NAVY PROGRAM GUIDE 2010

DEPARTMENT OF THE NAVY
WASHINGTON D.C.

http://www.navy.mil/navydata/policy/seapower/spne10/top-spne10.html

FOREWORD

G. Roughead
Admiral, U.S. Navy
Chief of Naval Operations

United States Navy men and women are deployed and engaged with partners and against adversaries to protect our nation's interests. Demand for naval forces remains high and continues to grow. Navy ships, aircraft and people are fighting today's wars in Iraq and Afghanistan, conducting maritime security operations in the Mediterranean and Horn of Africa, building and strengthening partnerships in Africa and South America, and providing stability and deterrence in the Arabian Gulf and Western Pacific. Wherever flexible, scalable and capable forces are required to provide defense, development and diplomacy, without the need for host-nation basing or over-flight, you will find the Navy.

The scope of our engagements reflects the growing complexity of our security environment. Terrorists and insurgents are employing modern weapons and communications previously confined to states, while adversary nations use terrorist surrogates, economics and peacetime attacks on civilians to pursue military ends. Natural disasters, transnational criminals, and operations in the physical and virtual domains all exist simultaneously. This complexity was a driving factor in the recent Quadrennial Defense Review (QDR) which suggests the U.S., along with our partners, must be ready to respond to a wide variety of large-scale contingencies and deter potential adversaries while conducting a long-term campaign against terrorist, insurgent and criminal threats. The QDR validated the underlying principle ushered in by *A Cooperative Strategy for the 21st Century Seapower* that preventing wars is as important as winning wars. This demands a Navy that can deter and defeat adversaries while also assuring and building partners.

To do this, our Navy must sustain rotational forward presence far from U.S. shores. This requires capacity and responsible attention to our ships, aircraft and people. The future force must also have the capability to provide access for the Joint Force and induce unacceptable risk for any adversary. There has been, and will likely be, more demand than resources, which makes finding the optimal mix of capability and capacity critical. We will balance capability and capacity to maintain a global, power projection fleet with the ability to be present in multiple regions.

We remain the preeminent naval force in the world because of the men and women in our Navy. What makes up the fleet is important, but how we use it is more important. No matter how great the sword, without the skill and wisdom to use it, the sword is useless. Our Sailors bring to life the full potential of our platforms and systems. It takes competent and motivated people to operate in today's complex security environment where one day we are training partners or providing humanitarian assistance, and the next day being called upon to bring to bear decisive force. As you read this, that is taking place throughout the world.

The future is uncertain. Add to that the complexity of the maritime environment, especially in the littoral, where sea, land, air, space and cyberspace converge and where the majority of the world's population lives. This is the environment where our Navy thrives.

This 2010 *Program Guide* is an overview of the systems, programs and initiatives we are pursing to deliver a future Navy that our Sailors will use to promote and secure our nation's interests.

TABLE OF CONTENTS

FROM STRATEGIC VISION…
TO HULLS IN THE WATER

NAVY PROGRAM GUIDE 2010

INFLUENCE AND OPPORTUNITY THROUGH GLOBAL PRESENCE

- **Our nation's global interests demand a global U.S. Navy**
- **Navy forward presence provides access, which gives our nation's leaders opportunities to influence events**
- **Navy ships, aircraft and people are inherently flexible and adaptable**
- **The Navy is our nation's strategic reserve across the entire spectrum of operations**

For more than 230 years, the U.S. Navy has used its access to the sea and its highly adaptive fleet to overcome challenges across the full range of conflict, from piracy, to terrorism, and to conventional and irregular warfare. Today, our Navy's global reach and permanent forward presence, spanning from the undersea domain to space, uniquely equip it to influence events around the world, create opportunities to promote security and stability, assure allies and deter potential adversaries.

As described in *A Cooperative Strategy for 21st Century Seapower*, American security and prosperity in a globalized world are inextricably linked to the security and prosperity of other nations. The U.S. will continue being a leader in preserving and protecting the stability and security of interdependent global systems of trade, finance, information, law and governance. Although the U.S. will continue to be the leader in promoting security and stability, we will increasingly develop the ability of partners to protect their people, borders and resources.

Maintaining access to global commons on and under the sea, in the air, in space and in cyberspace is essential to the peaceful functioning of global systems and the conduct of military operations. This access is under growing challenges from a combination of state and non-state actors.

OUR STRATEGIC CONCERNS

- **Winning the current fights and deterring future conflict are our top priorities**
- **Future conflicts will present a combination of irregular and conventional challenges**
- **Global trends predict increasing political, military and geographic challenges to access**
- **In an increasingly multi-polar world, cooperation will be critical to sustaining security and stability**

Current and Future Challenges

Since September 11, 2001, our country has engaged in more than eight years of conflict in Iraq, Afghanistan, and elsewhere. Successful completion of these operations is the Department of Defense's

(DoD) first priority. More than 12,000 sailors are on the ground supporting forces in the Middle East, while approximately 10,000 more are in the surrounding waters conducting strike, counter-insurgency, and counter-piracy operations. In addition, naval forces are deployed elsewhere overseas to build partners, assure our allies, and deter future conflict.

These future conflicts will be increasingly hybrid in nature, combining both irregular and conventional elements. Empowered by the proliferation of modern high-tech conventional weapons and mobile communications, terrorists, insurgents, and other non-state actors can employ weapons and tactics once only available to larger nations. Similarly, adversary nations unable to defeat the U.S. using traditional military operations will use irregular methods or attack non-military centers of gravity like civilian populations or infrastructure.

The irregular challenges that characterize today's fights in Iraq and Afghanistan require a holistic approach that encompasses military, political, and economic elements in order to prevail. Our Navy is a flexible and adaptive force that supports diplomacy, development and defense as part of this whole of government effort to mitigate the sources of irregular challenges. The forward deployed Navy has conducted these operations for more than 200 years—including maritime security of ports, fisheries and shipping lanes and power projection against terrorist or insurgent camps—without requiring a footprint ashore.

In addition to addressing today's irregular challenges, our Navy helps prevent the conflicts our nation could face in the future. We face rising and resurgent regional powers that are growing their military capabilities, particularly those designed to deny access to the global maritime, air, and cyberspace commons. The Navy, in concert with the U.S. Air Force and Marine Corps, provides the ability to defeat or circumvent these threats to access, such as ballistic and cruise missiles, submarines, and surface-to-air missiles. Through its forward presence and credible combat capability, the Navy deters aggression by conventional and nuclear-armed regional adversaries by showing U.S. resolve, the ability to deny their objectives and promptly retaliate.

Our Navy's ability to support and protect globally dispersed interests, at sea and ashore, enables our nation to promote security and stability without infringing on the sovereignty of our partners. While permanently forward stationed forces assure allies, growing sensitivities to U.S. presence means access to overseas bases should not be assumed. The Navy will continue forward-deploying ships, aircraft, and personnel to complement these forward-stationed forces in providing the nation a full range of engagement, deterrence and assurance capabilities.

Navy Capability and Capacity

The size of our Navy is based on the number and duration of operations the force must be able to conduct in multiple regions of the world. In addition to large-scale conventional, hybrid, and stability operations traditionally considered in force sizing, Navy capac-

Given that resources are not unlimited, the dynamic of exchanging numbers for capability is perhaps reaching a point of diminishing returns. A given ship or aircraft, no matter how capable or well equipped, can be in only one place at one time.

Robert M. Gates
Secretary of Defense

ity must also address steady state cooperative security, homeland defense and deterrence operations. The desired response time of forces to large-scale contingencies affects the type, number and location of naval presence forces needed to provide Combatant Commanders the flexibility to seize opportunities for influence or deterrence. These presence forces, in turn, are used to conduct steady state operations that shape the environment, build partner capacity, and respond to crises.

Demand for naval forces is greater than the forces available. Therefore, investments in the future force must reflect a balance between capacity for globally dispersed, steady state operations such as maritime interdiction and humanitarian assistance, and the capabilities necessary to perform more demanding missions such as anti-submarine warfare (ASW), ballistic missile defense (BMD), or strike warfare. In particular, providing the capacity to be successful in today's fights is essential to the ability of our nation to deter future conflicts. Our Navy continues to shape the force to meet the needs of today and the most plausible future operations. Examples of this rebalancing include restarting production of the Arleigh Burke-class destroyer to provide capacity in ASW and BMD; maintaining our tactical air dominance in today's fights; continuing E/A-18G *Growler* production to counter terrorist communications and attack; and expanding and accelerating unmanned aircraft systems including Navy Unmanned Combat Air System (N-UCAS).

Other examples include fielding the Littoral Combat Ship (LCS) to fill gaps in maritime security, surface warfare, mine warfare, and ASW, and the Joint High Speed Vessel (JHSV) to improve intra-theater lift capacity. Our Navy is also providing relevant capabilities and needed capacity through selective modernization of ships and aircraft, and the creative employment of our forces through disaggregated strike group operations and the use of a wide variety of ships for Global Maritime Partnership Operations, including high speed vessels, tenders, amphibious landing ships, hospital ships, and U.S. Coast Guard vessels.

The Maritime Strategy and Quadrennial Defense Review (QDR) call for increased cooperative security, security force assistance (SFA), and engagement operations. These operations are essential to building the capability of our partners to address their own security challenges. Our Navy has seen an increasing demand from Combatant Commanders for maritime security operations and proactive humanitarian assistance, through operations such as *Continuing Promise* in Latin America, *Pacific Partnership* in South East Asia, *Africa Partnership Station* in West Africa, and *Operation Unified Response* in Haiti. Building partner capacity through maritime security force assistance promotes regional stability by developing and enabling partner nation forces to conduct safety and security operations within their harbors, inland and coastal waters, and interests at sea. Recognizing our Navy cannot be everywhere all the time, maritime SFA

also builds the capacity to enable partners to maintain regional stability and prevent conflict. As we build the Navy of tomorrow, achieving the necessary capacity to conduct these missions will be essential.

Operations

Whether acting independently or as part of a joint or coalition force, our ships, aircraft, and Sailors operate globally to support day-to-day security and stability around the world. As necessary, they aggregate to perform highly integrated operations requiring concentrated combat power. When operating in combat, aircraft carriers and amphibious ships project forces to find and fight adversaries and secure objectives both at sea and ashore. Ships, aircraft, and submarines gain access for strike groups and protect them from surface and subsurface threats, while extending an air and missile defense umbrella over ships at sea and forces ashore.

While these strike and amphibious group units may be geographically dispersed, they remain integrated through common communication networks, operating procedures, and effective command and control systems.

For example, destroyers and cruisers operating alone or in small groups routinely conduct maritime security operations—intercepting smugglers, terrorists, and other criminals—but can rapidly link to provide a formidable air defense shield for coalition forces at sea or on land. Similarly, attack submarines are able to conduct intelligence, surveillance and reconnaissance missions, but can quickly rejoin their Carrier Strike Group to hunt, track or kill enemy submarines or deliver cruise missile strikes ashore as a part of coordinated power projection. As they are built and put to sea, Littoral Combat Ships will regularly conduct presence, stability and counterinsurgency operations, but can also rapidly reconfigure and join a strike group to clear mines or kill enemy submarines and surface combatants.

Our Navy is also developing capabilities primarily intended for security force assistance (SFA) missions. Riverine squadrons are focusing on training partner navies to improve maritime security of coastal and inland waterways and build partner capacity. Expeditionary Training teams train Navy personnel to conduct SFA and also directly train partner forces. Navy ships, which will include the JHSV, serve as home bases from which a variety of U.S. interagency, international partners and non-governmental organization activities can operate for extended periods regardless of available port infrastructure.

Core Capabilities

The strength of the U.S. Navy lies in its ability to rapidly and flexibly transition among multiple core capabilities or execute several of them simultaneously. Our Navy consists of a robust mix of ships, aircraft, systems and highly trained people delivering these core capabilities in day-to-day operations and major contingencies.

Forward Presence is our Navy's capability to sustain a force forward deployed, away from U.S. shores. Forward presence is maintained to gain familiarity with the environment, understand behavior patterns of regional actors, prevent conflict from erupting, support political stability in areas important to our nation, safeguard important sea lanes, show the flag, exercise with allies and partners to improve their capabilities, and, when needed, respond to crises and disasters.

A major advantage of sea-based forces is the ability to reach areas other forces cannot reach, and do so without infringing on sovereignty or requiring a footprint ashore. Our Navy maintains forces forward, using its robust Combat Logistics Force, including the new Lewis and Clark-class dry cargo and ammunition ships and overseas tenders. These ships allow our fleet to remain deployed indefinitely, maintaining combat capabilities in close proximity to friends, allies or adversaries in order to assure allies and partners of our nation's ability to deter or quickly respond to crisis and aggression.

Deterrence involves global, regional, and transnational efforts to deny aggressors success and provide a credible threat of prompt retaliation. Our Navy provides the most responsive and flexible capabilities to assure allies of U.S. support and deter those who would do us harm. The ability of deployed ships, submarines and aircraft to remain forward signals to aggressors that a rapid, scalable, credible U.S. response will deny their objectives, eliminate successful courses of action and impose costs far in excess of what they would hope to gain. Our Navy provides this capability without provoking aggressors or infringing on allies' sovereignty.

Our Navy provides comprehensive deterrence capabilities through offensive nuclear and non-nuclear strike, air and missile defense, and cyberspace operations. In particular, nuclear-powered ballistic missile submarines provide nuclear offensive strike capabilities anywhere in the world. Navy ballistic missile defense systems, such as Aegis, provide an umbrella of protection to forward-deployed forces, U.S. partners and allies, and the U.S. homeland. Both capabilities impress upon potential aggressors the unacceptable consequences of using weapons of mass destruction.

Sea Control is an important enabler in joint and interagency operations and is a capability only our Navy can provide. Since the founding of the United States, our Navy has protected shipping, denied maritime access to military aggressors and criminals, and maintained legitimate freedom of action throughout the global maritime commons—ensuring our own access while, when necessary, denying it to our adversaries.

Growing challenges to access are emerging from the proliferation of capabilities such as cruise missiles, submarines, mobile communications, cyber capabilities and improvised explosives. These threats threaten security in the maritime commons. As these threats imply, in the 21st century sea control entails more than just

the surface of the ocean; it includes activities beneath the surface, in the skies above the sea and across the electromagnetic spectrum within the operating area.

Surface ships form the front line of sea control by providing anti-submarine warfare, surface warfare, mine countermeasures, and by conducting maritime security operations. Cruisers and destroyers protect joint and coalition forces against air, cruise missile and ballistic missile threats.

The P-3 *Orion* and its follow-on P-8A *Poseidon* multi-mission maritime aircraft, the MH-60R *Seahawk* helicopter, remote sonar sensors and nuclear-powered attack submarines are key elements of our Navy's anti-submarine warfare capability, while the carrier-based F/A-18 E/F *Super Hornets* have significant capacity for surface warfare using anti-ship missiles.

Finding hostile contacts and supporting effective information dominance will increasingly rely on unmanned vehicles. Unmanned aircraft and underwater systems with the range and endurance to maintain persistent "eyes on target" for days at a time provide advantages in persistence and survivability. These systems provide a significant force multiplier in our efforts to establish Maritime Domain Awareness. Future unmanned systems will build upon current unmanned capabilities and span an increasing number of mission sets.

Adversaries will seek to deny U.S. forces the ability to conduct coordinated operations by attacking our satellites, jamming our communications and disrupting our computer networks. This growing threat places a premium on capabilities for cyberspace and space superiority. The CNO established Fleet Cyber Command/U.S. Tenth Fleet as the global operator of Navy's cyber, networks, cryptology/signals intelligence, information, electronic warfare, and space operations. Our Navy continues to provide and train the majority of DoD cyberspace operators.

Power Projection by the Navy-Marine Corps team, enabled by sea control and forward presence, uniquely overcomes diplomatic and geographic barriers to access critical areas and project power ashore without the need for bases, ports or airfields. Our Navy's strike-capable ships, aircraft, and systems can conduct attacks ranging from small-scale raids to extensive campaigns on little notice and over extended periods.

Our Navy's wide range of capability provides our nation's leaders with options to tailor a proportional response to provocation, limit regional conflict, respond quickly to larger-scale aggression or deter would-be adversaries. As land bases and overflight access diminish, the ability to project power from the sea will gain importance.

Nuclear-powered aircraft carriers and their embarked tactical aircraft provide the strike and electronic attack capabilities needed to deter conflict or conduct sustained combat operations without

deploying forces ashore. Surface ships and submarines contribute to power projection with cruise missiles and naval gunfire.

Protected by ships and aircraft, and supported by strike platforms, our Navy's fleet of amphibious and prepositioned ships can rapidly transport and sustain joint forces ashore to take and control the littoral. In addition to supporting Marines, ships at sea support personnel from all four Services, other U.S. Government agencies, international partner nations, and non-governmental organizations.

Maritime Security operations protect sovereignty and resources, while countering maritime terrorism, transnational crime, piracy, environmental destruction and trafficking of people and contraband.

Inherent in enabling effective maritime security operations are a comprehensive awareness of the maritime domain and an understanding of the nature of activities on and near the sea. In addition to the ships and aircraft used to perform maritime security operations, the Navy Expeditionary Combat Command provides this capability with a variety of units, from security forces and riverine squadrons to intelligence collectors and civil affairs teams. We also cooperate with partner navies and coast guards globally to provide security in the maritime commons.

Humanitarian Assistance and Disaster Response: During a crisis, forward-deployed U.S. maritime forces work with partner nations to quickly provide health care, emergency food and water, basic sanitation, transportation, shelter, and the restoration of public infrastructure. These capabilities are also used proactively to provide humanitarian assistance, build security capacity and improve relationships with new and existing partners. Navy hospital ships, sealift, high speed vessels and large-deck amphibious ships have deployed regularly for the past two years providing humanitarian assistance, as well as on short notice to provide disaster response.

Maritime security, humanitarian assistance and disaster response operations are usually conducted by general purpose forces (ships, aircraft and people) that are trained and maintained for warfighting and warfighting support, but have the flexibility to conduct these expanded missions. As demands for these capabilities grow and endure, Navy will continue to adapt existing ships and aircraft, training and procedures to conduct operations promoting security and stability through the development of partner nation capabilities. Ongoing operations in these missions benefit from adaptive force packages that rely on existing ships and aircraft used in new ways.

Command and Control

Command and control integrates these core capabilities and enables the forward-deployed naval force to promote security, prevent conflict and win in war. Today's conflicts have demonstrated the need for persistent intelligence, surveillance and reconnaissance

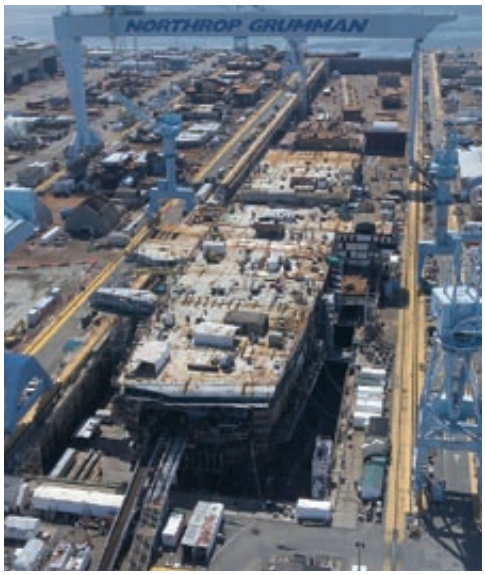
(ISR) support for the warfighter. The capabilities that manned and unmanned ISR systems bring to operational commanders can be truly game changing. More than ever before, current and future naval operations will require "information dominance," that is, combining ISR networks with command and control to provide commanders prompt, real-time and responsive information to enable coordinated action. To achieve information dominance, awareness of the physical environment must be combined with global awareness that integrates traditional, technologically-based methods with the social, cultural and language knowledge needed to better understand the human environment wherever we operate.

