Information Technology and Communication Services (ITACS)Information Technology and Communication Services (ITACS) Publi

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FY18 Annual ITACS Accountability Report

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FY18 ITACS
Annual Accountability Report

Information Technology

And

Communications Services

Naval Postgraduate School

Naval Postgraduate School
Mission Statement

The Naval Postgraduate School provides relevant and unique advanced education and research programs to increase the combat effectiveness of commissioned officers of the naval service to enhance the security of the United States. In support of the foregoing and to sustain academic excellence, NPS will foster a program of relevant and meritorious thesis and research experiences for NPS students that informs the curricula, supports the needs of Navy and Department of Defense, and builds the intellectual capital of NPS faculty. To support the core Navy mission, NPS' programs are inherently joint, inter-agency, and international.

Information Technology and Communications Services (ITACS)
Mission Statement

The mission of the Naval Postgraduate School's Information Technology and Communications Services is to provide technology and communications support for the NPS core mission of teaching, research and service to the Navy and Department of Defense, and to provide voice, video, and data infrastructure as mission-crucial enablers of innovation and experimentation within the educational enterprise.

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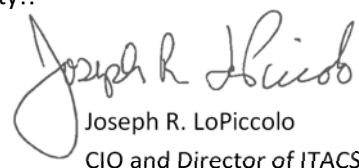
Message from the CIO and Director

Building upon the foundation established in 2016 and the momentum of 2017, the ITACS team continued this year with focused customer support for mission success. This year the team was particularly busy improving and securing IT service delivery. Specifically, we accomplished the following key successes:

◊ Working with the Associate Provost for Graduate Education, established the Teaching and Learning Commons wherein educational technologies can be vetted, tested, and selected with the active participation of faculty and students.

◊ Established the Cybersecurity Operations Center (CSOC) that now operates on a 24x7 level, continuously monitoring the NPS and DLI-FLC networks while sharing valuable cyber threat intelligence with the Naval War College and the Naval Academy.

◊ Introduced the next generation of the student information management system, Python 2, to the campus while improving functionality, usability, and capability.

◊ Upgraded the NPS Learning Management System, Sakai, to the latest version 12 while migrating all content and operations to a cloud provider which maintains the system at maximum availability with the latest features available to our campus.

◊ Initiated the "Capstone" program to support our Records Management efforts in retaining e-mail records of senior NPS leadership indefinitely, an important milestone of our ongoing records management efforts.

Very important to us as a service organization, is that our customers can use IT services, any time, from anywhere, on any device. To this end, we strengthened our EDU VPN authentication with two factor authentication using "DUO" and our EDU-to-MIL VPN authentication using the DoD CAC. We also introduced expanded support hours with a remote call center help desk and improved our Intranet, "MyNPS", with a new, modern content management system.

As a fully-accredited research university sponsored by DoD and military service organizations, it is important we maintain a level of security compliance consistent with our mission needs. Although the DoD CIO authorized me with the responsibility to manage the EDU network in accordance with mission requirements this year, we have the additional burden of operating a MIL network and a legacy classified SIPRNet network both of which recently passed Cybersecurity Inspections by Navy Fleet Cyber Command – evidence that we demonstrate the due diligence of protecting sensitive DoD networks while managing the flexibility and agility of an EDU network.

Please take the time to read about the other FY18 accomplishments in our Annual Accountability Report, while serving our campus daily. As the central nervous system of the campus, we do not take that role lightly – we are here to serve and to continue to make all of you successful. The ITACS staff and I thank you for the opportunity!!

Joseph R. LoPiccolo
CIO and Director of ITACS

FY18 Initiatives and Goals

Maintain a High Level of Customer Service. Invest in customer service and technical training for all ITACS staff, management and customers. Transition from a user-centric issue tracking system to a robust "Service Desk" model that consists of metrics reporting and trend analysis. Deploy a telephone call center to reduce the number of unanswered calls to the Help Desk. Develop and communicate an IT Service Catalog to inform our users of the services we offer and where they can get self-help.

Develop Mature Cybersecurity Capabilities. Leverage the integration of industry leading tools as part of the EDU Security Operations Center (EDU-SOC) to establish a Cybersecurity Information Sharing and Analysis Center with DLI-FLC, the USNA, and the NWC. Capture indications of attempted attacks, Tactics, Techniques and Procedures (TTP) and work with NPS Cyber Researchers to advance cyber defenses for the EDU enclaves.

Deploy a Campus-wide Software-Defined Network. Update network distribution components throughout the campus and establish and manage Quality of Service levels consistent with mission requirements.

Enable Increased Educational Opportunities with 100Gb Network Connectivity. Leverage the "Pacific Research Platform" to facilitate collaborative Big Data Analytics with member institutions focused on problems in Cybersecurity, Climate Change, and other emerging research opportunities.

Accelerate Movement into the Cloud. Expand opportunities for research environments to quickly spin up elastic services that do not require long term investment or management. Move enterprise services and applications to the Cloud while transitioning from CAPEX to OPEX planning and budgeting.

Improve the Academic Experience. Introduce technology within the Labs and Classrooms that monitors status in near-real time of all educational technologies so that ITACS can proactively address issues before the start of the academic day.

Leverage a Shared IT Services Contract. With the USNA and NWC, execute a multi-award contract that provides for a surge capability to address IT opportunities quickly using refined and lean contracting processes.

Establish a Records Management Program. Plan and budget for the policies, technologies, and processes required to support DoD and Navy records management requirements.

Enhance Distance Learning. - Adapt IT services to enhance Distance Learning support. Employ Cloud based applications and continue evolution from Video Tele-Education (VTE) to flexible web based systems.

Classified Computing Programs

As part of the *Client Services* team*, the *Classified Computing Programs (CCP)* provides staff and infrastructure to support the operations of the University's five classified networks. Leveraging the expertise found in ITACS' other functional areas, CCP supports classrooms, computer labs, secure video teleconferencing, distance learning, conferences, and seminars in the Sensitive Compartmented Information Facility (SCIF), Systems Technology Battle Lab (STBL), the Dudley Knox Library, Watkins Hall, and in various auditoria and lecture halls around campus, as needed.

Bridging a Gap

ITACS is very fortunate to have active duty military assigned to our organization. In general active duty military assigned to organizations divide their workday between military duties and tasks specific to each internal department .

The area in ITACS that leans heavily on the military staff is the Systems Technology Battle Laboratory (STBL). In FY18 there were three military staff members in the STBL ensuring successful daily operations. Some of the duties included maintaining strict access control, administering all classified video-teleconferences (VTCs), managing all campus secret internet protocol router network (SIPRnet) accounts, and conducting systems administration over 10 classified servers and over 50 workstations.

A few of their major accomplishments for FY18 were:

1) Provided administrative and technical support to faculty and students during classes and while performing research in a classified environment

2) Completed migration to Windows 10 ahead of Navy mandated deadlines

3) Virtualized the secure servers to increase sustainability and reduce life cycle cost

4) Provided support to ensure a reliable and consistent high-speed connection from the Defense Information Systems Agency (DISA)

The STBL and SCIF IT staff maintained a strict standard of DoD compliancy to provide effective cybersecurity. ITACS would not be able to support the NPS mission without the dedication and assistance of our talented military staff in the STBL.

FY18 SCIF Statistics

Number of accounts: 180

Secure video tele-conferences: 30

Special events: 17

Classes: 11

FY18 STBL Statistics

Number of accounts: 275 SIPR Accounts

Secure video tele-conferences: 120

Meetings and briefings: 100

Classes: 15

Special events: 5

CSI Results

COMPLIANT! In October of 2017, the Naval Postgraduate School Information Technology and Communications Services Department (ITACS), received word from Fleet Cyber Command that we were selected for Cybersecurity Inspections in January of 2018 for our Systems Technology Battle Lab (STBL) and Defense Research and Engineering Network (DREN). The inspections are the mechanisms which provide USCYBERCOM with situational awareness of indications of a site's operational readiness to respond to USCYBERCOM directives (WARNORDS, OPORDs and FRAGOs) and their ability to respond to changing threats to DoD networks while providing site Commanders with situational awareness and actionable recommendations for improving their cyber readiness.

