U.S. NAVY

PROGRAM GUIDE 2013

FOREWORD

THE U.S. NAVY IS THE WORLD'S MOST LETHAL, FLEXIBLE, AND CAPABLE MARITIME FORCE. As they have throughout our Nation's history, every day our Sailors operate forward to provide American leaders with timely options to deter aggression, assure allies, and respond to crises with a minimal footprint ashore.

During 2012, the Navy remained the Nation's front line in conflict and in peace. The USS John C. Stennis deployed twice to the Middle East in support of our troops in Afghanistan, and the USS Bataan Amphibious Ready Group operated forward there for nearly 11 months. We honed our coalition mine warfare skills in a 34-nation exercise in the Arabian Gulf. We demonstrated our combined anti-submarine, missile defense, surface warfare, and humanitarian assistance and disaster response capabilities with 22 partner nations in the 2012 Rim of the Pacific exercise. And we assembled 25 ships and 14,000 personnel to reinvigorate Navy-Marine Corps amphibious warfare skills in Exercise Bold Alligator.

As directed by the 2012 Defense Strategic Guidance *Sustaining U.S. Global Leadership: Priorities for 21st Century Defense*, the Navy also formulated and implemented a plan to rebalance our forces, their homeports, our capabilities, and our intellectual capital and partnerships toward the Asia-Pacific. As we continue this rebalance toward the Asia-Pacific, we will also support the Nation's transition from a decade of conflict in Iraq and Afghanistan by retaining a strong naval force to support our partners in the Middle East and address threats to stability there.

To implement the vision of my *Sailing Directions* and the Defense Strategic Guidance, we will enhance enduring capabilities—such as our undersea dominance—and develop new ones to overcome threats to our freedom of action and to exploit adversary vulnerabilities. We will field and integrate new unmanned air vehicles into our carrier air wings and accelerate procedures and systems to make the electromagnetic spectrum and cyberspace a primary warfighting domain. We will enable sustained operations at key maritime crossroads around the world through increased forward basing and by fielding new ships such as the Littoral Combat Ships, Joint High Speed Vessels, and Mobile Landing Platforms with rotating civilian and military crews. We will ensure the proficiency and confidence of today's Fleet with today's systems and weapons, and will continue to attack sexual assault and suicide, which threaten the safety, readiness, and well being of our Sailors.

Our Nation and military face unprecedented fiscal challenges and thus the Navy has had to make tough choices in building our Fiscal Year 2014 Navy Program. This program delivers the capacity to meet global presence requirements and builds the capability to address the primary missions outlined in the Defense Strategic Guidance. Through continued innovation, efficiency, and judicious application of resources, our Navy will remain the world's preeminent maritime force.

Jonathan W. Greenert

Jonathan W. Greenert
Admiral, U.S. Navy
Chief of Naval Operations

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MEETING TODAY'S CHALLENGES AND PREPARING FOR THE FUTURE

Indeed, as we end today's wars, we will focus on a broader range of challenges and opportunities, including the security and prosperity of the Asia-Pacific.

Barack Obama
President of the United States

A MARITIME NATION

The United States is a maritime nation with vital interests far from its shores. The U.S. Navy operates forward to provide stabilizing presence, deter conflict, and contribute key capabilities to win our Nation's wars. The Navy's Fiscal Year (FY) 2014 Program supports the President's Defense Strategic Guidance (DSG), *Sustaining U.S. Global Leadership: Priorities for 21st Century Defense*. In executing the DSG, the FY 2014 Navy Program rebalances our effort toward the Asia-Pacific region, sustains our support to partners in the Middle East, focuses our presence at key strategic maritime crossroads, and meets the highest-priority capability demands of the geographic combatant commanders.

With its FY 2014 investments, the Navy will continue to provide the ability to respond to a dynamic and complex international environment. The DSG highlights the challenges and opportunities the United States will face, establishes ten primary missions of the U.S. Armed Forces and offers a blueprint to guide decisions about the size and shape of the Joint Force between now and 2020.

The FY 2014 Navy program aligns with the DSG and reflects strategy-based decisions informed by the fiscal constraints imposed by the Budget Control Act of 2011. The Navy made tough choices to ensure a coherent budget that does the following, in priority order:

- **Delivers the overseas presence directed by the Secretary of Defense as described in the Global Force Management Allocation Plan.**
- **Continues the essential, near-term investments started in the FY 2012 and 2013 budgets to address challenges in the Middle East and Asia-Pacific—particularly mine warfare improvements, anti-submarine warfare systems and weapons, missile defense sensors and surface warfare weapons.**
- **Develops capabilities over the long-term to address warfighting challenges in the Middle East and Asia-Pacific theaters.**
- **Adds more capacity to our improved capabilities.**

SAILING DIRECTIONS

Sailing directions assist mariners in planning a long voyage by describing the destination, providing guidance on which routes to take, and identifying the conditions, cautions, and aids to navigation along the way. The Chief of Naval Operations (CNO) *Sailing Directions* likewise provide a vision of the future Fleet and the tenets and principles that will guide our decisions to pursue that

vision. The vision of the CNO's *Sailing Directions* and its tenets of "Warfighting First, Operate Forward, Be Ready" align very closely with the DSG and its blueprint for the Joint Force of 2020.

WARFIGHTING FIRST

The Navy must be ready to fight and win today, while building the force to win tomorrow. This is the primary mission of the Navy and all our efforts to improve capabilities, develop people, and align organizations are grounded in this fundamental responsibility. Quickly denying the objectives of an adversary or imposing unacceptable costs on aggressors are essential elements of deterring conflict. To this end, the FY 2014 Navy Program is focused on meeting steady-state presence requirements and addressing current and projected threats between now and 2020, as described in the DSG. Our investment decisions focus first on delivering capabilities, then on building required capacity.

We develop capabilities using an "effects chain" approach that ensures our forces have the systems, training and logistics support to find the target, fix that target's position, and complete an attack on it. This includes logistics infrastructure to sustain forward operations, sensors to identify and track targets, communications networks to transmit information, trained operators, maintained platforms, and weapons to deliver an effect. To be able to fund the right systems, platforms, or operators to complete needed effects chains we may buy a smaller capacity of them. If threats emerge, the Navy can build additional capacity in the future.

The Navy takes a similar "effects chain" approach to defeating adversary capabilities. Navy capability investments are designed to deny adversaries the ability to find, target, and communicate information about U.S. forces, as well as defeat the weapons adversaries employ against our ships and aircraft. While we invest in capabilities to address each link of the adversary effects chain, our FY 2014 program emphasizes certain investments that target vulnerabilities, the exceptionally weak links in the enemy effects chain. This focus results in the most cost-effective and sustainable methods to defeat adversary capabilities. For example, defense against anti-ship cruise missiles (ASCMs) has historically focused on shooting the missile down with an interceptor missile fired from a ship. A more effective method with greater capacity is to deny adversaries the ability to find, target, or communicate about U.S. ships, and to jam or deceive the missile once it is fired so it misses U.S. ships. Our FY 2014 program emphasizes development of these so-called "non-kinetic" methods to defeat threats while continuing to field "kinetic" interceptors for self defense.

To address near-term challenges in the Middle East, the FY 2014 Navy Program delivers improvements to current mine countermeasure (MCM), surface warfare, and intelligence, surveillance,

The Navy has continued to provide the flexibility our Commander in Chief needs to meet high-end conventional or asymmetrical threats.

The Honorable Ray Mabus
Secretary of the Navy

and reconnaissance (ISR) capabilities. MCM investments include continued deployment of the interim afloat forward staging base (AFSB-I) USS Ponce, development of the Mk 18 unmanned undersea vehicle (UUV) and Sea Fox mine neutralization system, as well as improved manning and maintenance for today's MCM ships and aircraft. Building on investments from FY 2012 and FY 2013, the FY 2014 Navy Program invests in capabilities to defeat small boat swarm threats through the addition of Advanced Precision Kill Weapon System (APKWS) guided rockets for helicopters and the addition of Griffin missiles to patrol craft. The FY 2014 Navy Program also grows capacity and further develops unmanned aerial vehicles (UAVs) to improve maritime ISR with the MQ-4C Triton, the MQ-8 *Fire Scout* vertical takeoff unmanned aerial vehicle (VTUAV), and the Unmanned Carrier Launched Airborne Surveillance and Strike System (UCLASS).

Across the Future Years Defense Plan, the FY 2014 Navy Program delivers payloads and platforms necessary to address Asia-Pacific security challenges. The U.S. Navy's current undersea dominance is our most important advantage in that region, and it underpins the Fleet's support to a range of key DSG missions, particularly assuring access in the face of growing anti-access and area-denial (A2/AD) threats. The FY 2014 Navy Program sustains Navy's undersea advantage through continued improvements in anti-submarine warfare (ASW) effects chains that will deny an adversary's effective use of the undersea domain. Proven platforms such as the *Virginia*-class attack submarine, *Arleigh Burke*-class destroyer and MH-60R helicopter and new platforms such as the P-8A *Poseidon* maritime patrol and ASW aircraft will host new systems and payloads to significantly improve our undersea capability. These systems include improved sonar processors, new airborne periscope detection radars, the Mk 54 torpedo, and more effective sonobuoys.

The P-8A in particular will significantly improve our undersea capability with its first deployment in 2014. The Poseidon brings a 50 percent higher search speed, longer range, and greater endurance due to in-flight refueling, as compared to the P-3C it replaces. The P-8As ability to conduct radar and sonobuoy searches and torpedo attacks from higher altitudes enhances its search and attack area. The MQ-4C Triton unmanned air system, which will operate from Guam to provide maritime ISR of thousands of square miles of ocean, will complement the P-8A.

The Navy leverages its undersea advantage to enable a secure nuclear deterrent with our nuclear ballistic missile submarines (SSBN) and to conduct conventional strike and anti-surface warfare with nuclear attack submarines (SSN) in otherwise denied areas. The Navy plans to mitigate the loss of capacity that will occur with the decommissioning of *Ohio*-class nuclear guided-missile submarines (SSGN) in the mid 2020s by fielding the *Virginia*-class payload module (VPM), which will be capable of carrying 40

cruise missiles in future *Virginia*-class submarines. To enhance the persistence of undersea sensing and expand its reach into confined and shallow waters inaccessible to other systems, the Navy continues to develop longer-range and endurance UUVs.

Navy FY 2014 investments also build capabilities to defeat air and surface threats. The Navy upgraded its Japan-based carrier air wing in 2012 to the F/A-18E/F *Super Hornet* and E/A-18G *Growler*. This air wing will also be the first to deploy the F-35C *Lightning II* when it enters the fleet, allowing for new operating concepts that employ the stealth and ISR capability of the F-35 alongside the complementary payload capacity of the F/A-18. To improve air-to-air warfare, the FY 2014 Navy Program builds effects chains that overcome or circumvent radar jamming by using improved sensors and air-to-air missiles. These improved capabilities will begin to deliver this year on the F/A-18E/F *Super Hornet* and continue with the introduction of the F-35C *Lightning II*.

Along with the potent anti-ship capabilities of our submarines, the Navy is developing additional options for air- and surface-launched anti-ship weapons. To assure access for surface forces, the Navy is sustaining effective defense against anti-ship cruise missiles and meeting the threat of emerging anti-ship ballistic missiles (ASBMs). The Navy will defeat the ASBM threat by countering each action needed for an adversary to find, target, launch, and complete an attack on a ship with a ballistic missile. The FY 2014 Navy Program fields systems that jam, decoy, or confuse the wide-area surveillance systems needed to find and target ships. To shoot down a missile once launched, the Fleet will employ the proven Aegis ballistic missile defense (BMD) system and SM-3 missile and electronic warfare systems. Navy ASCM defense will similarly rely on "non-kinetic" capabilities that defeat adversary command, control, computer communications and ISR (C4ISR) systems. This will be complemented with kinetic defense using an integrated fire control system (NIFC-CA) that combines the proven Aegis weapon system, new long-range ship-launched SM-6 missiles on cruisers and destroyers, and the new E-2D *Hawkeye* aircraft. This combination will be capable of detecting and engaging ASCMs hundreds of miles away. To defeat ASCMs at closer ranges, the FY 2014 Navy Program upgrades short-range missiles and electronic warfare systems to destroy incoming missiles or cause them to miss by deceiving and jamming their seekers.

The Fleet of 2020 will include today's proven platforms and a range of new weapon, sensor, and unmanned vehicle payloads with greater reach and persistence, guided by the Air-Sea Battle Concept. These payloads will fully exploit operations in the electromagnetic spectrum and cyberspace and will retain our undersea dominance.

OPERATE FORWARD

To effectively deter potential threats, promptly respond to crises and avert escalation our warfighting capabilities must be present where conflict and instability is most likely and consequential – the maritime crossroads. These areas, such as the Straits of Malacca and Hormuz or the Suez and Panama Canals, are where sea lanes, resources, and vital U.S. interests intersect.

Our naval forces are at their best when they are forward. The FY 2014 Navy Program establishes the forward posture described in the Defense Strategic Guidance between now and 2020. Specifically, our investments in readiness and supporting infrastructure that implement the rebalance to the Asia-Pacific, continue our support to partners in the Middle East, sustain our alliance commitments in Europe, and deliver mission-tailored forces to South America and Africa.

The FY 2014 Navy Program implements innovative approaches to continue operating forward in an era of finite resources. Our investments improve Navy's forward posture through a combination of rotational deployments, forward basing, rotational crewing, and the use of partner nation facilities overseas. Overall, the cumulative impact of ship deliveries, projected operating patterns, and forward basing of ships will yield an increase in day-to-day naval presence in the Middle East and Asia-Pacific between now and 2020.

The FY 2014 Navy Program sustains funding for Littoral Combat Ship (LCS) operations in Singapore and forward bases guided-missile destroyers in Rota, Spain. Each of these changes will increase the presence in the Asia-Pacific, as the four destroyers based in Spain will replace 10 rotationally deployed ships from the United States that conduct the BMD mission today. This enables six destroyers to rotationally deploy to the Asia-Pacific.

The FY 2014 Navy Program also provides the future Fleet with a mix of ships that will enable a better alignment of capability and capacity with the needs of each geographic region. For example, LCS and Joint High Speed Vessel (JHSV) will be well-suited for maritime security, security cooperation, and humanitarian assistance missions, particularly in Africa and South America. Similarly, the afloat forward staging base and Mobile Landing Platform (MLP) are better able to support MCM and counter-terrorism operations overseas. The LCS, JHSV, AFSB, and MLP all use rotational civilian or military crews, maximizing the time they remain deployed. By taking on missions from guided-missile destroyers and amphibious ships, these new platforms enable them to deploy elsewhere—including the Asia-Pacific.

The FY 2014 Navy Program expands Navy posture in the Middle East by supporting the forward stationing of five additional *Cyclone*-class Patrol Coastal vessels to Bahrain and increasing the

Our forward presence will build on and strengthen our partnerships and alliances where sea lanes, resources, and vital U.S. interests intersect.

Admiral Jonathan W. Greenert, USN
Chief of Naval Operations

capacity of MCM capabilities in the Arabian Gulf. These efforts will help support the eventual deployment of LCS to the region to replace the PCs and MCMs there today. Our rotational deployments of expeditionary warfare ships continue to be focused on the Middle East, but these forces are in high demand around the world. To meet this demand, our FY 2014 Navy Program invests in the next "large-deck" amphibious assault ship and continues efforts to ensure our *San Antonio*-class Amphibious Transport Dock ships and *Whidbey Island*- and *Harpers Ferry*-class Dock Landing ships are maintained and upgraded to maximize their operational availability and relevance to today's missions.

BE READY

The FY 2014 Navy Program ensures the Fleet is ready to meet current challenges today. The FY 2014 Navy Program continues our focus on the proficiency, confidence and support of today's Fleet at home and abroad, while addressing factors that detract from safety and readiness.

The Navy's most pressing challenge over the next decade will be sustaining Fleet capacity while maintaining relevant capability. Capacity is a function of payload and platform numbers and proper maintenance. Ships and aircraft with poor material conditions are unable to deploy effectively and are less likely to reach their expected service lives (ESL), generating earlier replacement costs and capacity shortfalls. The FY 2014 Navy Program improves afloat readiness by ensuring ships and aircraft reach ESLs by funding overhauls and modernization.

Current demand for naval forces exceeds supply, requiring ships to deploy longer and more frequently than a decade ago. For example, to address growing security concerns, the USS John C. Stennis Carrier Strike Group deployed twice to the Middle East and the USS Bataan Amphibious Ready Group deployed for almost 11 months in 2012. Since 2001, the number of annual underway days per ship has increased by 15 percent; meeting this demand required cutting maintenance periods short and deferring others. In addition to adequate maintenance funding, the FY 2014 Navy Program addresses this high level of demand by implementing deployment schedules that afford sufficient time for ship and aircraft maintenance and training. The program will meet the presence requirements of the expected FY 2014 Global Force Management Allocation Plan.

Another important aspect of the Fleet's ability to operate forward is readiness ashore. The FY 2014 Navy Program provides the resources necessary to build, operate, modernize, and sustain shore infrastructure in support of fleet warfighters and their families. The program also sustains both afloat and ashore energy initiatives to decrease risk to forward deployed forces and lessen the impact of volatility in energy prices.

…you (sailors) are the first thought each and every time.

Michael D. Stevens
Master Chief Petty Officer of the Navy

The FY 2014 Navy Program complements required capacity with relevant capability. In addition to investing in near- and far-term warfighting capabilities, the FY 2014 Navy Program continues investments in ordnance, targets, training time, and equipment needed for Sailors to be proficient and confident in using the systems they have today.

The FY 2014 Navy Program ensures that the Navy is prepared to harness the teamwork, talent, and imagination of our diverse workforce to be ready to fight and responsibly use our resources. It funds the manpower to meet high-priority fleet needs, including enlisted shore billets to enhance sea-shore flow, additional manning for regional maintenance centers, cyber acquisitions, and personnel for LCS crews, instructors, and shore support.

In addition to these manning needs, the FY 2014 Navy Program addresses concerns that detract from the safety and overall readiness of the Fleet. Navy continues to emphasize and fund training to prevent sexual assaults and provides the necessary resources for incident response. Additionally, the FY 2014 Navy Program continues a sustained effort to increase awareness, training, and resources for suicide prevention. Both sexual assault and suicide prevention are "all hands" evolutions, and ensuring resources are ready and accessible if a Sailor needs help remains a priority.

The Navy also maintains strong family support in the FY 2014 Navy Program with investments in childcare, morale, welfare, recreation, and youth programs, and provides military-to-civilian transition assistance through the Transition Assistance Program and Veteran's Employment Initiative to improve job opportunities for Sailors after their service is complete.

Overall, the FY 2014 Navy Program sustains our fleet capability with effective maintenance, timely modernization, and most importantly, provides our Sailors confidence in their equipment and their skills. The Navy program also continues and expands support for Navy families. In our FY 2014 Navy Program, we protected these investments to ensure our efforts to improve future capability or forward presence do not come at the expense of our readiness and ability to execute missions today.

REBALANCE TO THE ASIA-PACIFIC

A particular focus of our FY 2014 Navy Program is implementing the Defense Strategic Guidance to rebalance our efforts toward the Asia-Pacific region. This rebalance involves each of CNO's tenets and reflects the sustained and growing importance to the United States of the arc extending from the Western Pacific and East Asia into the Indian Ocean region and South Asia. The region is home to five of our seven treaty allies, six of the world's top 20 econo-

mies, and a range of emerging partners with whom we are building networks of economic and security cooperation. Our allies and partners in the Asia-Pacific depend on the maritime domain for food, energy, and trade. More than 90 percent of trade by volume and the majority of global energy supplies travel through the Asia-Pacific by sea, and our ability to deter and defeat threats to stability in the regional fundamentally relies on maritime access.

The Navy has had an important role in the Asia-Pacific for more than 70 years. Today more than 50 percent of our deployed ships are in the Pacific Ocean with almost 90 percent of them permanently or semi-permanently based there.

The FY 2014 Navy Program renews our emphasis on the Asia-Pacific region in four main ways: Deploying more forces to the Asia-Pacific; basing more ships and aircraft in the region; fielding new capabilities focused on Asia-Pacific challenges; and developing partnerships and intellectual capital across the region. Constraints in the current budget environment could delay timelines associated with these efforts.

First, the ship and air forces built and deployed to the region will increase the Navy's presence in the Asia-Pacific from about 50 ships today to about 60 ships by 2020. The FY 2014 Navy Program will sustain today's level of carrier and large deck amphibious ship operations and forward station LCS in Singapore, integrate forward-operating JHSV into the Pacific Fleet and increase amphibious and surface combatant presence in the region.

Second, the FY 2014 Navy Program continues to implement a plan that will rebalance homeports to sixty percent in the Pacific by 2020.

Third, Navy will continue to field capabilities focused on Asia-Pacific security challenges, particularly those needed to assure access. Navy will also preferentially deploy platforms with the newest capabilities to the region.

Finally, Navy will develop partnerships and intellectual capital toward the region. Notably, Navy is sharpening its focus on the warfighting missions that are most important in the Asia-Pacific – ASW, ISR, BMD, air defense, and electronic warfare. Navy is developing its people to serve in the Asia-Pacific, emphasizing the region's unique geopolitical and operational environment in our training and education programs. And we are increasing efforts to reassure allies and strengthen partnerships in the Asia-Pacific region by leading more than 170 exercises and 600 training events annually with more than 20 allies and partners in the Pacific and Indian Oceans.

America is a maritime nation, and we are returning to our maritime roots.

The Honorable Leon E. Panetta
Secretary of Defense

FOUNDATION FOR THE FUTURE

On any given day, more than 50,000 Sailors are underway on about 145 U.S. Navy ships and submarines. Approximately 100-120 of these ships operate forward independently or in rotationally deployed carrier strike groups and amphibious ready groups. More than 125 land-based patrol aircraft and helicopters, 1,000 Information Dominance personnel, and some 4,000 Navy Expeditionary Combat Command Sailors are forward on the ground or in the littorals supporting critical missions around the world.

Continued high demand for Navy forces, combined with the imperative to reduce the Nation's federal deficit and debt, requires the Navy to make tough choices to ensure our ability to both defend the United States and be responsible stewards of America's resources. The FY 2014 Navy Program is carefully designed to support current operations, emphasize credible warfighting capability, and preserve fleet capacity for presence in key regions, such as the Middle East and Asia-Pacific. At the same time, it reduces some capacity to operate outside these key regions or perform missions beyond the Navy's core responsibilities. In building the Joint Force of 2020, the FY 2014 Navy Program sustains planned evolutions in naval capabilities and facilitates continued dominance of the undersea domain, more effective employment of cyberspace and the electromagnetic spectrum, and assured operational access through the Air-Sea Battle concept.

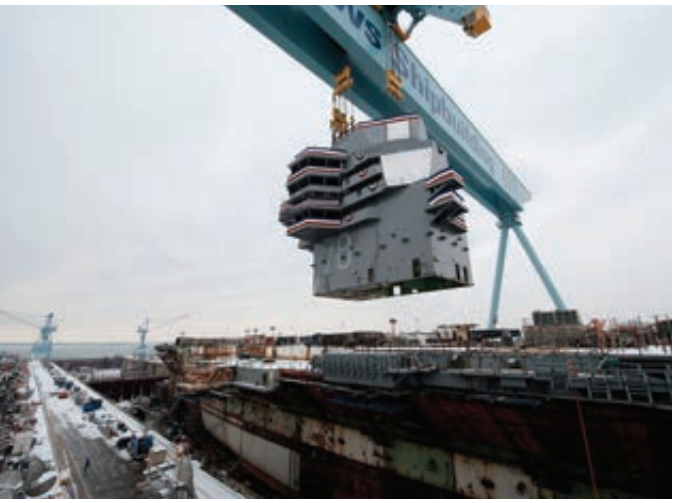
The FY 2014 Navy Program ensures that our forces can operate in and around the world's strategic maritime crossroads where our economic and security interests lie, and where conflict is most likely and most consequential. The Navy's warfighting capabilities, deployed forward, and operated by ready and confident Sailors, will continue to deliver offshore options to respond to crises, deter and defeat aggression, and build the capacity of partners and allies today and in years to come.

The following sections of the 2013 Program Guide describe the programs that the Navy has fielded and is developing, which enable the capabilities described above. While some programs contribute significantly to a single capability, many of them are designed to and are capable of supporting multiple core capabilities and mission requirements. The strength of the Navy's forces lies in their adaptability and flexibility across the range of military operations.

SECTION 1

NAVAL AVIATION

Naval Aviation is a critical component of the Nation's ability to carry out full-spectrum operations in the 21st Century—from delivering humanitarian assistance and disaster relief at home and overseas, to maritime security operations to ensure safe passage of commercial vessels, to high-intensity sea control and power projection in a major contingency. Helicopters and fixed-wing aircraft operating from nuclear aircraft carriers, large-deck amphibious ships and shore stations, and helicopters operating from cruisers and destroyers—complemented by advanced unmanned aerial vehicles—are key contributors to the capabilities of the U.S. Navy and Marine Corps.



AIRCRAFT CARRIERS

CVN 68 *Nimitz*-Class and CVN 78 *Ford*-Class Aircraft Carrier Programs

Description

The U.S. Navy's force of nuclear-powered aircraft carriers provide the operational flexibility and warfighting capability to meet all Fleet Response Plan commitments, as well as the combatant commanders' requirements for persistent presence in support of national goals. The FY 2010 National Defense Authorization Act authorized a temporary reduction in the carrier fleet from 11 to 10 ships between the December 2012 inactivation of the USS Enterprise (CVN 65), after more than 51 years of service, and the planned commissioning of Gerald R. Ford (CVN 78) in 2015.

The mission of the aircraft carrier is to support and operate air wing aircraft that conduct attack, early warning, surveillance, and electronic missions against sea-borne, air-borne, and land-based targets in support of joint and coalition forces. Navy carriers deploy globally in direct support of U.S. strategy and commitments. Our carriers continue to play an increasingly important role as the Navy continues to emphasize operations in the world's littorals. This is particularly important as forward-deployed land-based forces return home to the United States.

CVN 78 is the first of a new class of aircraft carriers in almost 40 years; the USS Nimitz (CVN 68) was commissioned in 1975. While nearly identical in size to *Nimitz*-class carriers, *Ford*-class ships are designed with upgraded hull, mechanical, electrical, and electronics capabilities. This class of aircraft carriers will also incorporate such advanced features as a new, more efficient nuclear propulsion plant, an Electro-Magnetic Aircraft Launch System (EMALS), Advanced Arresting Gear (AAG), Dual Band Radar (DBR), and a nearly three-fold increase in electrical-generation capacity compared to a Nimitz-class carrier. These technological improvements, along with a slightly expanded flight deck and other topside changes designed to increase operational efficiency, will provide significantly higher sortie generation rates. At the same time, maintenance and manpower requirements for the ship will be greatly reduced from today's needs, allowing the Navy to reap more than $5 billion dollars in life-cycle cost savings per ship throughout its 50-year service life. The follow-ships, John F. Kennedy (CVN 79) and Enterprise (CVN 80), will be built as modified-repeats of CVN 78 and are expected to deliver to the fleet in 2022 and 2027, respectively.

Status

Construction of Gerald R. Ford, the lead ship in the CVN 78 program, was approximately 45 percent complete in late 2012 at Huntington Ingalls Industries (HII), Newport News Shipbuilding. The ship is scheduled for delivery to the Navy in 2015. Keel laying for CVN 79 is planned for 2015.

Developers

Huntington Ingalls Industries (HII) Newport News, Virginia USA

AIRCRAFT

AH-1Z and UH-1Y Upgrades

Description

The H-1 program replaces the UH-1N and AH-1W aircraft with new UH-1Y and AH-1Z four-bladed, all-composite rotor system helicopters. The program will ensure that the Marine Air-Ground Task Force (MAGTF) possesses credible rotary-wing (helicopter) attack and utility support platforms for the next 20 years. The H-1 Upgrade Program will reduce life-cycle costs, significantly improve operational capabilities, and extend the service lives of both aircraft. There is 85 percent commonality between the two aircraft. This greatly enhances the maintainability and readiness of the systems by leveraging the ability to support and operate both aircraft within the same squadron structure.

The program includes a new, four-bladed, all-composite rotor system, coupled with a sophisticated, fully-integrated "glass cockpit." It also incorporates a performance-matched transmission, four-bladed tail-rotor drive system, and upgraded landing gear. The integrated glass cockpit with modern avionics systems will provide a more lethal platform as well as enhanced joint interoperability. Operational enhancements include a dramatic increase in range, speed, survivability, payload, and lethality of both aircraft, with a significant decrease in logistics footprint. The UH-1Y will operate at nearly twice the in-service range, with more than double the payload, than the UH-1N. The AH-1Z will realize similar performance increases, with the ability to carry twice the in-service load of precision-guided munitions than the AH-1W helo.

Status

As of late 2012, 156 H-1 aircraft were on contract (104 UH-1Y, 52 AH-1Z), with 65 UH-1Ys and 29 AH-1Zs delivered through September 2012. The FY 2014 budget requests 26 H-1 Upgrade aircraft. The last 70 aircraft have delivered an average of 37 days ahead of contract schedule at Bell Helicopter's production facility in Amarillo, Texas.

AH-1Z Full Rate Production (FRP) was achieved on November 28, 2010, and at the same time the H-1 Upgrades program was designated ACAT-1C. AH-1Z Initial Operational Capability (IOC) was attained February 24, 2011 and the first successful deployment of the new attack helicopter occurred with the 11th Marine Expeditionary Unit (MEU) from November 2011 to June 2012. This MEU detachment was another program first, as it was the first "All Upgrades" UH-1Y/AH-1Z deployment. The UH-1Y made its initial deployment with the 13th MEU from January-June 2009 and has conducted sustained combat operations in Operation Enduring Freedom (OEF) since November 2009.

Both the UH-1Y and AH-1Z have been aggressively deployed ahead of their respective Material Support Dates (MSD), in an effort to support our deployed troops with the most capable aircraft

available. The H-1 Upgrades program of record consists of 160 UH-1Ys and 189 AH-1Zs.

Developers

Bell Helicopter Textron	Fort Wort, Texas USA
Bell Helicopter Textron	Amarillo, Texas USA

AV-8B *Harrier II+*

Description

The AV-8B *Harrier II* is a single-seat, light attack aircraft that supports the MAGTF commander by engaging surface targets and escorting friendly aircraft, day or night, under all weather conditions during expeditionary, joint or combined operations. By virtue of its Vertical/Short Take-Off and Landing (V/STOL) capability, the AV-8B can operate from a variety of amphibious ships, rapidly constructed expeditionary airfields, forward sites—e.g., roads and Forward Operating Bases (FOBs)—and damaged conventional airfields. Two variants of the aircraft are in service: the Night Attack and the Radar/Night-Attack *Harrier*. The Night-Attack *Harrier* improved the original AV-8B design through incorporation of a Navigation, Forward-Looking InfraRed (NAVFLIR) sensor, a digital color moving map, night vision goggle compatibility, and a higher performance engine. The in-service Radar/Night-Attack *Harrier*, or *Harrier II+*, has all the improvements of the Night Attack aircraft plus the AN/APG-65 multi-mode radar. The fusion of night and radar capabilities allows the Harrier II+ to be responsive to the MAGTF's needs for expeditionary, night, and adverse-weather offensive air support.

Status

The Operational Flight Program H6.0 integrated the digital improved triple-ejector racks for increased carriage capacity for Joint Direct Attack Munition (JDAM), fully integrated ALE-47 expendable hardware and software, adjustments for improving moving target engagements, improved radar capability, and safety improvements, as well as AIM-120 A/B flight clearance. The AV-8B continues to maximize integration of the LITENING Advanced Targeting Pod, a third-generation dual TV/Infrared sensor providing target recognition and identification, laser designation, and laser spot tracking for precision targeting capability.

Work on H6.1 Operational Flight Program was underway in late 2012 and will offer fourth-generation LITENING, in-weapon laser capability for JDAM and Laser JDAM, moving-target calculations for increased laser JDAM effectiveness, as well as software improvements. LITENING Pods have also been equipped with a video downlink, which enables real-time video to be sent to ground-based commanders and forward-air controllers. This facilitates time-sensitive targeting and reduces the risk of fratricide and collateral damage.

Developers

Boeing	St. Louis, Missouri USA
Boeing	Amarillo, Texas USA

C-130T *Hercules*

Description

The Navy C-130T *Hercules*—a component of the Navy Unique Fleet Essential Airlift (NUFEA) complement—provides heavy, over-and-outsized organic airlift capability. These aircraft are deployed worldwide and provide rapid-response direct support to Navy Component Commanders' theater requirements. This aircraft can be rigged/re-rigged (configured) within minutes to transport up to 40,000 pounds of cargo or up to 75 passengers.

Status

The Navy has started a program to upgrade its C-130T aircraft to meet all communications navigation surveillance/air traffic management (CNS/ATM) requirements. These NUFEA, heavy-lift aircraft are stationed at Naval Air Station Jacksonville, Florida; Naval Air Station Joint Reserve Base New Orleans, Louisiana; Joint Base Andrews/Naval Air Facility Washington, DC; Naval Base Ventura County/Naval Air Station Point Mugu, California; and Joint Base McGuire/Dix/Lakehurst, New Jersey.

Developers

Lockheed Martin	Bethesda, Maryland USA
Lockheed Martin	Marietta, Georgia USA

C-2A(R) *Greyhound*

Description

The C-2A *Greyhound* is the Navy's sole carrier-based medium-lift/long-range logistics support aircraft, providing time-critical support to Carrier Strike Groups (CSGs). Its primary mission is transport of high-priority cargo, mail, and passengers between the CSGs and shore support bases. A high-wing monoplane powered by twin Allison T56-A-425 turboprop engines and Hamilton-Standard constant-speed propellers, the C-2A can deliver a combined payload of 10,000 pounds to a distance in excess of 1,000 nautical miles (NM). The interior arrangement of the cabin can readily accommodate cargo, passengers, and litter patients. Priority cargo such as jet engines or components can be transported from shore to ship in a matter of hours. A cargo cage system or transport stand provides restraint for loads during catapult launches and arrested landings. The large aft cargo ramp/door allows for straight-in rear cargo loading and unloading for fast turnaround. The C-2A is capable of air-dropping supplies and personnel. Its onboard auxiliary power unit provides autonomous engine starting capability and ground power self-sufficiency at austere bases, providing operational versatility.

Status

The aircraft completed a Service Life Extension Program (SLEP) to increase operating service life from 15,020 landings and 10,000 flight hours to 36,000 landings and 15,000 flight hours. In addition to the SLEP, aircraft modernization initiatives include aircraft rewire, cockpit avionics systems improvements (CNS/ATM), a new 8-blade propeller system (NP2000), and an anti-lock braking system to improve the ground handling characteristics. Mandated passenger transportation safety requirements, Traffic Alert and Collision Avoidance System (TCAS) and Terrain Awareness Warning System (TAWS), have been integrated into the aircraft. These investments, coupled with future sustainment activities, will ensure the C-2A continues to be the reliable CSG logistics support lifeline until it is recapitalized with a future Carrier Onboard Delivery (COD) aircraft in approximately 2026.

Developers

Northrop Grumman Bethpage, New York USA

Service Secretary Controlled Aircraft/Executive Airlift

Description

The Navy maintains Service Secretary Controlled Aircraft (SSCA)/Executive Airlift in accordance with the DoD Directive 4500.56. SSCAs are designated by the Secretaries of the Military Departments for transportation of their senior Service officials. The offices of the Secretary of the Navy, Chief of Naval Operations, and Commandant of the Marine Corps coordinate with Fleet Logistics Support Squadron ONE (VR-1) for scheduling of Navy and Marine Corps senior leader travel. At the SECNAV's discretion, other distinguished visitor-capable aircraft are stationed Outside Continental United States (OCONUS) to support Navy senior leader travel. In 2013, three C-37Bs (*Gulfstream-550*), one C-37A (*Gulfstream-V*), two C-20Ds (*Gulfstream-III*), and one C-20A (*Gulfstream-III*) provide executive transport services. The C-37A/B aircraft have replaced the VP-3A, substantially lowering operating costs. The C-37A/B meets all known international-imposed air traffic management communications, navigation, and surveillance requirements through FY 2014.

Status

The first C-37 aircraft was delivered in 2002, a second aircraft in 2005, and two more in 2006. The first aircraft, the Navy's only C-37A, is based at Hickam Air Force Base, Hawaii, and supports Commander Pacific Fleet (PACFLT). The C-37Bs are based at Joint Base Andrews/Naval Air Facility Washington, D.C., and are assigned to Fleet Logistics Support Squadron ONE (VR-1). Additionally, the Navy acquired a surplus C-20A from the Air Force in order to meet Commander Naval Forces Europe/Commander Naval Forces Africa (COMNAVEUR/COMNAVAF) executive transportation requirements, and it is located at Naval Air Station Sigonella, Italy.

Developers

Gulfstream (General Dynamics) Savannah, Georgia USA

C-40A *Clipper*

Description

The Naval Air Force Reserve provides 100 percent of the Navy's organic intra-theater logistics airlift capability via its Navy Unique Fleet Essential Airlift (NUFEA). NUFEA provides Navy Component Commanders with short-notice, fast response intra-theater logistics support for naval power projection worldwide. The legacy C-9B and C-20G aircraft are being replaced by the C-40A *Clipper*, a modified Boeing 737-700/800 series aircraft. This state-of-the-art aircraft can transport 121 passengers (passenger configuration), 40,000 pounds of cargo (cargo configuration), or a combination of the two (combination configuration), at ranges greater than 3,000 NM at Mach 0.8 cruise speed. The ability to carry cargo pallets and passengers simultaneously maximizes the operational capability, safety, and capacity. The C-40A has an electronic flight deck fully compliant with future communications, navigation and air traffic control architectures; advanced-technology Stage III noise-compliant, fuel-efficient engines; and an integral cargo door/cargo handling system. Maximum gross takeoff weight is 171,000 pounds.

Status

Twelve aircraft are in the C-40A inventory. The Navy has purchased the aircraft via commercial-off-the shelf (COTS) standards using standard best commercial practices. C-40A squadrons are located at Naval Air Station Oceana, Virginia; Naval Base Coronado/Naval Air Station North Island, California; Naval Air Station Jacksonville, Florida; and Naval Air Station Joint Reserve Base Fort Worth, Texas.

Developers

Boeing — Seattle, Washington USA

CH-53K (HLR) Heavy Lift Replacement

Description

The CH-53K is the follow-on to the Marine Corps CH-53E Heavy Lift Helicopter. Major systems improvements of the newly manufactured helicopter include new, greater-horsepower and more-capable engines, expanded gross weight airframe, drive train, advanced composite rotor blades, modern interoperable cockpit, external and internal cargo handling systems, and enhanced survivability. The CH-53K will be capable of externally lifting 27,000 pounds on a "Sea Level Hot day" (103° Fahrenheit) to a range of 110 nautical miles and dropping cargo in a landing zone at a pressure altitude of 3,000 feet at 91.5° Fahrenheit, a capability improvement that nearly triples the in-service CH-53E abilities under the same conditions. Additionally, the CH-53K will be capable of carrying a normal load of 30 combat-loaded troops.

The CH-53K's increased capabilities are essential to meeting the Marine Expeditionary Brigade (MEB) of 2015 Ship-to-Objective Maneuver (STOM) vision and it fully supports the Joint Operations Concept of Full Spectrum Dominance by enabling rapid, decisive operations and the early termination of conflict by projecting and sustaining forces to distant anti-access, area-denial environments. Expeditionary Maneuver Warfare (EMW) establishes the basis for the organization, deployment, and employment of the Marine Corps to conduct maneuver warfare and provides the doctrine to make joint and multinational operations possible.

Status

The Post Milestone (MS) B System Development and Demonstration (SDD) contract was awarded to Sikorsky Aircraft Corporation on April 5, 2006. The program conducted its Preliminary Design Review during the fourth quarter of FY 2008. The Critical Design Review was successfully completed ahead of schedule in the third quarter of FY 2010, and the program has transitioned from the design to the manufacturing phase. The first Ground Test Vehicle is in production with engine light- off projected for spring 2013 and first flight projected for spring 2014. The Marine Corps requirement remains 200 aircraft.

Developers

Sikorsky Aircraft Corporation Stratford, Connecticut USA

EA-18G *Growler* Airborne Electronic Attack Aircraft

Description

The EA-18G *Growler* is replacing the Navy's EA-6B *Prowler*. Like the Prowler, the EA-18G will provide full-spectrum electronic attack (EA) to counter enemy air defenses and communication networks, most notably Airborne Electronic Attack (AEA) and Anti-Radiation Missile (ARM). These capabilities continue to be in high demand in Overseas Contingency Operations (OCO) where both *Growler* and *Prowler* operations protect coalition forces and disrupt critical command control links. The *Growler* will maintain a high degree of commonality with the F/A-18F, retaining the latter's inherent strike-fighter and self-protection capabilities while providing air-to-air self-protection to free other assets for additional strike-fighter tasking.

Status

The EA-18G *Growler* reached Initial Operational Capability (IOC) in September 2009 and is in Full Rate Production. In December 2009, the Department of Defense made the decision to continue the Navy Expeditionary Airborne Electronic Attack (AEA) mission and recapitalized the Navy EA-6B expeditionary force with the EA-18G. As a result, 26 additional aircraft were programmed for procurement for three active and one reserve expeditionary squadrons. All three active component expeditionary squadrons have transitioned to the EA-18G. The first EA-18G deployment

occurred in November 2010 in an expeditionary role in support of Operation New Dawn and redeployed in March 2011 in support of Operations Odyssey Dawn and Unified Protector, where the EA-18G conducted combat operations. The first carrier deployment occurred in May 2011 on board the USS George H. W. Bush (CVN-77).

As of the end of FY 2012, 75 EA-18G aircraft have been delivered with another 12 aircraft scheduled for delivery in FY 2013. An inventory objective of 135 aircraft will support ten carrier-based squadrons, five active expeditionary squadrons, and one reserve squadron. Full Operational Capability is planned for FY 2015.

Developers

Boeing	St. Louis, Missouri USA
Northrop Grumman	Bethpage, New York USA

EA-6B *Prowler* Airborne Electronic Attack Aircraft

Description

The EA-6B *Prowler* provides Electronic Warfare (EW) capabilities against enemy systems operating within the radio frequency spectrum. EA-6B capabilities have traditionally enhanced the strike capabilities of carrier air wings and Marine Air Ground Task Force (MAGTF) operations. The need for EW has demonstrably increased during numerous joint and allied operations since 1995 against traditional and non-traditional target sets in support of ground forces. The enormous demand for AEA in Operations Enduring Freedom and Iraqi Freedom have driven EA-6B employment rates to record levels.

Status

The EA-6B Improved Capability (ICAP) III upgrade reached Initial Operational Capability (IOC) in September 2005. This generational leap in EW capability deployed for the first time in 2006. ICAP III includes a completely redesigned receiver system (ALQ-218), new displays, and MIDS/Link-16, which dramatically improve joint interoperability. The Navy will eventually "sundown" the *Prowler* and transition to an all EA-18G *Growler* force by 2015. The Marine Corps has completed its transition to ICAP III aircraft in FY 2012 and will fly the EA-6B ICAP III through 2019. Its planned replacement is a series of networked air and ground EW payloads forming a collaborative system of systems labeled MAGTF EW which will provide increased EW capacity, flexibility and scalability in direct support of the MAGTF Commander and, in turn, the Joint Force Commander. The first implementation of MAGTF EW, the Intrepid Tiger II pod carried on the AV-8B, made its initial deployment in May 2012.

Developers

Northrop Grumman Corporation	Bethpage, New York USA

F-35 Joint Strike Fighter

Description

The JSF F-35 *Lightning* II program will deliver a transformational family of next-generation strike aircraft, combining stealth and enhanced sensors to provide lethal, survivable, and supportable tactical jet aviation strike fighters. The Navy Carrier Variant (CV), the Marine Corps Short Takeoff and Vertical Landing (STOVL) and Air Force Conventional Takeoff and Landing (CTOL) "family of aircraft" designs share a high level of commonality while meeting U.S. service and allied partner needs. The keystone of this effort is a mission systems avionics suite that delivers unparalleled interoperability among U.S. Armed Services and Coalition Partners. Agreements for international participation in System Development and Demonstration (SDD) have been negotiated with Australia, Canada, Denmark, Italy, The Netherlands, Norway, Turkey, and the United Kingdom. A Security Cooperation Participant (SCP) Letter of Agreements has been signed with Israel while an SCP Memorandum of Understanding (MoU) has been established with Singapore. The CV will replace F/A-18A-C aircraft and complement the F/A-18E/F. The STOVL variant will replace Marine F/A-18s and AV-8Bs.

Status

The JSF is in its twelfth year of a planned 17-year SDD program. Following a Nunn-McCurdy breach, OSD certified the JSF as essential to national security. The DoD Base Realignment and Closure Commission 2005 directed the first JSF Integrated Training Center to be at Eglin Air Force Base, Florida. First CTOL variant SDD flight was December 2006; first STOVL flight was June 2008; and first CV flight was June 2010. Initial amphibious ship testing for the STOVL variant occurred onboard the USS Wasp (LHD 1) in October 2011. Initial Electro-Magnetic Aircraft Launch System (EMALS) testing for the CV occurred in November 2011. Completed roll-in arrestments and initial fly-in arrestments August 2012. STOVL Initial Operational Capability (IOC) is planned in 2015, and CV IOC is planned in 2018. By the end of 2014, the Navy plans to procure 50 STOVL (with 34 delivered) and 26 CV aircraft (with 13 delivered). The first USMC STOVL transition of a legacy F/A-18 squadron took place in November 2012. The first Navy CV transition of a legacy F/A-18 squadron is scheduled for 2016.

Developers

Lockheed Martin	Ft. Worth, Texas USA
Pratt & Whitney	Hartford, Connecticut USA

F/A-18E/F *Super Hornet* Strike-Fighter Aircraft

Description

The multi-mission F/A-18E/F *Super Hornet* strike fighter is an evolutionary upgrade of the F/A-18C/D *Hornet*. The F/A-18E/F is able

to conduct unescorted strikes against highly defended targets early in a conflict. The *Super Hornet* provides the carrier strike group with a strike fighter that has significant growth potential; more than adequate carrier-based landing weight, range, and endurance; and ordnance-carrying capabilities comparable to those of the F-14 *Tomcat* and F/A-18A/C *Hornet* it replaces. The single-seat F/A-18E and the two-seat F/A-18F have a 25 percent larger wing area and a 33 percent higher internal fuel capacity that effectively increases endurance by 50 percent and mission range by 41 percent. The *Super Hornet* incorporates two additional wing stations that allow for increased payload flexibility in the mix of air-to-air and air-to-ground ordnance. It has five "wet" stations that give the *Super Hornet* in-flight tanker capability, allowing it to replace the S-3 Viking in the tanking role. The *Super Hornet* is also able to carry a full array of the newest joint "smart" weapons, e.g., the Joint Direct Attack Munition (JDAM) and the Joint Standoff Weapon (JSOW).

The *Super Hornet* has the ability to recover aboard a carrier with optimum reserve fuel while carrying a load of precision-strike weapons. Its carrier-recovery payload is more than 9,000 pounds. The *Super Hornet* also has the space, power, and cooling capability needed to accommodate valuable but installation-sensitive avionics when they become available, including the Active Electronically Scanned-Array (AESA) radar.

Sophisticated systems—such as the Integrated Defensive Electronic Countermeasures System (IDECMS), Advanced Targeting Forward Looking Infrared (ATFLIR), Joint Helmet-Mounted Cueing System (JHMCS), JDAM and JSOW, AIM-9X missile, SHARP Shared Reconnaissance Pod, APG-79 AESA radar, and advanced mission computers and displays—make the F/A-18E/F an extremely capable and lethal strike platform. Future planned upgrades include Advanced Anti-Radiation Guided Missile (AARGM) and various cockpit and display improvements.

The first operational F/A-18E *Super Hornet* squadron (VFA-115) deployed on board the USS Abraham Lincoln (CVN 72) on July 24, 2002, for a ten-month initial deployment that included the opening events of Operation Iraqi Freedom. F/A-18E/F *Super Hornets* remain at the forefront of combat operations. *Super Hornet* squadrons have been integrated into all Navy air wings, and with future capability upgrades, are well suited to complement the arrival of the F-35 JSF.

Status

As of October 2012, there were 211 F/A-18E models and 245 F/A-18F models in the U.S. Navy inventory. F/A-18E/F program of record will complete at 552 aircraft with the last aircraft being procured in FY 2013.

Developers

Boeing	St. Louis, Missouri USA
General Electric	Lynn, Massachusetts USA

F/A-18A-D *Hornet* Strike-Fighter Aircraft

Description

The F/A-18 *Hornet* is a multi-mission strike fighter that combines the capabilities of a fighter and an attack aircraft. The single-seat F/A-18A and two-seat F/A-18B became operational in 1983. Eventually, the Hornet replaced the Navy's A-6, A-7, and F-4 and the Marine Corps' F-4 aircraft. Reliability and ease of maintenance were emphasized in the Hornet's design and F/A-18s have consistently flown three times as many hours without failure as other Navy tactical aircraft, while requiring half the maintenance time.

The F/A-18 is equipped with a digital fly-by-wire flight control system that provides exceptional maneuverability and allows the pilot to concentrate on operating the aircraft's weapons system. A solid thrust-to-weight ratio and superior turn characteristics, combined with energy sustainability, enable the *Hornet* to hold its own against any adversary. The ability to sustain evasive action is what many pilots consider to be the *Hornet's* finest trait. The F/A-18 is the Navy's first tactical jet to incorporate digital-bus architecture for the entire avionics suite, making this component of the aircraft relatively easy to upgrade on a regular and affordable basis.

Following a production run of more than 400 F/A-18A/Bs, deliveries of the single-seat F/A-18C and two-seat F/A-18D began in September 1987. The F/A-18C/D models incorporated upgrades for employing updated missiles and jamming devices. These versions are armed with the AIM-120 AMRAAM and the infrared-imaging version of the AGM-65 Maverick.

The *Hornet* has been battle tested and proved to be a highly reliable and versatile strike fighter. Navy and Marine Corps Hornets were in the forefront of strikes in Afghanistan in 2001 during Operation Enduring Freedom and continue serving in Operations Enduring Freedom and New Dawn. The latest lot of F/A-18C/D *Hornets* is far more capable than the first F/A-18A/Bs. Although the F/A-18C/D's growth is limited, the *Hornet* will continue to fill carrier air wings for years to come, before gradually giving way to the larger, longer-range and more capable F/A-18E/F *Super Hornet* and the F-35 Joint Strike Fighter. The last *Hornet*, an F/A-18D, rolled off the Boeing production line in August 2000.

Status

As of October 2012, the Navy and Marine Corps had 96 F/A-18A, 22 F/A-18B, 374 F/A-18C and 131 F/A-18D aircraft in service and test roles, and two NF/A-18C and two N4/A-18D versions in permanent test roles. Hornets equip 24 active Navy and Marine Corps and three Navy and Marine Corps Reserve strike fighter squadrons, two fleet readiness squadrons, three air test and evaluation squadrons, the Navy's Flight Demonstration Squadron (Blue Angels) and the Naval Strike & Air Warfare Center.

Developers

Boeing	St. Louis, Missouri USA
General Electric	Lynn, Massachusetts USA

HH-60H *Seahawk*

Description

The Navy's HH-60H *Seahawk* achieved Initial Operational Capability in 1989, providing combat search and rescue as well as naval special warfare support as an integral element of the carrier air wing. These capable aircraft are being replaced on board aircraft carriers by the newer MH-60S, but due to significant remaining airframe life, are being retained in two squadrons, HSC-84 and HSC-85, dedicated to special operations forces (SOF) combat support. HH-60H's use Forward Looking Infrared (FLIR) sensors, air-to-ground weapons, and robust communications capabilities to provide critical SOF mobility, fires, and logistics support. They are planned to remain in the naval inventory until 2028.

Status

All 35 HH-60H *Seahawks* are receiving necessary operational and maintenance capability upgrades to retain combat capability while leveraging MH-60 R/S technologies to reduce lifecycle costs.

Developers

Sikorsky Aircraft Corp	Stratford, Connecticut USA
General Electric	Lynn, Massachusetts USA

KC-130J *Hercules* Tactical Tanker and Transport

Description

The KC-130 is a four-engine turbo-prop, multi-role, multi-mission tactical aerial refueler and tactical transport aircraft that supports all six functions of Marine Aviation and is well suited to meet the mission needs of the forward-deployed MAGTF. The Hercules provides fixed-wing, rotary-wing, and tilt-rotor tactical air-to-air refueling; rapid ground refueling of aircraft and tactical vehicles; assault air transport of air-landed or air-delivered personnel, supplies, and equipment; command-and-control augmentation; battlefield illumination; tactical aero medical evacuation; combat search and rescue support. When equipped with the Harvest HAWK ISR / Weapon Mission kit, the aircraft can perform Multi-Sensor Image Reconnaissance (MIR) and provide Close Air Support (CAS). With its increase in speed, altitude, range, performance, state-of-the-art flight station (which includes two heads-up displays (HUDs), night vision lighting, an augmented crew station, fully integrated digital avionics), enhanced air-to-air refueling capability, and aircraft survivability enhancements, the KC-130J provides the MAGTF commander with multi-mission capabilities well into the 21st Century.

Status

The USMC requirement is for 79 KC-130Js. The legacy fleet of 51 KC-130F and R model aircraft were retired in February 2009, and 28 KC-130T model aircraft are yet to be replaced. As of October 2012, the USMC KC-130J inventory totaled 46 J-model *Hercules*.

Developers

Lockheed Martin	Marietta, Georgia USA

MH-53E *Sea Dragon*

Description

The MH-53E provides Airborne Mine Countermeasure (AMCM) capability to naval forces. Through various mine-hunting and mine-sweeping systems, the MH-53E supports undersea warfare by defending the fleet from surface and sub-surface mine threats and ensuring sea lines of communication remain passable for not only carrier and expeditionary strike groups, but also for vital commercial shipping. The MH-53E provides the Navy's only heavy-lift rotary-wing capability enabling over the horizon combat logistics support. Secondary missions include Vertical Onboard Delivery (VOD), Combat Logistics, Humanitarian Assistance and Disaster Relief (HA/DR), and Naval Special Warfare mission areas.

Status

The MH-53E program is executing an in-service sustainment strategy to ensure continued AMCM and heavy lift support to the sea base until the transition to MH-60S and Remote Multi-Mission Vehicle (RMMV) MCM capability is completed. The sustainment strategy addresses fatigue, obsolescence, readiness, and safety issues. A Fatigue Life Extension (FLEX) program is in progress, which will increase the aircraft service life to 10,000 hours and enable the Navy to maintain a legacy AMCM capability through the 2025 timeframe. In spring 2012 the USS Ponce deployed to the Arabian Gulf as an afloat forward staging base (AFSB), providing staging for MH-53Es and associated airborne mine-hunting and mine-sweeping systems. This conserves flying hours by reducing land-based transit flights to operating areas.

Developers

Sikorsky Aircraft	Stratford, Connecticut USA
General Electric	Lynn, Massachusetts USA

MH-60 R/S *Seahawk* Multi-Mission Combat Helicopters

Description

The MH-60R and MH-60S multi-mission combat helicopters are the two pillars of the CNO's Naval Helicopter Master Plan for the 21st Century. The complementary capabilities of these two helicopters are ideally suited to "Hunter-Killer" teams, leveraging MH-60R sensors and MH-60S weapons systems to rapidly neutralize surface and subsurface threats. As the Helicopter Master Plan is being implemented, Seahawks are deploying in companion squadrons as part of carrier air wings embarked in the Navy's aircraft carriers and as detachments on surface warships, logistics ships, and amphibious ships and at overseas stations. The MH-60R provides anti-submarine and surface warfare capability with a suite of sensors and weapons that include dipping sonar, surface search radar, electronic support measures, advanced Forward Looking Infrared (FLIR), precision air-to-surface missiles, and torpedoes. The MH-60S provides surface and mine countermeasure warfare capability, as well as robust Naval Special Warfare, Search and Rescue, Combat Search and Rescue, and logistics capability, with air-to-ground weapons and the same FLIR and Link16 capability as the MH-60R. Airborne mine countermeasure opera-

tions will be accomplished using advanced sensor and weapons packages to provide detection, localization, and neutralization of these anti-access threats. MH-60R/S platforms are produced with 85 percent common components (e.g., common cockpit and dynamic components) to simplify maintenance, logistics, and training.

Status

The MH-60R completed its Operational Evaluation in the third quarter FY 2005. It was authorized to enter Full Rate Production in March 2006. The Navy plans to acquire 291 MH-60Rs. The MH-60S was approved for full-rate production in August 2002 and in late 2012 is undergoing scheduled block upgrades for Armed Helicopter and AMCM missions. The MH-60R/S programs entered into multi-year contracts with Sikorsky Aircraft Corporation (MYP-8) for the airframe and Lockheed Martin (MYP-2) for the avionics systems for FYs 2012 through 2016. The Navy plans to acquire 275 MH-60S helicopters. In late 2012, there were 144 MH-60R and 211 MH-60S in the inventory.

Developers

Lockheed Martin	Owego, New York USA
Sikorsky	Stratford, Connecticut USA

MV-22 *Osprey*

Description

The MV-22B *Osprey* tilt-rotor aircraft—the only such operational military aircraft in the world—is an advanced technology vertical/short takeoff and landing (VSTOL), multi-purpose tactical aircraft replacing the fleet of Vietnam-era CH-46E helicopters. The MV-22B is a multi-mission aircraft acquired by the Marine Corps, Navy, and Air Force.

The MV-22B joins the Joint High Speed Vessel (JHSV) and Landing Craft Air Cushion (LCAC) as the sea-basing connectors necessary to execute expeditionary maneuver warfare. Specific missions for the MV-22B include expeditionary assault from land or sea; medium-lift assault support; aerial delivery; tactical recovery of aircraft and personnel; air evacuation; and rapid insertion and extraction.

The MV-22B's design incorporates the sophisticated but mature technologies of composite materials, fly-by-wire flight controls, digital cockpits, and advanced manufacturing processes. The MV-22B's prop-rotor system, engine and transmissions are mounted on each wingtip and allow it to operate as a helicopter for takeoff and landing. Once airborne, the nacelles rotate forward 90 degrees, transitioning the MV-22 into a high-speed, high-altitude, and fuel-efficient turboprop aircraft.

