal communication in a human–machine interface; and increasing the ease and speed of accessing diverse information in databases.

The KASER concept would allow computer systems to communicate with each other in what Marvin Minsky at Massachusetts Institute of Technology has termed, “a society of mind.”

MEDICAL DATA SURVEILLANCE SYSTEM[41]

The Medical Data Surveillance System (MDSS) project team continues to provide support to the Chief of Naval Operations and Office of Naval Operations sponsors and Naval Health Research Center (NHRC) partners with its medical informatics system. The system specifically applies to near-real-time medical surveillance for operational forces. MDSS was successfully implemented at the TriCare Medical Activity (TMA) in Washington, DC for use by Central Command in support of operational forces during Operation Iraqi Freedom. It became a part of the operational forces program of record for the Theater Medical Information Program on 26 September.

Although MDSS was not designed for medical surveillance use in day-to-day hospital and clinic operations, an advanced prototype installation of MDSS was successfully implemented at four Department of Defense (DoD) medical facilities. The DoD medical facilities are the hospitals and clinics that provide day-to-day care for members of all the uniform services and their dependents.

Briefings on MDSS were given at the Executive Information Decision Support TMA office as a part of the recent Medical Surveillance: Functional and Technology Review. MDSS was well-received and transition of completed research to the DoD medical facility, medical surveillance program of record was initiated.

The Joint Medical Operations–Telemedicine Advanced Concept Technology Demonstration successfully showed that MDSS provides theater-wide medical surveillance by integrating data from Navy hospitals at Camp Pendleton and San Diego, and ambulatory data from the Marine Corps clinics. USS *Coronado* (AGF-11) was used during this demonstration as the theater command. MDSS is also operating at the 121st Evacuation Hospital, 18 Medical Commands in Korea, and at the Navy Medical Center Okinawa, Japan.

MDSS is a web-enabled technology for generating analyses and reports from clinical data on patients. When medical personnel enter data to an electronic patient record, the system collects the records and analyzes the data to create and display reports or user-defined analyses. The system can detect shifts or changes in the health status of individuals in an operational or hospital setting.

Data from a central warehouse or an electronic patient record system, such as the Composite Health Care System or Standard Automated Medical System, can be automatically entered into an MDSS database and used to develop necessary medical actions. Data warehouses used by MDSS include the Joint Medical Workstation and the Theater Medical Information Program (TMIP) Inter-Theater Data Base (ITDB). In the future, the team hopes to connect with civilian hospitals for more and different data sources useful in homeland defense efforts.

TMIP is the universal program for the armed forces TriCare Healthcare System. The fact that MDSS has been chosen for integration with TMIP is significant. This system provides near-real-time medical surveillance. It can be set up to evaluate and analyze information every 15 minutes. The analysis is primarily based on the International Classification of Diseases Version Nine (ICD-9) that was developed by the World Health Organization to provide communication about disease across international and language barriers. All hospitals use this code.

ICD-9 codes are the same codes used by insurance companies to categorize an illness for charging and billing medical services. The ICD-9 code is fed into MDSS to find morbidity and mortality trends. During the first Gulf War, documentation of non-battle injury reports was hand-collected. The Joint Chiefs of Staff approved Disease and Non-Battle Injury (DNBI) categories, and the reporting of a standardized set

of reportable conditions. MDSS uses a Pacific Command mapping of ICD-9 codes to DNBI categories. It also contains many other mappings based on analysis of first Gulf War data and the reportable conditions. All MDSS reports and analyses can be used to provide a medical overview of the civilian and refugee populations.

Historically, and in studies conducted at NHRC, researchers have found that during military conflicts the greatest number of injuries, illnesses, or even deaths in a battle zone are not combat-related, but rather disease and non-battle injuries. Evaluating data such as dental disease, sanitation diseases, or sports injuries, and providing preventative measures, keeps military forces healthy. Moreover, chemical, biological, radiological, and nuclear threats can be detected, monitored, and tracked for a quick response by MDSS.

An ICD-9 designation of "ill-defined condition" indicates that the doctors do not know what the illness is. MDSS records key symptoms, takes common diagnoses, and finds common denominators. Epidemiology usually has historical data, and in a battle situation, a baseline must be created very quickly with small samples of statistics.

Operational testing was done in a number of military exercises. During Cobra Gold 2001 in Thailand, the Combined Joint Task Force Surgeon and the Preventive Medicine Officer used MDSS to track, quickly assess, and act on dermatological problems created by skin mites.

The MDSS program is unique in dealing with medical surveillance issues. It helps catch, act on, and evaluate remediation efforts to see if prevention methods are effective. The data can help determine if medical procedures are working.

COOPERATIVE OUTBOARD LOGISTICS UPGRADE (COBLU)[42]

SSC San Diego and a contractor team completed the first full-rate production software load of Cooperative Outboard Logistics Upgrade (COBLU) 3.1.6.16 aboard a United Kingdom (UK) platform. COBLU provides tactical communications and warnings for force protection, and contributes to national intelligence. The team included personnel from the Signal Exploitation and Information Management Division, Systems Engineering Team (Code 2722) and KAB.

COBLU is an initiative of the SPAWAR Naval Electronic Combat Surveillance Program Office (PMW-189). It began as an upgrade to the Shipboard Tactical Signals Exploitation/Direction Finding System (OUTBOARD). It is a joint program between the U.S. and UK navies. Personnel from Code 272 support COBLU in the U.S. and made several trips this year to the UK for installations, software loads, setups, calibration, and testing.

The original program provided two engineering development model systems. One system was fielded on a U.S. guided-missile destroyer (DD class) that went through successful operational evaluation. This led to the low-rate initial production program (LRIP) to produce five systems for the UK. Those systems have all been installed and are operating well to support the conflicts in the Persian Gulf. Following the LRIP, COBLU went into full-rate production, providing 17 systems that are fielded on U.S. guided-missile cruisers (CG class) and guided-missile Aegis destroyers (DDG class). Two Ticonderoga Class (CG-47) guided-missile cruisers with COBLU installations have been deployed for Operation Iraqi Freedom with good results.

As the technical direction agent, the COBLU team provides Cryptologic Unified Build support integration with the COBLU software. The team successfully created an open architecture where applications and programs that are available through national agencies can be incorporated into the design at a fairly low expense. The added capabilities were successful after initial development and have received praise from the Fleet.

The prime developer for COBLU, BAE Systems, builds the hardware and specialized software code. The U.S. Navy provides software, test support, design support, systems engineering, installation, and troubleshooting, and rides the ships to support the U.S./UK fleets. To support COBLU system training, the team developed the Cryptologic On-Line Trainer and installed the first iteration in UK and U.S. shore-based schoolhouses. Operators can train on the system using a simulation system on desktop computers that has the look and feel of COBLU, without the millions of dollars of hardware. Code 272 team members are now developing the simulation system for shipboard training.

COMMUNICATIONS AND INFORMATION SYSTEMS

GLOBAL POSITIONING SYSTEM USER EQUIPMENT IDENTIFICATION DATABASE[43]

The SSC San Diego Global Positioning System User Equipment Identification Database (GUIDE) team attended the Joint Navigation Conference held in Las Vegas, Nevada, in April. GUIDE team members presented a brief and manned an exhibit/demonstration booth, offering users a hands-on experience with the GUIDE.

The GUIDE was developed with sponsorship from the National Security Agency and the Global Positioning System (GPS) Joint Program Office. Under initial sponsorship, a prototype was developed and populated with a multitude of information from all services and various agencies, specific to GPS user equipment (UE). This prototype grew into a database that enables users to determine the current state of GPS UEs and provides the ability to research system capabilities by instantly accessing various reports, forms, and queries.

The GUIDE resulted from a thorough review of over 600 existing UEs in use by all branches of the armed forces and required rigorous interface with many organizations, including depots and the U.S. Space and Strategic Commands. The GUIDE uses a friendly graphical user interface to support users in the decision-making process where GPS UEs are a factor, including these key attributes:

- UE manufacturers
- Precise Positioning Service/Security Module (PPS-SM) and Selective Availability Anti-Spoofing Module (SAASM) security modules by designation
- Cryptographic keying capabilities and requirements
- Weapons platforms and their associated GPS guided munitions
- Hardware/software part number queries such as: “What types of UEs are handheld, and of these, what security modules and rekey options are available? What UEs are contained on a battle-ready F-14 Tomcat, including munitions? What is the keying capability of the Precision Lightweight GPS Receiver?” These questions can all be answered by clicking through the user interface and easily extracting pertinent data. In addition, by selecting the appropriate tables and fields, the requested information can also be prioritized and displayed in various formats inherent to a relational database.