SUSTAINMENT

OUR STRATEGIC CONCERNS

- **Our Navy must balance investments in procurement, readiness and manpower**
- **The shipbuilding and aviation industrial bases are national assets that must be preserved**
- **Rising manpower and operating costs may constrain options for operating and recapitalizing our fleet**

Our Navy's ships, aircraft and people are underway, deployed globally every day—including more than 12,000 Sailors on the ground in Central Command and about 11,000 Sailors on Individual Augmentee assignments supporting the current fight worldwide. Our Sailors are providing critical skills in intelligence, reconstruction, information operations, medicine, and electronic warfare. Increasing demands and aging equipment, however, stress our force. Supporting joint and coalition ground forces with strike missions, surveillance and reconnaissance through more than eight years of conflict has taken a toll on the life expectancy of our ships and aircraft. These demands are expected to continue in support of partner forces as we draw down our ground forces in Iraq and later Afghanistan.



The average age of Navy ships has risen in the past decade—from about 15 years to more than 20 years old—as the ships built during the 1970s/1980s reach the ends of their service lives and replacements have been delayed or procured in less quantity than originally planned. As a result, the industrial base that produces our ships and aircraft has downsized and consolidated significantly over the past 20 years.

The value of robust domestic shipbuilding and aircraft industries cannot be overstated. In addition to making what our Navy needs, the direct and indirect benefits to employment and the larger national economy are significant.

The ability to fund sustained procurement of ships and aircraft is pressurized, though, by the growing cost of manpower and operations. Although the Navy reduced personnel by more than 13 percent in the past decade, overall personnel costs continued to

rise slightly. Unless manpower costs are controlled and ongoing operations adequately funded, these accounts will increasingly crowd out needed investments in readiness or recapitalization.

Our Navy provides our nation a force necessary to exert global influence, prevent conflict, promote security and stability, and win in combat. Our Navy is continuously present overseas to promote security without an expensive and increasingly controversial footprint on foreign soil.

Navy Sailors serving aboard ships, aircraft and elsewhere continue to protect the American way of life and the global system upon which the U.S. and its partners, friends and allies depend.

The following sections of the 2010 Program Guide describe the programs that the Navy has fielded and is currently 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

AH-1Z and UH-1Y Upgrades

Description

The H-1 Upgrade Program replaces the UH-1N and AH-1W aircraft with the 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 attack and utility support platforms for the next 20 years. The H-1 Upgrade Program is designed to reduce life-cycle costs, significantly improve operational capabilities and extend the service life of both aircraft. There is 84 percent commonality between the two aircraft, which will greatly enhance the maintainability and deployability of the systems, with the capability to support and operate both aircraft within the same squadron structure.

The upgrade program includes a new four-bladed, all-composite rotor system, coupled with a sophisticated fully integrated glass cockpit. The program also incorporates a performance-matched transmission, four-bladed tail rotor, 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 current range with more than double the payload. The AH-1Z will realize similar performance increases, with the ability to carry twice the current load of precision-guided munitions.

Status

The preliminary design review was approved in June 1997, and the critical design review was completed in September 1998. Low rate initial production began in the first quarter FY 2004. Five Engineering and Manufacturing Design (EMD) aircraft have been produced, four of which will eventually become composite maintenance trainers and one aircraft (without an integrated avionics suite) that was used for live-fire test and evaluation. Phase I of Operational Evaluation (OPEVAL) concluded in November 2006; Phase II began in January 2008. The UH-1Y declared Initial Operational Capability (IOC) on 8 August 2008 and deployed with the 13th Marine Expeditionary Unit (MEU) in January 2009.

AH-1Z Phase IIA concluded in the summer of 2008. The September 2008 Defense Acquisition Board (DAB) approved UH-1Y FRP and AH-1Z Lot V LRIP. AH-1Z Phase IIC3 DT/OT is in preparation for the October 2010 Milestone III Decision. The AH-1Z is on schedule to meet IOC in the third quarter of FY 2011. FOC for the UH-1Y is FY 2012, and FOC for the AH-1Z is FY 2018. As of October 2009, 21 UH-1Ys and 6 AH-1Zs were delivered. Program of Record build is scheduled to be complete by FY 2019, which includes 123 UH-1Ys and 226 AH-1Zs.

Developers

Bell Helicopter Textron Fort Worth and 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 destroying 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, Forward Area Refueling Points (FARPs)), and damaged conventional airfields.

Two variants of the aircraft are in operational service: the Night Attack and the Radar/Night Attack *Harrier*. The Night Attack *Harrier* improved the original AV-8B design through incorporation of Navigation, Forward-Looking InfraRed (NAVFLIR) sensor, a moving map, night vision goggle compatibility, and a higher performance engine. The current 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* to be responsive to the MAGTF's needs for expeditionary, night, and adverse weather offensive air support.

Status

The AV-8B *Harrier* Open Systems Core Avionics Requirement (OSCAR), which updates obsolete software and computer equipment, has entered service. OSCAR with Operational Flight Program H5.0 enables the AV-8B to employ Joint Direct Attack Munitions, Dual Mode Laser Guided Bombs, and provides tremendous improvements in radar and LITENING Advanced Targeting Pod capability.

The LITENING Advanced Targeting Pod provides the AV-8B with a significant improvement in its lethality and survivability. This third-generation, forward-looking infrared set, dual-field-of-view TV seeker, and infrared marker provides improved target recognition and identification, while the laser designator and laser spot tracker provide precision targeting capability. 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. The Marine Corps is procuring LITENING Gen 4 Pods with increased capability for employment on the AV-8B, F/A-18 Hornets, and EA-6B Prowlers.

The AV-8B *Harrier* has converted from flight hours to Fatigue Life Expended measurement to track airframe life, significantly extending the life of its weapon system. Program Wholeness efforts and Warfighting Wholeness enhancements to the *Harrier* are critical links to providing continued support to the MAGTF, until the Joint Strike Fighter (JSF) transition is complete.

Developers

Boeing — St. Louis, Missouri USA

BAMS UAS
Broad Area Maritime Surveillance Unmanned Aircraft System

Description

BAMS UAS is integral to the recapitalization of Navy's airborne Intelligence, Surveillance, and Reconnaissance (ISR) capability inherent in the Maritime Patrol and Reconnaissance Force (MPRF). BAMS UAS on-station persistence enables unmatched Maritime Domain Awareness (MDA) by sustaining the maritime Common Operational Picture (COP) for surface warfare, overseas operations, and homeland defense. The system will act as a trip wire for surge forces, enhancing situational awareness of the battlespace and shortening the sensor-to-shooter kill chain. In its ISR role, it will support decision superiority precision and mobility while providing data and communication relay services that "net" the battlespace. BAMS UAS is a long endurance-class UAS that will operate from land-based sites around the world and most likely be co-located with the current P-3 aircraft, or its planned successor, the P-8A. Because BAMS UAS and the P-3/P-8A have related and complementary missions, co-location will enhance manpower, training, and maintenance efficiencies. Additionally, the Navy is investigating potential BAMS UAS operational, training, and production commonalities with its sister system, the U.S. Air Force's RQ-4B *Global Hawk*. The current Concept of Operations (CONOPS) includes systems of up to five air vehicles providing persistent ISR 24 hours a day, seven days a week, out to ranges of 2,000 nautical miles (NMs). Worldwide access is achieved by providing coverage over high-density sea lanes, littorals, and areas of national interest from its operating locations.

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, and SDD initiated in August 2008. Milestone C is scheduled for 2013, and IOC is expected in FY 2016.

Developers

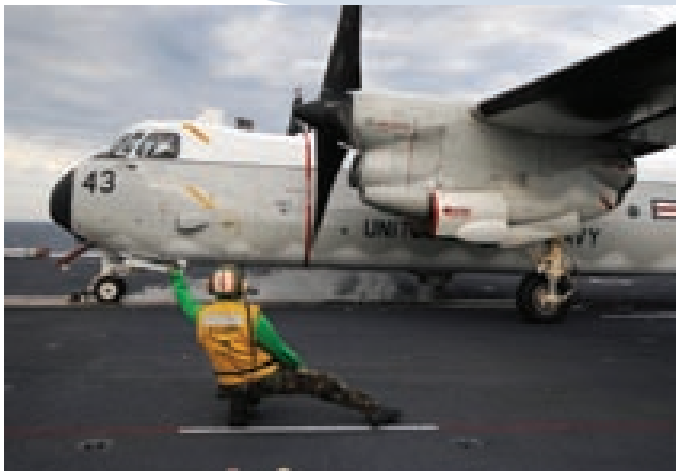
Northrop Grumman Palmdale, California USA

C-2A(R)
Greyhound

Description

The C-2A *Greyhound* provides critical logistics support to Carrier Strike Groups. Its primary mission is transport of high-priority cargo, mail, and passengers between carriers and shore bases. 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 up to a distance of 1,000 nautical miles. The interior arrangement of the cabin can readily accommodate cargo, passengers and litter patients. Priority cargo such as jet engines can be transported from shore to ship in a matter of hours. A cargo cage system or transport stand provides restraint for loads during launches and landings. The large aft car-

go ramp/door and a powered winch allow straight-in rear cargo loading and unloading for fast turnaround. The C-2A's in-flight ramp-open capability allows airdrop of supplies and personnel. Its onboard Auxiliary Power Unit (APU) provides engine starting capability and ground power self-sufficiency in remote areas, providing an operational versatility found in no other cargo aircraft.



Status

The aircraft is currently undergoing 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. The changes being incorporated include structural enhancements, engine improvements, aircraft rewire, cockpit avionics systems improvements, and a new eight-blade propeller system (NP2000). SLEP will make the C-2A a viable and maintainable platform until it is replaced. Additionally, as mandated by Congress and the CNO, two passenger-carrying safety requirements have been integrated into the C-2A: the Traffic Alert and Collision Avoidance System (TCAS) and Terrain Awareness Warning System (TAWS).

Developers

Northrop Grumman Bethpage, New York USA

C-37
Executive Transport

Description

The Navy maintains executive transport airlift in accordance with DoD Directive 4500.56. Senior Leaders require air transport that has secure communications capability. In 2010, 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 internationally 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 was delivered in 2005, and two more were delivered in 2006. The first aircraft, the Navy's only C-37A, is now based at Hickam AFB, Hawaii and supports Commander, U.S. Pacific Fleet (PACFLT). The C-37Bs are based at NAF Washington, DC 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, U.S. Naval Forces Europe-U.S. Naval Forces Africa (NAVEUR-NAVAF) executive transportation requirements.

Developers

General Dynamics Gulfstream Division 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. Fifteen C-9B aircraft, which currently perform the majority of these services, are being replaced by the C-40A *Clipper*, a modified Boeing 737-700 series aircraft. This state-of-the-art aircraft—not to be confused with Executive/VIP transport—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 nautical miles and Mach 0.8 cruise speed. The ability to simultaneously carry cargo pallets and passengers 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 take-off weight is 171,000 pounds.

Status

Nine aircraft were inventoried in early 2010, with two additional aircraft on contract. The Navy is purchasing the aircraft via commercial-off-the-shelf (COTS) standards, using standard best commercial practices. Three aircraft are stationed in NAS JRB Fort Worth, Texas; NAS Jacksonville, FL; and NAS North Island, San Diego, California.

Developers

Boeing — Seattle, Washington USA

C-130T/J Hercules

Description

The Navy C-130T *Hercules*, a component of the NUFEA complement, provides heavy, over-and-outsized lift capability. The C-130J, with its increased performance and maintenance reliability, is the follow-on aircraft to meet the Combatant Commander's requirements well into the 21st Century. These aircraft are deployed worldwide and provide rapid response direct support to the Navy's Component Commander's Theater Requirements. This aircraft can be rigged/re-rigged within minutes to transport up to 40,000 pounds of cargo or up to 75 passengers.

Status

The Navy has begun a procurement strategy to replace its C-130T aircraft with a modern C-130J. The current fleet is Communications Navigation Surveillance/Air Traffic Management (CNS/

ATM) compliant through FY 2014. In early 2010, 19 aircraft were in the inventory, stationed in NAS JRB Willow Grove, Pennsylvania; NAS Jacksonville, FL, NAS JRB New Orleans, Louisiana, NAF Washington, DC, and NBVC Point Mugu, California.

Developers

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

CH-53K
Heavy-Lift Replacement (HLR)

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 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 this cargo in a landing zone at a pressure altitude of 3,000 feet at 91.5 degrees Fahrenheit, a capability improvement that nearly triples the current CH-53E abilities under the same conditions. Additionally, the CH-53K will be capable of carrying a normal load of 30 combat loaded troops, with a maximum capacity of 32 troops. The CH-53K supports the Joint Operations Concept of Full Spectrum Dominance and Sea Power 21 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

Post Milestone (MS) B System Development and Demonstration (SDD) contract of $3 billion awarded to Sikorsky Aircraft Corporation on 5 April 2006. Program conducted Preliminary Design Review during the fourth quarter FY 2008. Critical Design Review is scheduled for the third quarter of FY 2010. The Marine Corps program of record requirement is 156 aircraft; the Marine Corps force structure growing to 202K Marines will increase the requirement to 200 aircraft. U.S. Navy and Foreign Military Sales participation is TBD.

Developers

Sikorsky Aircraft Corporation	Stratford, Connecticut USA

CNATRA Naval Aviation Training Aircraft

Description

Commander, Naval Air Training Command's (CNATRA) mission, the on-time delivery of aviators (USN/USMC/USAF/USCG pilots and military flight officers) trained with leading-edge technologies, is key to affordable fleet readiness. CNATRA's training aircraft inventory includes the T-34C *TurboMentor*, T-6 *Texan II*, T-45 *Goshawk*, TH-57, 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 *TurboMentor* (pilots) and the T-6A *Texan II* (flight officers). The T-34 started its Navy career in 1977 and has successfully and honorably completed its service at NAS Pensacola, where it was a primary training aircraft for student Naval Flight Officers (NFOs). All primary flight officers training is now conducted in the T-6A. Currently, avionics upgrades are inserted into the production line (T-6B) and T-6A aircraft already delivered are planned for retrofit to the T-6B configuration. While still in use at NAS Whiting Field and NAS Corpus Christi, the *TurboMentor* is scheduled to begin being replaced by the T-6B in FY 2011 at Whiting Field and FY 2013 at Corpus Christi.

The T-6 *Texan II* is one component of the Joint Primary Aircraft Training System (JPATS) along with simulators, computer-aided academics, and a Training Integration Management System (TIMS). The aircraft, built by Hawker Beechcraft Corporation, is a derivative of the Swiss Pilatus PC-9 aircraft with a Pratt & Whitney PT-6A-68 engine, digital cockpit, Martin-Baker ejection seats, cockpit pressurization, and an onboard oxygen-generating system.

The T-45 *Goshawk*, the Navy version of the British Aerospace Hawk aircraft, is used for the intermediate and advanced portions of the Navy/Marine Corps pilot training program for the jet carrier aviation and tactical strike syllabus. Upgrades to the T-45 include converting all analog cockpits (T-45A) to digital cockpits (T-45C), resolving an engine surge issue to make the aircraft more fuel efficient and safer to operate, and extending service life.

The TH-57 *Sea Ranger*, a derivative of the commercial Bell Jet Ranger 206, is the Navy's sole advanced rotary training platform used at NAS Whiting Field. Upgrades to the TH-57 underway include energy attenuating seats, exceedence-warning systems, and a digital cockpit with NVG capability, guaranteeing aircraft availability and relevance through 2030.

The T-44A *Pegasus* and the TC-12 *Huron* are both twin-engine, pressurized, fixed-wing aircraft that are used for intermediate and advanced training for multi-engine aircraft. Future upgrades to the T-44 include wing wiring, simulator upgrades, and converting cockpits from analog to digital (T-44C).

The T -39 *Sabreliner* is a multipurpose low-wing, twin-jet aircraft that has been in naval service since the early 1990's. The primary mission of the *Sabreliner* is to conduct intermediate and advanced

training for Strike/Strike-Fighter NFOs. The T-39 will be replaced in the NFO syllabus by the T-45 with a Virtual Mission Training System (VMTS). The T-45 *Goshawk* is currently being used for the tactical maneuvering portion of Strike/Strike-Fighter NFO training at NAS Pensacola.

CNATRA has recently charted a course to revolutionize NFO training by utilizing the T-6, the T-45C with VMTS and high fidelity simulators to train future NFOs. This new training program will capitalize on cutting edge technologies, while allowing the Navy to divest of the aging T-39 platform. The new capability is planned for IOC at NAS Pensacola in FY 2013.

Status

T-6 is currently in production with a planned inventory objective of 315 aircraft. The T-45 procurement program ended in FY 2007.

Developers

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

E-2C/D
Hawkeye Airborne Early Warning Aircraft

Description

The E-2 *Hawkeye* is the Navy's airborne surveillance and command and control (C2) platform, providing battle management and support of decisive power projection at sea and over land in a joint operational architecture. In addition to current capabilities, the E-2 has an extensive upgrade and development program to improve the capability of the aircraft as it is a critical element in an overall integrated air and missile defense (IAMD) program. Two upgrades will ensure that *Hawkeye* keep pace with changing tactical environments: the E-2C *Hawkeye 2000* (HE-2K) and the E-2D *Advanced Hawkeye* (AHE) aircraft which evolved from the E-2 Radar Modernization Program (RMP).

The E-2C *Hawkeye 2000*, currently the most advanced *Hawkeye* variant in the fleet, features a Mission Computer Upgrade, Cooperative Engagement Capability (CEC), Improved Electronic Support Measures (ESM), Joint Tactical Information Distribution System (JTIDS), 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* will significantly extend the engagement capability of air defense ships. It is the key to early cueing of the Aegis Weapons System, dramatically extending the lethal range of the Standard Missile (SM-2).

The E-2D *Advanced Hawkeyes* with the APY-9 radar will bring an improved over-the-horizon, overland and littoral detection and tracking capability to the strike group. The APY-9, when coupled with CEC, will fully integrate the E-2D *Advanced Hawkeye* into the Joint Integrated Air and Missile Defense (JIAMD) role. This

advanced detection and tracking capability, in conjunction with Aegis and the upgraded Standard Missile, 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. The E-2D *Hawkeye* will continue as the airborne "eyes and ears" of the fleet as it applies its capabilities in the integrated joint, overland, theater-wide air and cruise missile-defense environment. Many technological upgrades being incorporated in the *Hawkeye* represent leading-edge improvements for U.S. forces, not just in the Navy's theater air and missile defense programs.

Status

The last of 26 E-2C *Hawkeye 2000* aircraft were delivered to the Navy in September 2009. Two E-2D Advanced Hawkeye System Development and Demonstration (SDD) aircraft are in flight test at Patuxent River, Maryland. First flight took place in August 2007 and an operational assessment was completed October 2008. A Nunn-McCurdy breach precipitated in June 2009. USD (AT&L) recertified the program authorizing LRIP lots of 1&2 and approved a new original Acquisition Program Baseline (APB), establishing Average Procurement Unit Cost (APUC) and Program Acquisition Unit Cost (PAUC) at 0%. Three Pilot Production and two Low Rate Initial Production (LRIP) aircraft are currently in production in St. Augustine and are meeting all cost, schedule, and performance criteria. Four lots of LRIP aircraft are planned for procurement in FY 2009-12 with delivery scheduled two years after procurement. Full rate production begins in FY 2013 with an objective of 75 aircraft. OPEVAL is planned for FY 2012; the first squadron will begin the transition to E-2D in 2013 with IOC and the first deployment planned for the first quarter FY 2015 (October 2014).

Developers

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

E-6B Mercury

Description

The E-6B platform, derived from the Boeing 707, provides the Commander, U.S. Strategic Command (STRATCOM) with the command, control, and communications 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 STRATCOM Airborne Command Post mission, and Airborne Launch Control of ground-based ICBMs. It is the Navy's only survivable means of nuclear command and control.

Status

In order to sustain and improve E-6B capability, the Block I modification program was developed. The contract for Block I was

awarded to Rockwell Collins in March 2004 and it is designed to repair a number of aircraft deficiencies identified by STRATCOM. IOC is planned for 2013. 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 Block II program 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 IP/BE and Block II programs will support STRATCOM's migration of Nuclear C2 to a distributed, network/IP-based global C2 system as an airborne node. IP/BE IOC is scheduled for 2012, and the Block II IOC is 2015.

