COMMANDER’S CORNER

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Commander
Naval Supply Systems Command
and Chief of Supply Corps

MAINTAINING MARITIME SUPERIORITY

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Acting Assistant Secretary of the Navy for Energy, Installations & Environment

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EDITOR’S PERSPECTIVE

With the arrival of summer and travel season upon us, most Americans are not likely thinking of the men and women charged with protecting our way of life far from U.S. shores. The special initiative it takes to be a U.S. Navy Sailor or U.S. Marine is reflected in the resolve driving the many organizational assets which comprise the U.S. Navy’s global enterprise. In the Summer 2017 issue of Naval Power & Force Projection (NP&FP)/DoD Power & Energy (DoD P&E), readers get a look at the myriad responsibilities encompassing maritime domain awareness including topics such as re-supply and sealift operability, expeditionary combat, aerial recon, depot maintenance, not to neglect the energy required to make these missions possible.

Leading off Summer NP&FP/DoD P&E, we take a peek around the globe at some key efforts and accompanying challenges associated with U.S. Military Sealift Command (MSC) and MSC Far East (MSCFE), MSC’s southeastern Asia Pacific Command (PACOM) component. Responsible for providing sealift and ocean transportation for U.S. joint military services as well as government agencies, MSCFE is charged with maintenance oversight, logistics coordination and other needed services in ensuring the day-to-day flow of assets and manpower throughout a large portion of PACOM. Need is particularly acute in areas such as southeast Asia where distances are great and supply and re-supply support is critical to maintaining operational readiness.

Nothing carries greater imperative to naval operations than the uninterrupted re-supply of mission assets across sea zones both territorial and international. In an exclusive interview to NP&FP, Commander, NavalSupply Systems Command and Navy Supply Corps (NAVSUP), Chief RADM Jonathan Yuen speaks to a variety of challenges NAVSUP has in ensuring that fleet replenishment requirements set forth by the Chief of Naval Operations (CNO) are fulfilled. In addressing re-supply, one must also consider the energy required to make it happen. As such, NP&FP spoke with NAVSUP Energy Director, CAPT Edwin Bogdanowicz, about ongoing efforts to maximize fuel efficiency across the Navy’s surface ship fleet. Some of this effort involves the testing and re-testing of fuel alternatives as potential replacements for existing fuels. The challenge in many cases is not showing that an alternative can make a difference but that an alternative is both production-ready and cost-effective for operational employment.

Energy not only drives force re-supply but also the weapons systems that enable force protection to occur. From that standpoint, much of what drives the mission for the Navy’s Expeditionary Combat Command (NECC) and Naval Expeditionary Combat Forces (NECF) involves moving the manpower necessary to conduct explosive, security and physical hazards neutralization missions in shaping a secure environment throughout the global littorals. From a holistic force perspective, readers gain insight with an update on current Navy Energy priorities directly from the Office of the Assistant Secretary of the Navy for Energy, Installations & Environment. In a special to NP&FP/DoD P&E, Acting Assistant Secretary Mr. Steve Iselin speaks to key challenges the Navy is facing in achieving energy security assurance at U.S. naval installations to enable full continuity of mission operations.

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BRIDGING THE VASTNESS OF MARITIME DOMAIN

Personnel of the U.S. Military Sealift Command (MSC) and MSC Far East are responsible for the seamless transfer of millions of tons of DoD assets in support of force readiness.

By Christian Sheehy

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Cover: Arleigh Burke-class guided-missile destroyer USS Michael Murphy (DDG 112) (left) and Ticonderoga-class guided-missile cruiser USS Lake Champlain (CG 57) (middle) steam alongside the aircraft carrier USS Carl Vinson (CVN 70). Michael Murphy is on a regularly scheduled Western Pacific deployment with the Carl Vinson Carrier Strike Group as part of the U.S. Pacific Fleet-led initiative to extend the command and control functions of U.S. 3rd Fleet.

(U.S. Navy photo by Mass Communication Specialist 3rd Class Danny Kelley/Released)
In 1949, the Military Sea Transportation Service (MSTS) became the single managing agency for the Department of Defense's ocean transportation needs. The command assumed responsibility for providing sealift and ocean transportation for all military services as well as for other government agencies. Only nine months after its creation, MSTS responded to the challenge of the Korean War. On July 6, 1950, only 11 days after the initial invasion of South Korea by communist North Korean troops, MSTS transported the 24th Infantry Division and its equipment from Japan to Pusan, South Korea, for duty.

During the Vietnam War, MSTS was renamed Military Sealift Command (MSC). Between 1965 and 1969, MSC transported nearly 54 million tons of combat equipment and supplies and nearly 8 million tons of fuel to Vietnam. MSC ships also transported troops to Vietnam. The Vietnam era marked the last use of MSC troop ships. Now, U.S. troops are primarily transported to theater by air.

During the first Persian Gulf War's Operations Desert Shield and Desert Storm, MSC distinguished itself as the largest source of defense transportation of any nation involved. MSC ships delivered more than 12 million tons of wheeled and tracked vehicles, helicopters, ammunition, dry cargo, fuel and other supplies and equipment during the war. At the height of the war, MSC managed more than 230 government-owned and chartered ships.

Since Sept. 11, 2001, MSC ships have played a vital and continuing role in contingency operations around the world. As of January 2013, MSC ships delivered more than 25.7 billion gallons of fuel and moved 126.2 million square feet of combat equipment and supplies to U.S. and coalition forces engaged in operations supporting Iraq and Afghanistan.

**Wide Geographical Reach**

MSC is represented by five geographic area commands (Atlantic, Pacific, Europe, Middle East and Far East), which exercise tactical control of all assigned U.S. TRANSCOM forces and MSC forces not otherwise assigned to the numbered fleet commanders. The area command staffs are primarily responsible for the execution of strategic sealift missions. The MSC area commanders are U.S. Navy captains who serve as the primary points of contact for MSC customers and numbered fleet commanders in their respective areas. These area commanders also serve as the MSC commander's direct link to MSC ships, providing maintenance oversight, logistics coordination and other needed services.

Naval Power & Force Projection had the opportunity to speak with members of the U.S. Military Sealift Command (MSC), and specifically MSC Far East (MSCFE), responsible for conducting re-supply and transportation movements across a major segment of U.S. Pacific Command (PACOM). In the last decade, MSCFE has joined operational mission focus with Commander Task Force 73 (CTF 73) as part of an effort to align fleet operational chain of command for streamlined mission operations.

**NP&FP:** Regarding MSC Far East operations in support of U.S. Navy/Joint DoD mission sets, can you speak to the evolution of MSC and correspondingly MSC Far East as a primary military maritime supply/personnel mover?

Leonard F. Bell, Fleet Ordnance and Dry Cargo Project Officer, MSC: There are a few key focus areas that MSC Far East is responsible for on a daily basis:

**Expanded Combat Logistics Force (CLF) role.** In the 1990's Military Sealift Command Far East (MSCFE) was pretty much restricted to a type command (TYCOM) support role. We assisted in scheduling and executing maintenance but had very little input into scheduling or operational missions. With the co-location of MSCFE with Commander, Task Force 73 (CTF 73) in 2006, that role became much closer. While CTF 73 retains tactical control (TACON) of CLF ship, we have a greater role as subject-matter-expert (SME) for CLF ship operations. This has synced nicely with the evolution of MSC as operating some of the CLF platforms (primarily T-AO and T-AFS) to the current CLF structure where all CLF ships (T-AO, T-AKE and T-AOE) are MSC controlled ships.
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A second/third order effect of that has been the evaporation of CLF expertise from the Navy’s active duty component. MSC has inevitably filled that knowledge gap.

**Increased alignment with the fleet operational chain of command.** In the 1990’s, Commander, Military Sealift Command (COMSC) pretty much ran Strategic Sealift (point-to-point dry cargo and tankers) independently of the fleet. The increased terrorist threat in the late 1990’s culminating with 9/11 in 2001 changed the landscape permanently where we had to integrate the fleet in all aspects if MSC ship operations, including Strategic Sealift assets that are technically under U.S. Transportation Command (USTC) Component Commander (COCOM). Even though those ships were under a different operational chain of command, we had to integrate with the fleet for FP planning and execution. Similarly, under our CTG 73.7 hat, through the 1990’s, MSCFE/CTG 73.7 ran Special Mission ship operations (particularly with T-AGS) independently with very little input or visibility from the fleet, with most coordination being worked with the mission-sponsor (NAVOCEANO). The increasing assertiveness of the PRC in promoting their territorial claims became significantly more pronounced in 2001. That resulted in the currently arrangement where CTF 74 takes TACON for U/W missions and CTG 73.7 takes TACON for import planning to include logistical support and FP execution, which required close coordination for hand-off.

**Shift of focus away from strategic sealift to fleet-centric support missions.** MSC started life as DoD’s steamship company. Even in the mid-1990’s, we were delegated TACON of several long term time chartered Strategic Sealift ships that routinely moved DoD cargo around WESTPAC. That work shifted over time to commercial liners, operating under contract to Army Surface Deployment and Distribution Command (SDDC), mostly the result of direction from U.S. Transportation Command. As a result, MSCFE almost completely got out of the business of managing dry cargo moves other than the Diego Garcia (DGAR) Shuttle and support for exercises where it was determined that SDDC liners could not support. Meanwhile, the steady increase of direct fleet support missions (CLF, SMS, Towing and Salvage, Prepositioning and now HSV/T-EPF ops) necessitated a much closer alignment with the fleet culminating in the move of MSCFE staff from Yokohama to Singapore in 2006.

**NP&FP:** In terms of improvements in the streamlining of expeditionary operations in the region, please speak to some challenges that exercises such as those Operation Pacific Reach (OPR) are addressing through the use of Improved Navy Lighterage System (INLS) capabilities.

**LT Laura Price with Expeditionary Strike Group 3 (ESG 3):** INLS is a robust mission set that is used to offload military prepositioned stock and large cargo vessels in an austere environment where a port is degraded, has limited capacity, is draft constrained, or simply does not exist. Everything from tanks, tents, food, ammunition, and medical supplies are brought straight from the ship to a bare beach, ramp, or floating causeway.

