Navy Warfare Development Command's

NEXT

Spring 2013

Lessons Learned from Hurricane Sandy

INAUGURAL EDITION

PLUS:

CSG 360° War Game—Ready for the Fleet

CNO's Rapid Innovation Cell at Work

FLEX to Spearhead UxS Tests

Volume 1, Number 1

Message from the Commander

RADM Terry B. Kraft

Welcome to the first issue of *NEXT*—the innovation journal of Navy Warfare Development Command. I hope in this and future issues, you will find your creative and tactical senses stimulated! Here in Norfolk, we are lucky to be close to so many concept leaders while maintaining a close relationship with those across the waterfront. Through our interaction with the fleet, east and west, we have formed our lines of operation which help to drive our activities across the board. Deep analytical talent, operational focus, and a clear link to the warfighter are what make this command unique. It is our intention to drive innovation down to the deckplates while taking advantage of the incredible talents inherent in our Sailors. If I have not answered your question "what do they do at that command?", I hope the rest of this magazine will. I'm very proud of the 300+ professionals that produce tactical and strategic products every day while supporting fleet synthetic training around the world. Got an idea? Let us know by jumping on our portal at https://www.nwdc.navy.mil/.

NWDC—"Forward . . . For the Fleet."

MISSION

Navy Warfare Development Command (NWDC) links tomorrow's ideas to today's warfighter through the rapid generation and development of innovative solutions to operational challenges. Our unique synergies and capabilities help move the fleet forward through the 21st century.

VISION

Navy Warfare Development Command operates at the speed of the fleet to stay at the forefront of innovation, focused on non-material solutions for the near-term and the future.

Seamlessly combining our core competencies—concepts, experimentation, modeling and simulation, doctrine and lessons learned—NWDC generates cost-effective solutions that arm the warfighter with the tools needed to meet the global challenges of the maritime environment.

Our people, know-how, and technology work in unison to effectively move operational capability forward … for the fleet.

HISTORY

Naval Doctrine Command (NDC) was established in 1993 to provide the doctrinal foundation for naval forces to effectively contribute to joint and combined operations. NDC was disestablished and Navy Warfare Development Command was created as part of the Naval War College in 1998 at Newport, RI.

Navy Warfare Development Command was aligned under United States Fleet Forces Command (USFF) in 2002 in support of the Sea Trial process. As a result of BRAC Commission legislation, NWDC moved from Newport, RI to Naval Station Norfolk, VA, in June 2010 (the BRAC move was fully completed September 30, 2010).

Commander, Navy Warfare Development Command was designated in 2008 as the Navy's Executive Agent for Concept Generation and Concept Development.

Navy Warfare Development Command is located aboard Naval Station Norfolk, VA. The headquarters facility meets current Leadership in Energy and Environmental Design (LEED) Green Building Rating System standards. The three-story, 84,849 square-foot building includes office space for more than 300 subject matter experts, including foreign liaison officers.

NWDC headquarters is also the home of the Navy Center for Advanced Modeling and Simulation (NCAMS), a 10,000 square-foot, state-of-the-art modeling and simulation facility which supports the Navy Continuous Training Environment (NCTE), Experimentation, and Concept Generation and Concept Development.

Navy Warfare Development Command's
NEXT

On the Cover

NEW YORK, NY—*A MH-35E helicopter of Mine Countermeasures Squadron 14 (MH-14) brings sailors from USS San Antonio (LPD 17) and USS Wasp (LHD 1) to the Statue of Liberty for dewatering operations. The Wasp, San Antonio, and USS Carter Hall (LSD 50) were positioned in New York City harbor to provide relief support to areas affected by Hurricane Sandy. (U.S. Navy photo by Mass Communication Specialist 1st Class James Stenberg/Released)*

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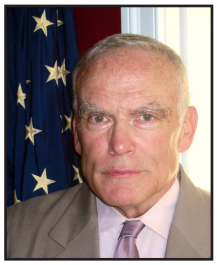
Navy Warfare Development Command is proud to present the Speaker Series spring schedule. NWDC's Speakers Series is designed to stimulate provocative discussion and action to drive a culture of innovation in the Navy.



Lt. Col. James Zumwalt, USMC (Ret.)
(Son of ADM Elmo "Bud" Zumwalt)
"Insight on My Father's Leadership"
March 14, 2013
1000–1100

ADM Thad Allen, USCG (Ret.)
Former Commandant of the Coast Guard
"Innovation in Homeland Defense"
April 16, 2013
1000–1100

Mr. George M. Marakas, PhD
Professor of Information Systems,
College of Business, Florida International University
"Everything That Can Be Digital, Will Be Digital"
May 16, 2013
1000–1100

Hampton Roads area personnel are welcome to attend all Speaker Series events at NWDC headquarters located at 1528 Piersey Street, Building O-27 on Naval Station Norfolk, VA. The presentations will also be available through Defense Connect Online. Registration, DCO, and other information can be found on NWDC's Web site at https://www.nwdc.navy.mil.

NAVY WARFARE DEVELOPMENT COMMAND

Navy Center for Innovation

daily blog watch - best of the blogs

A supplement to our daily round-up highlighting posts of interest

NWDC's Navy Center for Innovation publishes a daily roundup of blogs focused on Navy innovation. Here's a roundup of blogs of particular interest over the last several months. To subscribe to our daily blog feed, simply send an e-mail address to NWDC_NRFK_INNOVATIONS@navy.mil.

We also host the Navy Center for Innovation Weblog, and welcome guest submissions. To visit our Weblog, please go to https://www.nwdc.navy.mil/ncoi/blog/default.aspx.

January was a busy month for the **Center for International Maritime Security (CIMSEC)**, as over the course of the month they published their nine-part *Maritime Futures Project* "making predictions about the future challenges, opportunities, and technologies for maritime professionals . . ." http://cimsec.org/2013/01/

Small Wars Journal published a piece by Air Force Capt. Jeff Gilmore titled "*Where is Lt. Zuckerberg*" lamenting the failure of military Public Affairs to adjust to social media's rise http://smallwarsjournal.com/jrnl/art/where-is-lt-zuckerberg. The blog followed up with a post countering Capt. Gilmore's thoughts in a piece by Army CPT Crispin Burke titled "*Disruptive Thinking: The US Military Differs From Business*." http://smallwarsjournal.com/blog/disruptive-thinking-the-us-military-differs-from-business

Tim Kane's new book *Bleeding Talent: How the U.S. Military Mismanages Great Leaders and Why It's Time for a Revolution* received quite a bit of attention in the blogosphere. In one example, **Foreign Policy's National Security** blog posted a piece titled "*A Few Good Men and How the U.S. Military Lost Them*," detailing the stories of five veterans who left the service for reasons similar to those outlined in the book. http://www.foreignpolicy.com/articles/2013/01/10/a_few_good_men

The **Disruptive Thinkers** blog posted an interesting story, "*Forget Disruption: The Case for Iterative Innovation*," arguing that the constant search for a "disruptive innovation" can lead to the stagnation of small step, or iterative innovation. http://disruptivethinkers.org/forget-disruption-the-case-for-iterative-innovation/

Naval Diplomat posted a blog titled "*Mahan, Bean-Counting and Ideas*," playing off China's embrace of Mahanian theory to argue that in a world of quantification and "bean counters," ideas still matter. http://thediplomat.com/the-naval-diplomat/2013/01/14/mahan-bean-counting-and-ideas/

Naval Diplomat also published an interview with PACOM Commander, Admiral Samuel J. Locklear, where he spoke about "what the upgraded U.S. presence in the region will imply, including initiatives to neutralize the growing transnational challenges like violent extremism; the impact of the pivot on relations with Indonesia and Indochina; and, importantly, the likely reverberations for U.S.-China relations." http://thediplomat.com/2013/01/13/the-interview-admiral-samuel-j-locklear/

Naval Diplomat's Robert Farley traded posts with **Information Dissemination's** Bryan McGrath on the future of the U.S. SSBN fleet, starting with McGrath's "*Why I Advocate Scrapping SSBN's*." (http://www.informationdissemination.net/2013/01/why-i-advocate-scrapping-ssbns.html). That was followed by Farley's post on **Naval Diplomat's** site titled "*Don't Scrap America's Ballistic Missile Submarines*." http://thediplomat.com/flashpoints-blog/2013/01/23/dont-scrap-americas-ballistic-missile-submarines/ and ended with the two seeming to meet halfway in Farley's guest post at Information Dissemination, *"Keep Some Boomers."* (http://www.informationdissemination.net/2013/01/keep-some-boomers.html).