The MV-22 will be the cornerstone of Marine Corps' assault support capability, with the speed, endurance, and survivability needed to fight and win on tomorrow's battlefield. This combat multiplier represents a quantum improvement in strategic mobility and tactical flexibility for expeditionary forces. The *Osprey* has a 325-nautical mile combat radius, can cruise at 262 knots,

and is capable of carrying 24 combat-equipped Marines or a 12,500-pound external load. With a 2,100 nautical-mile single-aerial refueling range, the aircraft also has a strategic self-deployment capability.

Status

The Marine Corps' transition from the CH-46E to the MV-22B continues at the approximate rate of two *Ospreys* delivered per month and two squadrons transitioned per year. Production of the MV-22B is based on a block production strategy, which is designed to provide continual life-cycle and capability improvements throughout the life of the platform.

Block A-series aircraft are designed to serve as non-deployable, training aircraft only, and they include software enhancements, a nacelle reconfiguration, and additional reliability and maintainability improvements compared to the original aircraft design. All 30 Block A aircraft were delivered as of 2011.

Block B-series aircraft are the deployable configuration of the MV-22B *Osprey*. These aircraft provide improvements in effectiveness and maintainability for operators and maintainers, including improved access to the nacelle for inspection purposes and substantial reliability and maintenance improvements across the entire platform. All 108 Block B aircraft were delivered as of January 2012.

Block C aircraft incorporate mission enhancements and increased operational capability. Enhancements will include multiple additions: weather radar; a forward-firing ALE-47 dispenser; improved hover coupled features; an improved environmental conditioning system; and a troop commander situational awareness station. The first Block C aircraft was delivered to the fleet in January 2012.

Developers

Bell Helicopter Textron	Fort Worth, Texas USA
Boeing Defense and Space Group, Helicopter Division	Philadelphia, Pennsylvania USA
Rolls Royce	Indianapolis, Indiana USA

Naval Aviation Training Aircraft

Description

Commander, Naval Air Training Command's (CNATRA) mission is to safely train and produce the world's finest combat-quality aviation professionals—Aviators and Naval Flight Officers—and deliver them at the right time, in the right numbers, and at the right cost to the Fleet for follow-on tasking. This mission is key to affordable fleet readiness. CNATRA's training aircraft inventory includes the T-34 *Turbo Mentor*, T-6 *Texan II*, T-45 *Goshawk*, TH-57 *Sea Ranger*, T-44 *Pegasus*, TC-12 *Huron*, and the T-39 *Sabreliner*.

The first aircraft that all aspiring future USN/USMC pilots and flight officers fly are the T-34C *Turbo Mentor* or the T-6B *Texan II* (pilots) and the T-6A *Texan II* (flight officers). The T-34 began its Navy career in 1977 and has successfully completed its service at NAS Pensacola and NAS Whiting Field where it was the primary

training aircraft for Pilot and Undergraduate Military Flight Officer (UMFO) syllabi. All primary UMFO training is now conducted in the T-6A. The T-34C continues to be used for primary pilot training at NAS Corpus Christi, but will be replaced by the T-6B. The transition to the T-6B began in April 2010 at NAS Whiting Field and is scheduled to conclude in FY 2015 at NAS Corpus Christi.

The Joint Primary Aircraft Training System comprises the T-6 aircraft, flight simulators, computer-aided academics, and a Training Integration Management System. Built by Hawker Beechcraft Defense Corporation, the T-6 is a derivative of the Swiss Pilatus PC-9 aircraft and features a Pratt & Whitney PT-6A-68 engine, a digital cockpit, ejection seats, and cockpit pressurization and onboard oxygen-generating systems.

The T-45 *Goshawk*, the Navy version of the British Aerospace *Hawk* aircraft, is used for intermediate and advanced training in the strike (jet) pilot and UMFO syllabi. Upgrades to the T-45 include the conversion from analog (T-45A) to digital cockpits (T-45C), resolving an engine-surge issue to enhance fuel efficiency and safety, and preservation of in-service aircraft through Service Life Assessment and Service Life Extension Programs.

The TH-57 *Sea Ranger*, the Navy version of the commercial Bell *Jet Ranger*, is used for advanced training in the rotary-wing pilot syllabus. The TH-57B (visual flight), the TH-57C (instrument flight), and associated simulators will be converted from analog to digital cockpits (TH-57D), ensuring aircraft availability and relevance through 2030.

The T-44 *Pegasus* and the TC-12 *Huron* are both twin turboprop, pressurized, fixed-wing aircraft that are used for intermediate and advanced training in the multi-engine and tilt-rotor pilot syllabi. Future improvements to the T-44 include the replacement of wing wiring and simulator upgrades, and the conversion from analog (T-44A) to digital cockpits (T-44C).

The T-39 *Sabreliner* is a multi-purpose low-wing, twin-turbojet aircraft that has been in naval service since the early 1990s. The T-39 is used for intermediate and advanced training in the strike/strike-fighter UMFO syllabi. The T-45 is being used for the tactical maneuvering portion of strike/strike-fighter UMFO syllabus and will begin replacing the T-39 as the advanced phase radar trainer in FY 2013 with the integration of the Virtual Mission Training System (VMTS), an embedded synthetic radar training system.

CNATRA has charted a course to revolutionize UMFO training by employing the T-6A, the T-45C with VMTS, and high-fidelity simulators to train future UMFOs. This new training program will capitalize on cutting-edge technologies while allowing the Navy to divest of the aging T-39 platform. The new training syllabus is planned to achieve Initial Operating Capability at NAS Pensacola in FY 2013.

Status

The T-6 is in production with a planned inventory objective of 295 aircraft, with the last aircraft to be procured in FY 2014.

Developers

Hawker Beechcraft (T-6)	Wichita, Kansas USA
Boeing (T-45)	St. Louis, Missouri USA

P-8A *Poseidon* Multi-mission Maritime Aircraft (MMA)

Description

The P-8A *Poseidon* recapitalizes the broad area Anti-Submarine Warfare (ASW), Anti-Surface Warfare (ASUW), and armed Intelligence, Surveillance, and Reconnaissance (ISR) capability resident in the legacy P-3C *Orion*. The P-8A combines the proven reliability of the commercial 737 airframe, powerplants, and avionics with an open architecture that enables integration of modern sensors and communications networks. P-8A will leverage global logistics support infrastructure and commercial training applications to provide both higher operational availability and improved warfighting readiness. The P-8A will be built with incremental upgrades that include improved ASW sensors, network enabled ASW and ASUW weapons, sensor and targeting enhancements, and improved communications capability.

Status

The P-8A program is meeting all cost, schedule, and performance parameters in accordance with the Acquisition Program Baseline. The MMA program received a Milestone 0 decision in March 2000 and explored concepts for MMA with industry. Included in the concepts was the integration of UAVs to augment MMA capability. An Analysis of Alternatives (AoA) began in the summer 2000 and leveraged previous analyses and the results of the industry studies. The AoA concluded that manned aircraft are an essential element of providing broad area maritime and littoral armed ISR, and that UAVs provided a transformational opportunity for obtaining additional capability.

In 2002, the Navy re-engaged industry in Component Advanced Development, concept refinement, architecture design, and requirements validation. USD (AT&L) approved a revised acquisition strategy to focus MMA on P-3 replacement and not a P-3 Service Life Extension. The Operational Requirements Document/ Capability Development Document was endorsed by the Navy and Joint staff in preparation for a successful May 2004 Milestone B and entry into System Development and Demonstration. In June 2004, the Navy selected the McDonnell-Douglas Corporation, a wholly owned subsidiary of the Boeing Company, as the single system integrator. P-8A completed Preliminary Design Review in November 2005, Critical Design Review in June 2007, and Design Readiness Review in August 2007. The program successfully passed Milestone C in August 2010 and received permission from USD AT&L to buy three Low Rate Initial Production (LRIP) lots totaling 24 aircraft. The first LRIP aircraft delivery occurred in March 2012 to Patrol Squadron THIRTY (VP-30) at NAS Jacksonville, Florida, and the first operational VP squadron commenced transition from the P-3C to the P-8A in July 2012. Increment 1 of the P-8A program is on track for Initial Operational Capability (IOC) in late 2013, when the first squadron will have completed transition and

is ready to deploy. Increment 2, which includes a series of three Engineering Change Proposals (ECPs), is planned to achieve IOC in FY 2015, FY 2016, and FY 2017, respectively. Increment 3, which includes integration efforts that will deliver capabilities required to pace future threats, will reach IOC in 2020.

Developers
The Boeing Company Renton, Washington USA

P-3C *Orion* Modification, Improvement, and Sustainment

Description
The legacy P-3C *Orion* maritime patrol aircraft provides Anti-Submarine Warfare (ASW), Anti-Surface Warfare (ASUW), and Intelligence, Surveillance and Reconnaissance (ISR) capabilities to naval and joint task force commanders and contributes directly to maritime domain awareness across the globe. Squadrons are based in Jacksonville, Florida; Whidbey Island, Washington; and Kaneohe Bay, Hawaii. Due to the P-3's range and endurance and multi-mission capability, the airframe has been in high demand for the past five decades, and the aircraft are nearing the ends of their service lives.

The Navy's P-3 roadmap focuses on three areas: airframe sustainment; mission systems sustainment; and re-capitalization by the P-8A *Poseidon* Multi-Mission Maritime Aircraft (MMA). On the airframe sustainment front, 39 aircraft were grounded in December 2007, as a result of on-going Fatigue Life Management Program (FLMP) analysis that revealed the aft lower surface of the outer-wing (Zone 5) experienced fatigue at higher levels than previously estimated. Subsequently, the Chief of Naval Operations (CNO) approved a P-3 Recovery Plan, which included a dual-path approach that encompassed Zone 5 modifications, which included limited replacement of outer-wing components, as well as the manufacturing and installation of new outer-wing assemblies. The Mission System Sustainment program is designed to improve aircraft availability through replacement and upgrades of obsolete systems with modern hardware systems and software. These programs will ensure the P-3C continues to meet Navy's ASW, ASUW and ISR requirements through completion of the transition to the P-8A Poseidon in FY 2018.

Status
The Navy has successfully implemented its P-3C Fatigue Life Management Program as it awaits delivery of the P-8A *Poseidon*. Through CY 2012, 87 Special Structural Inspections (SSI), 39 Enhanced Special Structural Inspections (ESSI), 47 Special Structural Inspection-Kit (SSI-K) and 61 Zone 5 modifications have been completed, with 17 more aircraft sustainment activities in progress. Procurement of outer wing assemblies began in 2008 and installs commenced in 2011; five outer wing assemblies have been completed, with ten aircraft under rework.

Developers

Lockheed Martin	Marietta, Georgia USA
	Eagan, Minnesota USA
	Greenville, South Carolina USA
	Manassas, Virginia USA
L3 Communications	Greenville and Waco, Texas USA

VXX Presidential Replacement Helicopter

Description

A replacement is under review for the 37-year-old VH-3D and 23-year-old VH-60N helicopters that provide transportation for the President of the United States, foreign heads of state, and other dignitaries as directed by the White House Military Office. The Replacement Presidential Helicopter (VXX) will provide a survivable, mobile command-and-control transportation capability and a system-of-integrated-systems necessary to meet current and future presidential transport mission requirements.

Status

The VXX program is in Material Solution Analysis phase. An Initial Capabilities Document was approved by the JROC in June 2009, and the program received a Material Development Decision on June 7, 2010. An Analysis of Alternatives was completed in April 2012 and the program has been approved to enter at Milestone B in FY 2014. Risk reduction activities are ongoing in order to posture the program for success.

Developers

To be determined.

AVIATION WEAPONS

AGM-88E Advanced Anti-Radiation Guided Missile (AARGM)

Description

The Navy's AGM-88E (AARGM) is the latest evolution of the High-speed Anti-Radiation Mission (HARM) weapon system. HARM is the Navy's only anti-radiation, defense-suppression, air-to-surface missile. Employed successfully in naval operations for decades, HARM can destroy or suppress broadcasting enemy electronic emitters, especially those associated with radar sites used to direct anti-aircraft guns and surface-to-air missiles. Fielded configurations of HARM include AGM-88B (Block IIIA), AGM-88C (Block V), and AGM-88C (Block 5A). The HARM program is a Navy-led joint-service program.

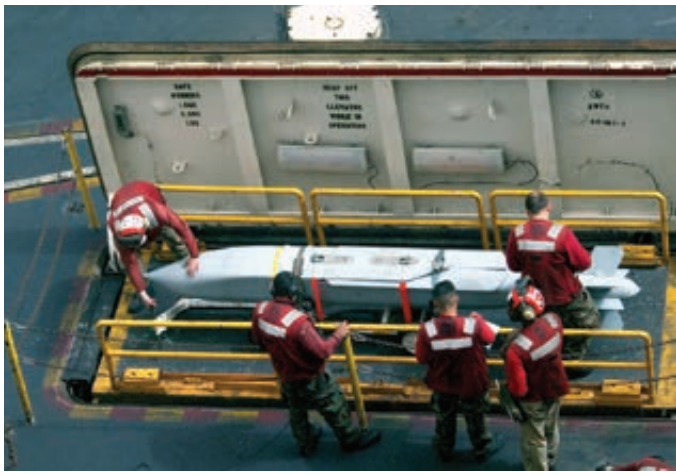
The AGM-88E (AARGM) program upgrades a portion of existing HARM missile inventory with a new guidance section and a modified control section to incorporate multi-sensor, multi-spectral, anti-radiation homing detection capability, Global Positioning System/Inertial Navigation System (GPS/INS) guidance, and a millimeter-wave terminal seeker. AARGM also includes a netted situation awareness/targeting capability and weapon impact as-

sessment reporting via direct connectivity with national technical means. The U.S. Department of Defense and the Ministry of Defense of the Republic of Italy have signed an international Memorandum of Agreement for cooperative development of AGM-88E. The AARGM system provides the U.S. Navy/Marine Corps and the Italian Air Force with a transformational and affordable upgrade to the legacy HARM.

Status
The AGM-88E ACAT-IC SDD program completed IOT&E and declared IOC during third quarter FY 2012. The Full Rate Production (FRP) decision was approved and first FRP contract was awarded in the fourth quarter FY 2012. The Navy is planning to procure 1,158 tactical rounds from FY 2014 through FY 2018 for integration on F/A-18C/D/E/F and EA-18G aircraft. The Italian Air Force will integrate AARGM on its Tornado ECR aircraft in accordance with the international cooperative development program agreements.

Developers
ATK Woodland Hills, California USA

AGM-154 Joint Standoff Weapon (JSOW)



Description
JSOW is a family of weapons that permits naval aircraft to attack targets at increased standoff distances using GPS and INS for guidance. All JSOW variants share a common body, but can be configured for use against area targets or bunker penetration. The JSOW Unitary (JSOW-C) variant adds an Imaging Infrared Seeker and Autonomous Target Acquisition (ATA) to attack point targets with precision and accuracy. Emergent, time-critical threats, whether in close-in proximity or over-the-horizon, require a weapon capable of penetrating sanctuaries through the weather, and affecting a lethal response against hostile vessels while minimizing the danger of collateral damage to friendly or neutral shipping. The JSOW-C-1 will incorporate new target tracking algorithms into the seeker for moving targets, giving the joint force commanders an affordable, air delivered, standoff weapon that is effective against fixed and re-locatable land and maritime targets. Used in conjunction with accurate targeting information and anti-radiation weapons, JSOW-C-1 will provide the capability to defeat enemy air defenses while creating sanctuaries that permit the rapid transition to low cost, direct-attack ordnance.

Status
AGM-154A reached IOC in 1999, and the AGM-154C variant achieved IOC in FY 2005. Procurement JSOW C-1 began in FY 2011 and will IOC in FY 2013. JSOW C-1 is planned to be procured until 2022.

Developers
Raytheon Tucson, Arizona USA

AIM-120 Advanced Medium Range Air-to-Air Missile (AMRAAM)

Description

AIM-120 AMRAAM is an all-weather, all-environment, radar-guided missile developed by the Air Force and Navy. The missile is deployed on the F/A-18A+/C/D *Hornet* and the F/A-18E/F *Super Hornet* and will be deployed on the EA-18G and Joint Strike Fighter (JSF) aircraft. Entering the fleet in September 1993, AMRAAM has evolved to maintain air superiority through Pre-Planned Product Improvement (P3I) programs. This modernization plan includes clipped wings for internal carriage, a propulsion enhancement program, increased warhead lethality, and enhanced electronic counter-countermeasures (ECCM) capabilities through hardware and software upgrades. Most importantly to the warfighter, the missile has improved capabilities against low- and high-altitude targets in an advancing threat environment. AIM-120C7 completed production in FY 2008 as AIM-120D production began. AMRAAM is expected to be the sole Medium/Beyond Visual Range (M/BVR) missile with the "sundown" of the AIM-7 Sparrow by the end of the future years defense program.

Status

The AIM-120C7 missile variant is a product of P3I and it reached IOC in FY 2008. AIM-120D IOC is scheduled for FY 2014. The AIM-120D is in Operational Test.

Developers

Raytheon Tucson, Arizona USA

AIM-9X Sidewinder Short Range Air-to-Air Missile

Description

The AIM-9X is the latest in the Sidewinder series. It is a fifth-generation IR launch-and-leave missile with superior detection and tracking capability, high off-bore sight capability, robust IR Counter-Countermeasures (IRCCM), enhanced maneuverability, and growth potential via software improvements. The AIM-9X development leveraged existing AIM-9M components to minimize development risk and cost. AIM-9X achieved Initial Operational Capability (IOC) in FY 2004 and is in production for both the United States and Foreign Military Sales (FMS) customers. Various independent obsolescence and Preplanned Product Improvements (P3I) efforts have been ongoing since IOC. A series of independent Engineering Change Proposals (ECPs) provided improved performance in the way of faster processors in the guidance control unit, an improved fuze/target detector (DSU-41), and smaller components. Exploiting these improvements, and the additional space they created, as part of an integrated solution provided an opportunity to increase the AIM-9X capability beyond what is fielded. The AIM-9X Block II Capability Production Document (CPD) was approved in FY 2011 to meet the upgraded requirement.

Status
More than 900 AIM-9X Block I all up rounds (AUR) and 350 Block I captive air training missiles (CATM) have been delivered to the Department of the Navy. AIM-9X Block II procurement began in FY 2011 and is in operational test.

Developers
Raytheon — Tucson, Arizona USA

Airborne Mine Neutralization System (AMNS)

Description
The AMNS is an expendable, remotely operated mine neutralization device that leverages non-developmental integration and commercial-off-the-shelf technologies. Deployed from MH-60S helicopters, it provides identification and neutralization of "proud" (i.e., not buried) and in-volume naval mines. AMNS devices are intended for use in previously detected mine locations, where it will reacquire and neutralize identified targets.

Status
Beginning in FY 2003, legacy AMNS (AN/ASQ-232) systems were procured for the MH-53E to provide a near-term contingency airborne neutralization capability. Follow-on AMNS (AN/ASQ-235) system integration work for the MH-60S began in FY 2003 and will continue through a projected FY 2014 IOC for the AMNS on the MH-60S and integrated aboard the Littoral Combat Ships (LCS) shipbuilding program.

Developers
Raytheon — Portsmouth, Rhode Island USA
BAE Systems — London, England

Joint Direct Attack Munition (JDAM) (GBU-31/32/38) / Laser JDAM (GBU-54)

Description
The Joint Direct-Attack Munition (JDAM) is an Air Force-led joint program, for a Global Positioning System (GPS)-aided, Inertial Navigation System (INS) guidance kit to improve the precision of in-service 500-pound, 1,000-pound, and 2,000-pound general-purpose and penetrator bombs in all weather conditions. JDAM addresses a broad spectrum of fixed and re-locatable targets at medium-range and releasing aircraft at high altitudes. The weapon is autonomous, all weather, and capable of being employed against pre-planned targets or targets of opportunity. This weapon system has proven to be a true force multiplier, allowing a single aircraft to attack multiple targets from a single release point and has shown its value many times over during operations in Iraq, Kosovo, and Afghanistan.

In September 2006, the Departments of Navy and Air Force undertook to provide a low-cost, non-developmental enhancement to GBU-38 (500-pound) to address moving targets. Open compe-

tition and source selection was completed in February 2010, and the contract was awarded to Boeing for a version of Laser JDAM (LJDAM), which provides a Direct-Attack Moving Target Capability (DAMTC). LJDAM (GBU-54) is a 500-pound dual-mode weapon that couples the GPS/INS precision of the JDAM and laser-designated accuracy of the LGB into a single weapon. LJDAM also provides added capability and flexibility to the Fleet's existing inventory of precision-guided munitions to satisfy the ground moving-target capability gap.

Status

LRIP for the 2,000-pound kits began in FY 1997, and Milestone III was reached in FY 2001. The 1,000-pound JDAM kit reached IOC in FY 2002, and IOC for the 500-pound weapon occurred during the second quarter of FY 2005. LJDAM reached IOC in FY 2012.

Developers

Boeing	St. Louis, Missouri USA
Lockheed Martin	Bethesda, Maryland USA

Paveway II (GBU-10/12/16) Laser Guided Bomb (LGB) / Dual-Mode LGB / Paveway III (GBU-24)

Description

The Paveway II/III Laser Guided Bomb (LGB) program is an Air Force-led joint effort with Navy. LGBs include GBU-10, -12, and -16, using the Mk 80/BLU series General Purpose (GP) bomb bodies, and GBU-24, which uses the BLU-109 bomb body with state-of-the-art guidance and control features. GBU-12 is a 500-pound class weapon; GBU-16 is a 1,000-pound class weapon; and GBU-10 is a 2,000-pound class weapon. An LGB has a Mk 80/BLU-series warhead fitted with a laser-guidance kit and Computer Control Group (CCG) mounted on the bomb nose.

The DMLGB retrofits legacy LGBs through conversion to a dual-mode configuration using common components. This provides increased flexibility to the warfighter by combining proven laser terminal guidance technology with the all-weather, fire-and-forget capability of Inertial Navigation System/Global Positioning System (INS/GPS).

Status

The DMLGB reached IOC in September 2007 on both the AV-8B and F/A-18. Approximately 7,000 DMLGB Kits have been procured. LGBs will remain in the inventory until at least 2020.

Developers

Raytheon	Tucson, Arizona USA
Lockheed Martin	Bethesda, Maryland USA

AVIATION SENSORS

Airborne Laser Mine Detection System (ALMDS)

Description

The ALMDS is a high-area coverage, electro-optic Airborne Mine Countermeasures (AMCM) laser system that detects, classifies, and localizes floating and near-surface moored sea mines. Deployed from the MH-60S helicopter, ALMDS will satisfy the Navy's need for a quick-response, wide-area MCM system that can rapidly detect and classify mine-like contacts for subsequent prosecution. This capability will be critical in littoral zones, confined straits, choke points, operating areas, and Amphibious Objective Areas. ALMDS offers a much greater area search rate than other types of AMCM equipment, and it represents a capability that does not exist in the inventory.

Status

A competitive contract was awarded in April 2000 for development of an integrated ALMDS system for the MH-60S. Milestone C and LRIP I occurred in FY 2005. The IOC is scheduled for FY 2014.

Developers

Northrop Grumman	Melbourne, Florida USA
Arete Associates	Tucson, Arizona USA

ALR-67(V)3 Advanced Special Receiver

Description

The ALR-67(V)3 is a Radar Warning Receiver (RWR) designed to meet Navy requirements through the year 2020. It enables the Navy F/A-18 family of aircraft to detect threat radar emissions, enhancing aircrew situational awareness and aircraft survivability.

Status

The ALR-67(V)3 program successfully completed EMD phase and operational testing in 1999 and is in full-rate production. Production quantities will eventually outfit all F/A-18 aircraft.

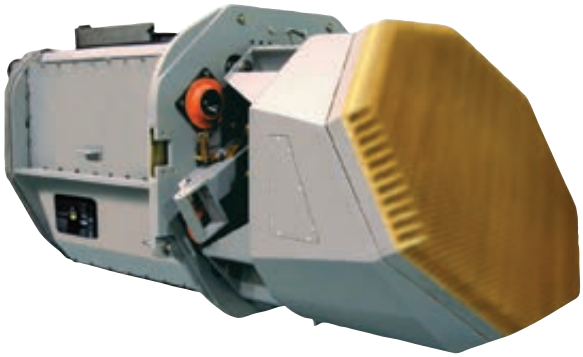
Developers

Raytheon	Goleta, California USA
Arete Associates	Tucson, Arizona USA

APG-79 Active Electronically Scanned Array (AESA) Radar System

Description

The APG-79 AESA Phase I upgrade provides multi-mode function flexibility while enhancing performance in the air-to-air arena (including cruise missile defense) as well as the air-to-ground arena. The Phase II upgrade provides enhanced performance in hostile electronic countermeasure environments and provides significant electronic warfare improvements enabling the targeting of hostile



emitters. Growth provisions will allow for future reconnaissance capability through the use of synthetic aperture radar technology and improved hardware and software. The APG-79 AESA radar is installed on block II F/A-18E/F and all EA-18G aircraft.

Status

The APG-79 completed subcontractor competition in November 1999, the Engineering and Manufacturing Development contract was awarded in February 2001, and the radar achieved Initial Operational Capability in 2007. Planned APG-79 AESA procurement is 537 systems—404 forward fit and 133 retrofit. AESA Milestone C and LRIP II approvals were received in January 2004, for initial delivery with Lot 27 *Super Hornets* in FY 2005. Full Rate Production was achieved in June 2007, following completion of the Initial Operational Test and Evaluation in December 2006. The first deployment of the AESA system was with VFA-22 in 2008. Retrofit installs into block II lot 26-29 F/A-18E/Fs will commence in 2013.

Developers

Boeing	St. Louis, Missouri USA
Raytheon	El Segundo, California USA

ASQ-228 Advanced Targeting Forward-Looking Infra-Red (ATFLIR)

Description

The ATFLIR provides the F/A-18A+/C/E/F aircraft with a significantly enhanced capability to detect, track, and attack air and ground targets over the AAS-38/46 NITEHAWK Targeting FLIR. Laser-guided and Global Positioning System (GPS) standoff weapons systems and higher-altitude attack profiles require the improved performance of the ATFLIR. The ATFLIR provides a significant improvement in operational effectiveness to support the precision strike mission requirements. Improved reliability and maintainability will increase operational availability while reducing total ownership costs.

Status

ATFLIR completed Phase I Operational Test and Evaluation in September 2003 and was determined to be operationally suitable and effective and was recommended for further fleet introduction. ATFLIR achieved IOC in September 2003 and has demonstrated its combat capability in support of Operations Iraqi Freedom and Enduring Freedom.

Developers

Boeing	St. Louis, Missouri USA
Raytheon	El Segundo, California USA

AVIATION EQUIPMENT AND SYSTEMS

Large Aircraft Infrared Countermeasures (LAIRCM)

Description

The AN/AAQ-24(V) 25, LAIRCM System combines advanced, two-color Infrared (IR) Missile Warning and Directed Laser Countermeasures to defeat shoulder-launched missiles. The system is being deployed on Marine Corps CH-53E and CH-46E assault helicopters to meet the urgent need for a "…state-of-the-art, reliable, carrier-based and land-based MWS and IR Countermeasure."

The LAIRCM system consists of five major components: IR MWS sensors; a dedicated processor; a Control Indicator Unit (CIU) for cockpit display; and Guardian Laser Tracker Assemblies (GLTA) consisting of a four-axis stabilized gimbaled system, a Fine Track Sensor (FTS), and a ViperTM laser.

The Naval Air Systems Command (NAVAIR) began LAIRCM integration on Navy C-40 and Marine Corps KC-130J platforms in FY 2012. The program will complete the Advanced Threat Warning (ATW) upgrade in FY 2013, which increases MWS performance, and adds Laser Warning and Hostile Fire Warning to address high priority threats and enhance overall survivability. The LAIRCM Program Office works closely with the U.S. Air Force to leverage contracts, test and evaluation, and sustainment efforts.

Status

LAIRCM initial operational capability (IOC) was achieved in May 2009 and a Full Rate Production (FRP) decision was approved in January 2010. The program is in FRP. Advanced Threat Warning OT&E and deployment is planned in FY 2013.

Developers

Northrop Grumman Rolling Meadows, Illinois USA

Integrated Defensive Electronic Counter-Measures (IDECM)

Description

The IDECM system is employed on the F/A-18 E/F *Super Hornet* and used to defend the host aircraft against radar-guided surface-to-air missile (SAM) systems and air-to-air missile systems. Through either a towed decoy or several onboard transmitters, the ALQ-214 produces complex waveform radar jamming that defeats advanced SAM systems.

Status

IDECM has been developed in three phases: Blk 1: ALQ-165 On Board Jammer and ALE-50 towed decoy (IOC FY 2002), Blk 2: ALQ-214 On Board Jammer and ALE-50 towed decoy (IOC FY2005), and Blk 3: ALQ-214 On Board Jammer and ALE-55 Fiber Optic Towed Decoy (IOC FY 2009). The ALQ-214 and ALE-50 (towed decoy) combination is in full-rate production, and the ALE-55 Fiber Optic Towed Decoy entered Full Rate Production in July 2011. IDECM is entering a fourth phase with development of the Blk 4 ALQ-214 On Board Jammer for the F/A-18C/D/E/F, which will IOC in FY14.

Developers

BAE Systems	Nashua, New Hampshire USA
ITT	Clifton, New Jersey USA

Joint and Allied Threat Awareness System (JATAS)

Description

JATAS is an advanced missile warning system that is designed to replace the legacy AN/AAR-47(V) Missile Warning System and increase the survivability of Marine Corps and Navy tilt-rotor and rotary-wing aircraft against IR threats. The system will also provide aircrew with warnings of laser-enabled weapon systems such as range finders, illuminators, and beam riders. The JATAS will interface with the existing AN/ALE-47 Countermeasures Dispensing System, the existing AN/APR-39 Radar Warning Receiver, the existing DoN Large Aircraft Infrared Countermeasure (LAIRCM) system, and other compatible Directed Infrared Countermeasures (DIRCM) systems as part of an integrated electronic countermeasures response to attacking infrared missiles. Additionally, the JATAS will be upgradeable to provide Hostile Fire Indication (HFI) of small arms, rockets, and other unguided threats.

JATAS will be deployed on the MV-22B (lead platform), AH-1Z, UH-1Y, and MH-60R/S. Per the January 2011 JROC-approved JATAS CDD and ASN(RDA) approved JATAS Acquisition Strategy, JATAS will be developed in two increments. Increment I, Phase I includes the missile warning and laser warning capabilities. Increment I, Phase II will add HFI capability against evolving threats during engineering and manufacturing development, if technology maturity permits. Increment II, when future technology advancements and funding permit, will develop HFI capability against Type II threats.

Status

JATAS completed a 16-month competitive prototyping technology development (TD) phase in January 2011. A process to select a single JATAS contractor for EMD via a full and open competition commenced in February 2011. JATAS cleared its Milestone B decision in June 2011, and the Navy awarded the EMD contract to ATK in July 2011. JATAS is in EMD phase with IOC scheduled for FY 2015 on the MV-22B.

Developers

ATK	Clearwater, Florida USA
ITT	Clifton, New Jersey USA

Joint Mission Planning Systems (JMPS)

Description

The Joint Mission Planning System-Maritime (JMPS-M)—the centerpiece of the Naval Mission Planning Systems (NavMPS) portfolio—is a suite of hardware, software, and peripheral equipment that Navy and Marine Corps aircrew use to plan and load mission data into aircraft, weapons, sensors, and avionics systems. It allows aircrew to perform tactical mission planning at various classification levels for a variety of aviation platforms and air-launched weapons, assembling required data from various information sources to enable tactical aircraft and weapon system mission execution. JMPS is designated the single mission-planning system for Naval Aviation; it brings "stovepipe" legacy MPS under one program and a common JMPS framework, which is a co-development effort with the Air Force. JMPS replaced legacy Navy Portable Flight Planning Software (N-PFPS) and other platform-specific MPS after incorporating the capabilities of N-PFPS, legacy H-60 MPS, among others. JMPS is the sole interface to load mission-critical data into supported fixed- and rotary-wing aircraft.

Status

JMPS is fielded in support of more than 35 type/model/series (T/M/S) aircraft: all F/A-18 variants, EA-6B, AV-8B, MV-22B, E-2C, C-2A, P-3C, EP-3E, all Navy helicopters (MH-53E, MH-60R/S, SH-60B/F, HH-60H), all Marine helos (AH-1W/Z, UH-1N/Y, CH-46E, CH-53E, VH-3D, VH-60N), and Naval Aviation training aircraft. JMPS replaced legacy Tactical Automated Mission Planning System (TAMPS) as the single MPS for Naval Aviation in FY 2006; TAMPS was retired in FY 2007. In FY 2008, JMPS began transitioning to a DoD-mandated Service Oriented Architecture (SOA); an initial SOA-based JMPS is scheduled to field in FY 2014.

Developers

BAE Systems	Rancho Bernardo, California USA
ITT	Clifton, New Jersey USA

Joint Precision Approach and Landing System (JPALS)

Description

The JPALS is a joint DoD effort with the Air Force and Army. The Navy assumed the lead service role in March 2007. JPALS fulfills the need for a rapidly deployable, adverse weather, adverse terrain, day-night, survivable, DoD/civil/internationally interoperable, and mobile Precision Approach and Landing capability that can support forward presence, crisis response, and mobility needs. Sea-based JPALS consists of a GPS/INS-based precision landing system component (Shipboard Relative GPS or SRGPS) with a two-way data-link and an independent backup system. JPALS provides critical enabling technology for several naval programs such as CVN/LH type ships, JSF, and unmanned systems (UCLASS). Sea-based JPALS will also be installed on all air-capable surface ships, carrier air wing aircraft, and DoD aircraft capable of operating from Navy ships. JPALS will replace the Automatic Carrier Landing System (ACLS) on nuclear aircraft carriers, SPN-35 on LH type amphibious ships, and various approach systems ashore, including Instrument Landing Systems (ILS), TACAN, and fixed and mobile Precision Approach Radar (PAR). JPALS land-based systems and aircraft systems will also be civil interoperable and FAA certifiable.

Status

JPALS completed MS B in June 2008, with contract award on September 15, 2008. Sea-based JPALS IOC is 2016. The system is on schedule for installation in CVN 78, the lead ship of the Gerald R. Ford new-design aircraft carrier program.

Developers

Raytheon Fullerton, California USA

Partnering developers include Rockwell Collins

Military Flight Operations Quality Assurance (MFOQA)

Description

MFOQA is knowledge-management process using data collected during flight to conduct post-flight analysis of aircrew and aircraft systems performance. MFOQA requires no additional equipment to be mounted on the aircraft platform and no additional tasking is added to the aircrew during flight. After each flight event, aircrew can remove the data-collection card, take it to the squadron ready room, and load in the data to squadron computers. Applying MFOQA software already loaded in the computer, the aircrew can replay the flight in animation, noting geographic position, instrument readings, and aircraft performance parameters. In addition, maintenance personnel can perform diagnostic analysis of the aircraft systems, aircrews can self-evaluate their performance, and squadron leadership can review and counsel on flight procedures and safety and training issues. The ultimate payoff will be increased readiness through improved safety, better training, and faster maintenance troubleshooting. Flight operations quality assurance has been used in the commercial aviation industry for years. Surveys from the airline industry have yielded high praise for the process and benefits to Maintenance, Operations, Safety, and Training (MOST) paradigm.

Status

MFOQA completed MS B in the first quarter FY 2007 and is scheduled for MS C in the second quarter FY 2014, with IOC shortly thereafter. The Navy plan will implement MFOQA capability for 22 type/model/series (T/M/S) aircraft during a phased approach. The lead platforms are the F/A-18C/D/E/F *Hornet* Strike Fighter and the EA-18G *Growler*. Follow-on phases will provide MFOQA capability to the MH-60R/S, MH/CH-53E/K, AH-1Z, and UH-1Y helicopters; the T-45 jet trainer; and MV-22B tilt-rotor aircraft with additional platforms to follow. Platform priorities are driven by several factors, including mishap rates, system architecture to support data collection, and fleet concerns.

Developers

Partnering developers include Rockwell Collins, Northrop Grumman, and SAIC. This is expected to be awarded to multiple sources after competition.

SECTION 2

SURFACE COMBATANTS

The U.S. Navy surface force accomplishes a range of missions that contribute to each of the Navy's core capabilities. Today's mix of surface combatants include fully integrated multi-mission guided missile cruisers and destroyers, modular multi-role littoral combat ships, frigates, and patrol coastal ships. Together, these ships ensure the Navy can meet demands for high-and low-end surface warfare missions and tasks. Operating forward, these ships provide credible presence to stabilize key regions, conduct maritime security operations, and respond to man-made and natural disasters. If necessary, they can also provide offensive and defensive capabilities to help ensure U.S. joint forces can gain and sustain access to critical theaters to deter and defeat aggression and project power.

SHIPS

CG 47 *Ticonderoga*-Class Aegis Guided Missile Cruiser Modernization

Description

Ticonderoga-class guided missile cruisers provide multi-mission offensive and defensive capabilities and can operate independently or as part of carrier strike groups, expeditionary strike groups, and surface action groups in support of global operations. *Ticonderoga*-class cruisers have a combat system centered on the Aegis Weapon System and the SPY-1B multi-function, phased-array radar. The combat system includes the Mk 41 Vertical Launching System (VLS), which employs Standard Missile surface-to-air missiles, Tomahawk land-attack cruise missiles, advanced undersea and surface warfare systems, embarked sea-control helicopters, and robust command, control and communications systems in a potent, multi-mission warship.

The Cruiser Modernization program includes hull, mechanical, and electrical (HM&E) upgrades as well as improved quality of life, mission life extension, Integrated Ship's Control (ISC), all-electric auxiliaries, and weight and moment modifications. Combat systems upgrades include an open-architecture computing environment. Specific improvements include upgrades in air dominance with Cooperative Engagement Capability (CEC), SPY radar upgrades, maritime force protection upgrades with the Close-In Weapon System (CIWS 1B), Evolved SeaSparrow Missile (ESSM), Nulka decoy and SPQ-9B radar, and the SQQ-89A(V)15 anti-submarine warfare suite. Open architecture cruiser modernization warfighting improvements will extend the Aegis Weapons System's capabilities against projected threats well into the 21st Century.

Status

Combat systems modernization commenced in FY 2008 with the USS Bunker Hill (CG 52). Twelve ships have completed the HM&E upgrade through the end of FY 2012. Bunker Hill completed the first combined HM&E and Combat Systems modernization availability in FY 2009. Five additional ships have completed combat systems modernization.

Developers

Huntington Ingalls Industries	Pascagoula, Mississippi USA
Lockheed Martin	Moorestown, New Jersey USA

DDG 1000 *Zumwalt*-Class Destroyer

Description

The DDG 1000 *Zumwalt*-class guided missile destroyer will be an optimally crewed, multi-mission surface combatant tailored for land attack and littoral dominance. This advanced warship will provide offensive, distributed, and precision fires in support of forces ashore and will provide a credible forward naval presence while operating independently or as an integral part of naval, joint or combined expeditionary strike forces. To ensure effective operations in the littorals, it will incorporate signature reduction, active and passive self-defense systems, and enhanced survivability features. It will field an undersea warfare (USW) suite capable of in-stride mine avoidance, as well as robust self-defense systems to defeat littoral submarine threats, next-generation anti-ship cruise missiles, and small boats. Additionally, it will provide valuable lessons in advanced technology, such as the integrated power system and advanced survivability features, which can be incorporated into other ship classes.

Status

The DDG 1000 Class was truncated to three ships in August 2008. DDG 1000 (Zumwalt) fabrication commenced in February 2009 and the ship is scheduled to deliver in FY 2014 with Initial Operational Capability (IOC) in FY 2016. At the start of fabrication, detail design was more than 80 percent complete and surpassed any previous surface combatant in design fidelity. Detail design is 100 percent complete as of early FY 2013, and Zumwalt (DDG 1000) physical progress is more than 75 percent complete. The ship's launch is scheduled in FY 2013. Michael Monsoor (DDG 1001) fabrication commenced in February 2010; the physical progress is greater than 40 percent complete, and the ship is scheduled to deliver in FY 2016 with sail away in FY 2017. Lyndon B. Johnson (DDG 1002) fabrication commenced in April 2012 and is scheduled to deliver in FY 2018 with Sail Away in FY 2019. The DDG 1000-class is being built by General Dynamics and Huntington Ingalls Industries with final assembly conducted at General Dynamics Bath Iron Works.

Developers

General Dynamics Bath Iron Works	Bath, Maine USA
Huntington Ingalls Industries	Pascagoula, Mississippi USA
Raytheon Systems, Inc.	Sudbury, Massachusetts USA
BAE Systems	Minneapolis, Minnesota USA

More than 80 companies nationwide, including Lockheed Martin, are also involved with DDG 1000.

DDG 51 *Arleigh Burke*-Class Aegis Guided-Missile Destroyer

Description

The *Arleigh Burke*-class guided missile destroyers combat system is centered on the Aegis Weapon System and the SPY-1D(V) multi-function, phased-array radar. The combat system includes the Mk 41 Vertical Launching System (VLS), an advanced anti-submarine warfare system, advanced anti-air warfare missiles, and Tomahawk land-attack cruise missiles. Incorporating all-steel construction and gas turbine propulsion, DDG 51 destroyers provide multi-mission offensive and defensive capability, operating independently or as part of a carrier strike group, surface action group, or expeditionary strike group. Flight IIA variants under construction incorporate facilities to support two embarked helicopters, significantly enhancing the ship's sea-control capability. A Flight III variant, which will incorporate the advanced Air and Missile Defense Radar (AMDR), is in development. Studies are on going to identify additional technology insertions to improve capability in other warfare area missions for Flight III.

Status

DDG 112 commissioned in October 2012 and completed the original DDG 51 acquisition program. DDG 112 is fitted with Aegis combat system Baseline 7 Phase 1R, which incorporates Cooperative Engagement Capability (CEC), Evolved SeaSparrow Missile (ESSM), improved SPY-1D(V) radar, and an open-architecture combat system using commercially developed processors and display equipment.

The DDG 51 line was restarted in FY 2010 to continue production of this highly capable platform. Contracts for four Flight IIA ships were awarded from FY 2010 through FY 2012. Additional Flight IIA ships are programmed in FY 2013 and beyond. Aegis Baseline 7.1R will be replaced with the Open Architecture Advanced Capability Build (ACB)-12 or follow-on Aegis Combat System, which is in development through the DDG Modernization program.

A multi-year contract is scheduled for award in FY 2013. This contract will include DDG 51 Flight IIAs, and DDG Flight IIIs which the Navy will begin to procure in FY 2016.

Developers

General Dynamics Bath Iron Works	Bath, Maine USA
Huntington Ingalls Industries	Pascagoula, Mississippi USA
Lockheed Martin	Moorestown, New Jersey USA

DDG 51 *Arleigh Burke*-Class Aegis Guided Missile Destroyer Modernization

Description

Arleigh Burke-class guided missile destroyers commenced mid-life modernization in FY 2010 with DDGs 51 and 53. The program will be accomplished in two phases. The first phase will concentrate on the hull, mechanical, and electrical (HM&E) systems to include new gigabit Ethernet connectivity in the engineering plant, a Digital Video Surveillance System (DVSS), an Integrated Bridge System (IBS), an advanced galley, and other habitability and manpower reduction modifications. A complete open-architecture computing environment will be the foundation for warfighting improvements in the second phase of the modernization for each ship. The upgrade plan consists of an improved Multi-Mission Signal Processor (MMSP) integrating air and ballistic missile defense (BMD) capabilities and enhancements improving radar performance in the littoral regions. Upon the completion of the modernization program, the ships will have the following weapons and sensors: Cooperative Engagement Capability (CEC), Evolved SeaSparrow Missile (ESSM), Close-In Weapon System (CIWS) Blk 1B, Surface Electronic Warfare Improvement Program (SEWIP), and Nulka decoys. The *Arleigh Burke*-class Mk 41 Vertical Launching System (VLS) will be upgraded to support SM-3 and newer variants of the Standard Missile family. These two phases will be accomplished on each ship approximately two years apart. Modernized DDG 51 class guided missile destroyers will continue to provide multi-mission offensive and defensive capabilities with the added benefit of sea-based protection from the ballistic missile threat.

Status

HM&E modernization modifications have been designed into the most recent new-construction *Arleigh Burke*-class destroyers. Incorporating modernization design in new construction optimizes risk reduction and proof of alteration in the builder's yards, reducing overall risk in the modernization program. DDG Modernization initially concentrates on the Flight I and II ships (hulls 51-78), but is intended as a modernization program for the entire class.

Developers

General Dynamics Bath Iron Works	Bath, Maine USA
Lockheed Martin	Moorestown, New Jersey USA

FFG 7 *Oliver Hazard Perry*-Class Guided Missile Frigate Modernization

Description

Oliver Hazard Perry-class frigates are capable of operating as integral parts of carrier strike groups or surface action groups. They are primarily used today to conduct maritime interception operations, presence missions, and counter-drug operations. A total of 55 *Perry*-class ships were built; 51 for the U.S. Navy and four for the Royal Australian Navy. Of the 51 ships built for the United States, 15 remain in active commissioned service in early FY 2013.

Status

Oliver Hazard Perry–class frigates completed modernization in FY 2012. Improvements assist the class in reaching its 30-year expected service life, correcting the most significant class maintenance and obsolescence issues, which included replacing four obsolete ship service diesel generators (SSDG) with commercial off-the shelf (COTS) SSDGs, obsolete evaporators with COTS reverse-osmosis (RO) units, and track-way boat davits with COTS slewing arm davits (SLADs). Other major hull, mechanical, and electrical (HM&E) alterations included ventilation modifications and number-three auxiliary machinery room fire-fighting sprinkler modifications. All FFGs are scheduled for decommissioning by FY 2019.

Developers

General Dynamics Bath Iron Works — Bath, Maine USA

Littoral Combat Ship (LCS)

Description

Successful joint and combined operations will increasingly depend on our ability to gain and sustain access in the face of unpredictable and asymmetric threats. Events of the last decade have brought a renewed sense of urgency to these missions. The anti-access threats challenging our naval forces in the littorals include quiet diesel submarines, mines, and small, highly maneuverable surface-attack craft. Such threats have great potential to be effectively employed by many less-capable countries and non-state actors to prevent unhindered access by U.S. forces to littoral areas.

Littoral Combat Ship (LCS) is a key element of Navy's future force and is optimized to defeat these anti-access threats in the littoral. Using an open architecture design, modular weapons, sensor systems, and a variety of manned and unmanned vehicles to gain, sustain, and exploit littoral maritime supremacy, the LCS ensures U.S. joint force access to critical theaters. Technology has matured to the point where significant warfighting capability can be employed from a small, focused-mission warship like the LCS. Mission packages (MPs) are being developed that will give LCS capabilities critical to forcible entry, sea/littoral superiority,

and homeland defense missions. The ship also possesses organic capabilities to conduct missions supporting intelligence, surveillance and reconnaissance (ISR); special operations, intra-theater lift; anti-terrorism/force protection; and maritime interdiction. Fully self-deployable and capable of sustained underway operation from homeport to any part of the world, LCS has the speed, endurance, and underway replenishment capability to transit and operate independently, with carrier strike groups, expeditionary strike groups, or surface action groups.

The LCS will capitalize on emerging unmanned vehicle, sensor, and weapons technologies to deliver focused-mission capability in mine countermeasures (MCM), surface warfare (SUW), and anti-submarine warfare (ASW). In May 2004, the Navy awarded two contract options to Lockheed Martin and General Dynamics / Austal to build the first LCS ships. The Lockheed Martin design is a steel semi-planning monohull designated with odd numbers. The General Dynamics design is an aluminum trimaran hull designated with even numbers.

Status

The USS Freedom (LCS 1), the first Lockheed Martin ship, was commissioned in November 2008 and conducted a successful early deployment in spring 2010. LCS 1 will commence its first full deployment in 2013. The USS Independence (LCS 2), the first General Dynamics ship, was commissioned in January 2010. LCS 2 is undergoing post-delivery tests and trials and preparations for MCM mission package testing in FY 2014. In 2009, the Navy awarded fixed-price type contracts for the Lockheed Martin USS Fort Worth (LCS 3) and General Dynamics / Austal Pre-Commissioning Unit Coronado (LCS 4) in 2009. LCS 3 was delivered June 2012 and commissioned September 22, 2012, and is undergoing post-delivery test and trials in San Diego, California. LCS 4 is under construction and scheduled to deliver in 2013. In December 2010, Navy received congressional authorization to proceed with a dual block buy, procuring 20 LCS, 10 of each design, through FY 2015. The Navy has since awarded fixed price type contracts to Lockheed Martin and Austal USA (formerly teamed with General Dynamics) for the first of these ships (LCS 5 – LCS 12).

Developers

Lockheed Martin and Marinette Marine	Marinette, Wisconsin USA
Austal USA	Mobile, Alabama USA

PC 1 *Cyclone*-Class Patrol Coastal Modernization Program

Description

Cyclone-class Patrol Coastal (PC) ships are essential for conducting theater security cooperation (TSC) tasks, maritime security operations (MSO), and intelligence, surveillance, and reconnaissance (ISR). PCs are uniquely suited to operating with maritime partner navies, particularly in the green-water/brown-water "seam." A total of 14 *Cyclone*-class ships were built; 13 are operating in the U.S. Navy and one was transferred to the Philippine Navy in 2004.

The PC Modernization improvements correct the most significant maintenance and obsolescence issues and will extend the life of the class by 15 years, to a 30-year expected service life (2023-2026). The program supports significant alterations, such as a main propulsion diesel engine pool and upgrading diesel generators and reverse-osmosis units. Additional hull, mechanical, and electrical (HM&E) modifications and updates to the weapons systems and C4ISR suite are also included. As part of Navy's-Counter Swarming Strategy, for example, a 7.62mm coaxial mount Gatling gun will be integrated into the forward and aft Mk 38 Mod 2 25mm electro-optical/infrared (EO/IR) machine gun system (MGS) to augment the PCs' surface warfare (SUW) capabilities for layered self-defense. In addition to the Mk 38 Mod 2 upgrade, the Griffin missile system installation is planned for all ten PCs to be deployed to Bahrain.

Status

The 13-ship *Cyclone*-class modernization program commenced in FY 2008; it is fully funded and scheduled for completion by FY 2017. Five PCs are forward deployed to Bahrain; the remaining eight PCs are home ported in Little Creek, Virginia. The Navy plans to deploy forward an additional five PCs to Bahrain, bringing the total PC complement there to ten by FY 2014. The first three will arrive in Bahrain in FY 2013, with the remaining two arriving in FY 2014. The forward and aft Mk 38 Mod 2 MGS upgrade was completed on all ten Bahrain PCs, with the remaining three PCs planned for completion in FY 2017.

Developers

Bollinger Shipyards, Lockport, LA USA

SURFACE WEAPONS

Advanced Gun System (AGS)

Description

The 155mm (6-inch) Advanced Gun System is planned for installation in the three *Zumwalt* (DDG 1000)-class destroyers to provide precision, volume, and sustained fires in support of distributed joint and coalition forces ashore. The AGS is a fully integrated, automatic gun and magazine weapon system that will support the *Zumwalt*-class naval surface fire support (NSFS) mission. Each system will be capable of independently firing up to ten rounds per minute. The AGS program includes development of the global positioning system (GPS)-guided 155mm Long-Range Land-Attack Projectile (LRLAP), the first of a family of AGS munitions. The DDG-1000 AGS was designed to meet optimal manning and radar-signature requirements.

Status

AGS manufacturing is underway at three facilities—Cordova, Alabama; Fridley, Minnesota; and Louisville, Kentucky—and is meeting the ships' production schedules. AGS magazines and guns have been delivered to Bath Iron Works (BIW) for DDG-1000. For DDG 1001, two magazines have been delivered to BIW; the first and second guns will be delivered in FY 2013. DDG 1002's magazine and gun production is in progress to meet in-yard need dates.

Developers

BAE Systems	Minneapolis, Minnesota USA

Long-Range Land-Attack Projectile (LRLAP)

Description

The Long-Range Land-Attack Projectile (LRLAP) is a 155mm (6-inch) gun-launched, rocket-assisted guided projectile developed for the Advanced Gun System (AGS) on the *Zumwalt* (DDG 1000)-class ships. The LRLAP is an advanced round that uses a global positioning system (GPS)-based guidance system and a unitary warhead to hit land-based targets at long ranges. It is the only round that the AGS is designed to fire and the only gun-launched, extended-range guided-projectile program of record (POR).

Status

LRLAP is in the engineering, manufacturing, and development phase through FY 2013. Development efforts are funded under the Advanced Gun System RDT&E budget.

Developers

BAE	Louisville, Kentucky USA
Lockheed Martin Missile and Fire Control	Orlando, Florida USA

Mk 15 Phalanx Close-In Weapon System (CIWS)

Description

The Mk 15 Mod 21-28 Phalanx Close-In Weapon System is an autonomous combat system that searches, detects, tracks (radar and electro-optic), and engages threats with a 20mm Gatling gun capable of firing 4,500 tungsten penetrator rounds per minute. Integral to ship self-defense and the anti-air warfare "defense-in-depth" concept, CIWS provides terminal defense against anti-ship missiles and high-speed aircraft penetrating other fleet defenses. Phalanx CIWS can operate autonomously or be integrated with a ship's combat system.

The Block 1B configuration provides expanded defense against asymmetric threats such as small, fast surface craft, slow-flying aircraft, and unmanned aerial vehicles through the addition of an integrated forward-looking infra-red (FLIR) system. Block 1B also incorporates an optimized gun barrel (OGB) for tighter ordnance dispersion. Enhanced lethality cartridges (ELC) can be used with the OGB for improved target penetration.

Mk 15 Mod 29 CIWS is the Land-based Phalanx Weapon System (LPWS) configuration developed to counter rocket, artillery, and mortar attacks. LPWS uses the inherent capabilities of CIWS Block 1B mounted on a trailer with portable power generation and cooling systems. The LPWS is deployed as part of the Counter-Rocket, Artillery, and Mortar (C-RAM) program by the U.S. Army at several forward operating bases (FOBs), defending U.S. personnel and assets as part of Operation New Dawn and Operation Enduring Freedom.

Mk 15 Mod 31 is the SeaRAM CIWS system. SeaRAM is also based on the Block 1B Phalanx configuration, with the gun subsystem replaced by an 11-round Rolling Airframe Missile (RAM) launcher. SeaRAM can be integrated with ship's combat system, but is capable of autonomously searching, detecting, tracking, and engaging threats with the RAM.

Status

More than 250 Mk 15 Phalanx CIWS systems are deployed in the Navy. By the end of FY 2014, all ships are scheduled to have Block 1B, and all ships are scheduled to complete an upgrade to baseline 2 by the end of FY 2019.

The Army has procured 45 LPWS systems for FOB defense under the C-RAM program. Two SeaRAM CIWS systems have been installed on the USS Independence (LCS 2) and USS Coronado (LCS 4). Subsequent SeaRAM CIWS deliveries/installations are dependent on the Littoral Combat Ship (LCS) program acquisition strategy.

Developers

Raytheon (Production/Depot)	Louisville, Kentucky USA
Raytheon (Engineering)	Tucson, Arizona USA

Mk 38 Mod 2 Stabilized 25mm Chain Gun

Description

The Mod 2 program upgrades the Mk 38 Mod 1 25mm chain gun by adding stabilization, remote operation, fire control, and an electro-optical sensor. These additions significantly expand the effective range, lethality, and nighttime capability of the weapon. The program reduces risk for surface ship self-defense by engaging asymmetric threats to ships at close range. It provides the capability to bridge current and future targeting and weapons technology in a close range force protection environment, including protection in port, at anchor, transiting choke points, or while operating in restricted waters.

Status

The Mk 38 Mod 2 was initiated in 2003 to improve ship self defense by developing and fielding a mid-term capability for surface ships that is simple, stabilized, and affordable. The program has now fielded 52 percent of the planned total of gun upgrades. The Mk 38 Mod 2 machine gun system (MGS) is being permanently installed on CG 47, DDG 51, LSD 41, LPD 17, PC, FFG, LHD, LHA, and LCC class ships. The Navy plans to expand Mk 38 fielding to aircraft carriers and submarine tenders as part of the Task Force Defense Initiative.

Developers

BAE	Louisville, Kentucky USA
Rafael USA, Inc.	Bethesda, Maryland

Mk 45 Mod 4 5-Inch/62-Caliber Gun System Upgrade

Description

The Mk 45 Mod 4 5-inch/62-caliber gun is a modification of the 5-inch/54-caliber gun with higher firing energies to support longer-range munitions. The gun retains the functionality of the 5-inch guns, including ability to fire all existing 5-inch rounds. The modified design also improves maintenance procedures and provides enhanced anti-surface and anti-air warfare performance. Modifications include a longer (62-caliber) barrel, an ammunition recognition system, and a digital control system.

Status

The gun was added to the *Arleigh Burke* (DDG 51)-class of destroyers starting with the USS Winston S. Churchill (DDG 81). As of September 2012, 30 destroyers and eight cruisers are equipped with the 5-inch/62 gun.

Developers

BAE Systems	Minneapolis, Minnesota USA

Mk 54 Lightweight Torpedo (LWT)

Description

The MK 54 Lightweight Torpedo is a modular upgrade to the lightweight torpedo inventory and adds the capability to counter quiet diesel-electric submarines operating in the littorals. The Mk 54 LWT combines existing torpedo hardware and software from the Mk 46, Mk 50, and Mk 48 Advanced Capability (ADCAP) programs with advanced digital commercial off-the shelf (COTS) electronics. The resulting Mk 54 LWT offers significantly improved shallow-water capability at reduced life-cycle costs. The Mk 54 LWT modernization plan will introduce new hardware and software updates providing stepped increases in probability of kill, while reducing life-cycle cost and allowing the torpedo to remain ahead of the evolving littoral submarine threat. The Mk 54 is replacing the Mk 46 as the payload in the Vertical-Launch Anti-Submarine Rocket (ASROC / VLA).

Status

Full-rate production began in FY 2005 with a procurement of 94 torpedoes. Mk 54 torpedoes are being delivered for fleet use to meet the total munitions requirement. Mk 46 torpedo maintenance has been augmented to supplement LWT inventory while Mk 54 inventory is built up. The Mk 54 Block Upgrade is undergoing operational testing, with initial operational capability (IOC) projected in FY 2013. The Mk 54 VLA achieved IOC in March 2010. The Navy is planning to procure 1,286 Mk 54 torpedoes from FY 2014 through FY 2018.