Naval Beach Group ONE (NBG-1) exercises INLS assets several times a year for proficiency, but the challenges that exercises like OPR are addressing push the envelope of capability by including the logistics of movement into theater. Additionally, exercises take place in operating areas with unfamiliar tidal shifts, hydrography, foreign governments, and local policies.

Every exercise in the PACOM and CENTCOM area of operations is constructed to address anticipated challenges in specific regions such as force protection, life support areas, medical evacuations, or establishing combined military command centers. As for the challenges related directly to INLS, the system is continuously utilized to validate throughput capacity, employment and redeployment timelines, and methods to conduct simultaneous lift-on/lift-off and roll-on/roll-off operations.

**NP&FP:** From an assets transfer perspective, how have capabilities, such as enabled by the USNS Montford Point, been used and modified to advance expeditionary strategy such as sea basing?

**Grady Fontana, Public Affairs Officer, MSCFE:** The USNS Montford Point (T-ESD 1) can operate like a floating pier-at-sea, 25 miles from shore. We are still exercising capabilities, and are working to be able to serve a variety of shore connectors for Marine Corps amphibious landing forces.

The platform is categorized as an expeditionary floating pier-at-sea; the ship is tasked to the Marine Corps to provide a pier-at-sea move and transfer from Large, Medium-Speed, Roll-on/Roll-off Ship (LMSR) ships to landing craft air cushion (LCAC) to provide the sea basing capabilities to the Navy and the Marine Corps.

The MONTFORD POINT is one of two T-ESDs that will be part of the Navy’s “Sea Base” concept that provides the capability to transfer vehicles and equipment at-sea through Sea State 3, improving the U.S. military’s ability to deliver equipment and cargo from ship to shore...
when land bases don’t exist. The other T-ESD is the USNS John Glenn (T-ESD 2).

When the T-ESD is on mission, the ship will submerge to about 40 feet while underway to the area of operations. Once on station it would submerge to about 50 feet, so that the LCAC can drive right up on the mission deck to pick up cargo. This allows it to operate like a floating pier and will serve as a transfer point for Marine Corps amphibious landing forces.

The T-ESD’s flexibility is critical for humanitarian response to natural disasters and for support to warfighters ashore. The size allows for 25,000 square feet of vehicle and equipment stowage space and 380,000 gallons of JP-5 fuel storage.

NP&FP: In terms of energy distribution challenges, in what manner has MSC helped improve off-shore petroleum distribution ship to shore for pre-positioned stock availability in case of contingencies?

Lt. Cmdr. J. Brandon Worl, Chief Staff Officer, Maritime Prepositioning Ships Squadron THREE (MPSRON 3): USNS Vadm K. R. Wheeler (T-AG 5001) is a unique ship which provides one of a kind capability to the US Navy. Wheeler allows the US Navy to pump bulk water/petroleum to an undeveloped beach from up to 8 statute miles offshore. Wheeler and her work boats are self-contained and do not require any outside support other than a tanker (source) to take suction from - the 8 miles of pipe are stored onboard Wheeler. Since there is always the possibility she may have to support an HADR mission and pump water ashore, she has never pushed fuel through her pipe. Up to now, she has only pumped water.

NP&FP: Please speak to the recent U.S. Forces Korea (USFK) exercise, from the evolution/requirement for the exercise (including timeframe, location, phases, etc), to the specific segments of the exercise and any lessons learned from those segments going forward.

LCDR Eric Oviatt, ESG-3, NS DACOS: The purpose of this exercise is the integration of Logistics Over-the-Shore (LOTS) capabilities under joint command and control, conduct Area Distribution Center (ADC) operations, conduct Air Terminal Supply Point (ATSP) operations, conduct rail operations, conduct inland waterways operations, demonstrate the ability to establish a distribution hub in vicinity of Pohang, validate operational concepts, and synchronize the download of cargo in order to stress Combined Forces Command (CFC) multi-domain, multi-nodal capability to refine future planning.

Combined Forces Command and Republic of Korea forces conducted exercise Operation Pacific Reach (OPRex17) from April 10 through April 21, 2017, at the Pohang Dogu Beach. Approximately 2,500 U.S. personnel (of which 1,500 were rotational personnel form outside the ROK) participated in the exercise and approximately 1,200 ROK forces participated.

OPRex is a regularly scheduled exercise that takes place every other year. It is the culmination of many months of planning and is based on realistic tactical requirements and missions expected of our ROK-U.S. combined and joint forces. While not directed toward a real-world situation or crisis, each training event has a unique tactical scenario aimed at improving readiness.

NP&FP: From a global logistics perspective, what are some key challenges to improved logistics in underway ship re-fueling and cargo transfer that MSC is addressing through enhanced interoperability of its combat logistics ship fleet?

Leonard F. Bell, Fleet Ordnance and Dry Cargo Project Officer, MSC: The key challenge to improve logistics in underway ship re-fueling and cargo transfer is impending obsolescence of Navy Standard UNREP systems. Current systems rely on older electro-hydraulic technology involving equipment that is no longer manufactured or supported. Additionally, technicians familiar with those systems are retiring and leaving the workforce. The Naval Sea Systems Command (NAVSEA) in coordination with MSC is addressing those challenges by implementing a new generation of UNREP equipment called E-STREAM (Electronic Standard Tension Replenishment Alongside Method), which replaces control systems with computerized controls and modern electrical components that will improve long term supportability as well as result in improved performance. E-STREAM is being incorporated into the T-AO 205 Class Fleet Oilers. MSC is also planning for modernization of existing UNREP stations on T-AKE and T-AOE class ships using E-STREAM components. A prototype E-STREAM station was installed aboard USNS Arctic (T-AOE 8) in 2012 and has performed extremely well. Another E-STREAM station will be installed aboard USNS Cesar Chavez (T-AKE 14) later this summer and will serve as the test-bed for the E-STREAM installations planned for the T-AO 205 Class.
The P-8A Poseidon, the U.S. Navy’s long-range maritime patrol aircraft, is refueled mid-air during testing. The P-8A’s aerial refueling capability is set to deploy next spring. The P-8A is the replacement for the P-3C Orion, an airframe that has supported maritime patrol missions for more than 50 years.

By Kevin Hunter, NP&FP Editor
Aircraft production and delivery of the U.S. Navy’s P-8A Poseidon Anti-submarine Warfare (ASW) platform continues on schedule in support of the on-going transition of fleet squadrons from P-3C to P-8A. Eight of 10 lots of production aircraft, including 91 aircraft, trainers, spares and support equipment, are on contract with Boeing Defense Space and Security. As of June 7, 2017, fleet squadrons have received 56 aircraft on or ahead of schedule.

“Ongoing program initiatives are focused on proactive coordination with allies, adjusting aircraft delivery schedules and accelerating acquisition milestones to maintain efficient aircraft build rates,” said U.S. Navy Capt. Tony Rossi, program manager for the Maritime Patrol & Reconnaissance Aircraft program office. “Since workups for the initial deployment back in Dec. 2013, we’ve helped the fleet to successfully transition from the legacy P-3C to the P-8A aircraft.”

Transition training is already complete for the six east coast fleet squadrons, one fleet replacement squadron, and one west coast fleet squadron. Transition is on track for completion during 2019.

As of May 2017, the P-8A fleet has exceeded 100,000 flight hours since the initial USN production Lot 1 aircraft delivery during March 2012. Since December 2013, there have been continuous fleet deployments. The P-8A Fleet Introduction Team supports squadron training using high fidelity pilot and aircrew simulators at the P-8A Integrated Training Center (ITC) at the Naval Air Station (NAS) Jacksonville, Fla. The ITC is meeting training requirements of the Fleet Replacement Squadron, while also successfully reducing requirements for on-aircraft training at this facility. The west coast fleet transition training at NAS Whidbey Island, Wash., began during October 2016. Currently, the transition is underway for a second squadron.

The P-8A has also completed its first fleet delivery of pre-planned incremental capability upgrades.

“The first upgrade under what we call P-8A Increment 2 (Inc 2) added broad-area, multi-static acoustic ASW enhancements,” said Rossi. “This capability, referred to as Multi-Static Active Coherent (MAC), significantly increases the P-8A’s ASW search rate. Additionally, the aircraft is scheduled to receive periodic future enhancements to pace the ASW threat.”

Coalition Cooperation

“The program office is continuing discussions with several nations that have expressed interest in acquiring the P-8A through Foreign Military Sales (FMS),” said Rossi. “Interest from allies includes both establishing and recapitalizing their maritime patrol aircraft capabilities. These partnerships create savings for both the USN and its partners.”

The Royal Australian Air Force (RAAF) joined the USN as a P-8A Inc 2 cooperative partner in April 2009. This agreement authorized the RAAF procurement of Inc 2 capable P-8A aircraft, participation in development of common sustainment strategies for the life of the aircraft, and participation in development of new platform capabilities. During August 2016, the United Kingdom Royal Airforce (UK RAF) joined the program as an FMS case, followed by Norway in March 2017. The RAAF’s FMS case includes nine aircraft and associated support, with the first aircraft delivery during April 2019. The Norwegian FMS case includes five aircraft and support, with the first delivery expected during 2012-2022 timeframe.

On March 30, 2017, the FY 17 Lot-8 aircraft production contract was awarded, and included 11 USN, four RAAF and two UK RAF P-8A aircraft. This combined procurement and the commonality of the production configurations is expected to produce unit cost savings for all partners, as well as substantial interoperability benefits during allied operations.
The P-8A provides more combat capability and requires a smaller force with less infrastructure to operate than the P-3C. It also delivers an extended global reach, greater payload capacity, higher operating altitude, open systems architecture and significant growth potential. Major sensor systems include an APY-10 radar system — developed specifically for the Poseidon — which features inverse synthetic aperture radar, and synthetic aperture radar. The Poseidon also carries an electro-optical/infrared sensor turret and has increased acoustic processing capability with 64 passive sonobuoys, 32 bistatic sonobuoys and concurrent passive/active processing.

The P-8A is part of a family of systems that includes the MQ-4C Triton Unmanned Aircraft System (UAS), and a ground based tactical operations center. The acquisition process for the P-8A used an evolutionary acquisition strategy that baselines its requirements for the manned aircraft and provides increased capabilities through subsequent increments. The Inc 2 integrates the evolved P-3C mission capabilities into the P-8A system.