On the Defense News blog **Intercepts**, Hudson Institute Senior Fellow Christopher Ford's comments on the Chinese military's "parallel universe of competing facts and historical claims" are called evidence of a "monstrous disconnect between China and the rest of the planet." http://blogs.defensenews.com/intercepts/2013/01/chinas-military-living-in-parallel-universe-clark/

At the **U.S. Naval Institute** blog, a guest post by Robert Kozloski titled "*Of Options and Plans: A Flawed System*," argues that the way the military provides advice to civilian authority is fundamentally flawed, and goes on to identify some of the causes. http://blog.usni.org/2013/01/17/of-options-and-plans-a-flawed-system

The **Marine Corps Association** urged the service to promote from within when it comes to finding the next Mahan or Clausewitz in a post headlined "*Absolute Travesty!*" http://mcgazette.blogspot.com/2013/01/absolute-travesty.html

gCAPTAIN, a blog normally focused on the commercial shipping industry, hosted a post from LCDR W.T. Door headlined "*A Call For Courage, Leadership, and Action.*" http://gcaptain.com/call-courage-leadership-action/

The Atlantic blog's James Fallows comments on what seems different about the "Mediant" report on Chinese hacking activities, noting "at first impression this reads to me like something new, specifically in the degree of traceability to the Chinese military," in a post titled "*What Do We Make of the Chinese Hacking?*" http://www.theatlantic.com/international/archive/2013/02/what-do-we-make-of-the-chinese-hacking/273311/

SPAWAR's blog **Grassroots S&T** asks the seemingly nonsensical "*Does your computer chair have a seat belt?*" and proceeds to explain why, in context, it makes complete sense. https://blog.spawar.navy.mil/grassroots/2013/02/does-your-computer-chair-have-a-seat-belt.html

At **Information Dissemination**, writer Bryan McGrath says that while typical military drawdowns force the Marine Corps to fend off attacks debating the need for two separate infantry-based services, this time may be different in his post "*The Centrality of the Marine Corps in the Emerging Defense Posture.*" http://www.informationdissemination.net/2013/02/the-centrality-of-marine-corps-in.html

Naval Drones blog discusses "*Tactical Employment of Drone Mother Ships,"* concluding, "Expect to see new combinations of unmanned vehicle carriers expanded into other warfare areas, including antisurface, antisubmarine, and intelligence, surveillance, and reconnaissance." http://blog.navaldrones.com/2013/02/tactical-employment-of-drone-motherships.html

The **Center For a New American Security** highlights tough issues the U.S. faces in the escalating tensions between China and Japan in an article headlined, "*China-Japan Dispute Puts U.S. in Tricky Spot*." http://www.cnas.org/node/10023

Q&A

with RADM Terry B. Kraft, Commander, Navy Warfare Development Command

RADM Terry B. Kraft assumed command of Navy Warfare Development Command (NWDC) in October 2011.

***NEXT*:** You have been at NWDC for about 18 months now. What changes have you implemented during that time?

RADM Kraft: About a month or so ago, I was looking at the pocket calendar my aide prints for me each morning, and I realized that everything I had to do that day I would not have been doing 18 months prior. Each meeting or document review was on a new initiative or product that NWDC was working on. That was quite an eye-opener—but a good one.

***NEXT*:** Can you give us some specifics?

RADM Kraft: Sure. In fact, I can give you several, because each of our directorates has taken on new missions over the last year. For example, our Concepts and Innovation Branch is working on new programs to get innovative ideas from the fleet to senior leadership without getting caught up in middle management. We have proposed a new concept generation/concept development process that includes two key components enabling a CNO's Advisory Board (CAB) and the CNO's (Chief of Naval Operations) Rapid Innovation Cell (CRIC). The CAB is similar to the general board during the interwar years and is made up of senior military, civilian, and academics who bring strategic ideas directly to the CNO for rapid decisions. The CRIC is made up of some of our most innovative junior officer and enlisted personnel and looks at specific fleet warfighting needs and how commercial solutions could be brought to bear on these issues.

In Experimentation, we've assumed responsibility for all Fleet Experimentations (FLEXs), so that has enabled 12 more experimention events based on commander's FLEX guidance from U.S. Fleet Forces Command and U.S. Pacific Fleet.

Also, anyone who has logged onto the Navy Doctrine Library System since December has hopefully been pleasantly surprised by the complete overhaul we've done to the system—everything from CAC-enabled sign-in, to personalized bookshelves, to Google-like search abilities.

There are other new initiatives discussed in the articles of this issue of *NEXT*, and ones we'll talk about in future issues.

***NEXT*:** What are your main areas of focus?

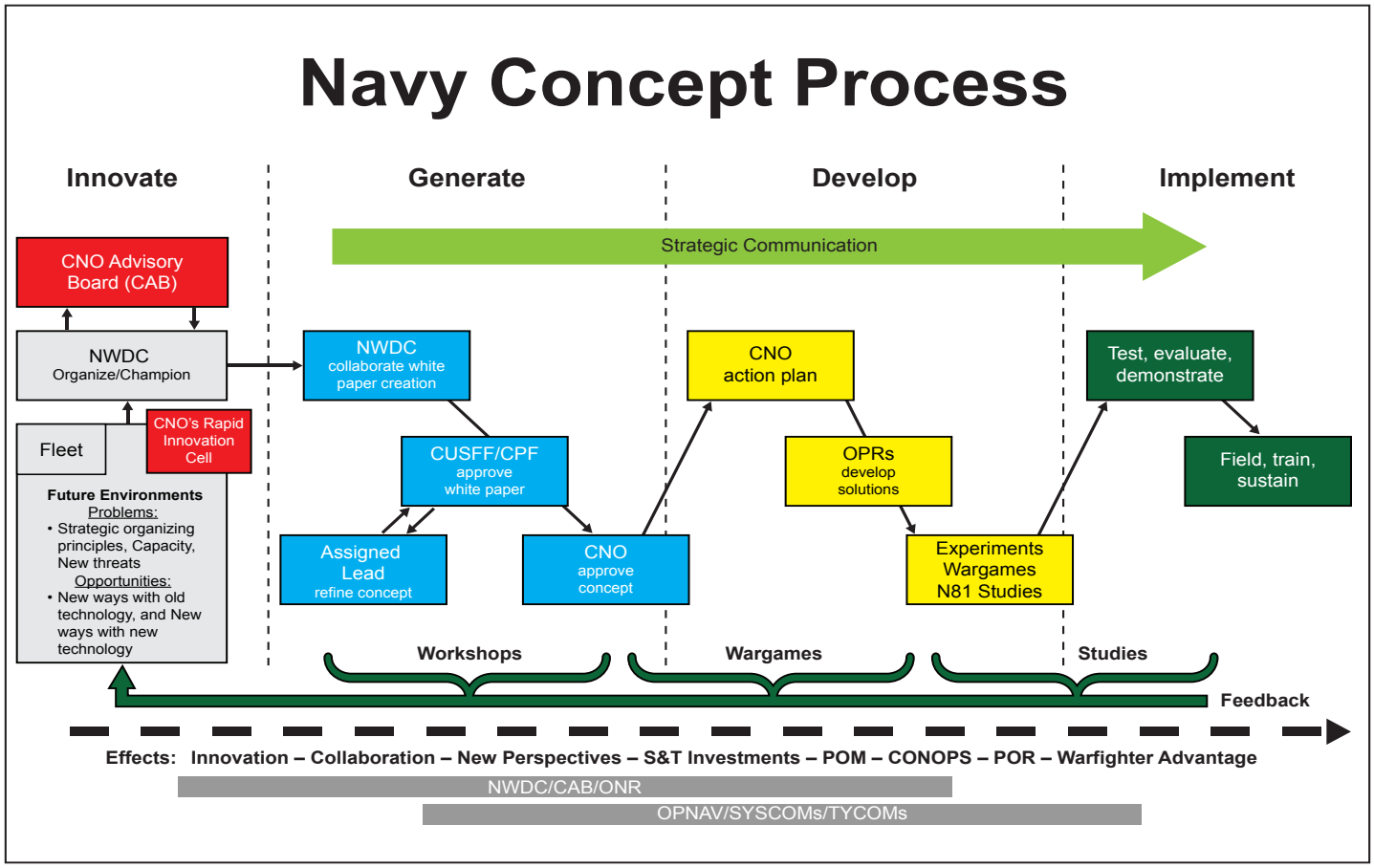
RADM Kraft: Our mission is to help move the fleet forward through the 21st century. To make sure we are working on relevant fleet needs, we established lines of operation (LOOs) based on input from the fleet and made sure everything we are working on fits into one of those LOOs. If it doesn't, we really question ourselves if it is something we should be spending resources on. We review these LOOs at the senior leadership level every 6 months and make adjustments as needed. (See page 15 for the current LOOs.)