Developers

LWT: Raytheon	Mukilteo, Washington USA
VLA: Lockheed Martin	Akron, Ohio USA

RGM/UGM-109E Tomahawk Land-Attack Missile (TLAM)

Description

Tomahawk Land-Attack Missile is the Navy's premier, all-weather, long-range, subsonic land-attack cruise missile deployed on surface warships and attack and guided missile submarines. The Block IV Tactical Tomahawk (TACTOM–RGM-109E/UGM-109E) preserves Tomahawk's long-range precision-strike capability while significantly increasing responsiveness and flexibility.

TACTOM improvements include in-flight retargeting, the ability to loiter over the battlefield, in-flight missile health and status monitoring, and battle damage indication imagery providing a digital look-down "snapshot" of the battlefield (via a satellite data link), rapid mission planning and execution via Global Positioning System (GPS) onboard the launch platform; improved anti-jam GPS; and alternative payloads that include smart sub-munitions, a penetrator warhead, and a multiple-response warhead.

Plans call for the Navy to procure more than 3,000 TACTOM missiles prior to program termination. TLAM Block III missiles will be retired from service by 2020.

Status
A full-rate production contract was signed in August 2004. It was Navy's first multi-year contract for TACTOM procurement, producing more than 1,500 missiles. This contract ended in FY 2008 and all missiles have been delivered. Tomahawk Block IV procurement in FY 2009 to FY 2011 was executed via firm fixed-price contracts. The Navy is planning to procure 980 TACTOMs from FY 2014 through FY 2018.

Developers
Raytheon Missile Systems Tucson, Arizona USA

RIM-7, Mk 57 NATO SeaSparrow Surface Missile System (NSSMS) and RIM-162 Evolved SeaSparrow Missile (ESSM)

Description
The Mk 57 NATO SeaSparrow Surface Missile System and its associated RIM-7P NSSM or RIM-162 Evolved SeaSparrow Missile serves as the primary surface-to-air ship self-defense missile system. NSSMS is deployed on aircraft carriers (CVN), surface warships, and landing helicopter dock (LHD)-class amphibious assault ships, and is being installed on the newest class of landing helicopter assault (LHA 6) amphibious assault ships. The Mk 57 Target Acquisition System (TAS) is a combined volume-search radar and control element that determines threat evaluation and weapon assignment. A kinematic upgrade to the RIM-7P missile, ESSM is the next-generation SeaSparrow missiles that serve as a self-defense weapon on cruisers, destroyers, aircraft carriers, and the *America* (LHA 6)-class ships. ESSM upgrades include a more powerful rocket motor, tail control section for quick response on vertical launch system (VLS) ships, upgraded warhead, and a quick-reaction electronic upgrade. Enhanced ESSM kinematics and warhead lethality leverage the robust RIM-7P guidance capability to provide increased operational effectiveness against high-speed, maneuvering, hardened anti-ship cruise missiles at greater intercept ranges than the RIM-7P.

Operational in FY 2004, ESSM is procured as part of the NATO SeaSparrow Consortium involving ten NATO countries. In order to pace evolving threats, the next generation ESSM Block 2 is being developed cooperatively by seven countries, replacing the missile guidance section with an active/semi-active dual-mode seeker.

Status
The NSSMS remained in production for America (LHA 6) and Ford (CVN 78). ESSM will be deployed on LHD, LHA 6, and cruisers and destroyers through planned modernization programs. However, LHA 5 will remain a RIM-7P "shooter." By 2025, 114 U.S. Navy ships will be armed with ESSM. ESSM joint universal weapon link (JUWL) development is on track, and interrupted continuous wave illumination (ICWI) is already incorporated. DDG 1000 and CVN 78 will require a unique variant of ESSM, incorporating both ICWI and JUWL. ESSM Block 2 is currently in

risk-reduction phase and will reach Milestone B in FY 2014 with initial operational capability (IOC) in 2020.

Developers

Raytheon	Tucson, Arizona USA

RIM-116A Rolling Airframe Missile (RAM)

Description

The RIM-116A Rolling Airframe Missile is a high-firepower, low-cost system based on the AIM-9 Sidewinder to engage anti-ship cruise missiles (ASCMs). RAM is a five-inch diameter surface-to-air missile with passive dual-mode radio frequency/infrared (RF/IR) guidance and an active-optical proximity and contact fuse. RAM has minimal shipboard control systems and is autonomous after launch. Effective against a wide spectrum of existing threats, RAM Block 1 IR upgrade incorporates IR "all-the-way-homing" to improve performance against evolving passive and active ASCMs. Plans are for RAM to evolve and keep pace with emerging threats. RAM Block 2, in the System Development and Demonstration (SDD) phase, will provide increased kinematic capability against highly maneuvering threats and improved RF detection against low probability of intercept threats.

The RAM program is a cooperative partnership with Germany, and the Block 2 missile is being developed jointly (50/50) with Germany.

Status

RAM is installed in *Tarawa*-class (LHA 1) and *Wasp*-class (LHD 1) class amphibious assault ships, *Whidbey Island*-class (LSD 41) and *Harpers Ferry*-class (LSD 49) dock landing ships, aircraft carriers (CVNs), and *San Antonio*-class (LPD 17) landing platform dock ships. RAM is also installed on the USS Freedom (LCS 1), the Lockheed Martin variant of the Littoral Combat Ship (LCS).

In 2001, an Engineering Change Proposal was submitted to develop a SeaRAM configuration. SeaRAM removed the Phalanx Gun System from the Close-In Weapon System (CIWS) and incorporated an 11-round RAM missile launcher system. The battlespace was increased by modifying the Phalanx radar to detect low-elevation, low-radar cross-section threats at an increased range. No missile modifications were required. SeaRAM was selected by General Dynamics as part of the combat system for the *Independence*-class (LCS 2) LCS.

The Block 2 missile is in the first year of low-rate initial production and scheduled to initial operational capability (IOC) in FY 2013.

Developers

Raytheon	Tucson, Arizona USA
RAMSYS GmbH	Ottobrunn, Germany

RIM-66C Standard Missile-2 Blocks III/IIIA/IIIB

Description

The RIM-66C Standard Missile (SM)-2 is the Navy's primary air-defense weapon. SM-2 Block III/IIIA/IIIB configurations are all-weather, ship-launched, medium-range surface-to-air missiles in service with the U.S. Navy and 15 allied navies. SM-2 enables forward naval presence, littoral operations, and projecting and sustaining U.S. forces in anti-access and area-denied environments. SM-2 Block III/IIIA/IIIB missiles are launched from the Mk 41 Vertical Launching System (VLS) installed in Aegis cruisers and destroyers. Block III features improved performance against low-altitude threats and optimizes the trajectory-shaping within the Aegis command guidance system by implementing shaping and fuse altimeter improvements. Block IIIA features improved performance and lethality against sea-skimming threats due to a new directional warhead and addition of a moving target indicator fuse design. Block IIIB adds an infrared-guidance mode capability developed in the Missile Homing Improvement Program (MHIP) to improve performance in a stressing electronic countermeasure environment. Blocks IIIA/IIIB will be the heart of the SM-2 inventory for the next 20 years. The latest generation of Block IIIB missiles includes a maneuverability upgrade (SM-2 Block IIIBw/MU2) to enhance IIIB performance against low-altitude, supersonic maneuvering threats.

Status

The SM-2 program transitioned to the sustainment phase with the cancellation of all-up-round production and the service life extension program (FY 2011/FY 2012). The Navy has established a limited depot (FY 2013) and rocket motor regrain program (FY 2014) to maintain the inventory out to the 2030 timeframe. This will allow the SM-2 inventory to keep pace with Navy's 30-year shipbuilding plan, keep infrastructure in place to convert SM-2 Blk IIIA missiles to the unique interrupted continuous wave illumination/joint universal weapon link (ICWI/JUWL) variant for the three *Zumwalt* (DDG 1000)-class warships, and support projected increases in fleet proficiency firings.

Developers

Raytheon — Tucson, Arizona USA

SM-6 Standard Missile 6 Extended-Range Active Missile (ERAM) Block I/II

Description

Standard Missile (SM)-6 is the U.S. Navy's next-generation extended-range anti-air warfare (AAW) interceptor. The introduction of active-seeker technology to air defense in the surface fleet reduces Aegis Weapon System's (AWS) reliance on illuminators. It also provides improved performance against stream raids and targets by employing advanced characteristics such as enhanced maneuverability, low-radar cross-section, improved kinematics, and advanced electronic countermeasures. The SM-6 Extended Range Active Missile (ERAM) acquisition strategy is characterized as a low-risk development approach that leverages SM-2 Block IV/IVA program non-developmental items and Raytheon's Advanced Medium Range Air-to-Air Missile (AMRAAM) Phase 3 active seeker

program from Naval Air Systems Command (NAVAIR). The SM-6 missile will be fielded on in-service *Arleigh Burke* (DDG 51)-class destroyers and *Ticonderoga* (CG 47)-class cruisers.

Status
The Navy established the SM-6 Extended-Range Air Defense program in FY 2004. SM-6 received permission to proceed with LRIP Lot 3 and procure long-lead material in April 2011. The program completed initial operational test and evaluation in July 2011 and is in low-rate initial production.

Developers

Raytheon	Tucson, Arizona USA

SURFACE SENSORS AND COMBAT SYSTEMS

Aegis Ashore

Description
On September 17, 2009, the President announced the plan to provide regional missile defense to U.S. deployed forces and allies called a Phased Adaptive Approach (PAA). The PAA tailors U.S. ballistic missile defense (BMD) capabilities to specific theater needs to enhance integrated regional missile defenses against medium- and intermediate-range ballistic missiles. Aegis Ashore is an adaptation of Navy's proven Aegis BMD capability. Components of the Aegis Weapons System (AWS) will be installed in modular containers and deployed to pre-prepared sites in host nations to provide a shore-based BMD capability. The Department of Defense Missile Defense Agency (MDA) is the Aegis Ashore material developer and funds development, procurement, and installation of BMD systems, peripherals, and Standard Missile (SM)-3 missiles. Director, MDA is designated the Acquisition Executive for the U.S. Ballistic Missile Defense System (BMDS). In this capacity, MDA exercises all source-selection and milestone decision authorities for all elements of the BMDS up to, but not including, production issues.

Status
The first Aegis Ashore site—the Aegis Ashore Missile Defense Test Complex (AAMDTC) at Pacific Missile Range Facility (PMRF), Kauai, Hawaii—will be completed in 2014. The first forward operating site in Romania will be operational in late 2015 with a second site in Poland operational by late 2018. Detailed deckhouse design is complete and fabrication has begun. The Naval Sea Systems Command (NAVSEA) and MDA established an Aegis Ashore Hybrid Program Office within the Aegis BMD directorate that is closely coordinating the efforts with Program Executive Office for Integrated Warfare Systems (PEO IWS), which will oversee Aegis Ashore development and deployment.

Developers

Lockheed Martin	Moorestown, New Jersey USA
Black & Veatch Corp.	Overland Park, Kansas USA
Gibbs & Cox Inc.	Arlington, Virginia USA
Carlson Technology Inc.	Livonia, Michigan USA

Aegis Combat System (ACS)

Description

The Aegis Combat System is a centralized, automated, command-and-control (C2) and weapons control system. ACS integrates combat capabilities developed in other Navy programs into the *Ticonderoga* (CG 47)-class and *Arleigh Burke* (DDG 51)-class ships and provides effective capability to counter current and future air, surface, and sub-surface threats. ACS is not a separate Acquisition Category (ACAT) program; it is part of the AEGIS Shipbuilding ACAT I Program.

Status

ACS has been in the Fleet since 1983 and continues to serve as the platform for new capabilities, weapons, and sensor systems. Aegis Modernization (AMOD) program is producing system upgrades via the Advanced Capability Build (ACB) process for CG and DDG Modernization, DDG Restart, and DDG FLT III to keep pace with evolving threats and the challenging littoral environment.

The first iteration of this process, ACB-08 / Technology Insertion (TI) 08, brings CGs 52 through 58 increased warfighting capabilities during CG Modernizations that began in 2009. ACB-08 separates hardware from software, allowing for commercial off-the shelf (COTS) computer processors, and re-uses elements of the Aegis Baseline 7.1R computer program code, while integrating improved system capabilities.

Two subsequent ACBs follow this iterative process. ACB-12 brings increased warfighting capability with regard to Integrated Air and Missile Defense (IAMD), Naval Integrated Fire Control-Counter Air (NIFC-CA), the SM-6 missile, the Evolved SeaSparrow Missile (ESSM), Close-in Weapon System (CIWS) BLK 1B, and Multi-Mission Signal Processor (MMSP). ACB-16 will integrate the following additional capabilities: improved IAMD capability with new Standard Missile; SPQ-9B; MH-60R; Surface Electronic Warfare Improvement Program (SEWIP) BLK II with Radar Designated Decoy Launch; and updates to Total Ship Training Capability (TSTC) Training, Interoperability, and C4I. ACB-12 initiates a Common Source Library (CSL) program for Aegis and brings in the first third-party developed software element, Track Manager/ Track Server, as well as the competitively awarded Common Display System (CDS) and Common Processor System (CPS).

A request for proposals (RFP), which is the first Aegis competition since 1969, has been issued for the Aegis Combat System Engineering Agent (CSEA) starting with subsequent ACBs. ACBs are bringing new capabilities to existing ships in a single package vice the legacy method of installing capability improvements through individualized deliveries. These capabilities will be fully integrated into the ACS for maximum effectiveness. In addition, there will be greater commonality across ACBs. This will ultimately result in an increased number of improved capability deliveries at a reduced cost.

Developers

Lockheed Martin	Moorestown, New Jersey USA
Naval Surface Warfare Center	Dahlgren, Virginia USA
Naval Surface Warfare Center	Port Hueneme, California USA

Air and Missile Defense Radar (AMDR)

Description

The Air and Missile Defense Radar advanced radar system is being developed to fill capability gaps identified by the Maritime Air and Missile Defense of Joint Forces (MAMDJF) Initial Capabilities Document (ICD). AMDR is a multi-function, active-phased array radar capable of search, detection, and tracking of airborne and ballistic missile targets and missile engagement support. The AMDR suite consists of an S-band radar (AMDR-S), an X-band radar (AN/SPQ-9B for the first 12 ship sets), and a Radar Suite Controller (RSC). The radar will be developed to support multiple ship classes—the first being the FLT III DDG 51. The multi-mission capability will be effective in air dominance of the battle space (Area Air Defense) and defense against ballistic missiles (BMD) tasks.

Status

AMDR is a Pre-Acquisition Category (ACAT) 1D program with Milestone A approval. The Technology Development (TD) phase commenced in early FY 2011 and completed at the end of FY 2012. Milestone B approval is expected in FY 2013 and a subsequent release of an Engineering and Manufacturing Development (EMD) phase contract award.

Developers

Northrop Grumman, Raytheon, and Lockheed Martin were awarded TD contracts to produce small-scale active phased array (S-band) prototypes during Technology Development, completed in Fall 2012. The EMD phase contract award will down-select to single developer.

AN/SPY-1 Aegis Multi-Function Phased-Array Radar

Description

The AN/SPY-1 S-Band radar system is the primary air and surface radar for the Aegis Combat System installed in *Ticonderoga* (CG 47)-class and *Arleigh Burke* (DDG 51)-class ships. It is a multi-function, passive phased-array radar capable of search, automatic detection, transition to track, tracking of air and surface targets, and missile engagement. The fifth variant of this radar, AN/SPY-1D(V) improves the radar's capability against low-altitude and reduced radar cross-section targets in heavy clutter environments and in the presence of intense electronic countermeasures. The AN/SPY-1 series radars are also on board selected Aegis cruisers and destroyers to detect, track, and engage ballistic missiles.

Status

The SPY-1A, SPY-1B, SPY-1D, and SPY-1D(V) radar variants are fielded and supported. The AN/SPY-1D(V) littoral radar upgrade supersedes the AN/SPY-1D in new-construction Flight IIA destroyers that began in FY 1998. Operational testing and evaluation was completed in the fall 2005. AN/SPY-1D (V) is installed in DDGs 91 through 112. A new Multi-Mission Signal Processor (MMSP) is funded and will deliver AN/SPY-1D (V) capability to

AN/SPY-1D DDGs to support Integrated Air and Missile Defense (IAMD), which includes ballistic missile defense (BMD). MMSP upgrades will be deployed through the DDG Modernization programs.

Developers

Lockheed Martin	Moorestown, New Jersey USA
Raytheon	Sudbury, Massachusetts USA

AN/SPY-3 Advanced Multi-Function Radar (MFR)

Description

The AN/SPY-3 Multi-Function Radar is an X-band active phased-array radar designed to meet all horizon-search and fire-control requirements for the 21st Century Fleet. SPY-3 is designed to detect the most advanced anti-ship cruise missile (ASCM) threats and support fire control illumination requirements for the Evolved SeaSparrow Missile (ESSM), the Standard Missile (SM)-2, and future missiles. SPY-3 also supports the new ship-design requirement for reduced radar cross-section, significantly reduced manning (no operators), and Total Ownership Cost (TOC) reduction. SPY-3 is planned for introduction onboard *Zumwalt* (DDG 1000)-class destroyers and as part of the Dual-Band Radar on next-generation *Ford* (CVN 78)-class aircraft carriers. For DDG 1000, SPY-3 will be modified to provide above horizon and volume search capability.

Status

Two SPY-3 Engineering Development Model radar arrays were installed and tested at the Wallops Island, Virginia, land-based test facility and onboard the Navy's Self-Defense Test Ship in 2006. SPY-3 was installed at the Wallops Island Engineering Test Center along with the S-band Volume Search Radar (VSR). Both underwent radar test and integration events that completed at the end of FY 2010. SPY-3 development, testing, and production schedules are planned to support equipment delivery schedules for DDG 1000 and CVN 78 class ships.

Developers

Raytheon Electronic Systems	Sudbury, Massachusetts USA

Littoral Combat Ship Mission Packages

Description

Littoral Combat Ships (LCS) are designed to employ modular mission packages (MPs) that address littoral anti-access capability gaps in the areas of surface warfare (SUW), mine countermeasures (MCM), and anti-submarine warfare (ASW). The capabilities of existing guided-missile frigates, mine countermeasures ships, and patrol coastal ships are not sufficient to close these capability gaps. LCS capabilities encompass the roles filled by these legacy ship classes as well as improved capabilities. The program has an af-

fordable inventory objective of 24 SUW, 24 MCM, and 16 ASW mission packages. Mission systems will be incrementally added to the MPs as they reach the level of maturity necessary for fielding. These systems provide a warfighting capability that will continuously improve through an evolutionary acquisition development process.

The SUW MP provides the ability to perform the full portfolio of maritime security operations (MSO) while delivering increased firepower and offensive and defensive capabilities against large numbers of fast, highly maneuverable small craft. The individual mission modules comprising the SUW Mission Package are: the maritime security module, which includes two 11m Rigid-Hull Inflatable Boats for Level 2 Visit, Board, Search, and Seizure; the gun mission module (GMM), consisting of two MK 46 30mm gun systems; surface-to-surface missile module (SSMM), consisting of the Griffin missile in increment 1, with a follow-on missile in increment 2; MH-60R helicopter armed with Hellfire or Advanced Precise Kill Weapon System (APKWS) missiles; and two vertical-takeoff unmanned aerial vehicles (VTUAVs).

The MCM MP will provide capabilities to counter deep, shallow, floating, tethered, bottom, and buried mines. This capability detects and identifies mines in the water column and neutralizes volume and bottom mines through use of systems deployed from off-board manned and unmanned vehicles. The MCM MP represents a significant tactical change by emphasizing the use of off-board assets, such that the LCS and its crew can operate outside of mine danger areas. Additionally, off-board assets will dramatically improve the speed with which an area can be searched and cleared of mines. Mission systems in the package include: Remote Multi-Mission Vehicle (RMMV) with the AN/AQS-20A mine hunting sonar; an MH-60S helicopter equipped with AN/ASQ-235 Airborne Mine Neutralization System (AMNS), or the AN/AES Airborne Laser Mine Detection System (ALMDS); a VTUAV with the Coastal Battlefield Reconnaissance & Analysis (COBRA) mine detection system; and will include an Unmanned Influence Sweep System (UISS) and Knife Fish Unmanned Underwater Vehicle (UUV) in the future.

The ASW MP enables LCS to conduct detect-to-engage operations against modern submarine threats. The package includes active and passive towed sonar arrays, to conduct area search and high value unit escort missions, and a torpedo countermeasure system, to enhance survivability in an ASW environment. Mission systems in the package also include: an MH-60R helicopter with Airborne Low Frequency Sonar (ALFS), sonobuoys, and Mk 54 Lightweight Torpedo; the Light Weight Towed Torpedo Defense and Countermeasures Module; the AN/SQR-20 Multi-Function Towed Array (MFTA); and variable-depth sonar (VDS).

Status

The SUW MP increment one will be forward stationed onboard LCS in Singapore in 2013. In FY 2012, four SUW MPs and two MCM MPs were delivered. Initial delivery of the ASW MP is planned for FY 2016. Three phases of MCM MP Developmental Testing (DT) have been completed and initial operational test and evaluation (IOT&E) is on track for completion in FY 2014. The first phase of SUW MP DT was completed in June 2012, and IOT&E is on track to be conducted on the USS Fort Worth (LCS 3) in FY 2014.

Developers

Northrop Grumman
Integrated Systems, Mission Package
Development and Integration — Falls Church, Virginia USA

Maritime Integrated Air and Missile Defense Planning System (MIPS)

Description

Maritime Integrated Air and Missile Defense Planning System (MIPS) is an operational-level Integrated Air and Missile Defense (IAMD) planning tool that supports the joint force maritime component commander (JFMCC) staff in rapidly developing optimized courses of action for the deployment of Navy air and missile defense assets. MIPS provides the JFMCC an automated tool to allocate Navy IAMD resources effectively and assess operational risks in a timely manner. The MIPS output is an operational-level plan detailing optimized use of forces developed with the warfighter's knowledge and judgment. MIPS is deployed on selected warships and in the numbered fleet maritime operations centers (MOC).

Status

MIPS is currently undergoing technical refresh to replace legacy and obsolete hardware. The technical refresh will be followed by two software capability development efforts: MIPS Increment 1 and Increment 2. Both increments will include enhanced planning capabilities and capacity for IAMD as well as an improved interface between the Aegis Ballistic Missile Defense Mission Planner and the Command, Control, Battle Management, and Communications (C2BMC) System. MIPS Increment 1 will achieve initial operational capability (IOC) in FY 2014. The MIPS program was designated a Navy ACAT III acquisition program on February 11, 2011.

Developers

General Dynamics
Advanced Information Systems — Fairfax, Virginia USA

Naval Fires Control System (NFCS)

Description

Naval Fires Control System (NFCS) allows surface warships to communicate directly with ground forces that operate within the Advanced Field Artillery Tactical Data System (AFATDS), a digital fire-support command and control network used by the Army and Marine Corps. NFCS is interoperable with joint C4ISR systems, providing the mission-planning and fire-support coordination functions required to support expanded NSFS mission capability.

Status

The system achieved IOC in April 2006 with 29 systems currently installed. A total of 32 systems were fielded at the end of FY 2012.

Developers

Naval Surface Warfare Center	Dahlgren, Virginia USA
Space and Naval Warfare Systems Center	San Diego, California USA
Naval Undersea Warfare Center	Keyport, Washington USA
General Dynamics Information Systems	Arlington, Virginia USA
GEC-Marconi Electronics Systems	Wayne, New Jersey USA

Navigation

Description

Navigation systems provide position, altitude, and timing information for use across all surface ships, aircraft carriers, and amphibious ships. The program consists of inertial navigators, gyrocompasses, speed logs, fathometers and Electronic Chart Display and Information System–Navy (ECDIS-N). In addition to supporting safety of navigation, shipboard navigation systems provide altitude information to Tomahawk land-attack cruise missiles and ballistic missile defense weapons systems.

Status

Modernization efforts are ongoing across the portfolio of navigation equipment. Legacy inertial navigators are being upgraded to the current standard of WSN-7/7B while development of the next generation of inertial navigation system is beginning. ECDIS-N systems are being fielded across the fleet to support navigation solely by electronic chart throughout the Navy.

Developers

Northrop Grumman Sperry Marine	Charlottesville, Virginia USA

Navy Ballistic Missile Defense (BMD)

Description

Aegis ballistic missile defense includes modifications to the Aegis Weapons System and development and upgrade of the Standard Missile (SM)-3 with its hit-to-kill kinetic warhead. This combination gives select Aegis cruisers and destroyers the capability to intercept short-, medium-, and intermediate-range ballistic missiles in the midcourse phase of exo-atmospheric trajectory. Additionally, Aegis BMD provides surveillance and tracking capability against long-range ballistic missile threats. Together, these capabilities contribute to robust defense-in-depth for U.S. and allied forces, critical political and military assets, population centers, and large geographic regions against the threat of ballistic missile attack. The Missile Defense Agency and Navy initially deployed the Aegis BMD long-range surveillance and tracking capability as an element of the U.S. Ballistic Missile Defense System (BMDS) in October 2004. The Aegis BMD engagement capability was certified for operational use in August 2006.

Status

As of early 2013, 28 in-service cruisers and destroyers have been modified to conduct BMD, with additional warships to be modified in the future. The Aegis BMD 3.6.1 program capability has been installed on 24 Aegis warships, BMD 4.0.1 has been installed on two cruisers, and BMD 4.0.2 has been installed on two destroyers. BMD ships have long-range surveillance and tracking (LRS&T) capability with an ability to provide cueing in defense of the homeland, and a BMD engagement capability using the SM-3 missile to conduct active defense against short-to-intermediate-range ballistic missiles. The SM-2 Block IV inventory has been modified for the terminal ballistic missile defense mission. This capability provides an endo-atmospheric "lower-tier" capability resulting in a more lethal, layered defense against enemy ballistic missiles. The Aegis Modernization program will eventually provide BMD capability to additional Aegis destroyers.

Developers

Lockheed Martin	Moorestown, New Jersey USA
Raytheon	Tucson, Arizona USA

Open Architecture (OA)

Description

Open Architecture is a business strategy for rapidly fielding superior, cost-effective warfighting systems. Naval OA is the confluence of business and technical practices yielding modular, interoperable systems that adhere to open standards with published interfaces. This approach increases opportunities for competitive innovation, enables re-use of components, facilitates rapid technology insertion, and reduces testing and maintenance constraints.

Status

The surface Navy has programmed funding for OA since 2003. The Aegis Combat System Modernization plan started with a

technical undertaking to implement an open architecture design by de-coupling hardware from software for cost-effective commercial off-the shelf (COTS) sustainment. Six of seven Baseline-2 cruisers (CGs) have been modernized with the initial Advance Capability Build (ACB-08), and the final CG is on-track to complete in 2012. The ACB plan transitions in 2012 with ACB-12 for the remaining CGs and destroyer (DDG) modernizations and new construction starting with DDG 113. A separate ship self-defense systems (SSDS) ACB-12 is planned for technically refreshing the SSDS Mk 2 in aircraft carriers (CVNs) and amphibious ships (LPD 17 and LHD/LHA)/. All modern surface combat systems (Aegis, SSDS, LCS, and DDG 1000) are being coordinated to ensure development of scalable, modular software application components and to provide greater business opportunities for competitive alternatives.

The acquisition-led OA Enterprise Team (OAET) is adopting broader business aspects of open architecture for more collaborative competition within and across programs, including small business involvement through the Office of Naval Research (ONR) led Small Business Innovative Research (SBIR) program, to deliver cost-effective, common capability quickly and more efficiently to the Fleet.

Developers

More than 80 companies nationwide are participating in surface warfare OA programs.

S-Band Volume Search Radar (VSR)

Description

Volume Search Radar (VSR) is an S-band active phased array radar designed to meet all above-horizon detection and tracking requirements for 21st-Century ships without area air-defense missions, specifically the *Ford* (CVN 78) class. VSR will provide long-range situational awareness with above-horizon detection and air control functionality, replacing in-service SPS-48E and SPS-49 radars. A non-rotating phased-array radar, VSR provides the requisite track revisit times to address fast, low/small, and high-diving missile threats, and provides cueing for the AN/SPY-3 Multi-Function Radar (MFR) to execute tracking and fire control functions above the horizon.

Status

Along with the SPY-3, VSR underwent radar test and integration events that completed at the end of FY 2010. VSR production arrays are in construction and testing at Lockheed Martin facilities in Moorestown, NJ. VSR will be deployed with SPY-3, as an integrated radar suite, referred to as the Dual-Band Radar (DBR) on CVN 78, scheduled to deliver in FY 2015.

Developers

Raytheon Electronic Systems	Sudbury, Massachusetts USA
Lockheed Martin Maritime Sensors & Systems	Moorestown, New Jersey USA

Ship Self Defense System (SSDS)

Description

Ship Self Defense System (SSDS) is a centralized, automated, command-and-control system for non-Aegis warships. An upgrade of the Advanced Combat Direction System, SSDS provides an integrated combat direction system for aircraft carriers and all amphibious ships, enabling them to keep pace with evolving anti-ship cruise missile (ASCM) threats. The SSDS open architecture system integrates detection and engagement elements of the combat system with automated weapons control doctrine, Cooperative Engagement Capability (CEC), and tactical data links for enhanced battlespace awareness. SSDS provides a robust self-defense capability to warships not configured with the Aegis Combat System.

Status

SSDS Mk 1 began full-rate production following operational testing in 1997 and is fielded in all LSD 41/49 class ships. SSDS Mk 2, which provides strike group interoperability via CEC and Tactical Data Information Link Joint (TADIL-J), achieved initial operational capability (IOC) in 2005 and continues fleet installation. The Navy plans to upgrade periodically the SSDS federated and technically decoupled architecture via commercial off-the shelf (COTS) technology insertion and preplanned product improvement (P3I).

SSDS Mk 2 is programmed for all CVNs, LHD/LHA, and LPD 17 class ships. SSDS Mk 2 will replace SSDS Mk 1 on LSD 41/49 class ships beginning in FY 2014, scheduled to complete fielding by 2016. Advanced Capability Build (ACB) 12 is in development with CVN 78 as the lead ship. ACB 16 development will begin in FY 2014 integrating Surface Electronic Warfare Improvement Program (SEWIP) Block 2, MH-60R, Close-in Weapon System (CIWS), and Identify Friend or Foe (IFF) Mode 5/S into SSDS. Competitive request for proposal for SSDS ACB 16 is planned for FY 2013.

Developers

Raytheon San Diego, California USA
ACB-16 developer to be determined

SPQ-9B Radar Anti-Ship Cruise Missile (ASCM) Radar

Description

SPQ-9B is a phased-array, rotating radar that significantly improves a ship's ability to detect and track low-altitude anti-ship cruise missiles (ASCM) in a heavy-clutter environment. This capability is in addition to, and improves upon, the surface search and gunfire control capability retained from previous versions of the SPQ-9 radar. It is a high-resolution track-while-scan, X-band, pulse-doppler radar which enables track detection at ranges that allow combat systems to engage subsonic or supersonic sea-skimming missiles at the outer edge of a ship's engagement envelop. Additional modifications are in developmental testing to add a periscope detection and discrimination capability to the radar's surface search capability.

Status

SPQ-9B is an integral part of the cruiser modernization program, providing an ASCM cue to the Aegis Combat System. SPQ-9B integrates with Ship Self Defense Surface (SSDS) Mk 2 on aircraft carriers and amphibious assault ships, enabling those ships' ASCM defense capabilities to pace the evolving worldwide threat. SPQ-9B is deployed in conjunction with SSDS Mk 2, and cruiser modernization, and is Navy Type/Navy Owned equipment on the U.S. Coast Guard's new construction National Security Cutters (WMSL 750). The SPQ-9B is also planned for deployment on the initial DDG Flight III destroyers.

Developers

Northrop Grumman Baltimore, Maryland USA

SQQ-89 Anti-Submarine Warfare (ASW) Combat System

Description

The SQQ-89 anti-submarine warfare combat system suite provides cruisers and destroyers with an integrated undersea warfare detection, classification, display, and targeting capability. SQQ-89 is the Surface ASW "system of systems" that integrates sensors, weapons, and underwater self-defense capabilities. The latest variant, the A(V)15, is planned for all DDGs and forward-deployed baseline 3 and 4 CGs. A(V)15 will be installed as part of the Aegis Modernization Program or as part of the A(V)15 Program of Record. The A(V)15 Program of Record will install the multi-function towed arrays (MFTAs) on DDGs 113 through 118.

AN/SQQ-89 A(V)15 is a modularized, Open Architecture (OA) system using commercial off-the shelf (COTS) technology to provide revolutionary ASW warfighting improvements, and continuous upgrades to the following subsystems of the ASW "detect to engage" sequence:

- Multi-Function Towed Array
- Continuous Active Sonar (CAS) and reduced false alarms algorithms

- ASW combat system interfaces for the MK 54 digital torpedo and MK 54 vertical launch ASROC (VLA)
- Echo tracker classifier (ETC) and active classification improvements
- Sonar performance and prediction algorithms and environmental models
- Computer-Aided Dead-Reckoning Table (CADRT) interfaces
- Torpedo Detection Classification and Localization
- Integrated high-fidelity Surface ASW Synthetic Trainer (SAST)
- Synthetic Aperture Sonar and small object avoidance

AN/SQQ-89 A(V)15 provides revolutionary ASW warfighting improvements that include:

- Enhanced capability in the shallow water littoral environment
- Improved sensor performance and increased detection ranges
- Fire control algorithms for improved weapons performance

Status

The first A(V)15 install was completed in the USS Mason (DDG 87) in September 2009. It included the addition of the MFTA and marked the first towed array installation in a DDG Flight IIA warship. At the end of 2012 there were 18 production A(V)15 systems installed. The Advanced Capability Build (ACB) process of providing software upgrades every two years and tech inserts on a four-year cycle provides the strategy for COTS obsolescence and future capability upgrades. The first ASW Advanced Capability Build ACB-11 was installed on the USS Bulkeley (DDG 84) in FY 2012. It included SAST and major upgrades that improve surface ships ability to detect threat torpedoes. SAST is also installed as part of the ACB-11 trainers at the Fleet ASW Training Center in San Diego, California, and is planned for incorporation into the future design of the shore-based ASW trainers.

Developers

Lockheed Martin	Syracuse, New York USA
Advanced Acoustic Concepts	Hauppauge, New York USA
Science Applications International Corporation	Arlington, Virginia USA

Surface Ship Torpedo Defense (SSTD)

Description

The Surface Ship Torpedo Defense system comprises a layered approach and a family of systems (FoS) acquisition strategy to provide anti-torpedo softkill and hardkill capability:

- Softkill: AN/SLQ- 25 (“Nixie”) towed system and Acoustic Device Countermeasure (ADC) MK 2 Mod 4 countermeasures are currently deployed onboard surface combatants (cruisers, destroyers, and amphibious ships) and high-value units (aircraft carriers and combat logistics force ships). The Nixie system is a towed persistent acoustic and non-acoustic countermeasure system. ADC Mk 2 Mod 4 is a hand-deployed acoustic countermeasure system.

- Hardkill: The Torpedo Warning System (TWS) provides torpedo detection, classification, and localization (TDCL) capability. In addition the TWS prepares launch solution, presets, and the operator interface to launch anti-torpedo torpedoes (ATTs) to deliver a hardkill capability. The countermeasure anti-torpedo (CAT) integrates the ATT with self-contained launch energetic in all-up-round equipment (AURE) to defeat primary stern sector threat salvoes. Both TWS and CAT will be designed to facilitate future software upgrades.

Status

AN/SLQ-25C "Nixie" Countermeasure System is installed on all in-service cruisers, destroyers, frigates, aircraft carriers, and amphibious warfare ships and will be installed on Zumwalt-class (DDG 1000) ships but not on mine warfare or Littoral Combat Ships (LCS).

AN/SLQ-25C (equivalent to 25A with engineering changes through EC-16) installations will be completed in FY 2015 to improve reliability and acoustic countermeasure capability, provide a new littoral tow cable, and add enhanced non-acoustic improvements to counter threat torpedoes.

AN/SLQ-25C EC-2 is under development and will provide a technology refresh of the current AN/SLQ-25 architecture and provide an interface to the TWS for system interoperability.

ADC MK 2 Mod 4 requirements are determined by the non-nuclear ordnance requirement (NNOR) process. Based on planned procurement rates, the ADC inventory is scheduled to reach NNOR required levels in FY 2016.

TWS/CAT is being developed for high value units and will achieve initial operational capability (IOC) in FY 2019. A hybrid-prototype system will deploy in FY 2013. Two Roll-On/Roll-Off (RORO) systems will be delivered in FY 2014. Four Engineering and Development Model (EDM) systems are programmed with two CVN installations per year during FY 2015 and FY 2016. TWS Prototype systems will be installed with eight CATs each. TWS achieved provisional milestone B in September 2011. Milestone C and Low Rate Initial Production (LRIP) are both planned for FY 2016. CAT will also seek Milestone C approval to enter System Development and Demonstration (SD&D) in FY 2014 with CAT LRIP deliveries also beginning in FY 2016.

Developers

Anti-Torpedo Torpedo:

Penn State Applied Research Laboratory	State College, Pennsylvania USA
Science Applications International Corporation	Arlington, Virginia USA

Countermeasure Anti-Torpedo:

Penn State Applied Research Laboratory	State College, Pennsylvania USA

Torpedo Warning System:
Alion Science and Technology New London, Connecticut USA

SLQ-25:
Argon ST Smithfield, Pennsylvania USA

ADC:
Ultra Electronics Braintree, Massachusetts USA

Tactical Tomahawk Weapon Control System (TTWCS)

Description

Tactical Tomahawk Weapon Control System Viability Build is the next significant upgrade to the in-service TTWCS. TTWCS initializes, prepares, and launches Block III and Block IV Tomahawk land-attack cruise missiles. TTWCS also provides capability for firing units to plan Block III and Block IV global positioning system (GPS)-only missions, retarget Block IV missiles to alternate targets, and monitor missiles in flight. The initial release of TTWCS reduced equipment racks required on board surface ships, introduced common software for the various Tomahawk capable platforms (DDG, CG, SSN, SSGN, and U.K. SSN), and reduced overall reaction and engagement planning timelines. The TTWCS Viability Builds improve the TTWCS system architecture to maintain existing Tomahawk Weapons System (TWS) functionality, provides for future growth, and enhances command-and-control interoperability. Eliminating obsolete hardware and software and redundant functionality in favor of existing TC2S functionality, Viability Builds maintain interoperability with evolving systems and modernize interfaces in accordance with joint mandates (e.g., Service Oriented Architecture and Internet Protocol Version 6). The Viability Build also improves operator interaction with the system, reduces system complexity, and provides an integrated training capability at all levels.

Status

TTWCS V5 incorporates Tomahawk Integrated Training Architecture, changes for Cruiser Modernization, and the addition of *Ohio* (SSGN 726), *Seawolf* (SSN 21), and *Virginia*-class guided-missile/attack submarines. The initial operational capability (IOC) of v5.4.0 was the first step toward TTWCS Viability, refreshing hardware and port resource intensive software executing on x86 processors with a Linux Operating System. The next software builds of the weapons control system, v5.4.0.2 and v5.4.1, will improve C4I interoperability, refresh the hardware and software to improve performance, introduce a new human computer interface, and align TTWCS with DoD mandates.

Developers

Naval Surface Warfare Center Dahlgren, Virginia USA
Lockheed Martin Valley Forge, Pennsylvania USA
Naval Undersea Warfare Center Newport, Rhode Island USA
Southeastern Computers Consultants Inc. Austin, Texas USA

Tomahawk Command and Control System (TC2S)

Description

The Theater Mission Planning Center (TMPC) is the mission planning and execution segment of the Tomahawk Weapon System (TWS). Under the umbrella of the TMPC, the Tomahawk Command and Control System (TC2S) provides subsystems for precision targeting, route planning, mission distribution, and strike management for Tomahawk cruise missile missions. TMPC optimizes all aspects of the Tomahawk missile mission to successfully engage a target. TC2S develops and distributes missions for the Tomahawk Missile; provides command information services for TWS; provides strike planning, execution, coordination, control and reporting, and provides Maritime Component Commanders (MCC) the capability to plan or modify conventional Tomahawk Land-Attack Missile (TLAM) missions. TC2S has evolved into scalable configurations deployed in five configurations at 177 sites: three Cruise Missile Support Activities (CMSA); three Tomahawk Strike Mission Planning Cells (TSMPC / C5F, C6F, C7F); 133 Carrier Strike Groups (CSGs) and Firing Units (FRUs); 11 Command and Control Nodes; five laboratories; and six Training Classrooms. TC2S and/or its components are employed by the United Kingdom under two separate Foreign Military Sales cases (TLAM and Storm Shadow). TC2S allows planners to exploit the full capabilities Tomahawk in either deliberate planning conditions or for battlefield time-sensitive planning operations, including executing all post-launch missile control operations.

Status

TC2S version 4.3 achieved initial operational capability (IOC) on May 26, 2012, which improved system usability and complete the migration of the precision targeting workstation (PTWs) functionality to the service oriented architecture-based targeting and navigation toolset (TNT), permitting the retirement of PTW. In addition TC2S 4.3 includes more than 1,000 modifications by users. In October 2011 the last TC2S 4.2.2 was installed in Seventh Fleet. The next version of TC2S 5.0.1 will IOC in 2014, with primary focus on Human Computer Interface (HCI) updates for improved usability. All Tomahawk missiles fired operationally from Operation Desert Storm through Operation Odyssey Dawn have been planned and executed with TC2S components.

Developers

COMGLOBAL	San Jose, California USA
Boeing	St. Louis, Missouri USA
BAE Systems	San Diego, California USA
SAIC	McLean, Virginia USA

SURFACE EQUIPMENT AND TRAINING SYSTEMS

Authorized Equipage Lists (AEL) and Naval Security Forces Vest (NSFV)

Description

Visit, board, search, and seizure (VBSS) authorized equippage list (AEL) provides equipment to perform compliant and non-compliant vessel VBSS missions integral to expanded maritime interception operations (EMIO), maritime counter-proliferation interdiction (MCPI), and maritime domain awareness (MDA). Anti-terrorism/force protection (AT/FP) physical security equipment (PSE) AEL provides individual personal protection, training and entry control point (ECP) equipment for use by the ship's self-defense forces when in port and transiting littoral and restricted maneuverability environments. naval Security Forces Vest (NSFV) is body armor designed for a Navy threat environment providing protection against ballistic and fragmentation standards. NSFV is designed to operate with enhanced small arms protective inserts (ESAPI) for increase protection.

Status

NSFV will replace both the concealable tactical response carrier (CTRC) and Navy flak vest (NFV) for consolidation and uniformity among fleet AELs. It is a Navy design for the maritime threat environment providing protection against ballistic and fragmentation threat standards and designed to operate with ESAPI for increased protection. NSFV is government designed, tested and quality assured. Solicitation for the NSFV is out to industry for a FY 2013 contract award, with a total quantity of 13,000 units to be fielded to all afloat assets.

Developers

Naval Surface Warfare Center — Crane, Indiana USA

Battle Force Tactical Trainer (BFTT)

Description

Battle Force Tactical Trainer (BFTT) integrates the family of embedded combat system trainers, providing aircraft carriers, cruisers, destroyers, and amphibious ships the capability to maintain readiness requirements across multiple warfare areas. These areas include air defense, electronic warfare, anti-submarine warfare, and integrated air and ballistic missile defense.

Status

BFTT began full-rate production following operational testing in 1997. It is fielded in all CVN, CG, DDG, LSD 41/49, and LPD 17 class ships. BFTT achieved initial operational capability (IOC) in 1999 and continues with fleet upgrades through 2015. The BFTT system is the combat system scenario generator on surface combatants and is undergoing modernization to improve ship training system reliability network interfaces to meet Navy continuous training environment (CTE) requirements. This includes development of an integrated total ship training capability (TSTC) aligned with advanced capability build (ACB) deliveries.

In addition to modernizing the BFTT system, the T46D variant will be the key enabler permitting integration of anti-submarine warfare, navigation, and engineering embedded trainers in a first step toward fielding a TSTC.

BFTT systems and associated interfaces maximize limited underway days and support Unit and Integrated synthetic training requirements as delineated in the USFCC Fleet Training Continuum (FTC) and CNSF Surface Force Training Manual (SFTM).

Developers

Naval Surface Warfare Center	Dam Neck, Virginia USA
Lockheed Martin	Chesapeake, Virginia USA
SYS Technologies	San Diego, California USA
NOVONICS	Arlington, Virginia USA
Electronic Warfare Associates	Chantilly, Virginia USA
L-3/Unidyne	Norfolk, Virginia USA
AAI Corp	Timonium, Maryland USA
AP Labs	San Diego, California USA
Tri Star	Chesapeake, Virginia USA
SAIC	San Diego, California USA
WR Systems	Fairfax, Virginia USA

Biometrics / Identity Dominance System (IDS)

Description

The Personnel Identification Version One (PIv1), official nomenclature AN/PYX-1 Identity Dominance System (IDS), program of record provides enhanced biometric and limited forensic collection capabilities for visit, board, search, and seizure (VBSS) teams conducting maritime interception operations (MIO). The program expands naval force capabilities by enabling VBSS teams to rapidly capture identity information of unknown individuals, and improves capacity to manage and share trusted information between agencies and international partners. PIv1 collects facial images ("mugshots"), iris images, fingerprints, contextual data, and cell phone media for exploitation, and matches iris images and fingerprints against an onboard biometrics enabled watchlist (BEWL) of known or suspected terrorists and persons of interest.

Status

Fleet VBSS teams use commercial-off-the-shelf (COTS) biometric collection devices to collect and transmit biometric information to the DoD's authoritative biometric database for intelligence analysis, and "match/no-match" analysis. Approximately 200 of these kits were procured in FY 2006/07 and fielded to VBSS-capable ships. Initial fielding provided stopgap biometrics capability to naval forces. Research and development efforts continue to develop a robust multi-modal biometric, document, and media exploitation capability through the Personnel Identification Version One (PIv1).

The Personnel Identification Version One (PIv1) System expands current biometrics capabilities through use of a rugged, lightweight system capable of collecting multiple biometric modalities and

electronic media for further matching and analysis. The IDS Capabilities Development Document was JROC-approved in September 2008 and achieved Milestone B in Q4, FY 2010. The PIv1 Capabilities Production Document is in its final stages of Navy and Joint staffing/approval with Initial Operating Capability anticipated in FY 2013.

Developers

Naval Surface Warfare Center	Dahlgren, Virginia USA
Aware Inc.	Bedford, Massachusetts USA

CBRN Dismounted Reconnaissance, Sets, Kits and Outfits (CBRN DR SKO)

Description

Chemical, biological, radiological, and nuclear (CBRN) dismounted reconnaissance sets, kits, and outfits (DR SKO) are an organic suite of specialized CBRN detection and protection equipment providing Navy boarding teams with additional CBRN capability to conduct efficient and thorough CBRN reconnaissance survey and monitoring missions on boarded vessels in response to CBRN threats. They provide visit, board, search, and seizure (VBSS) forces with the capability to detect the presence of weapons of mass destruction (WMD) in support of WMD interdiction (WMD-I) missions. Specifically, in addition to individual personnel protective equipment (IPPE) and Integrated radio/wireless communications, the DR SKO provides detection and identification capability for:

- Radiological and nuclear material
- Chemical warfare agents (CWA) and biological warfare agents (BWA)
- Toxic industrial chemicals/toxic industrial materials (TIC/TIM)
- Oxygen levels and combustible gases
- Some explosives and drugs

Status

The Navy's participation in this program is a response to Commander, U.S. Naval Forces Central Command's urgent operational need (UON) to provide VBSS teams with the capability to identify and detect CBRNE/WMD material. Approximately 163 radiation detection/hazardous atmospheric kits were procured in FY 2007-08. Each kit consists of:

- Six AN/UDR-15 personal radiation detectors (PRD)
- Six handheld radiation monitors (HRM)
- One Hermo IdentiFinder Ultra NGM (used to identify isotopes)
- One Chameleon TIC vapor and gas detector, 1x GAMIC 4 gas analyzer and 1x nIK drug testing kit

The Navy is fielding this equipment to deploying VBSS-capable ships to serve as an interim capability until the DR SKO program reaches IOC, planned for FY 2014.

Developers

Joint Program Manager – Nuclear, Biological and Chemical Contamination Avoidance — Aberdeen PG, Maryland USA
FLIR / ICx — Elkridge, Maryland USA

Chemical, Biological, Radiological and Nuclear Defense - Individual Protection Equipment - Readiness Improvement Program (CBRND - IPE - RIP)

Description

The Individual Protective Equipment Readiness Improvement Program for forces afloat manages millions of individual pieces of equipment for Sailors deploying into potential chemical, biological, and radiological (CBR) threat environments. Through centralized management, this program ensures afloat and deployed expeditionary Sailors are provided with correctly maintained and properly fitted individual protection ensembles and a chemical protective mask, ready for immediate retrieval in response to the dictated mission oriented protective posture (MOPP) condition. Historically, maintenance and logistics functions required to maintain the material readiness of this equipment required an extraordinary number of organizational manhours that could be better used supporting operations and training. Ninety-day predeployment readiness visits by the NAVSEA "RIP Team" relieve the ships of this burden. The cornerstone of the RIP is the NAVSEA Consolidated Storage Facility (CSF) located at Ft. Worth, Texas.

Status

This program continues to improve fleet CBR readiness. In addition to IPE and gas masks, the Readiness Improvement Program manages interceptor body armor (IBA), dorsal auxiliary protective systems (DAPS), and lightweight helmets (LWHs) for expeditionary forces; provides protective CBR equipment to the Navy's individual augmentees (IAs) as they process through designated Army training centers; manages chemical, biological, radiological and nuclear defense IPE for the Military Sealift Command (MSC); and manages the Navy's afloat anti-terrorism/force protection (AT/FP) equipment. In addition, Navy replaced the traditional lifecycle replacement program and implemented a condition-based obsolescence program to sustain the Fleet's CBRND equipment. This efficiency plan was adopted by the Joint Program Executive Office (JPEO) and was recommended by the JPEO to be the model service-wide.

Developers

Naval Surface Warfare Center — Panama City, Florida USA
Battelle Memorial Institute — Columbus, Ohio USA
Gryphon Technologies — Washington, DC USA
General Dynamics-IT — Fairfax, Virginia USA

Improved (Chemical Agent) Point Detection System – Lifecycle Replacement

Description

The Improved (Chemical Agent) Point Detection System - Lifecycle Replacement is a fixed-point detection system that monitors external air, detects and identifies chemical vapors, and provides an alert to ship personnel in time to take protective measures. The IPDS-LR is a fit, form, and function life-cycle replacement for legacy IPDS. It provides an automated chemical (vapor) point detection capability afloat with improved detection and reliability.

Status

IPDS-LR installations began in FY 2011 with 131 planned. Through FY 2012, it has been fielded to 26 ships (LHD 8, DDGs, and LPDs).

Developers

Bruker Billerica, Massachusetts USA

Joint Biological Tactical Detection System (JBTDS)

Description

Joint Biological Tactical Detection System (JBTDS) provides a portable biological warfare agent detection and collection capability for naval platforms during a full range of military operations. The Navy will use the JBTDS to replace all Dry Filter Unit (DFU) 1000s and augment the existing surface fleet biological detection and collection capabilities provided by the Joint Biological Point Detection System (JBPDS) and the Joint Biological Agent Identification and Diagnostic System (JBAIDS). Since it will be portable, the JBTDS detector/collector can be located at specific locations onboard ships in response to heightened threat levels.

Status

The JBTDS will reach Milestone B in FY 2013 and fielding is planned for multiple ship classes (CG, DDG 1000, DDG 51, LCS, LHA, LHD, LPD, LSD, MCM, T-AKE, LCC, and CVN).

Developers

Multiple sources.

Joint Service General-Purpose Mask (JSGPM)

Description

The Joint Service General-Purpose Mask (JSGPM) provides respiratory and ocular protection from chemical and biological agents, radiological particles, and specific toxic industrial chemicals (TICs). The JSGPM will replace the MCU-2/P and M-40 masks in the units. Compared to legacy chemical protective masks, the JSGPM provides lower breathing resistance, lower profile, greater comfort, clearer vision, improved equipment compatibility, and a modular carrier system.

Status

IJPM Protection is delivering 8,000 masks per week to the Fleet Consolidated Sustainment Facility in Fort Worth, Texas. This will continue until the end of March 2013 for a total of 273,930 masks for the Navy.

Developers

Avon Rubber & Plastics	Cadillac, Michigan USA
Science Applications International Corp.	Abingdon, Maryland USA
Guild Associates	Dublin, Ohio USA

Shipboard Collective Protection System (CPS)

Description

The Navy's shipboard collective protection system provides a protective environment from chemical, biological, and radiological (CBR) threats, where personnel can perform their mission-essential operations without the use of individual protective equipment. The system over-pressurizes specified ship spaces with air filtered through an array of housings that contain multiple CBR filter sets, which prevent the ingress of CBR contaminants. Zone ingress and egress is facilitated through a variety of supporting systems including air locks, pressure locks, and decontamination stations located on the zone boundaries that maintain the integrity of clean spaces. Integrated into the heating ventilation and air conditioning (HVAC) systems, shipboard CPS provides continuous protection to personnel and equipment within the zone boundary. On those ships where it is not feasible to provide protection to the entire ship, mission-essential spaces such as medical, command and control, and rest and relief areas are outfitted with CPS.

Status

The Navy successfully concluded an effort to extend the life of its CPS filters by an additional year. In addition, CPS coverage varies by ship class and ranges from the entire ship interior (DDG 51 FLT I, DDG 51 FLT II and T-AOE-6 classes) to zone-specific coverage systems (DDG 51 FLT IIA, LSD, LPD 17, LHD, LHA). These systems are a combination of new construction and backfit installations, depending on the ship. LHD 8 is programmed for an FY2015 completion and is funded by the JPEO CBD. Ship checks and early design efforts begin in FY 2013.

Developers

Naval Surface Warfare Center	Dahlgren, Virginia USA

SECTION 3

SUBMARINE FORCE

The submarine force, the Navy's "silent service," contributes significantly to many of the Navy's core capabilities. The concealment provided by the sea enables U.S. submarines to conduct undetected and non-provocative operations, to be survivable, and to attack both land and sea targets. Nuclear-powered attack submarines (SSNs) enable sea control, providing unseen surveillance of far-flung regions of ocean along with the ability to attack and sink hostile surface ships and submarines. The power-projection capabilities of nuclear-powered guided-missile submarines (SSGNs) include precision strike from land-attack cruise missiles and insertion of Special Operations Forces (SOF) to conduct reconnaissance and direct-action missions in hostile environments. The Navy's fleet of nuclear-powered ballistic missile submarines (SSBNs) provides the ability to conduct nuclear offensive strike, contributing to the core capability of deterrence at the national strategic level.

SUBMARINE AND UNDERSEA VEHICLES

Ohio-Class Replacement (OR) Fleet Ballistic-Missile Submarine

Description

The fleet ballistic-missile submarine (SSBN) supports the Nation's strategic nuclear triad by providing a flexible and survivable deterrent with the ability to provide an assured response capability. Starting in 2027, the oldest *Ohio*-class SSBN will reach the end of its strategic service with the remaining hulls retiring at a rate of approximately one per year. The highest priority is to ensure a successful and seamless transition to the *Ohio* Replacement SSBN to fulfill the national imperative of strategic deterrence.

The 12 *Ohio* Replacement SSBNs will provide 21st-Century strategic deterrent capabilities, well into the 2080s, at a responsible cost. The class will be designed to ensure survivability against predicted threats into the late 21st Century. The *Ohio* replacement SSBN includes the Common Missile Compartment (CMC), which is being developed jointly with the United Kingdom, continuing the long-standing SSBN partnership between the U.S. Navy and the U.K. Concurrent to the *Ohio*-Class Replacement, the United Kingdom will recapitalize its sea-based strategic deterrent platforms, the Vanguard-class SSBN, which also hosts the TRIDENT II (D5) submarine-launched ballistic missile (SLBM). Under cost-sharing agreements, the United States and United Kingdom jointly develop CMC components to reduce design and construction costs. Additional cost reduction initiatives include a life-of-ship reactor core, modular construction techniques, and the re-use/re-hosting of current submarine systems including continued use of the TRIDENT II (D5) SLBM.

Status

In January 2011 Milestone A was approved and the program entered the technology development phase. The Navy approved the *Ohio*-Class Replacement Capabilities Development Document (CDD) in August 2012 to guide technology development efforts. Early research and design efforts include prototyping and construction technique demonstration for the first new-design SLBM tubes built since the delivery of the USS Louisiana (SSBN 743) in 1997. Specifications for the U.S. and U.K. CMC quad pack were approved in August 2012. In December 2012, the Navy awarded a contract to General Dynamics Electric Boat for lead ship research and development through Fiscal Year 2017.

Developers

General Dynamics Electric Boat Corporation	Groton, Connecticut USA
Huntington Ingalls Industries	Newport News, Virginia USA

SSN 774 *Virginia*-Class Nuclear-Powered Attack Submarine

Description

The *Virginia*-class submarine is specifically designed for multi-mission operations in the littorals while retaining the submarine force's strength in traditional open-ocean anti-submarine and anti-surface missions. These submarines have advanced acoustic stealth technology that allows unimpeded operation within an adversary's defensive perimeter. Using this asymmetric access, *Virginia*-class submarines are configured to conduct sea-control, land attack, mine reconnaissance, Special Operations Forces (SOF) insertion/extraction, intelligence collection, and surveillance missions that enable successful access and follow-on operations by larger general-purpose forces. The *Virginia*-class can serve as host for various SOF delivery methods, including mini-submersibles and raiding craft via an embarked dry-deck shelter or directly to sea via integral lock-out chambers.

Virginia-class submarines are built under an innovative teaming arrangement between General Dynamics Electric Boat (GDEB) and Huntington Ingalls Industries (HII) Newport News using a modular construction process in which each shipyard builds portions of each ship with integration and delivery of completed submarines alternating between the shipyards. Modular construction also allows for assembly and testing of systems prior to installation in the hull, thereby reducing costs, minimizing rework, and simplifying system integration. The modular design and extensive use of open architecture electronics systems facilitates technology insertion in both future ships during new construction and ships in the fleet, enabling each *Virginia*-class submarine to keep pace with emerging threat capabilities throughout its 33 year service life.

Status

In 2008, the Navy negotiated the existing multi-year procurement contract for a total of eight submarines between 2009 and 2013. In 2010, the *Virginia*-class program completed Milestone C review, receiving Full Rate Production authority and achieving Full Operational Capability (FOC). In 2011, the Navy increased the procurement rate to two submarines per year, the first time the Navy procured two submarines in the same year since 1991. The USS Mississippi (SSN 782), the ninth *Virginia*-class submarine, delivered one year early in May 2012, and the Minnesota (SSN 783), the tenth ship of the class, is projected to deliver ahead of schedule in FY 2013, continuing the trend of constructing submarines ahead of schedule and under budget.