The GUIDE can be used and viewed from many perspectives:

1. From a logistics or integration perspective, the GUIDE provides users with detailed information concerning which UEs reside on specific platforms, and to which branch of the military service that platform belongs. Logistics professionals could also take advantage of tables of manufacturers, ancillary equipment, and GPS simulators for quick reference.
2. From a security perspective, the GUIDE displays a variety of different reports that show the various types of security modules: PPS-SM and Auxiliary Output Chip, SAASM, no module, hardware/software part numbers, etc. Users can also develop a detailed view of which UEs contain security modules and on what types of platforms they are used to support a risk assessment, or to determine if a specific type of key material is required for a particular UE.
3. From an operational perspective, performing a query will provide the user information on platform requirements such as: “Which platforms use a specific UE? What type of munitions does that platform carry, and of those which UEs are PPS-SM capable?” The GUIDE will also

assist in planning for mission integration where a mix of platforms exist to ensure UEs are capable of meeting mission requirements.

4. From a cryptographic key management perspective, the GUIDE offers easy access to a variety of information that shows what types of key fill devices certain UEs require for loading keying material (keymat). For units deployed to remote locations, this information is critical in planning for possible emergency supersession of GPS keymat. Similarly, the ability to query for UE keying capabilities and zeroization requirements could prove priceless in a contingency situation or following the known loss of an asset.
5. From a GPS overall user system capability planning and evolution perspective, the GUIDE can provide and maintain valuable data in terms of total GPS assets, capabilities, and status in one unified view of the total GPS system. The positive feedback from the Joint Navigation Conference attendees suggests that the GUIDE will be a potentially invaluable tool for a myriad of applications. The GUIDE is a relational database and extracting data and assembling it in desired combinations and formats is only bound by the user's imagination.

The GUIDE team entertained several hundred individuals at the conference and received written requests and implementation suggestions from approximately 50 individuals representing 30 organizations. These comments will be used in the next step for the GUIDE team, a brief to the Corporate Management Board at the GPS Joint Program Office.

JOINT TACTICAL RADIO SYSTEM[44]

The Joint Tactical Radio System (JTRS) Technology Laboratory (JTeL) sponsored an Open House for Industry at the Center on 6–7 August. The JTeL is the Waveform Test and Evaluation Activity for the JTRS Joint Program Office (JPO). Over 200 visitors from government and commercial activities attended the Open House, which featured presenters from the JTRS JPO and the JTeL staff. The Open House also included informational briefings on JTeL capabilities and demonstrations of the JTeL-developed suite of software test applications.

The Open House highlightws the 31 July milestone of the JTeL reaching its initial operational capabil-ity. SSC San Diego Commanding Officer Capt. Tim Flynn provided welcoming remarks and Col. Steven MacLaird, U.S. Air Force JTRS JPO program director, provided opening remarks.

The JTeL project is a joint endeavor by SSC San Diego and SSC Charleston. The JTRS program is dedicated to creating a digital, programmable, modular communications system that supports the need to share real-time information among joint warfighters. When fielded, JTRS will provide network connectiv-ity across the radio frequency spectrum, providing information transfer capability that cuts across all domains of warfare: land, air, and maritime.

JTRS consists of three key parts. The first key part is the concept of the Software Defined Radio in which functional capabilities are provided through software rather than hardware. Because JTRS includes software-defined radios, obsolescence is avoided through technology insertion. The second is the Software Communications Architecture (SCA), which provides a framework for developing software applications that can operate effectively on different JTRS hardware platforms. The third is the actual software applications and waveforms. Some waveforms will provide functionality that is compatible with current fielded tactical radios while other waveforms, such as the wideband networking waveform, will provide entirely new communications capabilities for JTRS radios. Since all the waveforms will comply with the SCA, the waveforms will be interoperable (in terms of frequency, bandwidth, and mode) from one JTRS radio to another.

The SSC San Diego team was selected by the JTRS JPO as the primary test and evaluation activity in November 2001. The award was in direct competition with other service labs and government activities.

The mission of the JTeL is to provide testing and certification of all JTRS products, serve as the repository for all certified JTRS waveforms, and provide guidance in advancing software-defined radio technology. The JTeL works in coordination with the National Security Agency and the Joint Interoperability Test Command to provide test coverage for the JTRS. Specifically, the JTeL verifies the compliance of each JTRS waveform to the SCA, ensures the portability of each waveform, validates the correctness and completeness of each JTRS waveform, and verifies the compliance of each JTRS waveform to security requirements.

BIOMETRICS[45]

The Information Assurance Network Security Branch (Code 2872) Biometrics Lab is a clearinghouse for biometrics security technology. Biometrics uses the unique physiological or behavioral attributes of an individual to provide a method of security authentication and verification of that person. The Branch is identifying unique Department of the Navy security requirements. These requirements are for physical access control to a space or building, and logical access control for a network or computer. They test commercial off-the-shelf (COTS) products to determine their strengths with the ultimate goal of deploying the technology in the Fleet. They are also participating with the Department of Defense (DoD) Biometrics Fusion Center (BFC) on the integration of biometrics with the Common Access Card.

The field of biometrics has changed since September 11. Before September 11, the technology did not generate much interest, but the Naval Criminal Investigative Service, Forensics Lab, and Fleet Combat Training Center Pacific are currently participating in Operational Capability Demonstrations by using biometrics for physical and logical access control.

The lab works with the DoD Biometrics Management Office (BMO) in Washington, DC, and the DoD BFC in West Virginia. The BMO is the agency that directs all DoD biometrics and the Department of the Army is currently the executive agent for this office. The BFC is the DoD test facility and the central repository for biometrics templates.

The biometrics lab evaluates physical-type biometric technologies, which include fingerprint recognition, facial recognition, iris recognition, and hand geometry. The lab also evaluates behavioral-type biometrics, which include keystroke dynamics, signature recognition, and voice recognition. A third type is multiple biometrics, which can include several physical or behavioral biometrics in combination.

The lab is currently focusing on iris recognition and hand geometry technology for physical and logical access control. The iris recognition system creates an image of the biometric, the iris, and uses mathematical algorithms to create a code. The template is then stored. By looking again into the unit, the iris of an eye can be linked with a specific individual. Hand geometry is another biometric system in which a template of a hand can be stored and then verified for access control.

All equipment and products reviewed in the Biometrics Lab focus specifically on Navy uses. The lab team works with the BFC to examine how best to perform configuration management and what metrics to use for product evaluation. They look for operational effectiveness and compatibility with a number of operating systems used in the Department of Navy. These systems must integrate with other technologies such as the Public Key Infrastructure and Smart Cards or Common Access Cards. The team examines the security of the templates and communication between the client and the server. From a user perspective, the lab team considers how comfortable a user feels with the technology and what would be best for different scenarios. Highly classified access would be layered with several robust and secure products that could improve the quality of life by using biometrics instead of memorizing many passwords.

The Biometrics Lab addresses the unique requirements of the Navy to see how well products would perform in operational environments afloat.

APPENDIX A: CY 2003 ACHIEVEMENT AWARDS

NAVY AWARDS

Navy Superior Civilian Service Award

Jim Williams, Component Command Centers (Code 24245), was awarded the Superior Civilian Service Award from Commander, U.S. Pacific Fleet. Williams serves as the C^4I systems engineer on the staff of Commander Submarine Force, U.S. Pacific Fleet. His efforts enhanced the capability of submarines to provide time-sensitive information for missions in support of Operation Enduring Freedom.

Navy Meritorious Service Awards

Kevin Adams led the Joint Simulation System Maritime Team to deliver their first software increment in May 2000 and met every program milestone and deadline since then.

Les Anderson was lead technical government team member for developing the U.S. Central Command Deployable Headquarters that was deployed to Qatar for Operation Iraqi Freedom.

Steven Auguston provided outstanding leadership for the 150 people that were scheduled to move out of Building C60.

James Burdell developed, integrated, and institutionalized new capabilities and tactics, techniques, and procedures into the Navy's Command and Control system.

Susan Burrows contributed to SPAWAR, receiving the “Best Small Business Program” award for 2002 by the Office of the Secretary of Defense.

Robert Cagle, program manager for the Automated Communications Management System project, was responsible for delivering the final software release, V2.1.5, in December 2002, on time and within budget.

Mary Chrysler laid the groundwork for a flourishing Tactical Data Link Foreign Military Sales business area in Code 245.

Russell Chun coordinated and managed C^4ISR installations onboard Navy ships homeported in Hawaii.

David Flattum is project manager and lead systems engineer for all 3.X and 4.X versions of the Global Command and Control System–Maritime (GCCS–M), enabling afloat systems to remain functional for frontline operational forces.

Efrain Flores-Colon directed the Systems Engineering Group as they designed, tested, and integrated the Navigation Sensor System Interface Lite system.