“The P-8A is equipped to complement unmanned assets, and may be integrated, while also providing fleet operators the added benefit of interfacing with unmanned aircraft systems when performing certain operations and missions,” said Rossi. “The P-8A has broad-area acoustics and underwater search capabilities, unlike Triton, although both platforms may conduct Intelligence, surveillance and reconnaissance operations. The P-8A also has attack capabilities, and may engage surface and submersed targets.”

Enhanced Mission Capability

The first Inc 2 upgrade added a broad-area, multi-static acoustic ASW capability to the aircraft. The P-8A Inc 2 Engineering Change Proposal (ECP) 1 MAC capability was introduced to the fleet in October 2015. Operators say this feature is highly effective in the littoral environment for which it was specifically designed. The P-8A program plans to continuously upgrade the MAC capability over the lifetime of the platform.

The P-8A Inc 2 ECP 2, which includes MAC (Phase 2), Automatic Identification System, Air-to-Air Refueling and High Altitude Anti-submarine Warfare capabilities completed integrated flight testing, and was released to the fleet in December 2016 for training. Likewise, the P-8A Inc 2 ECP 3 high-altitude ASW weapons capability captive carriage flight tests were completed Feb. 2016, and safe separation flight tests began Aug. 2016.

“The P-8A Increment 3 (Inc 3) program continues incremental enhancements to existing and new capabilities and builds-in efficiencies, cost effectiveness and ensures the rapid upgrade to major systems and fleet readiness,” said Rossi. “We’ll continue working with Fleet operators, Navy resource sponsors, industry, and academia to determine candidate capability improvements for introduction after Inc 3. We are using a formal capability and prioritization process to choose the capabilities of the most value to P-8A operators.”

The Inc 3 capabilities will be integrated both through the existing aircraft architecture and via new combat systems hardware and software. Inc 3 will incorporate improvements to aircraft systems including Combat System hardware and architecture improvements, ASW and Anti-Surface Warfare (ASuW) sensor improvements, communication capability upgrades, ASuW Net Enabled Weapon, and enhanced security capabilities.
RADM Jonathan Yuen became Commander, Naval Supply Systems Command (NAVSUP) and 47th Chief of Supply Corps Oct. 3, 2013. Previously, he served as Commander, NAVSUP Global Logistics Support, San Diego, CA.

Yuen, a San Francisco native, graduated with distinction from the U.S. Naval Academy in 1983. While a midshipman, he attended the U.S. Military Academy at West Point as an exchange student in the fall of 1981. He has a Master of Business Administration from The Wharton School of Business, University of Pennsylvania. He attended Executive Education Programs at the Stanford Graduate School of Business and the University of Virginia, Darden School of Business. He also attended the Navy Executive Business Course at the University of North Carolina’s Kenan-Flagler Business School.

His Supply Corps sea duty assignments include tours on USS Narwhal (SSN 671) and USS Constellation (CV 64) and as supply officer on USS Nassau (LHA 4).

His shore assignments include Navy acquisition contracting officer intern; Aide to the Director of the Supply, Programs and Policy Division in the Office of the Chief of Naval Operations; career counselor and community manager, Navy Supply Corps Personnel; executive assistant, Defense Logistics Support Center, Defense Logistics Agency; Executive Officer, Naval Supply Systems Command (NAVSUP) Fleet Logistics Center Yokosuka; Deputy Commander of Corporate Operations, Naval Supply Systems Command; Deputy Commander for Ships and Submarines, NAVSUP Weapon Systems Support; Fellow on the Chief of Naval Operations’ Strategic Studies Group and Deputy Chief of Staff for Logistics, Fleet Supply and Ordnance, U.S. Pacific Fleet.

His joint assignments include serving as Deputy Commander/Chief of Staff of the Joint Contracting Command - Iraq/Afghanistan, headquartered in the International Zone of Baghdad with 18 regional offices throughout both theaters. He also completed a Navy individual augmentee (IA) assignment as director, U.S. Central Command Deployment and Distribution Operations Center (CDDOC), Camp Arifjan, Kuwait.

Interview conducted by NP&FP Editor Kevin Hunter

**NP&FP:** Please speak to your role/responsibilities as Commander, Naval Supply Systems Command (NAVSUP).

RADM Yuen: I am the Navy’s supply chain manager. NAVSUP monitors and influences Navy and Joint Warfighter vital supplies, services, and quality-of-life support needed to accomplish our national defense missions. Around the world, NAVSUP manages the supply chains that provide material for Navy aircraft, surface ships, and submarines. Our NAVSUP Enterprise provides supply support and repair parts for weapon systems, logistics operations support to the waterfront, contracting for services and supplies, fuel, ordnance management, and more.

**NP&FP:** From a maritime supply perspective, what are some focal challenges that NAVSUP is addressing in keeping current U.S. Navy fleet operations optimized?

RADM Yuen: The Chief of Naval Operations has emphasized that we are in competition, and challenged us to grow stronger and fight differently. We are meeting this challenge in alignment with the CNO’s “Design for Maintaining Maritime Superiority,” optimizing our operational support, using high velocity learning and digitization, to lead, fight and win.
NAVSUP continues to develop and adapt to meet requirements from end-to-end, but provides the agility, flexibility, and resilience to support the full range of required capabilities. NAVSUP does not own the network time to ensure all operational forces are combat ready to deliver the required subsistence for each afloat unit over a specified time period. Our rapidly changing world challenges us to constantly learn and adapt. To achieve high velocity learning at every level of NAVSUP, we continue to develop our workforce, emphasizing a culture of learning and innovation, to field the best teams, to win the logistics fight. We are improving our workforce competence by emphasizing pushing the pubs, rigorous self-assessments, and by not only doing the right things, but also doing things right.

Through various digitization initiatives we are learning to harness our enormous historical supply chain data to predict and anticipate needs, and even solve logistics challenges before they occur. For example, one challenge we are addressing is establishing a repeatable process to provide provisions to deployed ships operating in a communications degraded or communications denied environment (C2D2E). We are testing push logistics concepts to replenishing ships at sea without relying on ship-to-ship or ship-to-shore communications. One concept uses a “digital twin” based on historic data to identify the amount of required subsistence for each afloat unit over a specified time period. This process will predict food consumption patterns for different types of operations and initiate automatic subsistence re-orders of the right types and amounts of food. Overall, we intend to apply these methodologies to other classes of supply to further strengthen the Navy’s readiness to operate in austere environments.

I am proud of what the NAVSUP team brings to the logistics fight, and the dedication each team member demonstrates daily. As we support the fleet operating in a changing and dynamic environment, we are adapting to fight differently to support our customers, by being agile, flexible, and proactive.

NP&FP: From a strategic perspective, how is NAVSUP helping ensure that the right equipment is where it needs to be to keep projected U.S. Navy/U.S. Marine Corps operational movements at op tempo?

RADM Yuen: NAVSUP is part of the Navy’s global logistics network and is focused on providing logistics support to the right place at the right time to ensure all operational forces are combat ready to deliver the full range of required capabilities. NAVSUP does not own the network end-to-end, but provides the agility, flexibility, and resilience to support navy unique requirements across the full range of military operations. NAVSUP continues to develop and adapt to meet requirements from forces operating in remote locations. These efforts provide services to ensure all requirements are available when units operate in a contested environment with limited or no communications. This is not easy; it is a challenge for any large organization to communicate clearly, even in a communications-rich environment. In order to bring the full capability and capacity of the entire NAVSUP Enterprise, we must be able to efficiently share information in all environments.

NAVSUP’s eight Fleet Logistics Centers (FLCs), located around the world, play a critical role in supporting both regional and fleet commanders. NAVSUP FLC planners, including interns, are embedded and integrated at each of the numbered fleets to respond to signals for current and future operations. These planners are part of a larger community assigned around the world as operational planners in both Navy and Joint billets.

An integral part of how NAVSUP fights is carried out by the NAVSUP FLC’s logistics response teams (LRT). LRTs conduct in-theater support operations tailored to the mission. These LRTs are task-organized to provide rapid, consistent, and scalable logistics. To provide this capability, trained personnel are developed and stationed on staff, ready to deploy at a moment’s notice. When LRT personnel arrive at a location, they either expand logistics functions already in place, or establish new logistics capabilities. This ability to augment local forces makes LRTs valuable, and can have a significant positive impact across the full range of military operations.

NAVSUP is geographically aligned with all operating forces, supporting deployed assets around the globe. The NAVSUP Enterprise aids in force preparedness and readiness, participating in operational planning, regional exercises, and training. We are committed to being ready, resourceful, and responsive!

NP&FP: In terms of partnering with industry, how is NAVSUP working to influence procurement decisions to maximize fleet supply technology and equipment availability?

RADM Yuen: We partner with industry in a variety of ways, including through Performance Based Logistics (PBL) contracts, automated data driven decision making tools, and “portfolio reviews.”

The PBL contracts used by NAVSUP Weapon Systems Support (WSS) are central to our long-term, outcome-based product support strategy. The strategy is designed to meet the warfighter’s requirements, optimize system readiness, and incentivize our industry product support providers to reduce costs through innovation. NAVSUP has employed PBL contracts for a number of years at NAVSUP WSS, and they have proven to be an excellent means of sharing risks and rewards between the Navy and our commercial product support providers, while also reducing fleet operational costs.

NAVSUP is also developing automated data driven decision making tools to improve the availability of data, and respond to official inquiries more rapidly. For example, we are developing a consolidated contracting data warehouse (CDW) as a repository for information from multiple acquisition reporting systems. The data analysis identifies areas where existing contracting vehicles can be leveraged, or a vehicle can be developed to reduce stand-alone, and sometimes redundant, contracts. Again, this is a win-win for industry and NAVSUP, as it reduces vendor costs by consolidating contracts, while simultaneously improving our management of these contracts and reducing our acquisition costs.

We are also working closer with our fleet customers by conducting “portfolio reviews” with them. Our contracting professionals at our NAVSUP FLCs in Norfolk and San Diego are using a proactive strategic
planning process, examining existing contracts and spending patterns. They are identifying opportunities to improve procurement methods by using “strategically sourced” contracting vehicles, noting areas for increased competition among our industry partners, reducing our reliance on “bridge contracts,” and increasing opportunities for our small business base. Our Strategic Sourcing Program Management Office supports this type of proactive market research, and other procurement related improvement efforts that enhance the contracting process, allow for collaboration of best practices, and generally improve contracting efficiencies and fleet support.