SSN 784 through SSN 791 will comprise the third block of *Virginia*-class submarines, which began construction in 2009. In December 2012, the Navy awarded the contract to GDEB to build the last two Block III submarines, South Dakota (SSN 790) and Delaware (SSN 791). Construction is expected to begin in FY 2013. Block III captures learning curve efficiency initiatives that help lower production costs. Block IV (nine SSNs) will include SSN 792 through SSN 800 and is under research and development (R&D). The Navy also received funds from Office of the Secretary of Defense for R&D and design efforts for *Virginia* Block V. To mitigate the large undersea strike capacity lost when *Ohio*-class nuclear guided-missile submarines (SSGN) retire between 2026 and 2028, *Virginia* Block V will incorporate Virginia Payload Modules

(VPM). VPM will provide future *Virginia*-class submarines an additional four large diameter payload tubes, increasing Tactical Tomahawk (TACTOM) strike capacity from 12 to 40.

Developers

General Dynamics Electric Boat Corporation	Groton, Connecticut USA
Huntington Ingalls Industries	Newport News, Virginia USA

Submarine Rescue Chamber / Diving and Recompression System (SRC / SRDRS)

Description

The Navy's legacy Deep Submergence Rescue Vehicles (DSRVs) have been replaced by the new Submarine Rescue Diving and Recompression System (SRDRS), which, along with the existing Submarine Rescue Chambers (SRCs), provides the Nation's capability for submarine rescue. These systems are transportable by truck, aircraft, and ship and can be quickly deployed in the event of a submarine accident.

The SRDRS consists of three distinct systems: (1) Assessment Underwater Work System (AUWS); (2) Pressurized Rescue Module System (PRMS); and (3) Surface Decompression System (SDS). AUWS provides the Atmospheric Diving System (ADS2000), a one-atmosphere, no-decompression manned diving system capable of depths to 2,000 feet for the main purpose of clearing and preparing a submarine hatch for seating a rescue platform. The PRMS provides a manned, tethered, remotely piloted vehicle capable of rescuing personnel from a stricken submarine to depths of 2,000 feet. The SDS overcomes a significant deficiency of older systems by enabling personnel "transfer under pressure" for surface decompression following rescue from a pressurized submarine environment.

The SRDRS is a government-owned, contractor-operated system, capable of rapid, worldwide deployment and mobilization on vessels of opportunity.

Status

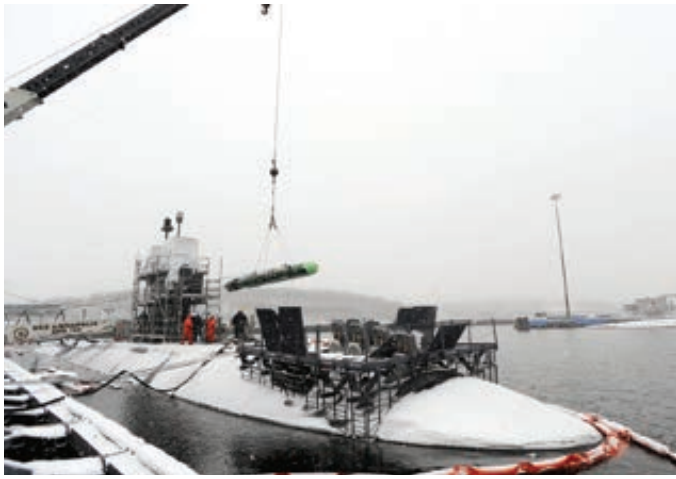
ADS2000 completed operational test and evaluation and was introduced to the Fleet in September 2007. Four ADS2000 suites are maintained at the Navy's Undersea Rescue Command. PRMS was delivered in late 2008 at which time the DSRV program was retired. Development of the SDS "transfer under pressure" capability is ongoing and planned to be introduced in FY 2013 with an initial operational capability (IOC) in FY 2015. SRC is programmed for continued service to the Fleet.

Developers

OceanWorks International	Vancouver, California USA
Oceaneering International	Upper Marlboro, Maryland USA
Southwest Research Institute	San Antonio, Texas USA
Environmental Tectonics Corporation	Southampton, Pennsylvania USA

SUBMARINE WEAPONS

Mk 48 Advanced Capability (ADCAP) Common Broadband Advanced Sonar System (CBASS) Torpedo



Description

The Mk 48 Advanced Capability (ADCAP) heavyweight torpedo is the Navy's sole submarine-launched weapon for anti-submarine (ASW) and anti-surface warfare (ASuW). The ADCAP torpedo was authorized for full-rate production in 1990 and the final production all-up-round torpedo was delivered to the U.S. Navy in 1996. Since then, the Navy has employed an open-architecture model to provide software and hardware improvements to the existing ADCAP torpedo inventory.

The ADCAP torpedo features sophisticated sonar, all-digital guidance and control systems, digital fusing systems, and improved torpedo acoustic stealth compared to the legacy Mk 48 torpedo. The Mod 7 Common Broadband Advanced Sonar System (CBASS) is an incremental improvement that includes a new broadband sonar system for shallow-water performance enhancement.

The CBASS upgrade to the ADCAP torpedo is part of an ongoing Armaments Cooperative Program with the Royal Australian Navy (RAN). In addition to the RAN, the Canadian, Dutch, and Brazilian navies also employ versions of the Mk 48 torpedo through the U.S. Navy's Foreign Military Sales program.

Status

Phase I (of II) of the CBASS program with the new Broadband Sonar Analog Receiver (BSAR) achieved Initial Operating Capability and was introduced to the Fleet in 2006. Phase II of the CBASS program with Advanced Processor Build (APB) Spiral 4 software improvements was released to the Fleet through the Navy's Quick Reaction Assessment process in March 2011 in response to emerging needs. Phase II continues through operational testing for which it is expected to achieve Full Operational Capability in second quarter FY 2013.

The Navy continues to procure CBASS hardware for eventual conversion of all ADCAP torpedoes through the life of the program. In parallel, the spiral development program continues to improve torpedo performance through software upgrades in challenging areas, such as defeating the shallow-water diesel submarine threat. A 2012 approved Capabilities Development Document (CDD) has established requirements for follow-on APB 5 and APB 6 software and hardware upgrades.

Developers

Lockheed Martin Sippican — Marion, Massachusetts USA

UGM-133A Trident II/D5 Submarine-Launched Ballistic Missile (SLBM)

Description

The Trident II/D5 is the sixth generation of the Navy's Fleet Ballistic Missile (FBM) program, which began in 1955. The D5 is a three-stage, solid propellant, inertial-guided submarine-launched ballistic missile (SLBM) with a range greater than 4,000 nautical miles and accuracy measured in hundreds of feet. Trident II missiles are carried by all 14 *Ohio* (SSBN 726)-class SSBNs, each of which carry 24 SLBMs. The New Strategic Arms Reduction Treaty of 2010 limits the numbers of delivery vehicles and warheads on all strategic systems, including TRIDENT II, and is to be implemented prior to February 2018.

The Navy continues to address future deterrence requirements against weapons of mass destruction and disruption, and the Trident II/D5 will ensure that the United States has a modern, survivable strategic deterrent. Navy has embarked on a Life Extension Program (D5LE), which will upgrade missile systems and maintain D5 in the fleet into the 2040s, bridging the transition from *Ohio*-class SSBNs to *Ohio* Replacement SSBNs. The initial payload of the Ohio Replacement SSBN will be the Trident II/D5 D5LE SLBM.

Status

Full missile procurement ended in FY 2012, with a total acquisition of 108 additional missiles. Life extension kits and replacement solid rocket motors are procured throughout and beyond the future years defense program to refurbish obsolete electronics and expiring rocket motors on existing missiles.

Developers

Lockheed Martin — Sunnyvale, California USA

SUBMARINE SENSORS

BQQ-10 Acoustic Rapid COTS Insertion (ARCI)

Description

Acoustic Rapid Commercial Off-the Shelf (COTS) Insertion (ARCI) replaces existing legacy submarine sonar systems on all submarine classes with a more capable and flexible COTS based, Open Systems Architecture (OSA) and provides the submarine force with a common sonar system. It allows development and use of complex algorithms that were previously well beyond the capability of legacy processors. The use of COTS/OSA technologies and systems enables biennial updates to both software and hardware with little or no impact to submarine scheduling. COTS-based processors allow computer power growth at a rate commensurate with that of commercial industry. Additionally, the open architecture design of the ARCI system allows for the rapid insertion of new sensor systems and processing techniques at minimal cost. New sensor systems, such as the Low-Cost Conformal Array (LCCA) and upgraded Fat Line Towed Array (TB-34), are currently being integrated in the ARCI system.

Status

BQQ-10 ARCI is the upgrade to legacy (BSY-1 and prior) sonar systems. Submarines receive periodic improvements through Technology Insertions (TIs) of hardware and Advanced Processor Builds (APBs) of software. While TI upgrades are designed for insertion biennially on the even years (e.g., TI08, TI10, TI12), individual submarines typically receive a TI every other cycle. This nominal four-year refresh of hardware keeps each submarine's processing power in line with the state of the computing industry while ensuring that the COTS components are upgraded before commercial obsolescence. Biennial APBs (on the odd years—APB07, APB09, APB11, etc.) allow for rapid insertion of improved acoustic processing algorithms and increased capabilities requested by the type commanders to address emerging challenges. ARCI is now on a common TI/APB cycle with combat control and imaging. Navy Research, Development, Testing, and Evaluation (RDT&E) will continue to develop processing algorithms from the surveillance, tactical and advanced R&D communities as well as perform laboratory and at-sea testing.

Developers

Applied Research Lab University of Texas	Austin, Texas USA
General Dynamics Advanced Information Systems	Fairfax, Virginia USA
Lockheed Martin	Manassas, Virginia USA
Progeny Systems Corporation	Manassas, Virginia USA
SEDNA Digital Systems	Manassas, Virginia USA

SUBMARINE EQUIPMENT AND SYSTEMS

BYG-1 Submarine Combat Control System

Description

BYG-1 is the common submarine combat control system across all submarine platforms except *Ohio*-class fleet ballistic-missile submarines. BYG-1 is a Commercial Off-the-Shelf (COTS) open systems architecture (OSA) system that incorporates organic sensor fusion, target solution development, combined tactical picture, weapon control, and Tactical Local Area Network (TacLAN) functions into a single procurement program. The use of COTS/OSA technologies and systems enables frequent periodic updates to both software and hardware with little or no impact on submarine scheduling. COTS-based processors allow computer power growth at a rate commensurate with that of commercial industry. Additionally, the open architecture design of the BYG-1 system allows for the rapid integration of new sensors and processing techniques at minimal cost. BYG-1 allows the submarine force to update rapidly the ship safety tactical picture, integrates the common tactical picture into the battle group, improves torpedo interfaces, and provides Tactical Tomahawk capability.

Status

BYG-1 is scheduled to be installed on all attack (SSN) and guided-missile (SSGN) submarines by the end of FY 2013. Submarines already upgraded receive periodic improvements through technical insertions (TI) of hardware and advanced processor builds (APB) of software. While TI upgrades are designed and produced biennially, individual submarines normally receive a TI every-other cycle. This nominal four-year refresh of hardware keeps each submarine's processing power on pace with the state of the computing industry while ensuring that the COTS components are upgraded before commercial obsolescence. Biennial APBs allow for rapid insertion of improved processing algorithms and increased capabilities requested by Navy type commanders to address emerging challenges. Navy research, development, testing, and evaluation will continue to develop processing algorithms from the surveillance, tactical, and advanced R&D communities as well as perform laboratory and at-sea testing.

Developers

General Dynamics Advanced Information Systems	Fair Lakes, Virginia USA
General Dynamics Advanced Information Systems	Pittsfield, Massachusetts USA
Progeny	Manassas, Virginia USA
Lockheed Martin	Eagan, Minnesota USA
John Hopkins University APL	Laurel, Maryland USA

Submarine Escape (SEIE)

Description

Submarine Escape and Immersion Equipment (SEIE) is a component of a larger escape system aboard submarines that allows submariners wearing self-contained immersion suits with integral rafts and safety equipment to escape from a stricken submarine at depths down to 600 feet. All submarines were initially outfitted with the Mk 10 SEIE suits, improved air delivery systems, and improved hatch operating systems. As Mk 10 SEIE suits reach the end of their 10-year service lives, they are being replaced by Mk 11 SEIE suits. In addition to providing thermal protection and an integral life raft, these suits allow for escape at greater depths than the older "STEINKE HOOD" system that they have replaced.

Status

SEIE installation is complete for the submarines of the *Los Angeles*, *Seawolf*, and *Ohio* classes. *Virginia*-class submarines are receiving Mk 11 SEIE suits upon initial outfitting following construction.

Developers

RFD Beaufort Survitec Defence and Aerospace	Birkenhead, United Kingdom
Electric Boat	Groton, Connecticut USA
Hale Hamilton Ltd.	Uxbridge, United Kingdom

Submarine Survivability

Description

Today's submariners use passive means to remove carbon dioxide from a disabled submarine's atmosphere, enabling survival up to seven days. Oxygen generating chlorate candles and atmosphere monitoring equipment are also used for submarine survivability. Current developments include improving the passive scrubbing capabilities by the introduction of new "flat-sheet" lithium hydroxide (LiOH) "packaged-in" canisters.

Status

Installation of passive carbon dioxide scrubbing curtains, granular lithium hydroxide, oxygen generating chlorate candles and atmosphere monitoring equipment onboard all submarines is complete. Newly developed flat-sheet LiOH canisters are being phased into the initial outfitting for *Virginia*-class SSNs.

Developers

Casco Manufacturing Solutions, Inc.	Cincinnati, Ohio USA
Analox Sensor Technology Ltd	Stokesley, United Kingdom
Micropore, Inc.	Newark, Delaware USA
Tangram Company LLC	Holtsville, New York USA
5. O.C. Lugo Co.	Nyack, New York USA

SECTION 4

EXPEDITIONARY FORCES

The Navy's expeditionary forces carry out a wide range of responsibilities and provide a robust set of capabilities. The Navy's vast and geographically dispersed logistics network, including its fleet of amphibious ships enable Navy and Marine Corps forces to sustain forward presence, exert sea control over large areas, and project power ashore. These survivable ships, equipped with aviation and surface-assault capabilities, rapidly close, decisively employ, and sustain Marines from the sea. Mine warfare ships operate forward to ensure operational access to key maritime crossroads, while coastal riverine forces operate in the littorals and inland waterways, protecting ships and maritime infrastructure. In addition, Joint High-Speed Vessels, hospital ships, and Mobile Construction Battalions (Seabees) provide humanitarian assistance, disaster relief, and build partner-nation capacity.

EXPEDITIONARY FORCES

Coastal Riverine Force (CRF)

Description

In 2012, Navy Expeditionary Combat Command (NECC) merged the Riverine Force and the Maritime Expeditionary Security Force to form the Coastal Riverine Force. The CRF is organized into three active squadrons (CRS) with four companies each and four reserve squadrons with three companies each. The CRF comprises 4,400 active duty and 1,900 Reserve personnel.

The CRF delivers task-organized units that are effective, flexible, and responsive to meet fleet and combatant commander demands and seamlessly operate with other Navy, joint, interagency, and coalition partners. The CRF performs "brown" and "green-water" combat and maritime security operations on inland waterways and in harbors and the coastal environment, bridging the maritime gap between land forces and the Navy's traditional littoral and blue-water forces. The primary unit of action for the CRF is the squadron, but the force maintains the capability to dis-aggregate into companies. Each CRF squadron can conduct 24-hour operations in varying weather conditions and climates, including the arctic, tropical areas, and deserts. It is the only U.S. force capable of sustained combat operations on inland waterways.

The CRF protects and defends the littoral operating area for the Navy and is scalable, agile, and adaptive to diverse mission requirements. Units conduct force protection of critical maritime infrastructure, strategic sealift vessels, and naval vessels operating in the inshore and coastal areas, anchorages and harbors. CRF units deploy worldwide to defend an area, unit or high-value asset against determined enemies and stand ready to conduct offensive operations.

Status

The Coastal Riverine Squadron (CORIVRON) Table of Allowance (TOA) was produced by merging the legacy Maritime Expeditionary Security Force (MESF) equipment with the three baseline TOAs of the Riverine Force. CRF outfitting responds to the operational requirements of the CORIVRONs' broad capabilities set. In that regard, new-design combatant craft that are capable of spanning the spectrum of CRF operations are key to the future viability of the force.

Developers

Multiple sources.

Explosive Ordnance Disposal / Mobile Diving and Salvage (EOD / MDSU)

Description

The Explosive Ordnance Disposal community is operationally organized into two deploying EOD groups, each headed by a Navy captain (O-6). Each group comprises multiple EOD Mobile Units (MUs), a Mobile Diving and Salvage Unit (MDSU), a Training and Evaluation Unit (TEU), and an Expeditionary Support Unit

(ESU). EOD units provide the Fleet, joint services, and the interagency community the capabilities to detect, identify, render safe, recover, exploit, and dispose of ordnance that has been fired, dropped, launched, projected or placed in such a manner as to constitute a hazard to operations, installations, people, or material. Usually operating in platoons and smaller elements, these EOD units assure access to battlespace by opening lines of communication in the sea-to-shore interface as well as blue-water and land-based operations. This can require diving operations, parachute insertion, or helicopter insertion and extraction. These mobility skills, along with responsibility for all underwater ordnance, make Navy EOD unique in the joint force.

The Secretary of the Navy (SecNav) is the Department of Defense Single Manager for EOD Technology and Training, carrying out these duties primarily through the Navy EOD Technology Center and the Naval School Explosive Ordnance Disposal, where all U.S. and select foreign-partner military EOD technicians receive the same initial training to defeat conventional land and air ordnance as well as improvised explosive devices (IEDs). Navy and other U.S. EOD units also can render safe chemical, biological, radiological, nuclear, and enhanced-explosive weapons including terrorist "dirty" bombs.

MDSUs conduct operations as a commander task group/unit (CTG/CTU), planning, coordinating, and directing combat harbor-clearance, anti-terrorism and force protection (ATFP) diving missions, salvage and recovery operations, and other mission areas. MDSUs operate in direct support of naval, joint or combined task forces, conducting operations afloat or ashore during combat or national emergencies in climate extremes—arctic, tropical, and desert environments. In addition to expeditionary salvage, search, and recovery operations, they perform harbor clearance to remove obstructions restricting access to ports, piers, and waterways; assist vessels in distress; de-beaching and salvaging of ships, submarines, and aircraft; locate and recover other high-value objects; underwater cutting and welding; limited underwater ship repair; ship husbandry; and ATFP dive support for ships in port and port facilities.

Status

Both EOD and MDSU have recapitalized their authorized equipment inventories with new Tables of Allowance (TOA). Based on a complete and thorough review of mission requirements, each TOA aligned with force structures and standardized equipment across the Navy Expeditionary Combat Enterprise. Specialty equipment—e.g., man-transportable robotic systems, unmanned underwater vehicles, and Mk-16 underwater breathing apparatus —were included for EOD units.

Developers

Multiple sources.

Maritime Civil Affairs and Security Training (MCAST) Command

Description

Headquartered in Dam Neck, Virginia, the Maritime Civil Affairs and Security Training Command is a "soft power" enabling force that works within a combatant commander's area of operations to promote regional security and stability. The MCAST mission is to assess, plan, evaluate, and implement civil/military affairs activities in regional maritime environments. MCAST Command assists with planning and coordination for U.S. country teams, non-combatant evacuation operations, refugee operations, host-nation interagency support, and restoration of communications and local infrastructures following military operations or natural disasters. MCAST also delivers maritime civil affairs teams (MCATs) and security force assistance mobile training teams (SFA MTTs) that generate a small footprint across a wide range of civil and military organizations. This makes MCATs and MTTs better suited to the capabilities of emerging world partners than larger naval and other forces, significantly enhancing partnership building. MCATs and MTTs are specially trained with cultural and language skills tailored to specific regions.

The MCAST areas of expertise include traditional civil affairs functions such as public education and health that are regionally aligned and focused on three maritime-specific functions: commercial port operations; harbor and channel construction and maintenance; and marine and fisheries resources. The MTTs likewise provide a broad range of training, including expeditionary security, small-boat operations and maintenance, marine engine maintenance, weapons handling, and professional development.

Status

The MCAST Table of Allowance (TOA) contains the equipment necessary for MCATs and MTTs to deploy in support of field operations.

Developers

Multiple sources.

Naval Mobile Construction Battalion (NMCB) "Seabee"

Description

Naval Construction Force Elements—"Seabees"—are the Navy's deployable engineer and construction force providing support to Marine Air-Ground Task Force (MAGTF), Navy commanders, and other joint forces and combatant commanders. The force comprises Naval Construction Regiments (NCR), Naval Mobile Construction Battalions (NMCB), Construction Battalion Maintenance Units (CBMU), and Underwater Construction Teams (UCT). The Navy/Marine Corps Team projects power from the sea with a rapid flow of maneuver forces ashore, using roads, expeditionary airfields, force-protection structures, intermediate staging bases, and advanced logistics bases often constructed or improved by the Navy's "Seabees."

Forward deployed "Seabees" enable the surge of task-tailored engineer forces and equipment sets to enhance the MAGTF and other naval and joint forces on land. "Seabee" capabilities include bridge erection, roadway clearing and construction, pier and wharf repair, forward operating base construction, airfield repair and construction, water well installation, and building construction such as schools and medical clinics. In operations other than war, forward-deployed Naval Mobile Combat Battalions (NMCB) hone construction skills through humanitarian assistance and disaster-recovery operations, participate in foreign engagement exercises, and complete construction projects that support sustainment, restoration, and modernization for Navy and Marine Corps' forward bases and facilities.

Status
The Navy has developed a long-range plan to recapitalize the tables of allowance of all Seabee units. The initial priority is to correct existing inventory deficiencies and replace aging tools and equipment that are no longer parts supportable. During the next several years, NMCB Tables of Allowance (TOA) will be outfitted with modern and recapitalized tactical vehicles, construction and maintenance equipment, communications gear, infantry items, and field support equipment.

Developers
Multiple sources.

Naval Special Warfare (NSW)

Description
The Naval Special Warfare community—Navy Sea, Air, Land (SEAL) forces—is the Maritime Component of the U.S. Special Operations Command (SOCOM) and the Special Operations Component of the Navy. The Commander, Naval Special Warfare Command is responsible for strategic vision; doctrinal, operational, and tactical guidance; and training, organizing, and equipping operational support components of the NSW community.

NSW forces provide highly effective capabilities and capacities across the spectrum of hostilities, from peacetime operations to general war. NSW principal mission areas include counter-terrorism, counter-proliferation, unconventional warfare; direct action; special reconnaissance; military information support operations, and security force assistance and civil affairs. NSW forces also conduct collateral missions such as counter-drug activities, humanitarian assistance, and personnel recovery.

The NSW community is organized under eight major commands, which include five operational commands, one training command, one tactics and technology development command, and one Reserve Component (RC) command. The major operational components of NSW are Naval Special Warfare Groups (NSWGs) One, Three, and Eleven in San Diego, California; and NSWGs Two, Four, and Ten in Little Creek, Virginia. The NSWG mission is to equip, support, and provide command and control elements

as well as trained and ready SEAL platoons/troops, SEAL delivery vehicle (SDV) platoons, Special Boat Teams (SBT) combatant craft detachments, and other forces to the combatant commanders. Two of the NSWGs also provide administrative control to a total of four NSW units and one detachment that are home ported forward and are under operational control of a theater Special Operations Command.

The primary deployable operational component of the community is the NSW Squadron (NSWRON). A NSWRON is a task-organized unit centered on a SEAL Team and led by a SEAL Team commanding officer. When a NSWRON is provisionally established, the deploying SEAL Team will normally be augmented by a combatant craft detachment; a support activity troop; an EOD platoon; communications, intelligence, tactical cryptological support detachments; Navy Seabees; and personnel or other detachments tailored for specific missions.

Status

Resources to support the NSW community are principally provided by USSOCOM, but the Navy retains resourcing of responsibilities for service-unique capabilities.

Navy Expeditionary Intelligence Command (NEIC)

Description

Navy Expeditionary Combat Command (NECC) established the Navy Expeditionary Intelligence Command to provide tactical indications and warning and force protection intelligence enabling Navy and Joint commanders to conduct missions across the full spectrum of expeditionary operations. NEIC activities are framed around its overall function to man, train, and equip Intelligence Exploitation Teams (IETs) in support of Navy component commander and joint force commander operational requirements. NEIC activities can be categorized as Command Element (CE), Command Support Staff (CSS), Active Component (AC) operational units, and Reserve Component (RC).

IETs are multi-intelligence, surveillance, and reconnaissance (ISR) collection platforms that operate at the tactical level, with unique access to areas and environments—from "blue" to "green" water, the coastal littoral, and far inland—that are constrained by more traditional ISR assets.

NEIC capabilities give expeditionary, maritime, joint, and combined forces timely, relevant, and actionable intelligence to deny the enemy sanctuary, freedom of movement, and use of waterborne lines of communication, while enabling friendly forces to find, fix, and destroy the enemy within the operation environment.

Status

COMNECC approved NEIC's reorganization into integrated teams in Septembver 2010. NEIC's updated Table of Allowance was approved mid-2012.

Navy Expeditionary Logistics Support Group (NAVELSG)

Description

The Navy Expeditionary Logistics Support Group consists of Navy Expeditionary Logistics Regiments (NELRs), Navy Cargo Handling Battalions (NCHBs), a Training and Evaluation Unit (TEU), and an Expeditionary Support Unit (ESU). NAVELSG is responsible for providing expeditionary logistics capabilities for the Navy, primarily within the littoral maritime domain. Capable of rapid, worldwide deployment, the NELRs and NCHBs are trained and equipped to provide shore-based logistical support to Navy, Marine Corps, and joint force commanders for peacetime support, humanitarian assistance, crisis response, and combat service support missions. NCHBs can control pier and terminal operations, handle surface or air cargo, and manage ordnance handling. Specialized capabilities include expeditionary fuel operations, pier and air terminal operations, cargo processing (to include bulk mail), heavy-lift crane operations, customs inspections, expeditionary communications, short-haul trucking, and expeditionary warehousing.

Status

The ELSG Table of Allowance (TOA) was approved in March 2010. The Navy has developed a long-range plan to recapitalize the TOAs of all expeditionary logistics units. The initial priority is to correct existing inventory deficiencies and replace aging tools and equipment that are no longer parts supportable.

Developers

Multiple sources.

EXPEDITIONARY AND SPECIAL MISSION SHIPS AND CRAFT

Landing Craft, Air Cushion (LCAC)

Description

This high-speed, fully amphibious landing craft is capable of carrying a 60-ton payload (75 tons in overload) at speeds in excess of 40 knots and a nominal range of 200 nautical miles. Its ability to ride on a cushion of air allows it to operate directly from the well decks of amphibious warships. Carrying equipment, troops, and supplies, landing craft air cushion vehicles launch from the well deck, transit at high speed, traverse the surf zone, and land at a suitable places ashore where they quickly offload and return to amphibious shipping for follow-on sorties. LCACs provide amphibious task force commanders flexibility in selecting landing sites, permitting access to more than 70 percent of the world's shores as compared with 17 percent for conventional landing craft. LCACs deliver vehicles and cargo directly onto dry land rather than in the surf zone, and have proved invaluable in support of Humanitarian Assistance/Disaster Relief (HA/DR) missions, for example, Operation Tomodachi Tsunami Relief in Japan, Hurricane Katrina, and Operation Unified Response in Haiti. LCACs

are multi-mission craft that can also conduct alternate missions when outfitted with appropriate mission packages and/or radar and radio system upgrades. Some of the craft have been outfitted with radar and radio systems upgrades prior to entry into service life extension program (SLEP). As part of the LCAC SLEP, the Navy will incorporate the following service life enhancements:

- An open-architecture concept, relying on modern commercial off-the shelf (COTS) equipment that will allow much easier incorporation of later technology changes, such as the precision navigation system and communications systems, that will be fully interoperable with in-service and near-term future joint systems.
- Engine upgrades (ETF-40B configuration) that will provide additional power and lift, particularly in hot (100° Fahrenheit and higher) environments, reducing fuel consumption, maintenance needs, and lift footprint.
- Refurbishment of the buoyancy box and some of the rotating machinery in order to solve corrosion problems, incorporate hull improvements, and "reset" the fatigue-limit "clock."
- Incorporation of a new deep skirt that will reduce drag, increase performance envelope over water and land, and reduce maintenance requirements.

Status

LCAC initial operational capability (IOC) was achieved in 1986. Contracts for 91 LCACs were approved in FY 1997, with all 91 craft delivered by the end of FY 2001. Nine that were in deep reduced operating status (ROS) were terminated in FY 2006 for cost reasons; two LCACs are dedicated research and development craft. The LCAC SLEP began in late 2000. Four SLEPs are planned each year through FY 2016.

Developers

Textron Marine and Land Systems	New Orleans, Louisiana USA
Avondale Marine	Gulfport, Mississippi USA
Gryphon Technologies LC	Panama City, Florida USA

LHA 6 *America*-Class General-Purpose Amphibious Assault Ship

Description

The *America* (LHA 6)-class general-purpose amphibious assault ships (formerly the LHA Replacement—LHA(R)—program) will provide forward presence and power projection capabilities as elements of U.S. expeditionary strike groups. With elements of a Marine landing force, *America*-class ships will embark, deploy, land, control, support, and operate helicopters, landing craft, and amphibious vehicles for sustained periods. The LHA 6 class will also support contingency response, forcible entry, and power

projection operations as an integral element of joint, interagency, and multinational maritime expeditionary forces. LHA 6 is the first of the *America* class. America is a variant of the USS Makin Island (LHD 8) and includes LHD 8 gas turbine propulsion plant and all-electric auxiliaries enhancements and a significant increase in aviation lift, sustainment, and maintenance capabilities; space for a marine expeditionary unit, amphibious group, or small-scale joint task force staff; an increase in service-life allowances for new-generation Marine Corps systems (e.g., MV-22 Osprey and the F-35B Joint Strike Fighter); and substantial survivability upgrades.

Status

Milestone B was reached in January 2006. The first LHA(R) was designated LHA 6 in August 2005. America (LHA 6) detail design and construction contract was awarded in FY 2007. LHA 6 was launched June 4, 2012 and delivery is planned for early FY 2014; she was christened in October 2012. The contract for LHA 7 was awarded on May 31, 2012. The third of the class, LHA 8, will modify the LHA 6 design to incorporate a well deck capable of supporting two landing craft, air cushion (LCAC) vehicles.

Developers

Huntington Ingalls Industries-	
Ingalls Shipbuilding	Pascagoula, Mississippi USA
Avondale Marine	Gulfport, Mississippi USA
Gryphon Technologies LC	Panama City, Florida USA

LHD 1 *Wasp*-Class Amphibious Assault Ship

Description

The *Wasp*-class (LHD 1) comprises eight 40,650-ton (full load), multi-purpose amphibious assault ships whose primary mission is to provide embarked commanders with command and control capabilities for sea-based maneuver/assault operations as well as employing elements of a landing force through a combination of helicopters and amphibious vehicles. The *Wasp*-class also has several secondary missions, including power projection and sea control. LHD 1-class ships increase total lift capacity by providing a flight deck for helicopters and Vertical/Short Take-Off or Landing (V/STOL) aircraft (AV-8B Harrier, the MV-22 Osprey, and, when modified, the F-35B Joint Strike Fighter), and a well deck for both air-cushioned and conventional landing craft. Each ship can embark 1,877 troops and has 125,000 cubic feet of cargo for stores and ammunition and 20,900 square feet for vehicles. Medical facilities include six operating rooms, an intensive-care unit, and a 47-bed ward.

LHDs 5 through 7 are modified variants of the class. Design changes include increased JP-5 fuel capacity, C4ISR and self-defense improvements, fire-fighting and damage-control enhancements, and Women-at-Sea accommodations. The USS Makin Island (LHD 8) incorporates additional significant design changes,

including gas turbine (GT) propulsion, all electric auxiliaries, and advanced machinery control. LHD 8 is the Navy's first hybrid-drive warship, with gas turbine-electric and diesel-electric drive systems. The ship's two gas turbines generate 70,000 shaft horsepower, replacing the two steam plants of the earlier LHD design and contributing to savings in manpower, maintenance, and operating costs. Operating on diesel-electric propulsion at lower speeds will save fuel costs, and when higher speeds are required the ship will engaged the GT plant.

Status

Eight LHDs have been delivered to the Fleet. The eighth and final ship of the class, the USS Makin Island (LHD 8) was commissioned October 24, 2009 in San Diego, California. All ships in the class will be modified to support F-35B Lightning II operations, with Wasp completing modifications in FY 2013.

Developers

Northrop Grumman Ship Systems
Ingalls Operations — Pascagoula, Mississippi USA

LPD 17 *San Antonio*-Class Amphibious Transport Dock Ship

Description

The *San Antonio*-class (LPD 17) amphibious transport dock ship is optimized for operational flexibility and designed to meet Marine Air-Ground Task Force (MAGTF) lift requirements in support of the expeditionary maneuver warfare concept of operations. The *San Antonio* LPDs are 684 feet in length, with a beam of 105 feet, a maximum displacement of 25,000 long tons, and a crew of approximately 360. Four turbocharged diesels with two shafts and two outboard-rotating controllable-pitch propellers generate a sustained speed of 22 plus knots. Other ship characteristics include 25,000 square feet of space for vehicles—more than twice that of the *Austin*-class (LPD 4), which LPD 17 replaces—34,000 cubic feet for cargo, accommodations for approximately 720 troops (800 surge), and a medical facility comprising 24 beds and four operating rooms (two medical and two dental). The aft well deck can launch and recover traditional surface assault craft as well as two landing craft air cushion (LCAC) vehicles capable of transporting cargo, personnel, Marine tracked and wheeled vehicles, and tanks. The LPD 17 aviation facilities include a hangar and flight deck (33 percent larger than the LPD 4-class) to operate and maintain a variety of aircraft, including current and future fixed- and rotary-wing aircraft. Other advanced features include the Advanced Enclosed Mast/Sensor (AEM/S) for reduced signature/sensor maintenance, reduced-signature composite-material enclosed masts, other stealth enhancements, state-of-the-art C4ISR and self-defense systems, a Shipboard Wide-Area Network (SWAN) / Consolidated Afloat Network Enterprise Services (CANES) linking shipboard systems with embarked Marine Corps platforms, and significant quality of life improvements.

Reducing total ownership costs (TOC) has been and will remain an important factor in the program's efforts. By introducing a variety of new approaches to streamlining the acquisition process and taking advantage of numerous "SmartShip" initiatives to optimize (not simply reduce) manning through focused human-factors engineering and thus enhance operational capabilities, the Navy estimates that it has reduced by about $4.5 billion.

Status

The initial contract award to design and build the lead ship of the class was awarded to the Avondale-Bath Alliance in December 1996. The Navy transferred LPD 17 class workload from Bath Iron Works to Northrop Grumman Ship Systems (NGSS) in June 2002. LPDs 17 through 24 have been delivered as of December 2012. LPDs 23 and 24 will be commissioned in FY 2013.

Developers

Huntington Ingalls Industries	
Avondale Shipyard	New Orleans, Louisiana USA
Ingalls Shipbuilding	Pascagoula, Mississippi USA
Raytheon	San Diego, California USA

LSD 41 *Whidbey Island*-Class / LSD 49 *Harpers Ferry*-Class Dock Landing Ship

Description

The mission of the Navy's dock landing ships (LSDs)—*Whidbey Island*-class (LSD 41) and *Harpers Ferry*-class (LSD 49)—is to transport and launch amphibious assault vehicles (AAVs) and landing craft in support of Navy-Marine Corps amphibious operations. The key difference between the LSD 49-class and the LSD 41-class is that the LSD 49-class cargo variants have significantly expanded cargo and ammunition stowage facilities over those of the LSD 41-class, but at the cost of decreased landing craft, air cushion (LCAC) capacity from four to two. The *Whidbey Island*-class is the primary support and operating platform for LCACs and can also provide limited docking and repair services as a boat haven for small ships and craft. Both LSD classes have two primary helicopter spots and can accommodate Navy and Marine Corps helicopters. Because neither class is configured with a hangar, helicopter refueling and rearming are conducted on the flight deck. LSDs are equipped with a vehicle turning area (turntable) and tactical logistics communication spaces to facilitate and coordinate troop/vehicle movement and logistics. These ships have a doctor and dentist assigned as ship's company, two dental examination rooms, and one medical operating room.

Status

There are 12 operating LSDs in the fleet: eight LPD 41-class and four LPD 49-class. Mid-life programs are designed around a 52-week maintenance availability with five ships completed and four in progress in late 2012. Scheduled to complete in FY 2015, the mid-life program will enable both ship classes to meet amphibious mission requirements and a 40-year expected service life

through FY 2038. The mid-life program improves material condition readiness, replaces obsolete equipment, and provides hull, mechanical, and electrical systems upgrades.

Developers

Avondale Industries Inc.	New Orleans, Louisiana USA
Lockheed Shipbuilding	Seattle, Washington USA
Raytheon	San Diego, California USA

LX(R) Dock Landing Ship Replacement

Description

LX(R) is intended to replace the LSD 41 *Whidbey Island*- and LSD 49 *Harpers Ferry*-classes of dock landing ships.

Status

The Navy's long-range shipbuilding plan associated with the FY 2013 President's Budget identified the LX(R) as an 11-ship program with lead ship procurement in FY 2018. LX(R) will be a recapitalization of the LSD 41/49-classes, which will begin reaching end of service lives in 2025. Planning for a replacement has already begun to ensure necessary lead-time for program development. The LX(R) initial capabilities have been defined and an Analysis of Alternatives (AoA) is planned to begin in FY 2013.

Developers

To be determined.

MCM 1 *Avenger*-Class Mine Countermeasures Ship Modernization (MCM Mod)

Description

Avenger-class (MCM 1) surface mine countermeasures ships are used to detect, classify, and neutralize or sweep mines in sea lines of communication and naval operating areas. These ships are one "leg" of the mine countermeasures "triad" comprising airborne MCM and explosive ordnance disposal (EOD) forces. MCM modernization improvements correct the most significant maintenance and obsolescence issues in order to maintain the ships through their full 30-year service lives. The modernization package includes: planned product improvement program upgrades on the Isotta Fraschini main engines and generators for MCM 3 through MCM 14; replacement of the SLQ-48 mine neutralization vehicle; upgrading the existing SQQ-32 sonar with high-frequency wide-band capabilities; and replacing the existing acoustic sweep system with the Advanced Acoustic Generator/Infrasonic Advanced Acoustic Generator system. Other major hull, mechanical, and electrical alterations include upgrades to the 400-Hz distribution system, replacement of aft deck hydraulic equipment with electric equipment, replacement of the diesel generator analog voltage regulators with digital voltage regulators, and upgrading the navigation system.

Status
The 13-ship MCM Modernization program commenced in FY 2004 and is scheduled to complete by FY 2018.

Developers
Raytheon Portsmouth, Rhode Island USA

Mobile Landing Platform

Description
The Mobile Landing Platform (MLP) is based on commercial float-on/float-off (FLO/FLO) technology to provide a surface interface between large medium-speed roll-on/roll-off (LMSR) prepositioning ships and landing craft air cushion (LCAC) surface connectors. The MLP is a major component to the Navy-Marine Corps solution for enhancing Maritime Prepositioning Squadrons (MPSRONs) throughput capability by expanding operating environments and access opportunities. The MLP is approximately 730 feet in length with a beam of 165 feet—more than a third wider than most ships—making it an extremely stable platform for sea base operations.

MLP 1 and 2 will provide an elevated vehicle staging area and three LCAC lanes (barriers, lighting, wash-down, and fueling services) to allow for transfer of equipment at sea in non-anchorage depths and delivery from over-the-horizon (OTH) through restricted access environments.

MLP 3 and 4 will be used as Afloat Forward Staging Bases (AFSB) and will include an accommodation barge (accommodating a maximum of 298 personnel) outfitted with common spaces to support ready room, command, operations, and logistics functions in support of mine warfare, special operations and other expeditionary missions. Other capabilities include two CH-53 operating spots with parking for two additional helicopters, a hangar and ordnance storage; an underway replenishment capability; and deck space for airborne mine countermeasure (AMCM) or Special Operating Force (SOF) equipment. Operating forward as AFSBs, MLP 3 and 4 will take on missions currently tasked to guided-missile destroyers and amphibious ships, freeing these higher-end ships for deployments elsewhere—including the Asia- Pacific.

AFSB capabilities support everything from special operations, counter-piracy/smuggling, maritime security, and mine clearing, to humanitarian aid and disaster relief. Although a port provides the potential for greater logistical capacity, AFSBs can operate globally in international waters providing support when or where needed most.

Status
The Navy awarded contracts for the first two MLPs in FY 2011. The lead ship, USNS Montford Point (MLP 1) commenced construction in June 2011 and launched on November 13, 2012. MLP 1 initial operational capability (IOC) and incorporation into the

Maritime Prepositioning Force (MPF) is scheduled for FY 2015. The second MLP commenced construction in April 2012. The Navy awarded the contract for the third MLP in February 2012, and MLP 3 is scheduled to begin construction in FY 2013. MLP 3 is planned to replace AFSB - I, USS Ponce.

Developers

General Dynamics NASSCO	San Diego, California USA
Lockheed Shipbuilding	Seattle, Washington USA
Raytheon	San Diego, California USA

Ship-to-Shore Connector (SSC) / LCAC 100

Description

The new-design Ship-to-Shore Connector will provide high-speed, heavy-lift for over-the-horizon (OTH) maneuver, surface lift, and shipping. The SSC/LCAC 100 addresses the gap in heavy sea-to-shore lift that will emerge as the upgraded in-service landing craft air cushion (LCAC) vehicles reach the ends of their extended service lives after FY 2015. The SSC payload design will exceed the legacy LCAC payload. The SSC/LCAC 100 design targets high failure rate and maintenance intensive systems in the LCACs to increase reliability and reduce life cycle costs. The SSC/LCAC 100 design will also employ enhanced lift fans and propellers and greater use of composite materials.

Status

The Joint Requirements Oversight Council (JROC) approved the Initial Capabilities Document (ICD) in October 2006. An Analysis of Alternatives (AOA) was approved in early FY 2008, and the Capability Development Document (CDD) was approved in June 2010. Initial Operating Capability (IOC) is scheduled for FY 2020. A contract for the detail design and construction of the first craft with options to build eight additional craft was awarded in July 2012. The first craft is funded by research and development to serve as a crew-transition training platform for LCAC crews to become familiar with the SSC/LCAC 100; it will also support operational test and evaluation (OT&E). The options included in the contract enable the Navy to begin low-rate initial procurement of the first cohort of craft to support fleet introduction in the FY 2020 timeframe.

Developers

Textron Marine & Land Systems	New Orleans, Louisiana USA
Alcoa Defense	Pittsburgh, Pennsylvania USA
L-3 Communications	New York USA

EXPEDITIONARY SYSTEMS

AQS-20A Mine-Hunting Sonar

Description

The AQS-20A is an underwater mine-detection sonar that also employs an electro-optic identification (EOID) sensor capable of locating and identifying bottom, close-tethered, and moored sea mines. The AQS-20A mine-hunting system will be operated from the Remote Multi-Mission Vehicle (RMMV), which together comprise the Remote Mine Hunting System (RMS) hosted onboard the Littoral Combat Ship (LCS).

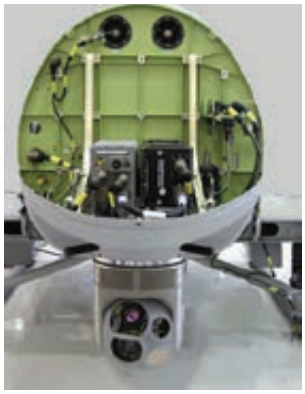
Status

Milestone C and Low Rate Initial Production (LRIP) I occurred in FY 2005. Improvements to computer-aided detection/computer-aided classification and environmental data collection capabilities are being implemented via enhanced research and development efforts. AQS-20A initial operational capability (IOC) is scheduled for FY 2014.

Developers

Raytheon	Portsmouth, Rhode Island USA

Assault Breaching System (ABS)



Description

The Assault Breaching System (ABS) program focuses on development of standoff systems to locate and neutralize mine and obstacle threats in the surf and beach zones. The program uses a "system of systems" approach that includes incremental development of the Coastal Battlefield Reconnaissance and Analysis (COBRA) mine/obstacle detection system, the Countermine System (CMS), and precision craft navigation and lane marking. The Joint Direct Attack Munition (JDAM) Assault Breaching System (JABS) provides in-service neutralization capability against "proud" (i.e., not buried) mines and obstacles in the beach and surf zone. CMS will provide neutralization capability for buried and surf zone mines. The platform for the COBRA system is the Fire Scout Vertical Take-off Unmanned Aerial Vehicle (VTUAV). Platforms for employment of the neutralization systems include naval strike aircraft and Air Force bombers.

Status

The COBRA Block I system achieved Milestone C in FY 2009, and initial operational capablity (IOC) is scheduled for FY 2014. JABS is a fielded capability in the beach and surf zone with a planned expanded very-shallow water capability by FY 2014. The CMS munition will achieve IOC in FY 2019.

Developers

Arete	Tucson, Arizona USA
Boeing	St. Louis, Missouri USA

Naval Quickstrike Mines

Description

The in-service Quickstrike family of aircraft-delivered bottom mines is being enhanced significantly by procurement of the programmable Target Detection Device (TDD) Mk 71. Engineering development efforts include new advanced algorithms for ship detection, classification, and localization against likely threats, including quiet diesel-electric submarines, mini-subs, fast patrol boats, and air-cushioned vehicles. The Quickstrike mines include one dedicated thin-wall mine—the 2,300-pound Mk 65 weapon––and two mines converted from conventional bombs: the Mk 62 500-pound and Mk 63 1,000-pound mines.

Status

In-service support continues for current inventories and funding is in place for algorithm development and procurement of the TDD Mk 71. In 2012, the Navy began an Analysis of Alternative (AOA) to identify near- and medium-term mining requirements and technologies and systems to satisfy those requirements.

Developers

SECHAN Electronics, Inc. Lititz, Pennsylvania USA

WLD-1 Remote Minehunting System

Description

The AN/WLD-1 Remote Minehunting System (RMS) consists of one Remote Multi Mission Vehicle (RMMV) and one AN/AQS-20A Variable Depth Sonar (VDS). RMS is a high-endurance, semi-submersible, unmanned offboard, low-observable vehicle that will be operated from the Littoral Combat Ship (LCS). RMS is launched with a pre-programmed search pattern and will search detect, classify, and identify non-mine objects and mine threats. RMS is capable of line-of-sight and over-the-horizon operations. Once the mission is completed, RMS will return to the ship and data will be downloaded for post-mission analysis (PMA) by which targets classified as mines are passed to follow-on systems for neutralization.

Status

RMS completed a Nunn-McCurdy recertification process on June 1, 2010 and is an Acquisition Category (ACAT) 1D post-Milestone B program. In FY 2012-2013, RMS is conducting phase 1 of 3 of its reliability growth program to improve its operational availability. Milestone C is scheduled for late FY 2014 and initial operational capability (IOC) in FY 2015.

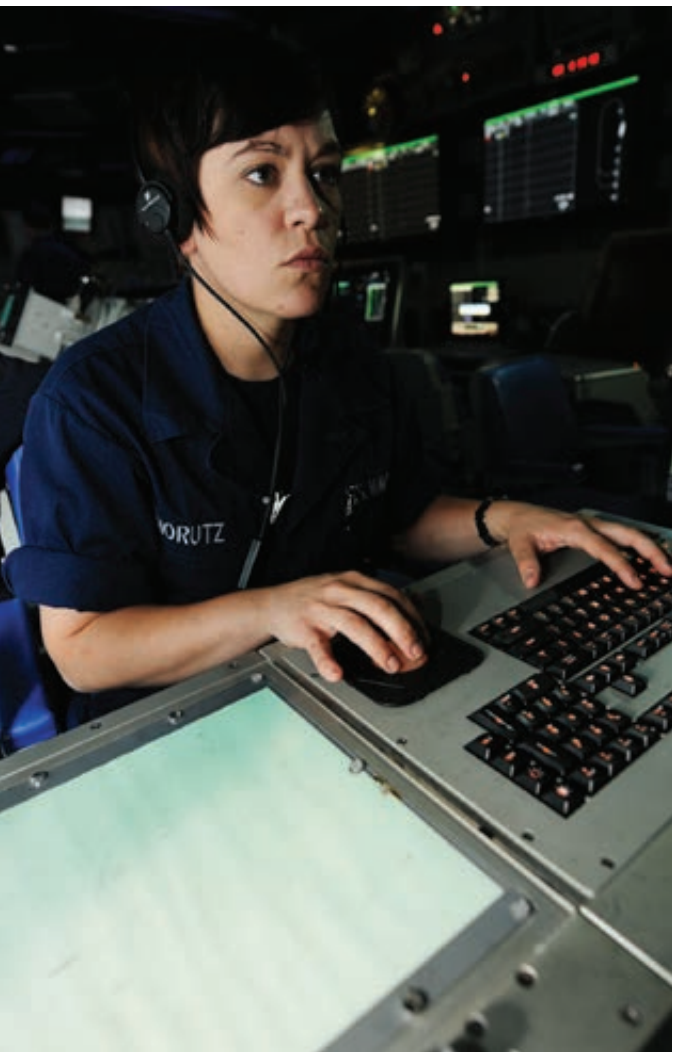
Developers

Lockheed Martin Riviera Beach, Florida USA

SECTION 5

INFORMATION DOMINANCE

The Navy's Information Dominance enables assured maritime command and control and superior battlespace awareness to deliver sustained, integrated fires across the full spectrum of 21st Century maritime warfare. The Navy's information capabilities and info-centric communities place the Navy in a better position to meet the challenges and threats of the Information Age. Success in the Information Age will require unmatched mastery of the capabilities, tools and techniques that enable us to collect, process, analyze, and apply information.



COMMUNICATIONS AND NETWORKS

Automated Digital Network System (ADNS)

Description

The Automated Digital Network System is the key enabler for delivering net-centric capabilities that depend upon robust, dynamic, adaptable, survivable, and secure communications. ADNS is the shipboard network interface that enables connectivity between the ship's internal network and the outside world via the radio frequency (RF) spectrum and land line when pierside. ADNS is also installed in Navy network operations centers (NOCs), enabling the NOCs to transmit and receive voice and data to and from ships underway or pierside. ADNS provides capability that enables Unclassified, Secret, Top Secret, and various joint, allied, and coalition services to interconnect to the Defense Information Systems Network (DISN). ADNS Increment I combines internet protocol (IP) traffic from different enclaves and transmits across available communications paths. ADNS Increment II added the capability to manage traffic from multiple enclaves simultaneously over multiple transit paths including RF and terrestrial links, but did not satisfy the Fleet's need for a higher throughput. Increased throughput and converged IP (voice, video, and data) capabilities were delivered to the Fleet with the deployment of Increment IIa/IIb. ADNS Increment III brings a protected core, reducing the exposure to cyber warfare network infiltration. It will support 25 megabits per second (Mbps) aggregate throughput for submarines and unit-level ships and 50 Mbps aggregate throughput for force-level ships. ADNS Increment III is a key enabler of our counter anti-access/area-denial (A2/AD) capability.

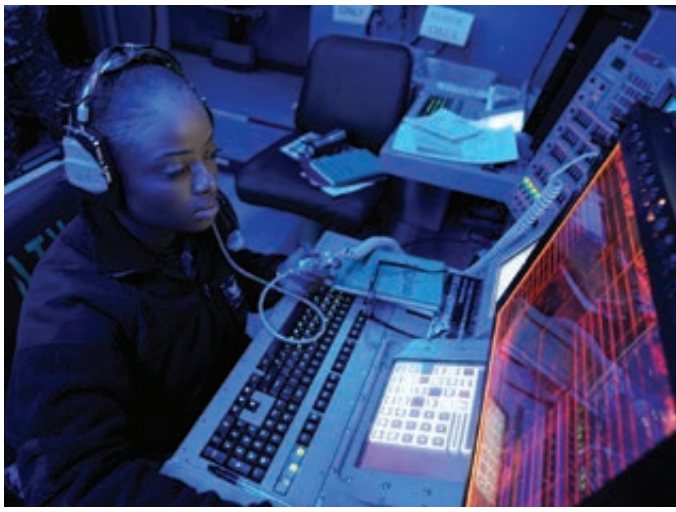
Status

By FY 2005, all active ships and ashore NOC facilities were equipped with either ADNS Increment I or II; additionally, all active submarines and broadcast control authority (BCA) facilities were equipped with Increment I. In FY 2006, ADNS Increment IIa installations began on aircraft carriers, large-deck amphibious assault ships, and fleet commander flagships (force-level ships). In FY 2007, ADNS Increment IIb installations began on unit-level ships. In FY 2008, select airborne platforms were incorporated into ADNS, bringing network connectivity to additional fleet assets. Increment III low-rate initial production began in FY 2009. ADNS Increment III reached IOC in FY 2010. Ashore NOC installs were completed in FY 2010. Increment III will be installed on all ships and submarines and their respective shore facilities. ADNS Increment III is planned to reach Full Operating Capability (FOC) in FY 2020 and is synchronized with CANES deployment.

Developers

PEO C4I	San Diego, California USA
SPAWAR Systems Center Pacific	San Diego, California USA
Science Applications International Corporation	Arlington, Virginia USA

Base Communications Office (BCO)



Description

Base Communications Office provides:

- Operations and maintenance: manage telephone switching networks and outside cable plant infrastructure
- Telephone services: Operate, maintain, and manage government and commercial service delivery points providing connectivity to Defense Switch Network (DSN), Public Switched Telephone Network (PSTN), and Federal Telephone System (FTS)
- Billing support: Provide telephone invoice validation and customer billing, issue/track calling cards, process customer requests for services
- Customer support: Aggregation of customer requirements; requirements definition and planning; review of military construction and special projects, and move, add, and change (MAC) telephone services

The Fleet Cyber Command/Tenth Fleet manages the program, and the PEO-C4I/PMW790 Shore Telephony Project Office provides acquisition support to BCO program, which serves more than 350,000 Navy personnel worldwide. Lifecycle switch replacement provides voice over IP (VOIP) capability.

Status

Naval Computer and Telecommunications Area Master Stations (NCTAMS) BCOs provide base communications services and support to approximately 3,890 Navy and non-Navy shore activities and deployable units. BCOs operate, maintain, and manage the communications infrastructure supporting the transport of switched voice, video, and data in support of more than 49 BCOs worldwide. BCOs provide services at 114 campuses (base/station/other) and manage 153 government-owned telephone switches and 21 commercial dial tone (CENTRIX) locations worldwide. This program responds to more than 69,000 customer service requests worldwide, each year, and its operators and auto attendants handle some 320,000 calls per month.

Developers

SPAWAR Systems Center Pacific	San Diego, California USA
Science Applications International Corporation	Arlington, Virginia USA

Base Level Information Infrastructure (BLII)

Description

Base Level Information Infrastructure provides state-of-the-art information technology (IT) capability for outside the continental United States (OCONUS) Navy Enterprise Network (ONE-NET) operations facilities. Its area of responsibility includes 14 major OCONUS fleet concentration bases, stations, and other remote locations. BLII provides the PEO C4I infrastructure, hardware, and software for the Fleet Cyber Command/Tenth Fleet-managed

ONE-NET NETOPS (e.g., Help Desk, IA, and Operations). BLII provides a fully integrated, interoperable, and secure IT infrastructure that enables the rapid and reliable transfer of voice, video, and data to our forward-deployed OCONUS bases, stations, homeports, and piers. BLII also sustains OCONUS pier IT infrastructure capability, which includes maintaining pier fiber runs, conduits, junction boxes, brow umbilicals, and associated electronics. Modern pier IT infrastructure enables forward-deployed ships to maintain situational awareness, receive operational and intelligence traffic, and perform maintenance or training on their radio frequency systems while pier side.

Status

This program currently provides IT services to more than 27,000 BLII/ONE-NET seats, supporting approximately 33,000 forward-deployed OCONUS Navy users. The BLII project is under the cognizance of Program Executive Office for Enterprise Information Systems.

Developers

SAIC	San Diego, California USA
BAH	San Diego, California USA
Deloitte	San Diego, California USA
CSC	San Diego, California USA

Battle Force Tactical Network (BFTN)

Description

The Battle Force Tactical Network provides high-frequency internet protocol (HFIP) and subnet relay (SNR) to allied, coalition, and national naval and maritime units with a direct platform-to-platform tactical networking capability using legacy ultra-high-frequency (UHF) and high-frequency (HF) radios. The two technologies operate efficiently with current legacy equipment providing a cost-effective solution for achieving tactical IP networking at sea. BFTN enables warfighters on Combined Enterprise Regional Information Exchange System-Maritime (CENTRIXS-M) and Secure Internet Protocol Routing Network (SIPRNET) networks to execute and plan in a real-time tactical environment by transporting IP data directly to and from ships, submarines, and aircraft. BFTN also serves as a primary backup for SIPRNET in the absence of satellite communications. HFIP operates in the HF spectrum and is capable of data rates of 9.6 kbps in single side band (SSB) and 19.2 kbps in independent side band (ISB). SNR operates in the UHF spectrum and is capable of data rates up to 64 kbps. BFTN allows surface platforms the ability to share a single SATCOM resource for reach-back capability. HFIP also supports the hardware/software upgrade requirements for battle force email (BFEM). BFTN is a key enabler of counter anti-access/area-denial (A2/AD) capability.

Status

USS Harry S. Truman (CVN 75) became the first carrier strike group to deploy with HFIP and SNR. Elements of BFTN have been tested in multiple TRIDENT WARRIOR exercises to experiment with this capability and have been effective in achieving improved data rates.

The Milestone C Acquisition Decision Memorandum (ADM) approved in September 2011 authorized LRIP system procurement to begin. The Navy plans to install BFTN on approximately 255 ships, submarines, and aircraft, with full operating capability planned for FY 2022.

Developers

Rockwell-Collins	Cedar Rapids, Iowa USA
Quatech	Hudson, Ohio USA
SAIC	San Diego, California USA

Commercial Satellite Communications (COMSATCOM)

Description

The Commercial Satellite Communications program augments military satellite communications capabilities in support of surface combatants and includes two elements: the new Commercial Broadband Satellite Program (CBSP) and the legacy Commercial Wideband Satellite Program (CWSP). CWSP will continue in the Fleet until replaced by CBSP. The CBSP terminal is the AN/USC-69(V), whereas the CWSP terminal is the AN/WSC-8(V). The CBSP AN/USC-69(V) terminal has three variants—Force Level, Unit Level, and Small Ship. Both terminal groups transport voice, video and data, e.g., NIPRNET, SIPRNET, JWICS DCGS-N, and other requirements. The CBSP program also includes the global space segment and services architecture.