Steven Holden and his team brought integrated, commercial off-the-shelf technologies into existing governmental infrastructures to produce highly reliable and available information technology architectures.

Robert Johnston established and staffed a detachment of the Marine Environmental Support Office in Bremerton, Washington, to provide onsite technical assistance in support of environmental programs at Puget Sound Naval Shipyard and Navy Region Northwest.

Neil Kamikawa introduced and deployed several intelligence dissemination capabilities and helped implement C^4I improvements in the U.S. Pacific Command (USPACOM) area of responsibility.

John Kuerzi has more than tripled the budget for the In-line Network Encryptors and National Security Agency/SPAWAR PMW-161 Crypto Modernization program.

Navy Meritorious Service Awards (cont)

William Macha managed and developed ADS Wet End Systems and translated the program goals into operational capabilities ready for use by the Fleet.

Steven Murphy managed and guided the Navigation Sensor System Interface program to successfully meet a demanding schedule on time and within budget.

Ahn Nuzen helped develop and present the Joint Distance Support and Response Advanced Concept Technology Demonstration management plan to the "Breakfast Club," which was approved.

Patricia Provencio met all challenges as the Center was phasing in the new automated financial management system and switching to Navy Marine Corps Intranet (NMCI).

Marc Rasmussen serves as the project manager and lead engineer for the Radiation Detection Indication and Computation Project. His team has consistently delivered the products to meet the needs of the warfighter, and the project has grown to $5 million in FY 03.

Dr. Stephen Russell's technical innovations established SSC San Diego as a leader in technology transfer; one example was recognized by the Federal Laboratory Consortium for Excellence in Technology Transfer.

Edward Rynne manages the Compact Deployable Multistatic Source project and continues to be a respected engineer and research leader in sonar and transducer technology.

Dr. Thomas Staley provided support to the Joint Task Force Wide Area Relay Network (JTF WARNET) in operational testing, which led to important connections between his research and tactical requirements.

Neil Weinstein served as Science Advisor to Commander Third Fleet for 3 years and, upon returning to the Center, he was selected as the first Deputy for Business in the Fleet Engineering Department.

Thomas Wing coordinated the integration of Integrated Broadcast Service-Interactive inject capability aboard USS *Higgins* (DDG 76) in support of Theater Ballistic Missile Defense during Operation Iraqi Freedom.

Depot Named Center of Industrial and Technical Excellence

The Secretary of the Navy (SECNAV) designated the SSC San Diego Depot as the Center of Industrial and Technical Excellence (CITE) for Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C^4ISR) systems, equipment, and products. The SSC San Diego Depot has three locations: a 100,000-square-foot complex at OT-1, a 7000-square-foot complex at the Naval Station, San Diego (conducting cryptographic equipment repairs), and a 4000-square-foot complex at Battery Ashburn, Point Loma (conducting RADIAC repair and calibration).

Lightning Bolt Award for Code 293

At the 10 March SPAWAR All Hands, SPAWAR Systems Activity Pacific Guam (Code 293) team members were recognized with a SPAWAR Lightning Bolt Award. The award was for the Commander in Chief, Pacific Fleet C^4I facility upgrade in support of Operations Enduring Freedom for Commander, Logistics Group Western Pacific, Singapore.

Lightning Bolt Award to RCC installation team

The SPAWAR Lightning Bolt Award was presented to SPAWAR Systems Activity Pacific (Code 290) Commander, Navy Region Hawaii (COMNAVREGHI) Regional Command Center (RCC) installation team. The RCC installation team provided innovative planning, design, and implementation of a new

anti-terrorism/force protection (AT/FP) capability. The Code 290/contract RCC installation team members are as follows:

Cmdr. Ray Alfaro	Glen Adachi	Derek Asato
Sharon Albus-Kimura	David Ching	Glenn Ching
Manuela Donald	Steve Francis	Ann Hanamura
Terri Hanaoka	Lloyd Hayashida	Francis Hirota
Howard Ishizuka	Steve Kobashigawa	Robert Lim
Wesley Masuda	Brian Maxwell	Linda Nomura
Sandy Sclabassi	Tracy Simon	Fredella Suga
Fred Sunada	Glenn Takahashi	Robert Taylor
Miles Terayama	George Uedoi	George Ushiyama
Robert Watanabe	Reid Yamamoto	Glenn Yee
Roy Gonsalves	Ryan Fujikawa	Gordon Ashimine
Clifford Wakumoto	Sonny Cabradilla	Joseph Begonia
Frederick Lorenzo	Dean Correa	

Lightning Bolt Award to Submarine Group Seven Installation Team

The SPAWAR Lightning Bolt Award was presented to the Commander, Submarine Group Seven Installation Team. This team was a cross-claimancy team of personnel from SPAWAR Systems Facility Pacific, Yokosuka (Code 292); SPAWAR Systems Activity Pacific, Hawaii (Code 290); Communication and Information Systems Department (Code 280); Fleet Engineering Department (Code 260); SSC Charleston; and SPAWAR. The team's efforts supported the Office of the Chief of Naval Operations sponsor's direction to accelerate installation of four complex systems in the CSG 7/CTF 54/CTF 74 Broadcast Control Authority facility. SPAWAR claimancy team members were Mike Dawson, Derrick Williams, Akira Noro, Lawrance Kane, Dave Yamamura, Yoshimasa Kobayashi, Masato Yoshida, Mitsuo Hirose, Koichi Seto, Greg Hama, Dean Lee, Candice Saka, Susan Fortney, John Walker, Larry Campbell, Marc Habel, Bruce Cosby, John Kmet, Karen Haines, David Bates, Mike Bubb, Robert Hanekamp, James Kampmeyer, Kurt Reese, William Farmer, Alma Loe, Charles Fisher, Tony Williams, and David Hayashi.

Lightning Bolt Award to C3F JOC Ashore

A Lightning Bolt Award was presented to the Commander Third Fleet Joint Operations Center Ashore (C3F JOC Ashore) transition team for their success and professionalism in the design, engineering, coordination, and installation of enhancements in Fleet Combat Training Center Pacific (FCTCPAC). An effort of this magnitude, normally taking several months, was completed under budget in 16 working days. Team personnel were Lead Project Engineer Mark Blocksom; Project Engineer Jeffrey Wildasin; UHF Project Engineers Gerald Boker and Jon Kershaw; EHF Project Engineer Mitch Borg; COWAN Project Engineers Lawrence Campbell and Gary Cappelli; Financial Analyst Leilani Doliente; Administrative Assistant Jean Farwell; Engineers Steve Francis and Jorge Rodrigues; UHF Groom Project Engineers Gregory Freeman, Keith Kubiak, and David Lindberg; Assist Shore Installation Management Officer Jack Knight; Link Project Engineer Jeffrey LaFrance; Regional Shore Installation Manager Lt. Antonio Ramos; and Communications Engineer Thomas Wessels.

ORGANIZATIONAL/INDUSTRY AWARDS

NDIA Award for Leadership

Donna Williamson, Advanced Concepts and Engineering Division (Code 24121), was selected to receive the National Defense Industrial Association (NDIA), San Diego Chapter, Fleet Support Award for Leadership.

Best Presenter Award from NDIA

Brian Groarke, director of the Systems Engineering Process Office (SEPO) in the Office of Science, Technology, and Engineering Operations (Code 212), was recognized as a “best presenter” by the National Defense Industrial Association (NDIA). The award was presented at the NDIA Third Annual Capability Maturity Model, Integrated (CMMI) Technology Conference and Users Group in Denver, Colorado, 17–20 November.

CENTER CIVILIAN AWARDS

Lauritsen–Bennett Awards

SSC San Diego's highest honorary award recognizes employees who have made significant achievements in science, engineering, and/or staff support. The achievements of this year's recipients, Clarence Funk and Edward (Mike) Reilley, have resulted in exceptional contributions to the Center and its mission.

For Excellence in Science

For over 35 years, Clarence Funk has analyzed the performance of undersea optical and acoustic imaging systems and some of the world's most sophisticated signal intelligence systems. He has spent years developing tools to help the warfighter extract tactically useful data from the sea or from space.

For Excellence in Engineering

Mike Reilley has contributed extensive experience in combat direction systems and command, control, communications, computers, and intelligence (C^4I) systems and helped develop many concepts that make up the Center's technical vision of today. He extended the Center's C^4I vision to include the Pyramid and the Fabric concepts that are now part of SPAWAR's FORCEnet vision.

Executive Director Award

Dr. Randy Moore was presented the Executive Director Award for his contributions and performance as the Center's coordinator of the New Professional (NP) Program.