NP&FP: Feel free to speak to recent NAVSUP goals/achievements.

RADM Yuen: Our Navy is being contested in some very important parts of the world, and we need to continue stepping up our game. The entire supply community is ready to support this fight. We recognize that for the Navy to maintain our competitive edge, we must strengthen and optimize all elements of our Navy’s supply systems, and we must move fast! The NAVSUP and Supply Corps team stands side-by-side with our joint warfighters and is doing great things in support of the fleet. I am extremely proud of each team member and their dedication to winning the logistics fight.

One example is the stellar support NAVSUP Fleet Logistics Centers (FLC) provide. Recently, NAVSUP FLC Puget Sound provided USS Nimitz (CVN 68) critical pre-deployment logistics support during the weeks and months leading up to the ship’s departure. In addition to daily deliveries of high priority parts and materials, 200 pallets of stock materials, and 1,102 pallets of food provisions, our team provided postal service, aviation fuel, and other logistics services. While deployed, our team will continue to provide critical logistics support, enabling the Nimitz Strike Group to execute their national defense missions wherever they sail.

Our innovative collaboration with other service providers to deliver logistics solutions for the fleet is another achievement. One example is the NAVSUP Logistics Cell (LOGCELL) initiative, which streamlines logistics processes between military and industry partners, and aids timely decision making. The LOGCELL is a war-room styled, web-based information center that allows a cross functional team to identify and respond to challenges through real time communication with the fleet. The program began with logistics data for the P-8A Poseidon aircraft and has expanded to support 14 aviation type/model/series (TMS) programs.

Looking forward, our strategic goals are laid out in my 2017-2021 Strategic Plan & Commander’s Guidance. These goals focus on how we will continue to fight across the full range of military operations, how we can optimize the supply chain, improve supply chain information technology systems, and increase access to quality-of-life services. Internally focused goals call for us to operate with sound internal controls, and to strengthen cybersecurity. My final goal is to lead with character and competence, to promote an ethical, effective, and committed workforce, because none of this happens without attaining a culture of moral excellence.

Going above and beyond to create innovative, customized Solutions.

We make the world safer and more productive.

Concurrent Technologies Corporation’s (CTC’s) full-services solutions team consists of energy and environment experts with in-depth experience. As a nonprofit organization, we partner with clients to provide the best possible solutions in the following areas:

• Environmental & Process Engineering
• Infrastructure Energy
• Operational Energy
• Water Recycling Technologies
• Safety & Environmental Health Services
• Strategic Advisory Services
In January 2006, the Chief of Naval Operations (CNO) established the Navy Expeditionary Combat Command (NECC) to centrally manage Navy Expeditionary Combat Forces (NECF). Under the Navy Expeditionary Forces (NEF), NECF communities of Coastal and Riverine Warfare, Explosive Ordnance Disposal, Diving and Salvage, Naval Construction, Combat Camera and Expeditionary Logistics forces provide core capabilities essential to the Fleet Commanders’ operational requirements, and have existed in one form or another for much of the Navy’s history.

“In the broadest sense, NEF enable the naval commander to translate sea control into power projected ashore; first by enabling access and then by establishing the expeditionary infrastructure required by naval forces to conduct and sustain operations,” said Lt. Cmdr. Jennifer Cragg, spokeswoman for Navy Expeditionary Combat Command.

“NECC forces contribute capability directly related to the Naval Force’s ability to meet the mission,” added Cragg. By forming NECC, the Navy brought many overlapping or similarly supported capabilities under one umbrella - capabilities that are unique in nature and if not formalized would otherwise have to be accomplished by pulling Sailors from the fleet in a temporary duty or ad hoc manner.

“NECC delivers its core capabilities through rapidly deployable expeditionary forces made up of both active and reserve force components,” said Cragg. “NECC continues to serve as a role model for Active Reserve Integration with approximately 50 percent of its force comprised of reservists.”
On any given day approximately one third of NECC forces are deployed worldwide on missions from theater security partnerships to partnership building to infrastructure protection.

**Targeted Command and Control**

Navy Expeditionary Combat Forces enable naval forces to translate Sea Control and Power Projection into combat effects. Our Expeditionary Force is trained to clear, secure, build and protect the following:

- Clear the battlespace of explosive, security and physical hazards, shaping the security environment;
- Secure the battlespace, throughout the littorals, for U.S. Joint and coalition partner access and action;
- Build partnerships leading to domain awareness through assured C2 and critical Infrastructure development;
- Protect from threats through battlespace.

“We provide a single advocate for this group of related military capabilities which operate together when deployed and have related missions,” said Cragg. “To better align, man train, and equip, NECC utilizes economy of scale by consolidating headquarters and centralizing equipping functions. This improves operations due to increased commonality of training, equipping, doctrine, and tactics.”

**Managing Critical Force Maneuver**

NECC provides consistent, standardized and repeatable unit certification processes that deliver combat-ready units of action that are integrated into Fleet and COCOM operations. The command drives commonality between the many different capabilities. NECC provides standardization – codifying readiness and warfighting standards in training and maintenance.

NECC serves as Expeditionary Force Management Agent for OPNAV, USFF, and CPF in development of GFMAP sourcing solutions; providing JOPES/TPFDD.

The U.S. Navy Expeditionary Logistics Support Group (NAVELSG) is homeported in Williamsburg, VA, with an active battalion located at Cheatham Annex; with forward-deployed detachments around the world and reserve battalions located across the United States.
NAVELSG provides Sailors with the knowledge and skills needed to support the fleet's surface and air-handling mission. More than 100 Sailors and civilians at NAVALSG headquarters work hand in hand with the fleet and are dedicated to ensuring training is current and well executed on behalf of 2,800 active duty and reserve Sailors in the administration, logistics and training of their active and reserve units.

“With one active duty cargo handling battalion to handle the peacetime movement of cargo, having six operational reserve battalions allows the Navy the flexibility to quickly mobilize in the event of a war or humanitarian crisis at a much more cost effective rate,” added Cragg. “It is within this context that the reserve component Sailors of the NAVALSG cargo handling battalions unique.”

Navy Cargo Handling Battalion ELEVEN (NCHB 11), one of six reserve component cargo handling battalions of NAVALSG, for example, have assisted the Marines during past exercises via roll on – roll off of vehicles. Additionally, active and reserve component Sailors of NAVALSG embark to provide full-time operation cargo handling functions on Military Sealift Command vessels. NAVALSG reserve component personnel are a natural and critical fit to the cargo handling mission.

Meeting the Mine Threat

Expeditionary Mine Countermeasures (ExMCM) works to leverage inherent expeditionary skillsets, providing rapid, responsive, scalable, agile, and adaptive MCM forces. In addition to adding MCM capacity, ExMCM companies deliver an organic, full detect-to-engage MCM capability in support of theatre requirements to defeat mines from Advanced Forward.

Staging Bases at sea, in harbors and over sea lines of communication, and are capable of taking their capability over the beach to provide EOD and exploitation capabilities ashore.

“The ExMCM capability utilizes underwater unmanned vehicles to find, fix, and finish explosive threats in the expeditionary warfare battle space,” said Cragg. “They can exploit explosive threats using technical means to attribute them to nation states or terrorist groups to provide information to strategic decision makers.”

EOD platoons deploy globally and participate in various coalition and joint exercises. ExMCM Command and Control demonstrations took place during the Rim of the Pacific (RIMPAC) 2016 exercise in the Pacific. “By interacting and operating with EOD commands from our sister services or with partner nations during strategic-level exercises, we improve the EOD’s intellectual enterprise to maximize the overall combat effectiveness of Naval Expeditionary Forces,” added Cragg.

Value-Added Commander Task Forces

In 2012, NECC Pacific was established for all NECF in the Pacific Fleet Area of Responsibility. Newly stood up Commander Task Forces (CTF) addressed various needs including employment of NECC forces by fleet and joint commanders.

By setting up the Commander Task Forces it provided deliberate
and crisis action planning to optimize their use. CTF 56, 68, and 75 were set up by Commander FIFTH, SIXTH, and SEVENTH Fleets respectively, in order to more effectively employ NECF in U.S. Naval Forces Command and control of U.S. Combatant Command Central Command (CENTCOM), Africa Command (AFRICOM), European Command (EUCOM), and Pacific Command (PACOM) through the formation of Adaptive Force Packages (AFPs).

NECF deploys AFPs which are scalable in capability, size and scope; they are task-oriented, consistent with supported-commander requirements, and by their very nature they are expeditionary.
Pressure from California air quality districts is mounting as local residents are increasingly voicing concerns over the chemicals exhausted into the air. Of particular concern is hexavalent chromium – a known carcinogen and pollutant associated with plating and anodizing processes.

Metal Processing Facilities in the area have already employed chemical technologies such as surface tension modifiers (defoamers) to reduce the hexavalent chromium discharge from their chromic acid anodize tanks. In other instances, chrome fume scrubbers have been employed at great cost.

Reduction of Hexavalent Chromium Emissions is Southern California’s Top Priority

South Coast Air Quality Management District (SCAQMD), the air pollution control agency for Orange County and major portions of Los Angeles, San Bernardino and Riverside counties, requires emissions in certain high impact areas to be less than 1 ng/cubic meter in the air outside the plating facilities so that local residents are not endangered. Cancer risk due to the elevated hexavalent chrome levels is estimated to be more than double that expected from background sources. Identification and reduction of above-background levels of hexavalent chromium is SCAQMD’s main focus:

“This is priority No. 1 for our air monitoring and enforcement staff,” said Wayne Nastri, acting executive officer for the South Coast Air Quality Management District.

The concerns raised in California by SCAQMD surrounding hexavalent chrome use as an anodic seal is expected to continue across the United States and globally. In Europe, the need to halt the use of hexavalent chromium was recognized as early as 2001 and resulted in the REACH initiative banning the use of hexavalent chrome beginning September 21, 2017.