Developers

Boeing	Seattle, Washington USA
Rockwell Collins	Cedar Rapids, Iowa USA
L3/VERTEX Aerospace	Madison, Mississippi USA

EA-6B
Prowler Airborne Electronic Attack Aircraft

Description

The EA-6B *Prowler* provides Airborne Electronic Attack (AEA) and Anti-Radiation Missile (ARM) capabilities against enemy radar and communications systems. In addition to enhancing strike capabilities of carrier air wings and Marine expeditionary forces, an expeditionary *Prowler* force has provided AEA capability during numerous joint and allied operations since 1995 against traditional and non-traditional target sets in support of ground forces. These capabilities continue to be demonstrated in Overseas Contingency Operations, where EA-6B operations in Afghanistan and Iraq protect coalition forces and disrupt critical communications links. The enormous demand for AEA in Operation Enduring Freedom and Operation Iraqi Freedom has driven EA-6B utilization rates to record levels.

Status

The Improved Capability (ICAP) III upgrade reached IOC in September 2005 with the "Cougars" of VAQ-139. This generational leap in electronic attack capability deployed for the first time in 2006. The ICAP III includes a completely redesigned receiver system (ALQ-218), new displays, and MIDS/Link-16, which dramatically improve joint interoperability. Additionally, the ALQ-218 will also form the heart of the EA-18G *Growler* AEA system–the Navy's follow-on platform for the EA-6B.

Developers

Northrop Grumman Corporation	Bethpage, New York USA

EA-18G
Growler Airborne Electronic Attack Aircraft

Description

The EA-18G *Growler* will replace the EA-6B *Prowler* as the Navy's sole tactical electronic attack aircraft. Like the *Prowler*, the EA-18G will provide full-spectrum electronic attack to counter enemy air defenses and communication networks. 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 other strike-fighter tasking.

Status

The EA-18G *Growler* reached IOC in 2009. The aircraft completed Critical Design Review in April 2005 and initial procurement of the first four aircraft began in FY 2006. The *Growler's* first flight was flown one month ahead of schedule, in August 2006. The aircraft has completed developmental test and is undergoing operational test and evaluation at NAWS China Lake, California. The EA-18G program achieved its MS C decision in July 2007 and has begun low rate initial production. The first production aircraft was delivered in September 2007. In June 2008, VAQ-129 (the Fleet Replacement Squadron located in Whidbey Island, WA) received its first aircraft and has been certified safe for flight. VAQ-132 completed transition in September 2009. An inventory objective of 114 aircraft is planned to support a 14-squadron, carrier and expeditionary-based force structure.

Developers

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

EP-3E
Aries II Modification and Sustainment

Description

The EP-3E is the Navy's only airborne Information Warfare (IW) and tactical Signals Intelligence (SIGINT) platform supporting naval and joint commanders. EP-3Es provide long-range, high-endurance support to carrier strike groups and expeditionary strike groups in addition to performing independent maritime operations. The current force consists of two active squadrons based in Whidbey Island, Washington. EP-3E roadmap focuses on three elements: P-3 to EP-3E conversions; EP-3E modernization; and inventory sustainment until a replacement capability can be fielded.

P-3 to EP-3E conversions: The P-3 to EP-3 conversion program completed in FY 2007 converted a total of five P-3C *Orion* to EP-3E *Aries II* aircraft.

EP-3E modernization: The original EP-3E Joint Airborne SIGINT Architecture Modification (JMOD) program was restructured in FY 2005 to accelerate capabilities to the fleet ahead of schedule.

The resultant JMOD Common Configuration (JCC) program aligns mission systems to meet the challenges of rapidly emerging threat technology and also addresses obsolescence issues. Using spiral developments, JCC is IP-based SCI network capable and includes improved ELINT and COMINT capabilities, multi-platform geo-location capabilities, advanced Special Signals Collection capability, IW/Information Operations (IO) capability, and incorporates quick reaction capabilities (QRCs) developed for OEF/OIF. JCC is also equipped with FLIR and remote reachback capabilities in response to Surge requirements in support of the current operations. In order to ensure EP-3E relevance beyond FY 2020, a Recapitalization Capabilities Migration (RCM) program will equip EP-3E with follow-on capabilities to be migrated to a replacement capability and continue to incorporate QRCs in response to critical warfighter demands.

Inventory sustainment: EP-3Es will be sustained through a series of Special Structural Inspections (SSIs) and Special Structural Inspection-Kits (SSI-Ks). SSIs will be completed on all aircraft. SSI-Ks will be completed on aircraft meeting criteria as required and will include preemptive replacement of fatigue critical structures.

Status

The EP-3E JCC ORD was approved on 10 June 2005. The JCC Development/Production Contract was awarded on 29 June 2005.

Developers

L-3 Communications	Waco, Texas USA
Northrop Grumman	Baltimore, Maryland USA
Titan	Vienna, Virginia USA
Aeronixs	Melbourne, Florida USA
General Dynamics	San Jose, California USA
Allied Signal	Sunnyvale, California USA
TRW	Sunnyvale, California USA
EDO Corporation	San Jose, California USA
Lockheed Martin	Fort Worth, Texas USA
Lockheed Martin	Denver, Colorado USA
Naval Surface Warfare Center (NSWC)	Crane, Indiana USA
NSWC	Dahlgren, Virginia USA
Naval Aviation Depot	Jacksonville, Florida USA
AT&T Solutions	Vienna, Virginia USA
Raytheon	Indianapolis, Indiana 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 provisions for employing updated missiles and jamming devices against enemy ordnance. 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 Iraqi Freedom. 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 now 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 2009, the Navy and Marine Corps had 101 F/A-18A, 26 F/A-18B, 377 F/A-18C, and 134 F/A-18D aircraft in service and test roles; two NF/A-18C and two NF/A-18D versions were in permanent test roles. *Hornets* equip 27 active Navy and Marine Corps and three Navy and Marine Corps Reserve strike fighter squadrons, three fleet readiness squadrons, one Navy Reserve fighter composite squadron, three air test and evaluation squadrons, the Navy's Flight Demonstration Squadron (Blue Angels), the Naval Strike & Air Warfare Center, and the Naval Test Pilot School at Patuxent River, Maryland.

Developers

Boeing	St. Louis, Missouri USA
General Electric	Lynn, Massachusetts 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, 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 are 4.2 feet longer than earlier *Hornets*, have a 25 percent larger wing area, a wing span 4.7 feet longer and a 33 percent higher internal fuel carry that effectively increases endurance by 50 percent and mission range by 41 percent. Its carrier-recovery payload is more than 9,000 pounds. 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, also 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).

There are two primary improvements in the *Super Hornet*. The first is the 41 percent interdiction-mission range increase. Second, the aircraft has the ability to recover aboard a carrier with optimum reserve fuel while carrying a load of precision-strike weapons. The *Super Hornet* also has the space, power, and cooling capability needed to accommodate valuable but installation-sensitive avionics including the Active Electronically Scanned-Array (AESA) radar. The *Super Hornet* was designed to optimize stealth and has other survivability enhancements. Compared to the F-14 *Tomcat*, the *Super Hornet's* cost per flight hour is 40 percent lower and requires 75 percent fewer labor hours per flight hour. Sophisticated systems—such as the Integrated Defensive Electronic Countermeasures System (IDECMS), Advanced Targeting Forward Looking Infrared (ATFLIR), Joint Helmet-Mounted Cueing System (JHMCS), JDAM, 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 Joint Air-to-Surface Standoff Missile (JASSM) and Advanced Aft-Cockpit Crew Station.

The first operational F/A-18E *Super Hornet* squadron, VFA-115, was deployed on board USS Abraham Lincoln (CVN 72) on 24 July 2002, for a ten-month initial deployment. The *Super Hornet* saw its first combat action on 6 November 2002, when VFA-115 carried out a strike on hostile targets during Operation Enduring Freedom. During this deployment, VFA-115 *Super Hornets* also completed precision strike, offensive and defensive counter-air, and airborne tanking missions. The second and third operational

Super Hornet units, VFA-14 and VFA-41 (the latter being the first operational F/A-18F squadron), flew combat missions in Iraq in April 2003 and introduced the SHARP reconnaissance pod and JHMCS.

F/A-18E/F *Super Hornets* remain at the forefront of combat operations in both Afghanistan and Iraq. *Super Hornet* squadrons have been integrated into all ten U.S. Navy air wings and with future capability upgrades are well suited to complement the arrival of the F-35 Joint Strike Fighter.

Status

The first *Super Hornet* squadron completed transition to the F/A-18F in 2003 and then permanently forward-deployed to Japan. As of October 2009, there were 176 F/A-18E models and 217 F/A-18F models in the U.S. Navy inventory. The F/A-18E will supplement and eventually replace the older F/A-18C, while the F/A-18F version has replaced the F-14 in fleet service.

Developers

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

F-35
Joint Strike Fighter (JSF) Lightning II

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" design 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, Norway, the Netherlands, Turkey, and the United Kingdom. Security Cooperation Partnership Memoranda of Understanding (MoU) have been established with Israel and Singapore. The STOVL variant will replace Marine F/A-18s and AV-8Bs. The CV variant will replace F/A-18A-C aircraft and complement the F/A-18E/F.

Status

The JSF is in its ninth year of a planned 13-year SDD program. The 12 November 2008 Defense Acquisition Board approved full funding for seven CTOL and seven STOVL aircraft for LRIP 3, and advance procurement funding for LRIP 4 for 12 CTOL, 16 STOVL, and four CV aircraft. First CTOL variant SDD flight was December 2006; first STOVL flight was June 2008; and first CV flight is projected for early CY 2010. The Marine Corps has scheduled

IOC in 2012 and the Navy in 2014. All key performance parameters are projected to be met at IOC. The DoD Base Realignment and Closure Commission 2005 directed the first JSF Integrated Training Center to be at Eglin Air Force Base, Florida.

Developers

Lockheed Martin	Fort Worth, Texas USA
Pratt Whitney	East Hartford, Connecticut 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 in-flight refueling; rapid ground refueling of aircraft and tactical vehicles; assault air transport of air-landed or air-delivered personnel, supplies, and equipment; C2 augmentation; battlefield illumination; tactical aero medical evacuation; and combat search and rescue support. The KC-130J—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—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 has all been retired as of December 2008, with 28 KC-130T model aircraft yet to be replaced. As of December 2009, 36 KC-130Js were in USMC inventory.

Developers

Lockheed Martin	Marietta, Georgia 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 CONOPS for the 21st Century. Under the Helicopter CONOPS, the *Seahawk* will deploy as companion squadrons embarked in the Navy's aircraft carriers, surface warships, and logistics ships. The MH-60R will provide surface and undersea warfare support to operations with a suite of sensors and weapons that include dipping sonar, electronic support measures, advanced Forward Looking Infrared, and precision air-to-surface missiles. The MH-60S will provide mine warfare support for Sea Shield and will partner with the

MH-60R for surface warfare missions carrying the same Forward Looking Infrared air-to-ground sensors and weapons. The MH-60S will be reconfigurable to provide Combat Search and Rescue and Naval Special Warfare support to joint theater operations. Airborne mine countermeasures operations will be accomplished using advanced sensor and weapons packages to provide detection, localization, and neutralization to anti-access threats. The MH-60S will anchor the fleet logistics role in carrier strike group and expeditionary strike group operations. 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 third quarter FY 2005. It was authorized to enter Full Rate Production in March 2006. The Navy plans to acquire 300 MH-60Rs. The MH-60S was approved for full-rate production in August 2002 and is currently undergoing scheduled block upgrades for Armed Helicopter and airborne mine counter-measure missions. The Navy plans to acquire 275 MH-60Ss.

Developers

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

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

Description

VTUAV Fire Scout supports warfighting requirements as a part of the Littoral Combat Ship ASW, MCM, and SUW Mission Modules. Fire Scout provides day/night real-time intelligence, surveillance, and reconnaissance (ISR); target acquisition; voice communications relay; and battlefield management capabilities a tactical commander. It is operated and maintained by members of a composite VTUAV/MH-60R or VTUAV/MH-60S aviation detachment.

Status

The VTUAV Fire Scout will complete development and operational testing aboard the USS McInerney (FFG 8), prior to integration with and operations from LCS. Fire Scout will conduct a Military Utility Assessment and Operational Evaluation and will achieve IOC in McInerney in FY 2010. Testing and integration into LCS is also scheduled for late FY 2010.

Developers

Northrop Grumman	San Diego, California USA
Schweizer Aircraft Corporation	Big Flats, New York USA

MV-22 Osprey

Description

The MV-22 *Osprey* is a tilt-rotor, Vertical/Short Take-Off or Landing (V/STOL) aircraft designed as the medium-lift replacement for the CH-46E helicopter. The MV-22 design incorporates advanced technologies in composite materials, survivability, airfoil design, fly-by-wire controls, digital avionics, and manufacturing. The MV-22 is capable of carrying 24 combat-equipped Marines or a 10,000-pound external load, and has a strategic self-deployment capability of 2,100 nautical miles with a single aerial refueling. The MV-22 flight capabilities are far superior to the CH-46E it replaces with twice the speed, three times the payload, and six times the range. The MV-22 represents a revolutionary change in aircraft capability to meet a plethora of expeditionary and unique missions for the 21st Century. A Special Operation Forces (SOF) variant, the CV-22, is being procured by the Air Force and SOCOM.

Status

MS III completed and approved for Full Rate Production, the V-22 entered a congressionally approved joint five-year MYP in FY 2008. IOC was achieved for the MV-22 in June 2007. Six east coast VMM squadrons have successfully completed combat tours in Iraq having performed well in all missions. An MV-22 squadron is now preparing for the aircraft's first operational combat deployment to Afghanistan in FY 2010. The first operational shipboard expeditionary deployment with a reinforced MV-22 squadron is in its final stages. CV-22 IOC occurred in FY 2009.

Developers

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

Navy Unmanned Combat Aircraft System Demonstration (UCAS-D)

Description

The Navy Unmanned Combat Air System Demonstration (UCAS-D) evolved from the Joint Navy/Air Force development program called J-UCAS. The 2006 QDR 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 are to demonstrate critical technologies for a carrier suitable low observable air vehicle in a relevant environment (UCAS-D) and to conduct automated air refueling (AAR) demonstrations. These and other risk reduction efforts must be

completed to achieve the appropriate Technology Readiness Level (TRL-6) in preparation for a potential acquisition program.

On 1 August 2007, Northrop Grumman Systems Corporation was awarded the UCAS-D contract. Demonstration areas for shipboard operations include catapult launches, arrested landings and flight in the vicinity of an aircraft carrier. Two air vehicles are being built for the UCAS-D, with first flight of Air Vehicle #1 scheduled for FY 2010. Carrier operations are to be conducted with both air vehicles in FY 2012. The AAR efforts will be conducted with Air Vehicle #2 after the CV Demonstration and conclude by 2013.

The UCAS-D air vehicles will neither carry weapons nor be operational, as they will not include any mission systems or sensors. Future UCAS technology development areas include transformational communications, integrated advanced propulsion, carrier-suitable materials, low-observable (LO) sensors and apertures, sense and avoid functionality (all operating in a LO environment), and expanded autonomous operations. Critical technological risks are associated with landing unmanned LO shapes aboard ships, the integration of UCAS into manned carrier air wing operations, and high levels of vehicle and sensor autonomy. A deliberate and step-wise approach is required to successfully make this transformation.

Status

The Navy is in the process of conducting a Capabilities Based Assessment that will evaluate and define potential future Strike/C4ISR capability gaps resulting from the sundown of the F/A-18 E/F force circa 2025 with the future posing increasingly sophisticated near-peer threats and anti-access environments. This assessment will begin the process to inform investment decisions for any future operational system design and capability requirements to conduct multiple missions including, but not limited to, strike, counter-air, surveillance, reconnaissance, and suppression of enemy air defenses.

Developers

Northrop Grumman Systems Corporation

P-3C
Orion Modification, Improvement and Sustainment

Description

A key enabler of the maritime strategy, the legacy P-3C *Orion* provides anti-submarine warfare (ASW), anti-surface warfare (ASUW) and Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR) capabilities to naval and joint commanders and contributes directly to maritime domain awareness across the globe in support of carrier and expeditionary strike groups. Squadrons are based in Jacksonville, Florida; Whidbey Island, Washington; and Kaneohe Bay, Hawaii.

An airframe in very high demand, the Navy's P-3 roadmap focuses

on three areas: inventory sustainment; modernization; and recapitalization by the P-8A *Poseidon* to provide a force optimized for regional and littoral crisis and conflict. Specific program elements include:

Inventory Sustainment: A service life assessment program was completed to determine what actions must be taken to safely extend the airframe service life. Special Structural Inspections (SSI) provide inspection and repairs necessary to ensure safety of flight until more comprehensive maintenance can be performed. SSI-Kit (SSI-K) (and previously Enhanced SSI (ESSI)) provides preemptive modification and replacement of critical structural components to allow up to 7000 additional flight hours. A lower wing surface (Zone 5) modification program and outer-wing replacements were instituted in December 2007 after continuing FLMP analysis revealed that the rear area of Zone 5 experienced fatigue much worse than previously estimated. Though P-3C material condition remains a persistent risk, these programs will allow sustainment of the P-3 fleet until the P-8A starts replacing the P-3C in 2013.

Modernization: The Critical Obsolescence and Mission System Sustainment programs are designed to improve aircraft availability through replacement of obsolete systems with modern and more reliable systems. These programs ensure the P-3C continues to meet Navy's Anti-Submarine Warfare, Anti-Surface Warfare, Over the Horizon Targeting C4I requirements, while also reducing risk in mission system migration/integration for the P-8A *Poseidon*.

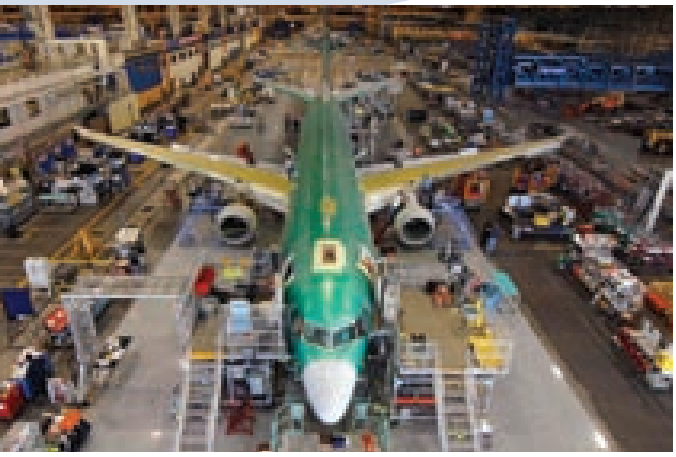
Recapitalization: P-8A *Poseidon* recapitalizes the Maritime Patrol Anti-submarine Warfare (ASW), Anti-surface Warfare (ASuW) and armed Intelligence, Surveillance and Reconnaissance (ISR) capability that currently resides in P-3 squadrons.

Status

P-3 sustainment and modernization programs remain critical to ensure successful transition to the P-8A *Poseidon*. Through FY 2009, 84 SSIs have been completed (one is in work); 39 ESSIs have been completed, and the program is finished; 20 SSI-Ks have been completed with 24 aircraft and six rotable wingsets in work (up to 87 aircraft planned); nine Zone 5 Modifications have been completed with 29 aircraft and four rotable wingsets in work (up to 66 planned); outer wing replacements will begin in 2010—wing procurement (17 kits) was initiated in 2008 (up to 29 planned).

Developers

Lockheed Martin	Marietta, Georgia USA
Lockheed Martin	Eagan, Minnesota USA
Lockheed Martin	Greenville, South Carolina USA
Lockheed Martin	Manassas, Virginia USA
L-3 Communications	Greenville, Texas USA



P-8A MMA
Multi-mission Maritime Aircraft

Description

The P-8A *Poseidon* Multi-Mission Aircraft (MMA) will replace the P-3C *Orion* aircraft, which has reached the end of its service life. The P-8A will feature a technologically agile, open architecture that enables integration of modern, capable sensors with robust communications. P-8A will tailor integration of its onboard mission suite with unmanned aerial vehicles and satellite-based systems and sensors to assure maritime access. It will provide unparalleled persistent undersea warfare capability as well as significant anti-surface warfare and intelligence, surveillance, and reconnaissance (ISR) capability. The P-8A will leverage global logistics support infrastructure and established advanced training applications to provide both higher availability and improved warfighting readiness.