The SSC San Diego Executive Director Award was presented to Lt. Tracie Andrusiak for leadership and technical performance as project manager and acquisition program manager for the Joint Ultra High Frequency (UHF) Military Satellite Communications Network Integrated Control System (JMINI). Lt. Andrusiak was the first military person to this award.

Team Awards

Litigation Involving the Award of a High Performance Modem Contract

This team consisted of 13 civilian and military personnel from headquarters and SSC San Diego's technical, contracting, and legal offices. A disappointed contractor lodged a protest and later a supplemental protest with the General Accounting Office (GAO) alleging that SSC San Diego's decision to eliminate that firm from the competition for technical non-acceptability was unreasonable. This team successfully defended SSC San Diego and SPAWAR Headquarter's efforts to evaluate and award a contract for the delivery of high-speed modems for installation on Navy ships. Team Members:

Scott Browne, Radio Frequency Systems Fleet Engineering Division (Code 262)
Jack Faulkner, 260/280/290 Staff and Tenants Branch (Code 2212)
Mike Lee, Super High Frequency Satellite Communication Branch (Code 2621)
Master Chief Kim Springer, Program Manager Navy Satellite Communications (PMW-176)
Sharon Pritchard (Code 2212)
Jeff Mansfield, General Law and Procurement Office (Code 20011)
Deana Jaeger (Code 20011)
Ana Smith (Code 20011)
Carye Concha, Office of Counsel (Code 2001)
Susan James (Code 2001)
Meredith Kertiss (Code 2001)
Jim Ward, Office of Patent Counsel (Code 20012)
Scott Miller (Code 2001)

Virtual Operations Network At-Sea Trial Team

The Virtual Operations Network (VON) At-Sea Trial (AST) Trial Team demonstrated a new capability to exchange coalition situation awareness via high-frequency (HF) radio nets in a timely and cost-effective manner. Center team Members:

Mark Clawson, Littoral Communications Systems Branch (Code 2846)
Mark Rott, (Code 2846)
Lt. Linda Rumbauth, Joint Task Group Superintendent, C^4I Superintendent (Code 26404)
Lewis Gutman, Tactical Network Solutions Branch (Code 2827)
Judi Appel, Joint Tactical Systems Branch (Code 2337)
David Chao, Tactical Network Solutions Branch (Code 2827)
Russ Frevele, Ocean Systems Engineering Corporation
Lt. Mark Sanders, Commander, Naval Surface Force, U.S. Pacific Fleet

Team K-Web for CCG-3 support to Operation Enduring Freedom

At the end of the Global 2000 war game in July 2000, Commander Carrier Group Three (CCG 3) was sufficiently impressed with the capabilities of the Command 21 Knowledge Wall/Knowledge Web concept that they requested the capability be installed aboard the USS *Carl Vinson* (CVN 70) for use during their 2001 deployment. The Command 21 team worked tirelessly to develop, fabricate and certify a multi-head display. Team Members:

Jeff Morrison, Simulation and Human Systems Technology Division, Deputy for Business (Code 2441)

Ken Kaufmann, Advanced Command Center Engineering (Code 244206)

Henry Dong (Code 244206)

James Boerke (Code 244206)

Dave Swanson (Code 244206)

Waldo Robinson (Code 244206)

Daniel Johnson, SSC Charleston

Charles Gibson, SSC Charleston

Nate Smith, Veridiane Corporation

Steve Francis, Sonalysts

Ronald Moore, Pacific Science and Engineering

Gene Averett, Pacific Science and Engineering

Janel Rogers, Pacific Science and Engineering

David Kobus, Pacific Science and Engineering

Commander Submarine Group Seven Integrated Installation Team

The Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4I) Integrated Installation Team coordinated and executed a C4I package as directed by the Office of the Chief of Naval Operations (OPNAV). The package accelerated installation of four complex systems in the Commander, Submarine Group Seven (COMSUBGRU Seven), Commander Task Force (CTF) 54, CTF 74 Broadcast Control Authority (BCA) facility. Team members represented SSC San Diego, SSC Charleston, and SPAWAR.

Team members were Marc Habel, Larry Campbell, Bruce Cosby, Mike Dawson, Derrick Williams, Akira Noro, Bernie Keena, Dave Yamamura, Yoshimasa Kobayashi, Masato Yoshida, Mitsuo Hirose, Koichi Seto, Greg Hama, Dean Lee, Candice Saka, Lawrance Kane, Bill Garmer, John Walker, Bill Bebinger, John Knight, John Kmet, David Bates, Mike Bubb, Robert Hanekamp, Lt. Bryan Duffy, ET1 Mike Glover, and Dennis Brister.

Expeditionary Pervasive Sensing Enabling Experimentation (EEE) Team

The EEE Team was tasked by the Navy Warfare Development Command (NWDC) and the Office of Naval Research to bring expeditionary pervasive sensing and agent-based computing to the sea-trial process. Taking concepts developed by the Information Knowledge Warfare Innovation Development Team at NWDC and technology developed by the Defense Advanced Research Project Agency, the SSC San Diego EEE Team led design and development efforts of a cross-laboratory (Naval Sea Systems Command, Naval Air Systems Command, and SPAWAR) team. They developed, demonstrated, deployed, and measured the ability of intelligent agents and information grids to support dynamic command and control.

Team members receiving the award were Jeff Waters, Bruce Plutchak, Robert Yowell, Henry Dong, Elaine Schiller, Kim Swecker, Jeff Sandlin, David Van Tassell, Dr. Jim Lockwood, Rick Lachowitz, Rob Morris, Ralph Johnson, John Harmon, Dr. Ed McDaid, Victor Marshall, Jim Burdell, Linda Rae, Cary Curtis, Sheila Zuehlke, Greg Bulla, and Joe Ortiz.

FORCEnet Limited Objective Experimentation 03-1 Team

The FORCEnet Limited Objective Experiment (LOE) 03-1 was a risk reduction effort in support of the FORCEnet Integrated Prototype Demonstration (IPD). The FORCEnet LOE 03-1 goal was to analyze and determine the significance/impact of the FORCEnet technical infrastructure in a simulated operational environment, and to create and operate a FORCEnet collaborative engineering environment for this, and future experiments.

The team members were Barry Siegel, Janet Anderson, Andy Leidy, Dale Bryan, Joe Mantione, Doug Bui, Jeff Quy, Noemi Ramirez, Paul Catano, Todd Landers, Gary McCown, Albert Legaspi, Conrad Dungca, Doug Hulbert, Nikhil Davé, Wonita Youm, Dan Altbaum, Jim Mathis, Troy Hawthorn, Dow Street, Sojin Choi, Cal Goodrich, Weden Teng, George Evanoff, Jin Park, Jonathan Aqui, Joe Kaye, Mark Ganzer, Tom Hively, Doug Kirby, Michelle Ferro-Czech, Sam Modica, Dennis Magsombol, John Myles, Mark Zabriskie, BeEm Le, Dave Tanguilig, Eric Lai, Jane Campbell, Kathleen Phan, Ken Ton, Sissy Gillihan, Steve Chance, James Boerke, Delores Washburn, Kenneth Boyd, Guy Leonard, Bill Torrez, Heather Woods, Britney Chan, David Leung, Eric Otte, Kevin Owens, Liz Rothgeb, Donna Williamson, Josh Duclos, Marco Muniz, Michael Schmidt, JoAnne Blodgett, Chuck Peters, Pete Wussow, and Jeff Clarkson.

Exemplary Achievement Awards

Robert Abramo
Neil Acantilado
Terrance Albert
Gregory Anderson
Teresa Anderson
Alan Antczak
Adrian Bagayas
Gregory Bostrom
Michael Bruch
Bruce Calder
Jane Campbell
Dr. Michael Cowen
Michael Crawford
Sherry Crisp
Christina Csanadi
Adrian Deal
Deborah Dondero
Anthy Dunlap
Michael Dwyer
Roger Easley
Mark Ebesu
Russell Eyres
Marcus Fieger
Michael Finlay
Barbara Fletcher
Robert Fletcher
Kenneth Garcia
Ronald Gauthier
Marsha Gay
Luis Gonzalez
George Green
Janine Greenhill
Karen Haines
Laura Hampton
Debora Harlor
Kreg Harsha
Dorothy Heidelberger
Michael Hendricks
Michael Herring
David Hina
Joe Hirschfelder
Brian Hobson
Brandon Howes
Gonzalo Islas
Christopher Johnson
David Jones
Jody Jordan
Sidney Kobashigawa
Keith Kubiak
Gregory Kwik
Stephan Lapic
Eric Matsuo
Myron Macneil
Katharine McCormick
Dr. Gary McCown
Lynn McDaniel
John McDonnell
Jodi McGee
Todd McKamey
Victor Metz
Nancy Miller
Margaret Minor
Neal Miyake
Anthony Morrison
Matthew Nicholson
Akira Noro
Cynthia Nguyen
Kevin Nuibe
Malcolm Onuma
Chuck Osborne
Robert Pangelinan
Dr. Clifton Phillips
Michael Phillips
Todd Pickering
Scott Price