Compliance and Enforcement are Difficult, Expensive

To enforce the requirement, fence line monitors have been placed at certain facilities, and when the concentration of hexavalent chromium rises above the threshold limit, the plater is required to shut down the chrome generating processes. Not only does this affect the local residents, it also affects the local manufacturers who supply jobs to the area. According to local plating shop owners each installation may reach into the millions of dollars. Many places will simply close and employees will be out of work:

“The South Coast Air Quality Management District has found that the sodium dichromate seal is a significant uncontrolled source of hexavalent chromium emissions. They have shown it to be a priority as they modify the current chrome emission rules. As the MFASC meets with the South Coast AQMD, it has become clear that the state Air Resources Board is also listening. The coming change in regional and then California rules is likely to cost shops significant dollars to comply, forcing many shops to relocate out of...
Sodium Dichromate and Dilute Chromate Seals Are Major Sources of Hex Chromium Emissions

SCAQMD survey testing performed in plating shops in Southern California has revealed that while the hex chrome emissions directly over the chromic acid anodize tank and conversion coating tanks are controlled and relatively low, the emissions directly over the sodium dichromate seal are staggering – as high as 682,000 ng/m3 – one hundred times as high as that of the chromic acid anodize tank.10

Although the vapor pressure of chromium is very low, it is believed that the aerosols generated by the wet steam mist above the seal tank and from micro-boiling on the tank heaters are carrying hexavalent chromium into the ventilation and out into the atmosphere.

Consortium Works towards Common Goal

A consortium of local metal finishers, the Metal Finishing Association of Southern California (MFASC), and CHEMEON Surface Technology of Minden, Nevada has been talking and working with SCAQMD and Prime Aerospace Contractors to mitigate the problems.

The group has started an outreach campaign to the stakeholders within the aerospace manufacturing sector, explaining the problem and potential downsides to the continued use of hexavalent chromium seals.

The outreach consists of direct calls and emails to the engineers who control the processing specifications within the aerospace companies.

CHEMEON Offers Safer Alternative

Of course, industrial controls can be used – this is very costly, and will result in some plating shops closing rather than make the large infrastructure investment required. A better choice is to use a seal without hexavalent chromium.

Many anodic seal replacements under consideration in recent years are problematic for a variety of reasons and have not been pursued as viable alternatives to dichromates. For instance, the most commonly used seal, nickel acetate, considered a mid-temp seal generally at 160-190°F, or higher, is energy consuming, and is a regulated pollutant and possible carcinogen. The room temperature nickel-fluoride seal is effective as a possible alternative but is a bath where time must be tightly controlled because of the aggressive fluoride content and is a possible causative factor in dissolution of the oxide if the bath is not maintained properly. The high purity DI hot water seal at 205°F works well but is time consuming, expensive to heat, prone to contamination and must be dumped frequently.

Another option is the use of the relatively new sealing technologies afforded by the trivalent chromium compounds originally developed and patented by the United States Navy in the early part of the 21st century.10 CHEMEON Surface Technology was one of the first licensees to bring the product to market - first as CHEMEON TCP-HF and then later derivatives such as TCP-HF SP (Spray) and TCP-NP (No Prep).

These trivalent chromium compounds are much safer than their hexavalent counterparts. They have very low toxicity, do not cause chronic exposure problems, and are non-carcinogenic.11 Because the trivalent chromium seal operates at room temperature, there is no aerosol formation from micro-boiling or steam, and very little chemistry is released into the air.

The TCP compounds have been available in commercial form since approximately 2006 and have slowly been working their way into Prime aerospace contractor approvals and specifications. Much of the original focus for the trivalents was in the area of replacement for hexavalent chromate conversion coatings on aluminum.

In recent years, the original patents that discuss use of the trivalent chromium zirconates as a sealant for anodized aluminum have been reexamined and developed into robust processes and products.

Aerospace Primes such as Sikorsky and Pratt and Whitney have patented variants of the original work, and have included TCP-HF and TCP-NP as a sealant in their specifications and processes.12 13

In 2010, the United States Navy approved the use of CHEMEON TCP-HF as a post-anodize seal at their Fleet Readiness Center Southeast (FRCSE) in Jacksonville FL for Types I, IC, II, IIB, and III.14 Corrosion resistance, paint adhesion, and fatigue life meet or exceed specification.15 The FRCSE services naval aircraft including the F/A-18 Hornet, F/A-18 Super Hornet, E/A-6B Prowler, and SH-60 Seahawk.

CHEMEON’s Trivalent chromate products exceed specification as an anodize seal

Studies at the CHEMEON R&D facility have shown that TCP-HF performs as well, or better, than sodium dichromate and hydrothermal seals. Corrosion resistance exceeds 1800 hours for Type II and 1000 hours for Type III coatings. Paint adhesion, wear resistance, dielectric strength are all comparable to the traditional hexavalent seals.16

The Navy studied the performance of TCP-HF as a sealer and found the performance to be “as good as or better than chromate in corrosion resistance and equal to chromate in paint adhesion. TCP is far superior to water for sealing.”17
What’s Next?

CHEMEOON TCP-HF has been shown to produce an anodize seal that is as good or better than conventional sodium dichromate and dilute chrome seals. Sealing with TCP-HF eliminates hexavalent chromium in the air and reduces energy consumption. Discussions are in process with MFASC, SCAQMD, and aerospace Primes about the advantages of TCP-HF.

About CHEMEOON

CHEMEOON Surface Technology is a Woman Owned Small Business that is licensed by the United States Navy to manufacture the MIL–SPEC and QPL/QPD approved CHEMEOON TCP-HF, a replacement for hexavalent chromium. CHEMEOON’s current focus is the direct replacement of the hexavalent based sodium dichromate seals with the high performance seal CHEMEOON TCP-HF.

If you are an OEM, Prime Contractor or a plating shop in the US or abroad and are interested in learning more about CHEMEOON as a direct replacement to sodium dichromate and dilute chrome seals visit www.chemeon.com or contact the chemists and subject matter experts at CHEMEOON Technical Support at 888.782.8324

Acknowledgements

A special thank you to CHEMEOON Research Scientist Jake Cruson for the use of his preliminary data on the performance of Type II anodize with TCP-HF seal.

Endnotes

9. Wesley Turnbow, President, Metal Finishing Association of Southern California, via email 9 Jun 17
10. U.S. Patent Number: 6,375,726 (PCT/US 01/45434); 6,511,532 (PCT/US 02/35599); 6,521,029; and 6,527,841 (PCT/US 02/35490)
15. Naval Environmental Sustainability Development (NT-ESDI) FY09 Year in Review Report
ENSURING NAVAL ENERGY SECURITY

By Steven Iselin, Acting Assistant Secretary of the Navy for Energy, Installations & Environment

In April 2013, terrorists attacked Pacific Gas & Electric’s Metcalf Transmission Substation in Southern California. The assailants cut the station’s communications lines and destroyed 17 large electrical transformers. In the aftermath of the attack, Federal Energy Regulatory Commission Chairman Jon Wellinghoff called the assault, “the most significant incident of domestic terrorism involving the grid that has ever occurred.”

Service disruption to tens of thousands of southern California customers was avoided thanks to grid managers, who rapidly rerouted power around the damaged systems. This incident highlighted the vulnerability of the commercial power grid and was a “wakeup call” to the power industry, the State and the Federal government. The incident contributed to the Department of the Navy’s (DON) ongoing efforts to assess the vulnerability of mission critical assets and the reliability and resiliency of the energy infrastructure serving those assets.

Enablers of Readiness

Navy and Marine Corps installations enable naval readiness. Combat readiness of afloat and expeditionary forces emanates from DON installations, where Sailors and Marines live and train; where our platforms and aircraft are operated and maintained; and where active missions are executed. As the risk of natural or manmade disruption to the commercial grid grows, DON leadership is prioritizing installation energy security to ensure the continuity of critical operations.

In 2016, Admiral John Richardson, Chief of Naval Operations, told the House of Representatives Defense Subcommittee, “America has been a maritime nation since we began. Our prosperity continues to depend on our maritime security.” Over the past decade, the DON leadership has confirmed how important Naval energy is to our safeguarding that maritime security. The DON has developed, and is implementing, energy programs designed to enhance our installation energy security. The DON team is delivering energy solutions that: are good for the warfighter; improve readiness; and have a strong business case.

The DON defines energy security as assured access to reliable energy supplies and the ability to protect and deliver sufficient energy to meet mission-essential requirements. Today, we look to build installation energy security through three pillars: reliability, resiliency, and efficiency.
When we assess an installation’s energy security, we consider that mission-essential facilities (e.g. shipyards and airfields) may require higher levels of reliability and resiliency than the commercial grid can provide. To improve installation energy security we are embracing new approaches including distributed energy generation, demand response technologies, and power storage infrastructure.

Our office has pursued aggressive energy security initiatives and worked with Navy and Marine Corps energy leaders to embrace innovative ways to reduce consumption and improve energy efficiency. We have leveraged existing authorities to incorporate renewable energy, energy storage technologies and cyber security improvements to improve installation resiliency. Both Navy and Marine Corps have used Energy Saving Performance Contracts (ESPCs), Utility Energy Savings Contracts (UESCs), and other third party-financing arrangements to make significant progress despite constrained appropriated budgets.

Commercial grid vulnerability to a cyber-attack is a reality that threatens our ability to execute critical missions. At least one successful cyber-attack has already been waged against a commercial power grid. In December 2015, operators at the Prykarpattyaoblenenergo control center in the Ukraine watched helplessly as an outside operator hijacked their computers and forced an electrical substation offline. Within hours two more power control centers were also brought down. In total, approximately 230,000 customers in Ukraine were deprived of power in the heart of winter. If a similar attack was executed against a California power station, operations at Navy and Marine Corps installations could be disrupted. An example how DON installations are responding to threats, Marine Corps Air Station Miramar leadership is constructing an internal microgrid capable of powering critical systems.

Some threats are very complex, such as the cyber security challenge. Others can be addressed at the local level where, for example, single points of failure can be mitigated by negotiating with local utilities to install a second transformer where such a vulnerability is identified. It is the responsibility of the services’ leadership to work with each base commander to analyze weaknesses and act to correct them, to ensure continuity of operations if the commercial grid fails.