Failure of a CSI would place the network in jeopardy of disconnect.

Upon notification of the inspections, ITACS leadership and staff, in close coordination with the Command Security Manager (CSM), sprang into action by scheduling a pre-inspection Training and Assist Visit (TAV) from the Navy Office of Compliance and Assessment.   The goal of the TAV subject matter experts is to advise network owners of any shortcomings in their cybersecurity posture.   Under challenging deadlines and changes in staffing, the ITACS military and civilian staff worked together as a team to guarantee NPS compliance with Navy and Department of Defense cybersecurity standards.

Kudos to ITACS and CSM staff members for their hard work and dedication to the mission, and a special thank you to all of our customers who were understanding during our preparations and inspections.

Unique Capability at NPS

The Sensitive Compartmented Information Facility (SCIF) has classrooms available for classified classes, meetings and seminars. All classrooms are certified for up to Top Secret information and discussions. Two of the classrooms have secure video teleconferencing (VTC) capability to facilitate distance learning classes, providing infrastructure for face-to-face interaction in conferences, meetings, and classes. These classrooms have recording capabilities for future viewing.

ITACS maintains a constant lifecycle refresh schedule in an effort to provide better service to the faculty, staff and students at NPS.

Cybersecurity

Cybersecurity is responsible for securing the networks and data on campus and off campus in locations throughout the world via remote access servers including computer network defense and monitoring, antivirus and vulnerability management, operating systems and application patch management, and certification and accreditation of networks and applications. Staff provide the tools and technologies to find, protect, and react to the unauthorized disclosure of sensitive/privacy data on NPS networks, liaise with third parties throughout the DOD, DON, the greater academic community and state and local government organizations to maintain currency with the latest cybersecurity and privacy policies, guidelines, threats and vulnerabilities. Additionally, staff deliver relevant and timely trainings to the campus user population and collaborate with faculty and students on cybersecurity-relevant research topics.

DUO Security Two-Factor Authentication

By the end of FY18, Duo Security two-factor authentication protected 11 different applications; mostly ITACS management systems. The top application is the GlobalProtect virtual private network (VPN) with 47,761 total Duo requests in the first six months. There are 2,396 Duo users with a total of 2,612 two-factor devices (e.g. phones, tablets) enrolled. The authentication success rate is 82.4% for all applications. Those numbers are expected to increase as Duo users become more familiar with the application and when Duo is protecting additional applications. 90.8% of all Duo authentication occurs using "Duo Push" via the mobile application; this is the recommended method rather than receiving a text or phone call to authenticate access. With its expanded implementation, Duo Security improved the security posture of NPS' sensitive data by adding an extra layer of user authentication, rather than just user-id and password, which is a known, significant vulnerability. Duo also provided greater insight to the devices on the NPS network (e.g. OS, browser, and plugin versions) which significantly aided the cybersecurity team when making decisions about protecting the network.

All Hands Cybersecurity Training

Cybersecurity provided quarterly instructor-led training sessions for fiscal year 2018. The sessions focused on conveying basic Cybersecurity best practices ensuring users were trained to protect themselves, their families and their personal and professional peers, at home or at work from today's Cyberspace threats. Each live session counted as credit for FY18 Cybersecurity training.

In each session, Cybersecurity covered the implications of emerging technologies such as the Internet of Things (IOT), Mobility and Cloud Computing and emphasized links shared with other security disciplines (Operations Security, Personnel Security, and Physical Security for example) and how each affects Cybersecurity. Attendees were not only taught cybersecurity best practices and emerging threats, but were also presented with incidents and issues unique to the NPS cyber domain, discussing strategies to identify, protect, and respond to exploit attempts.

Cybersecurity trained over 650 participants representing nearly 40% of the NPS user population who opted to attend a live training session. While completing the online DoD Cyber Awareness Challenge training remained the standard option to satisfy the annual training requirement, offering the alternative to attend instructor-led training helped to engage and invigorate the NPS user community and contributed to the highest cybersecurity training compliance level of the past three years.

NPS Cybersecurity Operations Center Renovation

In order to meet new and emerging cyber threats as well as increase integration/collaboration of cyber operations with the Navy's other institutions of higher education (U.S. Naval Academy and Naval War College), NPS recently requested and received Program Objective Memorandum (POM) funding to enhance its Cybersecurity Operations Center (CSOC) with a base period of performance from 1 Aug 2018 to 31 July 2019 with four additional option years. While the majority of these funds are used for contracted services for the operation of the CSOC facility, some of the money was used to upgrade the facility itself. What had historically been one, large multi-functional space with an antiquated video display system was recently transformed into two distinct areas; one for the CSOC watch floor which houses the schools' incident handlers on a 24x7 basis, and a "back-office" area which serves as home to the 8x5 support staff who designed and maintained the cyber infrastructure, developed and documented the business processes and conducted more in-depth cyber threat hunting and analysis for the watch floor.

In the span of only two weeks, ITACS personnel worked closely with NAVFAC public works and outside vendors to completely re-paint the space, clean the carpets, install and wire a set of six cubicles for the back-office team and install a new, state-of-the art video system with two 84" monitors.

The new personnel completed a rigorous training program to acclimate them to the schools' mission/organization, incident handling processes, computer network defense (CND) tools, documentation, and change management. Incident handlers rolled into shift rotations enabling incident handling to be performed with 24x7x365 coverage.

Additionally, the CSOC team re-architected the security information and event management (SIEM) function to incorporate a more modern platform with upgraded throughput and capacity for event log transmission and storage. With the capability to bring in event logs from new sources, incident handlers now have greater capability and capacity to generate and test new use cases for incident detection and response.

Completion of the space was a true team effort among many organizations, internal and external to ITACS. Through their combined efforts, the new CSOC now serves as the hub of defensive cyber operations at NPS for years to come.

⇒ *Number of suspected phishing tickets managed: 747*

⇒ *Number of incidents managed: 221*

⇒ *Number of SPAM e-mails blocked: 7,124,049*

⇒ *Cost savings to NPS by using SPAM firewall: $4,026,334*

⇒ *Malware blocked, preventing workstation infections: 3,530*

Splunk

Splunk Enterprise serves as the industry standard for data collection, data storage and analytics which provides for both real-time and historical analysis over large data sets. Computer activity produces overwhelming informational feeds requiring automated consumption through cybersecurity tools like Splunk.

Automation of cybersecurity operations is essential to combat yesterday's threat. Data aggregation among other defensive capabilities enables freed human capital through automation to identify today's and tomorrow's threats. The sheer magnitude and complexity of threat vectors has outpaced manual cyber defense. Splunk is one tool to pull information from disparate sources to paint a clearer picture of cyber activity allowing the analyst to detect and combat more sophisticated actors.

With its Enterprise Security and IT Service Intelligence solutions it provides great insight into NPS' cybersecurity posture and IT health and performance. Splunk replaced our need for the AlienVault security information and event management (SIEM). Additionally, Splunk is currently used by the Naval War College and will be adopted by the U.S. Naval Academy, so it will lend itself to better integration with these two naval higher education information technology consortium (NHEITC) organizations as we grow and expand the CSOC.

Development and Operations

Development and Operations provides the full scope of core IT services, to include server hardware, network cabling, datacenter management, and the management, maintenance, and operation of systems to provide IT resources to our customers throughout the campus and the world. The team behind the services includes system administrators, network engineers, infrastructure managers, telecommunications specialists, and developers, all working to ensure that the NPS systems are reliable and available when needed.