Jamie Pugh
Kevin Quinn
Donald Ridgeway
Dr. Ignacio Rivera
Kenneth Rogers
Joelle Rose
Dr. James Rohr
Candice Saka
James Schlosser
Sally Sebert
Alyce Shivers
Ferdinand Simbulan
James Smith
Michael Smith
Randall Smith
Mark Stell
David Stevens
Minh Ta
Kai Tang
Triet Vuong.
Scott Watson
Sheryl Wingard
Ernest Williams
Mark Williams
David B. Williamson
Lee Wise

Safety and Environmental Awards

The Safety and Environmental Incentive Award was presented in August to the Systems Support Engineering Division (Code 265) for its demonstrated commitment and dedication to Center safety and environmental excellence. The award was made to the following:

Former Code 265 Division Head Jack Cabana

Acting Division Head Tom Knoebel

Division Safety Coordinator John Granlee (Antenna/Electronic Signals Monitoring Restoration Section, Code 26543)

C^4I Support Branch Head Tri Hua (Code 2654)

Section Supervisor Wes Cooper (Digital/Radio Frequency Restoration Section, Code 26542)

Section Supervisor Darrel Van Camp (Manufacturing and Radar Restoration Section, Code 26541)

Section Supervisor Steve Fredrickson, (Code 26543)

Section Supervisor Keith Kubiak, (Code 2654)

Division Assistant Vandy Lehman, (Code 265)

Russ Clement, Advanced Technology Branch (Code 2853), and Gary Mastny, Ocean Sensors Branch (Code 2741), were recently awarded the Safety and Environmental Incentive Award for their outstanding support of the SSC San Diego Radiation Safety Program.

Secretarial Awards

Elizabeth “Nonie” Samano, Undersea Systems (Code 2715), and Mary Elliott, Office of Science, Technology, and Engineering Operations (Code 212) were recipients of the 2003 SSC San Diego Secretarial Awards. Awards were presented at an 23 April ceremony in conjunction with National Secretaries Week.

CENTER MILITARY AWARDS

Navy and Marine Corps Achievement Medal

To Information Systems Technician Second Class (Surface Warfare) Billy Williams, Military Resources Management Office (Code 2031), for serving as alternate Electronic Key Management System custodian during Joint Warrior Interoperability Demonstration 2002. With his support, limited fielding of technology was transitioned to coalition interoperability.

Navy and Marine Corps Commendation Medals

To Lt. John Heuisler, Airborne Tactical Systems (Code 24526) for acting as the line division officer assigned to Carrier Airborne Early Warning Squadron 126. He was selected to plan, coordinate, and execute numerous air defense exercises, and revitalize the training program.

To Lt. Cmdr. Jeffrey Myers, Wideband and Protected Satellite Communications Branch (Code 2842), for serving as administrative officer and Detachment Six officer-in-charge at Helicopter Combat Support Squadron Eleven. He was the first search and rescue Detachment Six officer in-charge-on station for Operation Enduring Freedom.

Sailor of the Year

The award of SSC San Diego Sailor of the Year was presented to Yeoman First Class (Surface Warfare) (YN1) Brenda Lee Shell, military admin for the Executive Officer (Code 203).

Sailor of the Quarter

Electronics Technician First Class (ET1) Jonathan Breeden was named SSC San Diego's Sailor of the Quarter. ET1 Breeden is a training instructor for system administration of the GCCS–M.

COMMUNITY AWARDS

Preservation on the Point Award

The Save Our Heritage Organization (SOHO) People in Preservation presented Mary Platter Rieger with “The Preservation on the Point Award” for significant contributions to historic preservation in San Diego. These accomplishments included restoring a World War I spotlight and two early 1900s streetlights, installing Fort Rosecrans Historic District signage, restoring the SSC San Diego Building 139 staircase, and creating the Battery Wilkeson restoration plan.

APPENDIX B: CY 2003 PATENT AWARDS

Inventor(s)	Title	Patent No.	Date
Ho, Thinh Q. Hart, Stephen M. Henry, Willard I.	High Rejection Evanescent MIC Multiplexers for Multifunctional Systems	6,507,252	14 Jan 03
Whitesell, Eric James	Electricity Generator with Counter-Rotating Collectors in a Radial Magnetic Field	6,515,391	4 Feb 03
de la Houssaye, Paul R.	Microelectromechanical Gas Concentrator	6,517,610	11 Feb 03
Shimabukuro, Randy L. Russell, Stephen D. Offord, Bruce W.	Ultra-High Resolution Liquid Crystal Display on Silicon-on-Sapphire	6,521,950	18 Feb 03
Andrews, John M. Lieberman, Stephen H. Kear-Padilla, Lora L. Games, Virginia	System for Quantifying the Hydrocarbon Content of Aqueous Media	6,525,325	25 Feb 03
Scheps, Richard	Compact Solid-State Dye Laser	6,539,041	25 Mar 03
Maiuzzo, Michael A. Li, Shing T. Rockway, John W. Schukantz, James H. Tam, Daniel W.	Comb Limiter Combiner for Frequency-Hopped Communications	6,549,560	15 Apr 03
Waters, Richard L. Aklufi, Monti E.	Micro-Electro-Mechanical Systems Resonant Optical Gyroscope	6,546,798	15 Apr 03
Waters, Richard L. Hutchens, Chris Aklufi, Monti E.	Differential Amplification for Micro-Electro-Mechanical Ultra-Sensitive Accelerometer	6,550,330	22 Apr 03
Lasher, Markham E. Dahlke, Weldon J.	System for Alternately Directing Optical Energy Through Multiple Optical Modulation Channels	6,560,382	6 May 03
Waters, Richard L. Aklufi, Monti E.	Micro-Electro-Mechanical Systems Ultra-Sensitive Accelerometer	6,581,465	24 Jun 03
Lengua, Gabriel A.	Object-Oriented System for Simulating Sonar Target Acoustic Scattering	6,584,300 B2	24 Jun 03
Adams, Richard C. Abramo, Robert S.	Ultra-Broadband Antenna Incorporated into a Garment	6,590,540	8 Jul 03
Shimabukuro, Randy L. Russell, Stephen D. Offord, Bruce W.	Method for Fabricating an Electrically Addressable Silicon-on-Sapphire Light Value	6,617,187	9 Sep 03
Adams, Richard C. Abramo, Robert S.	Ultra Broadband Antenna Having Asymmetrical Shorting Straps	6,621,457	16 Sep 03

CY 2003 Patent Awards (continued)

Boss, Pamela A. Lieberman, Stephen H. Martini, Leonard J. Smith Leon V.	Sensor for Performing Surface Enhanced Raman Spectroscopy	6,614,523	2 Sep 03
Cook, Richard Macomber, Bennie D. Vizard, William F. Williamson, Eldridge A. Estrada, Anthony	Short-Pulse Automatic Raning Anti-Ship Missile Fuze	6,617,998	9 Sep 03
Roberts, Mark W.	Compact Birefringent Spectrometer	6,618,142	9 Sep 03
Rast, Howard E.	Continuously Variable Fiber-Optic Delay Line Using Compressible Media	6,621,969	16 Sep 03
Schwartz, David F. Helton, J. William Allen, Jeffrey C.	Predictor for Optimal Broadband Impedance Matching	6,622,092	16 Sep 03
Sun, Chen-Kuo Pappert, Stephen A	Dynamic Range Extended for Optical Transmitters	6,619,866	16 Sep 03
Olson, Jack R.	Electrolytic Tilt Sensor and Method for Manufacturing Same	6,625,896	30 Sep 03
Lieberman, Stephen H. Boss, Pamela A. Anderson, Gregory W.	Method for Examining Subsurface Environments	6,630,947	
Stevenson, J. Mark Briest, Susan G. Fronk, Alan Marn, William H.	Digital Data Communications System	6,631,156	7 Oct 03
Russell, Stephen D. Shimabukaro, Randy L.	Solid-State Surface Plasmon Light Valve and Tunable Filter	6,646,782 B1	11 Nov 03
Ramirez, Ayax D. Russell, Stephen D. Poirier, Peter M.	Method and Optical Switch for Altering an Electromagnetic Energy Wave in Response to Acceleration Forces	6,661,566	9 Dec 03
Joshi, Narayan R. Brock, David W. Russell, Stephen D. Kasa, Shannon D. Garcia, Graham A.	Method and Apparatus for Discerning Degradation of Electromagnetic Radiating Tubes	6,667,711	23 Dec 03
Simonds, Hale Bradford	Compact Broad Band Antenna	6,667,721 B1	23 Dec 03
Scheps, Richard	Amplitude-Modulated Laser for High-Bandwidth Communications Systems	6,671,304 B2	30 Dec 03