Navy and Marine Corps leaders are not taking energy for granted; they are no longer assuming energy will always be there. There are 95 U.S. naval installations around the globe, all of which draw power from commercial grids that are vulnerable to physical or cyber-attack. Our national security dictates a more proactive approach to energy security by providing redundancy beyond external supplies.

Examples of recent Navy and Marine Corps energy security initiatives include:

- **Marine Corps Air Station Yuma, AZ:** The DON signed an innovative agreement in which the Marine Corps leased land to Arizona Power. As part of that agreement, the utility is developing a 25 megawatts (MW) natural gas “Peaker Plant” on the land, and microgrid network on the base. The Peaker Plant provides Arizona Power customers reliable power enclaved within the installation fence line for added security. In the event of a commercial grid disruption, the system supplies 100 percent of the backup power required to maintain operations at MCAS Yuma. As a result, the Marine Corps will realize significant cost savings by eliminating the need for dozens of backup diesel generators.

- **Portsmouth Naval Shipyard, NH:** At Portsmouth the Navy implemented a 10 MW Combined Heat and Power plant (with 4 MW of emergency back-up generation), with microgrid controls and a 580kWh energy storage system to improve resiliency. The control system intelligently adds or sheds electrical loads to balance available distributed generation on-site. In the event of a grid outage, this will enable the installation to prioritize powering those systems that support mission critical operations.

- **Naval Weapons Station Seal Beach:** DON has partnered with a third-party developer to build a 50-100 MW grid-scale battery system and, as part of the in-kind contribution by the developer, the DON will receive a fully interconnected 500 kW photovoltaic system and a one MW (6 MWh) battery for exclusive Navy use. The system will provide power to critical loads during commercial grid outages.

In addition to technical solutions, the Navy and the Marine Corps continue to improve the Department’s energy culture through behavior change campaigns. In 2015, the Marine Corps issued its Energy Ethos, a shared vision that emphasized the operational benefits from more efficiently using energy resources. Our office recently released a guidance document establishing an Installation Energy Security Framework, which defines energy security and the methods by which an installation may increases its resiliency, reliability, and efficiency.

We value the relationships we have developed with industry partners over the last several years, and we could not have made the significant progress on energy security without them. The contractors executing our renewable energy projects, ESPCs and UESCs brought industry best practices to bear in meeting installation energy requirements, while driving savings and upgrading key elements of our facilities. The DON has and will continue to partner with commercial utilities to diversify energy resources, improve utility reliability, and improve energy security when and where it makes sense.

In summary, the DON is working to take prudent action to increase the energy security of our naval installations. Physical attacks like the one at the Metcalf substation, cyber-attacks to commercial grid infrastructure, natural disasters like Superstorm Sandy which blacked out parts of the Northeast for days, or even the simple wear and tear of an aging electrical grid, are all threats we must be prepared to counter.

The Navy and Marine Corps must remain ready to deploy combat power around the clock, around the globe. Our national security demands we be ready to answer the call. To accomplish that mission, the Navy and Marine Corps must have access to secure, readily accessible energy resources. It is incumbent on the DON to continue to build our energy security by improving the reliability, resiliency, and efficiency of our installations. We will continue to invest in projects that are good for the warfighter, enable readiness, and have a strong business case. The Navy and Marine Corps team is up to the task.
CAPT Edwin Bogdanowicz is currently serving as Director, NAVSUP Energy Office at Fort Belvoir, VA. He leads a team of engineers, logistics specialists, chemists and experts in petroleum operations in developing requirements, supply chain policies and procedures to support the global Navy and Marine Corps bulk and retail fuel missions. His team provides functional oversight for 85 facilities, fuel infrastructure maintenance advocacy and coordination across the military services and the Department of Defense.

CAPT Bogdanowicz is originally from Western New York. He graduated from Cornell University with a BS in Mechanical and Aerospace Engineering and received his commission from the NROTC program in 1991. He received a Masters of Business Administration from the University of Kansas in 2002.

His previous shore tours were Defense Contract Management Command Syracuse, Fuel Department Director, Fleet and Industrial Support Center, Yokosuka, Japan, OPNAV N41, Joint Forces Command N43 and DLA Energy. He completed two Individual Augmentee assignments: Bosnia in 1995 and Iraq in 2005. His previous sea tours were in USS Nimitz (CVN-68), USS Miami (SSN-755) and USS Bataan (LHD-5).

His qualifications include Submarine Supply Officer, Naval Aviation Supply Officer and Surface Warfare Supply Corps Officer. He is a Joint Qualified Officer, DAWIA Level II Contracting Officer and a member of the Acquisition Professional Community. His subspecialties are contracting and fuels.

DoD Power & Energy had the opportunity to speak with CAPT Edwin Bogdanowicz, Director, U.S. Naval Supply Systems Command (NAVSUP), Ft. Belvoir, VA, regarding the Navy's latest efforts to maximize fuel and power sourcing for asset propulsion and weapons systems engagement.

Interview conducted by NP&FP Editor Kevin Hunter

DoD P&E: What is the role of Naval Supply Systems Command (NAVSUP) Energy and where are some primary points of operation?

Bogdanowicz: Our command relationship is on several different echelons. My office is responsible for all things NAVSUP in the energy arena. We are part of a subordinate command entitled Mobile Logistics Support, code 70. In that role, we provide support to all of the Navy deep draft fuel terminals co-located with almost all of the supply centers we have.

DoD P&E: What are other roles you address as Director, NAVSUP Energy?

Bogdanowicz: The other role I serve is directly to the Chief of Naval Operations (OPNAV) regarding the execution of fuel policy across the Navy. OPNAV has a role in determining the right instruction for the whole Navy on fuel. We serve as a subject matter expert in support of them as well. Fuel is a truly joint commodity. It’s not Navy, not Army, not Air Force, but a DoD asset that can be used to power joint capabilities without modification. In that respect, fuel owned by Defense Logistics Agency (DLA) Energy and NAVSUP, the Navy’s fuel service control point, essentially makes NAVSUP the liaison between DLA and big Navy, responsible for the joint purchasing function, procurement, and the fuel users who have specific mission requirements for fuel to make them happen. Our job is to take a look at all Navy-specific requirements for Navy ships, Navy aircraft, and other expeditionary forces, then translate them into joint requirements so that multiple DoD missions are made possible. This joint role involves the storing and transferring of fuel so that the Navy’s mission remains the priority, though in many places where NAVSUP operates, the majority of fuel consumption is not Navy. So the business of fueling DoD is really a joint mission. We have to understand all DoD service branch cultures and their unique requirements so we can put them together to form an overall picture of fuel needs across a global DoD enterprise.

DoD P&E: With some of the current day challenges in fuel and re-supply, can you speak to how NAVSUP is addressing some of these in terms of energy sustainment, and maybe speak to some alternative options as well?
Bogdanowicz: There is a fundamental difference between the Navy’s requirements and the rest of the services. We’re maritime so our fuel has to meet requirements to be used at sea, which, without getting too technical, means our fuel has to have a higher flash point or the temperature at which you can ignite the fuel with an open flame. Normal jet fuel is 100 degrees; our jet fuel is 140. Normal jet fuel is called JP-8, ours is called JP-5. Nobody else needs JP-5 in the commercial world. So we have a requirement that makes our fuel unique. Contrast that with Air Force jet fuel; they buy Jet-A in Konas, and Jet A-1, the standard stuff that all the airlines use. So the supply chains have evolved to be much more resilient and flexible on the land-based side.

Another thing worth mentioning is that in Secretary Mabus’s eight years as Secretary of the Navy, his primary emphasis has been on environmental stewardship and strategically moving towards alternative fuel. This line of thought culminated with 2016’s Great Green Fleet Initiative, a culmination of work to develop standards for alternative fuels, such as F-76, a new ship propulsion fuel that the Navy has approved as a 50/50 blend, with a 10 percent blend made from alternative feedstock. In this case it was beef tallow. The proof of concept challenge is to take this up to commercial scale and make this work operationally.

The other thing that’s happened since then is the whole alternative fuel business is reliant upon a relatively high price of crude oil. So, if the crude price goes down globally, it becomes harder and harder economically for companies to make alternatives and make a profit. And so, the hope is that industry gets better over time and the cost curve continues to go down, and then we can make this part of our normal business going forward. The strategic intent is now you’ve got another way to get petroleum; refined petroleum products besides crude oil. If I have long time scale disruptions in the crude oil market, and I’m a net importer, I’ve still got a way to operate my military over a period of years even if I’m not getting reliable imports. We’re a long way from that, but I think the long term goal is to have a more resilient national security strategy that doesn’t leave us reliant upon importing from countries that we may not be able to reliably count on through all the different possibilities of conflict.

DoD P&E: What are the primary test areas for the F-76 fuel variant?

Bogdanowicz: We’re testing for a lot of different types of trace metals. The intent is to slowly have a greater and greater percentage of alternative fuel be part of our normal business. The challenging part is, if you’re going to spend R&D money to try to increase productivity, it has to be likely enough to produce profitability so that the cost curve comes down quickly or expenditures can make any further investment unviable. I think the point that the Navy’s Great Green Fleet effort made is that we can take an alternative fuel and use it for military missions without mission impact.

DoD P&E: How is NAVSUP Energy helping Navy facilities better streamline energy usage and movement to accommodate fuel supply needs of the joint DOD?
Bogdanowicz: So, first of all, even though we’re called NAVSUP Energy, what we really are is Navy petroleum. We are experts at the military specification fuels that are used by the warfighter. The way DoD looks at it, and the Navy as well, is to take this stuff and break it into two parts. There’s the consumption side, operational energy, and then there is the supply side, energy.

‘Operational’ is once we’re using energy, or actual petroleum manipulation in the supply chain. My focus is on the industrial base and getting the requirements to them, transporting it and storing it, and giving it to the warfighter.

On the other side of the equation is, how are we using it? There are ways to economize and ways to change usage. One of the primary areas addressed by the Great Green Fleet was in coming up with new operations procedures. For example, when you launch aircraft from a carrier, there is a certain sequence in which aircraft launch, what they do once they get airborne, when they decide to do aerial refueling, and when they bring them back. The Navy took a hard look at it and said, I think there are some different ways we could do this and still meet the mission using less fuel.