***NEXT*:** You say your mission is to help the fleet, but how can the fleet help you with that mission?

RADM Kraft: It's a two-way process. The fleet is under tremendous stress with its current operation tempo (OPTEMPO). World events and the economic situation here at home are going to keep that pressure on for the foreseeable future. We analyze post-deployment briefs with the carrier strike groups, amphibious ready groups, and even independent deployers when they return home. We need those briefs to be as honest as possible—good and bad—because they are not just one-off briefing requirements. As the common denominator to each of these briefings, we conduct a meta-analysis and identify trends across the fleet that need to be addressed, and that qualitative and quantitative research provides leadership with independent, objective data to act upon. That product has been popular with leadership.

***NEXT*:** Where do you see NWDC going in the next 18 months?

RADM Kraft: We need to stay focused on our core missions over a period of time to make a substantive impact. The CNO has asked us to look forward about 3 years for our concepts generation and CONOPS development. Of course, we will continue to assess our lines of operation twice a year and will respond to emerging needs as required. One example could be information operations. In his "Imminent Domain" article in *Proceedings* last year, CNO challenged us to: 1) know the electromagnetic environment, 2) be agile, and 3) change our paradigm. Our Information Dominance directorate has a key role to play in that charge, and we're engaging the fleet to help them win future wars in cyberspace.



The CNO-approved Concept Generation/Concept Development Process

NWDC HQ—1528 Piersey Street, Naval Station Norfolk, VA

Learning Lessons from Hurricane Sandy

Navy Warfare Development Command discusses how the Navy supported civil authorities and how to do it even better next time

by NWDC Doctrine's CDR Howard Link, U.S. Navy; CDR Dylan Montes, U.S. Navy; and CDR Richard Schultz, U.S. Coast Guard LNO

(U.S. Navy photo)

As Hurricane Sandy barreled up the east coast of the United States in October 2012, Admiral William Gortney, Commander, United States Fleet Forces Command (USFF) ordered three ships underway to be pre-positioned in case they were needed in a humanitarian assistance/disaster relief (HA/DR) role following the storm. He also realized this was a unique opportunity to learn from an HA/DR operation on U.S. territory how to provide support to civil authorities.

As the Navy's lead for lessons learned, Navy Warfare Development Command (NWDC) quickly assembled three teams to conduct an active collection of data both afloat and ashore for this purpose. Active collections are the means by which NWDC reduces the burden on operational forces by capturing lessons learned. The warfighters can focus on their missions, and NWDC observers provide the service of collection, analysis, and feedback—critical steps in process improvement. The analysis of data obtained during an active collection provides insight to the warfighter on how best to optimize capabilities of the personnel and processes employed.

New York, NY—*CAPT Timothy Spratto, commander of Amphibious Squadron (PHIBRON) Six, visits the Office of Emergency Management in New York City to discuss the role of Navy ships positioned to assist with humanitarian operations. (U.S. Navy photo by Mass Communication Specialist 3rd Class Patrick Ratcliff/Released)*

The deployment of these active collection teams within hours of notification to three separate naval staffs supporting the Sandy HA/DR effort provided different perspectives on the operation. Each team independently pursued the goals of collecting data, identifying best practices and possible shortfalls, and ultimately delivering feedback to fleet operators.

The teams deployed to: U.S. Fleet Forces Command maritime operations center (MOC); Commander, Amphibious Squadron Six (CPR–6) leading the *Wasp* amphibious ready group (ARG); and with Navy Expeditionary Combat Command (NECC).

Lessons from the field . . .

United States Fleet Forces Command, Maritime Operations Center

The USFF MOC, based in Norfolk, VA, is an information nerve center, providing a framework of personnel and processes to allow the Navy commander to exercise command and control of assigned forces at an operational level. It serves as a focal point of information, analysis, and display to support the commander's decisionmaking during conflict. During times of peace and other normal

Breezy Point, NY—*Builder Constructionman Mohamed Farah and Builder Constructionman Michael Capcino, both assigned to Naval Mobile Construction Battalion (NMCB) Five, adjust pipes removing flood water from the basements of homes that were flooded during Hurricane Sandy. (U.S. Navy photo by Electronics Technician Seaman Sean Roozen/Released)*

New York, NY—*Seabees assigned to Naval Mobile Construction Battalion (NMCB) 11, from Gulfport, MS, load a skid steer with debris from a residential road during Hurricane Sandy relief efforts in Staten Island, NY, ahead of a forecasted storm. (U.S. Navy photo by Mass Communication Specialist 1st Class Martin Cuaron/Released)*

operations, the MOC maintains situational awareness over its area of operations and the status of naval forces operating in and around the maritime domain—ready to support the defense of American interests.

On October 24, 2012, the date then-Tropical Storm Sandy was designated as a Category 1 hurricane as it ravaged Jamaica, the MOC was in its third day of participating in the annual United States Naval Forces, Northern Command's (USNAVNORTH's) homeland defense exercise VIGILANT SHIELD. As part of its standard situational awareness duties, the meteorological cell of the MOC tracked the progress of Sandy, briefing its impact on real-world operations. The MOC watch standers, supporting round-the-clock operations, were flexing their highest level of readiness, engaged in the exercise scenarios of VIGILANT SHIELD.

In the days that followed, it became clear that Sandy would not remain at sea as previously modeled. Senior leadership at USFF shifted its attention from the exercise world to the developing real-world crisis, took precautions to protect Norfolk-based ships, and began planning to support a possible recovery effort.

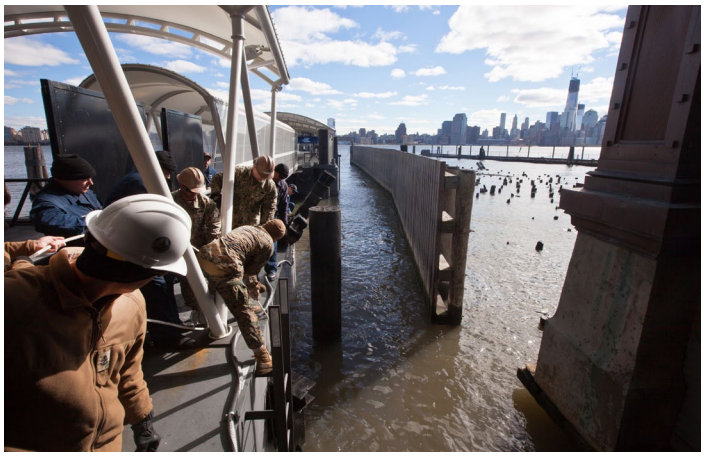
Defense support of civil authorities (DSCA) leverages military capabilities to support state and local emergencies in times of crisis. In the case of Hurricane Sandy, DSCA involved the movement of military forces and equipment to the New York/New Jersey (NY/NJ) area and the cooperation of military and civilian teams to ease the suffering of citizens and facilitate recovery from the natural disaster.

The command and control of the naval support to the DSCA mission was exercised by Commander, USFF in his role as Joint Force Maritime Component Commander-North (JFMCC–N). NWDC's analysts integrated with the MOC personnel, observing briefs, exchanges of information, and the command and control processes that allowed JFMCC–N to project the capabilities of the Navy/United States Marine Corps team in the DSCA effort.

New York, NY—*Sailors assigned to the amphibious assault ship USS Wasp (LHD 1) carry dewatering equipment to the Rockaway Water Pollution Control Plant to provide support to areas affected by Hurricane Sandy. (U.S. Navy photo by Mass Communication Specialist 3rd Class Patrick Ratcliff/Released)*

The NWDC team of CDR Howard Link, William Startin, and Floyd "Ken" Kennedy noted the daily battle rhythm included two daily briefings during which each of the commands involved provided the status of efforts and missions to Commander, United States Naval Forces, Northern Command and received the commander's intent for the following day.