SharePoint ~ New and Improved

ITACS migrated NPS SharePoint sites from an on premise installation to the cloud. This transition significantly improved users' experience with SharePoint. The new features included an improved user interface, the ability to access SharePoint sites on mobile devices, updated browser support and compatibility, and the capability to access Share-Point without a VPN connection. SharePoint will no longer be an internal only application. These improvements significantly enhanced the ability of faculty and staff to accomplish the mission of the university by increasing efficiency and deeply integrating with other Office 365 services in use by the campus. At the end of FY18 approximately 25% of the existing NPS SharePoint sites were migrated. Completed migrations and those currently in progress include several large sites, such as the Dudley Knox Library, Information Resources and ITACS, GSOIS, Safety, and the Space Systems Academic Group (SSAG).

As part of the transition to SharePoint Online, the SharePoint migration team developed a new lifecycle plan for the student thesis SharePoint sites. The team already created close to 3,000 student thesis sites, and going forward, students will receive their thesis SharePoint sites during their first quarter. The team researched ways to automate various manual processes, as well as integrate SharePoint thesis site processing with the new thesis dashboard in Python. The research work by these student theses is now increasingly accessible through multiple devices and collaboration among students globally.

The SharePoint migration team worked with the NPS Staff Development Council. SharePoint Online classes are now part of the training offered periodically for Microsoft products to NPS staff, faculty, and students. Migration team members attended the last two offerings of the SharePoint classes and were available to answer any governance questions and inquiries about the migrations.

SharePoint Online is part of the Microsoft Office 365 ecosystem. The SharePoint migration team actively searched for ways to leverage other Office 365 components to create new ways to access information stored in SharePoint. The team created a prototype PowerApps application for mobile devices that displays information from a Share-Point list. The team presented this application to the campus, and additional demo sessions are planned for the future.

Communications

Telecommunications services provided employees of NPS, Defense Language Institute Foreign Language Center (DLIFLC) and Fleet Numerical Meteorology and Oceanography Center (FNMOC) with landline commercial and DSN phone lines, voice-mail accessible from multiple devices, 911 services, and work cell phones for official duties, travel, etc., TeamQ enabled call center features, and the VeraSMART call accounting system stored phone call information to identify and prevent fraud, waste, and abuse.

Telecommunications services kept our faculty and staff in communication with one another and broader DoD and external customers with a variety of methods and devices. They increased our efficiency and capability in accomplishing the NPS mission.

New VPN for *.mil*

ITACS introduced the latest tool to provide access to .mil websites - the .mil Virtual Private Network (VPN). This upgrade retired aging hardware, improved security and integrated with the CAC for two factor authentication (2FA). The .mil VPN tightly integrated with our existing firewalls to provide a smoother, behind the scenes process.

To use the VPN for .mil, users must:

◇ Be a U.S. citizen with a valid DoD Common Access Card (CAC)

◇ Complete Cybersecurity Awareness Training

◇ Have an approved SAAR-N

Office 365 Update

With the completion of the Exchange Online migration, we introduced some of the enhanced or new Office 365 collaboration features. Outlook on the web, formerly known as Outlook Web App, lets faculty, staff and students access their Office 365 mailbox from any Web browser.

Part of the Office 365 suite includes the new collaboration tool "Microsoft Teams." Microsoft Teams is a messaging app that integrates with other Microsoft software including Skype, Office 365 services, as well as other 3rd party connectors and apps for a dynamic team working space. Features of Teams include:

- Use teams in browser or download the desktop/mobile app (Windows or Mac OsX)

- Schedule and facilitate meetings within the Teams app

- Chat one-on-one with members of your team, or create small group chats

- Great for faculty collaboration and/or student team project

Other benefits of Office 365 include:

- Easy access to Office 365 apps including SharePoint, OneNote, and Microsoft Planner

- Access to OneDrive, with 5 terabytes of storage per user

- Use of OneDrive allows users to share files/folders

- 5 licenses per FTE here and at home

NPS' New Intranet

The new NPS Intranet website, named *my*NPS, launched in March 2018. The *my*NPS design was created from research, analytics, and user feedback from NPS students, faculty, and staff. Throughout the design and development process, we solicited your feedback through surveys and user testing. Your input was well received. We made improvements based upon your suggestions. Some of the new capabilities that benefit our customers include the following:

- Improved site search
- Improved site navigation and organization
- My Quick Connect feature, a customizable widget that allows students, staff, and faculty to access their most frequently used tools and applications quickly
- Searchable NPS Instructions
- Mobile optimized to enable the website to be accessible across all devices

Since the launch, we received feedback from many customers and incorporated their suggestions including the following:

- Academic Departments list on the Academic page
- Departmental Calendars section under Calendars
- Tools such as myPay, Property Reuse, FASTDATA, and FAIRS were added to the Quick Connect menu
- Tips & Tricks for using *my*NPS features on the menu bar

Educational Technologies

Consistent with the NPS mission, Educational Technologies provides faculty, staff, and students cutting-edge technology, outstanding support services and extraordinary facilities to achieve their educational and operational goals.

As part of the Client Services team, Educational Technologies manages over 138 learning spaces across campus. These spaces include classrooms, labs, video-tele-education suites, auditoria, and conference rooms. Staff are responsible for training faculty in the use of the technologies in all of the spaces.

Educational Technologies also manages NPS' collaborative learning environment , consisting of Sakai, Collaborate, live video-streaming, on-demand class recordings, and on-campus podcasting. Progressive audio visual coupled with video tele-education infrastructure, has led to NPS's successful distance learning program.

Supporting the Mission

The Educational Technologies team provided campus-wide support of all NPS' shared learning spaces, technology and audio-visual (AV) systems used in teaching both resident and non-resident students. This included oversight of 12 computer labs, 8 VTC/Video Tele-Education (VTE) systems, 86 smart classrooms, 21 technology smart conference facilities, 135 software packages and several virtual environments with over 300 virtual machines. Educational Technologies also maintained the Sakai Collaborative Learning Environment (CLE), web-based collaboration, streaming and on-demand video systems, on-campus podcasting, and the robust video tele-education infrastructure including a 60-port Video Bridge.

- Created over 1,213 Sakai sites.

- Closed over 2,400 support tickets from faculty and students of which 562 AV tickets were completed to include x6911 requests for emergency classroom support.

- Provided audio-visual support in classrooms, as well as events across campus.

- Rewired VTC (Video Tele-conference) rooms to ensure quality and lessen the risk of failure.

- Conducted new student orientation briefings each quarter.

- Installed 10 new projectors completing the current AV technology refresh across classrooms. These provided higher resolution and lamp-free laser design that provided labor savings, quick startup time, and better integration with podium controls.
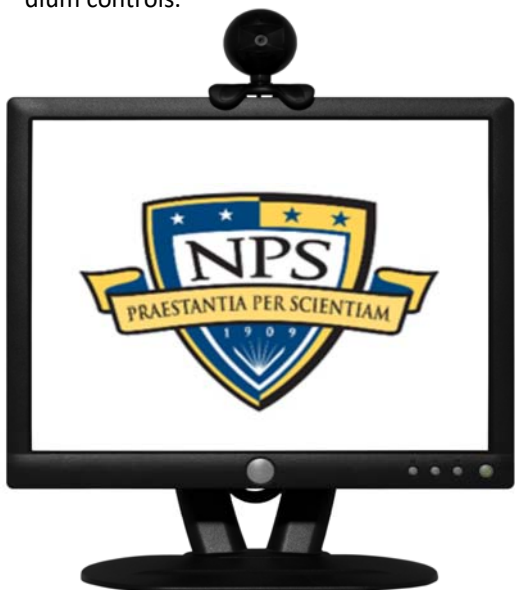
FY18 VTE/VTC Statistics

Video tele-education hours streamed:

> Fall quarter: 726

> Winter quarter: 620

> Spring quarter: 539

> Summer quarter: 599

Number of video tele-education connections: 705

Video tele-education instruction hours: 2,484

Number of video tele-education classes: 125

Number of video tele-conference events: 102

Cloud Hosting

The Information Technology and Communication Services (ITACS) division provides support and service for all IT and telecommunications issues for the Naval Postgraduate School (NPS) community. Over years, ITACS has developed an array of systems in supporting the various educational activities of NPS distance learning students. The backbone to the NPS Distance Learning infrastructure for both NPS courses and partner courses offered by DoDLearn and the Defense Language Institute (DLI) is an open source system called Sakai Collaboration and Learning Environment (CLE). Sakai CLE is a community source system that provides asynchronous learning content over a password protected portal. All four instances of Sakai have historically required contractor support for configuration and support. This continues now with the NPS Enterprise Sakai LMS now hosted by Longsight, a cloud hosted vendor. Sakai in the cloud provides:

- Version continuity across all Sakai instances

- Storage scalability

- An industry experienced team to maintain and upgrade the software

National Capitol Region (NCR) Satellite Office Shutdown

The NPS satellite office closed its doors after the Spring 2018 quarter. From an IT perspective, this meant a transition from older Video Teleconference (VTC) technology to a more modern web based approach. We continue to see success with Blackboard Collaborate and Zoom across all of DL.