Another example is on ships that have two jet turbine engines, such as the L2500 class. They can burn either diesel or jet fuel. Since jet engines like to spin at steady revolutions per minute (RPMs), unlike a diesel engine which operates at variable rates, the way we control how fast the ship goes through the water is by leaving jet engine propulsion operating at a steady rate, and then just change the pitch on the propeller. A greater pitch means you push more water, and hence go faster. If you want less power, you can shut down an engine or just trail a propeller to conserve energy.

The culture the Navy has been trying to address is in incentivizing commanding officers at the operational level to find the right balance between operational risk and readiness on the one hand, and efficiency and conservation on the other hand. And so, that’s sort of this cultural evolution that we’ve been going through. The Great Green Fleet was an attempt to accelerate that.

DoD P&E: What are some alternative propulsion methods the Navy is looking to implement to power ships with energy conservation in mind?

Bogdanowicz: The Navy is looking at diesel-electric engines. We’re building ships that essentially have diesel generators that are making electric power, and then we use electric power to drive the ship. That’s actually a level of efficiency greater than what we have now with jet engine propulsion.

The other benefit of diesel-electric capability is in the development of electromagnetic weapons that require huge amounts of power. If you don’t have a diesel-electric driven ship, you need lots of generators to produce the power to operate weapons systems, so we sort of dual-purposed these generators for their ship propulsion and weapons systems energy availability. The amounts of energy that diesel-electric driven ships are using is a magnitude above anything we would have on a non-diesel-electric ship, in terms of electrical power.

In terms of powering weapons systems on diesel-electric ships, electricity is stored in gigantic capacitors. It takes some time, minutes or seconds, to charge these capacitors for powering a weapons discharge. It’s essentially the difference in say a hundred dollars for a shell from an electric capacitor versus ten thousand dollars for a shell with all the necessary gunpowder from a ship without electric capacitors.

It’s a pretty cool transformational thing for the Navy not having to worry about the expense of ammunition magazines with all the fire suppression equipment that has to accompany the use of gun powder. Not to mention the expense of keeping a gun system operational. Electric-operated weapons systems will be cheaper to operate and cheaper to support logistically, with ranges at least an order of magnitude greater, so, you’re getting a lot more military effectiveness. With greater range for ship-launched weaponry to enemy positions, fewer aircraft will be needed to destroy positions that ships can now reach, saving lives and fuel associated with aviation engagement.

DoD P&E: Feel free to speak to any other objectives you’d like to mention.

Bogdanowicz: We regularly review our posture in terms of where our energy is stored. Our store fuel is for peak-time operating use in ships and aircraft, for normal peace-time missions. We also have fuel that we store for war-reserve, to be able to support our combat engagement plan. There’s been a general awareness that we’ve got some work to do on what we store and where, particularly in the Pacific Command (PACOM) area of operations (AOR). As such, we are taking a deliberate long-term look at our storage strategies, and looking to diversify where we keep our fuel.

We have a pre-positioned fleet full of all the war-reserve materials that we think we’re going to need, so we’re looking at what kinds of afloat capabilities do we want to have. The Navy’s assessment has been that what we have is going to be adequate to meet our needs and, as the threat profile changes, we need to be ready to adjust our strategy to address emerging threats.
DoD Power & Energy had the opportunity to speak with Mr. Roberto Guerrero, Deputy Assistant Secretary of the Air Force for Operational Energy, regarding Air Force efforts to optimize operational energy usage in order to ensure readiness, increase combat capability and reinforce mission success.

DoD P&E: How is the Air Force energy office different from other Service energy offices?

Mr. Guerrero: With more than 5,000 aircraft in the Air Force fleet and more than 40 different mission sets, the majority of energy expenditures reside in aviation energy. In fact, the Air Force's fuel cost in 2016 was more than $5 billion – approximately 81 percent of the total Air Force Energy bill and 4.7 percent of the overall Air Force budget. Additionally, the Air Force uses approximately 57 percent of the Department of Defense supply of Operational Energy – more than all the other Services combined.

DoD P&E: What are your primary focus areas?

Mr. Guerrero: For the Air Force, operational energy encompasses the energy required to operate aviation assets and aerospace ground equipment. The management of operation energy involves more than just the use of aviation fuel and therefore we focus on three major areas that include current operations, logistics and sustainment, and future operations.

Our current operations team is focused on ways to optimize how the Air Force flies its aircraft to maximize combat capability. Mission planning, cargo loading, and airspace and range usage are areas where we are exploring operational energy efficiencies. We live in a constantly changing world and adapting to these changes through continuous process improvement is what current operations is all about. Through internal Air Force process assessments, we ensure that we stay on top of new ways to maximize our training and combat capability.

Our second focus area is fuel logistics and aircraft sustainment. This team expands operational energy concerns beyond aircraft operations and looks at the development of advanced alternative fuels, risks
to the aviation fuel supply chain, as well as how the integration of operational energy considerations can impact the lifecycle costs of aviation platforms. Fuel supply chain vulnerabilities and solutions, including distribution and storage, are areas of focus that this office brings to the Air Force Title 10 wargames and joint analyses.

Our third line of effort is Future Operations and making sure we invest in technologies that increase our combat capability while paying dividends in fuel efficiency. The most effective method for addressing operational energy in new programs is to get involved in the early stages of the requirements process. All new programs are required by statute to address operational energy through the development of an energy Key Performance Parameter (eKPP). Foundational to the eKPP is the Energy Supportability Analysis that examines the operational energy demands of the platform and the ability of the infrastructure to support the platform under the most demanding scenario. These two formal acquisition processes ensure operational energy is a consideration in Air Force future warfighting capabilities.

Outside of the three main focus areas, we also look at how we educate the force on operational energy efficiencies that can enable greater combat capability, more training, and lower sustainment costs across the lifecycle of aviation platforms. We have had great success in both educating Airmen about operational energy as well as learning operational energy best practices that they have already incorporated. For example, one such success involved pilot instructors at Altus Air Force Base, Oklahoma, changing their training airspace utilization processes and realizing more than $2 million in cost avoidance from Fiscal Year’s 2010-2015 despite a 23 percent increase in student production.

DoD P&E: How do you work with industry from a tech standpoint on future and legacy aircraft upgrades?

Mr. Guerrero: It is imperative that our office engage with industry to understand and advocate for emerging operational energy technologies for our new and legacy aircraft. We have several processes by which we can engage with small and large businesses to demonstrate these initiatives. One example is the Office of the Secretary of Defense for Operational Energy’s Operational Energy Capability Improvement Fund. Through this funding we are able to review initiatives and support promising operational energy technologies. The Air Force can then transition successful technologies into formal programs.

Furthermore, our own Air Force Research Laboratory (AFRL) is developing several programs that address operational energy efficiencies. One remarkable program is the Adaptive Engine Technology Program engine, which can achieve up to a 25 percent reduction in specific fuel consumption whilst realizing increases in thrust and range over current engine technology.

Lastly, AFRL continues to develop and test many science and technology initiatives that address improving the operational energy efficiency of our legacy fleet. One example is attaching small airfoils called “microvanes” to aircraft fuselages (e.g. C-130s, C-17s) to reduce drag. Installing these microvanes on C-130Js shows an approximate three percent improvement in fuel efficiency. The test results on C-17s are still being analyzed, and we would expect to see similar positive conclusions. With the number of flight hours these aircraft accrue annually, even a 1-2 percent improvement can mean millions of dollars in savings for the Air Force with relatively low installation costs resulting in a high return on investment.

DoD P&E: What are some future challenges for operational energy in the Air Force?

Mr. Guerrero: Our long-term goal is to achieve the capability of automating aircraft operational energy data collection. Though we can report the amount of fuel delivered to an aircraft at a given time, we have yet to fully automate data collection of the aircraft’s fuel usage during a sortie. Fully characterizing energy usage during a sortie, will give us insight into inefficient processes and provide us solutions to increase mission effectiveness. Right now, through analyzing the aggregate fuel delivered and flight time data we have from previous years, we know that we have achieved a 5.7 percent improvement in operational energy productivity (gallons/flight hour) since 2011. This is significant when you recall that the Air Force spent more than $5 billion for operational energy in FY16. However, Air Force wide systematic and automated operational energy data collection will provide us more fidelity on the effectiveness of the various sortie types, and will show us areas that can still improve. As the saying goes, “What gets measured, gets done!”

Through manual data collection efforts, for example, we determined that aircraft at one base were landing with significantly more fuel than the required reserves. Not only does this incur a cost to carry penalty (an increase in burn rate of approximately three percent of the excess fuel per hour), but creates second and third order effects when you consider wear and tear on aircraft landing gear, brakes, tires, etc. Now that we have discovered this area of improvement, leadership can take steps to examine their processes and increase operational energy efficiency, which will optimize fuel burn as well as reduce sustainment costs. Ultimately, our efforts in this area, and all of our focus areas, will increase readiness though better execution, reduce maintenance tasks, and increase mission ready assets for combat and training.

Working with the Air Force Civil Engineer Center and Vandenberg Air Force Base, California, the Defense Logistics Agency Energy, Fort Belvoir, Virginia, recently awarded a contract for a 28.2 megawatt on-site solar energy production facility that projects a significant cost savings of up to 35 percent of Vandenberg's current electricity load.

“We worked diligently with Vandenberg’s project team, along with the Air Force Civil Engineer Center, on completing this complex acquisition and we are excited to finally award the contract,” said Cynthia Ralph, DLA Energy Installation Energy contracting officer. “These efforts continue to expand our knowledge and the depth and breadth of our program.”

The solar energy production facility will be installed on 129 acres of Vandenberg’s land. This facility will re-purpose a former housing site located on abandoned land. In addition, the project will be micro-grid capable, allowing for energy security enhancements to the Air Force base in the future.

Once finished, the solar array will provide approximately 54,500 megawatt hours of renewable energy to the base annually. Instead of having to appropriate millions of dollars and resources to build the solar energy production facility, Vandenberg AFB will purchase the electricity generated from the facility under a 25-year renewable energy supply agreement.

“The chosen business model benefits the Air Force in its ability to enter a long-term contract with a third party thereby avoiding the need to maintain and invest into capital-intensive projects,” said Dick Fillman, AFCEC renewable project manager. “Combined with the energy and environmental benefits, this is a great project for the base and the Air Force.”