During these briefings, the complexities of military interoperation with civilian agencies were exposed. The infrequent naval participation in DSCA operations revealed an unfamiliar command and control structure. Nearly every brief in the MOC hinted at instances of frustration as naval forces and capabilities arrived in the NY/NJ area but were not immediately ordered into action to support the rescue, relief, and recovery effort. High-level briefs often carried themes of "do good," "cut the red tape," or "apply capabilities," which added to the desire to order forces ashore to assist. United States Code subordinates Title 10 forces to the State National Guard-appointed dual-status commander, so named because he exercises command over both Title 10 and Title 32 (National Guard) forces. Therefore, restraint was required in order to comply with Federal policy, directive, and law.



HOBOKEN, NJ—*U.S. Navy Seabees repair pier facilities in Hoboken, NJ, following the destruction caused by Hurricane Sandy. (U.S. Marine Corps photo by Cpl. Bryan Nygaard/ Released)*

NEW YORK, NY—*Sailors assigned to the amphibious assault ship USS Wasp (LHD 1) prepare for dewatering operations of buildings on Rockaway Beach, NY. (U.S. Navy photo by Mass Communication Specialist 3rd Class Patrick Ratcliff/Released)*

The rules that dictate how, when, and to what degree military forces can assist Federal Emergency Management Agency (FEMA), state government agencies, and the National Guard, are necessarily complex. They serve to ensure that military forces do not exceed their U.S. Code Title 10 authorities, undermine the local economy, or otherwise discredit the armed forces. There are dozens of regulations, policies, and laws that describe how the military can and cannot be used to augment civilian assets.

The JFMCC–N staff at the MOC worked diligently to achieve the balance of bringing the enormous capability of the naval forces to bear, while cautiously observing the limitations of their mission assignments.

The complexity of the chain of command, the numerous military and National Guard forces on the ground, and rapidly evolving problems made getting mission assignment orders difficult. These mission assignments were necessary for the naval forces to be deployed ashore to assist the civilian efforts. Where clearly defined mission parameters and objectives could be determined, the DSCA chain of command provided missions to the naval forces, and forces both ashore and at sea were able to contribute successfully to the efforts in recovery from Hurricane Sandy.

Commander, Amphibious Squadron Six

As Sandy ravaged coastal and inland areas of New Jersey and New York, a two-person active collection team of CDR Richard Schultz and John Gough embarked USS *San Antonio* at Naval Station Norfolk as a massive load-out was taking place for the response of naval forces and capabilities for DSCA natural disaster relief efforts. The active collection team embedded with Commander, Amphibious Squadron Six (CPR–6) leading the *Wasp* ARG comprised of USS *Wasp*, USS *San Antonio*, and USS *Carter Hall*.

After steaming north to the New York City area and joining USS *Wasp*, already on station, CPR–6 and the embedded NWDC team transferred to USS *Wasp*. By the early morning of November 2, the entire ARG was anchored off New York City harbor poised to receive and act on relief effort mission assignments. Commodore Timothy Spratto, Commander, CPR–6, immediately embraced the active lessons learned collection process and gave an all-access

pass to the NWDC team. With the endorsement of the commodore, the team set about developing relationships with CPR–6, NECC, 26 Marine Expeditionary Unit (MEU), embarked helicopter squadrons, and other naval force responders.

The active collection used nonintrusive methods which included observing mission planning and operations, taking notes, collecting physical data (e.g., plans, presentations, guidance, metrics), and having short discussions with personnel throughout the day. Participation in these battle rhythm events enabled the team to understand the landscape, demand signals, decisionmaking, and challenges as the mission progressed.

The NWDC team on USS *Wasp* focused on collecting information related to command and control, inter-Service and interagency relationships, initiatives, innovations, and unique naval capabilities. Some of the critical battle rhythm events included the morning operations brief, commander's update brief, main planning group, crisis action team teleconference, and evening update briefs. Particularly challenging was being in the right place at the right time during the 15+ hour days to observe and note various issues unfolding and critical decisions being made by those in charge.

In addition to nonintrusive observations, the NWDC team distributed hard copies of NWDC-produced disaster relief doctrine, Navy Warfare Publication 3-29, Disaster Response Operations, and the Foreign Humanitarian Assistance/Disaster Relief Handbook, which proved helpful in providing initial guidance for the relief effort.

Once trusted relationships and firm battle rhythm were well established, key players were identified and scheduled for separate lessons learned interviews.

New York, NY—*The amphibious assault ship USS Wasp (LHD 1) positioned near New York and New Jersey to support disaster relief efforts. (U.S. Marine Corps photo by Cpl. Michael S. Lockett/Released)*

Staten Island, NY—*Col. Matthew St. Clair, 26th Marine Expeditionary Unit (MEU) commanding officer, speaks to a representative of the New York Police Department about Hurricane Sandy disaster relief efforts. (U.S. Marine Corps photo by Cpl. Christopher Stone/Released)*

Interview questions were developed, tailored to each individual's position and responsibilities, and based on the aforementioned focus areas. Over a 2 1/2-day period, the team interviewed 13 personnel from the U.S. Navy, U.S. Marine Corps, and U.S. Coast Guard. Interviews included personal experiences, best practices, lessons learned, and recommendations for future natural disaster response operations. Once all interviews were completed and after 10 days with the ARG, the team was able to disembark USS *Wasp* aboard a 26 MEU helicopter bound for Fort Dix, NJ.

Briefing notes and recorded interviews again revealed the complex challenges naval forces face when operating in a DSCA environment. One of the early lessons learned from the ARG was the need for a better understanding of the role of the dual status commander and the FEMA mission assignment process for employment of Title 10 forces. During a domestic natural disaster crisis, there is an immediate need to develop relationships with the dual status commander(s) of each state in the disaster zone and FEMA authorities. Instrumental to successful mutual understanding among military services and government agencies is the early assignment of capable and knowledgeable Navy/Marine Corps liaison officers at critical locations such as with the dual status commander and FEMA.

Other observations indicated the importance of commander's initiative, collaboration, and action on scene during the first 72 hours of post-storm disaster response while command and control is being developed. Finally, a common public affairs posture for all Title 10 forces must be established by higher headquarters and articulated to commanders early on to avoid the perception of competing interests.

Navy Expeditionary Combat Command

The third team of CDR Dylan Montes, LT Jennifer Elliott, Floyd Armstrong, and Steve Poniatowski rendezvoused and embedded with the Navy Expeditionary Combat Command advance liaison team and adaptive force package (AFP). The AFP's mission in HA/DR scenarios is to bring NECC headquarters units together as a command and control element for NECC forces to perform mission planning and execution and otherwise lead and employ the AFP forces as efficiently and effectively as possible. NECC forces can be formed into an adaptive force package to provide a deployed commander with either a single specific expeditionary skill set or an integrated unit with multiple skills such as riverine, explosive ordnance disposal team, and expeditionary logistics.

Hurricane Sandy's NECC AFP consisted of personnel and units from naval mobile construction battalions, maritime civil affairs and security training teams, mobile diving and salvage units, Navy Expeditionary Logistics Support Group, Coastal Riverine Group, and medical assistance teams.

On October 31, the NWDC ashore team successfully rendezvoused with the NECC advance liaison team at Joint Base McGuire-Dix-Lakehurst (MDL) in New Jersey. The AFP stood up its tactical operations center and command headquarters on board the Seabee compound on the Lakehurst portion of Joint Base MDL. Between October 31 and the conclusion of operations, more than 350 personnel from units across the country converged onto this small compound in support of recovery operations. The missions assigned to NECC included the Hoboken Ferry Terminal dewatering and lighting restoration in Hoboken, NJ; Barrier Island road clearing, pier assessment, and debris clearing in Sandy Hook, NJ; field clearing and earth moving in Staten Island and Long Island, NY; and pumping operations throughout New York City and other locations.

Over the next 10 days, the NWDC ashore team remained embedded within NECC and conducted nonintrusive observations and 19 interviews of personnel ranging in ranks from petty officers to flag officers. The ashore team also traveled to the Federal Emergency Management Agency Region II headquarters at Naval Weapons Station Earle, NJ, and conducted interviews with two Navy emergency preparedness liaison officers and observed the FEMA operations node.

At the request of RADM Michael Tillotson, Commander, NECC, two members of the team—CDR Montes and LT Elliott—traveled to the Hoboken Ferry Terminal in order to observe recovery efforts being conducted by key members of the NECC AFP. They also traveled with RADM Tillotson to Fort Hamilton in Brooklyn, NY, and attended a coordination meeting with United States Army Corps of Engineers command and control staff. In addition, the entire team traveled to the hard hit areas of Seaside Heights, NJ, to observe NECC units conducting road-clearing operations and witness firsthand the extent of Hurricane Sandy's incredible damage to this small community.