Status

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 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 for warfighters. In 2002, the Navy re-engaged industry in Component Advanced Development, refining concepts, matching architecture to fill the Navy vision, and validating requirements. USD (AT&L) approved a revised acquisition strategy to focus MMA on P-3 replacement, not a P-3 Service Life Extension. The Operational Requirements Document/Concept Development Document was endorsed by the Navy staff and received the required certifications from the Joint staff in preparation for a 2004 Milestone B (entry into System Development and Demonstration). That milestone was successfully passed in May 2004 and the Navy selected the McDonnell-Douglas Corporation, a wholly owned subsidiary of Boeing, as the single system integrator in June 2004. P-8A completed Preliminary Design Review in November 2005, Critical Design Review in June 2007 and Design Readiness Review in August 2007. The program is on track for Milestone C in mid-FY 2010 and IOC in FY 2013.

Developers

Boeing — Renton, Washington USA

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

Description

MCTUAS is an organic MEF/JTF Commander asset. The Army Shadow 200 is the current platform and is a transportable ISR asset capable of providing tactical commanders with day and night, battlefield and maritime reconnaissance in support of Marine Expeditionary Maneuver Warfare and maritime control operations. One

Shadow system consists of two Ground Control Stations, four Air Vehicles, one launcher, and support equipment. Each air vehicle has an Electro-Optical/Infra-Red/Laser Pointer Mission Payload. Increasing the organic capability of ISR to the MEF/JTF Commander, the USMC is standing up an additional VMU, totaling three. Each VMU will operate three systems and be task-organized to operate independently (distributive ops). A fourth VMU, VMU-4, stands up in FY 2011 and will be part of the Reserve component.

Status

The transition from Pioneer to Shadow (directed by DC(A) and approved by ASN RDA) is completing in early 2010. Shadow is a U.S. Army Program of Record, and the Army provides configuration management, training, RDTE, and production contracts. By maintaining the U.S. Army configuration, the USMC realizes economic efficiencies. VMU 3 stood up the fourth quarter FY 2008. Two Pioneer systems will be replaced by a total of 13 Shadow systems. Upgraded TCDL and Laser Designator capabilities under Army RDTE are planned for FY 2009-11.

Developers

AAI — Hunt Valley, Maryland USA

AVIATION WEAPONS

AGM-84H/K SLAM-ER
Standoff Land-Attack Missile-Expanded Response

Description

SLAM-ER is a long-range, highly precise, air-launched strike missile which is capable of attacking high value fixed and re-locatable land targets, as well as surface ship targets underway or in port. Terminal control of the weapon is accomplished by the pilot designating the impact point on the Imaging Infrared (IIR) scene transmitted from the weapon and displayed in-cockpit. Man-in-the-loop commands are sent to the SLAM-ER via a data link pod that is carried by the launch or secondary control aircraft. Both *Hornet* F/A-18A/B/C/D variants and *Super Hornet* F/A-18E/F variants can launch and provide terminal control of SLAM-ER.

Status

SLAM ER is expected to remain in the active inventory until 2025.

Developers

Boeing — St. Louis, Missouri USA

AGM-88E AARGM
Advanced Anti-Radiation Guided Missile

Description

The Navy's AGM-88E AARGM is the latest evolution of the HARM weapon system. HARM is Navy's only anti-radiation, defense-suppression, air-to-surface missile. Employed successfully in naval operations for decades, HARM is designed to destroy or suppress

broadcasting enemy electronic emitters, especially those associated with radar sites used to direct anti-aircraft guns and surface-to-air missiles. AGM-88B (Block IIIA) and AGM-88C (Block V) are the currently fielded fleet configurations of HARM. The AGM-88E program upgrades a portion of existing HARM missile inventory with a new guidance section incorporating multi-sensor, multi-spectral digital anti-radiation homing detection capability, Global Positioning System/Inertial Navigation System (GPS/INS) guidance, and a millimeter-wave terminal seeker. AARGM also includes netted situation awareness/targeting capability and weapon impact assessment reporting via direct connectivity with national technical means. The AARGM system will provide the U.S. Navy/Marine Corps and the Italian Air Force with a transformational and affordable Destruction of Enemy Air Defenses (DEAD) and time-sensitive strike capability upgrade to HARM. The U.S. DoD and the Ministry of Defense of the Republic of Italy have signed an international MoA for cooperative development of AGM-88E.

Status

The AGM-88E is an ACAT-IC SDD program with a planned IOC in November 2010. AARGM was successfully demonstrated as an ATD and "Quick Bolt" ACTD sponsored by EUCOM. The Italian Air Force will integrate AARGM on their Tornado ECR aircraft.

Developers

ATK Missile Systems	Woodland Hills, California USA
Raytheon	Tucson, Arizona USA

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

Description

AIM-120 AMRAAM is an all-weather, all-environment radar-guided missile developed by the Air Force and Navy. The missile is currently 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 F-35 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 FYDP. The Navy is investigating follow-on options for BVR missile capabilities to match the NAV2030 requirements.

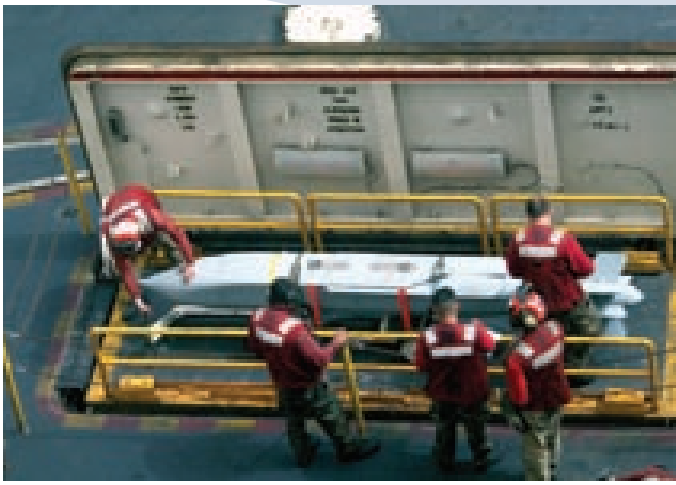
Status

The AIM-120C7 missile variant is a product of P3I and it reached IOC in FY 2008. AIM-120D IOC is scheduled for FY 2011.

Developers

Raytheon	Tucson, Arizona USA

AGM-154 JSOW
Joint Standoff Weapon



Description

JSOW is a family of armaments that permit naval aircraft to attack targets at increased standoff distances. The weapons use 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 accuracy. The JSOW-C-1 will incorporate new capabilities against moving targets, providing an affordable, air-delivered, standoff weapon that is effective against fixed and re-locatable land targets as well as maritime targets. Used in conjunction with accurate targeting information and anti-radiation weapons, JSOW-C-1 will destroy enemy air defenses and create sanctuaries that permit the rapid transition to lower cost ordnance.

Status

Procurement of JSOW C continues until FY 2010 when procurement of the JSOW C-1 will begin.

Developers

Raytheon — Tucson, Arizona USA

AMNS
Airborne Mine-Neutralization System

Description

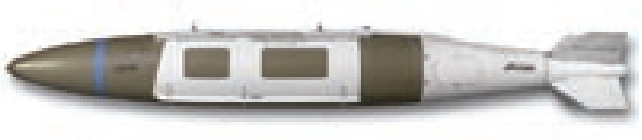
The AMNS is an expendable, remotely operated mine neutralization device that leverages non-developmental integration and commercial-off-the-shelf technologies. Deployed from MH-60S helicopters, it provides identification and neutralization of proud (i.e., not buried) bottom and in-volume naval mines.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

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 2011 IOC for the AMNS on the MH-60S.

Developers

BAE — England
Raytheon — Portsmouth, Rhode Island USA



GBU-31/32/38 JDAM
Joint Direct Attack Munition

Description

JDAM is a multi-service program that the U.S. Air Force leads. This program provides a Global Positioning System (GPS)-aided, Inertial Navigation System (INS) guidance kit that improves the accuracy of existing 500-pound, 1,000-pound, and 2,000-pound general-purpose and penetrator bombs (BLU-109) in all weather conditions. JDAMs are effective against fixed and re-locatable targets at ranges of 15 nautical miles from 40,000 feet. The weapon can be re-targeted by the pilot prior to release and is autonomous once programmed and released. JDAM is accurate to within a 13 meter Circular Error Probable (CEP), making it a force multiplier that allows a single aircraft to attack multiple targets from a single release point. It has been proven effective in combat operations worldwide.

Status

FY 2008 was the last programmed year for Navy procurement. However, USAF procurement is ongoing, and the production line is still open, should Navy need to resume procurement.

Developers

Boeing St. Louis, Missouri USA

GBU-10/12/16/24 LGB/DMLGB/DAMTC
Laser-Guided Bomb, Dual Mode LGB, and Direct-Attack Moving Target Capability

Description

LGB is a DoN and Air Force joint effort, with the latter acting as the lead. LGBs use Mk 80/BLU General Purpose and the BLU-109 pentrator bomb bodies, incorporating state-of-the-art guidance and control features. An LGB has a warhead (bomb body) fitted with a laser-guidance kit and a Computer Control Group (CCG) with seeker mounted on the nose. The seeker sends signals to the CCG canards to guide the weapon to the spot of reflected energy. Laser energy can be applied to the target by ground or airborne designators, or self-designated by laser-configured aircraft. LGBs will remain in the inventory until at least 2020.

The DMLGB is a retrofit to the legacy LGBs in the Navy's inventory. It combines laser terminal guidance with all-weather fire-and-forget capability of Inertial Navigation System/Global Positioning System (INS/GPS).

Addressing an urgent operational need, the Department of the Navy and the Department of the Air Force provided a low-cost, non-developmental enhancement to the GBU-38 to address the moving target capability gap. The competitive follow on acquisition program supporting this moving target capability is called Direct Attack Moving Target Capability (DAMTC). The intent is to provide a limited near-term capability gap-filler against mov-

ing targets until the Small Diameter Bomb II and the Joint Air to Ground Missile come on line and provide Joint Forces the ability to engage moving targets at standoff ranges. They are scheduled to become operational after 2015.

Status
DMLGB reached IOC in September 2007 on both the AV-8B and F/A-18 with planned future integration on the F-35. Approximately 7,500 Dual Mode Kits will be procured through the life of the program. Approximately 5,600 DAMTC Kits will be procured through the life of the program.

Developers

Raytheon Company	Tucson, Arizona USA
Lockheed Martin	Bethesda, Maryland USA

RAMICS
Rapid Airborne Mine Clearance System

Description
The RAMICS will fire a Mk 258 Mod 1 30mm supercavitating projectile from a Mk 44 Bushmaster II gun to neutralize surface and near-surface mines. The RAMICS will ultimately be hosted onboard the MH-60S helicopter as one of five developing Airborne MCM (AMCM) systems organic to the Littoral Combat Ship (LCS). The supercavitating Tungsten projectile is specially designed for traveling tactical distances in air and water and through a casing, causing a low-order deflagration of the mine. The gun is controlled by a fire-control system with targeting algorithms coupled with a Light Detection and Ranging (LIDAR) system. The LIDAR locates and targets the mines and provides aiming coordinates to the gun's fire control system to fire a burst of rounds at the mine, causing immediate and positive mine neutralization.

Status
The RAMICS program was re-structured in FY 2008. Procurement of systems begins upon successful aircraft integration, scheduled for FY 2017.

Developers

Northrop Grumman	Melbourne, Florida USA

AVIATION SENSORS

ALMDS
Airborne Laser Mine Detection System

Description
The ALMDS is an organic, high-area coverage, electro-optic Airborne Mine Countermeasures 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, organic AMCM system that can rapidly detect and classify mine-like contacts for subsequent pros-

ecution. 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 current 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 2011.

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 Navy F/A-18E/F 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-18E/F aircraft.

Developers

Raytheon	Goleta, California USA

APG-79 AESA
Active Electronically Scanned Array 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 will provide enhanced performance in hostile electronic countermeasures environments and also provide 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.

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 445 systems—310 forward fit and 135 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 for AESA was with VFA-22 in 2008. Retrofit installs into Lot 26-29 F/A-18E/Fs are planned to begin in 2010.

Developers

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

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

Description

The ATFLIR provides the F/A-18A+/C/D/E/F aircraft with a significantly enhanced capability to detect, track and attack air and ground targets. Laser-guided and Global Positioning System (GPS) standoff weapons systems and higher-altitude attack profiles require improved performance over the current AAS-38/46 NITE Hawk Targeting FLIR. The ATFLIR is designed to provide a quantum leap in operational effectiveness to support fully the standoff precision strike mission. 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, was determined to be operationally suitable and effective and was recommended for further fleet introduction. ATFLIR achieved IOC in September 2003 and demonstrated its combat capability in support of Operation Iraqi Freedom. The program was awarded MS III/FRP decision on 17 October 2003. Additional procurement will continue through FY 2010.

Developers

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

Collaborative Warfare Process (CWP)

Description

Naval Aviation has made significant investments in advanced platforms, sensors, and weapons. It is essential that these assets work together to achieve desired effects during military operations. A tactical network must provide collaboration between platforms and their subsystems—weapons, sensors, controls and displays, allowing them to transform information and data into actionable knowledge. Collaboration means more than just connectivity and information/data exchange. It includes the collation and fusion of information to aid the warfighter in making timely decisions. Some of the benefits of this transformational tactical network include: compression of kill chain timelines; increased weapons precision; increased survivability; reduced fratricide; and the efficient application of force. Collaborative Warfare (CW) is the operational application of networks to optimize transactions between platforms

to achieve desired warfighting effects during military operations. The Collaborative Warfare Process (CWP) leverages the Naval Aviation Enterprise (NAE) and Naval NETWAR FORCEnet Enterprise (NNFE) to develop material and non-material solutions that enhance mission performance. It ensures network requirements and investments are warfighter- and mission-driven by aligning operational, Science and Technology (S&T), and acquisition/budgeting to a coherent investment strategy. These investment strategies will result in significant cost savings while also quantifying the warfighting return on investment for tactical networks prior to making multi-billion dollar decisions.

For material solutions, the CWP aligns existing programs and supports new programs where gaps exist to deliver a Collaborative Warfare Environment (CWE) resident on Naval Aviation platforms, facilitating interoperability while simultaneously taking advantage of the numerous Open Architecture (OA) initiatives in Naval Aviation. The CWE consists of the necessary platforms, weapons, and avionics (radios, waveforms, sensors, displays, computers, etc.) that work together to enhance mission performance.

The ultimate capability delivered by the CWP is Dynamic Mission Execution. The transformational tactical network will provide survivable, dynamic, high-capacity, low-latency collaboration between platforms, enabling advanced mission functionality, such as: rapid tasking/re-tasking of assets; enhanced collaborative Combat ID, classification, and targeting (sensor and multi-INT fusion); integration of unmanned aerial systems (UAS) and networked weapons; and remote/third-party targeting and engagement.

CWP is a process effort across the NAE, NNFE, USMC and USAF. Critical to its success is support from numerous operational entities such as Naval Strike Air Warfare Center (NSAWC) and COCOMs; Commander, Naval Air Forces (CNAF); PEOs; program managers; S&T; SPAWARSYSCOM; and NAVAIRSYSCOM. The Surface Warfare Enterprise (SWE) has provided support for initial CWP efforts and is a critical element to success and pursuing cohesive tactical network strategies and solutions.

Status

The CWP is supported by the NAE, NNFE, USMC and USAF. It parallels the USAF Warfighter Networking (WFN) process, and both services are working closely together to address tactical networking challenges to keep pace with future threats. To successfully achieve this objective, a combined service initiative to prototype the CWE is in process.

Developers

L-3 Communications ComCept Division	Rockwall, Texas USA
Rockwell-Collins	Cedar Rapids, Iowa USA
Boeing	St. Louis, Missouri USA
Northrop Grumman	Long Island, New York USA

OASIS
Organic Airborne and Surface Influence Sweep

Description

The OASIS system will provide the Littoral Combat Ship (LCS) with an organic, high-speed, magnetic/acoustic influence minesweeping capability to effectively neutralize sea mine threats in operating ar-

eas where mine hunting is not possible due to mine burial or high bottom clutter. The OASIS system is one of five Airborne Mine Countermeasures systems under development that will be deployed and operated from the MH-60S helicopter.

Status
Milestone C and LRIP I completed in FY 2008. System re-design completed in FY 2009, and IOC is scheduled for 2013.

Developers
ITT — Panama City, Florida USA

AVIATION EQUIPMENT AND SYSTEMS

IDECM
Integrated Defensive Electronic Counter-Measures

Description
The IDECM system is used to defend the host aircraft against radar-guided surface-to-air and air-to-air missile systems. Either through a towed decoy or several onboard transmitters, the ALQ-214 produces complex waveform radar jamming that defeats advanced missile systems. Employed on the FA-18E/F. IDECM has been developed in three phases:

IDECM Blk 1: ALQ-165 On Board Jammer and ALE-50 towed decoy (IOC FY 2002)

IDECM Blk 2: ALQ-214 On Board Jammer and ALE-50 towed decoy (IOC FY 2005)

IDECM Blk 3: ALQ-214 On Board Jammer and ALE-55 Fiber Optic Towed Decoy (IOC FY 2009)

The ALQ-214 On Board Jammer portion of this system is also intended for F/A-18A+C/D aircraft.

Status
The ALQ-214 and ALE-50 (towed decoy) combination is currently in full-rate production. The ALE-55 Fiber Optic Towed Decoy is currently in developmental / Operational test.

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

JMPS
Joint Mission Planning Systems (JMPS)

Description
NavMPS—now known as the Joint Mission Planning System (JMPS)—is a suite of applications used to load a mission plan into an aircraft's avionics systems. It allows aircrew to perform tactical mission planning at the Unclassified, Secret, and Top Secret levels for a wide variety of aviation platforms and air-launched weapons. JMPS incorporates legacy Navy Portable Flight Planning Software (N-PFPS) capabilities and next-generation mission planning capabilities in a co-development effort by the Navy, Air Force, Army,

and U.S. Special Operations Command to bring all "stovepipe" legacy DoD mission-planning systems under one program and within a common JMPS framework. JMPS is a single source for preflight planning, including precision and conventional weapons targeting, data link planning, safety of flight considerations (e.g., aircraft performance data, fuel, and route planning and threat assessment). For platforms that have migrated, JMPS is now the sole interface to load mission critical data into the aircraft.

Status

JMPS currently supports all F/A-18 variants (including EA-18G), E-2C, EA-6B, AV-8B, V-22 and Naval Aviation training aircraft. All N-PFPS users plan to transition to JMPS by FY 2012; N-PFPS is used primarily by the Navy/Marine Corps helicopter community. JMPS began replacing the legacy Tactical Automated Mission Planning System (TAMPS) in FY 2005 with TAMPS being retired in FY 2007. In FY 2008, JMPS began development to transition to a DoD-mandated Service Oriented Architecture (SOA); an initial SOA-based JMPS is scheduled to IOC by FY 2012. A JMPS-based expeditionary warfare planning capability (JMPS-E) is slated to be fielded in FY 2010.

Developers

British Aerospace	Camarillo, California USA
USAF 46TS/TYBRIN	Fort Walton, Florida USA
Northrop Grumman	San Pedro, California USA

JPALS
Joint Precision Approach and Landing System

Description

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 the principles of forward presence, crisis response, and mobility. Sea-based JPALS consists of a GPS-INS based precision landing system component (Shipboard Relative GPS) with a Low Probability of Intercept (LPI) two-way data-link, as well as an independent backup system. JPALS provides critical enabling technology for emerging Naval programs such as Ford-class aircraft carriers, JSF, N-UCAS, and Zumwalt-class destroyers. Sea-based JPALS will also be installed on all air-capable surface ships, most CVN air wing aircraft (F/A-18E/F, EA-18G, E-2C/D, C-2A, and MH-60 R/S), and all DoD aircraft capable of operating from Navy ships. Except for the system designated as the SRGPS backup, JPALS will replace the Automatic Carrier Landing System (ACLS) on aircraft carriers, SPN-35 on LH-class amphibious ships, and various approach systems ashore, including Instrument Landing Systems (ILS), TACAN, and fixed and mobile Precision Approach Radar (PAR). JPALS will be civil interoperable and FAA certifiable.