Sakai Upgrade and Sakai Training

Sakai was updated from version 10 to version 12. This was a major upgrade for the campus. Sakai 12 improved usability, provided a better mobile experience and introduced many new features and enhancements.

Summer brown bag sessions held in Reed Hall provided a more detailed look at Sakai 12 with hands-on instruction. Each session focused on a different function. Also, Sakai was migrated to the Cloud which created a more sustainable and accessible environment that can be modified to support changes to mission requirements.

As Distance Learning (DL) continues to play a major part in our learning environment, we secured Sakai support on a one year contract with an additional four year option through Longsight, Inc., a major player in the open source software and education industry. They have significant experience with Sakai and expertly conducted our transition to Sakai 12. In addition to addressing trouble tickets, they provided user and Ed Tech training, provided online general user training sessions and provided a specialized Ed Tech instructor for on campus training.

The Sakai team hired a new customer service expert with years of Sakai experience, who will be here on campus to help faculty and students with Sakai 12 and the growing Distance Learning (DL) community.

ITACS in the News

The following articles highlight ITACS hosted events covered by the Public Affairs Office (PAO) office.

These and other ITACS related articles can be found on the myNPS website.

NPS IT Leaders Talk Cloud Computing Security

By MC2 Michael Ehrlich

Joe LoPiccolo, Naval Postgraduate School's (NPS) Chief Information Officer (CIO) and Director, Information Technology and Communications Services (ITACS), welcomed senior information technology leaders from regional DOD, academic and civilian organizations throughout the Monterey Peninsula to the NPS campus, Aug. 20, for the latest gathering of the Monterey Peninsula CIO Council.

"Today, we're talking about cloud operations and our acceleration into the cloud through our advanced contracts with partner vendors," said LoPiccolo. "We're also talking about our networking initiatives, and the icing on the cake, the new Cyber Security Operations Center (SOC)."

Led by ITACS' Director of Cyber Security Bob Goodwin, the SOC provides NPS with an advanced situational awareness, in real time, of the university's critical .EDU network.

Goodwin offered the consortium an overview of the center, and how it will expand the capabilities of NPS' IT team by being able to handle incidents in real time, rather than relying on firewalls and safety measures running in autopilot. Now, Goodwin says, there will be specialists manning these systems around the clock, capable of taking immediate action on issues or potential failures.

"We discussed the development of the SOC and why we went to 24/7 manning ... We really had a major transformation of the space over the past few months," Goodwin noted.

From the layout to the furniture to the integration of advanced cyber security systems, tools and monitors, the effort is beginning to bear fruit, he says.

"It's been a lot of work trying to get the space built," Goodwin added. "From paint to the new video system, furniture and cubicles ... it's all been one big dance."

NPS IT Leaders Re-energize Local CIO Consortium

By MC2 Patrick Dionne

NPS Chief Information Officer (CIO) Joe LoPiccolo welcomed fellow information technology leadership from regional DOD, academic and civilian organizations throughout the Monterey Peninsula to the NPS campus, April 4, for the Monterey Peninsula CIO Council.

"It has been a little over a year since we have all last met," said LoPiccolo. "These symposia are a great way to ensure that the Monterey Peninsula is rich with partnerships in the realm of information technology, and going forward, I would like to be able to have these forums every quarter."

Included in the forum were senior IT leaders from the Defense Language Institute Foreign Language Center (DLIFLC), Defense Manpower Data Center (DMDC), Fleet Numerical Meteorology and Oceanography Center (FNMOC), Fort Hunter Liggett, U.S. Coast Guard Station Monterey and U.S. Naval Research Laboratory (NRL). Also in attendance were representatives from civilian partners including the City of Monterey, Montage Health and Monterey County.

Presentations included an update from each member institution, as well as topical discussions on dark fiber, the latest in security operations and more.

"There are a lot of changes going on in IT and it is important that we are able to bounce ideas off our partners on topics such as industry involvement and cloud computing," added LoPiccolo. "The more we can know about what our colleagues are doing, and how they are doing it, the more we can seek out opportunities to work together."

NPS Hosts NHEITC

By MC2 Nathan K Serpico

The Naval Postgraduate School (NPS) welcomed information technology professionals from the United States Naval Academy (USNA) and Naval War College (NWC) for the latest gathering of the Navy Higher Education Information Technology Consortium (NHEITC), Oct. 24. The three peer institutions of the NHEITC have had a multi-year collaboration to enhance the consortium's employment of information technology (IT) towards meeting the mission needs of the three institutions. "This year we focused heavily on the new Cybersecurity Operations Center (CSOC)," said Joe LoPiccolo, NPS Chief Information Officer (CIO). "Although all three institutions have unique missions and provide their own cyber defenses, the CSOC has many new opportunities. Some have already been realized with advanced operational capabilities and by recent purchases to include all using the same Systems Information and Event Management (SIEM) tool. This will help correlate security events for quick defensive and preventive actions."

As mission enablers of the three organizations, the IT leadership teams came together to determine ways in which efficiencies and economies of scale could be realized with shared cloud services, software license costs, hardware purchases and various other opportunities.

"The opportunity for the three Navy Higher Education Schools to meet together as the NHEITC, away from the day to day operational distraction is invaluable," said Joe Pangborn, NWC CIO. "This collaboration provides a forum for the development of solutions to ensure the mission success of each institution." "The NHEITC provides a valuable forum for consideration of Navy higher education information technology issues having unique business, technology, policy and process aspects," echoed Herb Elkin, USNA Deputy CIO.

The NHEITC ensures that, from an IT perspective, these three schools are able to operate as efficiently as possible. "Long term, these collaborative efforts can reduce taxpayer costs and increase the quality of IT support services that are delivered to each of the school's faculty, students and staff," stated Chris Gaucher, NPS Deputy CIO.

NATO Board Evaluates Predictive Tools for Network Defense

By Javier Chagoya

NPS' own Information Technology and Communications Services (ITACS) hosted the NATO Science and Technology Organization Information Systems Technology-129 (IST-129) Board meeting on the university campus, June 13.

The IST-129 committee consists of cybersecurity experts from varied NATO member countries, NPS' own Chief Information Officer Joe LoPiccolo is one of them. The committee is charged with identifying predictive methods in cyber to help defenders anticipate and thwart adversarial attacks.

The discovery process for the committee's research has been an exhaustive, worldwide expedition, as they look for cogent, predictive analysis tools for the cyber domain. Interestingly, their search revealed a far too reactionary approach to network defense.

"We have reviewed hundreds of papers from leading experts in the field of cyber predictive analysis," said IST-129 Committee Chair Dennis McCallam. "We have fact checked each one and have dug deep into each of these proposals to ensure the validity of the work. And while there are some predictive analysis methods being devised approaching success, there is precious little that has been discovered in our investigations."

Ultimately, McCallum and the IST-129 committee he steers hope to shorten the adversary's window of opportunity, highlighting technology and techniques that provide timely mission impact alerts to operators and commanders protecting the nation's cyber domain.