Upon return to NWDC, interview recordings and briefing notes from the three teams were transcribed, summarized, and are being analyzed by NWDC lessons learned specialists and analysts. As the data continues to be analyzed, interviews held, and conclusions drawn, there is no doubt that more lessons will be learned and best practices captured to improve and streamline the Navy's support of the DSCA mission. Exercises in command and control under the DSCA organization, the development of contingency/planning orders, and review of the lessons learned from previous DSCA efforts, such as Hurricanes Katrina and Sandy, will provide future commanders better insight into how to optimize the personnel and resources allotted to a DSCA mission and how to more efficiently operate within the DSCA command structure.

New York, NY—*Sailors load a bulldozer onto an amphibious landing craft. The U.S. Navy positioned forces in the area to assist U.S. Northern Command (NORTHCOM) in support of FEMA and local civil authorities following the destruction caused by Hurricane Sandy. (U.S. Navy photo by Mass Communication Specialist 3rd Class Patrick Ratcliff/Released)*

Producing Results from Lessons Learned—
The Defense Support of Civil Authorities Quick Reference Guide

A major observation from Navy Warfare Development Command's (NWDC's) active collection of lessons learned during the naval response to Hurricane Sandy was the limited understanding of Department of Defense (DOD) authorities and roles when providing domestic humanitarian assistance and disaster relief.

The laws on interactions between military and Federal, State, and local government agencies are very complex. How DOD operates domestically in a defense support of civil authorities (DSCA) environment is very different from a foreign humanitarian assistance environment. During DSCA, civil authorities are in charge, and military forces support them. This relationship, the ensuing command and control structure, and applicable regulations can be confusing, especially during the chaotic hours of initial response to a major natural disaster.

To address these complex challenges naval forces face, NWDC has developed a quick reference guide to assist tactical-level naval commanders executing DSCA. The guide incorporates lessons learned and best practices from military responses to domestic disasters and provides important factors to help naval forces quickly understand their roles and responsibilities in domestic disaster response and the key actions required during DSCA operations.

The DSCA Quick Reference Guide is in the review process, and NWDC is seeking feedback from across the fleet to validate its utility. The guide can be accessed on the Navy Doctrine Library System at https://ndls.nwdc.navy.mil/BookViewer.aspx?docinstid=11613. Use the blank comment matrix to provide feedback to CDR Richard Schultz, at richard.j.schultz@navy.mil, or CDR Dylan Montes, at dylan.montes@navy.mil.

Navy Warfare Development Command

Lines of Operation:

CATI

Carrier Strike Group
Advanced Tactics Initiative

Navy Warfare Development Command operationally focuses its resources on eight distinct lines of operation (LOOs) developed in collaboration with the fleet. This approach enables integrated and synchronized programs across directorates fully aligned with leadership priorities and the Navy's most pressing needs.

These LOOs are:

- Carrier Strike Group (CSG) Advanced Tactics Initiative (CATI)
- Design for Undersea Warfare
- Information Dominance
- Rapid Integration of Information Operations Warfare Commander Construct at CSG
- Integrated Air and Missile Defense/Ballistic Missile Defense
- Navy/Marine Corps Expeditionary Warfare
- Concept Generation Concept Development/Innovation
- Command and Control of Maritime Forces

Each issue of *NEXT* will feature one of these LOOs. This edition looks at CATI.

Carrier Strike Group Advanced Tactics Initiative integrates the rapid development of CSG tactics and training while addressing fleet-identified capability gaps at the tactical level. CATI formalizes a collection process to capture, document, and pass on CSG lessons, tactics, and best practices. Aligned with the strike force training and the tactical training group communities, CATI provides a means to socialize existing and emerging CSG employment gaps with key stakeholders. These gaps are then prioritized and resourced through the United States Fleet Forces Command, Commander, United States Pacific Fleet Fleet Training Integration Panel, and Fleet Commanders' Readiness Council.

CATI energizes engagement opportunities with all prospective CSG commanders and many of the fleet warfighting staffs. These engagements provide NWDC with an informed perspective on current threats and an opportunity to address key doctrinal and training tactical gaps with strong partnerships.

What if . . .?

The NWDC "Free Radicals" of the CNO's Rapid Innovation Cell Are Asking Questions

by CAPT Richard Hencke, U.S. Navy, Director of Innovation, NWDC

What if you formed a team of bright junior naval officers and enlisted personnel and charged them with exploring radical new solutions to challenging naval problems? What if you provided them with the opportunity to meet with top researchers so they could learn about the latest technology and with the most innovative industry leaders and academicians so they could better understand how successful change happens? What if you then gave them the resources to rapidly turn their proposals into real solutions that could be handed directly to the warfighter? What if . . . ?

This is the thinking behind the CNO's Rapid Innovation Cell (CRIC), Navy Warfare Development Command's (NWDC's) response to the request to form a group of "free radicals" charged with identifying and developing potentially disruptive solutions to many of the Navy's most pressing challenges.

NWDC worked with commands across the Navy to find junior personnel known for their creativity and energy. These command's willingness to share their most creative and innovative junior members with the CRIC has been a key factor to the CRIC's success.

Since the group formed in October 2012, the CRIC has met with researchers at the Navy Research Lab, Johns Hopkins University, and SSC Pacific, discussed innovation with leading thinkers at Google and Qualcomm, collected lessons on managing change from innovators at the Pentagon, and gained valuable insights from top Navy brass, who made room in their calendars to guide the CRIC's development.

But the CRIC's real work occurs when members gather online in their virtual workspace and at in-person ideation sessions, which are typically held at NWDC. In these sessions, CRIC members apply what they have learned toward finding useful solutions to known fleet problems. Solutions proposed by the CRIC that require funding are assessed for technical feasibility, if applicable, and military utility. Once selected, a CRIC project can receive funding to build a working prototype or to develop a new way of operating. CRIC projects are managed at NWDC and greatly benefit from their access to NWDC's in-house analysis shop, fleet experimentation experience, and world-class modeling and simulation facility. These capabilities are used to refine and demonstrate the military utility of CRIC projects.

Since the CRIC is a rapid-development initiative, CRIC projects rely on mature solutions that may need only minor modifications or repurposing. Some solutions currently under consideration are commercial solutions never before considered for military use. Others are thoroughly tested military solutions that were not successful at their original application but have potential to be quite effective in another.

Why does the Navy need the CRIC to find these disruptive solutions? Are the conventional solution providers no longer providing effective means and ways to wage war? Quite the contrary. The U.S. Navy is unquestionably the world's finest. The CRIC is needed not because current solutions are failing; it is needed because they have been so successful. Success encourages an organization to continue to do those things that have historically made it successful. It also discourages potentially beneficial solutions that do not fit the current model of success.

Clayton Christensen made this point in his seminal book, *The Innovator's Dilemma*. He showed that successful organizations failed to become early adopters of disruptive technologies—solutions that their customer base would

Above: *The CRIC and SPAWAR Pacific's (SSC PAC) young scientists, "Grass Roots Innovation Group," discuss ways to improve collaboration between warfighters and technologists. (U.S. Navy photo)*
Previous Page: *Members of the CNO's Rapid Innovation Cell (CRIC) discuss their way forward with RADM Terry B. Kraft, commander, NWDC, at their initial meeting. (U.S. Navy photo)*

eventually demand—because they compared unfavorably to solutions that more closely align with the organization's current way of doing business. One CRIC project under consideration, 3D printing machines, exemplifies the dilemma. Those supporting the currently successful model rightfully ask, "Why install 3D printers on ships to make parts when we have a world-class logistics system able to rapidly deliver a part anywhere in the world?" The current metrics for success do not justify investing in this potentially disruptive technology. 3D printers may not be economically justifiable today, but their future holds such promise for increased operational effectiveness that it deserves an advocate. The CRIC is positioned for such a role.

The CRIC's use of junior leaders helps us escape the innovator's dilemma. They are not yet fully ingrained in the current Navy success model, leaving open a generational window of opportunity we can use to explore different models for success. Models other than the current one can be disruptive. The CRIC can become a disruptive idea safe haven where nontraditional solutions are matured to a point where they can effectively demonstrate their value to the Navy.