APPENDIX C: CY 2003 DISTINGUISHED VISITORS

January

8	Captain James McDonnell, USN Commanding Officer, USS *John C. Stennis* (CVN 74)
14	Captain Anthony Shutt, USN Commanding Officer, Naval Coastal Systems Center
21	Dr. Alan Berman Consultant, National Defense University

February

6	Rear Admiral Dennis Morral, USN Program Executive Officer, Program Executive Office for Littoral and Mine Warfare
21	Congressman George Miller (D-CA) 7th Congressional District U.S. House of Representatives
	Mr. Charlie Barone Minority Deputy Staff Director/Senior Legislative Associate for Education Education & Workforce Committee
26	Dr. John Deyst Chair, Committee on Autonomous Vehicles in Support of Naval Operations The National Academies

March

6	Rear Admiral Hiromi Koushim, JMSDF Head, Maritime Staff Office Japanese Maritime Self Defense Force
11	Mr. Walter Morrow Chairman, FORCEnet Implementation CNO Executive Panel Office of the Chief of Naval Operations
12	Rear Admiral Jose Betancourt, USN Commander, Navy Region Southwest
24	Rear Admiral Thomas E. Zelibor, USN Director, Space, Information Warfare, Command &Control Division (N61/N7) Office of the Chief of Naval Operations
18	Major General Daniel Dick, USAF Director, Requirements & Integration Directorate (J8) U.S. Joint Forces Command

CY 2003 Distinguished Visitors (continued)

April

8	Brigadier General Henry "Trey" Obering, III, USAF Deputy, Force Structure Integration & Deployment/Program Director Battle Management Command & Control Missile Defense Agency
16	Mr. Dave Whaley Senior Staff for Fisheries Policy, Subcommittee on Fisheries Conservation, Wildlife and Oceans Committee on Resources U.S. House of Representatives
	Mr. Todd Willens Senior Policy Director, Endangered Species Act Issues Committee on Resources U.S. House of Representatives
	Ms. Bonnie Bruce Professional Staff Member, Subcommittee on Fisheries Conservation, Wildlife and Oceans Committee on Resources U. S. House of Representatives
	Mr. Matt Miller Professional Staff Member, Committee on Resources U.S. House of Representatives
23	Mr. George Hardy Chief, Major Government Fraud Section Office of the U.S. Attorney The Southern District of California
24	Major General Craig Weston, USAF Vice Commander, Electronic Systems Center Air Force Material Command Hanscom AFB
24-25	Brigadier General Hakan Pettersson, RswAF Deputy Director, Military Intelligence & Security Directorate Swedish Armed Forces Headquarters
25	Brigadier General William Brandenburg, USA Deputy Commanding General for Training and Readiness Headquarters, I Corps and Fort Lewis

May

7	Rear Admiral Fillipo Foffi, ITN Director, Office of Future Warfare Italian National Military Joint Intelligence Center
15	Admiral Vern Clark, USN Chief of Naval Operations

CY 2003 Distinguished Visitors (continued)

20	Ms. Lorraine Wilson Acting Deputy Assistant Secretary of the Navy for Integrated Warfare Systems (IWS) Office of the Assistant Secretary of the Navy
	The Honorable Hansford T. Johnson Acting Secretary of the Navy
28	Rear Admiral Albert Calland, USN Commander, Naval Special Warfare Command

June

2	Brigadier General Richard Geraci, USA Director, National Security Space Architect
16	Dr. Michael McGrath Deputy Assistant Secretary of the Navy (RDT&E) Office of the Assistant Secretary of the Navy (RD&A)
20	Mr. Donald Schregardus Deputy Assistant Secretary of the Navy (Environment) Office of the Secretary of the Navy

July

8	Major General Jan C. Huly, USMC Commanding General, Marine Corps Recruit Depot/Western Recruiting Region/Prospective Deputy Commandant for Plans, Policies and Operations Headquarters, United States Marine Corps
15	Rear Admiral Dennis Morral, USN Program Executive Officer, Program Executive Office for Littoral and Mine Warfare
23	Rear Admiral Henry Ulrich, III, USN Director, Surface Warfare Division (N76) Office of the Chief of Naval Operations
23-24	Rear Admiral John D. Burns, USN Commander, Naval Security Group
30	Admiral Koichi Furusho, JMSDF Chief of Staff, Japan Maritime Self-Defense Force

August

4	Briagidier General William Catto, USMC Commanding General, Marine Corps Systems Command
	Mr. Robert Hobart Deputy Commander, Marine Corps System Command
6	Ms. Uyen Dinh Counsel, Armed Services Committee U.S. House of Representatives

CY 2003 Distinguished Visitors (continued)

11	Admiral Edmund Giambastiani, USN Commander, U.S. Joint Forces Command
14	Ms. Shana Dale Chief Of Staff and General Counsel, Office of Science and Technology Policy Executive Office of the President of the United States
	Dr. William Jeffrey Assistant Director for Space and Aeronautics, Department of Homeland Security
14	The Honorable Michael Wynne Acting Under Secretary of Defense (Acquisition, Technology and Logistics) Office of the Secretary of Defense
18	Rear Admiral Jose Betancourt, USN Commander, Navy Region Southwest
21	Rear Admiral Stephen Johnson, USN Director, Undersea Technology Naval Sea Systems Command
25	Rear Admiral Michael Sharp, USN Vice Commander, Space and Naval Warfare Systems Command/Chief Engineer Office of the Assistant Secretary of the Navy (RD&A)
	Vice Admiral John Nathman, USN Deputy Chief of Naval Operations for Warfare Requirements and Programs (N7) Office of the Chief of Naval Operations
	Rear Admiral Kevin Cosgriff, USN Director, Warfare Integration and Assessment Division (N70) Office of the Chief of Naval Operations
26	Captain Phil Wisecup, USN Director, White House Situation Room

September

1	Vice Admiral Michael McCabe, USN Commander, U.S. Third Fleet
	Vice Admiral Gary Roughead, USN Commander, U.S. Second Fleet
8	Vice Admiral Herb Brown, USN (RET) President/Chief Executive Officer, Armed Forces Communication and Electronics Association
	Rear Admiral Paul Tobin, USN (RET) Vice President for Education, Armed Forces Communication and Electronics Association
24	Major General C. Robert Kehler, USAF Director, National Security Space Integration Office of the Undersecretary of the Air Force

CY 2003 Distinguished Visitors (continued)

25 Commodore Nigel Bray, RN
Director of Naval Communications and Information Systems/Assistant Chief of Staff
CINCFLEET Headquarters

October

15 Rear Admiral David Snelson, RN
Commander, U.K. Maritime Forces/Commander Anti-Submarine Warfare Striking Force

22 Vice Admiral Jerry O. Tuttle, USN (RET)
President & CEO, J.O.T. Enterprises, LLC

30 Vice Admiral Timothy LaFleur, USN
Commander, Naval Surface Force, U.S. Pacific Fleet

November

10 Admiral Archie Clemins, USN (RET)
Consultant, Chief of Naval Operations

13 Mr. Bob Giesler
Director, Defense Technology Analysis Office
Office of the Deputy Undersecretary of Defense (Intelligence)

18 Rear Admiral (Sel) Elizabeth Hight, USN
Director, Fleet and Allied Requirements Division (N60)
Office of the Chief of Naval Operations

Rear Admiral David Architzel, USN
Commander, Operational Test & Evaluation Force

The Honorable John Young, Jr.
Assistant Secretary of the Navy (Research, Development, and Acquisition)

Mr. George Lotz
Assistant to the Secretary of Defense for Intelligence Oversight
Office of the Assistant Secretary of Defense

20 Admiral Vern Clark, USN
Chief of Naval Operations

25 Vice Admiral Timothy LaFleur, USN
Commander, Naval Surface Force, U.S. Pacific Fleet

December

17 Dr. Richard Ivanetich
Co-Chair, Naval Studies Board
Committee on FORCEnet Implementation Strategy (14)

Dr. Bruce Wald
Co-Chair, Naval Studies Board
Committee on FORCEnet Implementation Strategy (14)

CY 2003 Distinguished Visitors (continued)

18 Mr. David Cherington
Professional Staff Member, Armed Services Committee

Mr. Greg Kiley
Professional Staff Member, Armed Services Committee
United States Senate