INMARSAT terminals are no longer operational on surface combatants. INMARSAT terminals remain installed on cruisers and destroyers and may be used for other purposes. Separate from the emergency communications requirement on surface combatants, the Navy has more than 3,000 Iridium users. The Navy is responsible for a share of the Department of Defense (DoD) funding requirement to operate and maintain the Gateway in Hawaii. The Navy also maintains a Help Desk (SPAWAR ATLANTIC) to assist Navy users in the processing of both INMARSAT and Iridium requirements via DISA.

Status

CBSP was established as a rapid deployment capability in March 2007, achieved program Milestone C September 2009, initial operational capability (IOC) in June 2010, and full rate production in September 2011; full operational capability (FOC) is estimated for FY 2020. As of December 31, 2011, all ships reliant on INMARSAT were instead reliant on CBSP. The current CBSP terminal objective is 192 ships. As of the end of FY 2012, 50 ships are operational with the CBSP terminal, and a total of 110 are funded. The legacy CWSP AN/WSC-8 will continue in the fleet until replaced by the CBSP terminal in the FY 2014–2015 timeframe.

Developers

CBSP/CWSP: Harris Corporation	Melbourne, Florida USA
CBSP: CVG, Inc.	Chantilly, Virginia USA
JEOD VSAT: L3 Communications	Victor, New York USA
Iridium: Iridium, LLC	McLean, Virginia USA

Network Tactical Common Data Link (NTCDL)

Description

Common Data Links include the Network Tactical Common Data Link, and its predecessor, the Communications Data Link System (CDLS). The NTCDL provides the ability to transmit/receive real-time intelligence, surveillance, and reconnaissance (ISR) data simultaneously from multiple sources (air, surface, sub-surface, portable) and exchange command and control information (voice, data, imagery, and full-motion video) across dissimilar joint, service, coalition, and civil networks. NTCDL provides warfighters the capability to support multiple, simultaneous, networked operations with in-service Common Data Link (CDL)-equipped platforms—e.g. F/A-18, P-3, and MH-60R—in addition to next-generation manned and unmanned platforms––e.g., P-8, Broad Area Maritime Surveillance (BAMS) vehicle, Unmanned Carrier-Launched Airborne Surveillance and Strike (UCLASS) vehicle, Small Tactical Unmanned Aircraft Systems (STUAS), and Fire Scout. NTCDL is a tiered capability (air, surface, sub-surface, portable) providing modular, scalable, multiple-link networked communications. NTCDL benefits the fleet by providing horizon extension for line-of-sight sensor systems for use in time-critical strike missions, supports anti-access/area-denial (A2/AD) through relay capability, and supports Tasking Collection Processing Exploitation Dissemination (TCPED) via its ISR networking capability. NTCDL also supports humanitarian assistance/disaster relief (HA/DR) efforts through its ability to share ISR data across dissimilar joint, service, coalition, and civil organizations.

Status

In December 2010, the Chief of Naval Operations (CNO) directed a solution to address the Navy's requirement for multi-simultaneous CDL mission support within the Future Years Defense Plan. Specifically, the task was to replace the existing single, point-to-point shipboard CDLS with a multi-point networking system to support ISR transport. Initial investment stood up the NTCDL program of record (POR) and funded requirement for aircraft carriers (CVNs). NTCDL will support multi-simultaneous CDL missions; provide capability for ship-ship, ship-air and air-air communication; facilitate download of ISR information to multiple surface commands (ship/shore); support A2/AD portfolio for Unmanned Aerial Vehicles (UAV) and Unmanned Aircraft Systems (UAS) fielded, and planned and support TCPED architecture. The initial NTCDL (networked, multi-simultaneous missions) investment was for CVNs. Future investments will address alternate NTCDL platforms and required capabilities (e.g., data rates, ranges, and number of links). This completes NTCDL development in several high-value unit (CVN/LHA/LHD/LCC/LPD) hulls, including command, control, communications, computers, and intelligence (C4I) networking design and development.

Developers

L-3 Communications	New York, New York USA
Cubic	San Diego, California USA
BAE	London UK
Harris Corporation	Melbourne, Florida USA

Consolidated Afloat Network Enterprise System (CANES)

Description

The Consolidated Afloat Network Enterprise System is the Navy's program of record (POR) to replace existing afloat networks and provide the necessary infrastructure for applications, systems, and services to operate in the tactical domain. CANES is the technical and infrastructure consolidation of existing, separately managed afloat networks. CANES will replaces legacy afloat network designs that reached end of life in FY 2012. CANES will provide capacity for enterprise information assurance management. It will also reduce total ownership cost through consolidation and normalization of products and services while employing constant competition to enable efficient acquisition of new fleet requirements and capabilities.

CANES will deliver the next generation of Navy tactical networks through a common computing environment (CCE) and afloat core services (ACS) to replace the aging legacy networks currently deployed throughout the fleet. CANES will provide complete infrastructure, inclusive of hardware, software, processing, storage, and end user devices for Unclassified, Coalition, Secret, and Sensitive Compartmented Information (SCI) for all basic network services (email, web, chat, collaboration) to a wide variety of Navy surface combatants, submarines, maritime operations centers, and aircraft. In addition, approximately 36 hosted applications and systems inclusive of command and control, intelligence, surveillance and reconnaissance, information operations, logistics and business domains require CANES infrastructure in order to operate in the tactical environment. Integrating these applications and systems is accomplished through Application Integration, the engineering process used to evaluate and validate compatibility between CANES and the Navy-validated applications, systems and services that will utilize the CANES infrastructure and services. Specific programs, such as Distributed Common Ground System-Navy, Global Command and Control System-Maritime, Naval Tactical Command Support System, and Undersea Warfare Decision Support System, are dependent on the CANES Common Computing Environment to field, host, and sustain their capability because they no longer provide their own hardware. CANES requires that Automated Digital Network System (ADNS) field prior to or concurrently with CANES due to architectural reliance between the two programs.

CANES will field on a rolling four-year hardware and two-year software baselines. CANES capability is based on the concept of reducing the number of afloat networks and providing greater efficiency through a single engineering focus on integrated technical solutions. This will streamline acquisition, contracting, and test events, as well as achieve lifecycle efficiencies through consolidation of multiple current configuration management baselines, logistics, and training efforts into a unified support structure.

Status

The CANES program down-selected to a single design on February 1, 2012, awarding a contract to Northrop Grumman for FY 2012 and FY 2013 limited deployment production options. Developmental testing completed 24 July 2012. Operational assessment commenced in September 2012, and initial operational testing and evaluation is planned for the USS Milius following install, expected in the second quarter FY 2013. CANES Milestone C is planned for the first quarter FY 2013 for entry into the production and deployment phase of the program. CANES will achieve full deployment by FY 2020 and is synchronized with ADNS deployment.

Developers

Northrop Grumman Space and Mission Systems Corporation — Reston, Virginia USA

Defense Red Switch Network (DRSN)

Description

The Defense Red Switch Network is the secure circuit-switched element of the Defense Information System Network (DISN) providing reliable and high quality secure voice, data, and conferencing capabilities to senior national, combatant commander, and fleet commander decision-makers. The DRSN program ensures that operational commanders have immediate access to a flash-precedence, robust, secure, physically diverse, and survivable voice network. The Department of Defense and select federal agencies have a continuing operational requirement for a separate, controlled, and interoperable secure communications and conferencing network to support command, control, and crisis management activities. The DRSN capability satisfies that requirement and comprises a network of circuit switches interconnected by the DISN backbone and commercial transmission links.

Status

As assigned by the Joint Staff, the Navy has responsibility for operations and maintenance of five switches in the DRSN network: Commander, Joint Forces Command (Norfolk, Virginia); Commander, Pacific Command (Camp Smith, Hawaii); Commander, Pacific Fleet (Pearl Harbor, Hawaii); Commander, Naval Forces Europe (Naples, Italy); and Commander, U.S. Naval Forces Central (Manama, Bahrain). The Fleet Cyber Command (FCC) is responsible for facilities, personnel, training, logistics, security and accreditation, and command policy for DRSN assets under Navy operational control.

Developers

Multiple sources.

Digital Modular Radio (DMR)

Description

The AN/USC-61(C) Digital Modular Radio is the Navy's first software-defined radio to have become a communications system standard for the U.S. military. DMR has four independent, full-duplex channels, which provide surface ships, submarines, and shore commands with multiple waveforms and associated internal multi-level information security for voice and data communications. A single DMR is capable of replacing numerous existing legacy radios in the high frequency (HF), very high frequency (VHF) and ultra high frequency (UHF) line of sight (LOS) and UHF satellite communications (SATCOM) frequency bands. The DMR is software configurable and programmable with an open system architecture using commercial off-the-shelf (COTS)/non-developmental item (NDI) hardware.

Status

The Navy has procured approximately 500 DMR systems through early FY 2013. The DMR is installed on various platforms including the *Nimitz* (CVN-68) aircraft carrier -class, *Arleigh Burke* (DDG 51) guided missile destroyer -class, the USS Makin Island (LHD 8) and *America* (LHA 6) amphibious assault ships, *San Antonio* (LPD 17) amphibious transport dock -class, *Lewis and Clark* (T-AKE) -class ships, selected shore communications stations and on submarines as part of the Common Submarine Radio Room (CSRR). DMR achieved full rate production (FRP) status on May 7, 2012. This major milestone authorizes full fielding of the DMR system on surface ships, submarines, and shore sites. DMR is expected to start fielding the UHF SATCOM integrated waveform in FY 2014.

Developers

General Dynamics — Scottsdale, AZ USA

DoD Teleport

Description

Department of Defense (DoD) Teleport links the satellite communications space segment with the shore infrastructure and provides tactical users with a worldwide communications interface to the Global Information Grid (GIG). Primarily through multiple military, but also commercial radio frequency paths, DoD Teleport provides inter-theater reach-back into the Defense Information Systems Network (DISN) and service C4I (command, control, communications, computer intelligence, surveillance and reconnaissance) systems, as well as intra-theater communications support for tactical users. In 2001, DoD designated the Navy as the DoD Teleport requirements sponsor with the Defense Information Systems Agency (DISA) as the Executive Agent. Teleports are located at six primary sites and one secondary site. The Navy operates and maintains Teleports at Wahiawa, Hawaii; Northwest, Virginia; Lago Patria, Italy; and Bahrain. Non-Navy Teleport sites are located at Fort Buckner, Okinawa, Japan; Camp Roberts, California; and Landstuhl/Ramstein, Germany.

Status

DoD Teleport Generation (GEN) I and II are in sustainment, and GEN III has commenced procurement. GEN III comprises three phases. Phase 1 provides advanced EHF (AEHF)-capable terminals at the teleports using the Navy multiband terminal (NMT). Phase 1 reached Milestone (MS) C in September 2010, and NMT installs will begin in the second quarter of FY 2012. Phase 2 upgrades the X/Ka band terminals, using the Army modernization enterprise terminal (MET) to ensure compatibility with the wideband global satellite constellation. Phase 2 went through a successful critical design review (CDR) in FY 2011. DoD Teleport reached Milestone (MS) C in the third quarter of FY 2012. Phase 3 provides Mobile User Objective System-to-legacy Ultra High Frequency (MUOS-UHF) interoperability. DoD Teleport GEN III will reach Full Operational Capability (FOC) in the FY 2016-FY 2017 timeframe.

Developers

Arrowhead	Alexandria, Virginia USA
ViaSat	Carlsbad, California USA
Raytheon	St. Petersburg, Florida USA

Enterprise Services

Description

Enterprise Services establishes Navy's enterprise-level IT services that provide opportunities and enhance user capabilities to meet Navy needs while increasing security and achieving cost efficiencies. Enterprise Services provides the capabilities to manage and deliver the Navy's IT services centrally, enabling it to:

- Reduce total ownership costs
- Promote information sharing and interoperability in the Department of the Navy (DoN) and Department of Defense (DoD)
- Ensure compliance with DoD and congressional IT mandates
- Significantly improve the Navy's information assurance (IA) posture

This allows seamless access to resources no matter where they connect to the Navy or DoD. Initial efforts in Enterprise Services focus on consolidating data centers and portals, as well as establishing enterprise software licensing agreements. Managing services at the enterprise level provides an opportunity to eliminate stovepipe systems that do not communicate with each other and enhance the Navy warfighters' capability to access mission critical information. The DoN has made significant progress eliminating legacy networks, servers, systems, applications, and duplicative data environments. These Enterprise Services will be leveraged across the DoN and our joint partners to provide seamless connectivity to mission-critical information. Future technological demands warrant higher levels of interoperability with our joint partners and allies to achieve operational efficiency and success. Enterprise Services are critical enablers to help the DoN achieve Information Dominance, offering significant advantages operationally while enhancing our cyber security posture.

Status

The Navy is in the process of consolidating its data centers dispersed throughout the continental United States (CONUS). The Navy Data Center Consolidation (DCC) initiative will leverage DoN, Space and Naval Warfare Systems Command (SPAWAR), Defense Information Systems Agency (DISA), and commercial data centers to provide enterprise capabilities to satisfy system, application, and database hosting requirements for the Navy. Where organizations have already moved computing resources to DISA's Defense Enterprise Computing Center (DECC) capabilities, they will not be required to move to DoN or commercial environments. The Navy is engaged in implementing various IT infrastructure modernization and cost savings consolidation initiatives in preparation for transitioning to the Joint Information Environment (JIE). Throughout the Future Years Defense Program (FYDP), the Navy will reduce total Navy data centers to 25 or fewer. In addition to DCC, the Navy is actively engaged in other IT efficiency efforts, including Enterprise Software Licensing (ESL), Navy Portal Consolidation, and Application Rationalization. With the Marine Corps as the lead, the Navy established enterprise service license agreements with major software manufacturers starting in FY 2012. All of these efforts mutually support and complement the Federal DCC efforts and goals.

Developers

SPAWAR is the Navy's IT Technical Authority leading the DCC effort, and the Marine Corps is leading the DoN ESL initiative. There are multiple industry partners.

Global Broadcast Service (GBS)

Description

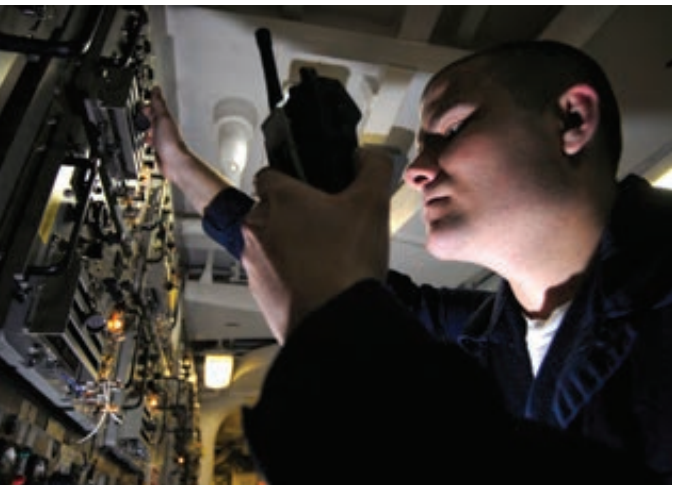
The Global Broadcast Service is a military satellite communications (MILSATCOM) extension of the Global Information Grid (GIG) that provides worldwide, high capacity, one-way transmission of voice, data, and video supporting fleet command centers and joint combat forces in garrison, in transit, and deployed to global combat zones. Specific products include unmanned aerial vehicle feeds, imagery, intelligence, missile-warning, weather, joint and service-unique news, education, training, video, homeland defense data, and various other high-bandwidth services. GBS is a joint Acquisition Category (ACAT) I program overseen by the Air Force, and Navy GBS is an ACAT III program that aligns to joint development. GBS interfaces with other communications systems to relieve overburdened and saturated satellite networks and provide information services to previously unsupportable (due to low bandwidth) users. It provides fleet and strike group commanders the highest broadband data rate currently available afloat, up to 23.5 Mbps per channel on UHF Follow-On (UFO) satellites and 45Mbps with the wideband global satellite constellation. GBS also enables critical delivery of information products while operating in emissions control (EMCON) or anti-access/area-denial (A2/AD) environments.

Status

Navy GBS is fully deployed and is undergoing sustainment and improvement efforts. Installations include aircraft carriers, assault and command ships, submarines, and a limited number of cruisers and destroyers. Architectural enhancements permit improved sharing and reallocation of broadcast coverage and bandwidth between users, information products, media types, and security levels. In FY 2009, Navy GBS began fielding Split Internet Protocol (Split IP) technology that enables users to request real-time data via an alternate off-ship system for delivery via GBS, significantly enhancing the warfighter's situational awareness. During FY 2010, the Navy GBS program completed fielding to *Los Angeles* (SSN 688)-class submarines, began fielding 26 additional unit-level cruiser/destroyer systems, and started to field the initial system-wide Navy GBS technology refresh. Worldwide SIPRNET Split IP capability was established in FY 2011. Current sustainment efforts include the Joint Internet Protocol Modem providing standardized joint encryption.

Developers

USAF Space and Missile Systems Center	El Segundo, California USA
Raytheon	El Segundo, California USA
SPAWAR Systems Center Pacific	San Diego, California USA



Information Systems Security Program (ISSP)

Description

The Navy's Information Systems Security Program ensures the protection of Navy and joint cyberspace systems from exploitation and attack. Products and capabilities are provided through the development, testing, certification, procurement, installation, life cycle support of network and host-based security products and systems, including: Computer network Defense (CND); Communication Security (COMSEC)/Cryptography (Crypto); Electronic Key Management systems (EKMS)/Key Management Infrastructure (KMI); Public Key Infrastructure (PKI); and Information Assurance (IA) Services/Engineering. Cyberspace systems include wired and wireless telecommunications systems, information technology (IT) systems, and the content processed, stored, or transmitted therein. The ISSP includes protection of the Navy's National Security Systems (NSS). The ISSP procures secure communications equipment for Navy ships, shore sites, aircraft, and Marine Corps and Coast Guard assets. The ISSP provides IA capabilities to protect information systems from unauthorized access or unauthorized modification and against the denial of service to authorized users or provision of service to unauthorized users. IA computer network defense (CND) is a layered protection strategy using commercial off-the-shelf and government off-the-shelf (COTS/GOTS) hardware and software products that collectively provide multiple levels of security mechanisms to detect and react to intrusions. IA is critical in protecting our ability to wage net-

work centric warfare (NCW), and the ISSP supports the entire naval cyberspace domain that includes the mobile forward-deployed subscriber and the supporting ashore infrastructure. The ISSP supports the entire naval cyberspace domain from the mobile forward-deployed subscriber, through the ashore supporting critical information infrastructure, and the interconnection with other cyberspace domains. IA/CND are the keys to support cyber security activities and must evolve quickly to meet the rapidly evolving threats and vulnerabilities. Navy's ISSP will continue to provide CND tools, technology, national cryptographic equipment, products, operations, people, and services in alignment with the Department of Defense Cyber Defense Program.

Status

Navy ISSP is a collection of related non-ACAT programs that provide the full spectrum of IA and CND capabilities. These programs are in various phases of the acquisition process, from concept development through capability sustainment. The ISSP provides Navy warfighters the essential information trust characteristics of availability, confidentiality, integrity, authentications, and non-repudiation. CND Increment II reached initial operational capability (IOC) in FY 2012 and is scheduled to reach full operational capability (FOC) by FY 2016. KMI is planned to reach IOC in FY 2013 with FOC in FY 2018. Tactical Key Loader (TKL) is planned to reach IOC in FY 2013 with FOC in FY 2015. PKI is planned to IOC in FY 2013 with FOC in FY 2014. VINSON/ANDVT Crypto Modernization (VACM) is planned to IOC in FY 2014 with FOC estimated in FY 2020.

Developers

BAH	San Diego, California USA
Northrop Grumman	Los Angeles, California USA
PROMIA	San Francisco, California USA
RAND Corporation	Santa Monica, California USA

Integrated Broadcast Service/ Joint Tactical Terminal (IBS/JTT)

Description

The Integrated Broadcast Service is a system-of-systems that will migrate the Tactical Receive Equipment (TRE) and related Tactical Data Dissemination System (TDDS), Tactical Information Broadcast Service (TIBS), Tactical Reconnaissance Intelligence Exchange System (TRIXS), and Near-Real-Time Dissemination (NRTD) System applications into an integrated service with a common message format. The IBS will send data via communications paths such as UHF SATCOM and via networks over SHF, EHF, and Global Broadcast Service. This program supports indications and warning, surveillance, and targeting data requirements of tactical and operational commanders and targeting staffs across all warfare areas. The Joint Tactical Terminal (JTT) is a multi-channel transmit and receive radio with onboard capabilities to filter, process, and translate the IBS data for shipboard use

on tactical data processors (TDP). The JTT is being upgraded to become interoperable with the new Common Interactive Broadcast (CIB) system, which employs the new common message format (CMF) and demand assigned multiple access (DAMA) integrated waveform.

Status

The Navy commenced shipboard installations of JTT in FY 2001, and 87 JTTs have been fielded as of late 2012. In order to support the addition of new ships within the Navy, which require access to IBS, the Navy contracted with Raytheon Systems to reopen the JTT production line with a multi-year indefinite delivery/indefinite quantity (IDIQ) contract for new JTT systems in FY 2012. The transition to the next-generation broadcast services is expected to begin in FY 2013 with the delivery of upgrade kits from the manufacturer following acceptance of the software.

Developers

IBS: L-3 Communications	Fairfax, Virginia USA
JTT: Raytheon Systems	St. Petersburg, Florida USA
PROMIA	San Francisco, California USA

Navy Multi-band Terminal (NMT)

Description

The Navy Multi-band Terminal supports a variety of protected and wideband command and control (C2) communications applications (e.g., secure voice, imagery, data, and fleet broadcast systems). The NMT has begun replacement of the USC-38 / Follow-on Terminal (FOT) and the WSC-6 SHF SATCOM terminals on Navy ships, submarines, and shore stations. NMT will provide protected and wideband access to more users and will offer increased protected and wideband throughput. The NMT will be more reliable with a 22 percent greater designed reliability requirement.

A completely redesigned user interface will make operator use easier with 85 percent fewer operator terminal interactions. The terminal will reduce cost by reducing the number of parts as well as reducing the terminal footprint onboard ships.

NMT-equipped units will be able to access military EHF and SHF SATCOM satellites, including protected EHF SATCOM services available on Milstar, EHF payloads on board ultra-high-frequency follow-on satellites, and interim polar EHF payloads. It provides wideband service using the Defense Satellite Communications System satellites. The NMT supports new services provided by the follow-on advanced EHF and wideband global satellites. The NMT is a key element of the Navy's mitigation of anti-access/area-denial (A2/AD) environment concerns and is an enabler of the ballistic missile defense mission.

Three international partners—Canada, the Netherlands, and the United Kingdom—are procuring a variant of the NMT. In addition the Department of Defense (DoD) Teleport and Enhanced

Polar SATCOM system programs have procured NMTs to provide fleet units with shore reach-back capabilities.

Status

NMT was granted full rate production by the Deputy Assistant Secretary of the Navy (DASN) on November 8, 2012. 113 of an objective 250 terminals have been placed under contract in the first three years of production. Installations began in February 2012 with 11 ship, submarine and shore installations completed as of November 2012, when full rate production was approved. The USS Roosevelt (DDG 80) completed the Navy's first full deployment of an NMT-equipped ship in 2012.

Developers

Raytheon	Marlborough, Massachusetts USA

Next-Generation Enterprise Network (NGEN)

Description

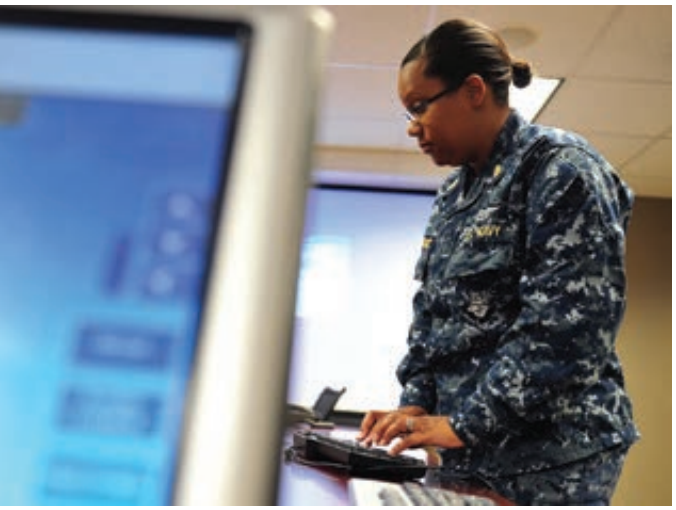
The Milestone Decision Authority (MDA) approved the current version of the NGEN Acquisition Strategy (AS), v18.5, on June 24, 2010. The NMCI Continuity of Services Contract (NMCI CoSC) was awarded on July 8, 2010 - developers listed below. This contract will continue to provide NMCI services until April 30, 2014 as a bridge contract and will enable the transition to NGEN expected in early 2014. NGEN successfully passed Secretary of the Navy (SECNAV) Acquisition Gate 6 to approve the Capability Production Document (CPD) in October 2011. A combined Transport Services (TXS) and Enterprise Services (ES) RFP was released on 9 May 2012 and award of the contract(s) is planned for early 2013. In addition, the DoN will work toward subsequent increments that will add increased warfighting capabilities, adaptability, and reliability.

Status

The Milestone Decision Authority approved the in-service version of the NGEN Acquisition Strategy v18.5 on June 24, 2010. The NMCI Continuity of Services Contract (NMCI CoSC) was awarded on July 8, 2010, to the developers listed below. The NMCI CoSC contract will continue to provide NMCI services until April 30, 2014 as a bridge contract and will enable the transition to NGEN. The transition of Navy services to NGEN is scheduled for April 2014. NGEN has successfully passed the Secretary of the Navy (SECNAV) Acquisition Gate 4, the request for proposal (RFP) and in October 2011 passed Gate 6, approving the capability production document. A combined Transport Services (TXS) and Enterprise Services (ES) RFP was released on May 9, 2012 and award of the contract(s) is planned for the second quarter of FY 2013. In addition, the DoN will work toward subsequent increments that will add increased warfighting capabilities, adaptability, and reliability.

Developers

EMC	Hopkinton, Massachusetts USA
Harris	Melbourne, Florida USA
Oracle	Redwood Shores, California USA
HP Enterprise Services	Plato, Texas USA



OCONUS Navy Enterprise Network (ONE-Net)

Description

The outside the continental United States (OCONUS) Navy Enterprise-Network provides the manpower and administration services to operate the Base Level Information Infrastructure (BLII) architecture, a fully integrated and interoperable network that consists of standard hardware, software, and information-assurance suites, governed by operational and administrative policies and procedures. ONE-NET is the OCONUS analog to the Navy's CONUS-based Enterprise Services and is the medium that enables the rapid and reliable transfer of official classified and unclassified messages, collaboration, e-mail, and data. ONE-NET manpower provides information technology (IT) operations including e-mail, print, storage, directory, and Internet services, as well as help desk and enterprise management for a projected 27,000 seats. This will satisfy the fleet commanders' requirements and deliver vast performance and security improvements compared to legacy networks. ONE-NET achieves significant IT efficiencies through the consolidation of 14 data centers, including the three theater network operation and security Centers (TNOSCs) at Yokosuka, Naples, and Bahrain, and 11 network operations centers (NOCs) within their respective regions, more than 30 legacy networks.

Status

The program provides IT services to more than 27,000 BLII/ONE-NET seats, supporting approximately 33,000 forward-deployed OCONUS Navy users. The Fleet Cyber Command operates the three TNOSCs and 11 local NOCs servicing ONE-NET customers. Critical network services are provided for: Non-classified Internet Protocol Router Network (NIPRNET); Secret Internet Protocol Router Network (SIPRNET); web/portal access, e-mail, help desk support; and network security to OCONUS fleet and regional commanders and subordinate commands at 14 OCONUS locations. ONE-NET will assimilate IT operations responsibilities for more than 30 overseas legacy networks per the BLII deployment schedule. Numerous sources are involved in development and manufacture of ONE-NET. All hardware and software procured and installed in conjunction with the Base Level Information Infrastructure (BLII) program of record is under the cognizance of PEO EIS.

Developers

CSC	Falls Church, Virginia USA
SAIC	San Diego, California USA
C4I Corporation	San Diego, California USA
ITT	White Plains, New York USA

Submarine Communications Equipment

Description

The Submarine Communications Equipment program's mission is to create a common, automated, open system architecture radio room for all submarine classes. The program provides for the procurement and installation of systems incorporating the tech-

nical advances of network centric warfare to allow the submarine force to communicate as part of the strike group. It addresses the unique demands of submarine communications, obsolescence issues, and higher data rate requirements and includes two elements: Common Submarine Radio Room (CSRR) and Submarine Antennas.

CSRR is a network-centric communications gateway that supports interoperable communications and information dominance between on-board subsystems, external platforms, and land-based communications facilities and is interoperable with the planned Department of Defense (DoD) infrastructure. CSRR comprises an open-architecture hardware and software approach for integrating government-off-the-shelf (GOTS), commercial-off-the-shelf (COTS) and non-developmental item (NDI) hardware and application specific software into a common, centrally managed architecture. CSRR leverages existing Navy and DoD C4I capability based acquisition programs. CSRR allows common systems, software, and equipment to be installed on all submarine classes, use of common logistics products across all submarine classes and the uniform training of personnel across all submarine classes, resulting in new capability at a reduced cost.

The Submarine Antennas program supports the development and sustainment of antennas designed to withstand the underwater environment. These antennas cover the frequency spectrum from very low frequency (VLF) to optical. Programs in the development phase include the OE-538 Increment II Multifunction Mast, the Submarine High-Data-Rate (SubHDR) antenna, and the Advanced High-Data-Rate (AdvHDR) antenna. The improvements to the OE-538 Multi-Function Mast antenna provide Mobile User Objective System (MUOS), Link-16, and Iridium capability to the Increment I antenna that supplies reception in the VLF to UHF frequency bands. The improvement to the SubHDR antenna is an improved radome and shock hardening. AdvHDR is intended to replace the SubHDR antenna, providing improved bandwidth.

Status

CSRR Increment I Version 3 began fielding in FY 2011 and is scheduled to complete in FY 2018. OE-583 Increment II is scheduled for a Milestone C decision in FY 2014. SubHDR radome replacement begins fielding in FY 2013. AdvHDR is scheduled for a Milestone B decision in FY 2015.

Developers

Lockheed Martin	Eagan, Minnesota USA
Naval Underwater Warfare Center	Newport, Rhode Island USA
Space and Naval Warfare Systems Center	San Diego, California USA

Super-High-Frequency (SHF) Satellite Communications

Description

The Super-High-Frequency Satellite Communications program includes: the WSC-6(V) 5, 7, and 9 terminals; the X-Band Kit Upgrade to the EHF Follow-On Terminal (FOT) installed on submarines; and the Enhanced Bandwidth Efficient Modem (EBEM) installed on surface ships. The SHF SATCOM WSC-6 terminal is the primary SATCOM terminal in the Fleet, providing the bandwidth for voice, video, data, and imagery requirements for the warfighter, including NIPRNET, SIPRNET, JWICS, JCA, video teleconferencing, and telephones. These SHF system terminals have been in the Fleet since the early 1990s and are currently in sustainment. The Navy Multiband Terminal (NMT) WSC-9 began replacing the WSC-6 terminal in FY 2012.

Status

As of the end of FY 2012, there were 123 AN/WSC-6 terminals installed in the Fleet. They are expected to continue in operation until FY 2017, when the next-generation Navy Multiband Terminal (WSC-9) will replace them. The AN/WSC-6(V)9 terminal on 20 guided missile destroyers now includes Ka-band. The X-band upgrade to the EHF FOT (USC-38) terminals on 64 submarines was completed in 2010. EBEM is the current modem for static point–to-point operations in conjunction with the WSC-6 terminal, the WSC-8 terminal, the next-generation Navy Multiband Terminal (WSC-9), and the next-generation Commercial Broadband Satellite Program (CBSP) terminal (USC-69). 275 EBEM modems are installed in the Fleet. SHF systems discussed are in sustainment while the Navy Multiband Terminal (NMT) is procured and deployed.

In FY 2013 the Modernization of Enterprise (MET) terminal (X/Ka band) is being procured and installed in FY 2013-2014 as a replacement terminal at Diego Garcia. The existing terminal is a Navy responsibility and reaches end-of-life in FY 2013.

Developers

AN/WSC-6(V) 5, 7:	
Raytheon	Marlborough, Massachusetts USA
AN/WSC-6(V) 9: Harris	Melbourne, Florida USA
X-Band Kit Upgrade:	
Raytheon	Marlborough, Massachusetts USA
EBEM: Viasat	Carlsbad, California USA

Telephony

Description

The Navy's Telephony program procures and installs fully integrated, interoperable, Information Assurance certified telephony systems, and peripherals in support of Defense Switch Network (DSN) telephone switches and connectivity to the commercial telephone network at Fleet Cyber Command shore installations. Telephony provides system sustainment, obsolescence management, and technology refresh for shore telephone switches that service our worldwide forces necessary to ensure regulatory compliance and prevent capability degradation. Specific Telephony capabilities include the following:

- Voice (Analog, Digital, ISDN, VoIP), Conferencing, Voicemail, Call Centers, and Telephony Management System (TMS)
- Switches provide trunking to support telephone, VTC, and data services to customers ashore and afloat
- C2 voice communications to the Navy warfighter, including multi-level precedence and preemption (MLPP)
- Engineering support for Base Communications Office (BCO)
- C2 shore-to-ship dial tone (POTS—"Plain Old Telephone Service"— and pierside lines) via tactical networks and infrastructure
- Voice over Internet protocol (VoIP) and future enterprise capabilities
- Sustainment of FCC/C10F-owned switches (approximately 115 OCONUS)

Telephony suite replacement and modernization funding ensures that all telephony equipment under Navy's purview in the continental United States (CONUS) and outside CONUS (OCONUS) are replaced in accordance with industry life cycle standards and that software is upgraded in a systemic manner to ensure compatibility with DoD and commercial telephone systems. The majority of the Navy's telephone switches are Defense Switched Network (DSN) switches. These switches provide on-base Federal Telephone System local and long-distance calling service as well as worldwide DSN connectivity.

Status

Telephony is replacing time division multiplex (TDM) switches with VOIP technology in response to TDM technology obsolescence. As Telephony capabilities migrate to VOIP they will become increasingly reliant on Navy Enterprise Services.

Developers

BAH	San Diego, California USA
BAH	Norfolk, Virginia USA
Prosoft	Norfolk, Virginia USA
Secure Mission Solutions	Norfolk, Virginia USA

INTELLIGENCE, SURVEILLANCE, AND RECONNAISSANCE (ISR)

Airborne Antisubmarine Warfare (ASW) Intelligence (AAI)

Description

Airborne Antisubmarine Warfare Intelligence provides measurement and signature intelligence (MASINT) collections in support of Chief of Naval Operations' initiatives. AAI is responsible for 70 percent of the Navy's acoustic intelligence (ACINT) collections, including 100 percent of ACINT active target strength measurement (ATSM) collections, and 100 percent of the Navy's electromagnetic collections. Additionally, AAI enables environmental characterization and rapid development and insertion of advanced ASW capabilities onboard fleet assets. AAI intelligence products provide input to the Navy's tactical ASW decision aids, oceanographic prediction models, strategic simulations, fleet ASW training, and the development of future ASW sensors. The program additionally supports emergent and special ASW operations. AAI collection platforms include the P-3C *Orion* maritime patrol aircraft and SH-60B *Seahawk* helicopter, and will be incorporated onboard P-8A *Poseidon* multi-mission maritime patrol aircraft and MH-60R helo. Collection of ASW intelligence is fully aligned with the 2012 Defense Strategic Guidance by providing products to all tactical decision aids and across all ASW engineering disciplines for performance improvements and development of next-generation ASW weapons systems.

Status

Airborne ASW Intelligence provided and maintains collection suites to support up to 22 P-3C aircraft and 12 SH-60B helicopters. The program modified eight P-3Cs and 12 SH-60Bs in FY 2012 in preparation of squadron forward deployments to Seventh, Sixth, and Fifth Fleet areas of responsibility (AORs). In FY 2013, the program will conduct engineering analysis on P-8A acoustic systems to verify the platform's ACINT collection capabilities for certification and develop platform-specific ACINT collection guidelines and calibration procedures. The program will make improvements to the Tactical Acoustic Processing System (TAPS) used to conduct detailed analysis and mission reconstruction of collected acoustic intelligence data against real world submarines. AAI will recapitalize the Navy Underwater Active Multiple Ping (NUAMP) family of sonobuoys that enables calibrated measurement of threat submarines for the improvement of ASW modeling and simulations and weapons systems that use active sonar emissions.

Developers

General Scientific Corporation	Lexington Park, Maryland USA
EAGLE Systems	Lexington Park, Maryland USA

EP-3E ARIES II Spiral 3

Description

The EP-3E ARIES II Spiral 3 aircraft is the Navy's premier manned airborne intelligence, surveillance, reconnaissance, and targeting (AISR&T) platform supporting naval and joint commanders. EP-3Es provide long-range, high-endurance support to carrier strike groups and amphibious readiness groups, in addition to performing independent maritime ISR&T operations. The 2013 force consists of one active duty squadron based at Naval Air Station Whidbey Island, Washington. Although optimized for the maritime and littoral environments, capability upgrades ensured EP-3E mission effectiveness in support of global contingency operations. The fusion of Internet protocol (IP) connectivity, the incorporation of imagery intelligence (IMINT) capability, and completion of significant signals intelligence (SIGINT) upgrades enable continued alignment with the Intelligence Community and the early implementation of a distributed SIGINT concept of operations. Multi-INT sensors, robust communication and data links, and employment on the flexible and dependable P-3 air vehicle ensure effective AISR&T support to conventional and non-conventional warfare across the range of military operations (ROMO). Operating around the globe, the EP-3E continues to satisfy critical joint, combatant commander, and service airborne ISR priorities and requirements. With the EP-3E currently scheduled for retirement in FY 2019, the Navy is focused on sustainment and modernization to pace emerging threats until transitioning the capabilities across the spectrum of manned and unmanned platforms.

Status

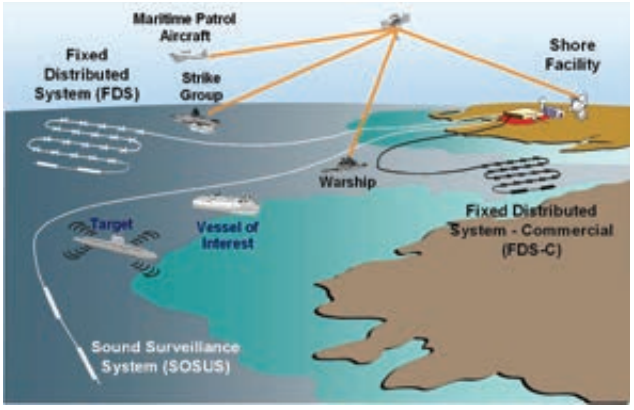
EP-3E aircraft are being sustained through a series of special structural inspections (SSIs) and replacement of outer wing assemblies (OWAs). SSIs and OWAs will provide the inspections and repairs necessary to ensure safety of flight until more comprehensive maintenance can be performed. The pre-emptive modification and replacement of critical structural components allows up to 7,000 additional flight hours. These programs ensure sustainment of the EP-3E fleet until the capability is recapitalized across the spectrum of manned and unmanned platforms.

Multi-INT Modernization: The EP-3E Joint Airborne SIGINT Architecture Modification Common Configuration (JCC) program was designed to accelerate advanced capabilities to the fleet. The resultant program aligns mission systems to meet the challenges of rapidly emerging threat technology and addresses obsolescence issues. Spiral developments have modernized the aircraft systems, which include capabilities for an IP-based SCI network, improved electronic intelligence and communications intelligence collection, multi-platform geo-location, advanced special signals collection, information warfare/information operations, and quick-reaction capabilities developed for overseas contingency operations. The aircraft is also equipped with forward-looking infrared and remote reach-back capabilities in response to requirements. Recapitalization capabilities migration will allow continued development of the EP-3E and vital testing of equipment designed for use in the next generation of ISR&T platforms. The JCC Spiral 3 upgrade enables the EP-3E to better pace the enemy threat by providing faster, more precise geo-location capability for better precision targeting, indications and warning (IW), and direct-

threat warning against our adversary's rapidly developing technology. The first JCC Spiral 3 aircraft were delivered to the Fleet in 2011, and three were deployed in early FY 2013.

Developers

L3 Communications	Waco, Texas USA
Argon	Fairfax, Virginia USA
Ticom Geomatics	Austin, Texas USA
Aeronixs	Melbourne, Florida USA



Fixed Surveillance Systems (FSS)

Description

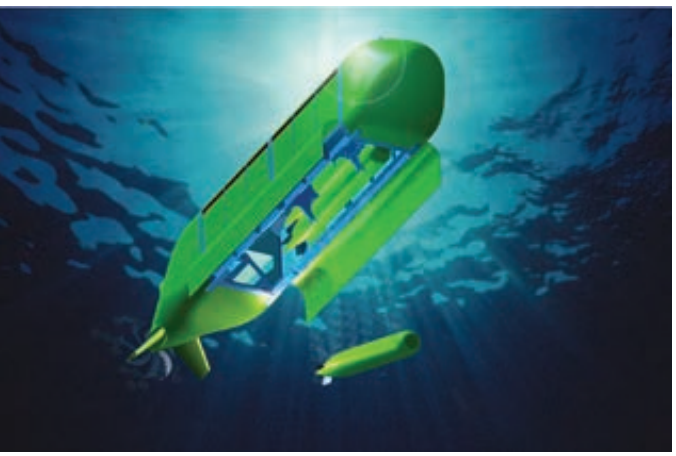
The Fixed Surveillance Systems program consists of the Sound Surveillance System (SOSUS), the Fixed Distributed System (FDS), and the FDS-C, which is a commercial off-the-shelf (COTS) version of FDS. FSS provides threat location information to tactical forces and contributes to an accurate operational maritime picture for the joint force commander. Due to its strategic positioning and long in-situ lifetime, it provides indication and warning of hostile maritime activity before conflicts begin. FSS comprises a series of arrays deployed on the ocean floor in deep-ocean areas, across straits and other chokepoints, or in strategic shallow-water littoral areas. The system consists of two segments: the integrated common processor (ICP), which handles the processing, display, and communication functions; and the underwater segment, which consists of SOSUS, a long array of hydrophones, and FDS, a large area distributed field of acoustic arrays. FDS-C was developed as a less-expensive follow-on version of FDS by converting to COTS equipment. Taking advantage of advances made in the commercial industry provides a much more cost-effective FDS-caliber system to meet the Fleet's ongoing needs for long-term undersea surveillance.

Status

ICP technical refreshes will be installed as required to provide increased operator proficiency, increased functionality, and savings in logistics support and software maintenance.

Developers

Multiple sources.



Large Displacement Unmanned Undersea Vehicle (LDUUV)

Description

The Large-Displacement UUV will provide a robust, long endurance, persistent, multi-mission unmanned undersea vehicle capability for the Navy and will contribute to the joint Air-Sea Battle across all phases of operations. LDUUV will be employed in concert with manned platforms and fixed and mobile distributed netted sensor systems. Potential LDUUV launch and recovery platforms include shore, ship, and submarine. LDUUV leverages years of research and development efforts by the Office of Naval Research (ONR), which is currently building prototype LDUUVs

in the ongoing ONR Innovative Naval Prototype (INP) started in FY 2011. ONR is pursuing advanced energy and autonomy to perform extended safe operations at sea. The acquisition program will build on ONR's INP to pursue a 60-plus day endurance and to produce a flexible undersea ISR platform.

Status

LDUUV analysis of alternatives (AoA) was initiated in July 2012. The AoA final report is planned for spring of FY 2013. The LDUUV specific capability requirement and initial concept of operations (CONOPS) are in development. The Navy will achieve a limited operational capability (LOC) for LDUUV by FY 2015. LDUUV initial operational capability (IOC) is expected in FY 2021.

Developers

To be determined.

MQ-4C *Triton* Unmanned Aircraft System (UAS) (formerly Broad Area Maritime Surveillance (BAMS)

Description

The MQ-4C *Triton* Unmanned Aircraft System is integral to the recapitalization of Navy's airborne intelligence, surveillance, and reconnaissance (ISR) capability inherent in the maritime patrol and reconnaissance force (MPRF). *Triton* will be a force multiplier for the Joint Force and Fleet commander enhancing situational awareness for the battle space and shortening the sensor-to-shooter kill chain by providing a multiple-sensor, persistent maritime ISR capability. *Triton's* persistent sensor dwell and ability to network its data will deliver a capability that will enable the MPRF family of systems to meet the Navy's maritime ISR requirements. A single *Triton* orbit provides continuous surveillance capability at a maximum mission radius of 2,000 nautical miles for a minimum of 24 hours. At full operational capability the system provides up to five simultaneous orbits worldwide.

Status

The BAMS UAS analysis of alternatives (AoA), operational requirements document (ORD), capability development document (CDD), and initial CONOPS are complete. Milestone B was achieved in April 2008. The system design document (SDD) was initiated in August 2008, and the Gate 6 review was completed on August 6, 2012. *Triton's* first flight and follow-on flight test activities are scheduled to begin in the second quarter of FY 2013. Milestone C is scheduled for FY 2013, and IOC is expected in FY 2016.

Developers

Northrop Grumman	Bethpage, New York USA
Exelis	Baltimore, Maryland USA
Rolls Royce	Indianapolis, Texas USA
L3COM	Salt Lake, Utah USA

MQ-8B/C *Fire Scout* Vertical Takeoff and Landing Tactical UAV (VTUAV)

Description

The MQ-8B/C *Fire Scout* Vertical Takeoff and Landing Unmanned Aerial Vehicle is a component of the Navy's airborne ISR family of systems construct, with specific emphasis on support to irregular warfare capabilities and missions. The VTUAV is designed to operate (conduct launch, recovery, and mission command-and-control functions) from the Littoral Combat Ship (LCS) and any air capable ship, as well as land-based sites for expeditionary operations and support to Special Operations Forces (SOF). *Fire Scout* variants will provide day and night real-time ISR; target acquisition; voice communications relay; and battlefield management capabilities to a tactical commander. It is operated and maintained by members of a composite VTUAV/MH-60R or VTUAV/MH-60S aviation detachment at sea. The system is comprised of the air vehicle, ground control station and tactical control system (TCS). TCS is the operating system resident on the ground control station. LCS testing and integration is underway and will complete in FY 2014.

Status

The MQ-8B *Fire Scout*, designed for Littoral Combat Ship warfare module support, will cease initial production at the end of FY 2014 in favor of a more capable follow on version expected between FY 2017-2018. MQ-8B is deployed with limited Navy surface forces and is conducting expeditionary operations within the Central Command (CENTCOM) area of responsibility.

The Navy has also developed a rapid deployment capability MQ-8C to provide VTUAV with increased range, endurance, and payload capacity in response to SOF emergent requirements.

Both versions currently are funding efforts to add additional sensor and weapon capability to support a critical CENTCOM requirements and LCS IOC planned for FY 2013. SECNAV Gate-6 Sufficiency Review is expected in FY 2013 to review and decide on a material solution for VTUAV on the LCS.

Developers

Northrop Grumman	San Diego, California USA
Schweizer Aircraft Corporation	Big Flats, New York USA
Ticom Geomatics	Austin, Texas USA
Aeronixs	Melbourne, Florida USA

Navy Unmanned Combat Aircraft System Demonstration (UCAS-D)

Description

The Navy Unmanned Combat Air System Demonstration evolved from the Joint Navy/Air Force development program called J-UCAS. The 2006 Quadrennial Defense Review and other program decisions restructured the J-UCAS program to initiate development of an unmanned longer-range carrier-based aircraft to provide greater standoff capability and increase naval reach and persistence. Program management and associated technologies were transferred to the Navy in August 2006. The initial efforts in the UCAS program were to demonstrate critical technologies for a carrier-suitable low observable (LO) air vehicle in a relevant environment and to conduct automated air refueling (AAR) demonstrations.

Status

On August 1, 2007, Northrop Grumman Systems Corporation was awarded the UCAS-D contract. The Navy is exploring the capabilities required for a future unmanned, carrier based aircraft that could conduct intelligence, surveillance, reconnaissance, and some precision strike missions. Demonstration areas for shipboard operations include catapult launches, arrested landings, and flight in the vicinity of an aircraft carrier. Two X-47B air vehicles have been built for demonstrations. Air Vehicle #1 made its first flight on February 4, 2011. Carrier operations are to be conducted with both air vehicles during FY 2013. The AAR test efforts will be conducted with surrogate aircraft using the UCAS-D software. The UCAS-D air vehicles will neither carry weapons nor be operational, as they will not include any mission systems or sensors. Critical technological risks addressed by UCAS-D are landing an unmanned LO shape aboard ships and establishing the digital messaging and network architecture with associated ship modifications to support accomplishment of this objective. UCAS-D serves as an essential risk reduction effort to achieve the appropriate technology readiness level (TRL-6) for transition of technologies to the Unmanned Carrier Launched Airborne Surveillance and Strike (UCLASS) program.

Developers

Northrop Grumman Systems Corporation	El Segundo, California USA
Schweizer Aircraft Corporation	Big Flats, New York USA
Ticom Geomatics	Austin, Texas USA
Aeronixs	Melbourne, Florida USA

Persistent Littoral Undersea Surveillance (PLUS) System

Description

The Persistent Littoral Undersea Surveillance System is a cluster of networked unmanned undersea vehicles using powered and gliding vehicles providing an effective, persistent, adaptive and passive acoustic undersea surveillance capability. PLUS monitors shallow-water environments from fixed positions on the ocean floor or moves through the water to scan large areas for extended periods of time. PLUS deploys from platforms of opportunity and travels to the area of interest from over-the-horizon.

Status

The Office of Naval Research is completing development of the PLUS System under the Innovative Naval Prototype Program. PLUS will transition to the Fleet in FY 2013 as a user operational evaluation system (UOES) to detect and localize quiet submerged targets. The PLUS UOES program will be used to develop tactics, techniques, and procedures for employment and to mitigate risk of future UUV systems including the Large Displacement UUV. As a UOES effort, PLUS will not be a formal program of record.

Developers

Office of Naval Research	Ballston, Virginia USA

RQ-21A Small Tactical Unmanned Aircraft System (STUAS)

Description

The Small Tactical Unmanned Aircraft System is an organic asset intended for Navy Special Warfare, Navy Expeditionary Combat Command, and LSD 41-class ships to provide tactical intelligence, surveillance, and reconnaissance capability. STUAS sensors include electro-optic/infrared (EO/IR), with laser range finder and illuminator, communications relay (land-based version), and automatic identification system capability. A STUAS detachment consists of five vehicles, one (ship) or two (shore) ground control station(s), launch and recovery equipment, spares, and government furnished equipment. The RQ-21A Integrator is a 75-pound/16-foot wingspan vehicle (135 pounds fully loaded) capable of 12-15 hours endurance, 55 knots at greater than 15,000 feet altitude.

Status

Initial operational capability is expected in the fourth quarter of FY 2013 pending congressional approval. The Navy continues RDT&E investment but has deferred procurement. The Marine Corps is scheduled to acquire 32 systems and has separate Marine Corps procurement funding for its systems.

Developers

Insitu, Inc.	Bingen, Washington USA
Quatro Composites	Poway, California USA
HoodTech	Hood River, Oregon USA
NW UAV	Portland, Oregon USA

RQ-7B *Shadow* Marine Corps Tactical Unmanned Aircraft System (MCTUAS)

Description

The RQ-7B *Shadow* is an expeditionary Group 3 unmanned aircraft system (UAS) integral to the Marine Aircraft Wings. The *Shadow* provides dedicated tactical reconnaissance, surveillance, target acquisition, target laser designation, and communications relay in support of Marine Air-Ground Task Force and maritime control operations. Each *Shadow* system consists of two ground control stations, four air vehicles, a pneumatic-hydraulic launcher, and support equipment. Each air vehicle is equipped with a full motion video electro-optical/infrared camera with an integral laser pointer/designator and a dedicated communications relay package for ground support. Three active duty VMU (Marine Corps Unmanned Air Vehicle) squadrons and one reserve component squadron provide organic UAS multi-mission capability to Marine Expeditionary Force and joint task force commanders. Each VMU squadron operates three RQ-7B systems that are task-organized to operate independently as separate detachments supporting distributed operations.

Status

The RQ-7B *Shadow* is a U.S. Army Acquisition Category 2 program. The Army, acting as lead service, provides configuration management, training, RDT&E, and production contracting support to the Navy/USMC team. By maintaining a common RQ-7B configuration, all three services are able to realize programmatic economic efficiencies. The fielded USMC *Shadow* systems are scheduled to receive several technical upgrades between FY 2013 and FY 2016. These upgrades include an encrypted tactical common data link, digital universal ground control Stations, air vehicle wing modifications to increase endurance, and upgraded powerplants to increase reliability. Additionally, the USMC will conduct a field user evaluation of a weaponized RQ-7B system in FY 2014.

Developers

AAI	Hunt Valley, Maryland USA
Stark Aerospace	Columbus, Mississippi USA
Sierra Nevada Corp.	Sparks, Nevada USA
Freewave Technologies	Boulder, Colorado USA

Unmanned Carrier Launched Airborne Surveillance and Strike (UCLASS) System

Description

In FY 2009, the Office of the Chief of Naval Operations (OPNAV) conducted the Power Projection from the Sea Capabilities Based Assessment. It identified gaps in persistent sea-based intelligence, surveillance, and reconnaissance (ISR) with precision strike across the Range of Military Operations. Concurrently, Combatant Commander Integrated Priority Lists identified a high-priority need for additional ISR. The Navy ISR resource sponsor (OPNAV N2N6) identified funding in FY 2012 to begin development of a carrier-based, unmanned air system (UAS) to provide ISR with precision strike capability to close these gaps. The UCLASS System is expected to enhance carrier versatility through integration of four to eight UAVs into a carrier air wing, enabling a single carrier to conduct "24/7" ISR, targeting, strike, and bomb damage assessment operations. The UCLASS will be able to operate from CVN-68 and CVN 78-class ships. The UCLASS System is comprised of an air vehicle segment (airframe, ISR payloads, mission systems, and weapons integration), a control and connectivity segment, and a carrier integration segment. Affordability is the focus for the UCLASS system, with incremental growth capability designed in up-front. The UCLASS system will interface with existing shipboard and land-based processing, exploitation, and dissemination systems. The scope of the effort includes design, development, integration, test, and training. The acquisition program will be structured to match programmed resources to Navy's funding objectives with the goal of delivering an initial operational capability in 2020 and a deployed operational capability in 2022.

Status

The Navy endorsed the program baseline May 2011. An initial capabilities document was approved in a Joint Requirements Oversight Council Memorandum later that year. The Undersecretary of Defense for Acquisition, Technology, and Logistics authorized the UCLASS program for entry into the materiel solutions analysis phase. The UCLASS Analysis of Alternatives (AoA) was completed in May 2012 and approved by the Navy Resources and Requirements Review Board. The AoA was reviewed by OSD (CAPE) and deemed sufficient. Navy approved the UCLASS service-level capabilities development document (CDD) in FY 2012, endorsing the UCLASS draft system concept of operations and the technology development strategy. The Navy expects to release a request for proposals to industry in FY 2013.

Developers

To be determined.

UQQ-2 Surveillance Towed Array Sensor System (SURTASS)

Description

The UQQ-2 Surveillance Towed Array Sensor System capability consists of a fleet of five ships that provide passive detection of quiet nuclear and diesel-electric powered submarines and real-time reporting to theater commanders and operational units. SURTASS employs the TL-29A twin-line passive acoustic towed array, which offers significant passive detection capability for undersea surveillance operations in both deep-ocean and shallow water littoral environments using directional noise rejection and a bearing ambiguity resolution capability.

Status

Five SURTASS vessels are operational in the Pacific fleet. All SURTASS vessels currently have TL-29A twin line arrays and have been upgraded with the integrated common processor, which will result in increased operator proficiency, increased functionality, and savings in logistics support and software maintenance. Technical refreshes to ICP hardware will be installed as required.

Developers

Lockheed Martin	Syracuse, New York USA
Lockheed Martin	Manassas, Virginia USA

WQT-2 Surveillance Towed Array Sensor System (SURTASS)/Low Frequency Active (LFA)

Description

The Low Frequency Active system is the active adjunct to the Surveillance Towed Array Sensor System (SURTASS) sonar system. LFA consists of a vertical source array with active transducers deployed from a center well hatch, power amplifiers, and an array handling system. It uses the SURTASS passive array as the receiver and is capable of long-range detections of submarine and surface ship contacts. As a mobile system, SURTASS/LFA can be employed as a force-protection sensor wherever the force commander directs, including forward operating areas or in support of carrier strike group and amphibious readiness group operations.

Status

One LFA array system is installed onboard the USNS Impeccable (T-AGOS 23). The Compact LFA (CLFA) system, employing smaller and lighter sources, has been installed on the USNS Able (T-AGOS 20), USNS Effective (T-AGOS 21), and USNS Victorious (T-AGOS 19). Technical refreshes to the integrated common processor will be installed as required to maintain increased operator proficiency and increased functionality.

Developers

BAE Systems	Manchester, New Hampshire USA
Lockheed Martin	Manassas, Virginia USA

ELECTRONIC AND CYBER WARFARE

Airborne Electronic Attack

Description

The Next-Generation Jammer (NGJ) is the replacement for the aging ALQ-99 Tactical Jamming System (TJS). ALQ-99 is the only airborne TJS in the DoD inventory. ALQ-99 is facing obsolescence and thus cannot counter all current, much less future threats. NGJ will address evolving threats and fill capability gaps that the aging ALQ-99 TJS cannot. NGJ will be a full-spectrum jammer, developed in increments, and will initially be fielded on the EA-18G *Growler*. NGJ will be the prime contributor for the airborne electronic attack mission.

Status

NGJ is in the technology maturation phase. The request for proposals for technology development (TD) has been released with the TD phase scheduled to begin in the third quarter of FY 2013.