"We are characterizing the current research on predictive analysis in the cyber domain to develop a comprehensive roadmap for a set of methodologies, technologies and tools to defensively counter adversarial cyber operations in real-time," said McCallam, a Northrop Grumman Fellow and adjunct professor at George Mason University.

The group will be recommending several activities to continue such analysis, and will finalize those over the course of the next set of meetings, scheduled in Munich, Germany in December of this year.

High Performance Computing

The HPC supercomputer is named Hamming after the computer pioneer and former NPS professor Dr. Richard Hamming. It has over 5,000 computational cores and 11,296 graphical processing unit (GPU) cores tied together by a fast infiniband network. It is used primarily for scientific number-crunching operations such as: weather/ice forecasting, turbo-propulsion models, and earthquake prediction. HPC also supports a big data system called Grace named after Navy Admiral Grace Hopper, one of the first computer programmers in the world.

High-Performance Computing (HPC)

HPC includes supercomputer systems, storage and archiving systems, Linux-based scientific workstations, visualization systems, high-speed networks, special purpose and experimental systems, and application and systems software needed to make these systems useful. In FY18, the HPC systems supported teaching and research, including several theses projects. Examples include weather and polar ice prediction models, cyber threat detection, and tracking of anomalous ship movement.

The HPC resources at NPS include the following:

HAMMING

Hamming is a general-purpose heterogeneous supercomputer. First installed in 2009 and refreshed several times since, the cluster's name commemorates the internationally renowned mathematician Richard Hamming, who was a Professor of Mathematics at NPS from 1976 until his passing in 1998. With 4,270 cores and over 18 Terabytes of available memory, the Hamming supercomputer is a formidable resource for research needs and classroom use alike. Ten of Hamming's 81 compute nodes also feature GPUs for appropriate applications, and a large curated collection of proprietary and open-source software is available.

GRACE

Grace was obtained by means of a $1 million grant from the DoD High Performance Computing and Modernization Program and went online in early 2016.

Grace is a cluster for "big data" research using the Hadoop distributed filesystem and Spark in-memory processing system. First installed in 2015, this subsystem is named after RDML Grace Hopper, a pioneer in computer science and information theory whose significance to the US Navy and her field will be remembered for generations. Whereas Hamming is suited for simulations, where code on multiple machines can "pull in" data as needed, Grace's model is the opposite: the code is deployed to the data, which is stored across multiple compute nodes, for processing "in place." These intermediate results can then be combined incrementally to give research insights. This model makes Grace suited for real-world data sets that are too large for processing directly.

MASERATI

Maserati is a fast data transfer point, connected directly to the CENIC research network. Maserati is a data transfer node (DTN) connected via a 100Gb/s link, and participates in the Pacific Research Platform. This network is especially useful for researchers who want to share data with colleagues at other institutions along the west coast, including California universities, Department of Defense research laboratories, and Department of Energy computing facilities.

BOWDITCH

Bowditch is a platform for "cloud-native" computing applications. The system is named after the mathematician Nathaniel Bowditch, whose work in navigation is still important to navies and sailors today over 200 years after his death. Bowditch is a generic "container" platform, using some of the same tools that power the likes of Google and Amazon. Resources already developed on Hamming or Grace can be accessed from Bowditch using the unified high-speed cluster network or deployed to cloud services such as Amazon Web Services (AWS) when more scalability is needed. Still under development, Bowditch will be used for applications such as neural network training, artificial intelligence, and machine learning.

HPC Highlights

Many significant research efforts supporting student projects took place this past year. Several theses projects were performed using HPC resources. The most notable commonality of these various projects was the use of Artificial Intelligence and Machine Learning. These types of projects require significant computing resources including specialized hardware ("Graphical Processing Units" or "GPUs") and significant disk storage space (tens to hundreds of terabytes) for the purposes of analyzing large datasets. In addition, a growing number of student projects took advantage of "cloud computing" using hardware resources provided under contract with Amazon Web Services (AWS).

HPC USER ACCOUNTS BY DEPARTMENT

- Computer Science (178)
- Operations Research (95)
- Mechanical and Aerospace Eng. (62)
- Electrical and Computer Eng. (35)
- Mathematics (27)
- Physics (26)
- Meteorology and Oceanography (19)
- Information Sciences (11)
- ITACS (4)
- Space Systems (7)
- MOVES Institute (8)
- Other (61)
- Army TRAC (8)
- Business and Public Policy (12)
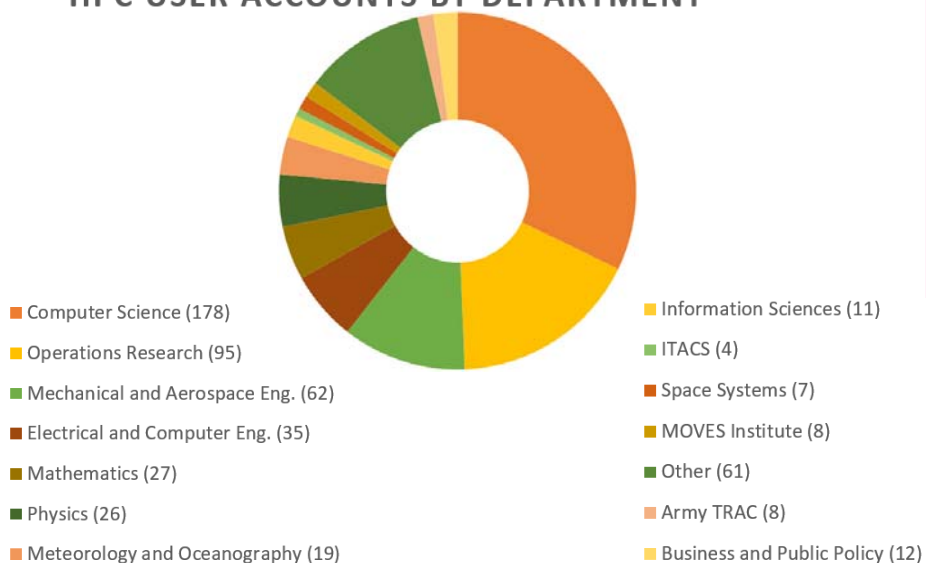
Research Computing Support

Research Computing provides support for High Performance Computing (or HPC, also known as Supercomputing), Linux computing, Machine Learning/ Artificial Intelligence, and Big Data/ Data Analytics (Hadoop).

The HPC Data Center was established in 2009, and currently hosts approximately 400 users (students, faculty, staff, and their collaborators) that are using the computers for teaching and research.

As of May 2018, the systems in the HPC datacenter have approximately 5,570 CPU "cores" across 124 servers, and over 3 Petabytes of disk storage. The users of the systems typically are running models and codes which requires immense amounts of computing power and storage that would otherwise require them to obtain resources on systems outside of NPS. Several new faculty members have come to NPS in part because of the availability of the NPS Research Computing resources.

HPC Quarterly Maintenance

Did you know that maintenance is performed on the Hamming and Grace Supercomputers ("High Performance Computers" or HPC) every quarter, right after finals week? The HPC Team reserves 1-5 days the week after finals take place in order to perform routine maintenance, replace broken parts, and to upgrade hardware and software. The Hamming SuperComputer has thousands of computing "cores" and is used to solve problems which require billions of mathematical calculations. The Grace SuperComputer has fewer computing cores, but it has more physical disk drives so that it can be used to solve "Big Data" problems. There are also several smaller computers in the HPC facility which are used for special purpose computing. For example, a new computer called "Bowditch" (named after the father of mathematical oceanographic navigation) is being used to analyze ship tracking data.

The Hamming Supercomputer operating system, CentOS, was upgraded to version 7.4. Though this may not sound terribly exciting, it ensures that our Supercomputer has the most recent security patches installed, and also allows our researchers to take advantage of advances in hardware and software technology. The Grace Supercomputer was upgraded with the Cloudera 5.13.1 and Spark 2 distributions. These are very important software packages for Big Data Research.