APPENDIX D: CY 2003 MAJOR CONFERENCES AND MEETINGS

January

13–16	Army Tencap User's Working Group
14	Naval Command College Class of 2003

February

5	Embedded National Tactical Receiver Tactical Receive Segment Program Management Reviews

April

8	National Imagery and Mapping Agency Commercial Joint Mapping Toolkit User's Conference

May

1	Joint C4ISR Symposium

June

2–5	2003 Military Sensing Symposia National Symposium on Sensor and Data Fusion
3–5	Fleet Space, Information Warfare, Command & Control (N6) Conference

July

21 Jul – 1 Aug	Naval Research Advisory Committee (NRAC) Summer Study

August

6–7	Joint Tactical Radio System Technology Laboratory Open House with Industry
20	Space and Naval Warfare Systems Command – National Reconnaissance Office Technology Forum

October

27–31	The 74th Shock & Vibration Symposium

November

3–6	Collaboration Interoperability Working Group/Defense Collaboration Tool Suite User's Group Quarterly Meeting

APPENDIX E: ACRONYMS

ACS	Advanced Concepts Site
ACTD	Advanced Concept Technology Demonstration
AFB	Air Force Base
ARL	Army Research Laboratories
AST	At-Sea Trial
ASW	Antisubmarine Warfare
AT	Anti-terrorism
AT/FP	Anti-terrorism/Force Protection
BFC	Biometrics Fusion Center
BFIT	Battle Force Interoperability Testing
BMO	Biometrics Management Office
BSC	Balanced Scorecard
C2TD	Command and Control Translator Database
C^3	Command, Control, and Communications
C^4	Command, Control, Communications, and Computers
C^4I	Command, Control, Communications, Computers, and Intelligence
C^4ISR	Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance
CCAT	Center for Commercialization of Advanced Technology
CDHQ	Command Deployable Headquarters
CENTCOM	U.S. Central Command
CFBLNet	Combined Federated Battle Laboratory Network
CCG 3	Carrier Group Three
CITE	Center of Industrial and Technical Excellence
CJTF	Combined Joint Task Force
CMMI	Capability Maturity Model Integration
COBLU	Cooperative Outboard Logistics Upgrade
COE	Common Operating Environment
COMDAC	COE Segment Command Display and Control
COMNAVREGHI	Commander, Navy Region Hawaii
COMPACFLT	Commander, Pacific Fleet
COMTHIRDFLT	Commander, Third Fleet
COMWIN	Combat Wear Integration
CoRE	Consolidated Reduction and Evaluation
CRADA	Cooperative Research and Development Agreements
CTT	Commanders Tactical Receiver
CWAN	Coalition Wide Area Network
CY	Calendar Year
DARPA	Defense Advanced Research Projects Agency
DCS	Display and Control Subsystem
DCT	Distributed Computer Technology
DEP	Distributed Engineering Plant
DNBI	Disease and Non-Battle Injury
DoD	Department of Defense

EA	Evolutionary Acquisition
Ed Tech Fair	Educational Technology Fair
EFW	Embedded Firewall
ET1	Electronics Technician First Class
FA	Filter Agent
FP	Force Protection
FY	Fiscal Year
GAO	General Accounting Office
GCCS–M	Global Command and Control System–Maritime
GPS	Global Positioning System
GTE	Gateway Terminal Emulator
GUIDE	Global Positioning System User Equipment Identification Database
GVH	Gateway Virtual Host
GVT	Gateway Virtual Terminal
HF	High Frequency
HO	Hydrographic Office
HPCMP	High Performance Computing Modernization Program
HPCNIG	High Performance Networking and Computing Initiative Group
HPO	Higher Performing Organization
HPU	Harbor Patrol Unit
HUBZone	Historically Under utilized Business Zone
ICD-9	International Classification of Diseases Version Nine
ILS	Integrated Logistics Support
INS	Integrated Navigation Segment
IO	Information Operations
IOC2	Information Operations Command and Control
IOCOF	Information Operations Center of the Future
ISEA	In-Service Engineering Agent
ISR	Intelligence, Surveillance, and Reconnaissance
IT-21	Information Technology for the Twenty-First Century
ITDB	Inter-Theater Data Base
JICF	Joint Integrated Communications Facility
JMINI	Joint Ultra High Frequency UHF Military Satellite Communications Network Integrated Control System
JOC	Joint Operations Center
JPO	Joint Program Office
JPSD	Joint Precision Strike Demonstration
JSIMS–M	Joint Simulation System–Maritime
JTASC	Joint Training, Analysis, and Simulation Center
JteL	JTRS Technology Laboratory
JTF	Joint Task Force
JTIDS	Joint Tactical Information Distribution System
JTRS	Joint Tactical Radio System
JTT	Joint Task Terminal
JWFC	Joint Warfighting Center
JWID	Joint Warrior Interoperability Demonstration

KASER	Knowledge Amplification by Structured Expert Randomization
KPA	Key Process Area
LAN	Local Area Network
LRIP	Low-Rate Initial Production Program
MAGTF	Marine Air–Ground Task Force
MATT	Multi-Mission Advanced Tactical Terminal
MCAPS	Mission Control and Processing Subsystem
MDSS	Medical Data Surveillance System
METMF(R)	Meteorological Mobile Facility (Replacement)
METOC	Meteorological and Oceanography
MIDS	Multi-Functional Information Distribution System
MMS	Marine Mammal System
MNTG	Multi-National Naval Task Group
MOC	Memorandum of Cooperation and Collaboration
MSRC	Major Shared Resource Center
MTF	Multinational Task Force
NANDS	Noise Activated, Nonlinear Dynamic Sensors
NATO	North Atlantic Treaty Organization
NAVAIR	Naval Air Systems Command
NAVSEA	Naval Sea Systems Command
NAVSSI	Navigation Sensor System Interface
NCS	Nework-Centric Solutions
NDIA	National Defense Industrial Association
NHRC	Naval Health Research Center
NIMA	National Imagery and Mapping Agency
NITES	Naval Integrated Tactical Environmental System
NMCI	Navy Marine Corps Intranet
NP	New Professional
NRS	NAVSSI Remote Station
NSCT-1	Naval Special Clearance Team One
NSI	Navigation Source Integration
NSWC	Naval Surface Warfare Center
NUWC	Naval Undersea Warfare Center
OMN	Operation and Maintenance, Navy
ONR	Office of Naval Research
OPN	Other Procurement, Navy
OSS	Ocean Survey System
PACOM	Pacific Command
PET	Programming Environment and Training
PKI	Public Key Infrastructure
PM	Project Management
PMC	Project Management Council
RADIAC	Radiation Detection, Indication and Computation
RCC	Regional Command Center

RDT&E	Research, Development, Test and Evaluation
RelNav	Relative Navigation
RESA	Research, Evaluation, and Systems Analysis
RFN	Radio Frequency Network
RLGN	Ring Laser Gyro Navigation
RTS	Real-Time Subsystem
SBO	Small Business Office
SCA	Software Communications Architecture
SDMA	San Diego Mathematics, Engineering, and Science Achievement
SECNAV	Secretary of the Navy
SEPO	Systems Engineering Process Office
SIF	System Integration Facility
SOHO	Save Our Heritage Organization
SPAWAR	Space and Naval Warfare Systems Command
SPI	Software Process Improvement
SSA	Software Support Activity
SSC San Diego	Space and Naval Warfare Systems Center, San Diego
SSDS	Ship Self-Defense System
STSC	Software Technology Support Center
SW-CMM	Software Engineering Institute's Capability Maturity Model for Software
SWIDS	Shallow Water Intruder Detection System
TADIL	Tactical Digital Information Link
TBMCS	Theater Battle Management Core Systems
TCS	Tactical Communication Solutions
TCS	Time-Critical Strike
TMA	TriCare Medical Activity
TMIP	Theater Medical Information Program
TRS	Tactical Receiver Segment
UAV	Unmanned Aerial Vehicle
UCSD	University of California, San Diego
UE	User Equipment
UFL03	Ulchi Focus Lens 03
UHF	Ultrahigh Frequency
UK	United Kingdom
UPS	Universal Parser Segment
USJFCOM	U.S. Joint Forces Command
USPACOM	U.S. Pacific Command
USTRANSCOM	U.S. Transportation Command
USV	Unmanned Surface Vehicle
VLAN	Virtual Local Area Network
VMS	Voyage Management System
VON	Virtual Operations Network
WARNET	Wide Area Relay Network

SOURCES/NOTES

[1] *Outlook*, "SSC San Diego Executive Director Dr. Bob Kolb retires," 1 August 2003, Volume 26, Number 14

[2] *Outlook*, "Rod Smith named Center's acting Executive Director," 15 August 2003, Volume 26, Number 15

[3] Outlook, "Rod Smith confirmed as Center's Executive Director," 21 November 2003, Volume 26, Number 22

[4] *Outlook*, "Code 280 Department Head Bob Kochanski retires," 10 October 2003, Volume 26, Number 19

[5] *Outlook*, "Code 210 Department Head Dr. Tom Kaye retires," 26 September 2003, Volume 26, Number 18

[6] *Outlook*, "Bob Kochanski and Dr. Kolb lead Center Strategy Meeting," 14 March 2003, Volume 26, Number 5

[7] *Outlook*, "Center Strategy Meeting held," 28 March 2003, Volume 26, Number 6. Note: the first two strategy meetings were intended primarily for the technical codes; implementation of the Balanced Scorecard for Support Codes began in early October 2003.