Developers

BAE Systems	Nashua, New Hampshire USA
ITT	Clifton, New Jersey USA
Northrop Grumman Systems Corporation	Bethpage, New York USA
Raytheon	Goleta, California USA

Joint Counter Radio-Controlled Improvised Explosive Device (RCIED) Electronic Warfare (JCREW)

Description

Improvised explosive devices (IEDs) present a significant threat to U.S. and coalition forces throughout the world and across the full range of military operations. The Counter Radio-Controlled IED Electronic Warfare (CREW) program encompasses all of the mobile, man-portable, and fixed-site protection systems employed to counter IEDs that are either armed or initiated by radio-command signals. Fielded first- and second-generation CREW systems were acquired largely by non-developmental urgent operational need (UON) initiatives to address immediate warfighter requirements.

Joint CREW (JCREW) is a Navy-led program to develop the next generation of joint-service CREW systems. JCREW will deliver capabilities that correct deficiencies in existing CREW systems and address future worldwide RCIED threats. Additionally, JCREW has an open architecture, facilitating evolution as new threats, advances in technology, and new vehicle requirements are introduced.

Status

The Navy will continue as lead through the development of Block One of the initial capability, integrating joint service requirements. The Army will then take lead as the executive agent and incorporate the

JCREW capability into the Defensive Electronic Attack (DEA) portion of their future Integrated Electronic Warfare System (IEWS) program.

Developers

Northrop Grumman Systems Corporation	San Diego, California USA

Nulka Radar Decoy System

Description

Nulka is an active, off-board, ship-launched decoy developed in cooperation with Australia to counter a wide spectrum of present and future radar-guided anti-ship cruise missiles (ASCMs). The Nulka decoy employs a broadband radio frequency repeater mounted on a hovering rocket platform. After launch, the Nulka decoy radiates a large, ship-like radar cross-section and flies a trajectory that seduces incoming ASCMs away from their intended targets. Australia developed the hovering rocket, launcher, and launcher interface unit. The Navy developed the electronic payload and fire control system. The in-service Mk 36 Decoy Launching System (DLS) has been modified to support Nulka decoys and is designated the Mk 53 DLS.

Status

Nulka received Milestone III approval for full-rate production in January 1999. Installation began on U.S. and Australian warships in September 1999. The system is installed on U.S. Coast Guard cutters and more than 120 U.S. Navy ships. Installation on aircraft carriers is scheduled to begin in FY 2013.

Developers

BAE Systems	Edinburgh, Australia
SECHAN Electronics Inc.	Lititz, Pennsylvania USA
Lockheed Martin Sippican	Marion, Massachusetts USA

SSQ-130 Ship Signal Exploitation Equipment (SSEE) Increment F

Description

The Shipboard Information Warfare Exploit program provides improved situational awareness and near real-time indications and warnings to the warfighter by improving and increasing tactical cryptologic and information warfare exploitation capabilities across Navy combatant platforms. The SSQ-130 SSEE Increment F is a shipboard information operations (IO)/electronic warfare (EW) system that provides commanders with automatic signal acquisition, direction finding, and target geo-location. SSEE–F will incorporate many developmental counter-ISR capabilities. SSEE provides deployed forces with an afloat IO/IW/EW system/sensor. SSEE is a commercial-off-the-shelf (COTS)/non-developmental item (NDI) program that is easily reconfigured, and therefore able to respond rapidly to emergent tasking in evolving threat envi-

ronments. The system design permits rapid insertion of new and emerging technologies that will integrate capabilities from existing systems and advanced technologies into a single, scalable, spirally developed, interoperable system.

Status

SSEE Increment F entered full rate production in August 2011 and 40 are estimated to be delivered by FY 2018 with full operational capability (FOC) estimated for FY 2019. Seven units have been delivered through FY 2012.

Developers

Argon-ST	Fairfax, Virginia USA

Surface Electronic Warfare Improvement Program (SEWIP)

Description

Surface Electronic Warfare Improvement Program is an evolutionary development block upgrade program for the SLQ-32 electronic warfare (EW) system installed on numerous Navy aircraft carrier and surface and amphibious warships, as well as Coast Guard cutters, with total of 170 systems in service. Block 1A replaces the SLQ-32 processor with an electronic surveillance enhancement processor and the display console with a UYQ-70. Block 1B also improves the human machine interface of the SLQ-32 and adds specific emitter identification (SEI) capability that provides platform identification. The high-gain high sensitivity (HGHS) receiver (Block 1B3) provides improved situational awareness through non-cooperative detection and identification of platforms beyond radar horizon. Block 2 provides improvements to the electronic support (ES) receiver. Upgrades to the antenna, receiver, and combat system interface provide capability to pace the threat, improving detection, measurement accuracies, classification, and mitigation of electromagnetic interference. Block 3 will provide improvements for the electronic attack (EA) transmitter by providing integrated countermeasures against RF guided threats and will also extend frequency range coverage. SEWIP will also cue Nulka decoy launch.

Status

SEWIP was established as an ACAT II program in July 2002, after cancellation of the Advanced Integrated Electronic Warfare System (AIEWS). SEWIP Block 2 development contract was awarded September 30, 2009 and will deliver in FY 2014. SEWIP Block 3's advanced, active electronic attack (EA) capabilities are in full development with Milestone B scheduled for FY 2013. Development completion and first procurement is expected in FY 2017, followed by first delivery in the FY 2018 timeframe.

Developers

Northrop Grumman PRB Systems	Goleta, California USA
Lockheed Martin	Eagan, Minnesota USA
General Dynamics Advanced Information Systems	Fairfax, Virginia USA

DECISION SUPERIORITY

E-2C/D *Hawkeye* Airborne Early Warning Aircraft

Description

The E-2C *Hawkeye* is the Navy's airborne surveillance and battle management command and control (BMC2) platform, providing support of decisive power projection at sea and over land for the carrier strike group and joint force commanders. In addition to current capabilities, the E-2 has an extensive upgrade and development program to improve the capability of the aircraft as a critical element in the joint integrated air and missile defense (IAMD) architecture. Two upgrades will ensure the E-2 keeps pace with changing tactical environments: the E-2C *Hawkeye* 2000 and the E-2D *Advanced Hawkeye*.

The E-2C *Hawkeye* 2000, with the APS-145 radar, features a mission computer upgrade (MCU), Cooperative Engagement Capability (CEC), improved electronic support measures (IESM), Link-16, global positioning system (GPS), and satellite data and voice capability. The MCU greatly improves weapons systems processing power, enabling incorporation of CEC. In turn, CEC-equipped *Hawkeye* 2000s significantly extend the engagement capability of air-defense warships. It is the key to early cueing of the Aegis Weapons System, which in turn dramatically extends the lethal range of the Standard Missile.

The E-2D *Advanced Hawkeye* and APY-9 radar—a two-generation leap in radar performance—bring an improved over-the-horizon, overland, and littoral detection and tracking capability to the carrier strike group and joint force commanders. The APY-9, coupled with CEC, Link-16, and the Advanced Tactical Data Link, fully integrates the E-2D *Advanced Hawkeye* into the joint IAMD role. The APY-9's advanced detection and tracking capability, in conjunction with Aegis and the upgraded Standard Missile—as well as the F/A-18 *Hornet* and its upgraded AIM-120 Advanced Medium Range Air-to-Air Missile (AMRAAM),—will allow strike groups to deploy an organic, theater-wide air and cruise missile defense capability to protect high-priority areas and U.S. and coalition forces ashore and afloat. E-2D is the key enabler to the Naval Integrated Fire Control–Counter Air (NIFC-CA) capability and will continue as the airborne "eyes " of the Fleet.

Status

There are 63 E-2C aircraft in the Fleet as of late 2012, 26 of which are *Hawkeye* 2000s. Two E-2D *Advanced Hawkeye* system development and demonstration aircraft are in flight test at Patuxent River, Maryland. All three pilot production aircraft have been delivered to support testing and initial training, with the Fleet Replacement Squadron receiving their first E-2D on July 29, 2010. Three low-rate initial production (LRIP) aircraft have been delivered and five others are currently in production in St. Augustine and are meeting all cost, schedule, and performance criteria. A total of four lots of LRIP aircraft are approved for procurement in FY 2009-2012, with delivery scheduled two years after procurement. Full-rate production begins in FY 2013

with 32 planned for production in the first year of a multi-year procurement that is scheduled to run from FY 2104 to FY 2018. The E-2D developmental test program is complete. The E-2D continues to meet or exceed all key performance parameters. Initial operational test and evaluation began in December 2012, and the first fleet squadron will begin transition to E-2D in 2013, with initial operational capability and first deployment planned for FY 2015.

Developers

Northrop Grumman	Bethpage, New York USA
Northrop Grumman	St. Augustine, Florida USA
Lockheed Martin	Syracuse, New York USA

Advanced Tactical Data Link Systems (ATDLS)

Description

The Advanced Tactical Data Link Systems provides tactical data link (TDL) command and control (C2) for U.S. forces, allies, and coalition partners in accordance with the Joint Tactical Data Enterprise Services Migration Plan (JTMP), the DoD roadmap for TDL implementation. ATDLS sustains and improves existing networks while developing future networks. Joint TDLs (Link-11, Link-16, and Link-22) include terminals, gateways, networks, and support initiatives that improve connectivity, interoperability, training, and support. Link-16 is DoD's primary TDL implemented to most TDL-capable platforms and some munitions for specific applications. Link-22 is a multi-national development effort replacing Link-11 with a more suitable high frequency (HF) protocol using a message standard similar to Link-16.

Terminals include the Joint Tactical Information Distribution System (JTIDS) and Multifunctional Information Distribution System (MIDS), which provide a Link-16 capability for command and control (C2) aircraft, ships, and ground sites. MIDS-Low Volume Terminal (MIDS-LVT) is a joint and multi-national cooperative program to develop, produce, and sustain a successor terminal to JTIDS and is the most widely employed Link-16 terminal. MIDS is the core for MIDS On Ship (MOS). The United States serves as MIDS-LVT program leader, with France, Germany, Italy, and Spain as full partners. Dynamic Network Management (DNM) increases Link-16 network efficiency and reconfiguration flexibility. MIDS Joint Tactical Radio System (JTRS) is an engineering change proposal of the MIDS-LVT and fully interoperable with JTIDS and MIDS-LVT providing Link-16, TACAN, J Voice and three channels for future scalability.

Gateways include the command and control processor (C2P), the air defense system integrator (ADSI), and the link monitoring and management tool (LMMT). C2P is a TDL communication processor associated with host combat systems—such as Aegis or Ship Self-Defense System (SSDS) Next-Generation C2P (NGC2P)––deliver extended functionality of C2P provide improved Human Machine Interface (HMI) and adds Link maintenance, NGC2P uses an incremental approach for capability enhancements, and

technology refreshment of obsolescent components. Common Data Link Management System (CDLMS) integrates components to monitor multi-TDL networks simultaneously. ADSI is a near real-time tactical command and control (C2), commercial off-the-shelf (COTS) system providing for processing and display of multiple TDL interfaces, data forwarding, and TDL information to the Global Command and Control System–Maritime (GCCS-M). LMMT is a prototype effort to meet network monitoring management and communications requirements for the Maritime Operations Center (MOC) C2 Ballistic Missile Defense (BMD) Forces by addressing the shortcomings of existing systems such as ADSI.

Status

JTIDS/MOS: JTIDS/MOS terminals will be updated for cryptographic modernization and frequency remapping to address National Security Agency (NSA) and DoD/Department of Transportation (DoT) mandates with an initial operational capability (IOC) of FY 2016. Program management and acquisition authority for JTIDS/MOS is under the Link-16 network program.

DNM: TSR achieved IOC on ships in the C2P and JTIDS programs in FY 2007. TSR was also fielded on USN E-2C, EA-6B, and H-60 platforms in FY 2009, and is scheduled to field on other joint platforms such as E-3 and E-8. DNM is scheduled for Milestone C/Full Deployment Decision Review (FDDR) and IOC in FY 2013, and FOC in FY 2014.

MIDS-LVT: The program entered the engineering, management, and development (EMD) phase in December 1993. MIDS was approved for low-rate initial production (LRIP) in FY 2000 and reached IOC on the F/A-18C/D Hornet in FY 2003. Within the Navy, MIDS is being procured from 2012 through FY 2017 for F/A-18 C/D/E/F, E/A-18/G, MH-60R/S, and CH-53K aircraft. The Air Force F-15 fighter variant, MIDS-LVT(3), is fully fielded, and the Army variant, LVT(2), is deployed with all designated Army units. All MIDS-LVTs will be updated to the Block Upgrade 2 (BU2) configuration commencing in FY 2016. BU2 will incorporate cryptographic modernization, frequency remapping, and enhanced throughput features into the terminal in order to maintain system viability and to address NSA and DoD/DoT mandates. As of the end FY 2012, more than 8,100 MIDS-LVTs have been delivered and/or on contract, and integrated in 76 platforms within the five partners—France, Germany, Italy, Spain, and the United States—and 38 foreign military sales customer nations.

MIDS JTRS: MIDS JTRS completed operational testing on its lead platform, the F/A-18E/F *Super Hornet*, in FY 2012. F/A-18 IOTE report stated the MIDS JTRS as operationally effective and suitable with minor deficiencies for fleet deployment. Additionally, DT/OT testing of the MIDS JTRS terminal was performed on both USAF E-8C (JSTARS) and RC-135 (Rivet Joint) platforms. MIDS JTRS was also found to be operationally effective and suitable with limitations. MIDS JTRS received full production and fielding approval in FY 2012, with IOC for the F/A-18E/F in FY 2012. In addition, it is on schedule for deployment on USAF RC-135 in FY 2013. MIDS

JTRS Block Cycle 1 (BC1) was awarded in FY 2011. BC1 configuration includes crypto modernization upgrades to fully comply with NSA mandates. BC1 retrofits will be available in FY 2013. MIDS JTRS Block Cycle 2 (BC2) will be awarded in FY 2013. BC2 will incorporate DNM, RelNav, and specific MOS platform requirements into MIDS JTRS. To complete MIDS JTRS Increment 1, the Navy funded several improvements including four Net Concurrent Multi-Netting with Concurrent Contention Receive (CMN-4) and Tactical Targeting and Networking Technology (TTNT). CMN-4 increases Link-16 network capacity by allowing better use of the Link-16 network. CMN-4 is fully interoperable with non-CMN-4 Link-16 platforms. TTNT complements Link-16 and meets emerging networking requirements that Link-16 cannot fulfill. TTNT will enable IP capability on an airborne environment for tactical aircraft. MIDS JTRS CMN-4 full rate production and retrofits are planned for FY 2016. MIDS JTRS CMN-4/TTNT full rate production is planned for FY 2018.

C2P: C2P Legacy, C2P Rehost, and NGC2P Increment 1 have completed fielding and are in the operations and support phase. NGC2P Increment 2 achieved full rate production in July 2008 and will achieve full operational capability and transition to the O&S phase in FY 2013. NGC2P Increment 3 is funded to begin development in FY 2013.

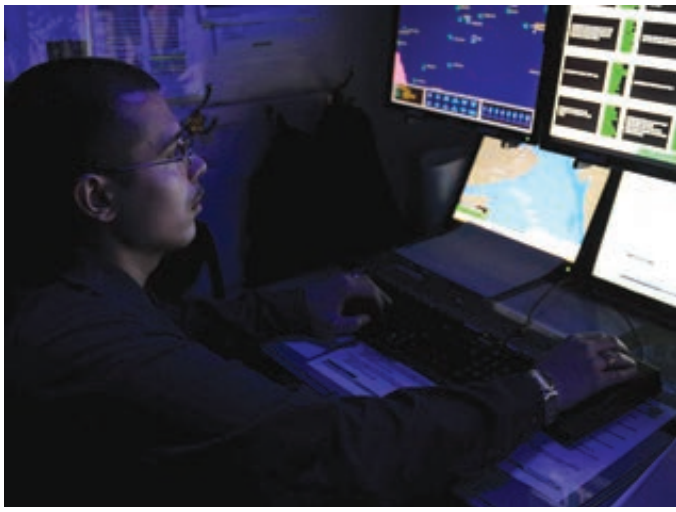
NILE: NILE partner countries have fielded Link-22 on limited ship and shore sites. Link-22 will be implemented in NGC2P as Increment 3, beginning in FY 2013.

ADSI: ADSI Version 14 is in fielding. ADSI Version 15 is in development and planned for limited fielding beginning in FY 2014. The program intends to supplement/replace certain ADSI systems with the LMMT capability.

Developers

Ultra Electronics	Austin, Texas USA
Northrop Grumman	San Diego, California USA
DRS Inc.	Wyndmoor, Pennsylvania USA
Data Link Solutions	Wayne, New Jersey USA

Automatic Identification System (AIS)



Description

The Automatic Identification System is a maritime digital broadcast system that continually exchanges voyage and vessel data among network participants over VHF radio frequency, in support of regional and global maritime domain awareness (MDA) requirements. The data includes vessel identity, position, speed, course, destination, and other data of critical interest for navigation safety and maritime security. Commercial vessels greater than 300 gross tons (GT) are required by the International Maritime Organization (IMO) and International Convention for the Safety of Life at Sea (SOLAS) 1974 Treaty to use AIS. Warships are exempt. The Navy AIS program collects open-source AIS data that is being broadcast from AIS transceivers on commercial vessels. This open-source AIS data, combined with other government intelligence and surveillance data, is used by Navy ships and submarines to improve safety of navigation and is integrated into the common operational picture (COP) to enhance situational awareness. The AIS data collected by Navy platforms is also aggregated within the MDA/AIS Sensor/Server (MASS) capability at several operational shore sites. The MASS then provides the data to unclassified and classified users in support of MDA efforts, with particular focus on improving the Nation's maritime security

Status

AIS began as a rapid deployment capability, transitioned to a program of record on December 24, 2008, and was designated as an Acquisition Category (ACAT) IVT program. PEO C4I is the milestone decision authority. As of December 2012, Increment I AIS systems have been installed on 156 unit-level ships (e.g., cruisers and destroyers) and provide basic AIS capability, including a laptop computer display on the bridge and connectivity to send unclassified AIS data to shore sites. AIS Increment I systems have also been installed on 21 force-level ships (aircraft carriers and amphibious assault ships), which, in addition to the basic capability, allow for the direct transfer of AIS track information to the Global Command and Control System (GCCS). AIS installations have been completed on 23 submarines, with an additional eight scheduled through FY 2013. The Navy plans to complete AIS retrofit installations on 26 additional submarines through FY 2018. AIS shore sites are operational at Third, Fifth, Pacific Fleet, and Fleet Forces Command.

Developers

L-3 Communications	Orlando, Florida USA
Sperry Marine Northrop Grumman Electronic Systems	Charlottesville, Virginia USA
Scientific Research Corporation	Charleston, South Carolina USA
SPAWAR Systems Center Atlantic	Charleston, South Carolina USA

Cooperative Engagement Capability (CEC)

Description

Cooperative Engagement Capability provides improved battle force air-defense capabilities by integrating sensor data of each cooperating ship, aircraft, and ground station into a single, real-time, fire-control-quality, composite track picture. CEC is a critical pillar of the Naval Integrated Fire Control-Counter Air (NIFC-CA) capability and will provide a significant contribution to the Joint Integrated Fire Control (JIFC) operational architecture. CEC interfaces the weapons and sensor capabilities of each CEC-equipped ship and aircraft in the strike group, as well as ground mobile units in support of integrated engagement capability. By simultaneously distributing sensor data on airborne threats to each ship within a strike group, CEC extends the range at which a ship can engage hostile tracks to beyond the radar horizon, thus significantly improving area, local, and self-defense capabilities. CEC enables a strike group or joint task force to act as a single, geographically distributed combat system. CEC provides the fleet with greater defense in-depth and the mutual support required to confront evolving threats of anti-ship cruise missiles and theater ballistic missiles.

Status

In April 2002, the Defense Acquisition Board (DAB) approved CEC full-rate production for AN/USG-2 shipboard and low-rate initial production for E-2C *Hawkeye* (AN/USG-3) airborne equipment sets. In September 2003, USD (AT&L) approved FY 2004/2005 follow-on production for the AN/USG-3. CEC systems are at sea in 64 ships (Aegis CGs and DDGs, carriers, and amphibious ships) and 34 E-2C/D aircraft as of September 2012. Total future CEC installation is planned for 269 ships, aircraft, and land units. The January 19, 2010 acquisition strategy implements a pre-planned product improvement (P3I) incorporating open architecture-based hardware with re-hosted existing software. The P3I hardware supports reduced cost, weight, cooling, and power objectives and is more extensible to other Services. This initiative culminated in the competitive design and production of the CEC signal data processor (SDP), which is installed on several land-based test sites, DDGs, and the E-2D *Hawkeye*, and is proceeding through testing. The Navy has coordinated with the Joint Staff, Office of the Secretary of Defense (OSD), and other Services to explore potential multi-Service avenues for CEC capability implementation that will expand sensor netting track data availability to meet a variety of warfighting requirements across various platforms. This effort has resulted in the implementation of CEC into ground mobile systems including the Marine Corps' Composite Tracking Network (CTN) and the Army's Joint Land-Attack Cruise Missile Defense Elevated Netted Sensor (JLENS). The SDP has been re-designed to incorporate National Security Agency (NSA)-mandated cryptologic modernization changes. The crypto-modified SDP (SDP-S) hardware and software have passed critical design review and NSA certification. The SDP-S was integrated into the E-2D Advanced Hawkeye and began Operational Test and Evaluation (OT&E) in FY 2012. The crypto modernization strategy for fielded CEC platforms is to back-fit them with the crypto-modified SDP upon completion of the follow-on operational test and evaluation for each platform type.

Developers

Johns Hopkins University	
Applied Physics Laboratory	Laurel, Maryland USA
Raytheon Systems Company	St. Petersburg, Florida USA
Sechan Electronics Inc.	Lititz, Pennsylvania USA

Deployable Joint Command and Control Capability (DJC2)

Description

The Deployable Joint Command and Control program is a standardized, rapidly deployable, scalable, and reconfigurable C2 and collaboration combat operations center that can be set up anywhere in the world to support geographic combatant commanders (COCOMs) and their joint component commands in the rapid standup of a joint task force (JTF) headquarters. DJC2 can be employed when executing operations ranging in scale from that of a first responder or small early-entry, forward-component operations center to that of a full JTF combat operation center. DJC2 has been used for humanitarian assistance/disaster response (HA/DR) operations, including: JTF Unified Response after the earthquake in Haiti; Operation Tomodachi – Japan; JTF Caring Response after Cyclone Nargis in Myanmar; and JTF Katrina after Hurricane Katrina in New Orleans, Louisiana. DJC2 supports the Navy Strategic Plan by extending the joint sea base ashore for rapid, dynamic joint operations. Additionally, the systems are used extensively for JTF HQ joint exercises and training.

The DJC2 system has four modular tent/mobile shelter configurations, which iteratively build up C2 capability during the first phases of a joint operation. Configurations include: an autonomous Rapid-Response Kit (RRK, 5 to 15 seats); En Route (6 to 12 seats carried on board C-130 and C-17 aircraft); Early Entry (20 to 40 seats); and Core (60 seats). An Early Entry configuration can be set up and operational with three networks and communications in less than six hours. The fully fielded DJC2 configuration can be set up and operational with five networks in less than 24 hours in a footprint of approximately 40,000 square feet. The number of users supported can be expanded by lashing together two or more Cores, or by adding Core Expansion Kits (three are available, adding 60 seats each, for a total of 180 seats).

Fully fielded, the DJC2 includes self-generated power, environmental control, shelters (tents), infrastructure, limited communications equipment, C2 applications, office automation and collaboration software applications with operator workstations (laptop computers, chairs and tables), displays, intercommunications, local area networks, and access to wide area networks.

The DJC2 program has delivered to the COCOM and joint force commanders an operationally tested C2 system that is:

- Horizontally and vertically integrated across all levels of command

- Interoperable across joint, coalition, interagency, non-governmental/private volunteer organizations
- Robust, scalable, and rapidly deployable, including autonomous en-route and RRK capabilities
- Incorporated into the design through evolving technology insertion and fielding to continuously meet COCOM and JTF emerging requirements

Status

The DJC2 program attained full operational capability with the delivery of six operational Core systems to U.S. Southern Command, U.S. European Command, U.S. Pacific Command, U.S. Army South, U.S. Army Africa, and III Marine Expeditionary Force. Programmed funding supports hardware sustainment, information technology refresh, and technology-insertion efforts (based on warfighter input as technologies mature) across the Future Years Defense Program (FYDP). The first cycles of technology insertion have been successfully delivered and included secure wireless networking and a new variant of the RRK that is more modular and includes a specialized commander's kit. Follow-on cycles of technology insertion are delivering such capabilities as application virtualization, core expansion kits, early entry light configuration, robust storage architecture, and Voice over Secure Internet Protocol (VoSIP). Future capabilities planned include cloud services, application virtualization, virtual desktop infrastructure, and IPv6. Because of its open architecture and modular design, the DJC2 system can be reconfigured to meet a wide variety of form/fit/functions. This design advantage, coupled with the system's robust capabilities and proven utility, has resulted in several non-program of record customers procuring DJC2 capabilities as a low-risk, cost-effective (due to savings in development costs) solution to meeting their deployable C2 requirements. For example, the DJC2 program repackaged its architecture and components to provide deployable C2 capabilities in a road vehicle for U.S. Northern Command in support of its homeland security mission. U.S. Naval Forces Central Command (NAVCENT) has leveraged DJC2 technology and architecture for its operations center using a combination of internal airlift/helicopter slingable container unit (ISU) containers and tents.

In addition, the capabilities of DJC2 are being leveraged by the Services for Service-specific C2 needs. The U.S. Marine Corps has procured three modified DJC2 Core systems (with an expanded 180 seats each) to serve as its Combat Operations Center (COC) v(1) system. The Naval Expeditionary Combat Command (NECC), four Marine Expeditionary Units (MEUs), and Naval Mine and Anti-Submarine Warfare Command (NMAWC) have procured RRKs (and plans to procure other DJC2 configurations/subsystems) to meet expeditionary needs.

Developers

Naval Surface Warfare Center	Panama City, Florida USA
ARINC	Panama City, Florida USA
Georgia Tech Research Institute	Atlanta, Georgia USA
ISPA Technology	Panama City, Florida USA

Distributed Common Ground System-Navy (DCGS-N)

Description

Distributed Common Ground System-Navy Increment One is the Navy component of the DoD DCGS family of systems. DCGS-N is the Navy's primary intelligence, surveillance, reconnaissance, and targeting (ISR&T) support system, providing processing, exploitation, and dissemination services at the operational and tactical levels of war. DCGS-N operates at the General Services (GENSER) and Sensitive Compartmented Information (SCI) security levels. DCGS-N Increment One is replacing all legacy JSIPS-N (Joint Service Imagery Processing System-Navy) and TES-N (Tactical Exploitation System-Navy) systems.

DCGS-N makes maximum use of commercial-off-the-shelf (COTS), mature government-off-the-shelf (GOTS), and joint services software, tools, and standards to provide a scalable, modular, and extensible multi-source capability that is interoperable with other Service and agency DCGS systems.

In 2007, the DCGS-N program was realigned to the CANES Common Computing Environment (CCE)/Afloat Core Services (ACS) architecture. The Increment One follow-on system, DCGS-N Increment Two, planned for FY 2016, will be hosted primarily as software within the CANES infrastructure as part of the Navy's long-term vision for consolidation of C4I networks and services.

DCGS-N Increment Two will build upon the capabilities provided by DCGS-N Increment One and Maritime Domain Awareness (MDA) Spiral 1 and converge afloat and ashore ISR. Increment Two will leverage the CANES, DoD, and Intelligence Community (IC) hardware and software infrastructures, including the widget construct and emerging cloud architecture, to ensure the Navy's joint command, control, communications, computers, intelligence, surveillance and reconnaissance (C4ISR) interoperability. Increment Two will provide the necessary end-to-end processing, exploitation, and dissemination architecture to address future sensor data from Navy ISR tactical sensor platform investments. It will greatly improve the Navy's ability to: (1) identify maritime threats; (2) fuse national, tactical, and inter-theater data for operational use; and (3) allow better DCGS family of systems and Intelligence Community visibility into maritime collection requirements. Increment Two will be a software-centric program that will support evolving fleet needs through early and frequent delivery of capabilities.

The Intelligence Carry-On Program (ICOP) is a new start in FY 2014 that will deliver ISR capability to the unit level beginning in FY 2015.

Status

The DCGS-N installation plan includes aircraft carriers (CVN), large-deck amphibious assault ships (LHA/LHD), fleet command ships (LCC), intelligence training centers, and school house facilities and shore-based numbered fleet Maritime Operations Centers (MOC) reach-back support sites. Increment One has fielded 20 systems, with an additional 14 scheduled for installation through FY 2014. Increment Two is scheduled to be tested and fielded beginning in FY 2016 as part of CANES and will eventually replace all Increment One installations.

Developers

BAE Systems	Rancho Bernardo, California USA

E-6B Mercury

Description

Derived from the Boeing 707, the E-6B platform provides the Commander, U.S. Strategic Command (USSTRATCOM) with the command, control, and communications (C3) capability needed for execution and direction of strategic forces. Designed to support a robust and flexible nuclear deterrent posture well into the 21st Century, the E-6B performs VLF emergency communications, the U.S. Strategic Command Airborne Command Post mission, and Airborne Launch Control of ground-based ICBMs. It is the Navy's only survivable means of nuclear C2.

Status

The Block I modification program will sustain and improve E-6B capability and is focused on several aircraft deficiencies identified by USSTRATCOM. The contract for Block I was awarded to Rockwell Collins in March 2004. Initial operational capability (IOC) is planned for 2014. In 2005, the Navy initiated the Internet Protocol and Bandwidth Expansion (IP/BE) program to modernize the E-6B platform, and in 2008 directed the Multi-Role Tactical Common Data Link (MR-TCDL) and Family of Advanced Beyond Line-of-Sight Terminal/Presidential National Voice Conferencing (FAB-T/PNVC) programs to provide additional enhancements to field a T-3 capability and the replacement of the MILSTAR terminals to connect with the advanced extremely high frequency satellite system. The contract for MR-TCDL integration and installation into one E-6B aircraft and E-6B Systems Integration Lab (SIL) was awarded to Northrop Grumman in March 2012. The IP/BE, MR-TCDL and FAB-T/PNVC programs will support USSTRATCOM's migration of Nuclear Command and Control (C2) to a distributed, network/IP-based global C2 system as an airborne node. IP/BE IOC is planned for FY 2014, MR-TCDL IOC is planned for FY 2016 and FAB-T/PNVC IOC is planned for FY 2019.

Developers

Boeing	Wichita, Kansas USA
Rockwell Collins	Richardson, Texas USA
Northrop Grumman	Herndon, Virginia USA
DRS	Tinker AFB, Oklahoma USA

Global Command and Control System–Maritime (GCCS-M)

Description

Global Command and Control System-Maritime is the maritime implementation of the GCCS family of systems (FoS). It supports decision making at all echelons of command with a single, integrated, scalable C4I system that fuses, correlates, filters, maintains, and displays location and attribute information on friendly, hostile, and neutral land, sea, and air forces, integrated with available intelligence and environmental information. GCCS-M operates in near real-time and constantly updates unit positions and other situational awareness data. GCCS-M also records data in databases and maintains a history of changes to those records. System users can then use the data to construct relevant tactical pictures using maps, charts, topography overlays, oceanographic overlays, meteorological overlays, imagery, and all-source intelligence information coordinated into a common operational picture that can be shared locally and with other sites. Navy commanders review and evaluate the general tactical situation, plan actions and operations, direct forces, synchronize tactical movements, and integrate force maneuver with firepower. The system operates in a variety of environments and supports joint, coalition, allied, and multinational forces. GCCS-M is implemented afloat and at select ashore fixed command centers.

Status

The GCCS-M program is designated Acquisition Category (ACAT) IAC with the Assistant Secretary of the Navy for Research, Development, and Acquisition (ASN (RDA)) designated as the milestone decision authority (MDA). GCCS-M is an evolutionary acquisition program with development and implementation progressing in increments. In keeping with DoD regulations for evolutionary acquisition programs, the acquisition strategy calls for each GCCS-M increment (major release) to proceed through acquisition milestone reviews prior to fielding. The program is operating in two simultaneous acquisition increments: GCCS-M Increment 1 (GCCS-M Version 4.0 and prior) is in deployment/sustainment; and Increment 2, (GCCS-M Version 4.1) which completed a fielding decision review (FDR) on August 16, 2011, resulting in MDA authorization of full fielding of Increment 2 force level and unit level configurations. The Increment 2 group level configuration is currently in the integration and testing phase with an operational test planned for the fourth quarter of FY 2013 and an FDR planned for the second quarter of FY 2014. GCCS-M includes efforts necessary to ensure synchronization and interoperability with the GCCS FoS.

Developers

SPAWAR Systems Center	San Diego, California USA
SAIC	San Diego, California USA

Maritime Operations Center (MOC)

Description

The Navy's Maritime Operations Centers enhance command and control (C2) capabilities at the operational level through headquarters manned by individuals proficient in joint and naval operational-level staff processes and equipped to provide globally networked, scalable, and flexible capability across the spectrum of conflict. MOCs provide organizational consistency, the scalability and flexibility to transition between various command roles, and enhanced global networking among Navy-maritime organizations. The MOC construct achieves effective, agile, networked, and scalable staffs, employing standardized doctrine, processes, and C4I systems. Each will be able to operate in diverse organizational constructs and in various roles (joint, interagency, combined). The global network and commonality enable both reach-back and load sharing across all MOCs. Education provided via the Maritime Staff Operators Course provides foundational knowledge in joint and naval operational-level processes yielding personnel ready to perform MOC functions.

Status

Eight established headquarters are equipped with the initial MOC configuration, and ongoing assessment of Commander Tenth Fleet requirements will ensure installation of appropriate standardized capabilities from MOC initial configuration. Key MOC baseline systems hardware and software capabilities have been fielded to Third, Fourth, Fifth, Sixth, Seventh, Tenth, and Pacific Fleet and U.S. Fleet Forces Command. Systems fielded were the Combined Enterprise Regional Information Exchange System–Maritime (CENTRIXS–M), Air Defense System Integrator (ADSI), Radiant Mercury, Analyst Notebook, Missile Defense Planning System (MIPS), Command and Control Personal Computer (C2PC), Distributed Common Ground System–Navy (DCGS–N), and Global Command and Control System–Maritime (GCCS–M) Sensitive Compartmented Information (SCI). In FY 2012, a continuation of fielding the remaining MOC capabilities included installing Joint Automated Deep Operations Coordination System (JADOCS) and Command and Control Battle Management Communication (C2BMC) Browser and Planner at selected MOCs. Training and assist teams from U.S. Fleet Forces Command and the Naval War College provide MOCs on-site training and assessment in order to maintain proficiency in doctrine, execute critical staff processes, and share best practices. The MOC is designated as a system of system (SoS) project and as such does not have a single RDT&E or acquisition budget line to support development and fielding. The MOC SoS project is responsible for communicating MOC C4I SoS requirements and capability gaps to existing or planned C4I Systems in order to become an integrated C4I SoS required to support the MOC C4I SoS capability.

Developers

Rockwell Collins	Richardson, Texas USA
DRS	Tinker AFB, Oklahoma USA

In addition, there are multiple sources of materials.

Mk XIIA Mode 5 Identification Friend or Foe (IFF)

Description

The Mk XIIA Mode 5 Identification Friend or Foe is a secure, real-time, cooperative "blue-force" combat identification system designed to inform commanders' "Shoot/No Shoot" decisions. Advanced technology, coding, and cryptographic techniques are incorporated into the IFF Mode 5 to provide reliable, secure, and improved equipment performance compared to Mode 4. The Mode 5 waveform is defined in NATO Standardization Agreement (STANAG) 4193 and is compatible with all U.S. and international civil IFF requirements. This Navy ACAT II program is based on the improved Mk XII Cooperative IFF Operational Requirements Document, dated April 27, 2001. Transponders will be installed on more than 3,000 ships and Navy/Marine Corps aircraft. Mode 5 interrogator equipment will be fielded on select ships and aircraft, the latter including MH-60R Seahawk, E-2D *Hawkeye*, F/A-18 C/D *Hornet*, and F/A-18E/F/G *Super Hornet* and *Growler*.

Status

A successful initial operational test and evaluation (IOT&E) was held in FY 2012. Navy initial operational capability (IOC) and full-rate production (FRP) were approved in FY 2012. Integrated and operational testing on the E-2D and MV-22 is underway in FY 2013. Operational testing of the Combined Interrogator/Transponder (CIT) on the F/A-18E/F and EA-18G is planned for FY 2014. The program is on track for Joint IOC and FOC in FY 2014 and 2020 respectively.

Developers

BAE Systems	Greenlawn, New York USA
General Dynamics Decision Systems	Scottsdale, Arizona USA
DRS	Tinker AFB, Oklahoma USA

Navy Air Operations Command and Control (NAOC2)

Description

Navy Air Operations Command and Control allows task force commanders the ability to plan, disseminate, monitor, and execute theater air battles. NAOC2 capability is provided by the Theater Battle Management Core Systems (TBMCS). TBMCS is an Air Force Acquisition Category (ACAT) III program of record with joint interest. TBMCS is integrated and fielded to enable the Air Planner to produce the Joint Air Tasking Order (ATO) and Air Space Control Order (ACO), which gives afloat battle staffs and maritime operations centers (MOCs) the capability to lead, monitor and direct the activities of assigned or attached forces during large-scale combined Joint service operations with a Joint Force Air and Space Component Commander (JFACC).

Status

TBMCS 1.1.3 is in the operations and sustainment phase. Software and security upgrades are fielded as they become available. The NAOC2 program is integrated and tested within the Navy operational environment for fielding to force-level ships (CVN/LHA/

LHD/LCC), MOCs, and selected training sites. The Air Force's Command and Control Air and Space Operations Suite (C2AOS) and Command Control and Information Services (C2IS) Programs of Record will replace TBMCS. The Air Force will develop these programs in a service oriented architecture (SOA) environment; the Navy will migrate into these programs, which will reside in the Consolidated Afloat Networks and Enterprise Services (CANES) environment.

Developers

Lockheed Martin	Colorado Springs, Colorado USA
SPAWAR Systems Center Pacific	San Diego, California USA

Tactical Messaging

Description

The Tactical Messaging and the Defense Messaging System provide the Navy with organizational messaging services to and from worldwide DoD consumers such as tactical deployed users, designated federal government organizations, and allies. Tactical Messaging consists of the Navy Modular Automated Communications System (NAVMACS), a shipboard message processing system that guards broadcast channels. DMS provides shore messaging via the Navy Regional Enterprise Messaging System (NREMS).

Status

The Navy will transition to an Internet Protocol (IP) based solution called Command and Control Official Information Exchange (C2OIX) starting in FY 2014. C2OIX will replace both messaging systems with a single program of record supporting all naval messaging requirements, providing organizational C2 messages to all ashore, afloat, and mobile Navy users.

Developers

TELOS	Ashburn, Virginia USA
Raytheon Systems Company	St. Petersburg, Florida USA
Sechan Electronics Inc.	Lititz, Pennsylvania USA

Tactical Mobile (TacMobile)

Description

The Navy Tactical/Mobile program provides systems to support maritime commanders with the capability to plan, direct, and control the tactical operations of maritime patrol and reconnaissance forces (MPRF), joint and naval expeditionary forces, and other assigned units within their respective areas of responsibility. The TacMobile systems that support these missions are tactical operations centers (TOCs), mobile tactical operations centers (MTOCs), and joint mobile ashore support terminals (JMASTs).

TOCs and MTOCs provide MPRF operational support ashore at main operating bases, primary deployment sites, and forward operating bases, similar to support provided on board an aircraft carrier to embarked tactical air wings. Support includes persistent situational operational and tactical awareness, maritime patrol

and reconnaissance aircraft (MPRA) pre-mission coordination and planning, mission and target briefings, tactical in-flight support, post-mission analysis of collected sensor data, data dissemination, and feedback to aircraft sensor operators and supported commanders. Services provided include: analysis and correlation of diverse sensor information; data management support; command decision aids; data communication; mission planning, evaluation, and dissemination of surveillance data; and threat alerts to operational users ashore and afloat. As advances in sensor technology are fielded on MPRA, the TOC and MTOC sensor analysis equipment will evolve to support the new sensor capabilities.

JMAST provides a robust and transportable C4ISR capability to a Navy component commander or other staff. JMAST systems have supported overseas contingency operations, humanitarian assistance and disaster response (HA/DR) efforts, and non-combatant evacuation operations (NEO), along with other critical operations.

Status

TacMobile Increment 2.0 full-rate production and fielding were authorized in June 2009 to field new capabilities, such as CENTRIXS, GBS, and high-frequency Internet protocol (HF-IP) without eliminating existing C4I capabilities. Increment 2.0, which incorporates warfighter interface capabilities for TOC/MTOC activities plus communication upgrades needed for MTOCs to support P-3C *Orion* operations, achieved Full Operational Capability (FOC) in FY 2012. Increment 2.1 is in final development and will incorporate P-8A *Poseidon* Multi-mission Maritime Aircraft (MMA) mission support and systems interfaces as well as critical communications upgrades. Increment 2.1 Milestone C was achieved in October 2011, and completed Operational Testing in August 2012. A full-rate production decision is scheduled for FY 2013. Development is underway to support P-8A Increment 2 engineering change proposals and Broad Area Maritime Surveillance (BAMS) Unmanned Aircraft System (UAS), to achieve more efficient information flow across the Navy's sensor grid through implementation of tactical service-oriented architecture enabled by the Global Information Grid.

Developers

Centurum Inc.	Charleston, South Carolina USA
Honeywell International Inc.	Charleston, South Carolina USA
Northrop Grumman	Hollywood, Maryland USA
Space and Naval Warfare Systems Center Atlantic	Charleston, South Carolina USA

UYQ-100 Undersea Warfare Decision Support System (USW-DSS)

Description

Undersea Warfare Decision Support System provides unique capabilities to shorten command and control (C2) decision processes from detection-to-engagement, extending unit-level anti-submarine warfare (ASW) combat systems to a fully networked capabil-

ity at the force and theater levels. USW-DSS is the sole Navy program of record providing an undersea warfare common tactical picture (CTP). USW-DSS complements and provides a two-way interface with common operational picture (COP) systems such as GCCS-M and Link-11/16. USW-DSS is maturing solutions using the incremental acoustic rapid commercial-off-the shelf insertion (ARCI) process for fulfilling fleet-prioritized and JROC-approved material requirements that will eventually coordinate all ASW sensors into a single, composite track picture capable of fire control. These decision support tools use a service-oriented architecture with existing computing hardware and communication links comprising sensor data from air, surface, submarine, theater, and surveillance platforms to provide rapid confidence in the decision processes between sensors and weapons. These capabilities provide the sea combat commander (SCC), theater ASW commander (TASWC), and ASW commander (ASWC) an integrated capability to plan, conduct, and coordinate USW operations across all ASW platforms. USW-DSS will provide common and highly detailed visualization, integrated platform sensor and distributed combat systems, reduced data entry, improved sensor performance predictions, data fusion, while reducing redundancy of USW tactical decision aids.

Status

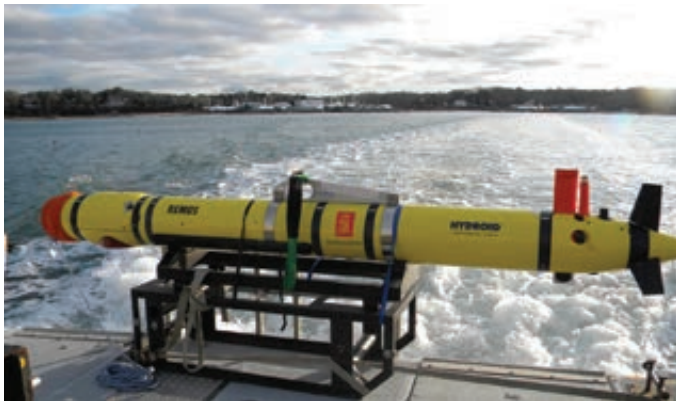
USW-DSS has delivered a mix of two increments on a total of 35 surface combatants and aircraft carriers. USW-DSS is also operational at five shore commands and at five sites conducting initial and refresher training. These increments include Advanced Capability Build 2 (ACB-2) that provides unique USW mission-planning capabilities and mission execution, USW CTP, and tactical execution capabilities. ACB-2 is phasing out all prior increments as an early adopter for Consolidated Afloat Network and Enterprise Services (CANES) by installing as software only with Integrated Shipboard Network Services (ISNS) Increment I as well as software and hardware on forward-deployed naval forces to meet Commander Pacific Fleet fielding requirements. The initial operating capability was fielded in the first quarter of FY 2010 and the operational assessment for ACB-2 was completed in the third quarter of FY 2010. ACB-2 fielding will continue through FY 2015 on a total of 102 ships and shore sites. Design and task analysis for ACB-3 will commence following completion of ACB-2 operational evaluation in FY 2013. ACB-3 will transition an Office of Naval Research Decision Support for Dynamic Target Engagement project and take the next step in coordinating all ASW sensors for a single, composite track picture, capable of providing fire-control fidelity data. USW-DSS ACB-3 will deliver software-only solutions on the Navy's common computing environment and afloat core services provided by the CANES program of record.

Developers

Progeny Systems Corporation	Manassas, Virginia USA
Adaptive Methods Inc.	Centerville, Virginia USA
DDL Omni Engineering LLC	McLean, Virginia USA

OCEANOGRAPHY, SPACE, AND MARITIME DOMAIN AWARENESS

Littoral Battlespace Sensing–Unmanned Undersea Vehicles (LBS-UUV)



Description

The Littoral Battlespace Sensing–Unmanned Undersea Vehicle program of record provides a low-observable, continuous capability to characterize ocean properties that influence sound and light propagation for acoustic and optical weapon and sensor performance predictions within areas of interest. It will deliver buoyancy-driven undersea gliders (LBS-G) and electrically powered autonomous undersea vehicles (LBS-AUV) to enable anti-submarine, mine, expeditionary, and naval special warfare (ASW/MIW/EXW/NSW) planning and execution and persistent intelligence preparation of the environment (IPOE). Launched and recovered from T-AGS oceanographic survey vessels, LBS-G, and LBS-AUV will provide persistent ocean sensing capability as well as expand the survey capability of vessels in contested areas while increasing the spatial and temporal fidelity of the data collected to meet fleet and combatant commander (COCOM) requirements.

LBS-UUV is increment 1 of Littoral Battlespace Sensing, Fusion, and Integration (LBSF&I), the Department of the Navy's principal IPOE programmatic construct for meteorological and oceanographic (METOC) data collection, processing, and data/product dissemination. LBS-UUV is a key component of battlespace awareness through 2020 and beyond. LBSF&I is an integrated end-to-end system-of-systems capable of measuring a large variety of environmental parameters from the sea floor to the top of the atmosphere. LBSF&I will be capable of processing, exploiting, and assuring the quality of these data. The relevant information collected from this system is integrated at the Glider Operations Center into naval C4ISR systems as part of the Global Information Grid Enterprise Services (GIG-ES).

Status

LBS-G reached full operational capability (FOC) in July 2012 and has delivered more than 50 gliders to the Naval Oceanographic Office; 150 total gliders will be delivered by FY 2015. LBS-AUV reached a favorable Milestone C and full-rate production decision in June 2012, and has delivered two engineering design models to the Naval Oceanographic office; a total of eight vehicles will be delivered by FY 2017. Both LBS-G and LBS-AUV are conducting real-world ocean-sensing missions in overseas locations in support of ASW/MIW and IPOE.

Developers

Teledyne Brown Engineering	Huntsville, Alabama USA
Teledyne Webb Research	East Falmouth, Massachusetts USA
Hydroid, Inc.	Pocasset, Massachusetts USA

Maritime Domain Awareness (MDA)

Description

Maritime Domain Awareness facilitates timely decision-making that enables early actions to neutralize threats to U.S. national security interests. MDA results from the discovery, collection, sharing, fusion, analysis, and dissemination of mission-relevant data, information, and intelligence in the context of maritime political, social, economic, and environmental trends within geographic regions. MDA requires a collaborative and comprehensive information and intelligence-sharing environment working across international and agency borders.

The Navy MDA Concept signed in July 2011 emphasizes Navy maritime operations centers (MOCs) as the focal point for efforts to improve Navy MDA, with analytical support provided by information and intelligence hubs via reach-back. The Navy's MDA concept is complemented by the 2012 Presidential Policy Directive (PPD)-18 on Maritime Security, which directs integration of all-source intelligence, law enforcement information, and open-source data. Navy funding also supports MDA-focused analytical capabilities at the Naval Criminal Investigative Service (NCIS) and Office of Naval Intelligence (ONI) to support requirements direction and close capability gaps.

Status

In 2010, the Joint Requirements Oversight Council (JROC) approved the MDA initial capabilities document (ICD), which identified 20 prioritized MDA capability gaps aimed at improving information access, analysis, and sharing to a wide range of interagency and international partners. Dynamic Enterprise Integration Platform (DEIP) is a GENSER level web-based software deployed in 2011 that fuses and aggregates data from multiple levels and sources to address gaps. Future tools will reside within Increment 2 of the Distributed Common Ground System-Navy (DCGS-N) program. In-service MDA capabilities are in sustainment and will be maintained until DCGS-N Increment 2 achieves initial operational capability (IOC) in FY 2016.

Developers

SPAWAR Systems Center	San Diego, California USA
SPAWAR PMW-120	San Diego, California USA

Meteorological Mobile Facility Replacement Next Generation (METMF(R) NEXGEN)

Description

The Meteorological Mobile Facility Replacement Next Generation weather forecasting system provides meteorological and oceanographic (METOC) support to the U.S. Marine Corps and joint forces. The main functions of the system are to collect, process, exploit, interpret, produce, and disseminate METOC data. Following evolutionary acquisition, METMF(R) NEXGEN is a single-increment replacement of the Meteorological Mobile Facility Replacement (METMF(R)) that provides greater mobility and operational flexibility in response to identified METMF(R) ca-

pability gaps. The required capabilities for the METMF(R) are defined in two operational requirements documents.

Status

METMF(R) reached full operational capability in July 2002 and deployed in support of U.S. Marine Corps operational forces during Operation Iraqi Freedom and Operation Enduring Freedom, during which operational deficiencies were identified, and subsequently validated in several studies.

In 2006 the Marine Corps Combat Development Command (MCCDC) approved a universal need statement (UNS) for a "METOC Environmental Support System." The UNS identified a need for an expeditionary system with a smaller footprint than METMF(R), as well as upgraded sensing, fusing, and communications capabilities. Analysis of alternatives determined the most effective course of action to be an upgraded or next-generation METMF(R). Two METMF(R) NEXGEN prototypes have been developed and the capability production document was approved in July 2010. METMF(R) NEXGEN passed its operational evaluation in September 2011, and was approved at Milestone C for full-rate production in October 2011.

Developers

Smiths Detection	Edgewood, Maryland USA
(PMW-120)	San Diego, California USA

Mobile User Objective System (MUOS)

Description

The Mobile User Objective System is a next-generation narrowband tactical communications system designed to improve communications for U.S. forces on the move. The Navy is responsible for providing narrowband satellite communication for the Department of Defense (DoD), and U.S. Fleet Cyber Command is assigned to serve as the Navy Component Command to the U.S Strategic Command (USSTRATCOM) for space, cyberspace, and information operations. In addition to providing continuous communication for all branches of the U.S. military, Navy-delivered space-based narrowband capability that MUOS provides also ensures reliable worldwide coverage for national emergency assistance, disaster response, and humanitarian relief.

MUOS has a legacy UHF payload that provides the replacement capability similar to the legacy UHF satellites, as well as a new MUOS wideband code division multiple access payload that will provide a significant improvement to spectrum usage efficiency required to meet growing warfighter needs. The MUOS constellation will consist of five geo-synchronous satellites, one of which will be an on-orbit spare. The system also includes four ground stations strategically located around the globe, which provide worldwide coverage and the ability to connect users wherever they are. The ground system transports data, manages the worldwide network, and controls the satellites.

The MUOS design leverages commercial technology, providing worldwide netted, point-to-point, and broadcast services of voice, video, and data. MUOS has been designated a DoD space major defense acquisition program. Target users are unified commands and joint task force components, DoD and non-DoD agencies, and allied and coalition mobile users who require communications on the move. Legacy narrowband communication system users have to be stationary with an antenna up and pointed toward a satellite. MUOS will allow the warfighter to move around the battlespace while communicating and send data at 10 times increased capacity.

Status

Key decision point-C occurred in August 2006 and build approval was granted in February 2008. The first satellite was launched in February 2012 and was accepted for initial operational use in November 2012.

All other MUOS satellites are on contract and in production. After the launch of the second satellite, projected for July 2013, MUOS will provide military users simultaneous voice, video and data capability by leveraging 3G mobile communications technology. The MUOS constellation is expected to achieve full operational capability in FY 2015, extending narrowband availability well past 2025.

Developers

Lockheed Martin	Sunnyvale, California USA
General Dynamics	Scottsdale, California USA
Boeing	El Segundo, Arizona USA

NAVSTAR Global Positioning System (GPS)

Description

The NAVSTAR Global Positioning System program is a space-based, satellite radio navigation system that provides authorized users with "24/7", worldwide, all weather, three-dimensional positioning, velocity, and precise time data. Navy responsibilities include the integration of GPS in more than 300 surface ships and submarines and 5,000 aircraft, integration of shipboard combat systems with the Navigation Sensor System Interface (NAVSSI), the follow-on GPS-based Positioning, Navigation and Timing Services (GPNTS) and anti-jam (A/J) protection for high-priority combat platforms through the navigation warfare (NAVWAR) program. NAVWAR provides anti-jam antennas to protect air and sea naval platforms against GPS interference in order to ensure a continued high level of mission effectiveness in a GPS jamming environment. GPS plays a critical role not only in precise navigation, but also in providing precise time synchronization to precision-strike weapons, naval surface fire support systems, and ship C4I systems. NAVSSI is the current shipboard system that collects, processes, and disseminates position, velocity, and timing data to weapons systems, C4I, and combat-support systems on board surface warships. It hosts embedded card-based GPS receivers. GPNTS will incorporate the next-generation of GPS receivers, initially the Selective Availability Anti-Spoofing Mod-

ule (SAASM), to be followed by M-Code receivers, to ensure that U.S. Navy ships will be capable of using the new GPS signals being broadcast from the latest GPS satellites. GPNTS also features A/J antennas and multiple atomic clocks to support assured PNT. GPNTS initial operating capability is expected in FY 2016.

Status

All Navy platform GPS installations are complete. The Air NAVWAR program is conducting tests on suitable A/J antennas for Navy unmanned aerial vehicles such as Fire Scout. Installation of A/J antennas in F/A-18 E/F/G *Super Hornet/Growler* and AV-8B *Harrier* aircraft is ongoing. The Sea NAVWAR program is installing A/J antennas on major surface combatants such as cruisers and destroyers. Additionally, the Sea NAVWAR program has identified a suitable A/J antenna for the Navy's submarine force, with integration and installations to follow within the next few years. The Navy continues the installation of NAVSSIs on select Navy surface combatants with an expected final operational capability (FOC) in FY 2015.

The GPNTS program completed a successful preliminary design review (PDR) in February of 2012. The program's next major event is its critical design review (CDR) scheduled in FY 2013.

Developers

Boeing Military Aircraft	St. Louis, Missouri USA
Litton Data Systems	San Diego, California USA
Raytheon	Los Angeles, California USA
Rockwell-Collins	Cedar Rapids, Iowa USA

T-AGS 66 Oceanographic Survey Ship

Description

The *Pathfinder*-class (T-AGS 60) oceanographic survey vessels comprise six 329-foot long, 5,000-ton vessels that provide multipurpose oceanographic capabilities in coastal and deep-ocean areas. These ships perform acoustic, biological, physical, and geophysical surveys, and gather data that provide much of the military's information on the ocean environment as well as mapping the ocean floor to update nautical charts and promote safety of navigation. These data help to improve technology in undersea warfare and enemy ship detection. The ships are manned and operated for the Oceanographer of the Navy by civilian crews provided by the Military Sealift Command (MSC). Mission scientists and technicians are from the Naval Oceanographic Office (NAVOCEANO). T-AGS 60-class ships are designed with a common bus diesel-electric propulsion system consisting of twin-screw propellers driven through Z-drives. The Z-drives, with 360-degree direction control, provide for precise and accurate position-keeping and track-line following.

In FY 2013, the Navy will deliver the newest vessel to the fleet, the USNS Maury (T-AGS 66), a modification of the T-AGS 60 *Pathfinder* class. Named after Matthew Fontaine Maury, the father of modern oceanography and naval meteorology, T-AGS 66 will

be 24 feet longer than the in-service *Pathfinder* T-AGS vessels to accommodate the addition of an 18 x18-foot inboard moon pool. The moon pool will allow access to the water through the ship's hull for the deployment and retrieval of unmanned undersea vehicles. The increased ship length will also provide 12 additional permanent berthing accommodations. As on previous vessels, a hull-mounted mission system gondola will house the multi-beam sonar system.

Status

The construction of the USNS Maury (T-AGS 66) is under contract with VT Halter Marine of Pascagoula, Mississippi. The keel was laid on February 1, 2011. The ship is scheduled for delivery to the Navy in FY 2014.

Developers

Oceanographer of the Navy	Washington, D.C. USA
Naval Meteorology and Oceanography Command Stennis Space Center	Hancock County, Mississippi USA
VT Halter Marine	Pascagoula, Mississippi USA

Task Force Climate Change (TFCC)

Description

The Chief of Naval Operations established Task Force Climate Change in 2009 to address the impacts of climate change on naval readiness. TFCC engages with representatives from many Navy offices and staffs, the National Atmospheric and Oceanic Administration (NOAA), and the U.S. Coast Guard. The objective of TFCC is to develop policy, strategy, and investment recommendations regarding climate change and the Navy, with a near-term focus on the Arctic because that maritime region is changing more rapidly than the rest of the world. TFCC is informed by national, defense, and Navy strategic guidance in executing this objective.

Status

Task Force Climate Change has developed two roadmaps signed by the Vice Chief of Naval Operations that provide plans of action with timelines to drive Navy policy, engagement, and investment decisions regarding the Arctic and global climate change. Actions specified in the roadmaps are underway and TFCC provides quarterly updates to the Chief of Naval Operations. Following the guidance in the 2010 Quadrennial Defense Review, the Navy's initial investment strategy for the Arctic involves science and technology efforts to improve observation and prediction in high-latitude maritime regions.

Developers

None.