Status
JPALS completed MS B in June 2008 with contract award on 15 September 2008. Sea-based JPALS IOC is 2014. The system is on schedule for installation in PCU Gerald R. Ford (CVN 78), the lead ship of the Ford-class aircraft carriers.

Developers
Raytheon — Fullerton, California USA
Partnering developers include
Rockwell Collins, Northrop
Grumman and SAIC

MFOQA
Military Flight Operations Quality Assurance

Description
MFOQA is a knowledge management process using existing 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. Data from each flight is aggregated for trend analysis at upper tiers of command at the group, wing, and type command levels. Flight operations quality assurance has been used in the commercial aviation industry for several years. Surveys from the airline industry have yielded high praise for the process and its benefits to Maintenance, Operations, Safety, and Training (MOST).

Status
MFOQA completed MS B in the first quarter FY 2007 and is scheduled for MS C in FY 2011, with IOC to follow shortly thereafter. The current plan is to implement MFOQA capability for 26 Type/Model/Series (T/M/S) aircraft over an annual, phased approach. The lead platform is the F/A-18C/D/E/F Strike Fighter and the EA-18G *Growler*. Follow-on phases will provide MFOQA capability to the MH-60R/S helicopters, the CH-53E heavy-lift helicopter, the MV-22B tilt-rotor aircraft, and the T-45 jet trainer, with additional platforms to follow. Initiated with FY 2006 funding, the current schedule is to achieve IOC in FY 2011.

Developers
Expected to be multiple sources after competition

TBMCS
Theater Battle Management Core System

Description

Theater Battle Management Core System (TBMCS) is used to schedule, plan, and fly aircraft missions in joint air space. TBMCS is a USAF program, used by all Services for Air Command and Control (C2), which integrates legacy Air Force C4I systems supporting theater air operations including: Contingency Theater Automated Planning System (CTAPS), Wing Command and Control System (WCCS), Combat Intelligence System (CIS), and Air and Space Operations Center Modernization program in 2001. TBMCS is the core system within the USAF's Air Operations Center Weapon System (AN/USQ-163 Falconer) to support the Joint Forces Air Component Commander (JFACC). TBMCS provides automated C2 and decision support tools to improve the planning, preparation, and execution of joint air combat capabilities. TBMCS Force Level includes those tools necessary to produce an Air Tasking Order (ATO) and to perform collaboration with services while unit level includes those tools necessary to perform various unit-level tasks such as tracking aircrew hours. A TBMCS Host (FORCE Level) includes numerous servers and workstations that provide the necessary capability to produce the ATO; TBMCS Web Client (formerly called "Remote") is a single workstation that can receive certain updates and provide mission updates to the theater Air and Space Operations Center. TBMCS is integrated with Global Command and Control System – Maritime (GCCS-M) and managed by Electronic Systems Command (ESC) at Hanscom AFB, MA. The USAF's User Representative is the Air Force Command and Control, Intelligence, Surveillance, and Reconnaissance (ISR) Center (AFC2ISRC) at Langley AFB, Virginia.

Status

TBMCS host capability is fielded on all Navy carriers, Command and Control ships and large deck amphibious ships (LHA/LHD) and will be fielded at some selected shore sites including Maritime Operations Centers. Joint standard TBMCS V1.1.3 (SUN server based) has replaced legacy TBMCS V1.1 (a Navy-unique Hewlett-Packard server based system) on all Navy platforms.

Developers

Lockheed Martin Colorado Springs, Colorado USA

TCS
Tactical Control System

Description

TCS is the ground station software operating system for the MQ-8B Fire Scout Vertical Takeoff and Landing Tactical UAV (VTUAV) Program. The software provides a full range of scalable unmanned aircraft system (UAS) capabilities from passive receipt of air vehicle and payload data to full air vehicle and payload command and control from Ground Control Stations (GCSs) both ashore and

afloat. TCS is designed to simultaneously control multiple UAS aircraft. TCS has the potential to be the common operating system for the Broad Area Maritime Surveillance (BAMS) UAS and Small Tactical UAS (STUAS) programs providing interoperability and commonality for mission planning, command and control, and C4I interfaces. It is compliant with NATO Standardization Agreement (STANAG) 4586 for UAS interoperability.

Status

As part of the Fire Scout VTUAV Program, TCS is completing development, will conduct operational testing on the USS McInerney (FFG 8), and will IOC with the Fire Scout in FY 2010.

Developers

System Integrator, Raytheon Systems Inc. — Falls Church, Virginia USA

SECTION 2

SURFACE COMBATANTS

The Navy's surface force adapts to contribute to all of the Navy's core capabilities. A warship that provides power projection one day can deliver humanitarian aid and provide maritime security the next. Surface ships are on the front line of forward presence, sea control, and power projection, and also provide maritime security, deterrence, and humanitarian assistance.

SHIPS

CG 47 CG MOD
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 forces, and surface action groups in support of global operations. The 22 Ticonderoga-class cruisers have a combat system centered on the Aegis Weapon System and the SPY-1 A/B multi-function, phased-array radar. The combat system includes the Mk 41 Vertical Launching System (VLS), which employs the Standard Missile surface-to-air missiles and Tomahawk Land Attack 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 (CS) 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 CIWS 1B, ESSM, Nulka and SPQ-9B; and the SQQ-89A(V)15 anti-submarine warfare suite.

Cruiser Modernization warfighting improvements using an Open Architecture design will extend the Aegis Weapons System's capabilities against projected threats well into the 21st Century.

Status

Cruiser Modernization commenced in FY 2008. Six ships have completed the HM&E upgrades through the end CY 2009. The USS Bunker Hill (CG 52) completed the first combined HM&E and CS modernization availability in FY 2009. The remaining cruisers will be modernized by 2018.

Developers

General Dynamics, Bath Iron Works	Bath, Maine USA
Northrop Grumman Ship Systems	Pascagoula, Mississippi USA
Lockheed Martin	Moorestown, New Jersey USA

CVN 68 and CVN 21
Aircraft Carrier Programs

Description

The mission of an aircraft carrier is to support and operate the aircraft that conduct attack, early warning, surveillance, and electronic missions during warfare against seaborne, airborne, and land-based targets in support of joint and coalition forces. America's carriers deploy throughout the world in direct support of U.S. strategy and commitments. Additionally, our carriers continue to play an increasingly important role as the Navy adjusts its emphasis toward the world's littoral regions. This becomes especially important as permanent forward-deployed, land-based forces are brought home to the United States.

The delivery of USS George H.W. Bush (CVN 77), coupled with the decommissioning of the Kitty Hawk (CV 63) after more than 48 years of active service, resulted in an all nuclear-powered carrier fleet for the U.S. Navy. This unprecedented force provides the operational flexibility and warfighting capability to meet all Fleet Response Plan (FRP) commitments, as well as the presence requirements for Combatant Commanders in support of national strategies. To maintain an 11-carrier force, these carriers are replaced on a one-for-one basis, with a new ship in the fleet approximately every five years. The carrier fleet will experience a temporary reduction to 10 ships following the November 2012 inactivation of the USS Enterprise (CVN 65), after nearly 52 years of service. When PCU Gerald R. Ford (CVN 78), the lead ship of the first new class of aircraft carriers in almost 40 years, is delivered in September 2015, the force will again be at 11 aircraft carriers.

In-service Nimitz-class aircraft carriers are refueled mid-life during a Refueling Complex Overhaul (RCOH) conducted at Northrop Grumman/Newport News. These refuelings allow the ships to achieve their planned 50-year service life.

CVN 78 represents a new class of aircraft carriers that, while similarly sized to the Nimitz-class carriers, will incorporate upgraded hull, mechanical, electrical, and electronics capabilities. Follow-on ships, CVN 79 and CVN 80, will be Ford-class carriers, built at as CVN 78 "repeats" at five-year intervals and are expected to deliver to the fleet in 2020 and 2025, respectively. CVN 80 and subsequent hulls will also be built at five-year intervals, with a plan providing for the insertion of new technologies that have evolved in the previous decade. This class of aircraft carriers will incorporate such advanced features as a new, more efficient nuclear propulsion plant; an Electro-Magnetic Aircraft Launch System (EMALS) and Advanced Arresting Gear (AAG); and a nearly three-fold increase in electrical generation capacity compared to a Nimitz-class carrier. These 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 levels, allowing the Navy to reap more than $5 billion dollars in life-cycle cost savings per ship throughout a 50-year service life.

Status

George H.W. Bush, the tenth and final ship of the Nimitz-class, was commissioned in January 2009. CVN 77 will enter the fleet in January 2010 following completion of a Post Shakedown Availability/Selected Restricted Availability. USS Theodore Roosevelt (CVN 71) began RCOH at Northrop Grumman/Newport News in FY 2010. Construction of CVN 78, the lead ship of Ford-class carriers, commenced in 2008. The ship is planned for delivery to the Navy in September 2015.

Developers

Northrop Grumman Ship Systems Newport News, Virginia USA

DDG 51
Arleigh Burke-Class Aegis Guided-Missile Destroyer

Description

Arleigh Burke-class guided missile destroyers have combat systems 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 cruise missiles. Incorporating all-steel construction and gas-turbine propulsion, DDG 51 destroyers provide multi-mission offensive and defensive capabilities and can operate independently or as part of carrier strike groups, surface action groups, and expeditionary strike forces. The Flight IIA variants currently under construction incorporate facilities to support two embarked helicopters, significantly enhancing the ship's sea-control capabilities.

Status

DDG 112 will deliver in FY 2011, completing the legacy DDG 51 line. DDG 112, will field Aegis combat system Baseline 7 Phase 1R, which incorporates Cooperative Engagement Capability (CEC), the Evolved Sea Sparrow Missile (ESSM), the improved SPY-1D(V) radar, and advanced Open Architecture combat systems using commercially developed processors and display equipment.

Beginning in FY 2009, the DDG 51 line was restarted to continue to produce this highly capable platform. In these later ships, the Aegis Baseline 7.1R will be replaced with the Open Architecture Advanced Capability Build (ACB) 12 Aegis Combat System, in development for the DDG Modernization program. Late in the FYDP, Flight III ships will begin production, incorporating more advanced radar and fire control systems currently under development.

Developers

General Dynamics Bath Iron Works Bath, Maine USA
Northrop Grumman Ship Systems Pascagoula, Mississippi USA
Lockheed Martin Moorestown, New Jersey USA

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

Description

Arleigh Burke-class guided missile destroyers will undergo mid-life modernizations commencing in FY 2010 with DDG 51. 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, 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) to accommodate an integrated air and Ballistic Missile Defense (BMD) capability and an improvement to 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 Sea Sparrow Missile (ESSM), CIWS Blk 1B, Surface Electronic Warfare Improvement Program (SEWIP), and Nulka. 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. DDG 51 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

The HM&E modifications are being designed into the most recent new-construction Arleigh Burke-class destroyers. This design in new construction maximizes risk reduction and proofs these alterations in the builder's yards. The authorization and appropriation for DDG 111-112, to complete an initial buy of 62 ships, was completed in 2005. DDG Modernization concentrates initially 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
Northrop Grumman Ship Systems	Pascagoula, Mississippi USA
Lockheed Martin	Moorestown, New Jersey USA

DDG 1000
Zumwalt-Class 21st Century Destroyer

Description

The DDG 1000 Zumwalt guided missile destroyer will be an optimally crewed, multi-mission surface combatant designed to fulfill long-range precision land attack requirements. These ships will provide offensive, distributed, and precision fires in support of forces ashore. Additionally, they will serve as test-beds for advanced technology, such as integrated power systems, dual band radars, and advanced survivability features, which can be incorporated into our other ship classes. Other DDG 1000 features include an advanced hull form, optimal manning based on comprehensive human-systems integration and human-factors engineering studies, extensive automation, and advanced apertures. The crew size will be approximately half the size of a DDG 51.

Status

The DDG 1000 Program was truncated to three ships in August of 2008. Ship fabrication commenced in February 2009 for delivery in 2013 with an initial operating capability scheduled for FY 2015. At the start of fabrication, the Detail Design was more than 80 percent complete and surpassed any previous surface combatant in design fidelity. These ships will be built by both General Dynamics and Northrup Grumman, with the final assembly to be conducted at General Dynamics Bath Iron Works.

Developers

Northrop Grumman Ship Systems	Pascagoula, Mississippi USA
General Dynamics Bath Iron Works	Bath, Maine 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.

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 Oliver Hazard 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, 21 remain in active commissioned service and nine are in the Navy Reserve Force.

Status

Oliver Hazard Perry–class frigates are undergoing a modernization package that commenced in FY 2003. The modernization improvements will assist the class in reaching its 30-year expected service life. It corrects the most significant class maintenance and obsolescence issues, including replacing the four obsolete Ship Service Diesel Generators (SSDG) with COTS SSDGs, obsolete evaporators with COTS Reverse Osmosis (RO) units, and the track-way boat davits with COTS Slewing Arm Davits (SLADs). Other major HM&E alterations included ventilation modifications and Auxiliary Machinery Room #3 fire-fighting sprinkler modifications. The modernization effort is scheduled for completion by 2011. All ships have been completed with the exception of four that will receive the COTS SSDG upgrade over the next two years. Decommissioning of 26 of the 29 FFG's is scheduled to occur during the FYDP. LCS will make up this lost capacity.

Developers

General Dynamics Bath Iron Works — Bath, Maine USA

Littoral Combat Ship (LCS)

Description

Future joint and combined operations will hinge on our ability to provide access in the face of an unpredictable and asymmetrical threat. This has been recognized for some time; however, the events of the last several years 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 U.S. forces from unhindered use of littoral areas.

The Littoral Combat Ship (LCS) is one element of the future surface combatant family of ships and is optimized to defeat these anti-access threats in the littoral. It uses an open-systems architecture design, modular weapons and sensor systems and a variety of manned and unmanned vehicles to expand the battle space

and project offensive power into the littoral. Technology has matured to the point where we can employ significant warfighting capability from a small, focused-mission warship like the LCS. Focused-mission LCS mission packages are being developed that will provide capabilities critical to forcible entry, sea/littoral superiority and homeland defense missions. The ship will also possess inherent capabilities to conduct missions supporting Intelligence, Surveillance and Reconnaissance (ISR), special operations and maritime interception, regardless of mission package installed. Fully self-deployable and capable of sustained underway operations from homeports to any part of the world, the LCS will have the speed, endurance and underway replenishment capabilities to transit and operate independently or with carrier strike groups, surface action groups and expeditionary strike groups.

Status

LCS will capitalize on emerging unmanned vehicle, sensor and weapons technologies and will deliver the focused missions of Mine Countermeasures (MCM), Surface Warfare (SUW), and Anti-Submarine Warfare (ASW). In May 2004, Navy awarded two contracts options to Lockheed Martin and General Dynamics to build the LCS ships. USS Freedom (LCS 1), the Lockheed Martin ship, commissioned in November 2008, has been delivered and is preparing to conduct an early deployment. USS Independence (LCS 2), the first General Dynamics ship, completed construction at Austal in Mobile, Alabama in December 2009 and commissioned in January 2010. The first MCM mission package was delivered September 2007. ASW and SUW packages were delivered in September and July 2008, respectively. In 2009, the Navy began a new LCS acquisition strategy that, starting in FY 2010, will award a single contract for up to 10 ships to one of the two competitors.

Developers

Lockheed Martin and Marinette Marine (LCS 1)	Marinette, Wisconsin USA
General Dynamics and Austal Marine (LCS 2)	Mobile, Alabama USA

WEAPONS

AGS
Advanced Gun System

Description

The 155mm AGS is planned for installation in DDG 1000 to provide precision, volume, and sustained fires in support of distributed joint and coalition forces ashore. 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 10 rounds per minute from a fully automated magazine. The AGS program includes development of the GPS-guided 155mm Long-Range Land-Attack Projectile (LRLAP), the first of a family of AGS munitions. AGS, fully integrated into DDG 1000, is designed to

meet the reduced manning and radar-signature requirements of the Zumwalt-class destroyer.

Status
AGS manufacturing is underway at three facilities (Cordova, Alabama; Fridley, Minnesota; and Louisville, Kentucky) and is on track to meet the lead ship production schedule. LRLAP development and testing is also on track and the Critical Design Review is planned for summer 2010.

Developers
BAE Systems — Minneapolis, Minnesota USA

BGM-109/UGM-109 TLAM
Tomahawk Land-Attack Missile

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

TACTOM improvements include in-flight retargeting and an ability to loiter over the battlefield, in-flight missile health and status as well as Battle Damage Indication Imagery that gives a digital look-down "snapshot" of the battlefield, both functioning 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.

Current plans call for the Navy to procure more than 3,000 TACTOM missiles. TLAM Block III BGM-109 and UGM-109 missiles are still deployed in the fleet and will undergo periodic recertification and maintenance to assure their continued viability.

Status
A full-rate production contract was signed in August 2004, which was the Navy's first multi-year contract for TACTOM procurement, producing more than 1,500 missiles. This contract ended in 2008, and follow-on production contracts are negotiated on an annual basis.

Developers
Raytheon Missile Systems — Tucson, Arizona USA

MIPS
Maritime Integrated Air and Missile Defense Planning System

Description

The 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 allows the Commander and staff to visualize an end-state and determine the most effective way to reach that end-state. MIPS provides the JFMCC a tool to allocate resources and assess risks in a timely manner. The product is an operational-level plan detailing the optimized use of forces developed with the warfighter's knowledge and judgment. The combined warfighter and MIPS product promotes an orderly handover of a Maritime Integrated Air and Missile Defense Plan to those tasked with execution of an operation. MIPS has been deployed in the Maritime Operations Centers of all numbered fleet commanders likely to be assigned as JFMCC, as well as in selected higher headquarters.

Status

MIPS Increment 0 was formally known as the Area Air Defense Commander Capability System. MIPS Increment 1 is envisioned as a replacement of legacy hardware that maintains the functionality and capability in Increment 0 and will include enhanced planning capacity for Ballistic Missile Defense (BMD) and an interface between the Aegis BMD Mission Planner and Missile Defense Agency's Command, Control, Battle Management, and Communications (C2BMC) System. MIPS Increment 2 will be a software application in Consolidated Afloat Network Enterprise System (CANES) architecture and is planned to incorporate new IAMD capability—Naval Integrated Fire Control–Counter Air, Standard Missile (SM)-6, and BMD Engage-on-Remote. The MIPS program is in process of being re-designated as a Navy ACAT III acquisition program.

Developers

General Dynamics Advanced Information Systems	Fairfax, Virginia USA
Lockheed Martin	Moorestown, New Jersey USA

Mk 15 CIWS
Phalanx Close-In Weapon System

Description

The MK 15 Mod 21-28 Phalanx CIWS is an autonomous combat system that searches (Ku-band radar), 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 current Block 1B configuration further provides defense against asymmetric threats like small, fast surface craft, slow-flying aircraft, and Unmanned Aerial Vehicles through the addition of an integrated Forward-Looking Infra-Red. 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 and is mounted on a trailer with portable power generation and cooling systems. The LPWS is presently deployed as part of the Counter-Rocket, Artillery, 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 Iraqi Freedom (OIF).

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 a ship's combat system, but is capable of autonomously searching, detecting, tracking, and engaging threats with RAM.

Status

More than 250 Mk 15 Phalanx CIWS systems are deployed in the U.S. Navy. The U.S. Army has procured 45 LPWS systems for FOB defense under the C-RAM program. One SeaRAM CIWS system was delivered to General Dynamics in 2008 for installation on board USS Independence (LCS 2). Subsequent SeaRAM CIWS deliveries/installations depend on the LCS program acquisition strategy.