[8] Balanced Scorecard, developed by two business leaders and Harvard professors (Robert S. Kaplin, Professor of Leadership Development at Harvard Business School, and David P. Norton, President of Balanced Scorecard Collaborative, Incorporated) provides the framework for translating the organization's strategy into operational objectives, specifically objectives that can be measured. For more background information, see *Outlook*, "Balanced Scorecard translates strategy into operational objectives," 27 September 2002, Volume 25, Number 19.

[9] Summary of questions from Center Strategy meeting (*Outlook*, "Center Strategy Meeting held," 28 March 2003, Volume 26, Number 6)

Q: I am working on a project in homeland defense. This is not a Department of Defense (DoD) program, so am I working in the right leadership area?

A: It could be, depending on exactly what you are doing. We work on non-DoD programs in the intelligence community, for the Coast Guard, and others but less than 2% of our work is non-DoD. It is a bigger issue at very high levels as to whether it is appropriate for DoD labs to do homeland defense. In the meantime, we should try to align to mission areas. When bringing in work, discuss it with your division head to determine if it aligns with the Center's mission.

Q: Will reorganization result from aligning work areas?

A: We should always strive for a more efficient organization, and reorganization should not be ruled out.

Q: With the retirement of so many in the workforce, don't we need mentoring?

A: Informally, ff you are thinking of retiring, please voluntarily put somebody under your wing and don't let the organization lose your expertise. We need to make sure we have the core competencies left as the work force retires and individuals must take that responsibility.

Q: Should individual projects develop their own balanced scorecard?

A: Yes, we have to consider and keep in mind the four balanced perspectives in all decisions we make.

Q: How do we do strategic outreach and to whom do we outreach?

A: We let our customers know who we are and what we do. We are not a platform organization and this is a good thing. We do work for SPAWAR, Office of Naval Research, Defense Advanced Research Projects Agency, the Air Force, Army, Naval Sea Systems Command, Naval Air Systems Command and others. Our employees will attend the National Defense Industrial Association Symposium at no cost this year and this is an excellent opportunity to reach our customer base.

Q: Our project received good feedback from all of the customers involved, except for SPAWAR headquarters. Could you comment?

A: We have a policy of speaking with one voice in the SPAWAR organization. There may be individuals who have not done that, and that type of occurrence should be referred to the department head. It is most important for individual projects to make customers comfortable at giving candid feedback, give us suggestions to do things better, and refer customers to other parts of the organization that can address their business area.

Q: Should we be looking at employees' skill bases from across all departments to locate the right expertise to serve our customers?

A: Yes. We are looking at creating a database of individual skill sets across the Center. It would be a living system with each individual updating his or her own education and training record. We have not yet figured out the execution of our plan, but this is a wonderful idea that we are investigating.

[10] *Outlook*, "Support codes All Hands presents future Center challenges as opportunities," 18 July 2003, Volume 26, Number 13

[11] *Outlook*, "SSC Insider: New Intranet upgrade is here," 28 February 2003, Volume 26, Number 4

[12] *Ou*tlook, "SSC San Diego reassessed at SW-CMM Level 3," 29 August 2003, Volume 26, Number 16

[13] *Outlook*, "CCAT program facilitates commercialization of Center technologies," 20 June 2003, Volume 26, Number 12

[14] *Outlook*, "New Project Management Council established," 23 May 2003, Volume 26, Number 10

[15] *Outlook*, "Small Business Office hosts two summer events," 12 September 2003, Volume 26, Number 17

[16] *Outlook*, "Center participates in Educational Technology Fair," 14 March 2003, Volume 26, Number 5

[17] *Outlook*, "Center employees support Science and Engineering Fair," 25 April 2003, Volume 26, Number

[18] Outlook, "Center supports San Diego State University students' Shadow Day," 19 December 2003, Volume 26, Number 24

[19] *Outlook*, "Block 4.2.0 Navigation Sensor System Interface delivered, 28 February 2003, Volume 26, Number 4. Additional background information about Block 3 can be found in SSC San Diego Command History for Calendar Year 1999 (SSC San Diego Technical Document 3111, June 2000). Extensive information about the NAVSSI program can be found in "An Integrated Approach to Electronic Navigation," in the SSC San Diego Biennial Review 2001, SSC San Diego Technical Document 3117, August 2001.

[20] *Outlook*, "Update completed to HMS Scott ocean survey system," 23 May 2003, Volume 26, Number 10. Note: The update concluded in early December 2002; information was not received in time to include it in the Command History for CY 2002 and therefore is included here.

[21] *Outlook*, "Alex, Bentley and Zak return from Persian Gulf," 9 May 2003, Volume 26, Number 9

[22] *Outlook*, "Applying Nonlinear Dynamics for fun and profit: A new generation of micro-sensors," 14 March 2003, Volume 26, Number 5

[23] *Outlook*, "Center develops Command Deployable Headquarters," 31 January 2003, Volume 26, Number 2. Note: the Command Deployable Headquarters was deployed in 2002; information was not received in time to include it in the Command History for CY 2002 and therefore is included here.

[24] *Outlook*, "Center team participates in Exercise Ulchi Focus Lens," 10 October 2003, Volume 26, Number 19

[25] *Outlook*, "Teams implement Gateway capability on the Navy's Distributed Engineering Plant," 12 September 2003, Volume 26, Number 17

[26] *Outlook*, "Information Operations Center conducts experiment," 17 January 2003, Volume 26, Number 1. Note: The IOC2 Dynamic Network Defense Experiment was conducted in November 2002; information was not received in time to include it in the Command History for CY 2002 and therefore is included here.

[27] *Outlook*, "National Imagery and Mapping Agency team recognized," 25 April 2003, Volume 26, Number 8

[28] *Outlook*, "Code 240 projects benefit from Software Process Improvement,"1 August 2003, Volume 26, Number 14

[29] *Outlook*, "JSIMS Maritime Team achieves CMM Level 3," 28 March 2003, Volume 26, Number 6

[30] *Outlook*, "JTF WARNET completes final test and checkout," 24 October 2003, Volume 26, Number 20

[31] *Outlook*, C2 Engineering, Tidewater, survives Hurricane Isabel," 7 November 2003, Volume 26, Number 21

[32] *Outlook* "Depot named Center of Industrial and Technical Excellence," 31 January 2003, Volume 26, Number 2

[33] *Outlook*, "JWID '03 supports coalition interoperability," 1 August 2003, Volume 26, Number 14

[34] *Outlook*, "METMF(R) system supports military operations," 6 June 2003, Volume 26, Number 11

[35] *Outlook*, "METMF(R) uses Fleet Engineering SPI initiatives," 6 June 2003, Volume 26, Number 11

[36] *Outlook*, "Lightning Bolt Award to RCC installation team," 18 July 2003, Volume 26, Number 13

[37] *Outlook*, "Filter Agent passes operational readiness testing," 17 January 2003, Volume 26, Number 1. Note: Filter Agent passed operational readiness testing on 18 November 2002; information was not received in time to include it in the Command History for CY 2002 and therefore is included here.

[38] *Outlook*, "DoD HPC Modernization Program nurtures technical excellence at SSC San Diego," 15 August 2003, Volume 26, Number 15.

[39] *Outlook*, "Memorandum of cooperation signed," 9 May 2003, Volume 26, Number 9

[40] *Outlook*, "KASER is a study to capture the bounds of human reasoning," 7 November 2003, Volume 26, Number 21

[41] *Outlook*, "Medical Data Surveillance System supports operational forces and Department of Defense medical facilities," 21 November 2003, Volume 26, Number 22

[42] *Outlook*, "COBLU installed on United Kingdom platform," 19 December 2003, Volume 26, Number 24

[43] *Outlook*, "GUIDE provides the future for GPS databases," 6 June 2003, Volume 26, Number 11.

[44] *Outlook*, "JTeL holds open house," 15 August 2003, Volume 26, Number 15

[45] *Outlook*, "Biometrics Lab team evaluates security technologies," 14 March 2003, Volume 26, Number 5