SECTION 6

SUPPLY AND LOGISTICS

Naval logistics is essential to our combat power, bridging our nation's industrial base to forward deployed naval forces. Readiness and the ability to sustain forward operations hinge upon logistics support. Naval logistics is the process of getting material from the manufacturer's shipping terminal to our forces worldwide. In addition to material, naval logistics encompasses planning, acquisition, maintenance, engineering support, training, transportation, facilities operations, and personnel support backing up our naval forces around the globe, day and night, in peace and war.

Photo courtesy of AUSTAL USA

Joint High-Speed Vessel (JHSV)

Description

The Joint High-Speed Vessel (JHSV) is a high-speed, shallow-draft surface vessel able to transport rapidly medium payloads of cargo and personnel over intra-theater distances and load/offload without reliance on port infrastructure. During advanced concept technology demonstration testing, leased high-speed vessels such as Joint Venture (HSV 1), Swift (HSV 2), and Westpac Express (HSV 4676) have demonstrated the ability to embark and transport combat forces rapidly. JHSV is an intra-theater lift capability, not an assault platform. JHSV will be capable of speeds in excess of 35 knots and ranges of 1,200 nautical miles fully loaded. In addition, the shallow-draft characteristics will enable the JHSV to operate effectively in littoral areas and access small, austere ports.

Status

USNS Spearhead (JHSV 1) was delivered in December 2012. USNS Choctaw County (JHSV 2) was launched and christened in September 2012 and is expected to deliver in FY 2013.

Developers

AUSTAL USA — Mobile, Alabama USA

Naval Tactical Command Support System (NTCSS)

Description

Naval Tactical Command Support System (NTCSS) is the combat logistics support information system used by Navy and Marine Corps commanders to manage and assess unit and group material and personnel readiness. NTCSS provides intermediate and organizational maintenance, supply, and personnel administration management capabilities to surface, sub-surface, and aviation operational commanders in peacetime and during war. NTCSS also supports network-centric warfare by integrating logistics information to complement the tactical readiness picture for operational commanders.

Through an evolutionary acquisition strategy, NTCSS replaced, merged, and optimized legacy Shipboard Non-tactical ADP Program (SNAP), Naval Aviation Logistics Command Management Information System (NALCOMIS), Maintenance Resource Management System (MRMS), and several smaller logistics applications into an integrated and modernized capability. The first stage of the strategy included hardware modernization and network installations using open system architectures and operating environments common with shipboard tactical programs. The second stage optimized the functional applications using modern software development tools, relational databases, and data replication.

Going forward, business process improvements are being developed and implemented under sponsorship of functional and fleet managers. Such planned initiatives include: migration to an open Service Oriented Architecture (SOA), data center hosting, imple-

mentation of web services, transfer of shipboard logistics data ashore as part of a broader initiative to Move Workload Ashore and reduce shipboard manpower, making NTCSS data accessible via the common operational picture to enable operational decisions based on near-real-time readiness data, and merging systems such as NTCSS, Global Command Support System-Marine Corps (GCSS-MC), and GCSS-Maritime (GCSS-M) into a common/shared capability that exchanges data with Naval Enterprise Resource Planning (ERP). As a result, the Navy and Marine Corps will realize greater operational efficiency and lower total ownership costs.

Status

NTCSS is a mature program in Full Rate Production and continues to be the warfighter's production system to maintain Fleet readiness. Full Operational Capability (FOC) at naval air stations, Marine air logistics squadrons, and ship and submarines was achieved in FY 2010. An optimized NTCSS capability, targeted for aircraft squadrons, began Full Rate Production in FY 2007 and achieved FOC in the first quarter FY 2012. The "tech refresh" to replace antiquated NTCSS hardware/software and maintain compliance with DoD/DoN Information Assurance and Baseline Reduction mandates commenced in FY 2010, with the completion of deployment cycle planned in FY 2017.

Developers

CACI	Norfolk, Virginia USA
Advanced Enterprise Systems (AES)	Norfolk, Virginia USA

The Navy is procuring commercial off-the shelf (COTS) hardware through indefinite delivery/indefinite quantity government contracts. Engineering, development, integration, installation, training, and life cycle support will be accomplished through Navy and Defense Department activities, with additional support from industry partners.

Navy Energy Program

Description

The Navy Energy Vision addresses energy as a strategic resource. The Navy understands how energy security is fundamental to executing our mission afloat and ashore, and the service must be resilient to potential energy futures. The goal is to invest in energy efficiency and consumption-reduction initiatives that reduce the overall requirement for petroleum and to increase the use of alternatives both tactically and ashore. The Navy Energy Strategy guides a strong portfolio of investments in people, technology, and programs across Navy enterprises: education, maritime, aviation, expeditionary, shore, and fuel. In the near-term, the Navy will make significant gains by adjusting policies to enable more energy-efficient operations, encouraging awareness and energy-conscious behavior in every Navy setting, optimizing existing technologies to reduce energy consumption, and speeding the implementation of new technologies, all with the intent of enhancing or enabling greater combat readiness and mission success.

The Navy is also "grooming" a new generation of "energy warriors" through incentives and education. As an example, the Incentivized Energy Conservation (i-ENCON) program encourages efficient ship operations during underway missions and supports Secretary of the Navy (SecNav) efforts to reduce total energy consumption on Navy ships. This program was so successful that the Navy recently launched its Aircraft Energy Conservation Program (known as Air-Encon) to optimize fuel consumption by the Navy's 3,700 aircraft. Beginning in FY 2013, the SecNav's Executive Energy Series will be delivered to flag officers and senior executives.

Our maritime efficiency initiatives seek to reduce energy output in all shipboard evolutions. Hybrid drive systems research is developing energy storage, power conversion, and control approaches to enable single generator ship operations for reduced fuel consumption operations. Stern Flaps modify the flow field under the hull to reduce drag, turbulence, and reduce overall hull resistance. The Shipboard Energy Dashboard provides real-time situational awareness of energy demand associated with equipment. Smart Voyage Planning Decision Aid sends messages to ships with optimized routing plans for both ship safety and fuel savings.

Aircraft engine research is focused on new turbine engine configurations with program goals to decrease fuel consumption and to decrease acquisition and maintenance costs, while increasing aircraft operational availability and performance. Engine improvements will be accomplished by using innovative materials and processes to produce improved components. These include developing new high-temperature metal alloys and inter-metallic materials for lighter and more heat-resistant turbine blades and disks and thermal/environmental barrier coatings systems to improve component heat resistance to obtain greater fuel efficiency.

For shore and infrastructure investment, this balance is achieved through a watch, partner, and lead strategy. This approach allows Navy to watch maturing technology and invest when/where viable (e.g., solar and wind), partner to develop needed technology with other government organizations or industry (e.g., SmartGrid), and lead the development of mission critical technologies (e.g., ocean energy for island bases). Doing so allows Navy to invest to achieve goals on a path that meets legislative requirements and sets the stage to achieve larger, long-term objectives.

Status

Hybrid Electric Drive is installed on the USS Makin Island (LHD 8). Stern Flaps are installed or being installed on cruisers (CG 47-class), destroyers (DDG 51-class), and certain amphibious ships (LPD 4/17- classes, LHD 1-class, and LSD 41/49-classes). Smart Voyage Planning Decision Aid will be installed fleet-wide. Gas turbine online water wash is currently installed on the USS Preble (DDG 88). The Rim of the Pacific (RIMPAC) 2012 Exercise featured the first demonstration of a U.S. Navy "green strike group," during which surface combatants and carrier-based aircraft successfully tested, evaluated, and demonstrated the cross-platform utility and functionality of alternative fuel. This demonstration also incorporated prototype energy efficiency initiatives, such as Solid-State Lighting,

On-line Gas Turbine Waterwash, and energy-management tools. The Naval Post Graduate School Energy Masters Program and SecNav Executive Energy Series are funded for FY 2013. The Navy's FY 2013 investment sustains the enhancements made in FY 2012, including allocating additional funds to address shore energy legislative requirements and tactical energy initiatives that target energy efficiency, reduce energy consumption, and complete alternative fuel test and certification to lay the foundation for increased alternative fuel use.

Developers

Naval Sea Systems Command	Washington, DC USA
Naval Facilities Command	Washington, DC USA
Naval Air Systems Command	Patuxent River, Maryland USA
Cebrowski Institute, NPS	Monterey, California USA

Navy Enterprise Resource Planning (Navy ERP)

Description

Enterprise Resource Planning (ERP) is a generic name for comprehensive management systems used to power an organization's crucial business functions. The Navy ERP solution allows the Navy to unify, standardize, and streamline all its business activities into one system that will deliver information transparency that is secure, reliable, accessible, and current. The solution enables sustained Navy compliance with the Chief Financial Officers Act of 1990 and the Department of Defense Information Assurance Certification and Accreditation Process.

Navy ERP is being delivered in two releases. The Finance/Acquisition Solution (Release 1.0) provides the Navy with unprecedented financial transparency that can be leveraged across the Navy as a common cost-management framework. This release provides the Navy with an enterprise solution supporting budgeting, billing, external procurement, period close, business warehousing, and cost planning. The Single Supply Solution (Release 1.1) delivers enterprise visibility and process standardization of the Navy Supply Chain. The Single Supply Solution provides an integrated capability from global planning to local inventory handling, enabling the Navy to optimize positioning of stock to improve fleet readiness and maximize use of supply funds and assets. More specifically, the Single Supply Solution supports such functions as order fulfillment, inventory management, consignment, warehouse management, provisioning, carcass tracking, supply outfitting, and supply and demand planning. Navy ERP combines Business Process Reengineering (BPR) and industry best practices, supported by commercial off-the-shelf (COTS) software and integrates all facets of Navy business operations, using a single database to manage shared common data.

Status

Navy ERP financial solution has been deployed to the following commands: NAVAIR (2007), NAVSUP (2008), SPAWAR (2009), NAVSEA General Fund (2010), NAVSEA Working Capital Fund (2011), the Office of Naval Research (ONR), and Strategic Systems

Programs (2012). The Navy ERP Single Supply Solution deployment started in February 2010 and has been successfully deployed to the Naval Inventory Control Points at Philadelphia and Mechanicsburg, Pennsylvania. The first regional implementation of the Single Supply Solution was completed in August 2012. Initial Operating Capability (IOC) was achieved in May 2008. In October 2008, the Assistant Secretary of the Navy (Financial Management and Comptroller) designated Navy ERP the Navy's Financial System of Record. Navy ERP is deployed to approximately 71,000 users and manages approximately 51 percent of the Navy's Total Obligation Authority (TOA).

Developers

SAP America, Inc.	Newtown Square, Pennsylvania USA
IBM	Armonk, New York USA
Deloitte Consulting	Alexandria, Virginia USA

T-AH 19 *Mercy*-Class Hospital Ship

Description

The two T-AH 19 *Mercy*-class hospital ships are national strategic assets and are employed in support of combatant commander (COCOM) requirements. Hospital ships provide a highly capable medical facility and are configured and equipped to meet their primary mission as a large-scale trauma center for combat operations. Each ship has 12 operating rooms and up to 1,000 beds (100 acute care, 400 intermediate, and 500 minor). Additionally, the hospital ships serve as cornerstones for peacetime shaping and stability operations, acting as powerful enablers of stability, security, and reconstruction efforts around the globe. Hospital ships provide a highly visible, engaged, and reassuring presence when deployed for Theater Security Cooperation (TSC) or when called to respond to Humanitarian Assistance or Disaster Relief (HA/DR) needs.

As part of the Naval Fleet Auxiliary Force (NFAF) managed by Military Sealift Command (MSC), these ships are maintained in either a reduced operating status (ROS) or full operating status depending on mission tasking and COCOM requests. Generally, one hospital ship is scheduled for a 120-150 day TSC deployment per year. Periodic maintenance is performed to ensure both ships are able to meet full operational capability within a few days of activation when they are in ROS status. Civilian mariner crews man these ships, with medical staff augmentation during periods of activation.

Status

The Navy has two hospital ships—USNS Mercy (T-AH 19) and USNS Comfort (T-AH-20)—in the Fleet.

Developers

National Steel and Shipbuilding Company	San Diego, California USA

T-AKE 1 *Lewis and Clark*-Class Dry Cargo and Ammunition Ship

Description

The *Lewis and Clark* (T-AKE 1)-class dry cargo and ammunition ships replace the *Kilauea* (T-AE 26), *Mars* (T-AFS 1), and *Sirius* (T-AFS 8) classes of fleet auxiliaries. T-AKE ships provide logistic lift from sources of supply and transfer this cargo at sea to customer ships or to station ships that are directly supporting combat forces and other naval vessels. As a secondary mission, T-AKEs can act in concert with a fleet oiler (T-AO) as a substitute station ship. T-AKE ships are built to commercial standards and crewed by Military Sealift Command civilian mariners with small military detachments (MILDETs). That said, the crews will be 100 percent civilian mariners by 2013. A Navy aviation detachment or commercial equivalent using contracted commercial helicopters provides vertical replenishment capability.

Status

The fixed price incentive contract with General Dynamics National Steel and Shipbuilding Company (NASSCO) included option pricing for up to 14 T-AKE hulls to support Combat Logistics Force (CLF) and Maritime Prepositioning Force (MPF) program requirements. The Navy and the Marines have agreed that hulls 12-14 that were originally designated for the MPF will instead serve as CLF ships, and the MPF will receive the first two hulls in the class. The third ship that was to be assigned to MPF will be designated as a CLF asset, be placed in a Reduced Operating Status (ROS)-5 and maintained pierside with a reduced crew, which carry out support surge operations within five days of notification. The final hull (T-AKE 14) was delivered October 2012.

Developers

National Steel and Shipbuilding Company — San Diego, California USA

T-AO(X) Replenishment Oiler

Description

The Navy has 15 in-service *Kaiser* (T-AO 187)-class replenishment oilers in the Combat Logistics Force (CLF). The ships are part of the Naval Fleet Auxiliary Force (NFAF) under the control of the Military Sealift Command (MSC) and are crewed by MSC civilian mariners. The ships shuttle dry cargo and fuel from resupply bases or station ships to Navy combatants and task forces in the areas of operation. They provide bulk petroleum (e.g., Diesel Fuel Marine and JP5 Jet Fuel) and stores, packaged cargo, refrigerated cargo, and mail to forces afloat. The *Kaiser*-class oilers start to reach the end of their 35-year estimated service lives beginning in 2021. Of the 15 *Kaiser*-class oilers in service, only three have been constructed with double hulls to meet International marine pollution regulations.

Status

The Capabilities Based Assessment for the T-AO(X) was completed in March 2010. The Initial Capabilities Document was

approved by the Joint Requirements Oversight Council in January 2011. The Material Development Decision Acquisition Decision Memorandum of March 2011 approved entry into the Materiel Solution Analysis Phase and initiation of the Analysis of Alternatives (AoA), which completed in October 2011. The draft Capability Development Document (CDD) was issued in July 2012 for Navy review and service approved it in November 2012. Milestone A and industry studies planned for FY 2013. The lead ship is funded for production in FY 2016.

Developers
To be determined.

T-ATF(X) Fleet Ocean Tugs

Description
The Navy has four in-service T-ATF fleet ocean tugs to support towing, diving, and rescue operations. The primary missions of the T-ATF include emergency towing of battle-damaged ships, providing firefighting assistance to other ships, and supporting submarine-rescue and portable self-sustaining deep-diving operations.

Two of the four in-service T-ATFs will reach their expected service lives (ESL) in 2020 and the remaining two in 2021. These retirements are within five years of when the Navy's four T-ARS rescue and salvage ships reach the ends of their ESLs. Recapitalization of the T-ATF and T-ARS classes is required, either in kind or with a common hull as a Towing, Salvage and Rescue Ship (T-ATS(X)). The Analysis of Alternatives (AoA) will determine whether using a common hull for both classes would accrue meaningful cost savings and meet both ships' operational requirements.

Status
The Initial Capabilities Document was approved in December 2010. The Material Development Decision Acquisition Decision Memorandum of February 2011 approved entry into the Materiel Solution Analysis Phase and initiation of the AoA. The AoA commenced in May 2011 and is planned to complete in FY 2013. The Capability Development Document (CDD) is under development and is expected to enter Navy staffing in FY 2013. Milestone A will be scheduled following approval of the CDD. The lead ship is funded for production in FY 2017.

Developers
To be determined.

SECTION 7

SCIENCE AND TECHNOLOGY

Naval science and technology (S&T) delivers new capabilities to the Navy and Marine Corps that ensure continued superiority of the U.S. naval forces of today and warfighters of the future. In keeping with its mandate, the Office of Naval Research (ONR) plans, fosters, and encourages scientific research in recognition of its paramount importance to future naval power and national security. The Naval S&T objective is to support a Navy and Marine Corps that is capable of prevailing in any environment by focusing on S&T areas with big payoffs, encouraging innovative thinking and business processes, and striving to improve the transition of S&T into acquisition programs in the most cost-effective means possible—striking the right balance between responsive near-term technology insertion and long-term basic research.

SCIENCE AND TECHNOLOGY

Autonomous Aerial Cargo/Utility System (AACUS)

Description

The Autonomous Aerial Cargo/Utility System is an Office of Naval Research (ONR) Innovative Naval Prototype (INP) program. AACUS explores advanced autonomous capabilities for reliable resupply/retrograde and, in the long term, casualty evacuation by an unmanned air vehicle under adverse conditions. Key features of AACUS include a vehicle autonomously avoiding obstacles while finding and landing at an unprepared landing site in dynamic conditions, with goal-directed supervisory control by a field operator possessing no special training.

The AACUS INP represents a substantial leap compared to present-day operations as well as other more near-term Cargo Unmanned Aerial Systems (CUASs) development programs. AACUS focuses on autonomous obstacle avoidance and unprepared landing site selection, with precision-landing capabilities that include contingency management until the point of landing. AACUS includes a goal-based supervisory control component such that any field personnel can request and negotiate a desired landing site. Moreover, AACUS will communicate with ground personnel for seamless and safe loading and unloading.

Because the program embraces an open architecture approach for global management of mission planning data, AACUS technologies will be platform agnostic and transferable to both new and legacy CUASs. AACUS-enabled CUASs will rapidly respond to requests for support in all weather conditions, launch from sea and land, fly in high/hot environments, and autonomously detect and negotiate precision landing sites in potentially hostile settings. These missions could require significant obstacle and threat avoidance, with aggressive maneuvering in the descent-to-land phase.

Status

The AACUS INP is an FY 2012 start, sponsored through the ONR's Office of Innovation.

Developers

Office of Naval Research — Ballston, Virginia USA

Electromagnetic Railgun

Description

The Electromagnetic (EM) Railgun is a long-range weapon that fires projectiles using electricity instead of chemical propellants. Magnetic fields created by high electrical currents accelerate a sliding metal conductor, or armature, between two rails to launch projectiles at 4,500 mph to 5,600 mph. Electricity generated by the ship is stored over several seconds in the pulsed power system. Next, an electric pulse is sent to the railgun, creating an electromagnetic force accelerating the projectile at speeds of up to Mach 7. The kinetic-energy warhead eliminates the hazards of high explosives in the ship and unexploded ordnance on the battlefield.

Ultimately, the EM railgun program will address multiple missions with long range, persistent, precision fires, while simultaneously increasing magazine capacity and decreasing total cost. This multi-mission platform will cover a broad spectrum of capabilities to include naval surface fire support, anti-surface warfare, and self-defense applications.

Status

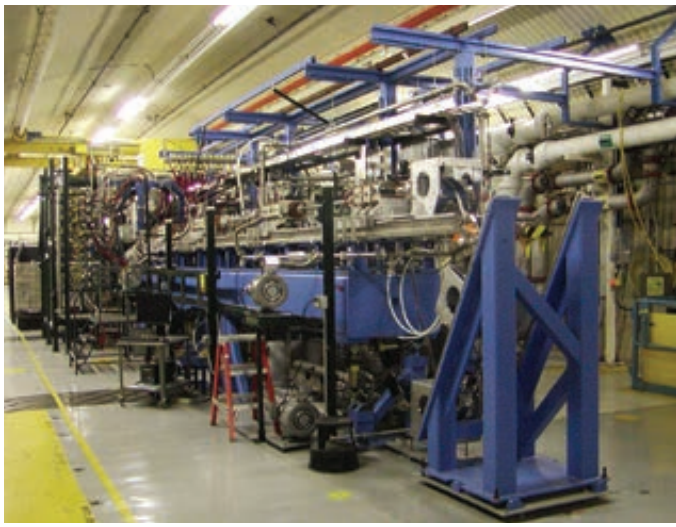
The Electromagnetic Railgun Innovative Naval Prototype was initiated in FY 2005. Phase I was focused on the development of launcher technology with adequate service life, development of reliable pulsed power technology, and component risk reduction for the projectile. The Phase I goal of 32 mega-joule muzzle energy proof-of-concept demonstration has been achieved. A future weapon system at this energy level would be capable of launching a 100-nautical mile projectile. This launch energy has the advantage of being able to stress many components to evaluate full-scale mechanical and electromagnetic forces.

Phase II, which began in FY 2012, will advance the technology for transition to a future acquisition program. Phase II technology efforts will concentrate on demonstrating a 10-rounds-per-minute firing rate. Thermal management techniques required for sustained firing rates will be developed for both the launcher system and the pulsed power system.

Developers

Office of Naval Research	Ballston, Virginia USA
Naval Surface Warfare Center (NSWC-DD)	Dahlgren, Virginia USA

Free Electron Laser (FEL)



Description

The Free Electron Laser will provide naval platforms with a highly effective and affordable point-defense capability against surface and air threats—future anti-ship cruise missiles or swarms of small boats. FEL also allows an unlimited magazine with speed-of light delivery. FEL generates high-intensity laser light by channeling the energy from unbound accelerated high-energy electrons. This technology is commonly used in the Department of Energy's particle colliders for basic subatomic research. The FEL program is an investment by the Office of Naval Research (ONR) to transition the accelerator technology from particle colliders to a future ship self-defense weapon system.

This revolutionary technology provides multiple payoffs to the warfighter. The ability to control the frequency of the laser beam allows for operation in the maritime environment. The variability of the beam strength provides graduated lethality with minimum collateral damage and a low cost-per-engagement when compared to a kinetic projectile and logistics support costs of conventional explosive munitions. Against low-value targets it is an effective alternative to the use of expensive missile systems. The FEL provides speed-of-light precision engagement of high-speed, sophis-

ticated anti-ship missiles, as well as swarming, slow-speed, unsophisticated small craft.

Status
The ONR FEL technology INP program began in FY 2010. It will demonstrate scalability of the necessary FEL physics and engineering for an eventual megawatt-class device. The program will focus on the design, development, fabrication, integration and test of a 100-kilowatt class FEL device. Future needs for ship integration and beam control are being considered.

Developers
Office of Naval Research Ballston, Virginia USA

Future Naval Capabilities (FNC)

Description
The Office of Naval Research Future Naval Capabilities program is a requirements-driven science & technology (S&T) program focused on developing and transitioning advanced technologies to the warfighter more quickly than a traditional program. FNCs are near-term projects and represent the requirements-driven, delivery-oriented portion of the naval S&T portfolio. The FNC program aims to deliver mature products for integration into platforms, weapons, sensors, or specifications that improve Navy and Marine Corps warfighting and support capabilities.

FNCs are governed by a formal set of business rules that ensure all stakeholders are involved in the programs' oversight, management, and execution. By design, FNCs strengthen S&T coordination between the Fleet/Force, S&T, acquisition, and resource-requirements communities.

FNC products are selected annually to address specific gaps, with final prioritization approved by a Three-Star Technology Oversight Group (TOG). FNC products are often based on previous early research investments and are intended to transition to the fleet/force within a five-year time frame. FNC project selection takes into account related work in other naval centers of excellence the Department of Defense (DoD), other government agencies, and industry and academia.

Some examples of FNC successes include:

The Advanced Undersea Weapon System FNC provides operational commanders with a clandestinely delivered, autonomous and remotely controlled, cost-effective battle space shaping system. It will provide a tactically flexible asymmetric capability to deter and restrict the mobility and access of adversary forces that threaten our ability to maneuver at sea.

The Blast Load Assessment Sense and Test (BLAST) FNC provides three products addressing Traumatic Brain Injury (TBI): (1) a fieldable head- and body-mounted personal protective equipment (PPE) sensor that will record blast pressure, acceleration,

and impulse; (2) the TBI assessment tool that is a forward deployable quantitative cognitive testing platform that uses non-invasive neurophysiological measures; and (3) an algorithm that incorporates blast exposure(s) and cognitive data to provide a "Go/No Go" output in response to blast events.

The Spectral and Reconnaissance Imagery for Tactical Exploitation (SPRITE) FNC provides a revolutionary hyperspectral and wide-area reconnaissance ISR capability for Marine Corps and Navy unmanned aerial systems platforms. In addition, provides robust autonomous detection of improvised explosive device (IED) precursors, hidden targets, camouflage, and taggants over wide areas complementing wide-area airborne electro-optical (EO) surveillance. The hyperspectral sensor will autonomously detect specific threats and provide cues to analysts or to other sensors.

Status

The FNC program was initiated in FY 2002 to improve the delivery of new technological capabilities to the warfighter. Approved projects are required to have technology transition agreements that document the commitment of ONR, the resource sponsor, and the acquisition program to develop, deliver, and integrate products into new or upgraded systems to be delivered to the operating forces. Every FNC product's technical and financial milestones are reviewed annually and must meet required transition commitment levels for S&T development to continue. Products that no longer have viable transition paths are terminated, and residual funding is used to address issues with existing products, or start new products in compliance with Navy priorities, charters, business rules, and development guidelines.

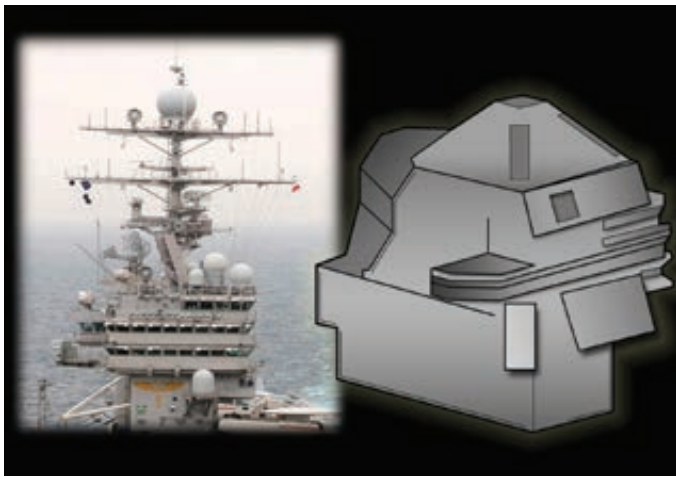
Developers

Office of Naval Research — Ballston, Virginia USA

Integrated Topside (InTop)

Description

Integrated Topside is an integrated, multifunctional, multibeam topside aperture construct that has a modular open radio frequency (RF) architecture, software-defined functionality, and synchronization and optimization of RF functions for electromagnetic interference (EMI) mitigation. The InTop program will develop a scalable family of electronic warfare, radar, and communications capability to support multiple classes of ships and other Navy platforms. InTop will use a modular, open RF design to facilitate best-of-breed technology and cost-effective upgrades. The InTop vision is to dominate the RF spectrum, enable innovation through an RF open architecture (hardware and software), and create affordable systems that are scalable across platforms.



In the past, the topside design approach was based on developing separate systems and associated antennas for each individual RF function, leading to a significant increase in topside antennas. This increase has led to EMI problems, radar cross-section vul-

nerabilities, and the overall performance of critical ship electronic warfare and communication functions. InTop will address these problems through the reduction of topside apertures present on Navy ships through the use of integrated, multifunction, and multibeam arrays.

Status

The InTop program has indefinite delivery/indefinite quantity (IDIQ) contracts with 18 qualified industry partners. These contracts cover full system capability development, niche capability development, and systems integration. They allow the acquisition community to purchase initial production units of InTop-developed technology for implementation in combat systems.

The program has awarded six contracts for studies regarding Surface Ship EW/Information Operations (IO)/Comms systems. Multiple contract awards for development of an integrated EW/IO/Comms advanced development model were awarded in FY 2010 along with a contract for development of a Submarine Satellite Communication Multi-function Mast System. Additional contracts in other RF functional areas are forthcoming.

Developers

Office of Naval Research — Ballston, Virginia USA
Multiple industry partners.

Naval Research Laboratory (NRL)

Description

The Naval Research Laboratory is the Department of the Navy's corporate laboratory. The NRL base program carries out research to meet needs identified in the Naval S&T Strategic Plan and sustains world-class skills and innovation in our "in-house lab." The broad-based core scientific research at NRL serves as the foundation that can be focused on any particular area of interest to develop technology rapidly from concept to operation when high-priority, short-term needs arise. NRL has served the Navy, Marine Corps, and the Nation for nearly 90 years with a breadth of research that facilitates quick assimilation of critical ideas and technologies being developed overseas for exploitation or countermeasures. In addition, NRL remains the lead Navy laboratory for research in space systems, firefighting, tactical electronic warfare, microelectronic devices, and artificial intelligence.

NRL lines of business include battlespace environments, electronics and electronic warfare, information systems technology, materials, sensors, space platforms, technology transfer and undersea warfare. For example, NRL research explores naval environments with wide-ranging investigations that measure parameters of deep oceans, analyze marine atmospheric conditions, monitor solar behavior, and assess survivability of critical naval space assets. Detection and communication capabilities benefit by research that exploits new portions of the electromagnetic spectrum, extends ranges to outer space, and enables reliable and secure transfer of

information. Research in the fields of autonomous systems, biomolecular science, engineering, firefighting, fuels, lubricants, nanotechnology, shipbuilding materials, sound in the sea, submarine habitability, superconductivity and virtual reality remain steadfast concerns at NRL.

Status
Congress established NRL in 1916 and ONR in 1946. Projects continue in a broad spectrum of fields.

Developers
Office of Naval Research
Naval Research Lab Washington, DC USA

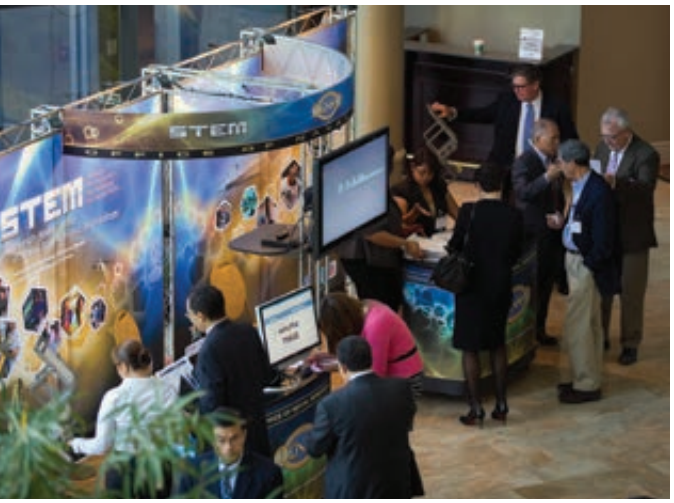
Office of Naval Research Global (ONR Global)

Description
The Office of Naval Research Global provides worldwide science & technology (S&T)-based solutions for current and future naval challenges. Leveraging the expertise of more than 50 scientists, technologists and engineers, ONR Global maintains a physical presence on five continents. The command reaches out to the broad global technical community and the operational commands to foster cooperation in areas of mutual interest and to bring the full range of possibilities to the Navy and Marine Corps.

The worldwide dimension of S&T is reflected in more than 100 percent growth in global S&T investment during the last ten years. The purpose of our effort is to search the globe for emerging scientific research and advanced technologies that enable ONR to address both current Fleet/Force needs, as well as requirements of future naval missions and capabilities. We work through ONR Global offices to establish new contacts and relationships with international leaders in relevant research fields. This allows us to gain new perspectives and expertise, identify geographically significant trends and advances, and help forecast global trends and threats. It also enables us to recruit the world's best scientists and engineers in partnerships that benefit U.S. forces and allies.

Status
Congress established NRL in 1916 and ONR in 1946. Beginning with establishment of our London office in 1946, ONR now has offices in Santiago, Prague, Tokyo, and Singapore, and closely coordinates with the other Services and Defense Department organizations.

Developers
Office of Naval Research Ballston, Virginia USA



Science, Technology, Engineering and Mathematics (STEM)

Description

Recognizing that a healthy science, technology, engineering, and mathematics workforce is critical to meeting the Navy and Marine Corps' greatest challenges, the Department of the Navy is committed to doubling its investment in STEM during the next five years. This commitment answers a national call by the President to improve our country's STEM education over the next decade.

The Department of the Navy's STEM Roadmap focuses on five priorities that combine best-in-class experiences for students alongside the needs of the Navy for a STEM workforce pipeline. Initiatives include exciting new programs that will increase participation by students and teachers, allow for hands-on and meaningful learning experiences, and meet the underserved where they live. The five priorities are:

1. Inspire the next generation of scientists and engineers
2. Engage students and build their STEM confidence and skills through hands-on learning activities that incorporate Naval-relevant content
3. Educate students to be well prepared for employment in STEM careers that support the Navy and Marine Corps
4. Employ, retain and develop Naval STEM professionals
5. Collaborate on STEM efforts across the Department of the Navy, the Federal government and best practice organizations

In support of these STEM priorities, our STEM portfolio includes:

1. High-engagement, long-duration, and hands-on learning K-12 programs, particularly at the middle school level
2. Programs and practices that target under-represented populations
3. Naval-relevant content as an integral part of programs
4. Programs that improve student interest, confidence and retention in STEM
5. Teacher training and development programs
6. Partnerships with "Best Practice" programs

As part of the plan, the Office of Naval Research will manage the coordination of the Navy's STEM effort, a portfolio of more than 80 localized outreach and education efforts across the country.

Status

In FY 2012, the Navy portfolio had grown to more than $55 million in direct investments as well as an additional $33 million from the Department of Defense allocated across 200 STEM programs nationwide. We invest an additional $108 million annually to support domestic graduate students and research assistants under research grants to academic institutions. These investments are

significant but not sufficient. The Department of the Navy has committed to increasing its direct investment in STEM to more than $100 million by FY 2016.

Developers
Multiple sources.

SwampWorks

Description
The SwampWorks program explores innovative, high-risk, and disruptive technologies and concepts. Due to the portfolio's high-risk nature, SwampWorks leverages short exploratory studies to examine the maturation of a proposed technology before making substantial investments. Efforts are smaller in scope than Innovative Naval Prototypes (INPs) and are intended to produce results in less than three years.

SwampWorks projects are not limited to any set of technology areas. Open to great ideas all year long, the program invests in innovative technology development and experimentation that will ultimately provide a dramatic improvement for the warfighter. Examples include:

ASW Stop Rotor UAV: Aerodynamically clean vertical take-off and landing (VTOL) hybrid rotary-wing aircraft that is capable of converting into a fixed-wing aircraft to take advantage of efficient high-speed flight. It will then convert from the fixed-wing mode back into helicopter mode for hovering on station or for landing. It takes advantage of swashplateless technology developed at the Naval Research Laboratory (NRL) to control the main rotor with such precision that it can flip the left wing/rotor blade 180 degrees between flight modes (patent pending) and stop the rotor at 90 degrees from the fuselage. Even with only 30 minutes of flight duration, the battery electric concept demonstrator, with 25 pounds of payload, can fly 15 nautical miles, hover for 5 minutes above the target, and then return and land vertically.

Optimizer for APG-73 Radar Signal Processing Code: Automatic optimizer for APG-73 signal processing code to improve hardware utilization and eliminate errors due to manual optimization. This improved use of APG-73 Radar Processing Element (PE) frees up cycles to implement static discharge algorithms. This code is expected to be able to keep the units current without costly system replacement for the near future. This will result in a 20 percent reduction in computing cycles for key algorithms, a 15 percent reduction in coding errors for PE code, and a 25 percent reduction in development (implement and test) cycle time.

Fuel-Tank Protection System for Tactical Wheeled Vehicles: This developed a new class of integrated fuel tank protection for combat vehicles encompassing a singular coating technology that self-seals upon ballistic threats/impacts and provides fire suppression

for improvised explosive device (IED) and ballistic events. The integration of fire-suppression and self-sealing technologies into a single design will reduce overall costs, streamline procurement efforts, and result in a much improved, lighter fuel tank with enhanced protection and increased survivability.

Status
SwampWorks has substantial flexibility in planning and execution. Its streamlined approval process allows for the shortest possible technology development timeframe. A formal transition agreement is not required; however, SwampWorks programs routinely have strong advocacy outside of the Office of Naval Research, particularly from the acquisition community and the Fleet.

Developers
Office of Naval Research Ballston, Virginia USA

TechSolutions

Description
TechSolutions is a transformational business process created by the Chief of Naval Research to provide Sailors and Marines with a web-based tool for bringing technology needs to the Naval Research Enterprise for rapid response and delivery.

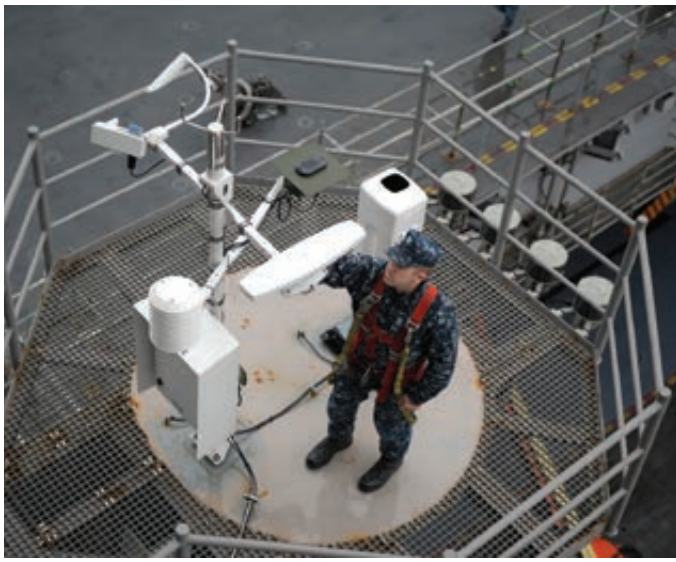
Available on the Internet and SIPRnet, TechSolutions accepts recommendations and suggestions from Navy and Marine Corps personnel working at the ground level on ways to improve mission effectiveness through the application of technology. It is solely focused on delivering needed technology to the Navy and Marine Corps and moving the sea services toward more effective and efficient use of personnel. TechSolutions uses rapid prototyping of technologies to meet specific requirements with definable metrics and includes appropriate systems command elements in an integrated product team concept. While neither a substitute for the acquisition process, nor a replacement for the systems commands, TechSolutions aims to provide the fleet and force with a prototype demonstration that is a 60 to 80 percent solution addressing immediate needs and can be easily transitioned by the acquisition community. Examples include:

Improved Performance Assessment and Readiness Training System (IPARTS): This supports aircraft landing signal officers (LSOs) with an enhanced tracking and assessment tool that exceeds the capabilities of the current Microsoft Access pilot performance tracking system known as APARTS. IPARTS automates LSO tasks that are currently performed by hand. It leverages a networked Oracle database, laptops and a handheld tablet computer. The tablet enables LSOs to record passes directly into the database in real-time. The handheld component also allows LSOs to use shorthand for expedient data entry during recoveries. IPARTS automatically generates frequently used documents and identifies pilot trends. The system will provide top-down visibility to carrier aviation safety across all carrier wings and squadrons. Ultimately,

IPARTS will collect data from across the Fleet, providing decision makers with a realistic picture of carrier aviation readiness.

Power Management Kit (PMK): This is a lightweight universal system that powers explosive ordnance disposal (EOD) platoon equipment and charges the platoon's batteries, replacing a large number of batteries and individual chargers. The PMK is extremely effective in austere operating environments. The 1-pound Soldier Power Manager (SPM) charges all standard batteries from almost any energy source including, vehicle, solar, and alternating current. SPM powers equipment (e.g., radios, laptops, and x-ray generators) from almost any military or commercial battery, converting voltages as needed. Six universal power ports permit versatile operation of powering devices, managing energy sources, and charging up to five connected batteries. All the functions can occur simultaneously. The PMK reduces weight, size, and number of batteries and chargers the warfighter needs to carry to power gear. Initial measurements indicate the PMK, with all cables and the SPM in a soft-roll case, weighs nine pounds, replacing up to 50 pounds of specialized chargers and related equipment. Based on mission, the EOD operator chooses the right components from the PMK required in the field.

Automated Shipboard Weather Observation System (ASO): This is a weather data collection system designed for surface ships. ASO is a suite of sensors designed to reduce workload on Sailors by automating the required periodic weather reports. The system replaces the existing METAR/SYNOPTIC data collections. Navy ships are required to provide a weather report at least every six hours. ASO will automatically send weather reports to the Fleet Numerical Meteorological and Oceanographic Center, enabling Sailors to focus on other important tasks. Additionally, it will automatically generate frequently used documents and identify pilot trends. ASO will provide uniformly formatted weather data and increased ship reporting while minimizing the potential for human error and improving safety. Data collected by ASO will improve the accuracy of weather models and improve hazardous weather avoidance routing.



Status

To succeed in its mission, TechSolutions needs active involvement and participation by the operating forces. Every query will be answered, and if a demonstration is performed or prototype is developed, the submitter will be invited to participate in the process from the start through final delivery of the technology. TechSolutions will deliver a demonstration or prototype within 12 months.

Developers

Multiple sources.

APPENDIX A

RECENT NAVY-MARINE CORPS COMBAT ACTIONS, CRISIS RESPONSES, AND EXERCISES

Dates	Location/Operation/Mission	U.S. Naval Forces
Nov 2011 - Ongoing	Op ENDURING FREEDOM	USS John C Stennis (CVN 74) Strike Group USS Nimitz (CVN 68) Strike Group USS Abraham Lincoln (CVN 72) Strike Group USS Enterprise (CVN 65) Strike Group USS Carl Vinson (CVN 70) Strike Group USS George H W Bush (CVN 77) Strike Group USS Dwight D Eisenhower (CVN 69) Strike Group
Nov 2011 - Ongoing	Counter-Piracy Operations in the GOA (Gulf of Aden) / HOA (Horn of Africa) / Somali Basin / Arabian Sea	USS New Orleans (LPD 18) USS Donald Cook (DDG 75) USS Samuel Roberts (FFG 58) USS Dewey (DDG 105) USS Bataan (LHD 5) USS Makin Island (LHD 8) USS Pinckney (DDG 91) USS Halsey (DDG 97) USS Momsen (DDG 92) USS Taylor (FFG 50) USS Nitze (DDG 94) USS Milius (DDG 69) USS Porter (DDG 78) USS Oscar Austin (DDG 79) USS Klakring (FFG 42) USS Winston S Churchill (DDG 81) USS Florida (SSGN 728) USS Georgia (SSGN 729) USS McFaul (DDG 74)
Nov 2011 - Ongoing	Counter Illicit Trafficking OPS SOUTHCOM	USS Rentz (FFG 46) USS Carr (FFG 52) USS Asheville (SSN 758) USS Ingraham (FFG 61) USS Oak Hill (LSD 51) USS McClusky (FFG 41) USS Elrod (FFG 55) USS Nicholas (FFG 47) USS Curtis (DDG 54) USS Anzio (CG 68) USS Gravely (DDG 107)
Oct - Nov 2011	ANNUALEX 23G	USS George Washington (CVN 73) USS Cowpens (CG 63) USS Lassen (DDG 82) USS Wayne E Meyer (DDG 108) USS Stethem (DDG 63) USS Dewey (DDG 105) USS Curtis Wilbur (DDG 54) USS Ohio (SSGN 726) USS Albuquerque (SSN 706) USS Oklahoma City (SSN 723) USS Tortuga (LSD 46) USS Patriot (MCM 7) USS Guardian (MCM 5) USNS Able (T-AGOS 20)

Dates	Location/Operation/Mission	U.S. Naval Forces
Nov 2011	Ex GRAMPUS	USS The Sullivans (DDG 68) USS Montpelier (SSN 765)
Nov 2011	Ex KOA KAI 12-1	USS Chafee (DDG 90) USS O'Kane (DDG 77) USS Crommelin (FFG 37) USS Hawaii (SSN 776) USS Bremerton (SSN 698) USNS Washington Chambers (T-AKE 11)
Nov 2011	Ex RAPID ARROW	USS The Sullivans (DDG 68)
Nov 2011	Ex NEON RESPONSE	EOD Mobile Unit 4
Nov 2011	OLYMPIC TITAN	USNS Observation Island (T-AGM 23)
Nov 2011	SILENT SHARK II (GUAMEX)	USS Fitzgerald (DDG 62) USS Buffalo (SSN 715)
Nov 2011	US-IN SALVEX 12	Mobile Diving and Support Unit 2
Nov 2011	Op HARPOONED CRAB II	USNS Mary Sears (T-AGS 65)
Nov 2011	J-DIAMD FTX	USS Nitze (DDG 94)
Nov 2011	Task Group Ex 4-11	USS Bulkeley (DDG 84) USNS Lewis & Clark (T-AKE 1)
Nov 2011	IWO COMPTUEX	USS Iwo Jima (LHD 7) USS Nicholas (FFG 47) USS Elrod (FFG 55) USS Taylor (FFG 50) USS Simpson (FFG 56) USS New York (LPD 21) USS Gunston Hall (LSD 44) USS Vella Gulf (CG 72) USS Helena (SSN 725) USS Boise (SSN 764)
Nov 2011	Ex NIMBLE TITAN 12	USS Hopper (DDG 70)
Nov 2011	Ex RELENTLESS ARCHER	USS Ramage (DDG 61)
Nov 2011 - Mar 2012	Op SOUTHERN PARTNERSHIP STATION	HSV Swift (HSV 2) USS Oak Hill (LSD 51) USNS Pathfinder (T-AGS 60) USNS Grapple (T-ARS 53)
Dec 2011	CVN USWEX 12-1	USS Carl Vinson (CVN 70) USS Bunker Hill (CG 52) USS Halsey (DDG 97) USS Santa Fe (SSN 763) USS Hawaii (SSN 776)
Dec 2011	Cambodia MAREX 12-1	USS New Orleans (LPD 18) USS Pearl Harbor (LSD 52)

Dates	Location/Operation/Mission	U.S. Naval Forces
Dec 2011	ABE USWEX 12-3	USS Abraham Lincoln (CVN 72) USS Momsen (DDG 92) USS Sterett (DDG 104) USS Santa Fe (SSN 763) USS Hawaii (SSN 776)
Dec 2011	ENT Groupsail	USS Enterprise (CVN 65) USS Vicksburg (CG 69) USS Porter (DDG 78) USS Nitze (DDG 94) USS James E Williams (DDG 95) USS Toledo (SSN 769) USNS Supply (T-AOE 6)
Dec 2011	Ex AUSTERE CHALLENGE 12	USS Mount Whitney (LCC 20)
Dec 2011	Op OCTAVE FUSION	P-3, EP-3, and MQ-1 aircraft
Dec 2011	Ex PHOENIX EXPRESS	USS Simpson (FFG 56) USNS LCPL Roy M Wheat (T-AK 3016) USNS SGT Matej Kocak (T-AK 3005) USNS Kanawha (T-AO 196) USNS Grasp (T-ARS 51)
Dec 2011	Op COPPER DUNE	USS Pinckney (DDG 91)
Dec 2011	CARL VINSON USWEX	USS Carl Vinson (CVN 70) USS Bunker Hill (CG 52) USS Halsey (DDG 97) USS Santa Fe (SSN 763) USS Hawaii (SSN 776)
Dec 2011	ABRAHAM LINCOLN USWEX	USS Abraham Lincoln (CVN 72) USS Cape St. George (CG 71) USS Momsen (DDG 92) USS Sterett (DDG 104) USS Santa Fe (SSN 763) USS Hawaii (SSN 776)
Jan 2012	ENT COMPTUEX	USS Enterprise (CVN 65) USS Vicksburg (CG 69) USS Cole (DDG 67) USS McFaul (DDG 74) USS Porter (DDG 78) USS Nitze (DDG 94) USS James E Williams (DDG 95) USS New Mexico (SSN 779) USS Boise (SSN 764) USNS John Lenthall (T-AO 189)
Jan 2012	GUAMEX	USS Michigan (SSGN 727)
Jan 2012	Ex IRON SIREN	USS Wayne E Meyer (DDG 108) USS Chinook (PC 9)
Jan 2012	Ex EAGER MACE	USS Makin Island (LHD 8)

Dates	Location/Operation/Mission	U.S. Naval Forces
Jan 2012	MULTISAIL 12	USS Curtis Wilbur (DDG 54) USS John S McCain (DDG 56) USS Fitzgerald (DDG 62) USS Stethem (DDG 63) USS Lassen (DDG 82) USS Mustin (DDG 89) USS North Carolina (SSN 777) USS Michigan (SSGN 727)
Jan 2012	SUBCOMP 12	USS Connecticut (SSN 22)
Jan 2012	IWO ARG CERTEX	USS Iwo Jima (LHD 7) USS New York (LPD 21) USS Gunston Hall (LSD 44) USNS Robert E Peary (T-AKE 5)
Jan 2012	USN/JMSDF MINEX	USS Patriot (MCM 7)
Jan 2012	Op OLYMPIC TITAN	USNS Observation Island (T-AGM 23)
Jan 2012	Dual CVN Operations	USS Carl Vinson (CVN 70) USS Abraham Lincoln (CVN 72)
Jan-Feb 2012	Ex MULTI-SAIL 12	USS Curtis Wilbur (DDG 54) USS John S McCain (DDG 56) USS Fitzgerald (DDG 62) USS Stethem (DDG 63) USS Lassen (DDG 82) USS Mustin (DDG 89) USS North Carolina (SSN 777) USS Michigan (SSGN 727)
Feb 2012	Ex BOLD ALLIGATOR	USS Enterprise (CVN 65) USS Vicksburg (CG 69) USS Porter (DDG 78) USS Nitze (DDG 94) USS James E Williams (DDG 95) USS Iwo Jima (LHD 7) USS Wasp (LHD 1) USS Kearsarge (LHD 3) USS New York (LPD 21) USS Gunston Hall (LSD 44) USS Oak Hill (LSD 51) USS San Antonio (LPD 17) USS Carter Hall (LSD 50) USNS Laramie (T-AO 203)
Feb 2012	SHAMAL 12-1	USS Dextrous (MCM 13) USS Scout (MCM 8) USS Ardent (MCM 12) USS New Orleans (LPD 18) USS Pearl Harbor (LSD 52) USS Russell (DDG 59) USS Annapolis (SSN 760) USNS Flint (T-AE 32) USNS Catawba (T-ATF 168) USS Abraham Lincoln (CVN 72) USS Momsen (DDG 92)

Dates	Location/Operation/Mission	U.S. Naval Forces
		USS Bunker Hill (CG 52) USS Cape St George (CG 71) USS Halsey (DDG 97) USS Sterett (DDG 104) USS John Paul Jones (DDG 53)
Feb 2012	COBRA GOLD 12	USS Germantown (LSD 42) USS Tortuga (LSD 46) USS Chafee (DDG 90)
Feb 2012	SALVEX 12-1	Mobile Diving and Salvage Unit 1 USNS Sioux (T-ATF 171)
Feb 2012	Ex PROUD MANTA	USS The Sullivans (DDG 68) USS Vella Gulf (CG 72)
Feb 2012	TASK GROUP Ex 2-12	USNS Robert E Peary (T-AKE 5)
Feb 2012	Ex KEY RESOLVE	Commander, Destroyer Squadron 15 USS Blue Ridge (LCC 19)
Feb 2012	Ex OBANGAME EXPRESS	USS Simpson (FFG 56)
Feb 2012	Op AFRICA PARTNERSHIP	USS Simpson (FFG 56)
Jan-Feb 2012	Ex MULTI-SAIL 12	USS Curtis Wilbur (DDG 54) USS John S McCain (DDG 56) USS Fitzgerald (DDG 62) USS Stethem (DDG 63) USS Lassen (DDG 82) USS Mustin (DDG 89) USS North Carolina (SSN 777) USS Michigan (SSGN 727)
Jan-Mar 2012	Ex IRON FIST 12	USS Peleliu (LHA 5) USS Comstock (LSD 45)
Feb - Apr 2012	Ex FOAL EAGLE	USS Fitzgerald (DDG 62) USS Stethem (DDG 63) USS Lassen (DDG 82) USS Mustin (DDG 89) USS Columbus (SSN 762) USS Essex (LHD 2) USS Bonhomme Richard (LHD 6) USS Denver (LPD 9) USS Tortuga (LSD 46) USS Avenger (MCM 1) USS Defender (MCM 2) USS Patriot (MCM 7)
Feb 2012	Ex Cobra Gold 12	USS Germantown (LSD 42) USS Tortuga (LSD 46) USS Chafee (DDG 90) EOD Mobile Unit 5
Feb-Mar 2012	Ex KEY RESOLVE 12	USS Blue Ridge (LCC 19)

Dates	Location/Operation/Mission	U.S. Naval Forces
Feb-Apr 2012	Ex FOAL EAGLE 12	USS Fitzgerald (DDG 62) USS Stethem (DDG 63) USS Lassen (DDG 82) USS Mustin (DDG 89) USS Columbus (SSN 762) USS Essex (LHD 2) USS Bonhomme Richard (LHD 6) USS Denver (LPD 9) USS Tortuga (LSD 46) USS Avenger (MCM 1) USS Defender (MCM 2) USS Patriot (MCM 7) EOD Mobile Unit 5
Mar 2012	SSANG YONG 12	USS Stethem (DDG 63) USS Essex (LHD 2) USS Bonhomme Richard (LHD 6) USS Denver (LPD 9) USS Tortuga (LSD 46) USS Chafee (DDG 90)
Mar 2012	ESX ARG CERTEX	USS Bonhomme Richard (LHD 6) USS Denver (LPD 9) USS Tortuga (LSD 46)
Mar 2012	Ex EASTERN MAVERICK / ANGLER / SAILOR	USS Makin Island (LHD 8)
Mar 2012	Ex VITAL ARCHER	USS Wasp (LHD 1) USS Mitscher (DDG 57) USS Dallas (SSN 700)
Mar 2012	Ex NOBLE DINA	USS Vella Gulf (CG 72) USNS Kanawha (T-AO 196)
Mar 2012	IKE GROUP SAIL	USS Dwight D Eisenhower (CVN 69) USS Hue City (CG 66) USS Winston S Churchill (DDG 81) USS Farragut (DDG 99) USS Jason Dunham (DDG 109) USNS Supply (T-AOE 6) USS Oscar Austin (DDG 79)
Apr 2012	Ex MALABAR 12	USS Carl Vinson (CVN 70) USS Bunker Hill (CG 52) USS Halsey (DDG 97)
Apr 2012	Ex SHAREM 170	Commander, Destroyer Squadron 15 USS Columbus (SSN 762)
Apr 2012	Ex FLASH ACTION	USS Michigan (SSGN 727)
Apr 2012	Ex JOINT WARRIOR	USS Forrest Sherman (DDG 98) USNS Leroy Grumman (T-AO 195)
Apr 2012	Ex BALIKATAN 12	USS Denver (LPD 9) USS Tortuga (LSD 46)

Dates	Location/Operation/Mission	U.S. Naval Forces
Apr 2012	IKE COMPTUEX	USS Dwight D Eisenhower (CVN 69) USS Hue City (CG 66) USS Winston S Churchill (DDG 81) USS Farragut (DDG 99) USS Jason Dunham (DDG 109) USS Oscar Austin (DDG 79) USS Laboon (DDG 58) USS Klakring (FFG 42) USS Underwood (FFG 36) USS Carr (FFG 52) USS Dallas (SSN 700) USNS Big Horn (T-AO 198)
Apr 2012	Vietnam Naval Engagement Activity	USS Blue Ridge (LCC 19) USS Crommelin (FFG 37) USNS Safeguard (T-ARS 50)
Apr - Oct 2012	Op SOUTHERN SEAS w/ UNITAS	USS Underwood (FFG 36) USS Anzio (CG 68) USS Gravely (DDG 107) USNS Patuxent (T-AO 201) USNS Hunter USS Bradley (FFG 49)
Apr 2012	Ex KOA KAI 12-2	USS Port Royal (CG 73) USS Paul Hamilton (DDG 60) USS Benfold (DDG 65) USS Hopper (DDG 70) USS Crommelin (FFG 37) USS Vandegrift (FFG 48) USS Reuben James (FFG 57) USNS Henry J Kaiser (T-AO 187) USS La Jolla (SSN 701) USS Cheyenne (SSN 773) USS Texas (SSN 775)
Apr 2012	Ex MALABAR 12	USS Carl Vinson (CVN 70) USS Bunker Hill (CG 52) USS Halsey (DDG 97) USNS Bridge (T-AOE 10) USS Louisville (SSN 724)
Apr 2012	Ex BALIKATAN 12	USS Denver (LPD 9) USS Tortuga (LSD 46) EOD Mobile Unit 5
Apr 2012	Vietnam Naval Engagement Activity	USS Blue Ridge (LCC 19) USS Chafee (DDG 90) USNS Safeguard (T-ARS 50) Mobile Diving and Salvage Unit 1
May 2012	Ex PHOENIX EXPRESS	USS Simpson (SSN 56)
May 2012	Ex CARAT INDONESIA	USS Vandegrift (FFG 48) USS Germantown (LSD 42)

Dates	Location/Operation/Mission	U.S. Naval Forces
May 2012	Ex PACIFIC BOND	USS Hawaii (SSN 776)
May 2012	Ex EAGLE SALUTE	USS James E Williams (DDG 95)
May 2012	Ex CARAT THAILAND	USS Lassen (DDG 82) USS Germantown (LSD 42) USNS Washington Chambers (T-AKE 11)
May 2012	Ex KHUNJAR HAAD	USS Sterett (DDG 104) USS Dextrous (MCM 13) USS Sirocco (PC 6)
May - Oct 2012	Op SOUTHERN SEAS	USS Underwood (FFG 36)
May - Jun 2012	1812 CELEBRATION	USS Wasp (LHD 1) USS Gonzalez (DDG 66) USS San Jacinto (CG 56) USS Donald Cook (DDG 75) USS Montpelier (SSN 765) USS Fort McHenry (LSD 43) USS Hurricane (PC 3) USS Anzio (CG 68) USS Monsoon (PC 4) USS San Antonio (LPD 17) USS Roosevelt (DDG 80) USS Mitscher (DDG 57) USS Zephyr (PC 8) USS Shamal (PC 13)
May 2012	Ex CARAT THAILAND	USS Lassen (DDG 82) USS Germantown (LSD 42) USNS Safeguard (T-ARS 50) USNS Washington Chambers (T-AKE 11) EODMU FIVE Mobile Diving and Salvage Unit 1
May 2012	Ex TERMINAL FURY PART A CPX	None
May 2012	Ex TERMINAL FURY PART B CPX	USS Blue Ridge (LCC 19)
May-Aug 2012	Op PACIFIC PARTNERSHIP 2012	USNS Mercy (T-AH 19)
May-June 2012	Ex CARAT INDONESIA	USS Vandegrift (FFG 48) USS Germantown (LSD 42)
Jun 2012	1812 FLEETEX	USS Gravely (DDG 107) USS Gonzalez (DDG 66) USS San Jacinto (CG 56) USS Halyburton (FFG 40) USS Donald Cook (DDG 75) USNS Leroy Grumman (T-AO 195)
Jun 2012	PACIFIC DRAGON	USS Lake Erie (CG 70) USS Hopper (DDG 70)