Developers

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

Mk 45 Mod 4 Gun MOD
Five-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 gun and incorporates improvements to accommodate higher firing energies required to support long-range munitions currently under consideration. The gun retains all of the functionality of the family of 5-inch guns from which it was derived including ability to fire all existing 5-inch rounds. The modified design also significantly 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-class of destroyers, starting with USS Winston S. Churchill (DDG 81), and is being back-fitted onto Ticonderoga-class cruisers as part of the Cruiser Modernization package. As of early 2010, 27 destroyers and three cruisers are equipped with the 5-inch/62 gun.

Developers

BAE Systems Minneapolis, Minnesota USA

Mk 54
Lightweight Torpedo (LWT)

Description

The Mk 54 LWT is a modular upgrade to the lightweight torpedo inventory and adds the capability to counter a quiet diesel-electric submarine operating in the littoral. The Mk 54 LWT combines existing torpedo hardware and software from the Mk 46, Mk 50, and Mk 8 Advanced Capability (ADCAP) programs with advanced digital COTS electronics. The resulting Mk 54 LWT offers significantly improved shallow water capability at reduced life-cycle costs. The intent of the Mk 54 LWT modernization plan is to 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 will replace the Mk 46 as the payload in the Vertical Launch ASROC (VLA).

Status

Full Rate Production originally began in FY 2005, with a procurement of 94 torpedoes. Production and quality issues have caused delivery delays, and Mk 46 torpedo maintenance has been augmented to mitigate the impact on LWT inventory. The Mk 54 VLA successfully completed Operational Testing in February 2009.

Developers

Raytheon Mukilteo, Washington USA

Naval Surface Fire Support

Description

The Extended Range Munitions Program was terminated in early 2008 because of technical issues associated with the program. As a result, the Navy conducted a Joint Expeditionary Fires Analysis of Alternatives (AoA) to determine potential Naval Surface Fire Support (NSFS) materiel solutions to address validated joint gaps. The Navy and Marine Corps are working closely to examine a set of systems that could meet fires mission requirements in the most cost effective manner.

Status

The AoA was formally started in November 2008 and is currently under review.

Developers

None

RIM-7, RIM-162 NATO Sea Sparrow Missile System (NSSMS) and RIM-162 Evolved Sea Sparrow Missile (ESSM)

Description

The Mk 57 NSSMS and its associated RIM-7P NSSM or RIM-162 ESSM serves as the primary surface-to-surface and surface-to-air ship self-defense missile system. The Mk 57 NSSMS is deployed on aircraft carriers (CVN), and Landing Helicopter Dock (LHD) multipurpose amphibious assault ships, and is being installed on the newest class of Landing Helicopter Assault (LHA) multipurpose amphibious assault ships. The Mk 57 Target Acquisition System (TAS), engineered to support ships in air defense, is a combined volume-search radar with a control element that determines threat evaluation and weapon assignment for RIM-7 in LHDs and CVNs. A kinematic upgrade to the RIM-7P missile, ESSM is the next generation of Sea Sparrow missiles and is currently deployed on Arleigh Burke-class Flight IIA Aegis destroyers. ESSM is also the primary self-defense weapon for DDG 1000, CVN, and LHA 6-class ships, as well as for Aegis cruisers and destroyers receiving Aegis Modernization.

ESSM upgrades include a more powerful rocket motor, a tail control section for quick response on VLS ships, an 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 is now possible with the RIM-7P. Operational in 2004, ESSM is procured as part of the NATO Sea Sparrow Consortium involving ten NATO countries.

Status

ESSM was introduced in Ticonderoga-class cruisers in FY 2009 improving capability against close-in, high-maneuvering threats.

Remaining Arleigh Burke-class Flight I/II AEGIS destroyers will be upgraded to ESSM in conjunction with the Aegis Modernization Program. Future upgrades to ESSM are being explored.

Developers
Raytheon Tucson, Arizona USA

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

Description
SM-2 is the Navy's primary area air-defense weapon. SM-2 Block III/IIIA/IIIB configurations are all-weather, ship-launched, medium-range surface-to-air missiles currently in service with the U.S. Navy and nine allied navies. SM-2 enables forward naval presence, operating in the littorals, and projecting and sustaining U.S. forces in distant anti-access or area-denial environments. SM-2 Block III/IIIA/IIIB missiles are launched from the Mk 41 Vertical Launching System installed in Aegis cruisers and destroyers. Block III features improved performance against low-altitude threats and optimizes the trajectory-shaping resident within the command guidance from the Aegis weapons 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 ECM 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 IIIB w/ MU2) to enhance IIIB performance against low-altitude, supersonic maneuvering threats.

Status
Block IIIB MU2 is the only variant in production for the U.S. Navy, although Block IIIA is still produced for Foreign Military Sales. Block IIIB MU2s are being produced as new all-up rounds and as upgrades from older Block III and IIIA missiles through a service life extension program.

Developers
Raytheon Tucson, Arizona USA

RIM-116A RAM
Rolling Airframe Missile

Description
RAM is a high-firepower, low-cost system based on the AIM-9 Sidewinder, designed to engage Anti-Ship Cruise Missiles (ASCMs) in the stressing electronic counter measures littoral conflict environment. RAM is a five-inch diameter surface-to-air missile with passive dual-mode radio frequency/infrared (RF/IR) guid-

ance 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, the RAM Block 1 IR upgrade incorporates IR "all-the-way-homing" to improve performance against evolving passive and active ASCMs. Current plans are for RAM to continue evolving to keep pace with emerging threats. RAM Block 2, currently in System Development and Demonstration (SDD), will provide increased kinematics against 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 currently being developed jointly (50/50) with Germany.

Status

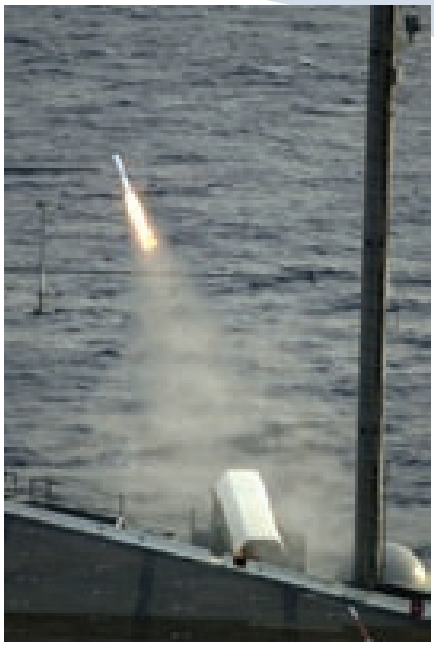
RAM is installed in USS Tarawa (LHA 1) and USS Wasp (LHD 1) amphibious assault ships; USS Whidbey Island (LSD 41) and USS Harpers Ferry (LSD 49) dock landing ships, aircraft carriers (CVNs), and San Antonio-class landing platform dock ships. RAM is also installed on USS Freedom (LCS 1), the Lockheed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

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 USS Independence (LCS 2).

Block 1A is at full-rate production. The Block 2 missile is currently in development and is scheduled for first delivery in FY 2013. RAM Block 2 is a kinematic upgrade for countering advanced maneuvering threats and regaining battlespace through extended range.

Developers

Raytheon	Tucson, Arizona USA
RAMSYS GmbH	Ottobrunn, Germany



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

Description

SM-6 is the 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 and provides improved performance against stream raids and targets employing advanced characteristics such as enhanced maneuverability, low-ra-

dar cross-section, improved kinematics, and advanced electronic countermeasures. The SM-6 ERAM acquisition strategy is characterized as a low-risk development approach which leverages the SM-2 Block IV/IVA program Non-Developmental Items and Raytheon's Advanced Medium Range Air-to-Air Missile Phase 3 active seeker program from NAVAIR. The SM-6 missile will be fielded on in-service Arleigh Burke-class destroyers and Ticonderoga-class cruisers class ships as well as future surface combatants. The program has conducted three successful live-fire tests of the SM-6 at the White Sands Missile Range. The first test flight, conducted in June 2008, resulted in a skin-to-skin intercept. the second test, conducted in September 2008, also resulted in a skin-to-skin intercept of the target. The third test flight, conducted August 2009, successfully stressed the kinematics limits of the missile.

Status

The Navy established the SM-6 Extended-Range Air Defense program in FY 2004, with an FY 2011 initial operational capability. SM-6 entered the first increment of Low Rate Initial Production in FY 2009. SM-6 at sea testing is scheduled to commence in March 2010.

Developers

Raytheon — Tucson, Arizona USA

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 developed beginning in 2003 to improve ship self defense by developing and fielding a mid-term capability for surface ships that is simple, stabilized, and low cost. The Mk 38 Mod 2 MGS is being permanently installed on CG 47, DDG 51, LSD 41, LSD 49, LPD 17, PC (USN and USCG), FFG, LHD, LHA, and LCC class ships.

Developers

BAE — Louisville, Kentucky USA
Rafael USA, Inc. — Haifa, Israel

SENSORS AND COMBAT SYSTEMS

Aegis BMD
Navy Ballistic Missile Defense

Description

Aegis BMD includes modifications to the Aegis Weapons System and the development and upgrade of the Standard Missile 3 (SM-3) with its hit-to-kill kinetic warhead. This combination gives select Aegis cruisers and destroyers the capability to intercept short and medium-range ballistic missiles in the ascent, midcourse, and descent phases of their exo-atmospheric trajectories. 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, vital political and military assets, population centers, and large geographic regions against the threat of ballistic missile attack. The Missile Defense Agency and Navy deployed the Aegis BMD long-range surveillance and tracking capability as an element of the Ballistic Missile Defense System (BMDS) in October 2004. The Aegis BMD short and medium-range ballistic missile engagement capability was certified for operational use in August 2006.

Status

More than 20 cruisers and destroyers have been modified to conduct BMD with additional ships to be modified in the future. BMD ships have both the 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 and medium-range ballistic missiles. In February 2008, USS Lake Erie (CG 70), using an SM-3 missile, intercepted a failed U.S. satellite in the first intercept of a target using data generated exclusively from other BMDS sensors. The SM-2 Block IV inventory is being 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. To facilitate terminal defense, the Aegis BMD 3.6.1 program capability has been installed in 20 BMD capable Aegis ships. The ongoing Aegis Modernization program will provide BMD capability to all Aegis destroyers and selected Aegis cruisers beginning in 2012.

Developers

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

AMDR
Air and Missile Defense Radar

Description

The AMDR 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. AMDR is a multifunction, active-phased array radar capable of search, detection, and tracking of airborne and ballistic missile targets, and missile engagement support. AMDR consists of an S-band radar (AMDR-S), an X-band radar (AMDR-X), and a Radar Suite Controller (RSC). The radar will be developed to support multiple ship classes through an evolutionary acquisition process, with the first increment of development in support of new construction ships. AMDR key technologies and systems—including new High Power Amplifiers and Transmit/Receive modules, an Active Array physical architecture, large aperture Digital Beam-forming, and Distributed Receivers/Exciters—enable multi-mission performance in stressing environments against Theater Air and Missile Defense threats. The multi-mission capability will be effective in both air dominance of the battle space (Area Air Defense) and in defense against ballistic missiles.

Status

AMDR is being developed as a competitive program and will enter a Technology Development phase in FY 2010. A radar hull study was conducted and the results are reflected in the future shipbuilding plan.

Developers

Potentially Northrop Grumman, Raytheon, and Lockheed Martin. Up to three developers will be selected to produce small-scale active phased array (S-band) prototypes following the release of an initial Request for Proposal in FY 2010.

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-class and Arleigh Burke-class ships. It is a multifunction, passive phased-array radar capable of search, automatic detection, transition to track, tracking of air and surface targets, and missile engagement support. 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 used to detect, track, and engage theater ballistic missiles on selected Aegis cruisers and destroyers.

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 de-

stroyers 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 109 and programmed for installation in DDGs 110 through 112. A new Multi-Mission Signal Processor (MMSP) is funded and will deliver AN/SPY-1D (V) capability to AN/SPY-1D DDGs and AN/SPY-1B CGs. MMSP upgrades will be deployed through the DDG and CG Modernization programs.

Developers

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

AN/SPY-3 MFR
Advanced Multi-Function Radar

Description

The AN/SPY-3 MFR is an X-band active phased-array radar designed to meet all horizon search and fire control requirements for the 21st Century Fleet. MFR is designed to detect the most advanced Anti-Ship Cruise Missile threats and support fire-control illumination requirements for the Evolved Sea Sparrow Missile, the Standard Missile (SM)-2, and future missiles. The MFR also supports the new ship-design requirement for reduced radar cross-section, significantly reduced manning (no operators), and total ownership cost reduction. The MFR is planned for introduction in DDG 1000 and the next-generation CVN 78 class aircraft carriers. In conjunction with AMDR, SPY-3 will be incorporated into the next generation DDG 51 class ships.

Status

Two MFR Engineering Development Model radar arrays were installed and tested at the Wallops Island, Virginia, land-based test facility and on board the Self-Defense Test Ship in 2006. MFR is installed at the DDG 1000 Wallops Island Engineering Test Center along with the S-band Volume Search Radar (VSR). Both are undergoing radar test and integration events. MFR development, testing, and production schedules are planned to support equipment delivery schedules for DDG 1000 and CVN 78 class ships. The MFR will be fielded with the VSR, as an integrated radar suite, together referred to as the Dual-Band Radar (DBR). DBR Operational Evaluation will occur with DDG 1000 testing. DBR initial operational capability is scheduled for 2013.

Developers

Raytheon Electronic Systems (Prime)	Sudbury, Massachusetts USA

AN/UQQ-2 SURTASS
Surveillance Towed Array Sensor System

Description

The SURTASS capability consists of a mobile fleet of five ships that employ the fleet's most capable deep and shallow water (littoral zone) passive-acoustic towed-array sonar systems. These ships provide passive detection of quiet nuclear and diesel submarines and real-time reporting of surveillance information to theater commanders and operational units. SURTASS employs either a long-line passive-sonar acoustic array or a shorter TwinLine passive-sonar acoustic array. The twin-line system is the best operational shallow water towed array and the only multi-line towed array in the Navy. It consists of a pair of arrays towed side-by- side from a SURTASS ship and offers significant advantages for undersea surveillance operations in the littoral zone. It can be towed in water as shallow as 180 feet, provides significant directional noise rejection, offers bearing ambiguity solution without turning, allows the ship to tow at higher speed, and results in a shorter time to stabilize the array after a turn.

Status

Five SURTASS vessels are operational in the Pacific fleet. The first production model TB-29A twin-line SURTASS array was installed in FY 2005, and all SURTASS vessels will have TB-29A twin line arrays by the end of FY 2009. SURTASS is also being upgraded with the Integrated Common Processor (ICP) that will result in increased operator proficiency, increased functionality and savings in Logistics Support and Software Maintenance.

Developers

Lockheed Martin	Syracuse, New York USA
Lockheed Martin	Manassas, Virginia USA
BAE Systems	Manchester, New Hampshire USA
General Dynamics Advanced Information Systems	Anaheim Hills, California USA

CEC
Cooperative Engagement Capability

Description

CEC provides improved battle force air defense capabilities by integrating sensor data of each cooperating ship and aircraft into a single, real-time, fire-control-quality, composite track picture. CEC is a critical pillar of Naval Integrated Fire Control-Counter Air (NIFC-CA) capability and will provide a significant contribution to the Joint Integrated Fire Control operational architecture. 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, significantly improving area, local, and self-defense capabilities. 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

The CEC system (USG-2 for shipboard and USG-3 for E2-C *Hawkeye*) was successfully developed and tested during 1996-2001, with approval for full rate production of USG-2 and low rate initial production of USG-3 equipment sets in 2002. In early 2010, CEC systems are at sea in 46 ships (CGs, DDGs, CVNs, and LHDs) and 26 E-2C *Hawkeye 2000* aircraft. Future CEC installation is planned for approximately 275 ships, aircraft and ground units, including E-2D *Advanced Hawkeye* aircraft, CVN 78, DDG 1000, the Marine Corps Composite Tracking Network (CTN) and the Army Joint Land Attack Cruise Missile Defense Elevated Netted Sensor (JLENS). The 2004 acquisition strategy implements a Pre-Planned Product Improvement (P3I) Program incorporating Open Architecture based hardware with re-hosted software to reduce cost, weight, cooling, and power objectives, making it more extensible to other Services. This initiative culminated in the CEC Signal Data Processor that is currently undergoing a re-design to incorporate NSA-mandated cryptologic modernization. The crypto-modified SDP (SDP-S) is expected to certify in June 2010, complete test and evaluation in the E-2D in 2012 and then backfit into current CEC users.

Developers

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

JBAIDS
Joint Biological Agent Identification and Diagnostic System

Description

The Joint Biological Agent Identification and Diagnostic System (JBAIDS) is an integrated system for rapid identification and diagnostic confirmation of biological agent exposure or infection. Based on commercially available technology, JBAIDS is portable, reusable, and will be capable of the simultaneous identification of multiple Biological Warfare agents (BWA) and other pathogens of operational concern. The system includes equipment used to take samples and perform analysis, a laptop computer for testing result readout display, and assay reagent test kits. JBAIDS will replace the current Light Cycler PCR (Polymerace Chain Reaction) system in the medical spaces of all CVNs and Large Deck Amphibious Assault ships.

Photo courtesy of Idaho Technology.

Status

JBAIDS is currently scheduled for installation on 24 large-deck ships (CVNs, LHAs, LHDs) between FY 2009 and FY 2013; however, the Navy is currently working to accelerate this schedule and complete installation by FY 2010.

Developers

Joint Program Manager Chemical Biological Medical Systems	Fort Detrick, Maryland USA
Idaho Technologies, Inc	Salt Lake City, Utah USA

NFCS
Naval Fires Control System

Description

Naval Fires Control System allows surface ships to directly communicate with ground forces using a digital fire support command and control network, the Advanced Field Artillery Tactical Data System (AFATDS). 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 Initial Operating Capability in April 2006 and 28 systems are currently installed. A total of 32 systems will be fielded by the end of FY 2011.

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

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. 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 flying a trajectory that seduces incoming ASCMs away from their intended targets. Australia developed the hovering rocket, launcher, and launcher interface unit. The U.S. Navy developed the electronic payload and fire control system. The existing MK-36 Decoy Launching System has been modified to support Nulka decoys and is designated the MK-53 Decoy Launching System.

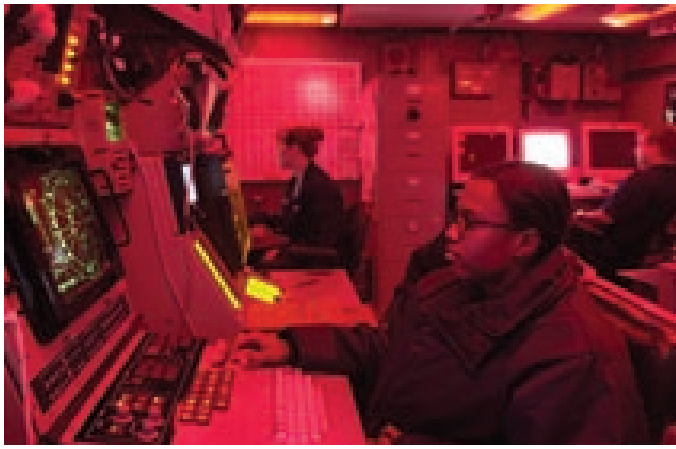
Status

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 more than 100 U.S. Navy ships. Remaining installations will be completed by the fall 2010.

Developers

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

SEWIP Block 1 Upgrade
Surface Electronic Warfare Improvement Program



Description

SEWIP is an evolutionary development block upgrade program for the SLQ-32 Electronic Warfare system which is installed on CG, DDG, FFG, CVN, LSD, LPD, LHA, LHD, and LCC ships in the U.S. Navy—in early 2010 a fleet-wide population of 170 systems. Block 1A replaces the SLQ-32 processor with an Electronic Surveillance Enhancement (ESE) 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. It will also queue Nulka decoy launch.

Status

SEWIP was established as an ACAT II program in July 2002 after cancellation of Advanced Integrated Electronic Warfare System. SEWIP Block 2 contract was awarded 30 September 2009.