Some CRIC ideas currently being considered for development answer those "what if" questions: What if we put 3D printers on ships? What if we had something like LinkedIn or Monster.com that better matches personal ability to job requirements? What if we had something like Kickstarter.com, where Sailors could propose new tools or solutions to help perform their job and other Sailors can vote on those ideas that apply to them, giving the chain of command insight into issues affecting a wide range of Sailors? Many of the CRIC members' ideas likely come from their personal lives, where their relationship with technology is far different from that of the generation before them. They use social media not just to keep in touch with friends, but as a powerful collaborative tool to get information, understand the world, and get work done.

Many junior leaders want to make a difference beyond their assigned duties. But they often do not know how to get their ideas heard, and the pressing needs of day-to-day operations leave little time for them to explore the one question that can change the Navy: "What if . . . ?"

The Innovation Department at NWDC is working hard to develop mechanisms to solve the former. Commands across the Navy can help with the latter by encouraging their junior people to devote time to improving how we do business. Hold wardroom discussions on platform tactics. Challenge your junior leaders to propose better ways for doing the things we have done a certain way for so long that we no longer consider changing them.

NWDC searched across the Navy to find CRIC members with a disruptive and questioning nature, but they are less of a statistical outlier than you might think. There are plenty of smart and energetic junior leaders inside the Navy. Gather them in a room, add some pizza, and stand back and prepare to be amazed at the results.

The CRIC is always looking for more disruptive thinkers. Qualities demonstrated in successful CRIC members are not rare—you are likely to possess them—have an opinion you are willing to share, have an open mind to receive the opinions of others, have a sincere desire to improve the Navy, and have the imagination to pose the question: "What if . . . ?"

NWDC's CSG 360° War Game
Ready for the Fleet

by Dr. David K. Brown, NWDC Naval Warfare Analyst; and CAPT Jim Bock, NWDC Director of Intelligence

(U.S. Navy photo)

With limited resources and lengthening deployments, how can we practice for war at sea in the 21st century? Clausewitz noted that great commanders gained a coup d'oeil—the ability "to see things simply" and discern at a glance the advantages and disadvantages of a tactical situation—by fighting many battles and learning from studying their experiences and after-action reviews.

However, our recent combat experiences have been very much limited in nature. Our decades-long focus on Iraq and Afghanistan may have dulled our ability to conduct maritime theater operations against a technologically equivalent opponent. In fact, we have been fighting opponents over the past two decades who have not really threatened our sea and air control; we've simply accepted control and freedom of maneuver/action forward in-theater as a given. That is changing, both rapidly and radically. We are now facing significant challenges to our operations forward at least as severe as those that we faced during the Cold War. The critical skills we require to gain and hold sea and air control against a competent foe need to be developed, practiced, and honed for a very robust, high-technology threat. This is a true "sea change" over the way we have been doing business for the past generation.

What then can we do to prepare our naval commanders to think as warriors and focus on victory in a fight in a maritime theater over the next years? The "minds" of our current tactical warfighting construct—the composite warfare commander, the staff, and the subordinate warfare commanders and coordinators, must be challenged to think and consider "what could happen and what will you do if . . .?"

The Naval War College (NWC) began wargaming in 1887 as one means of preparing current and future commanders for thinking about and executing war at sea. More recently, NWC's Center for Naval Warfare Studies Advanced Research Program developed credible scenarios focused on potential flashpoints that pit potential real-world adversaries against each other in the maritime domain. Today NWDC has teamed with the Advanced Research Program's Halsey Group to leverage its expertise to create a tactical-level war game meant to address and explore the challenges of the high-end warfight after two decades of fighting at the mid-level. We call it "CSG 360°."

CSG 360° is a classic two-sided, open-ended, free-play, tabletop game with thinking friendly and opposition forces employing all the platforms, weapons, and sensors, from the basic to the most advanced, currently available to them. With a scenario that begins with the determination that "deterrence has failed," one force is ordered to seize the initiative and take the fight to the other in order to accomplish certain missions and achieve an assigned objective. Players construct and execute two independent courses of action to test imagination, planning, guidance,

and articulation of commander's intent in order to prepare minds for sustained fleet combat operations.

Three cells participate in each game: the opposing force—RED (played by NWDC's Red Cell); the control group who adjudicates interactions—WHITE (composed of a core team drawn from across NWDC and in coordination with/trained by NWC's Halsey Group); and the friendly force—BLUE.

With this makeup, CSG 360° is a true free-play war game like those employed so usefully at the Naval War College in the interwar period. Move adjudication by WHITE is by employing literal dice rolls, with outcomes determined by specific probabilities of detection and strike. The derived probabilities are based upon a combination of the best real-world experience and the best modeling available. Game outcomes are not predetermined. RED can, and often does, win. BLUE can, and often does, suffer heavy losses. The objectives of the game are both educational and research. Through the games, we seek to gain a better understanding of the requirements for success in a modern conflict at the high end of the spectrum and to identify key areas where the United States might gain significant operational advantage.

The intent is for BLUE to be played by any strike commander and staff or groups from fleet training commands from either coast, afloat or ashore, in a distributed environment. Imagine playing chess by mail but where both white and black move at the same time not necessarily knowing where the other's pieces are. The CSG 360° war game incorporates Clausewitz's passion, reason, and chance and prominently includes the fog of war; each side only knows what the WHITE cell determines it would be able to know based on how it has employed platforms and sensors and considering the delay associated with moving that information across platforms and between chains-of-command. During the game, in addition to the tactics of fighting their units, commanders face decisions on how to explore exploitation phases after successful attacks in one aspect of warfare or consider how to recover and reset following a series of exchanges where they came off the worse in another aspect of warfare—and probably both at the same time. In a recent war game, the BLUE force commander had to consider how to press on with the mission in spite of losing aircraft and ships in the first days of combat—issues we often have to pass through during normal fleet training events due to schedule limitations. Overall success of the mission had not been assured, and the opportunity for launching more strikes would not occur for several hours. As this was the end of a move, the BLUE commander had the chance within the game that he would not have in actual combat: time. He took the opportunity to contemplate "what could BLUE do differently to achieve a more favorable outcome?" Given the difference between "game time" and "real time," BLUE was able to make considered adjustments to its course of action thought out over days that it otherwise would have had to make on the fly in hours or minutes in real life.

CSG 360° war game is ready for the fleet. NWDC's team is available to challenge carrier strike group (CSG) commanders and their staffs in a tabletop war game that can be played from anywhere. We will begin the process of inviting CSG staffs and fleet training commands to take advantage of this game contingent on their position in the fleet readiness training plan, availability of strike group leaders, and other scheduled commitments.

The desired outcomes include:

1. Strike group commanders, their staffs, and the warfare commanders and coordinators' commanders (and their replacements) have an educational opportunity to fight a high-end, real-world threat against a thinking opponent, in the process gaining a better understanding of their own and adversary capabilities and limitations, and potential tactics, techniques, and procedures.

2. Over multiple games NWDC has rich material to analyze that will inform current and future experimentation, doctrine, and concept development.

Game insights and lessons learned will be shared across the fleet in briefings, newsletters, discussions, and after-action reviews. Commands interested in learning more and participating may contact the game directors, Dr. David K. Brown and CAPT Jim Bock, at NWDC.

FLEX to Spearhead UxS Tests

Unmanned Systems Experimentation Campaign to Study Mine Warfare and Force Protection

by LCDR Jeremy Tyler, Royal Navy
NWDC Experimentation

The Fleet Experimentation (FLEX) program, led by Navy Warfare Development Command's (NWDC's) Experimentation Directorate, will execute more than 12 complex experiments and 8 tactical development and evaluation (TAC D&E) projects in fiscal year 2013. Collectively, these efforts span the entire spectrum of warfighter priorities.

The U.S. Navy is experimenting with unmanned systems at a rapid pace with the expectation that these diverse capabilities will offer the fleet flexibility for a wide range of operations in the near future. The increasing capabilities provided by unmanned sensors means they must operate seamlessly, especially when employed with manned systems. One campaign we are conducting specifically looks at the integration of both manned and unmanned systems in mine warfare (MIW) and the force protection (FP) of these unmanned systems (UxS).

A QUICK LOOK AT THE CAMPAIGN:

LOE 1	LOE 2	LOE 3
Tabletop	*Live Event*	*Live Event*
Dec 2012	Summer 2013	Summer 2013

TACMEMO Development—Delivery in November 2013

Objective: Develop fleet tactics for integrated air, surface, and undersea unmanned systems operating in support of minehunting, sweeping and neutralization, and the protection of those systems.

Dubbed MIW/FP, UxS will chart paths and identify emergent technologies that will allow unmanned systems to fill an expanding role in mine warfare while also addressing a protection plan for these assets.