The HPC team also made sure that upgrades to compilers (Intel, Portland Group, and gnu) were put into place, along with mathematical software packages such as Matlab, R, Octave, Julia, Autodyne, and many others. These packages may not be household names, but to our faculty, students, and staff engaged in HPC work, it is important that we keep up-to-date versions available. We also ensure we replaced any failed hardware, such as hard disks, power supplies, and networking cables.

Plans and Projects

The Plans and Projects team defines and maintains standards for ITACS project management, mentors ITACS project managers, implements project management principles, practices, and methodologies in the department, and manages many of ITACS projects. The team also reviews IT programs to assess overall compliance with industry best practices, NPS plans and policies, and alignment with business requirements. Additionally, the team is responsible for establishing policy and procedures for effective and appropriate management of NPS' records from their creation through to their final disposition.

PYTHON 2

Originally, NPS students developed the PYTHON Student Information System as part of a thesis project. It was implemented in 2001. PYTHON is used for managing student enrollment, track completion of classes, produce transcripts, and perform additional functions typically needed for academic administration of a university. While additional functionality had been added to the PYTHON system over time, the application itself was written in a superseded programming language and was becoming increasingly difficult to maintain and to modify to meet the changing needs of NPS. Consequently, a multi-year contract to modernize PYTHON was awarded in September 2014. The modernization consisted of redesigning the application architecture to take advantage of modern, object-oriented programming techniques using a modern programming language. The modernization of PYTHON was completed and the cutover from legacy PYTHON to PYTHON 2 occurred at the beginning of March. PYTHON 2 provides the following benefits:

- Enhanced Usability

- A powerful new thesis tracking module, to include Capstone Assessment

- Improved functionality for coordination of Distance Learning (DL) class scheduling

- Improved functionality for the international Graduate Program Office (IGPO) in support of international students

- Enhanced data for the Center for Educational Design, Development & Distribution (CED3) support of DL students

- Improved maintainability and security

Feedback from users has been overwhelmingly positive.

FY18 PYTHON Metrics

◊ *Number of improvements and new features implemented: 177*

◊ *Number of bugs fixed: 139*

Microsoft (MS) Premier

We renewed the Microsoft Premier Support contract, which provides NPS with fully-integrated and comprehensive support for all Microsoft software for supporting the NPS networks and its mission. It provided rapid response and solutions for mission-impacting operational problems. It also provided proactive services to assist NPS in ensuring the health of configurations around Microsoft software products.

The MS Premier support contract in fact provided extremely helpful assistance with the NPS migration to Office 365 e-mail and SharePoint Online. The transition to O365 e-mail was so seamless for most customers that they did not realize their e-mail was moved to the cloud. O365 provides the following benefits:

- 5 licenses per FTE here and at home

Records Management FY 2018

During FY 2018, the members of the ITACS Records Management Team worked with the Records Custodians for the NPS organizations that produce or receive records to help them develop a file plan. A file plan lists the categories of records the organization has, where those records are located, and the disposition schedule of the categories of records. Additionally, NPS was selected as one of the Echelon II commands to participate in a pilot to test and implement the Navy's new Electronic Records Management System, called DON TRACKER RM. Selected members of the ITACS Records Management Team received "Train-the-Trainer" sessions on DON TRACKER RM. The Team continues to develop the Records Management wiki space as an information resource for NPS personnel.

FY18 KFS Metrics

◊ *Number of research and data call requests: 44*

◊ *Number of new KFS features implemented: 42*

◊ *Number of bugs fixed: 17*

Capstone Approach to E-mail Records Management

ITACS implemented the Capstone Approach to E-mail Records Management. This approach is recommended by the National Archives and Records Administration (NARA) and is being implemented throughout the Department of the Navy (DON). With this approach, senior officials are designated as "Capstone" officials and their e-mail is treated as a permanent record, i.e., never destroyed. Everyone else's e-mail is considered temporary records and are kept for a time period to be determined by the Navy. This approach relieves individuals of the burden of sorting through all of their e-mail to determine which e-mails are records and then either printing or converting the e-mails to PDF to place in the appropriate file.

While waiting for the list of NPS Capstone officials to be approved by NARA, ITACS implemented an indefinite hold on all e-mail accounts. Once the list of Capstone officials is approved, only the Capstone officials will have the indefinite hold on their e-mail. For all others, once the Navy decides on the disposition schedule, the hold will be adjusted to the specified length of time. Users can delete e-mail and it will disappear from their Inbox but the e-mail is moved to a hidden folder that can be found through an "eDiscovery" search.

Resource Management

Resource Management fully supports all operational areas within ITACS in budget, procurement, contracts, human resource services, and facilities. In addition, Resource Management supports ITACS in areas of training, travel, and communications.

Resource Management is committed to providing a stable work environment with equal opportunity for learning and personal growth. Creativity and innovation are encouraged for improving the effectiveness of ITACS. Above all, employees are provided the same concern, respect, and caring attitude within the organization that they are expected to share externally with every customer. The mission of ITACS Resource Management is dedication to the highest quality of customer service delivered with excellence and integrity.

ITACS Conferences Attended:

- DON IT West 2018
- Educause Annual Conference
- CENIC Annual Conference
- Internet 2
- Amazon Web Services (AWS) Summit
- iFest—National Defense Industrial Association
- DoD HPC Users Group
- Society for Human Resource Management (SHRM) Annual Conference

Professional Development

Continuous information technology training is crucial to the success of ITACS, as well as NPS. Technology is always changing and new applications and capabilities are constantly released in an effort to streamline business practices. In order to keep updated with the latest technology and with campus demands, it is mission essential that ITACS personnel be trained. Part of keeping up with the newest technology is also the attendance at DoD and non-DoD conferences where networking with IT professionals can be very beneficial.

In FY18, $150K was devoted to professional development and attendance at technology conferences and training events. The money allotted provided over 29 training and conference events. Whenever possible, training was brought to campus in order to provide instruction to as many individuals as possible, minimizing travel time and reducing costs. Providing professional development opportunities for ITACS personnel enhances their knowledge and skills in an effort to meet the NPS mission.

ITACS Staffing

Number of government civilian employees by team:	On-Board	Billets
Client Services		
Classified Computing Programs	6	7
Educational Technologies	4	6
Technology Assistance Center	12	15
Cybersecurity	5	5
Development and Operations	15	21
High Performance Computing	1	1
Records Management	1	1
Resource Management	5	5
CIO, Deputy CIO's	3	3

Military Staffing

Military staff are valued for their exemplary professionalism, specialized knowledge, and genuine representation of the service component of ITACS' core values. Tour of duty is normally between 2-4 years.

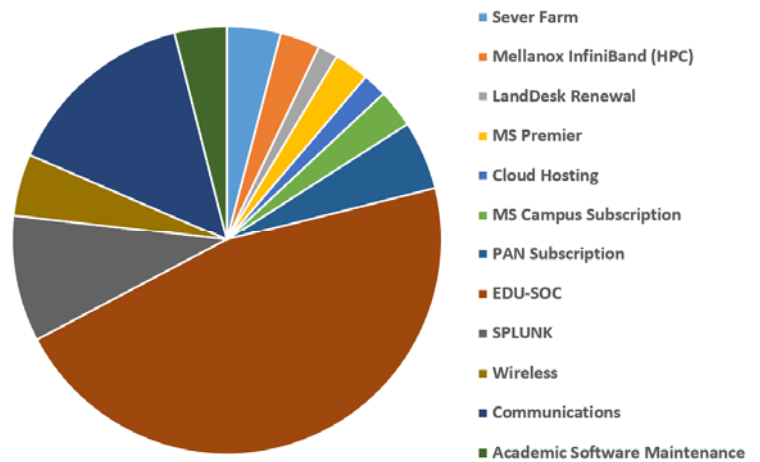Number of Military staff per team:

Classified Computing Programs...........3

Cybersecurity…………………………………3
Development and Operations..............2
Educational Technologies....................1

Records Management ………………………1
Technology Assistance Center…………..5

What It Takes to Keep the Lights On

Of the total ITACS budget, only $210K was spent on internal department requirements. Approximately $60K was spent on hardware lifecycle replacements and $150K was spent on training and travel for ITACS personnel. The remainder of the budget was spent on Enterprise equipment and service that supports the campus educational and research missions. ITACS generates over $6 million in procurements each year. The procurements are required to support the campus' IT requirements. The requirements span across a spectrum of categories: academic software licenses, maintenance agreements, service contracts, and hardware purchases. Some of the purchases were simple government-wide purchase card holder acquisition while others involved contract specialist support. In 2018 ITACS initiated approximately 190 procurements, roughly one third of these were simple credit card purchases while the remaining were contracts.