Developers

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

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

Description

The SPQ-9B is a slotted, phased-array, rotating radar that significantly improves the ability of ships to detect and track low-altitude anti-ship cruise missiles in a heavy-clutter environment. Its high-resolution track-while-scan, X-band, pulse-Doppler radar enables detection and establishment of a firm track at ranges allowing the combat system to engage subsonic or supersonic sea-skimming missiles at the outer edge of a ship's engagement envelop.

Status

The SPQ-9B is an integral part of the Cruiser Modernization program, providing an ASCM cue to the Aegis Combat System. SPQ-9B integrates with SSDS MK-2 on aircraft carriers and amphibious assault ships, enabling ASCM defense capabilities to pace the evolving worldwide threat. The SPQ-9B is being deployed in conjunction with SSDS MK-2 and cruiser modernization.

Developers

Northrop Grumman	Melville, New York USA

SSDS
Ship Self-Defense System

Description

SSDS is a centralized, automated command-and-control system. An upgrade from 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. Adopting an open architecture system, SSDS integrates detection and engagement elements of the combat system with automated weapons control doctrine, Cooperative Engagement Capability (CEC), and tactical data links for enhanced battle space awareness. SSDS provides a robust self-defense capability.

Status

SSDS MK-1 began full-rate production following operational testing in 1997 and is currently fielded in all LSD 41/49 class ships. SSDS MK-2 (which provides strike group interoperability via CEC and TADIL J) achieved IOC in 2005 and continues fleet installation. With a federated and technically decoupled architecture, Navy plans to periodically upgrade SSDS via COTS Tech Insertion and Preplanned Product Improvement (P3I). SSDS MK-2, which is programmed for all CVNs, LHDs 7 and 8, LHA 6 and 7, and LPD 17 class ships, will complete fielding by 2015.

Developers

Raytheon	San Diego, California USA
Technical support:	
Johns Hopkins University Applied Physics Laboratory	Laurel, Maryland USA
Naval Surface Warfare Centers	Dahlgren, Virginia USA
	Dam Neck, Virginia USA
	Port Hueneme, California USA

SSTD
Surface Ship Torpedo Defense

Description

Surface Ship Torpedo Defense consists of the Anti-Torpedo Torpedo (ATT) Defensive System (ATTDS), the AN/SLQ-25 "Nixie" towed torpedo countermeasure, and expendable acoustic decoys combined with tactical maneuvering. The purpose of SSTD is to provide torpedo protection for all major surface ship types including surface combatants, aircraft carriers, amphibious assault ships, logistics ships, and military sealift command ships.

The ATTDS provides Torpedo Detection, Classification, and Localization of the incoming threats and provides targeting solutions for the ATT. The ATT is a very fast, highly maneuverable, autonomous defensive weapon. The ATT will minimize the need

for ship evasion tactics, thereby enabling sustained operations to ensure the entire range of missions are carried out without interruption.

The AN/SLQ-25A "Nixie" Countermeasure System is a towed system that incorporates both acoustic and non-acoustic countermeasures. The Nixie system provides continuous and effective countermeasure protection against most threat torpedo types.

In FY 2006 and FY 2007, the Navy funded the procurement of Mk 2 Mod 4 Acoustic Decoy Countermeasures (ADCs) for surface ships. ADCs are manually deployed acoustic decoys to distract and delay threat torpedoes.

Expendable acoustic countermeasures are designated as Acoustic Decoy Countermeasure or ADC MK IIs. The ADC MK II is a hand-deployed acoustic countermeasure used to defend surface ships from acoustic homing torpedoes. These devices, when deployed in accordance with approved tactical maneuvers, have been proven to be highly effective.

Status

A Nixie upgrade, the AN/SLQ-25C, is being installed to improve reliability and acoustic countermeasure capability, provide a new littoral tow cable, and add enhanced non-acoustic (EC-16) capability to combat recent improvements to threat torpedoes. Additional Nixie improvements are in development, including: a modular winch design (for new installations only), an Open Architecture improvement, a shock-hardening improvement, a security upgrade, and Nixie Enhanced Modes of Operation (NEMO).

The ATT Engineering Development Model One (EDM-1) was successfully tested in several FY 2007 through FY 2009 at-sea exercises. The capabilities to impulse launch, achieve maximum speed and turn rate, and coordinate a "2v2" salvo attack were all demonstrated.

Sufficient quantities of ADC MK IIs were procured in FY 2006 and FY 2007 and an additional buy in FY 2008 was completed to provide all ship fill requirements and usage during fleet exercises for the next several years.

Upgrades to the AN/SLQ-25 towed countermeasure are also in-process and being fielded to all ships with this system.

Developers

Anti-Torpedo Torpedo:	
Penn State Applied Research Laboratory	State College, Pennsylvania USA
DCL Systems:	
Advanced Acoustic Concepts	Long Island, New York USA
Ultra Electronics	Braintree, Massachusetts USA
SLQ-25:	
Argon ST	Smithfield, Pennsylvania USA
Technical Direction Agent:	
Naval Undersea Warfare Center	Newport, Rhode Island USA

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

Description

The SQQ-89 ASW combat system suite provides cruisers and destroyers with an integrated undersea warfare detection, classification, display, and targeting capability. The SQQ-89 is the Surface ASW "system of systems" that integrates sensors, weapons, and underwater self defense capabilities. The Aegis Modernization Program upgrades DDG 51 to 78 and CG 59 to CG 73 ships with AN/SQQ-89A(V)15. The A(V)15 Program of Record upgrades legacy systems on DDG 79 to DDG 90, and completes the A(V)15 conversion on DDG 91 to DDG 112.

AN/SQQ-89 A(V)15 is a modularized, Open Architecture (OA) system that uses COTS technology to continuously upgrade the following subsystems of the ASW "detect to engage" sequence:

- MH-60R multi-mission helicopter
- Multi-Function Towed Array (MFTA)
- Continuous Active Sonar and Reduced False Alarms Algorithms
- The MK-54 digital torpedo and Mk-54 VLA
- Echo Tracker Classifier (ETC) and active classification improvements
- Sonar Performance and Prediction algorithms and environmental models
- Computer-Aided Dead-Reckoning Table (CADRT)
- Torpedo Recognition and Alertment functions
- The integrated high-fidelity Surface ASW Synthetic Trainer

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

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

Status

The first A(V)15 install was completed in USS Mason (DDG 87) in September 2009. That system is pending final certification, planned for 2010. This installation included the addition of a Multi Function Towed Array and marks the first towed array installation in a DDG Flight IIA warship. In February 2009, the Surface ASW Synthetic Trainer (SAST), a high-fidelity embedded trainer modeled from the Submarine Multi-Mission Team Trainer, was completed and in July 2009 delivered to the Fleet ASW Training Center in San Diego, California for testing. SAST is scheduled to delivery in 2011 as part of the ASW Advanced Capability Build FY 2011.

Developers

Lockheed Martin	Syracuse, New York USA
Advanced Acoustic Concepts	Hauppauge, New York USA

TTWCS
Tactical Tomahawk Weapon Control System

Description

TTWCS is the next significant upgrade to the in-service Advanced Tomahawk Weapon Control System (ATWCS). TTWCS initializes, prepares, and launches Block III and Block IV Tomahawk Land Attack Missiles. TTWCS also introduces the ability for firing units to plan Block III and Block IV GPS-only missions, retarget Block IV missiles to alternate targets, and monitor missiles in flight. The upgraded system reduces the number of equipment racks required on board surface ships, introduces common software for the various Tomahawk capable platforms (U.S. DDG, CG, SSN, SSGN, and U.K. SSN), and reduces overall reaction and engagement planning timelines. TTWCS also improves operator interaction with the system and provides an integrated training capability at all levels. Furthermore, TTWCS builds upon the ATWCS system architecture to maintain existing Tomahawk Weapon System (TWS) Baseline III functionality, provides for future growth, and enhances command-and-control interoperability.

Status

TTWCS V5 incorporates the Tomahawk Integrated Training Architecture, changes for Cruiser Modernization, and the addition of SSGN and SSN Seawolf and Virginia class submarines. The next software build of the weapons system is the TTWCS Viability, which will improve C4I interoperability, provide compatibility for DDG 1000, update computer hardware and performance, and align TTWCS with DoD mandates.

Developers

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

VSR
S-Band Volume Search Radar

Description

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 DDG 1000 and CVN 78 classes. VSR will provide long-range situational awareness with above-horizon detection and air control (marshalling) 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

A VSR Engineering Development Model was completed in 2006 and is installed at the DDG 1000 Wallops Island Engineering Test Center, along with the MFR, undergoing radar test and integration events. VSR integration testing continues through FY 2010. VSR development, testing, and production schedules are aligned with DDG 1000 and CVN 78 shipbuilding schedules. VSR will be fielded with the AN/SPY-3 MFR, as an integrated radar suite, referred to as the Dual-Band Radar (DBR). DBR Operational Evaluation will occur with DDG 1000 testing. DBR initial operational capability is scheduled for 2014.

Developers

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

WQT-2 LFA
SURTASS/Low Frequency Active

Description

The LFA system, the active adjunct to the Surveillance Towed Array Sensor System SURTASS sonar system, is capable of long-range detections of submarine and surface ship contacts. It comprises a low-frequency active sonar transmitter deployed below a SURTASS ship, with the SURTASS passive towed array acting as the receiver. Other Navy ships with towed arrays and compatible processing systems can also process the LFA signal returns in what is known as a "bi-static" mode. As a mobile system, SURTASS/LFA can be employed as a force-protection sensor wherever the force commander directs, including in forward operating areas or in support of battle group activities. A UHF SATCOM communication system provides direct voice and data connectivity between the SURTASS/LFA ship and tactical platforms. Two LFA systems exist, installed on board the USNS Impeccable (T-AGOS 23) and the leased R/V Cory Chouest. Development continues for the Compact LFA (CLFA) system employing smaller, lighter sources, enabling installation on smaller SURTASS vessels.

Status

SURTASS LFA was successfully reintroduced to the fleet in January 2003 following a five-year hiatus for completion of the Environmental Impact Statement (EIS) process. In October 2003, a Federal District Court enjoined testing and training with LFA for violation of the procedural requirements of the Marine Mammal Protection Act, Endangered Species Act, and National Environmental Policy Act, notwithstanding the court's finding that a national security need existed for employment of LFA and commended the Navy for the breadth of scientific research supporting the EIS. Subject to this injunction, LFA may conduct operations in certain areas within the Philippine Sea, East China Sea, South China Sea, and the Sea of Japan. The Navy released a Final Supplemental Environmental Impact Statement (FSEIS) in the April 2007. This FSEIS addresses legislative changes to the

Marine Mammal Protection Act and pertinent deficiencies raised by the District Court. Currently the program consists of the USNS Impeccable (T-AGOS 23) and one leased vessel, the R/V Cory Choust.

Developers

General Dynamics-Advanced Information Systems	Anaheim Hills, California USA
BAE Systems	Manchester, New Hampshire USA
Lockheed Martin Naval Electronics & Surveillance Systems	Manassas, Virginia USA

EQUIPMENT AND TRAINING SYSTEMS

BFTT
Battle Force Tactical Trainer

Description

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

Status

BFTT began full-rate production following operational testing in 1997 and is currently fielded in all CVN, CG, DDG, LSD 41/49, and LPD 17 class ships. BFTT achieved IOC in 1999 and continues with fleet upgrades through 2015. Modernization plans include upgrading COTS hardware and meeting Open Architecture requirements improving interoperability and reliability through a modernization program established to field the latest model, BFTT T46D.

In addition to modernizing the BFTT system, the T46D variant will be the key enabler permitting integration of ASW, Navigation, and Engineering embedded trainers in a first step toward fielding a Total Ship Training System (TSTS) capable of delivering a total ship training capability.

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
DRS	Parsippany, New Jersey USA

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

Description

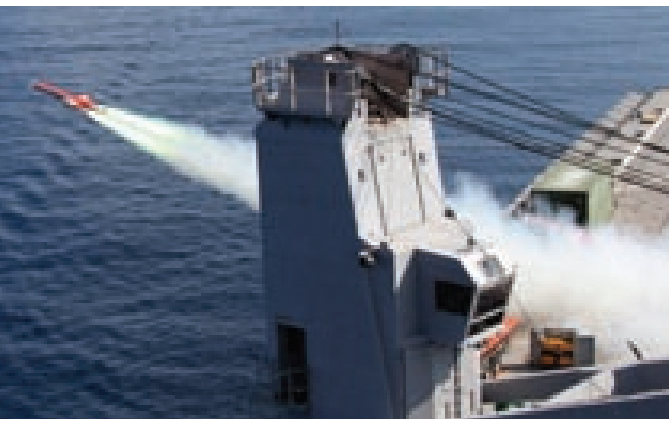
The Individual Protective Equipment (IPE) Readiness Improvement Program (RIP) for Forces Afloat manages millions of individual pieces of equipment for Sailors deploying into potential CBR threat environments. Through centralized management, this program ensures Sailors are always provided with correctly 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, the maintenance and logistics functions required to maintain the material readiness of this equipment required an extraordinary amount of organizational unit man hours that were better used supporting operations and training. The cornerstone of the RIP is the NAVSEA Consolidated Storage Facility (CSF) located at Ft. Worth, Texas. This program utilizes a NAVSEA "RIP Team" which visits ships prior to deployment and performs all required life-cycle and readiness enhancement services.

Status

This program is ongoing and continues to improve Fleet CBR readiness. In addition to the IPE and gas masks, the Readiness Improvement Program currently manages Interceptor Body Armor (IBA), Dorsal Auxiliary Protective Systems (DAPS), and Light Weight Helmets (LWHs) for expeditionary forces, provides protective CBR equipment to the Navy's Individual Augmentees as they process through designated Army training centers; the program also manages CBRND IPE, and, for the Military Sealift Command, manages Anti-Terrorism/Force Protection (AT/FP) equipment.

Developers

Naval Surface Warfare Center	Panama City, Florida USA
Battelle Memorial Institute	Columbus, Ohio USA
Gryphon Technologies LC	Greenbelt, Maryland USA
General Dynamics Information Technology	Fairfax, Virginia USA



Navy Ranges Branch Aerial Target Systems

Description

The Navy Aerial Target Systems Program assesses foreign threats, identifies requirements, develops targets to adequately represent the threats, and procures those target systems for weapon system test and evaluation and fleet training. The current inventory includes targets that represent the following types of threats: supersonic sea-skimming cruise missiles (GQM-163A), high-altitude supersonic missiles (AQM-37), subsonic sea-skimming anti-ship cruise missiles (BQM-34, BQM-74E), and fighter aircraft (QF-4). To represent evolving threats, the Navy has initiated a program to develop and field a sea skimming subsonic-to-supersonic target;

the Multi-Stage Supersonic Target (MSST). The Navy has released a request for proposal to solicit contract proposals to replace the BQM-74E with the follow on Subsonic Aerial Target (SSAT). Additionally, the Navy is partnering with the Air Force to develop the QF-16 to replace the QF-4 Full Scale Aerial Target (FSAT).

Status

The GQM-163A is in full rate production and fully meets Navy requirements to test against supersonic sea skimming threats. A demonstration of a GQM-163A modified to fly a high-diver profile is planned for early 2010 in support of refining supersonic high-diver target requirements. The SSAT will represent the most modern subsonic anti-ship cruise missile threats. The SSAT program development is anticipated to commence in late 2010 with first delivery planned for 2014. The last production contract for the BQM-74E was awarded in early 2009. The joint development of the QF-16 will provide the Navy with the ability to conduct tests against a modern full scale target. In addition to the family of aerial target systems, a moving land target system is planned for procurement in 2010 to provide realistic training and test capability against high-speed threat representative targets.

Developers

BQM-74 E:

Northrop Grumman	Rancho Bernardo, California USA
GQM-163A: Orbital Sciences	Chandler, Arizona USA
MSST: Alliant Techsytems	Woodland Hills, California USA

Shipboard CPS
Shipboard Collective Protection System

Description

CPS 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 which contain multiple 200 cubic feet per minute CBR filter sets preventing 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 spaces, command and control, and rest and relief areas are outfitted with CPS.

Status

Shipboard CPS is installed on more than 80 ships. CPS coverage varies by ship class and ranges from the entire ship interior (DDG 51 FLT I, DDG 51 FLT II, and AOE/T-AOE-6 class) to zone-specific coverage systems (DDG 51 FLT IIA, LSD, LPD 17, LHD, LHA,

and LCS). These systems are a combination of new construction and back-fit installations, depending on the ship class. The current projection is that 116 ships will have CPS by FY 2013.

Developers
Naval Surface Warfare Center Dahlgren, Virginia USA

SSEE
Ship Signal Exploitation Equipment Increment F

Description
The Shipboard Information Warfare (IW) Exploit program provides improved situational awareness and near real-time Indications and Warnings to the warfighter by improving and increasing tactical cryptologic and IW exploitation capabilities across Navy combatant platforms. The SSQ-130 Ship Signal Exploitation Equipment (SSEE) Increment F is a Shipboard Information Operations/Information Warfare/Electronic Warfare (IO/IW/EW) system that provides commanders with threat, search, and identification information. SSEE provides deployed forces with an afloat IO/IW/EW system/sensor. SSEE is a COTS/NDI program that is easily reconfigured and therefore able to respond rapidly to tasking. The system design permits the 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 is in production. SSEE Increment E is now out of production and is expected to attain FOC in FY 2011 with the last afloat installation.

Developers
Argon-ST Fairfax, Virginia USA

SPS
Shipboard Protection System

Description
SPS is designed to augment current force protection tactics and doctrine by providing capability to detect, classify, and engage surface threats at close-range while in port, at anchor, transiting choke points, or operating in restricted waters. The system will integrate COTS systems with current and future force protection initiatives and combat system technologies to provide 360-degree situational awareness. A prototype system installed in USS Ramage (DDG 61) employed COTS-based products interfaced with the ship's existing navigation radar. Its key components include electro-optical/infra-red devices (EO/IR), an integrated surveillance system, spotlights, acoustic-hailing devices, and remotely operated stabilized small arms mounts. Ramage provided valuable integration and component reliability feedback, lessons learned, and integrated logistics support information that pro-

vided the functional demonstration of SPS capability and helped define the formal requirements for SPS.

Status

SPS was approved at Milestone C for low rate initial production with an approved Capability Production Document in August 2009. SPS Block 0, Acoustic Hailing Device fielding, is underway. SPS Block 1 installations were completed in FY 2008 to assess the command and control (C2) core and EO/IR sensing system. Block 3, which represents the full SPS capability, was deployed in FY 2009 on board USS Donald Cook (DDG 75) for testing and operational evaluation.

Developers

Naval Surface Warfare Center	Dahlgren, Virginia USA
	Crane, Indiana USA
FLIR Systems, Inc.	Wilsonville, Oregon USA
IML Corp.	Marietta, Georgia USA
General Dynamics Armament and Technical Products	Charlotte, North Carolina 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.

SUBMARINES AND UNDERSEA VEHICLES

SSBN 726

Ohio-Class Fleet Ballistic-Missile Submarine

Description

The Ohio-class Trident fleet ballistic missile submarine is the Navy's contribution to the Nation's strategic deterrent strategy and posture—a critical "leg" of the nuclear triad that includes Air Force long-range manned bombers and land-based intercontinental ballistic missiles. The SSBN is the most survivable and enduring leg of that strategic triad and it is one of the Navy's highest policy, program, and operational priorities. Each of the 14 Ohio-class SSBNs is armed with the Trident II/D5 Submarine-Launched Ballistic Missile (SLBM) system. Trident SLBMs are capable of carrying Multiple Independently Targeted Reentry Vehicles (MIRVs), with the total number of MIRVs governed by the missile's capability and strategic arms treaty requirements.

Each year, one of the Ohio-class SSBNs enters a shipyard for mid-life overhaul and nuclear reactor refueling. Each boat spends about 18 months in the shipyard before returning to the fleet. This refueling program extends the life of these boats and ensures that Ohio-class SSBNs will remain a ready and credible deterrent into the future.

Starting in 2027, the 14 Ohio-class SSBNs will reach the ends of their useful lives at a rate of about one per year. The Navy intends to replace the Ohio-class submarines with a follow-on SSBN, which will have strategic nuclear deterrence as the primary mission. The payload will be the Trident II/D5 Life Extension (LE) SLBM. The associated missile systems will be developed jointly with the United Kingdom, continuing the long-standing SSBN partnership between the U.S. Navy and the Royal Navy.