The campaign will ultimately produce a tactical memorandum (TACMEMO) to codify and integrate air, surface, and undersea unmanned systems performing minehunting, sweeping, and neutralization operations.

The experiments examine the possible need for the maritime forces to operate in mined waterways with specific geographic limitations; a scenario with significant stakeholder buy-in. In order to accelerate the timeline, the MIW/FP UxS campaign includes considerable work already conducted within the Navy at various levels while also incorporating findings from previous United States Fleet Forces Command MIW experimentation efforts.

The current campaign plan includes three limited objective experiments (LOEs); one tabletop and two employing live forces and assets.

Limited Objective Experiment 1

LOE 1 addressed manned force protection supporting unmanned systems conducting mine clearance operations. The 2-day tabletop event held at NWDC acted as a precursor to the live experimentation planned for the summer of 2013. Representatives from key stakeholder commands included Naval Mine and Anti-Submarine Warfare Command; Navy Expeditionary Combat Command; Commander, Destroyer Squadron 26; Mine Countermeasures (MCM) Division 31; and Coastal Riverine Group 2.

Limited Objective Experiments 2 and 3: Force Protection and USV/Unmanned Underwater Vehicle Integration

LOEs 2 and 3 are live-force experiments scheduled to take place off the west coast during the summer of 2013. These events will incorporate all of the key elements of unmanned systems conducting MIW and FP in support of current and future operations. Unmanned systems will conduct MCM operations, supported by manned and unmanned systems providing force protection. The experiments will also include intelligence, surveillance, and reconnaissance from unmanned aerial vehicles (UAVs). The complex command and control (C2) architecture for the experiment must demonstrate a robust capability to deliver high data rates, including full-motion video to afloat and ashore commands.

LOE 2 will also include manned units for opposition and Blue forces, providing manned FP in the vicinity of the MCM operations. The Blue forces will be used as the control for the unmanned experimentation and, therefore, provide crucial data to analyze the utility and validity of unmanned force protection.

Three industry organizations will also participate in LOE 2, demonstrating their technologies as part of the experiment.

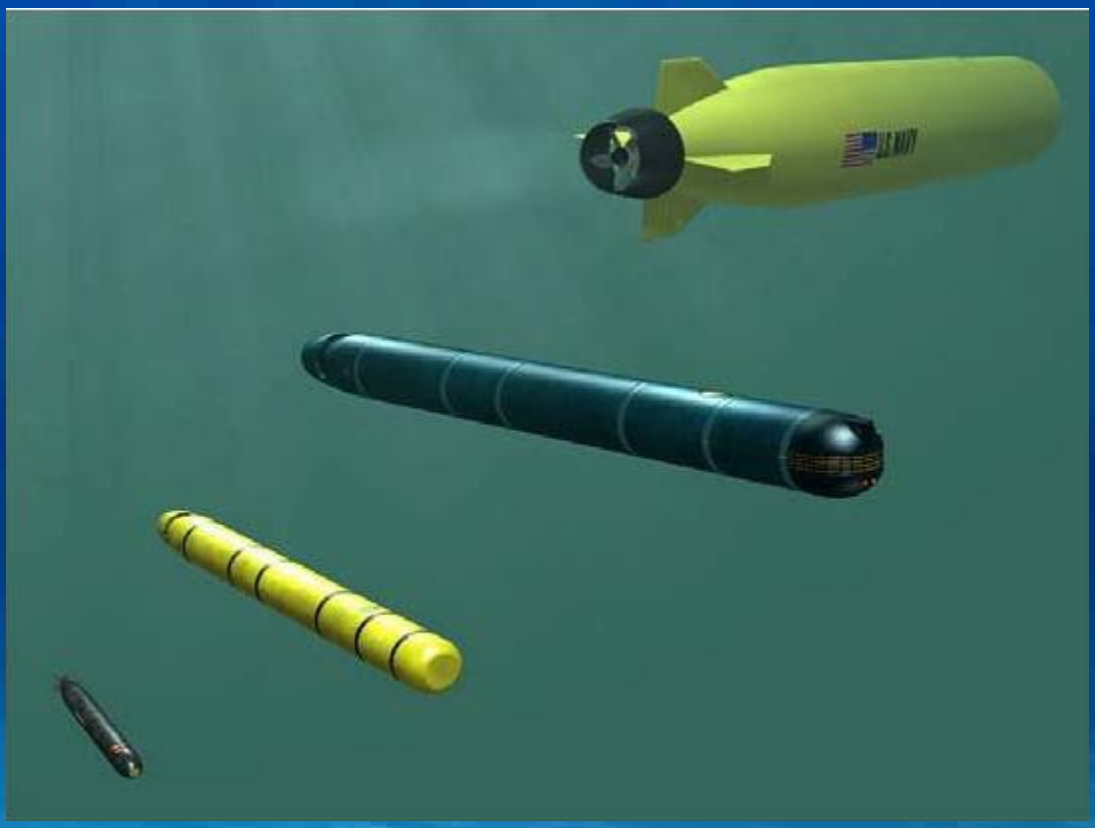
MIW/FP UxS Campaign Plan Product

The developing TACMEMO focuses on unmanned technology that will be deployed into theater, supporting the current efforts of the Unmanned Maritime Systems Program Office. The TACMEMO annexes will also cover additional technologies included for experimentation during LOE 2.

Operating MIW and FP unmanned systems in a potentially hostile high-threat environment requires specific aspects of command and control. During the experiment, subject matter experts will incorporate options for range extension such as an aerostat or UAV; numerous technologies are being considered to extend the C2 range, and a decision should be forthcoming as to what technologies will be incorporated.

This dynamic campaign plan is focused on answering the needs of the warfighter in the very near term, while also experimenting with future technology to further enhance the fleet's warfighting capability. The goal to address issues in both timeframes requires a delicate balance to deliver maximum support and capability to the front line.

For more information about upcoming MIW/FP LOE events, visit the Fleet Experimentation Information Management System on the classified network at http://fims.nwdc.navy.smil.mil, events #30729 (LOE 2) and #30747 (LOE 3).



Top: ***Double Eagle Mk III unmanned underwater vehicle (UUV).***

Bottom: ***Multi-mission reconfigurable UUVs.***

At the Crossroads of Information and Integration:

. . . . . CRUSER . . . . . .

The Consortium for Robotics and Unmanned Systems Education and Research: Cross-organizational Integration in Practice

Chartered by the Secretary of the Navy, the Consortium for Robotics and Unmanned Systems Education and Research (CRUSER) provides a collaborative environment and community of interest for the advancement of unmanned systems education and research endeavors across the Department of Defense (DOD), academia, and industry. Benefiting from and leveraging ongoing efforts by the Navy Warfare Development Command (NWDC), CRUSER aligns unmanned systems research and experimentation at the Naval Postgraduate School (NPS) and provides a foundation for information exchange across the community.

CRUSER is a facilitator for the Navy's common research interests in future unmanned systems and robotics. The consortium works to support and incorporate robotics and unmanned systems into existing field experiments, exercises, and war games which are both experimental and educational. Specifically, CRUSER:

- Provides a source for unmanned systems employment concepts for operations and technical research
- Provides an experimentation program to evaluate unmanned system employment concepts
- Provides a venue for Navy-wide education in unmanned systems
- Provides a DOD-wide forum for collaborative education, research, and experimentation in unmanned systems

CRUSER takes a broad systems and holistic approach to address issues related to naval unmanned systems research and employment, from technical to ethical, and concept generation to experimentation. Manning requirements, human systems integration, information processing, information display, training, logistics, acquisition, development, command and control architectures, legal constraints, and levels of autonomy versus mission risk are samples of topics for investigation. These research areas inform and augment traditional technical research in unmanned systems and aid in their integration into fleet operations.

CRUSER highlights the successful research, education, and experimentation efforts in unmanned systems currently ongoing at NPS and across the DOD, industry, and other academia.

Major aligned events starting in fiscal year (FY)11 through FY14 are plotted along program innovation threads starting with concept generation workshops and follow technical symposia, with field experimentation to test selected technologies. These activities each have separate reports, which are available upon request.

From Concepts Through Modeling/Sims and Analysis of Lessons Learned

The CRUSER program framework involves concurrent innovation threads as illustrated below.