Distribution of ITACS Non-Labor Dollars

- Sever Farm
- Mellanox InfiniBand (HPC)
- LandDesk Renewal
- MS Premier
- Cloud Hosting
- MS Campus Subscription
- PAN Subscription
- EDU-SOC
- SPLUNK
- Wireless
- Communications
- Academic Software Maintenance

In order to support the needs of the NPS faculty and students, ITACS procured a little more than $1.2 million in service contracts that provided the campus with IT expertise to support the teaching and research mission of NPS. Some of the service contracts included support for NPS' Kuali Financial System (KFS), Bursar system development, and Python (NPS' Student Information System).

ITACS Overview/Data Center Tours-Cyber Briefings/Visits

The Chief Information Officer (CIO) and Deputy CIO provide an overview of how the Information Technology department supports

11/27/17	VADM Frederick Roegge, President, National Defense University
02/05/18	DLI Community Senior Leadership Forum
02/07/18	Dr. Michael Bermes, Executive Director, HQMC Force Preservation Directorate
03/29/18	Mr. Bob Woods, Assistant Secretary of the Navy, M&RA
04/25/18	NPS Board of Advisors
05/08/18	RDML Edward Anderson, Deputy Commander, Fleet Readiness Directorate, Space and Naval Warfare Systems Command
05/09/18	Ms. Keysha Webb, Director, Defense Intelligence Innovation Office (DI2O), Office of the Under Secretary of Defense (Intelligence)
05/10/18	Mr. Steve Rice, Deputy CIO, Department of Homeland Security
05/18/18	Supervisor Mary Adams, District 5, Monterey County

06/05/18	Mr. Rich Patterson, CEO, NPS Foundation
06/07/18	RADM Kathleen Creighton, Deputy Commander, JFHQ DoDIN
06/14/18	Dr. John Zangardi, CIO, DHS
06/22/18	Dr. Steven Lerman, Provost, NPS (Touring new C-SOC)
07/09/18	CAPT Edward McCabe, Air Warfare Chair, NPS
07/10/18	Mr. Mark Gerencser, Chairman of the Board of University of Maryland, University College Ventures
07/23/18	VADM Frederick Roegge, President, National Defense University
08/07/18	COL Gary Hausman, Commandant, DLI
08/14/18	Tony Torres-Ramos Director, Mission Support, Office of Naval Research
09/10/18	Stephanie Davie, Deputy Director, OCHR Stennis

Technology Assistance Center

The Technology Assistance Center (TAC) is the primary means of information technology support for students, staff and faculty. The TAC receives, prioritizes, and handles a high call volume of IT trouble tickets daily. The TAC is dedicated to providing a high level of customer service to support the academic mission.

TAC FY18 by the Numbers

An active year in the Technology Assistance Center! The TAC logged over 30,000 trouble calls from our faculty, student and staff customer base. Staff received and closed, on average, 95 tickets per day. A large portion of those tickets come in the form of phone calls, which can range anywhere from 60 – 120 phone calls a day.

Remote Call Center

To eliminate hold times on calls to the TAC a Remote Call center was established via contract towards the end of FY18, providing additional phone support from 0700-1700 Pacific time. Customers will no longer be placed on hold. If a support agent isn't available, a message can be left and returned in no more than ten minutes. The remote call center has been able to resolve 70 percent of all incoming calls at first contact.

ITACS has seen an improved response to customer needs and a greater ability for our resident technicians to get out on campus and tackle challenging issues. As an example, in the past any tickets that came in that had to do with email or server permissions would have to be passed from the TAC to the Server Management group. Those tickets can now be handled by the TAC technicians and reduces customer wait time.

The largest percentage of TAC traffic continued to be password resets and account lockouts. After passwords, the most common challenges related to software, email and VPN. Improved instructions on the TAC wiki, better integration of applications within Office 365, focus during TAC training, and emphasis on these subjects during onboarding sessions (such as new student orientation) are moving the needle in the right direction.

Total Tickets Opened 34,441

- 14% Walk-In tickets
- 45% Phone Calls
- 41% Emails
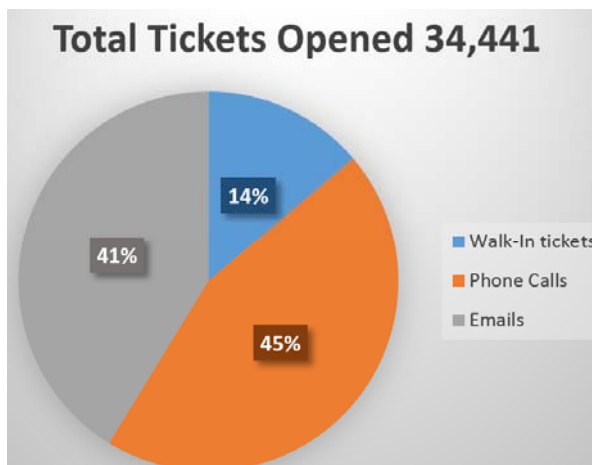
Top Five Trouble Ticket Categories:

⇒ Account Administration
⇒ Software
⇒ Hardware
⇒ Network
⇒ Web

Hardware and Software

The PC shop imaged 1,022 workstations for students, staff, and faculty in FY-18 and distributed over 200 new computers to labs and classrooms across campus. The TAC maintained over 2,600 campus computers using LanDesk software to remotely push application updates and new versions of software.   Packaging the 55 pieces of software for the GSEAS labs for new Windows 10 PCs was a significant accomplishment allowing ITACS to replace student and podium PCs in Bullard, Watkins, and Spanagel Hall. Additionally, most of the administrative staff equipment was refreshed with new Windows 10 machines on the scheduled refresh plan. ITACS continues to manage a growing list of academic software from the basic Microsoft Office suite to specialized engineering applications such as MATLAB and Solidworks. In this area, ITACS spent >$700K for application licenses.

Significantly, an application streaming pilot was completed with Systems Engineering. ITACS gained enough insight to go forward with a complementary service to Cloudlab which will provide app delivery anywhere, to any machine – a big win - especially for our distance learners.

Printer services for 110 Multi-function devices was supported by Xerox.

TAC Training

Personnel completed proficiency training across the Microsoft application suite, Windows 10, Windows Server Update Services (WSUS), Duo Security, and Palo Alto Network products. These trainings are critical for our technicians to be familiar with the latest and best technologies available in industry.

Emergency Notification System

In March 2018, AtHoc replaced DesktopAlert (NPSAlerts) as NSA Monterey's mass warning and notification system. AtHoc's reliability and flexibility enables NSA Monterey's Emergency Management Office (EMO) to communicate critical information quickly and effectively to NSA Monterey personnel during emergency situations via numerous communications channels (desktop popups, e-mail alerts, mobile app alerts, phone calls, and/or SMS/text notifications). AtHoc serves an estimated 4,000 students, staff, and faculty located at the Main Base (NSAM/NPS), the Annex (FNMOC), and La Mesa Village.