Once the facility is operational, it will reduce annual emissions of carbon dioxide by approximately 38,000 metric tons, the equivalent of removing 8,000 vehicles off the road. Construction on the solar energy production facility began in spring 2017 with completion slated for February 2018.

“The Air Force has made a big investment in the future of energy resilience by committing to this project,” Ralph said. “This results in a big win for the environment as well as for Vandenberg AFB who will be benefiting from a lower cost of energy. It has been a pleasure working with the Air Force’s team on this project and we look forward to our long-term partnership.”

As a Department of Defense combat support agency, DLA provides the Army, Navy, Air Force, Marine Corps, Coast Guard, other federal agencies, and partner nations with a variety of logistics, acquisition and technical services. The agency sources and provides nearly 100 percent of the consumable items America’s military forces need to operate, from food, fuel and energy, to uniforms, medical supplies, and construction equipment. For more than 70 years, DLA Energy has provided the DoD and other government agencies with comprehensive energy solutions in the most effective and efficient manner possible.
Brig. Gen. Gregory L. Masiello
Assistant Commander for Logistics & Industrial Operations
U.S. Naval Air Systems Command

NP&FP: Please speak to your role as Naval Air Systems Command (NAVAIR) Assistant Commander of Logistics and Industrial Operations (Air 6.0).

Brig. Gen. Masiello: As Air 6.0, I am responsible for providing acquisition and in-service support of all naval aviation programs. This includes the resources needed to develop, plan and integrate logistics support functions required to maintain the readiness and operational capability of weapon systems and subsystems.

Air 6.0, one of eight competencies (or communities of practice) within NAVAIR, is the resource financial manager for Aircraft Depot Maintenance and Aircraft Spares and Repair Parts Procurement accounts. Through our Air 6.0 resource managers and NAVAIR Corporate Operations and Total Force competency (Air 7.0) business and financial managers, we develop, coordinate and monitor budget development and budget execution of our enabler accounts such as Aircraft Spares and Repair Parts Procurement (APN-6), Aviation Technical Data and Engineering Services (1A3A), Air Systems Support (1A4N), Aviation Depot Maintenance (1A5A), Aviation Depot Operations Support (1A6A), Aviation Logistics (1A9A) and Equipment Maintenance (1C7C).
We work closely with Commander, Fleet Readiness Centers (COMFRC) to maintain, repair and overhaul Navy and Marine Corps aviation assets and support equipment.

In addition, I am one of five flag/general officers who lead the Naval Aviation Enterprise (NAE) Engineering, Maintenance and Supply Chain Management Team. This cross-functional team oversees and enables our aviation elements—the five functional disciplines that support the warfighter in the field. This includes engineering in support of in-service aircraft provided by NAVAir Research and Engineering (Air 4.0); organizational-, intermediate- and depot-level maintenance overseen by COMFRC and Commander, Naval Air Forces (CNAP); the 12 elements of product support/logistics as coordinated and provided by Air 6.0; as well as material and supply support at the DoD level by the Defense Logistics Agency (DLA) and at the department level by Navy Supply Systems Command, Weapons System Support (NAVSUP WSS). As a whole, the team provides all “elements” to support our Navy and Marine Corps aviation forces.

NP&FP: Describe the state of NAVAir logistics operations for the coming year(s).

Brig. Gen. Masiello: Decades of war and an increased demand for capabilities have presented readiness challenges for naval aviation. “Modernization and maintenance” is a singular term; we need both to address aviation readiness and our warfighting needs. Delays in modernizing select programs means flying and sustaining legacy aircraft well beyond their intended service life. Continuing resolutions and sequestration have created funding uncertainties and have impacted aircraft maintenance and repair schedules.

To improve aviation readiness, we are transforming processes and practices from reactive (applying solutions to problems as they arise) to predictive (anticipating and precluding risks) to proactive (taking preemptive actions enabled by our smart aircraft). Air 6.0’s strategic priorities include:

• Increase aircraft readiness through material/non-material solutions
• Improve affordability
• Increase speed to the fleet
• Enhance our workforce culture of performance

Our logistics and industrial enterprise initiatives support our approach. Comprised of multiple lines of effort (LOE), we are centered on a core competency of data analytics that change how we process information and inform decisions across the enterprise.

Air 6.0’s data analytic tools help decision makers see the health of naval aviation. We developed an aircraft management dashboard that provides a visual representation of real-time readiness statuses across the inventory, sorted by type/model/series (TMS), units and/or individual aircraft bureau numbers. We are enhancing this view to include total asset visibility (TAV)—real-time data on the movement of components and materials across our fleet. With TAV, we will also possess the ability to track artisans’ locations and levels of expertise.

Readiness playbooks for each TMS aircraft, developed by aircraft program offices, prioritize “at-the-ready” initiatives and strategies that will sustain readiness into the future. Two predictive readiness tools—a readiness forecast model (RFM) and a predictive analytics model (PAM)—move us into the predictive environment essential for programs managers to make data-informed decisions. RFM applies tactical information from our programs’ or fleet’s current plans, known constraints and funding levels to forecast expected readiness for the next 12 months. PAM enables strategic solutions and investment opportunities articulated in the program playbooks and prioritizes them according to their impact on readiness. PAM will show how investments could reduce readiness gaps over a 10-year-period and inform our budgeting process.

Sustaining engineering is an essential element of our predictive approach. Our aircraft and programs manage and mine large volumes of data. Condition-based maintenance (CBM), which has been used in naval aviation for years, is showing a return on investment on this front.

CBM plus (CBM+) gives engineers real-time data from sensors embedded in components that indicate failures much earlier than before. As a result, instead of removing an entire subsystem for repair at pre-determined intervals, engineers can identify subcomponents for replacement, saving time, maintenance hours and money. CBM+ practices occurring on the H-1 main gearbox (MGB) have reduced its high removal rate by identifying anomalies within subcomponents before they fail and enabled predictive maintenance actions. Since May 2016, this H-1 CBM+ diagnostic maintenance strategy has avoided more than $40 million in MGB repair costs, approximately 8,000 maintenance man-hours; and more than 20 precautionary landings. Engineers are also using data on our CH-53s and H-60s to update component service life limits and manage them based on actual use.

NP&FP: From a current challenges perspective, please speak to some key areas impacting support to the fleet and fleet readiness.

Brig. Gen. Masiello: A lack of harmony and alignment within our readiness enabler funding accounts continues to impede how naval aviation manages readiness. Dollars for program-related logistics, technical data, spares, air systems support, support equipment, safety
and others all drive how the flying hour program is executed. Our team developed a sustainment account harmonization tool to help programmers and NAE decision makers identify the necessary resources across enabler and readiness accounts and determine the impact of funding levels. Using tools such as these will help smooth our episodic budget process and help us make informed resourcing decisions.

NP&FP: How is Air 6.0 facilitating working efforts with other DoD agencies and mitigating associated challenges?

Brig. Gen. Masiello: Readiness is a team sport. Collaboration among all stakeholders and providers is essential. Air 6.0, DLA-Aviation, NAVSUP WSS and the Marine Corps Aviation Logistics Support Branch are writing joint standard work packages that define clear lines of responsibilities, specific actions and how to measure results.

To increase aircraft readiness and reduce aircraft downtime for supply, we have developed end-to-end supply chain metrics that focus on identifying opportunities to address systemic challenges. We have established teams, using existing and emerging data analytic tools, to improve flight line readiness. These cross-functional teams are creating a roadmap to address our system architecture, processes, funding requirements and concept of operations across naval aviation sustainment.

Because of growing technology use and the need to secure data, Air 6.0 is a member of the NAVAIR Cyber Incident Response Team. This team includes the Department of Homeland Security, Navy Safety Center, Naval Criminal Investigation Service, Defense Cyber Crime Center and Johns Hopkins University Applied Physics Laboratory. To support increased cyber awareness, we are training all Air 6.0 employees in this area.

NP&FP: From an industry partnering perspective, how is Air 6.0 working to broaden and strengthen capability implementation efforts?

Brig. Gen. Masiello: Industry continues to be integral in naval aviation's acquisition and sustainment. We have taken steps to improve our industrial support contracts, including initiating Fast Acquisition Solutions to Enable Readiness, a family of Navy-wide, multiple-award, indefinite quantity, indefinite delivery contracts to acquire industrial support. Air 6.0 has also established an Agile Industrial Support Initiative, an assisted acquisition service that will help program offices, product support managers and assistant program managers as they contract for industrial support, to include contractor logistic support, performance-based logistics and heavy depot maintenance.

Organic supportability of platforms requires technical data to support maintenance, repair and overhaul of fielded systems, with a concurrent need for engineering data to assist in long-term sustainment and modernization of weapons systems. Disputed data rights have, in some circumstances, impacted readiness and led to prolonged negotiations when the government asserted its rights years after fielding a platform. We are now addressing this requirement and expectation early in the acquisition phase as well as actively implementing strategies and approaches with industry partners on securing appropriate rights for tomorrow's weapon systems.

NP&FP: Any other goals Air 6.0 is addressing going forward in 2017?

Brig. Gen. Masiello: Air 6.0 is working closely with COMFRC and other partners to develop and modernize processes key to NAE Sustainment Vision 2020—an approach to transform naval aviation's current practices into a real-time, agile, cost-effective, proactive sustainment system. NAVAIR Commander Vice Adm. Paul Grosklags recently articulated his framework for Vision 2020 as four pillars:

- Supply
- Maintenance planning
- Manpower (including training)
- Facilities/infrastructure (including support equipment and test benches)

A partner in this initiative, Air 6.0 will use this architecture to leverage its current data collection, visualization and logistics execution tools and develop new solutions as needed with an eye to capitalize on the vast array of data available within the sustainment infrastructure. Long term, the goal is to employ a digital thread that connects widely disparate information from multiple sources, making that data available to decision makers at any level within the NAE.

Alignment of all readiness lines of effort is crucial to naval aviation's future. With this focus and framework, Air 6.0 and other stakeholders will enable sustained readiness and quicken the delivery of capability to the warfighter.

Aircraft Electrician Stephen A. Nugen replaces the overhead lighting panel in a former Marine UH-1N Huey Fleet Readiness Center East is converting to Air Force specifications. (U.S. Navy photo)
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