Concepts generated during the September 2011 Warfare Innovation Workshop (WIW) were organized into five focus areas. These focus areas provided the basis for presentations that refined those concepts at the CRUSER Technical Continuum in May 2012. Two of the presented concepts are now continuing on to field experimentation in FY13, and the results will be presented to the Office of Naval Research (ONR) in Washington, DC, in June 2013, completing the first innovation thread, "UxS Employment in Naval Operations." The second innovation thread, "Advancing the Design of Undersea Warfare," is currently under way and is scheduled to report out in June 2014.

Warfare Innovation Workshops
CRUSER partners with NWDC to conduct NPS warfare innovation workshops fulfilling the concept generation portion of the program mission. NWDC sponsors the NPS Chair of Warfare Innovation who oversees the workshops. Once known as the Chair of Tactical Analysis, this research chair is currently held by CAPT Deidre McLay, USN.

Innovation workshops have been requested by various sponsors to address self-propelled semi-submersibles, maritime irregular challenges, undersea weapons concepts, and unmanned systems concepts generation. Participants in these workshops have included junior officers from NPS and the fleet, early career engineers from industry and Navy laboratories, and CNO Strategic Studies Group director Fellows.

Recent WIWs have included The Future Unmanned Naval Systems (FUNS) Wargame Competition (March 2011), Revolutionary Concept Generation from Evolutionary Use of UxS Technology (September 2011), and Advancing the Design of Undersea Warfare (September 2012). NWDC has been heavily involved in these workshops as subject matter experts and senior mentors. Scheduled during NPS Enrichment Week in March 2013, the next WIW—Undersea Superiority 2050—will help ensure long-term U.S. undersea superiority by identifying concepts for new undersea warfare systems and payloads. A cooperative research effort with General Dynamics Electric Boat Corporation, CRUSER is currently recruiting participants for this intensive look at unmanned systems in the undersea domain.

Robo-Ethics Continuing Education Series
In January 2012 the Office of Naval Research, Deputy Chief of Naval Operations for Information Dominance (N2/N6), and CRUSER cosponsored the first Robo-Ethics Continuing Education offering, Rhetoric vs. Reality, a two-day symposium comprised of four panels addressing social, cultural, legal, and ethical aspects of unmanned system employment. To minimize costs and maximize participant convenience, the venue was the Pentagon Conference Center. Based on requests, this continuing education series will be offered again in May 2013 in San Diego.

Robots in the Roses Research Fair
Building on the success of the last two annual research fairs, the third annual Robots in the Roses Research Fair is scheduled for April 11, 2013 on the NPS campus. This event expands the CRUSER community of interest, provides NPS students and faculty the opportunity to explore emergent technology, and inspires younger students to approach their formal education in science, technology, engineering, and math with zeal. We hope to magnify the outcome for participants this year by holding the research fair in concert with our NPS CRUSER Technical Continuum, where we will invite community of interest members to explore concepts generated in the September 2012 and March 2013 warfare innovation workshops.

STEM Outreach
CRUSER is in a unique position to support the ongoing Science, Technology, Engineering, and Math (STEM) outreach efforts of the Navy and the DOD. Attracting students to participate in an activity involving robotics and then using the activity to encourage further study of STEM subjects is an ideal pairing.

In a relatively short program lifetime, CRUSER has helped facilitate opportunities for student groups in all ranges, including K–8, high school, and collegiate levels, such as hosting robotics activities such as field trips and scouting events, interacting with local high school robotics clubs in our annual research fair, and conducting lab tours for visiting community college classes. CRUSER has also sponsored high school through graduate-level interns in a variety of unmanned systems research projects across campus.

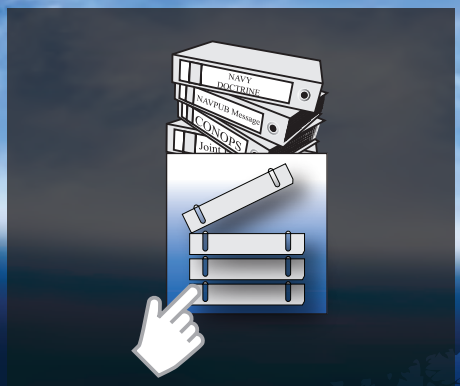
Join CRUSER!
FY12 was CRUSER's first full year in operation and our community has grown to nearly 1,000 members. Membership benefits include a monthly newsletter, invitation to monthly VTC meetings, and access to a growing online presence, (e.g., Web site, wiki, Facebook, and soon to include a SIPRNET site). It's easy, it's free, and you will be joining a community riding the wave of the future.

Go to http://www.nps.edu/Research/cruser/index.html and click "Join CRUSER." Join today!

Editor's note: At the Crossroads of Information and Integration is a regular feature showcasing NWDC's partnerships in capabilty, tactics, and doctrine development across the fleet.

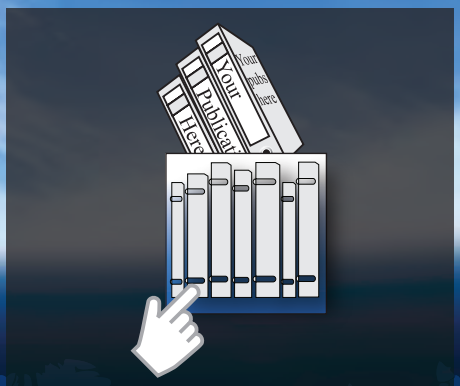
NDLS

Navy Doctrine Library System



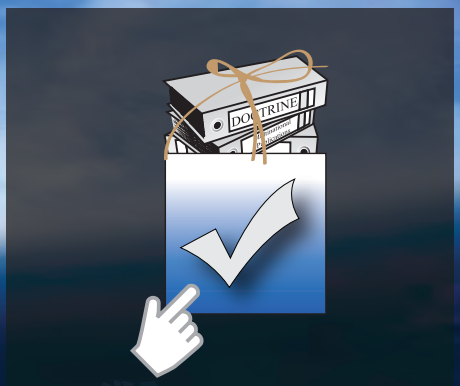
The Navy Library

Click on the book stack button to access the Navy publication library. In addition to Navy doctrine, NDLS includes NAVPUB messages, CONOPS, and multinational and joint publications as PDFs for easy viewing and printing. Customize your search by choosing from a myriad of options such as title, acronym, key words, metadata, and many more.



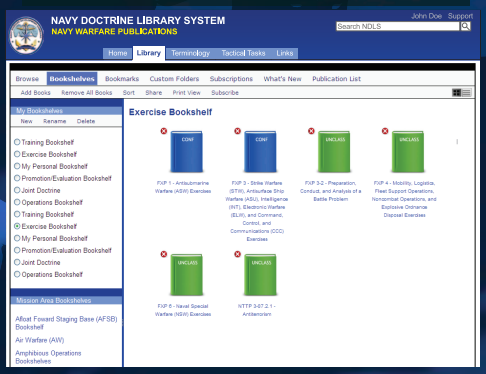
Your Favorite Bookshelf

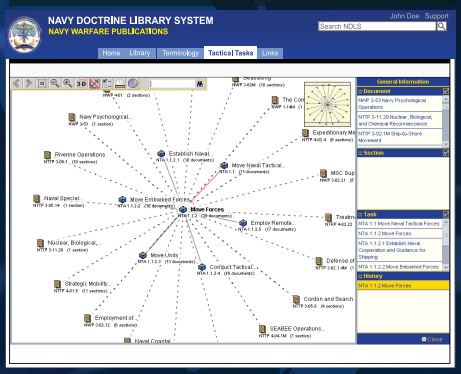
Click on the bookshelf button to create unlimited, customizable bookshelves. Add bookmarks to easily reference sections of publications. Provide feedback for future revisions through comments within the text of publications. You can be a part of the doctrine development process with online collaboration tools that will provide information to the fleet faster.



The Big Picture

Click on the Navy tactical tasks (NTAs) check mark button to activate Thinkmap. Thinkmap flows through the Navy Tactical Task List and provides an interactive link capability directly to the content being researched. Doctrine linkage to NTAs is graphically represented with spider diagrams that show connections among tasks, documents, sections, or key words.





The Navy Doctrine Library System is the authoritative repository of all approved Navy doctrine as well as joint, multiservice, and Allied doctrine used by the Navy. NDLS also serves as the central forum for developing and updating Navy doctrine and contains personalization features that allow users to save doctrine information for future reference and comment on doctrine that requires correction or update. The NDLS database contains not only the doctrine itself, but also its status, sponsoring organization, and other relevant metadata.

NAVY WARFARE DEVELOPMENT COMMAND

NIPRNET
https://ndls.nwdc.navy.mil

SIPRNET
http://ndls.nwdc.navy.smil.mil