During deployment, the system was tested thoroughly to ensure it would perform well during actual emergency situations. Before putting the system into production, a final series of test alerts were published to NSA Monterey personnel to introduce the system. The alerts encouraged personnel to log into the Self Service portal for inputting additional contact information and the option for downloading the mobile app to receive critical communications during emergency situations.

Amazon Web Services (AWS)

This fiscal year NPS contracted with Amazon Web Services (AWS) for cloud computing services. Cloud services are commodities that range from infrastructure building blocks to full application suites. Cloud services benefit from economies of scale through common, integrated solutions which meet the needs of many customers. ITACS migrated many Enterprise applications, services, and websites to AWS, and is in the process of moving others. Most of this is invisible to the end-user: web applications that were once hosted on computer servers in the ITACS datacenter are now hosted "in the cloud" using AWS as our cloud service provider.

AWS received DoD compliancy certifications that allow NPS users to host a wide variety of applications on AWS cloud assets, including classified projects.

Relative to the needs of any particular consumer, the cloud provides a practically unlimited set of resources. NPS users have the ability to immediately provision compute capacity, storage and other services in extremely large quantities, consume those resources for as long as necessary, and immediately de-provision them when they are no longer needed. This eliminates the need for over-provisioning resources to meet future demand. In support of research and education initiatives IT resources can now be acquired in minutes rather than months. For example, developers can provision a multi-server environment to test new applications without having to go through traditionally long hardware procurement processes. In FY18, ITACS consolidated more than 40 individually-managed research accounts and workloads under one ITACS-managed account, relieving those faculty, staff and students from the burden of account administration and taking further advantage of economies of scale.

ITACS sponsored five AWS training events to campus which helped advance several data-science projects, improved the knowledge and capabilities of AWS users on campus, and streamlined AWS account management procedures.

AWS has several prebuilt "images" that allowed NPS users to quickly spin-up databases, webservers, Linux clusters, artificial intelligence and machine learning testbeds, and many others. These AWS "instances" were quickly provisioned and expanded/scaled as needed, and quickly decommissioned once the work was completed. The use of AWS scalable resources resulted in savings of hundreds of thousands of dollars in hardware purchases as well as hundreds of man-hours in purchasing/contracting, installation and maintenance.

Data Center Modernization

Over the last year, the NPS' datacenter (W.R. Church Computer Center) was renovated and modernized. The datacenter on the first floor of Ingersoll is approximately 5,000 square feet in size, but much of the infrastructure is decades old. For example, new heating ventilation air conditioning (HVAC) units combined with Computer Room Air Conditioners (CRACs) and Air Handlers (CRAHs) are much more efficient than those that were previously in place, and **take advantage of cool outdoor ambient air to cool the datacenter more efficiently and in a much more environmentally friendly way than ever before**. Naval Facilities Engineering Command Southwest (NAVFAC) SW worked together with ITACS and Naval Support Activity Monterey (NSAM) personnel to modernize the datacenter infrastructure.

In addition, computer racks which were scattered over the datacenter were standardized and consolidated into "hot aisle containment" rows (see photo below). These hot aisles are supplied power by overhead power buses as shown in the photo, and cables are neatly managed using basket racks.

The datacenter now has a total power supply of roughly 350 kilowatts (about 60% capacity). **Recent upgrades to power panels and battery backup supplies ensure that in the event of a commercial power outage, power to the main datacenter will be uninterrupted.** The battery uninterruptible power supply (UPS) can keep the entire datacenter running for up to 15 minutes. An automatic transfer switch on the UPS ensures that an onsite diesel powered generator starts after 15 seconds on battery power, and after about 45 seconds on battery power, the data center switches to the diesel powered generator. This diesel powered generator can keep the entire datacenter running for 5 entire days on a full tank of fuel.

Heat from NPS computer racks is exhausted into a "hot aisle".

Partnerships and Outreach

ITACS has dedicated time to participate in campus-wide committees with the goal of improving services on campus. These efforts have been related to financial systems, student systems, web applications for academic programs and academic administration. Additionally the team works to stay connected and leverage partnerships on the peninsula, both within DoD and education. These partnerships provide opportunity to leverage resources, stay aligned with best practices and collaborate on innovation that can be applied as each organization serves their customers and their mission.

Navy Higher Education IT Consortium

The three peer institutions of the Navy Higher Education Information Technology Consortium (NHEITC); the Naval Postgraduate School (NPS), the Naval War College (NWC), and the United State Naval Academy (USNA) have had a 13 year collaboration to enhance the consortium's employment of Information Technology (IT) towards meeting the mission needs of the three member institutions.

Classified Computing Committee

The Classified Computing Committee, composed of experienced faculty and staff from many of the academic disciplines, is deeply involved in classified teaching and research. The committee acts in an oversight and advisory capacity in the management of classified computing services by setting priority for the allocation of resources, ensuring alignment of proposed projects with the NPS mission, and providing a campus-wide collaboration for NPS' classified computing program.

Information Technology (IT) Council

The Information Technology (IT) Council, consists of representatives from the NPS Academic and Support Directorates and allows an open forum for the review of NPS' Information Technology strategic decision-making. They provide guidance and input to the Chief Information Officer (CIO) and the Provost in the development and annual update of strategic IT goals. This includes review of the annual budget, operational plan, resource plan, network development plan, the annual accountability report, and campus-wide Information Technology and Communications policies.

HPC Advisory Panel

Given its interdisciplinary nature, supercomputing at NPS is governed in consultation with a panel of NPS faculty. These experts in supercomputing work to create a "roadmap" that determines how to best augment the computing power of the NPS Supercomputers Hamming and Grace applied to NPS mission needs. The panel includes members from Operations Research, Computer Science, Applied Mathematics, and Meteorology and meetings are typically held once per quarter.

Configuration Control Board (CCB)

The CCB is the official mechanism for controlling the configuration of the networks in place at NPS. As such, the CCB manages the integrity of the networks' configurations over their life cycle. The NPS networks include everything inside the border routers on both the classified and unclassified networks. In addition to the network devices, firewalls, routers and switches, the CCB oversees the operational efficiency of the network as well as maintains an appropriate information assurance posture in accordance with statutory requirements and acceptable practices.

Web Advisory Board

The Web Advisory Board is comprised of a group of representatives throughout NPS who seek to advance the mission of the university by recommending policies, procedures, and guidelines regarding web-related issues. The board acts as a facilitator, fostering communication, education, collaboration, and a sense of community among those involved with or are interested in online communications at the Naval Postgraduate School.

Cybersecurity Workforce

The Cybersecurity Workforce (CSWF) is comprised of personnel (DoD Civilian, Military, and Contractor) responsible for planning, implementing, and managing technology in order to effectively prevent and respond to attacks. The NPS CSWF professionals have signed non-disclosure agreements and agreements for privileged level access, and possess the training and certification to properly execute their tasks. The CSWF includes all those employed, appointed or assigned to facilitate information technology services. Members of the CSWF spend their days perfecting their craft to ensure technology devices and services are secure, operational and available, as well as invest time in maintaining their professional certifications through continued education.

CENIC

Being Charter members of the Corporation for Education Network Initiatives in California (CENIC) provides connectivity to leading-edge institutions and industry research organizations around the world, serving the public as a catalyst for a vibrant California. Our external connectivity to the CENIC network provides an initial layer of protection, through access control lists, between CENIC and the Internet at their Internet Access Points, and additional protections between CENIC and NPS. The security stack between NPS and CENIC is the second major line of defense in the overall network defense-in-depth posture. Also, we are members of their Cybersecurity Advisory Board and Executive Members of the Board of Advisors.

Monterey Peninsula CIO Council

The Monterey Peninsula CIO Council is comprised of Chief Information Officers and IT leaders from various education, research, and medical institutions as well as federal and local government organizations in the Monterey Bay area. The Council meets to align goals, leverage resources, share information, and maximize the benefits of information technology efforts in the region. The Council embraces collaboration to accomplish mission through cooperative efforts.

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