Dates	Location/Operation/Mission	U.S. Naval Forces
Jun 2012	TRILATERAL/BILATERAL EXERCISES	USS George Washington (CVN 73) USS Cowpens (CG 63) USS Shiloh (CG 67) USS Lassen (DDG 82) USS McCampbell (DDG 85)
Jun 2012	GOMEX Quick Draw	USS Mitscher (DDG 57)
Jun 2012	Ex FRUKUS	USS Normandy (CG 60)
Jun 2012	Ex STELLAR MINOTAUR	USS Lake Erie (CG 70)
Jun 2012	Ex BALTIC OPERATIONS	USS Normandy (CG 60) USNS 2nd LT John P Bobo (T-AK 3008)
Jun-Sep 2012	WAR OF 1812 GREAT LAKES CRUISE	USS DeWert (FFG 45) USS Kearsarge (LHD 3) USS Gravely (DDG 107) USS Forth Worth (LCS 3) USS Hurricane (PC 3)
Jun 2012	West Sea Operations: TRILAT (JMSDF/ROKN/USN)	USS George Washington (CVN 73) USS Cowpens (CG 63) USS Shiloh (CG 67) USS Lassen (DDG 82)
Jun 2012	West Sea Operations: BILAT (ROKN/USN)	USS George Washington (CVN 73) USS Cowpens (CG 63) USS Shiloh (CG 67) USS Lassen (DDG 82)
Jun 2012	Ex CARAT MALAYSIA	USS Vandegrift (FFG 48) USS Germantown (LSD 42) USNS Safeguard (T-ARS 50)
Jun-Aug 2012	Ex RIMPAC 12	USS Nimitz (CVN 68) USS Essex (LHD 2) USS Princeton (CG 59) USS Chosin (CG 65) USS Lake Erie (CG 70) USS Port Royal (CG 73) USS Paul Hamilton (DDG 60) USS Higgins (DDG 76) USS Chafee (DDG 90) USS Chung Hoon (DDG 93) USS Stockdale (DDG 106) USS Crommelin (FFG 37) USS Gary (FFG 51) USS Reuben James (FFG 57) USNS Henry J Kaiser (T-AO 187) USNS Yukon (T AO 202) USNS Matthew Perry (T-AKE 9) USNS Salvor (T-ARS 52) USS Charlotte (SSN 766) USS Cheyenne (SSN 773) USS North Carolina (SSN 777)

Dates	Location/Operation/Mission	U.S. Naval Forces
Jul 2012	Ex SEA BREEZE	USS Jason Dunham (DDG 109)
Jul 2012	Ex CARAT SINGAPORE	USS Sampson (DDG 102) USS Buffalo (SSN 715) USNS Alan Shepard (T-AKE 3)
Jul 2012	Ex CARAT PHILIPPINES	USS Vandegrift (FFG 48) USS Germantown (LSD 42) USNS Safeguard (T-ARS 50)
Jul 2012	SHIN KAME SUBEX	USS Buffalo (SSN 715)
Jul 2012	ROKN SUBEX	USS Hawaii (SSN 776)
Jul 2012	Ex CARAT PHILIPPINES	USS Vandegrift (FFG 48) USNS Safeguard (T-ARS 50) Mobile Diving and Salvage Unit 1
Jul 2012	Ex CARAT SINGAPORE	USS Sampson (DDG 102) USS Buffalo (SSN 715) USNS Alan Shepard (T-AKE 3)
Jul-Aug 2012	PELELIU COMPTUEX	USS Peleliu (LHA 5) USS Green Bay (LPD 20) USS Lassen (DDG 82)
Aug 2012	Ex NORTHERN EAGLE	USS Farragut (DDG 99)
Aug 2012	Ex ULCHI FREEDOM GUARDIAN	USS Blue Ridge (LCC 19)
Aug 2012	PELELIU ARG CERTEX 12	USS Peleliu (LHA 5) USS Green Bay (LPD 20) USS Rushmore (LSD 47)
Aug-12	Op AFRICA PARTNERSHIP	USNS Swift (HSV 2)
Aug - Sep 2012	Ex SEACAT	USS Chung Hoon (DDG 93) USS Howard (DDG 83) USNS Safeguard (T-ARS 50)
Aug 2012	GUAMEX	USS Chicago (SSN 721)
Aug 2012	Ex RELIANT MERMAID 12	USS Jason Dunham (DDG 109) USS Forrest Sherman (DDG 98) USNS John Lenthall (T-AO 189)
Aug 2012	ROYAL THAI NAVY ASWEX	USS Buffalo (SSN 715) USS Emory S Land (AS 39)
Aug 2012	Ex RADIANT SCOUT	USS Topeka (SSN 754) USS Lassen (DDG 82)
Aug 2012	TRILATERALEX	USS Port Royal (CG 73) USS Reuben James (FFG 57) USNS Matthew Perry (T-AKE 9)

Dates	Location/Operation/Mission	U.S. Naval Forces
Aug 2012	USN/JMSDF/ROKN TRILATERAL SAREX	USNS Safeguard (T ARS 50) USS Port Royal (CG 73) USS Chafee (DDG 90) USNS Matthew Perry (T-AKE 9)
Aug 2012	PELELIU CERTEX	USS Peleliu (LHA 5) USS Green Bay (LPD 20) USS Rushmore (LSD 45)
Aug-Sep 2012	Ex SEACAT	USNS Safeguard (T-ARS 50)
Sep 2012	IMCMEX 12	USS Iwo Jima (LHA 7) USS New York (LPD 21) USS Gunston Hall (LSD 44) USS Ponce (AFSB 15) USS James E Williams (DDG 95) USS Chinook (PC 9) USS Ardent (MCM 12) USS Dextrous (MCM 13) USS Gladiator (MCM 11) USS Scout (MCM 8) USS Devastator (MCM 6) USS Pioneer (MCM 9) USS Sentry (MCM 3) USS Warrior (MCM 10)
Sep 2012	Ex JACKAL STONE	USS Farragut (DDG 99)
Sep 2012	Ex UNITAS LANT	USS Anzio (CG 68) USS Gravely (DDG 107) USNS Patuxent (T-AO 201)
Sep 2012	Ex TEMPEST WIND	USS Tortuga (LSD 46) USS McCampbell (DDG 85) USS Chung Hoon (DDG 93) USNS PFC Dewayne T Williams (T-AK 3009)
Sep 2012	Ex VALIANT SHIELD	USS George Washington (CVN 73) USS Cowpens (CG 63) USS Fitzgerald (DDG 62) USS McCampbell (DDG 85) USS Mustin (DDG 89) USS Chafee (DDG 90) USS Chung Hoon (DDG 93) USS Chicago (SSN 721) USS Oklahoma City (SSN 723) USS Michigan (SSGN 727) USNS Effective (T-AGOS 21) USNS Amelia Earhart (T-AKE 6) USNS John Ericsson (T-AO 194)
Sep 2012	NIMITZ FLEET SYNTHETIC TRAINING	USS Nimitz (CVN 68) USS Princeton (CG 59) USS Stockdale (DDG 106) USS Shoup (DDG 86) USS William P Lawrence (DDG 110) USS Higgins (DDG 76) USS Thach (FFG 43)

Dates	Location/Operation/Mission	U.S. Naval Forces
Sep 2012	Ex EASTERN ENDEAVOR	USS Vandegrift (FFG 48) USNS Red Cloud (T-AKR 313)
Sep 2012	Ex JUDICIOUS RESPONSE	USS Mount Whitney (LCC 20)
Sep 2012	Ex TEMPEST WIND 12	EOD Mobile Unit 5 USS Tortuga (LSD 46) USS McCampbell (DDG 85) USS Chung Hoon (DDG 93) USNS PFC Dwayne T Williams (T-AK 3009)
Sep 2012	Ex VALIANT SHIELD 12	USS George Washington (CVN 73) USS Cowpens (CG 63) USS Fitzgerald (DDG 62) USS McCampbell (DDG 85) USS Mustin (DDG 89) USS Chafee (DDG 90) USS Chung Hoon (DDG 93) USS La Jolla (SSN 701) USS Chicago (SSN 721) USS Oklahoma City (SSN 723) USS Michigan (SSN 727) USNS Effective (T-AGOS 21) USNS Amelia Earhart (T-AKE 6) USNS John Ericsson (T-AO 194) USNS Tippecanoe (T-AO 199)
Sep 2012	Ex CARAT BANGLADESH	USS Decatur (DDG 73) USNS Safeguard (T-ARS 50) Mobile Diving and Salvage Unit 1 Riverine Squadron 2 EOD Mobile Unit 5
Sep 2012	Response to Benghazi, Libya Embassy Attack	USS Mount Whitney (LCC 20) USS McFaul (DDG 74) USS Fort McHenry (LSD 43) USS Jason Dunham (DDG 109) USS Forrest Sherman (DDG 98)
Sep - Oct 2012	Dual CVN Operations	USS George Washington (CVN 73) USS John C Stennis (CVN 74) USS Mobile Bay (CG 53) USS Cowpens (CG 63)
Sep - Oct 2012	Op JUKEBOX LOTUS	USS Fort McHenry (LSD 43) USS McFaul (DDG 74)
Oct 2012	NIM CSG COMPTUEX	USS Nimitz (CVN 68) USS Antietam (CG 54) USS Preble (DDG 88) USS Thach (FFG 43) USS Sampson (DDG 102) USS Sterett (DDG 104) USS Wayne E Meyer (DDG 108) USS Hampton (SSN 767) USS San Francisco (SSN 711)

Dates	Location/Operation/Mission	U.S. Naval Forces
Oct 2012	Ex AUSTERE CHALLENGE	USS Mount Whitney (LCC 20) USS Laboon (DDG 58)
Oct 2012	Ex CARAT CAMBODIA	USS Vandegrift (FFG 48) USNS Safeguard (T-ARS 50) USNS Salvor (T-ARS 52)
Oct 2012	Ex PHIBLEX	USS Bonhomme Richard (LHD 6) USS Denver (LPD 9) USS Tortuga (LSD 46)
Oct 2012	Ex RADIANT SCOUT	USS Greeneville (SSN 614) USS Mustin (DDG 89)
Oct 2012	San Francisco Fleet Week	USS Makin Island (LHD 8) USS Spruance (DDG 111) USS Preble (DDG 88)
Oct 2012	Ex CLEAR HORIZON	USS Patriot (MCM 7) USS Guardian (MCM 5)
Sept-Oct 2012	Pacific Island Nations (PINS) Oceania	USS Peleliu (LHA 5)
Oct 2012	Ex CLEAR HORIZON 12	USS Patriot (MCM 7) USS Guardian (MCM 5)
Oct 2012	PHIBLEX 13	USS Bonhomme Richard (LHD 6) USS Tortuga (LSD 46) USS Denver (LPD 9)
Oct 2012	Ex CARAT CAMBODIA	USS Vandegrift (FFG 48) USNS Safeguard (T-ARS 50) USNS Salvor (T-ARS 52) Mobile Diving and Salvage Unit 1 Riverine Squadron 1
Oct-Nov 2012	Ex Keen SWORD/ANNUALEX	USS George Washington (CVN 73) USS Cowpens (CG 63) USS John S McCain (DDG 56) USS Fitzgerald (DDG 62) USS McCampbell (DDG 85) USS Mustin (DDG 89) USNS Tippecanoe (T-AOE 199) USNS Amelia Earhart (T-AKE 6) USS Denver (LPD 9) USS Tortuga (LSD 46) USS Defender (MCM 2)
Nov 2012	NIMITZ COMPTUEX	USS Nimitz (CVN 68) USS Antietam (CG 54) USS Preble (DDG 88) USS Sampson (DDG 102) USS Sterett (DDG 104) USS Ford (FFG 54) USS San Francisco (SSN 711) USS Hampton (SSN 767)

Dates	Location/Operation/Mission	U.S. Naval Forces
Nov 2012	NIMITZ JTFEX	USS Nimitz (CVN 68) USS Momsen (DDG 92) USS Sampson (DDG 102) USS Sterett (DDG 104) USS Ford (FFG 54) USS San Francisco (SSN 711) USS Hampton (SSN 767)
Nov 2012	Ex CARAT BRUNEI	USS Reuben James (FFG 57)
Nov 2012	Hurricane SANDY DSCA Response	Naval Mobile Construction Battalion 5 USS Wasp (LHD 1) USS San Antonio (LPD 17) USS Carter Hall (LSD 50)

* CJTF-Combined Joint Task Force; CTF-Commander, Task Force; HSC-Helicopter Sea Combat Squadron; HM-Helicopter Mine Countermeasures Squadron; HSL-Helicopter Anti-Submarine Warfare Squadron (Light) SEAL-Sea Air Land Teams; MDSU- Mobile Diving and Salvage Unit; MEU-Marine Expeditionary Unit; MEF-Marine Expeditionary Force; SOC-Special Operations Capable; NSW-Naval Special Warfare; TRAP-Tactical Recovery of Aircraft and Personnel; Seabees-Naval Construction Battalions; FAST-Fleet Antiterrorism Support Team

APPENDIX B
GLOSSARY

A2/AD	Anti-access/area-denial
AACUS	Autonomous Aerial Cargo/Utility System
AADC	Area Air Defense Commander
AAG	Advanced Arresting Gear
AAMDTC	Aegis Ashore Missile Defense Test Complex
AARGM	Advanced Anti-Radiation Guided Missile
AAW	Anti-Air Warfare
ABNCP	Airborne Command Post
ABS	Assault Breaching System
ACAT	Acquisition Category
ACB	Amphibious Construction Battalion, or, Advanced Capability Build
ACCES	Advanced Cryptologic Carry-on Exploitation System
ACDS	Advanced Combat Direction System
ACINT	Acoustic Intelligence
ACS	Aerial Common Sensor, or, Aegis Combat System
ACTD	Advanced Concept Technology Demonstration
AD	Air Defense
ADCAP	Advanced Capability
ADM	Acquisition Decision Memorandum
ADNS	Automated Digital Network System
ADP	Automated Data Processing
ADS	Advanced Deployable System
AE	Assault Echelons
AEA	Airborne Electronic Attack
AEHF	Advanced Extremely High Frequency
AEL	Authorized Equippage List
AEM/S	Advanced Enclosed Mast/Sensor
AoA	Analysis of Alternatives
AESA	Active Electronically Scanned Array
AFATDS	Advanced Field Artillery Tactical Data System
AFB	Air Force Base
AFG	Airfoil Group
AFFF	Aqueous Film Forming Foam
AFOE	Assault Follow-On Echelon
AFQT	Armed Forces Qualification Test
AG	Aerographer's Mate (enlisted classification)
AGF/LCC	Amphibious Command Ship
AGS	Advanced Gun System
AIEWS	Advanced Integrated Electronic Warfare System
AIP	Anti-Submarine Warfare Improvement Program
ALCS	Airborne Launch Control System
AHE	Advanced Hawkeye
ALFS	Airborne Low-Frequency Active Sonar
ALMDS	Airborne Laser Mine Detection System
AMCM	Airborne Mine Countermeasures
AMF	Airborne Maritime Fixed
AMNS	Airborne Mine Neutralization System
AMPIR	Airborne Polarmetric Microwave Imaging Radiometer
AMRAAM	Advanced Medium Range Air-to-Air Missile
ANDVT	Advanced Narrow-Band Digital Voice Terminal
AOA	Analysis of Alternatives, also, Amphibious Objective Area
AOE	Fast Combat Support Ship
AOR	Area of Responsibility
APB	Advanced Processor Build, or, Acquisition Program Baseline
APMIR	Airborne Polarmetric Microwave Imaging Radiometer
APS	Air Force Prepositioning Ships
APTS	Afloat Personal Telephone Service
ARCI	Acoustic Rapid COTS Insertion
ARG	Amphibious Ready Group
ARI	Active Reserve Integration
ARM	Anti-Radiation Missile
AS	Submarine Tender, or, Acquisition Strategy
ASDS	Advanced Seal Delivery System
ASCM	Anti-Ship Cruise Missile
ASO	Automated Shipboard Weather Observation System
ASROC	Anti-Submarine ROCket
ASUW	Anti-Surface Warfare
ASW	Anti-Submarine Warfare
ASWC	Anti-Submarine Warfare Commander, or, ASW Commander
AT	Advanced Targeting
ATA	Automatic Target Acquisition
ATC	Air Traffic Control
ATD	Advanced Technology Demonstration, or, Aircrew Training Device
ATDLS	Advanced Tactical Data Link System
ATFLIR	Advanced Targeting Forward Looking Infrared
ATFP	Anti-Terrorism and Force Protection
ATM	Asynchronous Transfer Mode
ATSM	Active Target Strength Measurement
ATT	Anti-Torpedo Torpedo
ATW	Advanced Threat Warning
ATWCS	Advanced Tomahawk Weapon Control
AURE	All-Up Round Equipment
AUWS	Automated Underwater Work System
AWACS	Airborne Warning and Control System
AWS	Aegis Weapon System
BAH	Basic Allowance for Housing
BAMS	Broad Area Maritime Surveillance
BCA	Broadcast Control Authority
BDI	Battle Damage Indication
BDII	Battle Damage Indication Imagery
BEWL	Biometrics Enabled Watchlist
BFCAPP	Battle Force Capability Assessment and Programming Process
BFEM	Battle Force Email
BFTN	Battle Force Tactical Network
BLAST	Blast Load Assessment Sense and Test
BLII	Base-Level Information Infrastructure
BLOS	Basic Line of Sight
BMC4I	Battle Management/ Command, Control, Communications, Computers, and Intelligence
BMD	Ballistic Missile Defense
BMDS	Ballistic Missile Defense System
BMUP	Block Modification Upgrade Program
BPI	Business Process Improvement
BPR	Business Process Re-Engineering
BRAC	Base Realignment and Closure
BSAR	Broadband Sonar Analog Receiver
C2BMC	Command, Control, Battle Management, and Communications
C2P	Command and Control Processor

C4I	Command, Control, Communications, Computers, and Intelligence
C4ISR	Command, Control, Communication, Computers, Intelligence, Surveillance, and Reconnaissance
C4N	Command, Control, Communications, Computers, and Navigation
C5F	Commander, Fifth Fleet
CAC	Common-Access Cards
CAD	Component Advanced Development
CADRT	Computer-Aided Dead-Reckoning Table
CAL/VAL	Calibration and Validation
CANES	Consolidated Afloat Network Enterprise Services
CAS	Close Air Support
CATM	Captive Air Training Missiles
CB	Chemical, Biological
CBASS	Common Broadband Advanced Sonar System
CBMU	Construction Battalion Maintenance Units
CBR	Chemical, Biological, and Radiological
CBRND	Chemical, Biological, Radiological, Nuclear Defense
CBSP	Commercial Broadband Satellite Program
CBSP	Commercial Broadband Satellite Program
CCD	Center for Career Development
CCE	Common Computing Environment
CCG	Computer Control Group
CCP	Common Configuration Program
CCS	Combat Control System
CDA	Commercially-Derived Aircraft
CDD	Capability Development Document
CDHQ	Central Command Deployable Headquarters
CDLMS	Common Data Link Management System
CDL-N	Common Data Link, Navy
CDLS	Common Data Link System
CDR	Critical Design Review
CDS	Combat Direction System, or, Common Display System
CEB	CNO Executive Board
CEC	Cooperative Engagement Capability
CENTRIXS	Combined Enterprise Regional Information Exchange System
CFFC	Commander, Fleet Forces Command
CG	Guided Missile Cruiser
CIB	Common Interactive Broadband
CIE	Collaborative Information Environment
CIO	Chief Information Officer
CIU	Control Indicator Unit
CIWS	Close-In Weapon System
CJF	Commander, Joint Forces
CLF	Combat Logistics Force
CLFA	Compact LFA
CLIP	Common Link Integration Processing
CM	Cryptographic Modernization
CMC	Common Missile Compartment
CMCO	Counter Mine Counter Obstacle
CMF	Common Message Format
CNATRA	Commander, Air Naval Air Training Command
CND	Computer Network Defense
CNIC	Commander, Naval Installations Command
CNO	Chief of Naval Operations
CNRC	Commander, Naval Recruiting Command
CNRRR	Commander, Naval Reserve Recruiting Region
CNS	Communication/Navigation System
CNVA	Computer Network Vulnerability Assessment
COBRA	Coastal Battlefield Reconnaissance and Analysis
COE	Common Operating Environment
COLDS	Cargo Offload and Discharge System
COMINT	Communications Intelligence
COMSEC	Communications Security
COMSUBGRU	Commander, Submarine Group
CONOPS	Concept of Operations
CONUS	Continental United States
COP	Common Operational Picture
CORIVRON	Coastal Riverine Squadron
COS	Class of Service
COTS	Commercial-Off-The-Shelf, also Cargo Offload and Transfer System
CPD	Capability Production Document
CPS	Common Processor System
C-RAM	Counter-Rocket, Artillery, and Mortar
CRF	Coastal Riverine Force
CSAR	Combat Search and Rescue
CSDTS	Common Shipboard Data Terminal Set
CSF	Consolidated Storage Facility
CSG	Carrier Strike Group
CSIT	Combat System Integration and Test
CSL	Common Source Library
CSRB	Critical Skills Retention Bonus
CSRR	Common Submarine Radio Room
CSWP	Commercial Satellite Wideband Program
CTAPS	Contingency Tactical Automated Planning System (for TACS)
CTE	Continuous Training Environment
CTF	Component Task Force, or, Commander Task Force
CTOL	Conventional Takeoff and Landing
CTP	Common Tactical Picture
CUAS	Cargo Unmanned Aerial Systems
CUP	Common Undersea Program
CV	Conventionally Powered Aircraft Carrier, or, Carrier Variant aircraft
CVBG	Aircraft Carrier Battle Group
CVIC	Carrier Intelligence Center
CVN	Nuclear-Powered Aircraft Carrier
CWSP	Commercial Wideband Satellite Program
D5E	Destruction, degradation, denial, disruption, deceit, and Exploitation
DAB	Defense Acquisition Board
DAMA	Demand Assigned Multiple Access
DAMTC	Direct-Attach Moving Target Capability
DAPS	Dorsal Auxiliary Protective Systems
DARPA	Defense Advanced Research Projects Agency
DBR	Dual Band Radar
DCA	Defensive Counter-Air
DCC	Data Center Consolidation
DCGN-S	Distributed Common Ground System-Navy
DCGS	Distributed Common Ground System
DCID	Director, Central Intelligence Directive
DCL	Detection, Classification, and Localization
DCMS	Director, Communications Security Material Systems
DCNO	Deputy Chief of Naval Operations
DDG	Guided Missile Destroyer
DECC	Defense Enterprise Computing System
DEIP	Dynamic Enterprise Integration Platform
DEM/VAL	Demonstration/Validation
DF	Direction Finding
DFU	Dry Filter Unit
DIB	DCGS Integration Backbone
DiD	Defense-in-Depth
DIF	Database Integration Framework
DII COE	Defense Information Infrastructure Common Operating Environment

DIMHRS	Defense Integrated Military Human Resource System
DIMUS	Digital Multi-beam Steering
DIO	Defensive Information Operations
DIRCM	Directed Infrared Countermeasures
DISA	Defense Information Systems Agency
DISN	Defense Information Systems Network
DJC2	Deployable Joint Command and Control (program)
DLS	Decoy Launching System
DMR	Digital Modular Radar
DMR	Digital Modular Radio
DMS	Defense Message System
DMSP	Defense Meteorology Satellite Program
DNM	Dynamic Network Management
DNS	Director, Navy Staff
DoD	Department of Defense
DoN	Department of the Navy
DOTMLPF	Doctrine, Organization, Training, Materiel, Leadership, Personnel, and Facilities
DPRIS/EMPRS	Defense Personnel Record Imaging System/ Electronic Military Personnel Record System
DRPM	Direct-Reporting Program Manager
DRSN	Defense Red Switch Network
DSCS	Defense Satellite Communications System
DSMAC	Digital Scene-Matching Area Correlation
DSN	Defense Switching Network
DSRV	Deep-Submergence Rescue Vehicle
DT	Developmental Testing
DTH	DMS Transitional Hubs
EA	Electronic Attack
EAM	Emergency Action Message
EB	Electric Boat
EBEM	Enhanced Bandwidth Efficient Modem
ECCM	Electronic Counter-Countermeasures
ECIDS-N	Electronic Chart Display and Information System—Navy
ECM	Electronic Countermeasures
ECP	Engineering Change Proposal
ECS	Exterior Communication System
EDM	Engineering Development Model
EDS	Electronic Data Systems
EHF	Extremely High Frequency
EIS	Environmental Impact Statement
EKMS	Electronic Key Management System
ELC	Enhanced Lethality Cartridge
ELINT	Electronic Intelligence
EMALS	Electromagnetic Aircraft Launch System
EMCON	Emissions Control
EMD	Engineering and Manufacturing Development
EMI	Electro-Magnetic Interference
EMIO	Expanded Maritime Interception Operations
EMPRS	Electronic Military Personnel Record System
EMW	Expeditionary Maneuver Warfare
EO/IR	Electro-Optical/Infrared
EOC	Early Operational Capability
EOD	Explosive Ordnance Disposal
EOID	Electro-Optic Identification
ER	Extended Range
ER AAW	Extended Range Anti-Air Warfare
ERAM	Extended Range Active Missile
ERM	Extended Range Munition
ERNT	CNO Executive Review of Navy Training
ERP	Enterprise Resource Planning
ESAPI	Enhanced Small Arms Protective Inserts
ESE	Electronic Surveillance Enhancement
ESG	Expeditionary Strike Group
ESL	Enterprise Software Licensing
ESM	Electronic Support Measures
ESSI	Enhanced Special Structural Inspection
ESSM	Evolved Sea Sparrow Missile
ESU	Expeditionary Support Unit
ETC	Echo Tracker Classifier
EUCOM	U.S. European Command
EURCENT	European Central (NCTAMS)
EW	Electronic Warfare
EXCEL	Excellence through Commitment to Education and Learning
FARP	Forward Arming and Refueling Point
FBE	Fleet Battle Experiment
FBM	Fleet Ballistic Missile
FDS	Fixed Distributed System
FDS-C	FDS - COTS
FEL	Free Electron Laser
FFG	Guided Missile Frigate
FFSP	Fleet and Family Support Program
FHLT	Fleet High-Level Terminal
FIE	Fly-In Echelon
FITC	Fleet Intelligence Training Center
FLEX	Fatigue Life Extension
FLIR	Forward-Looking Infrared
FLMP	Fatigue Life Management Program
FLO/FLO	Float-On/Float-Off
FLTSAT	Fleet Satellite
FNC	Future Naval Capabilities
FOB	Forward Operating Base
FOC	Full Operational Capability
FORCEnet	Navy web of secure communications and information links
FOT	Follow-On Terminal
FOT&E	Full Operational Test and Evaluation
FP	Full Production
FRP	Full-Rate Production, or, Fleet Response Plan
FTS	Federal Telephone System, or, Full-Time Support
FUE	First Unit Equipped
FY	Fiscal Year
FYDP	Future Years Defense Plan
GBS	Global Broadcast Service
GBTS	Ground-Based Training System
GCCS	Global Command and Control System
GCS	Ground Control Station
GCSS	Global Command Support System
GDAIS	General Dynamics Advanced Information Systems
GDIS	General Dynamics Information Systems
GENDET	General Detail (personnel)
GENSER	General Service
GFE	Government-Furnished Equipment
GHMD	Global Hawk Maritime Demonstration system
GIG	Global Information Grid
GIG-BE	Global Information Grid - Bandwidth Expansion
GIG-ES	Global Information Grid Enterprise Services
GLTA	Guardian Laser Tracker Assemblies
GMF	Ground Mobile Force (Air Force)
GMM	Gun Mission Module
GOTS	Government-Off-The-Shelf
GPNTS	GPS-based Positioning, Navigation, and Timing
GPS	Global Positioning System
GT	Gas Turbine
GWOT	Global War on Terror

HA/DR	Humanitarian Assistance/Disaster Relief
HARM	High-Speed Anti-Radiation Missile
HCI	Human Computer Interface
HD/LD	High-Demand/Low-Density
HDR	High Data-Rate
HF	High Frequency
HFIP	High-Frequency Internet Protocol
HGHS	High-Gain High Sensitivity
HGHS	High Gain High Sensitivity
HM&E	Hull, Mechanical, and Electrical (systems)
HMI	Human-Machine Interface
HMMWV	High-Mobility Multi-purpose Wheeled Vehicle
HOLC	High Order Language Computer
HPC	Human Performance Center
HSDG	High School Diploma Graduate
HSI	Human Systems Integration
HUD	Heads Up Display
I&W	Indications & Warning
IA	Information Assurance
IAMD	Integrated Air and Missile Defense
IATF	IA Technical Framework
IBA	Interceptor Body Armor
IBS	Integrated Broadcast Service
IBS/JTT	Integrated Broadcast Service/ Joint Tactical Terminal
ICAO	International Civil Aviation Organization
ICAP	Improved Capability
ICD	Initial Capabilities Document
ICP	Integrated Common Processor
ICSTF	Integrated Combat Systems Test Facility
IDECMS	Integrated Defensive Electronic Countermeasures System
IDIQ	Indefinite Delivery/Indefinite Quantity
IDS	Identity Dominance System
IDSN	Integrated Digital Switching Network
IDTC	Inter-Deployment Training Cycle
IED	Improvised Explosive Device
i-ENCON	Incentivized Energy Conservation
IET	Intelligence Exploitation Team
IETM	Interactive Electronic Technical Manual
IFF	Identification, Friend or Foe
ILS	Instrument Landing System
IMINT	Imagery Intelligence
INLS	Improved Navy Lighterage
INP	Innovative Naval Prototype
INS	Inertial Navigation System
IO	Information Operations
IOC	Initial Operational Capability
IP	Internet Protocol
IPARTS	Improved Performance Assessment and Readiness Training System
IPDS	Improved Point Detector System
IPPD	Integrated Product and Process Development
IPR	Interim Program Review
IPS	Integrated Power System
IPT	Integrated Process Team
IR	Infrared
IRCCM	Infrared Counter-Countermeasures
IRST	Infrared Search and Track
IS	Information Systems
ISC	Integrated Ship's Control
ISDN	Integrated Services Digital Network
ISNS	Integrated Shipboard Network System
ISO	Investment Strategy Options
ISPP	Integrated Sponsor's Program Proposal
ISR	Intelligence, Surveillance, Reconnaissance
ISRT	Intelligence, Surveillance, Reconnaissance, and Targeting
ISS	Installation Subsystem
ISS	Information Superiority/Sensors
ISSP	Information Systems Security Program
IT	Information Technology
IT-21	Information Technology for the 21st Century
ITAB	Information Technology Acquisition Board
IU	Interface Unit
IUSS	Integrated Undersea Surveillance System
IW	Indications and Warning
IWS	Integrated Warfare Systems
J&A	Justification and Approval
JASA	Joint Airborne SIGINT Architecture
JASSM	Joint Air-to-Surface Standoff Missile
JATAS	Joint and Allied Threat Awareness System
JBAIDS	Joint Biological Agent Identification and Diagnostic System
JC2-MA	Joint Command and Control - Maritime Applications
JCIDS	Joint Capabilities Integration and Development System
JCM	Joint Common Missile
JCREW	Joint Counter RCIED Electronic Warfare
JCS	Joint Chiefs of Staff
JDAM	Joint Direct Attack Munition
JDISS	Joint Deployable Intelligence Support Service
JDN	Joint Data Network
JFC	Joint Force Commander
JFCOM	Joint Forces Command
JFCOM JPO	Joint Forces Command Joint Program Office
JFMCC	Joint Forces Maritime Component Commander
JFN	Joint Fires Network
JFNU	Joint Fires Network Unit
JHDA	Joint Host Demand Algorithm
JHMCS	Joint Helmet Mounted Cueing System
JIC	Joint Intelligence Center
JICO/JSS	Joint Interface Control Officer Support System
JIE	Joint Information Environment
JIFC	Joint Integrated Fire Control
JLENS	Joint Land-Attack Cruise Missile Defense Elevated Netted Sensor
JMAST	Joint Mobile Ashore Support Terminal
JMCIS	Joint Maritime Command Information System
JMCOMS	Joint Maritime Communications Strategy
JMLS	Joint Modular Lighterage System
JMOD	Joint Airborne SIGINT Architecture Modification
JMPS	Joint Mission Planning System
JMPS-M	Joint Mission Planning System-Maritime
JNIC	Joint National Integration Center
JNMS	Joint Network Management System
JOA	Joint Operations Area
JOTBS	Joint Operational Test Bed System
JPACE	Joint Protective Aircrew Ensemble
JPATS	Joint Primary Aircraft Training System
JPEO	Joint Program Executive Office
JROC	Joint Requirements Oversight Council
JSF	Joint Strike Fighter
JSIPS	Joint Service Imagery Processing System
JSMO	Joint Systems Management Office
JSOW	Joint Standoff Weapon
JSPO	Joint System Program Office
JTA	Joint Tactical Architecture
JTAMDO	Joint Theater Air and Missile Defense Organization
JTDLMP	Joint Tactical Data Link Management Plan

JTIDS	Joint Tactical Information Distribution System
JTRS	Joint Tactical Radio System
JTT	Joint Tactical Terminal
JWICS	Joint Worldwide Intelligence Communications System
KDP	Key Decision Point
KPP	Key Performance Parameter
KSA	Key Systems Attribute
LAIRCM	Large Aircraft Infrared Countermeasures
LAMPS	Light Airborne Multipurpose System
LAN	Local Area Network
LANT	Atlantic
LANTIRN	Low-Altitude Navigation and Targeting Infrared At Night
LBSF&I	Littoral Battlespace Sensing, Fusion and Integration
LBS-UUV	Littoral Battlespace Sensing-Unmanned Undersea Vehicles
LCAC	Landing Craft, Air Cushion
LCB	Lateral Conversion Bonus
LCC	Amphibious Command Ship
LCCA	Low-Cost Conformal Display
LCGR	Launch Control Group Replacement
LCS	Littoral Combat Ship
LD/HD	Low-Density/High Demand
LDR	Low Data Rate
LDUUV	Large-Diameter Unmanned Undersea Vehicle
LEAD	Launched Expendable Acoustic Decoy
LEAP	Lightweight Exo-Atmospheric Projectile
LEASAT	Leased Satellite
LFA	Low Frequency Active
LGB	Laser-Guided Bomb
LHA(R)	Amphibious Assault Ship-Replacement
LHD	Amphibious Assault Ship
LHT	Lightweight Hybrid Torpedo
LIDAR	Light Detection and Ranging System
LIDAR	Light Detection and Ranging
LiOH	Lithium Hydroxide
LMRS	Long-Term Mine Reconnaissance System
LMS	Local Monitor Station
LMSR	Large Medium-Speed Roll-On/Roll-Off
LOS	Line of Sight, or, Length of Service
LOTS	Logistics-Over-The-Shore
LPD	Amphibious Transport Dock [Ship]
LPI	Low-Probability-of-Intercept
LPMP	Launch Platform Mission Planning
LPWS	Land-Based Phalanx Weapons System
LRIP	Low Rate Initial Production
LRLAP	Long-Range Land-Attack Projectile
LRS&T	Long-Range Surveillance and Tracking
LSD	Dock Landing Ship
LSO	Landing Signal Officer
LSS	Littoral Surveillance System
LVT	Low-Volume Terminal
LWH	Lightweight Helmets
M/BVR	Medium/Beyond Visual Range missile
MA	Maritime Applications
MAGTF	Marine Air-Ground Task Force
MAMDJF	Maritime Air and Missile Defense of Joint Forces
MARCEMP	Manual Relay Center Modernization Program
MASINT	Measurement and Signature Intelligence
MAST	Mobile Ashore Support Terminal
MATT	Multi-mission Airborne Tactical Terminal
MAWS	Missile Approach Warning System
MCAS	Marine Corps Air Station
MCAST	Maritime Civil Affairs and Security Training
MCAT	Maritime Civil Affairs Teams
MCEN	Marine Corps Enterprise Network
MCM	Mine Countermeasures
MCM	Mine Countermeasures
MCP	Mission Capability Package
MCPON	Master Chief Petty Officer of the Navy
MCS	Mine Countermeasures Command, Control, and Support Ship, or, Mission Computer System
MCS-21	Maritime Cryptologic System for the 21st Century
MCTUAS	Marine Corps Tactical Unmanned Aircraft System
MCU	Mission Computer Upgrade
MDA	Maritime Domain Awareness, or, Missile Defense Agency
MDR	Medium Data Rate
MDS	Multi-function Display System
MDSU	Mobile Diving and Salvage Unit
MEB	Marine Expeditionary Brigade
MEDAL	Mine Warfare and Environmental Decision Aids Library
MEF	Marine Expeditionary Force
MESF	Maritime Expeditionary Security Force
METMF(R) NEXGEN	Meteorological Mobile Facility Replacement Next Generation
METOC	Meteorological and Oceanographic Sensors
MEU	Marine Expeditionary Unit
MEU(SOC)	Marine Expeditionary Unit (Special Operations Capable)
MF	Medium Frequency
MFL	Multi-Frequency Link
MFOQA	Military Flight Operations Quality Assurance
MFR	Multi-Function Radar
MFTA	Multi-Function Towed Array
MGS	Machine Gun System (MGS)
MHIP	Missile Homing Improvement Program
MICFAC	Mobile Integrated Command Facility
MID	Management Initiative Decision
MIDS	Multi-Function Information Distribution System
MIDS-LVT	Multi-Function Information Distribution System-Low -Volume Terminal
MILDET	Military Detachment
MILSTAR	Military Strategic and Tactical Relay Satellite
MIO	Maritime Interception Operations
MIR	Multi-Sensor Image Reconnaissance
MIRV	Multiple Independently Targeted Reentry Vehicle
MIUW	Mobile Inshore Undersea Warfare
MIW	Mine Warfare
MIWC	Mine Warfare Commander
MK	Mark
MLS	Multi-Level Security
MMA	Multi-mission Maritime Aircraft
MMRT	Modified Miniature Receiver Terminal
MMSP	Mission Signal Processor
MNS	Mission Need Statement, or, Mine Neutralization System
MOA	Memorandum of Agreement
MOCC	Mobile Operational Command Control Center
MOD	Modification
MOPP	Mission Oriented Protective Posture
MOU	Memorandum of Understanding
MPA	Maritime Patrol Aircraft
MPF(F)	Maritime Prepositioning Force(Future)
MPG	Maritime Prepositioning Group
MPRF	Maritime Patrol and Reconnaissance Force
MPRF	Maritime Patrol and Reconnaissance Forces

MPS	Maritime Prepositioning Ship, or, Mission Planning System
MRMS	Maintenance Resource Management System
MRMUAS	Medium-Range Maritime Unmanned Aerial System
MR-TCDL	Multi-Role Tactical Common Data Link
MRUUV	Mission-Reconfigurable Unmanned Undersea Vehicle
MSC	Military Sealift Command
MSD	Material Support Dates
MSO	Maritime Security Operations
MTI	Moving Target Indicator
MUOS	Mobile User Objective System
MWR	Morale, Welfare, and Recreation
N/JCA	Navy/Joint Concentrator Architecture
NADEP	Naval Aviation Depot
NAF	Naval Air Facility
NALCOMIS	Naval Aviation Logistics Command Management Information System
NAS	Naval Air Station
NASA	National Aeronautics and Space Administration
NATOPS	Naval Aviation and Training Operating Procedures Standardization
NAVAIRSYSCOM	Naval Air Systems Command
NAVCENT	U.S. Naval Forces, Central Commmand
NAVFLIR	Navigation, Forward-Looking Infrared
NAVMAC	Navy Modular Automated Communications
NavMPS	Naval Mission Planning Systems
NAVSEA	Naval Sea Systems Command
NAVSECGRU	Naval Security Group
NAVSSI	Navigation Sensor System Interface
NAVSUP	Naval Supply Systems Command
NAVWAR	Navigation Warfare
NCDP	Naval Capabilities Development Process
NCES	Net-Centric Enterprise Services
NCFS	Naval Fires Control System
NCHB	Navy Cargo Handling Battalion
NCIS	Naval Criminal Investigative Service
NCO	Network-Centric Operations
NCP	Naval Capability Pillar, or, Naval Capability Plan
NCR	Naval Construction Regiment
NCTAMS	Naval Computer and Telecommunications Area Master Stations
NCTF	Naval Component Task Force
NCTS	Naval Computer and Telecommunications Station
NCUSW	Net Centric Undersea Warfare
NCW	Network-Centric Warfare, or, Navy Coastal Warfare
NCWES	Network-Centric Warfare Electronic Support
NDI	Non-Developmental Item
NEC	Naval Enlistment Classification
NECC	Naval Expeditionary Combat Command
NELR	Navy Expeditionary Logistics Regiment
NEO	Non-Combatant Evacuation Operations
NEP	Navy Enterprise Portal
NEPLO	National Emergency Preparedness Liaison Officer
NESP	Navy Extremely High Frequency (EHF) Satellite Program
NETC	Naval Education and Training Command
NETWARCOM	Network Warfare Command
NFCS	Naval Fires Control System
NFN	Naval Fires Network, and/or Joint Fires Network
NFO	Naval Flight Officer
NFS	Naval Fire Support
NGC2P	Next Generation Command and Control Processor
NGEN	Next Generation Enterprise Network
NGJ	Next Generation Jammer
NGO	Non-Governmental Organization
NGSS	Northrup Grumman Ship Systems
NIFC-CA	Navy Integrated Fire Control - Counter Air
NII	Network Information Integration
NILE	NATO Improved Link Eleven
NIMA	National Imagery and Mapping Agency
NIPRNET	Unclassified-but-Sensitive Internet Protocol Router Network
NITF	National Imagery Transportation Format
NMCB	Naval Mobile Construction Battalion
NMCI	Navy Marine Corps Intranet
NMCP	Navy Marine Corps Portal
NMITC	Navy Maritime Intelligence Training Center
NMT	Navy Advanced Extremely High Frequency Multiband Terminal
NNOR	Non-Nuclear Ordnance Requirement
NNSOC	Naval Network and Space Command
NOAA	National Oceanographic and Atmospheric Administration
NOC	Network Operation Center
NPDC	Naval Personnel Development Command
N-PFPS	Navy Portable Flight Planning Software
NPOESS	National Polar-Orbiting Operational Environmental Satellite System
NREMS	Navy Regional Enterprise Messaging System
NRF	Naval Reserve Force
NRL	Naval Research Laboratory
NRTD	Near Real-Time Dissemination
NSA	National Security Agency
NSAWC	Naval Strike Air Warfare Center
NSCT	Naval Special Clearance Team
NSFS	Naval Surface Fire Support
NSFV	Naval Security Forces Vest
NSIPS	Navy Standard Integrated Personnel System
NSPG	Navy Strategic Planning Guidance
NSSN	New Attack Submarine (Virginia SSN 774 Class)
NSTC	Naval Service Training Command
NSW	Naval Special Warfare
NSW	Naval Special Warfare
NSWC/DD	Naval Surface Warfare Center/Dahlgren Division
NSWC/PH	Naval Surface Warfare Center/Port Hueneme
NSWG	Naval Special Warfare Group
NSWRON	NSW Squadron
NTCDL	Network Tactical Common Data Link
NTCS-A	Naval Tactical Command System - Afloat
NTCSS	Naval Tactical Command Support System
NTDS	Naval Tactical Data System
NUFEA-RA	Navy Unique Fleet Essential Airlift-Replacement Aircraft
NUWC	Naval Underwater Warfare Center
NWDC	Navy Warfare Development Command
OAG	Operational Advisory Group
OAS	Offensive Air Support
OASD	Office of the Assistant Secretary of Defense
OASIS	Organic Airborne and Surface Influence Sweep
OBT	On-Board Trainer
OCA	Offensive Counter-Air
OCONUS	Outside Continental United States
OED	OSIS Evolutionary Development
OEF	Operation Enduring Freedom
OEO	Other Expeditionary Operations
OGB	Optimized Gun Barrel

OIF	Operation Iraqi Freedom
OIPT	Overarching Integrated Product Team
OMFTS	Operational Maneuver From The Sea
ONI	Office of Naval Intelligence
ONR	Office of Naval Research
OPAREA	Operational Exercise Area
OPEVAL	Operational Evaluation
OPNAV	Office of the Chief of Naval Operations
OPTEMPO	Operating Tempo
OPTEVFOR	Operational Test and Evaluation Force
OR	Operational Requirement
ORD	Operational Requirements Document
OSA	Open System Architecture
OSCAR	Open Systems-Core Avionics Requirements
OSD	Office of the Secretary of Defense
OSD-CAPE	Office of the Secretary of Defense, Cost Assessment and Program Evaluation
OSIS	Ocean Surveillance Information System
OSS	Operational Support System
OT	Operational Testing
OT&E	Operational Testing and Evaluation
OTH	Over the Horizon
P3I	Pre-Planned Product Improvement
PAA	Phased Adaptive Approach
PAC	Pacific
PACE	Program for Afloat College Education
PAS	Processing and Analysis Segment
PCU	Pre-Commissioning Unit
PDM	Program Decision Memorandum
PDR	Preliminary Design Review
PEO	Program Executive Office (and Officer)
PEO IWS	Program Executive Office for Integrated Warfare Systems
PERSTEMPO	Personnel Tempo
PFPS	Portable Flight-Planning Software
PGM	Precision-Guided Munition
PHIBGRU	Amphibious Group
PIP	Product Improvement Program, or, Pioneer (UAV) Improvement Program
PKI	Public Key Infrastructure
PLUS	Persistent Littoral Undersea Surveillance
PMA	Post-Mission Analysis
PMK	Power Management Kit
POM	Program Objective Memorandum
POR	Program of Record
PPBE	Planning, Programming, Budgeting, and Execution process
PRMS	Pressurized Rescue Module System
PSE	Physical Security Equipment
PSTN	Public Switched Telephone Network
PTAN	Precision Terrain Aided Navigation
PTW	Precision Targeting Workstation
PUMA	Precision Underwater Mapping
PVO	Private Volunteer Organization
QDR	Quadrennial Defense Review
QOL	Quality of Life
QOS	Quality of Service
R&D	Research and Development
RAM	Rolling Airframe Missile
RAMICS	Rapid Airborne Mine Clearance System
RC	Reserve Component
RCC	Regional Combatant Commander
RCIED	Radio Controlled Improvised Explosive Device
RCOH	Nuclear Refueling/Complex Overhaul
RD&A	Research, Development, and Acquisition
RDC	Rapid Deployment Capability
RDT&E	Research, Development, Test and Evaluation
REPLO	Regional Emergency Preparedness Liaison Officer
RF	Radio Frequency
RFP	Request for Proposals
RL	Restricted Line
RM	Radiant Mercury (classified information sanitization program)
RMAST	Reserve Mobile Ashore Support Terminal
RMIG	Radiant Mercury Imagery Guard
RMMV	Remote Multi-Mission Vehicle
RMS	Remote Minehunting System
RO	Reverse Osmosis
ROMO	Range of Military Operations
RORO	Roll-On/Roll-Off
ROS	Reduced Operating Status
RRDD	Risk Reduction and Design Development
RSC	Radar Suite Controller
RSOC	Regional SIGINT Operations Center
RTC	Remote Terminal Component, or, Recruit Training Command
RWR	Radar Warning Receiver
S&T	Science and Technology
SA	Situational Awareness
SAASM	Selective Availability Anti-Spoofing Module
SAG	Surface Action Group
SAHRV	Semiautonomous Hydrographic Reconnaissance Vehicle
SAIC	Science Applications International Corporation
SALTS	Streamlined Alternative Logistic Transmission System
SAM	Surface-to-Air Missile
SAML	Security Assertion Markup Language
SAST	Surface ASW Synthetic Trainer
SATCOM	Satellite Communications
SBIR	Small Business Innovative Research
SBT	Special Boat Team
SCA	Software Communications Architecture
SCC	Sea Combat Commander
SCI	Sensitive Compartmented Information
SCN	Shipbuilding and Conversion (Navy)
SDAP	Special Duty Assignment Pay
SDD	System Design Document, or, System Development and Demonstration (phase)
SDS	Surface Decompression System (SDS)
SDTS	Self-Defense Test Ship
SDV	Swimmer (or SEAL) Delivery Vehicle
SDVT	Swimmer (or SEAL) Delivery Vehicle Team
Seabee	Naval Construction Battalion
SEAD	Suppression of Enemy Air Defense
SEAL	Sea-Air-Land Naval Special Warfare Forces
SEAPRINT	Systems Engineering, Acquisition, and Personnel Integration
SEI	Specific Emitter Identification
SEIE	Submarine Escape Immersion Equipment
SELRES	Selected Reserve
SEPLO	State Emergency Preparedness Liaison Officer
SEWIP	Surface Electronic Warfare Improvement Program
SFA MTTs	Security Force Assistance Mobile Training Teams
SHARP	Shared Reconnaissance Pod
SHF	Super High Frequency
SHUMA	Stochastic Unified Multiple Access
SI	Special Intelligence
SIAP	Single Integrated Air Picture
SIGINT	Signals Intelligence

SIMAS	Sonar In-situ Mode Assessment System
SINCGARS	Single Channel Ground and Air Radio System
SIPRNET	Secret Internet Protocol Router Network
SLAD	Slewing-Arm Davit
SLAM	Standoff Land-Attack Missile
SLAM-ER	Standoff Land-Attack Missile-Expanded Response
SLAP	Service Life Assessment Program
SLBM	Submarine-Launched Ballistic Missile
SLEP	Service Life Extension Program
SLR	Side-Looking Radar
SM	Standard Missile
SMCM	Surface Mine Countermeasure
SNAP	Shipboard Non-tactical ADP Program
SNR	Subnet Relay
SOA	Service Oriented Architecture, or, Sustained Operations Ashore
SOAD	Standoff Outside Area Defense
SOAP	Simple Object Access Protocol
SOC	Special Operations Cable, or, Special Operations Craft
SOF	Special Operations Forces
SOPD	Standoff Outside Point Defense
SOSUS	Sound Surveillance System
SPAWAR	Space and Naval Warfare Systems Command
SPECAT	Special Category
SPM	Soldier Power Manager
SPRITE	Spectral and Reconnaissance Imagery for Tactical Exploitation
SRB	Selective Reenlistment Bonus
SRC	Submarine Rescue Chamber
SRDRS	Submarine Rescue Diving Recompression System
SS	Sensor Subsystem
SSBN	Nuclear-Powered Ballistic Missile Submarine
SSCA	Service Secretary Controlled Aircraft
SSDG	Ship Service Diesel Generators
SSDS	Ship Self-Defense System
SSEE	Ship's Signals Exploitation Equipment
SSG	Strategic Studies Group
SSGN	Guided Missile Submarine
SSI	Special Structural Inspection
SSI-K	Special Structural Inspection-Kit
SSIPS	Shore Signal and Information Processing Segment
SSK	Diesel-electric/Advanced Air Independent Submarine
SSMIS	Special Sensor Microwave Imager/ Sounder (Air Force)
SSMM	Surface-to-Surface Missile Module
SSN	Nuclear-Powered Submarine
SSO	Special Security Office
SS-SPY	Solid State- SPY (radar)
SSST	Supersonic Sea-Skimming Target
START	Strategic Arms Reduction Treaty
STEM	Science, Technology, Engineering and Mathematics
STEP	Standardized Tactical Entry Point
STOM	Ship-To-Objective Maneuver
STOVL	Short Take-Off and Vertical Landing
STT	Submarine Tactical Terminal
STUAS	Small Tactical Unmanned Aircraft System
STU-III/R	Secure Telephone Unit, Third Generation, Remote Control Interface
SURTASS	Surveillance Towed Array Sensor System
S-VSR	S-Band Volume Search Radar
SWAN	Shipboard Wide-Area Network
SWATH	Small Waterplane Area, Twin Hull [Ship]
SYSCEN	Systems Center
TACAIR	Tactical Aircraft
TACAMO	Take-Charge-and-Move-Out
TACC	Tactical Air Command Centers
TacLAN	Tactical Local Area Network
TACS	Tactical Air Control System
TACTAS	Tactical Towed Array System
TACTOM	Tactical Tomahawk
TADIL-J	Tactical Digital Information Link - Joint Service
TADIRCM	Tactical Aircraft Directed Infra-Red Countermeasure
TADIXS	Tactical Data Information Exchange Systems
T-AGOS	Ocean Surveillance Ship (MSC-operated)
T-AGS	Oceanographic Survey Ships (MSC/Civilian Agency-operated)
T-AH	Hospital Ship
T-AKE	Stores/Ammunition Ship
TAMD	Theater Air and Missile Defense
TAMPS	Tactical Automated Mission Planning System
T-AO	Oiler (MSC-operated)
TAOC	Tactical Air Operations Center (Marine Corps)
TAP	Tactical Training Theater Assessment Planning
TARPS	Tactical Airborne Reconnaissance Pod System
TASWC	Theater ASW Commander
TAWS	Terrain Awareness Warning Systems
TBI	Traumatic Brain Injury
TBMCS	Theater Battle Management Core Systems
TC2S	Tomahawk Command and Control System
TCAS	Traffic Alert and Collision Avoidance System
TCDL	Tactical Common Data Link
TCGR	Track Control Group Replacement
TCP	Transmission Control Protocol
TCPED	Tasking Collection Processing Exploitation Dissemination
TCS	Tactical Control System, or, Time-Critical Strike
TCT	Time-Critical Targeting
TDA	Tactical Decision Aid
TDCL	Torpedo Detection, Classification and Localization
TDD	Target Detection Device
TDLS	Tactical Data Link System
TDM	Time Division Multiplex
TDMA	Time Division Multiple Access
TDP	Tactical Data Processor
TDSS	Tactical Display Support System
TECHEVAL	Technical (Developmental) Evaluation
TEMPALT	Temporary Alteration
TERCOM	Terrain Contour Mapping
TES-N	Tactical Exploitation System - Navy
TESS/NITES	Tactical Environmental Support System/Navy Integrated Tactical Environmental Subsystem
TEU	Training and Evaluation Unit
TFCC	Task Force Climate Change
TFW	Task Force Web
TI	Tach Insertion
TIBS	Tactical Information Broadcast Service
TICs	Toxic Industrial Chemical Agents
TIDS	Tactical Integrated Digital System
TIMS	Training Integrated Management System
TIS	Trusted Information System
TIS	Tactical Interface Subsystem
TJS	Tactical Jamming System
TLAM	Tomahawk Land-Attack Cruise Missile
TLR	Top Level Requirements

TNT	Targeting and Navigation Toolset
TOA	Total Obligational Authority, or, Tables of Allowance
TOC	Total Ownership Costs
TOG	Technology Oversight Group
TOW	Tube-launched, Optically-tracked, Wire-guided (missile)
TPPU	Task, Post, Process, Use
TRAFS	Torpedo Recognition and Alertment Functional Segment
T-RDF	Transportable - Radio Direction Finding
TRE	Tactical Receive Equipment
TRIXS	Tactical Reconnaissance Intelligence Exchange System
TS	Top Secret
TSC	Tactical Support Center
TSTC	Total Ship Training Capability
TTNT	Tactical Targeting Network Technology
TTWCS	Tactical Tomahawk Weapon Control System
TUSWC	Theater Undersea Warfare Commander
TWS	Torpedo Warning System
TXS	Transport Services
UAV	Unmanned Aerial Vehicle
UCAS-D	Unmanned Combat Aircraft System Demonstration
UCLASS	Unmanned Carrier-Launched Airborne Surveillance and Strike
UCT	Underwater Construction Teams
UCT	Underwater Construction Team
UCWI/JUWL	Interrupted Continuous Wave Illumination/ Joint Universal Weapon Link
UDDI	Universal Description, Discovery, and Integration
UFO	Ultra High Frequency Follow-On
UHF	Ultra High Frequency
UISS	Unmanned Influence Sweep System
UMFO	Undergraduate Military Flight Officer
UNITAS	Annual US - South American Allied Exercise
UNREP	Underway Replenishment
UOES	User Operational Evaluation System
UOES	User Operational Evaluation System
UON	Urgent Operational Need
URL	Unrestricted Line
USD/AT&L	Under Secretary of Defense for Acquisition, Technology, and Logistics
USPACOM	United States. Pacific Command
USS	Undersea Surveillance System, and, United States Ship
USSOCOM	U.S. Special Operations Command
USW	Undersea Warfare
USW-DSS	Undersea Warfare-Decision Support System
UUV	Unmanned Undersea Vehicle
UWS	Underwater Segment
UXO	Unexploded Ordnance
V/STOL	Vertical/Short Take-Off and Landing
VCNO	Vice Chief of Naval Operations
VDS	Variable-Depth Sonar
VERTREP	Vertical (underway) Replenishment
VHA	Variable Housing Allowance
VHF	Very High Frequency
VIXS	Video Information Exchange System
VLA	Vertical Launch ASROC
VLF/LF	Very Low Frequency/Low Frequency
VLS	Vertical Launching System
VME	Versa Module Eurocard
VMTS	Virtual Mission Training System
VOD	Vertical Onboard Delivery
VPM	Virginia Payload Module
VPN	Virtual Private Network
VSR	Volume Search Radar
VSW	Very Shallow Water
VTC	Video Teleconferencing
VTM	Video Tele-Medicine
VTOL	Vertical Take-Off and Landing
VTT	Video Tele-Training
VTUAV	Vertical Takeoff and Landing Tactical Unmanned Aerial Vehicle
VVD	Voice-Video-Data
WAA	Wide Aperture Array
WAN	Wide Area Network
WDL	Weapons Data Link
WEN	Web-Enabled Navy
WGS	Wideband Gapfiller Satellite
WMD	Weapons of Mass Destruction (nuclear, biological, chemical)
WMP	Wideband Modernization Plan
WPN	Navy Weapons Procurement (appropriation)
WSC	Wideband Satellite Communications
XML	Extensible Markup Language
ZBR	Zero-Based Review

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http://www.navy.mil/navydata/policy/seapower/npg13/top-npg13.pdf