The Ohio-class replacement must IOC no later than 2029 to ensure the Navy maintains operational requirements. Additionally, the UK begins retirement of their legacy Vanguard-class SSBN's prior to the Ohio-class retirement. Thus, development of the joint US/UK Common Missile Compartment began in 2010 to ensure that both nations are able to continue to meet Strategic Deterrence requirements. US specific research and development efforts also began in 2010.

Lessons learned from the successful Virginia-class submarine program demonstrate that early and robust investment in design leads to more developed designs and technical specifications prior to construction start. This results in lower costs and increased adherence to scheduled build duration.

Status

Eighteen Ohio-class SSBNs were built and commissioned, and the final boat of the class, USS Louisiana (SSBN 743), joined the Fleet in FY1997. The first four Ohio-class SSBNs were converted to enhanced land-attack, strike and Special Forces platforms (SSGNs). The remaining 14 Ohio-class submarines are being re-capitalized via Engineered Refueling Overhauls (EROs), which refuel the

nuclear reactor and overhaul all major systems, allowing them to operate for an additional 20 years. The last SSBN ERO will commence in FY 2018. An Analysis of Alternatives (AoA) for the replacement SSBN was conducted in 2009 and is currently under review.

Developers

General Dynamics Electric Boat — Groton, Connecticut USA

SSN 774

Virginia-Class Nuclear-Powered Attack Submarine

Description

The Virginia-class submarine is specifically designed for multi-mission operations in littoral and shallow water while retaining the U.S. submarine force's strength in traditional open-ocean anti-submarine and anti-surface missions. These submarines have advanced acoustic technology and are configured to conduct mine reconnaissance, Special Operations Forces (SOF) insertion/extraction, carrier/expeditionary strike group support, intelligence collection and surveillance missions, sea-control, and land attack. The Virginia-class can serve as host for various SOF delivery methods, including mini-submersibles and raiding craft via an embarked dry-dock shelter directly to sea via integral lock-out chambers.

The boats are built using a modular construction process that allows construction, assembly, and testing of systems prior to installation in the boat's hull, thereby reducing costs, minimizing rework, and simplifying system integration. The boat's modular design and extensive use of open architecture electronics systems facilitates technology insertion in both future boats during new-construction and boats in the fleet, enabling each Virginia-class boat to keep pace with emerging threat capabilities throughout its 30-year service life.

Status

The boats are being built under an innovative teaming arrangement between General Dynamics Electric Boat (EB) and Northrop Grumman Newport News (NGNN). Using the modular construction process, each shipyard builds portions of each boat, with integration and delivery of completed submarines alternating between EB and NGNN. Construction of USS Virginia (SSN 774) began in FY 1998 and commissioned in October 2004, with final construction occurring at Electric Boat. USS Texas (SSN 775) began construction in FY 1999 and was commissioned in September 2006, with final construction at Newport News. Follow-on boats continue to alternate between the two shipyards, with both cost and length of construction reduced with each boat. In 2008, the Navy negotiated a multi-year procurement contract for these boats, for a total of 10 boats between 2009-2013 (including procurement of two boats per year beginning in FY 2011). Six Virginia-class submarines have been delivered as of the end of CY 2009.

Developers

General Dynamics Electric Boat Corporation — Groton, Connecticut USA
Northrop Grumman — Newport News, Virginia USA

Submarine Rescue (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 provides the nation's current capabilities for submarine rescue and the existing Submarine Rescue Chamber (SRC). These systems can be quickly deployed in the event of a submarine accident. They are transportable by truck, aircraft and boat. 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, zero-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

After it completed operational testing and evaluation, ADS2000 was introduced to the fleet in September 2007. Four ADS2000 suits are maintained at the Navy's Deep Submergence Unit. PRMS was delivered in late 2008, establishing the initial operating capability (IOC), 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 2011. 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
Caley Ocean Systems	Glasgow, Scotland UK
Environmental Tectonics Corporation	Southampton, Pennsylvania USA

Unmanned Undersea Vehicles (UUV)

Description

Several programs have been funded by the Navy to field UUV systems to improve current Navy Sea Shield capabilities in enabling assured access. The three highest priority UUV missions—ISR, MCM, and ASW—are the focus of Navy research and development efforts.

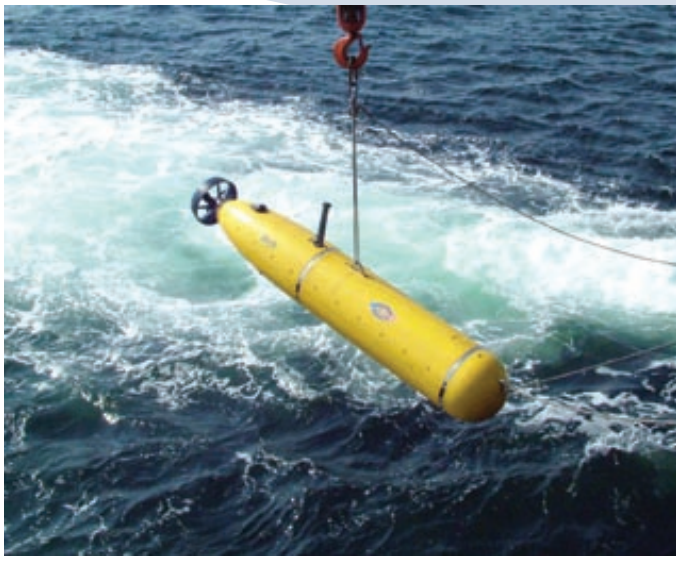
The Navy has funded R&D of engineering development vehicles that provide several technologies key to developing a capability to conduct clandestine reconnaissance. In 2005, two test vehicles

proved clandestine launch and recovery and autonomous operation, and provided critical battery technology and integration development to enable up to 40 hours of endurance.

Status
The Navy is evaluating several UUV technologies with the goal of transitioning the most promising to procurement.

Developers

LMRS: Boeing	Anaheim, California USA
SAHRV: Woods Hole Oceanographic Institution	Woods Hole, Massachusetts USA
NSCT-1: Bluefin Robotics	Cambridge, Massachusetts USA
Hydroid	Pocasset, Massachusetts
EOD: Lockheed Martin, Perry Technologies	Sunnyvale, California USA
Bluefin Robotics	
SMCM: Hydroid	



SUBMARINE WEAPONS

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

Description
The Mk 48 Advanced Capability (ADCAP) heavyweight torpedo is the United States 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 first ADCAP torpedo (Mod 5) featured sophisticated sonar, all-digital guidance and control systems, digital fusing systems and propulsion improvements to the legacy Mk 48 torpedo. The next incremental upgrade to the ADCAP (Mod 6) improved the guidance and control system and improved torpedo acoustic stealth. The latest increment (Mod 7 Common Broadband Advanced Sonar System (CBASS)) includes a new broadband sonar system and shallow water performance improvements. Phase I (of II) of the CBASS program, with the new Broadband Sonar Analog Receiver (BSAR), achieved IOC and was introduced to the fleet in 2006. 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 and Dutch Navies also employ versions of the Mk 48 torpedo through the U.S. Navy's Foreign Military Sales program.

Status
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 against the shallow water diesel submarine threat. Phase II of the CBASS program, with Advanced Processor Build (APB) Spiral 4 software improvements, is expected to achieve Full Operational Capability (FOC) in 2011. The Mk 48 ADCAP is and will remain the Navy's primary submarine-launched torpedo through 2026.

Developers
Raytheon Systems Corporation Keyport, Washington 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 started 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. The first eight Ohio-class submarines were configured to carry 24 Trident I/C4 missiles SLBMs. The ninth boat, USS Tennessee (SSBN 734), and all later boats, were armed with the Trident II/D5 missile system. Conversion of C4 SSBNs to carry the Trident II/D5 missile began in FY 2000 and completed in FY 2008. All SSBNs now deploy with only the D5 missile. In operation, Trident II/D5 missiles have been declared at eight MIRV warheads under the Strategic Arms Reduction Treaty (START). 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.

The Navy has embarked on a Life Extension Program (D5LE) that will upgrade missile systems, maintaining D5 in the fleet into the 2040s, including service on board the Ohio-class replacement, the Sea-Based Strategic Deterrent (SBSD).

Status
Full missile procurement began in FY 2008 and will end in FY 2012, with a total acquisition of 108 additional missiles. D5LE procurement will proceed throughout and past the FYDP.

Developers
Lockheed Martin Sunnyvale, California USA

SUBMARINE SENSORS

BQQ-10
Acoustic Rapid COTS Insertion (ARCI)

Description

ARCI is a three-phase program that replaces existing legacy submarine sonar systems—including BQQ-5 (SSN 688), BSY-1 (SSN 688I), BSY-2 (SSN 21), and BQQ-6 (SSBN 726) sonars—with a more capable and flexible commercial-off-the-shelf (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 will enable 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 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 in development, such as the low-cost conformal array and follow-on towed arrays will be incorporated in the ARCI system through biennial advanced processor build (APB) software improvements and hardware technical insertions of improved processing power.

Status

ARCI Phase II (FY 1999) provided substantial towed and hull array software and hardware processing upgrades that significantly improved LF detection capability. Phase III (FY 2001) augmented the current Spherical Array DIMUS beam-former with a linear beam-former and enhanced processing that improves MF detection capability. Phase IV (FY 2001) upgraded the HF sonar on improved Los Angeles-class submarines. Each phase installs improved processing and workstations (point-click trackballs, Windows environment). Recent, real-world encounters have consistently demonstrated the overwhelming success of this program to restore U.S. acoustic superiority. ARCI completed OPEVAL in FY 2003. The BQQ-10 sonar system is being installed on all submarines as rapidly as possible given the available funding. Continuous improvements via the advanced processor build and technical insertion processes (every two years) add additional processing and functional capability to the system. These improvements include additional towed array processing in support of fleet operations, accelerated delivery of organic mine countermeasures capability inherent in ARCI Phase IV, and adding automation and bell ringer features. 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

Lockheed Martin	Manassas, Virginia USA
General Dynamics Advanced Information Systems	Fairfax, Virginia USA
Advanced Research Laboratory, University of Texas at Austin	Austin, Texas USA

TB-33
Submarine Thin-Line Towed Array

Description

The TB-33 Submarine Thin-Line Towed Array is the follow-on replacement for the TB-29 and TB-29A thin line towed array. These arrays will be back fit on USS Los Angeles (SSN 688 & SSN 688I), USS Seawolf (SSN 21), and SSGN submarines and will be forward-fit on USS Virginia (SSN 774)-class submarine. The TB-33 is a fiber optic array designed to have the same capabilities of the TB-29 and TB-29A towed array with superior reliability.

Status

The TB-33 program is in the final design phase with procurement scheduled to be conducted in FY 2012.

Developers

Chesapeake Sciences Corporation Millersville, Maryland USA

SUBMARINE EQUIPMENT AND SYSTEMS

Common Submarine Radio Room (CSRR)

Description

The CSRR Program modernizes the radio rooms on Seawolf, Ohio and Los Angeles-class submarines based on the Exterior Communications System (ECS) architecture developed for Virginia-class submarines. The system includes up to two High Data Rate (HDR) and/ or up to two OE-538 Multi-function Masts (total of two masts per boat) for enhanced wideband connectivity. A common approach to submarine radio room modernization provides the submarine force with the added benefit of common training, common logistics, and common technical insertion.

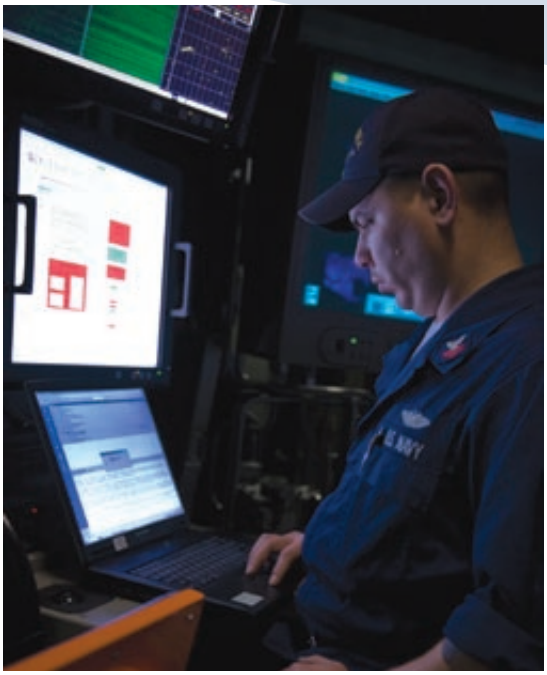
Status

Installation of the CSRR in all submarines is ongoing. All submarines will be outfitted with CSRR by the end of FY 2019.

Developers

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

Submarine Local Area Network (SubLAN)



Description

Submarine Local Area Network (SubLAN) provides Navy submarines with reliable, high-speed Secret, Sensitive but Unclassified (SBU), and Top Secret Local Area Networks (LANs). SubLAN network is combined with other subsystems to deliver end-to-end capability to execute network-centric warfare missions. The network infrastructure incorporates AN/USQ-177 Variants (V)1,2,3,4 and an Unclassified Wireless Local Area Network (UWLAN), plus servers and the Common PC Operating System Environment (COMPOSE). COMPOSE is the operating system environment used by such applications as the Non-Tactical Data Processing System (NTDPS). SubLAN accommodates hardware/software upgrade and technology insertion for the life of the boat and provides connectivity for all tactical and non-tactical subsystems, enabling battle force/JTF interoperability, enabling boat-wide access to the common operating picture, JWICS/SIPRNET/NIPRNET e-mail and web browsing, battle force chat, and other collaborative tools. To reduce footprint, SubLAN will merge with Integrated Shipboard Network System (ISNS), Combined Enterprise Regional Information Exchange System Maritime (CENTRIXS-M) and SCI Networks into the Consolidated Afloat Networks and Enterprise Services (CANES). CANES will provide the network infrastructure and core services in an Afloat Core Services (ACS) and Multi-Level Security (MLS) environment for applications hosted on SubLAN such as DCGS-N, GCCS-M and USW-DSS.

Status

SubLAN 1 installations commenced in FY 2004 and will complete in FY 2011. SubLAN 2 installations commenced in FY 2009 and are planned to complete in FY 2015.

Developers

Naval Underwater Warfare Center	Newport, Rhode Island USA
Space and Naval Warfare Systems Command Systems Center	San Diego, California USA
Science Applications International Corporation	Sterling, Virginia USA

Submarine High Data-Rate Antenna (HDR)

Description

The submarine HDR antenna program is a top-priority submarine C4I initiative and is the Navy's first multi-band dish antenna. The HDR antenna provides the submarine force with worldwide HDR satellite communications capability while operating submerged. It enables the submarine to access the secure and survivable Joint MILSTAR Satellite Program in the Extremely High Frequency (EHF) band, provides boats with the capability to receive time critical tactical information from the Global Broadcast Service (GBS) tailored to each boat's mission and requirements, and enables access to the Defense Satellite Communications System (DSCS) in the Super High Frequency (SHF) band.

Status
The HDR Antenna is installed on SSNs and SSGNs. SSBN's will have all installations and follow-on testing completed by the end of FY 2011.

Developers

Raytheon	Marlboro, Massachusetts USA

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. Current developments include improving the passive scrubbing capabilities by the introduction of new Lithium Hydroxide (LiOH) canisters and more accurately monitoring a disabled submarines atmosphere with the introduction of the Analox Sub MkIIP atmosphere analyzer.

Status
Installation of passive scrubbing curtains onboard all submarines is complete. Newly developed flat-sheet LiOH canisters are being phased into the initial outfitting for the Virginia-class. Procurement and installation of the Analox Sub MkIIP hyperbaric atmosphere analyzer was completed on all submarines in FY 2008.

Developers

Battelle Memorial Institute	Columbus, Ohio USA
Analox Sensor Technology Ltd	Stokesley UK
Micropore, Inc.	Newark, Delaware USA

Submarine Escape (SEIE)

Description
Submarine Escape and Immersion Equipment (SEIE) is a system aboard submarines that allows submariners to escape from a stricken submarine at depths down to 600 feet in self-contained immersion suits with integral rafts and safety equipment. All submarines are being outfitted with the Mk 10 SEIE suits, improved air delivery systems and improved hatch operating systems. In addition to provide thermal protection and an integral life raft, these suits allow for escape at greater depth than the older "STEINKE" system that they have replaced.

Status
Installation is complete for Los Angeles and Seawolf-class submarines. All SSBNs/SSGNs installations were completed in FY 2009. The Virginia-class is receiving SEIE suits upon initial outfitting following construction.

Developers

RFD Beaufort Survitec Defence and Aerospace	Birkenhead UK
General Dynamics Electric Boat	Groton, Connecticut USA
Hale Hamilton Ltd.	Uxbridge UK

BYG-1
Submarine Combat Control System

Description

The BYG-1 is the combat control system common across all submarine platforms (except Ohio-class) which incorporates tactical control, weapon control, and Tactical Local Area Network (TacLAN) functions into a single procurement program. BYG-1 allows the submarine force to rapidly update the boat's safety tactical picture, integrates the common tactical picture into the battle group, improves torpedo interfaces, and provides tactical Tomahawk capability. BYG-1 systems will be updated continuously with hardware enhancements to address COTS obsolescence and capability improvements as defined by the Advanced Processor Build (APB) process. These updates are referred to as Tech Insertion (TI) kits and are differentiated by year of development (i.e., TI00, TI04, and so on). The TI upgrades provide the baseline for all future BYG-1 procurements and periodic sustainment.

Status

BYG-1 is scheduled to be installed on all attack- and guided-missile submarines by FY 2012.

Developers

Raytheon	Portsmouth, Rhode Island USA
General Dynamics Advanced Information Systems	Manassas, Virginia USA
Progeny	Manassas, Virginia USA
Lockheed Martin	Eagan, Minnesota USA

Fixed Distributed System
Commercial Off-The-Shelf (FDS-C)

Description

FDS-C is a COTS version of the long-term passive acoustic FDS fixed distributed surveillance system. FDS-C provides threat location information to tactical forces and contributes to an accurate maritime picture for the Joint Force Commander. Due to its strategic positioning and long lifetime, it provides indication and warning of hostile maritime activity before conflicts begin. Both FDS and FDS-C comprise 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 is made up of two segments: the Shore Signal and Information Processing Segment (SSIPS), which handles the processing, display, and communication functions; and the Underwater Segment, which consists of 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. Additionally, the program is pursuing the development of other technologies, such as an all fiber optic hydrophone passive array, to further increase system reliability and performance at reduced cost.

Status
FDS and FDS-C processing are being upgraded with the Integrated Common Processor (ICP) that will result in increased operator proficiency, increased functionality and savings in logistics support and software maintenance.

Developers
None

SECTION 4

EXPEDITIONARY WARFARE

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—LHA, LHD, LSD, and LPD—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. Their capacity to provide equipment and supplies ashore enables them to respond quickly to world crises. Riverine and expeditionary security forces provide maritime security in coastal and inland waterways, protecting ships and maritime infrastructure. In addition, Joint High-Speed Vessels (JHSVs), hospital ships (T-AHs), and Mobile Construction Battalions (Seabees) provide humanitarian assistance, disaster relief, and build partner-nation capacity.

FORCES

EOD/MDSU
Explosive Ordnance Disposal/Mobile Diving and Salvage

Description

The Explosive Ordnance Disposal (EOD) Community is operationally organized into two deploying EOD groups, each headed by a Navy Captain. Each group has several EOD Mobile Units, a Mobile Diving and Salvage Unit (MDSU), a Training Unit, and an Expeditionary Support Unit assigned. EOD units are tasked with providing the fleet, sister services, and other government agencies with the capability to detect, identify, render safe, recover, evaluate, and dispose of explosive ordnance that has been fired, dropped, launched, projected or placed in such a manner as to constitute a hazard to operations, installations, personnel, or material. Commonly operating in platoons and smaller elements, these EOD units assure access to battlespace by opening lines of communication in the sea-to-shore interface and beyond. Their missions eliminate hazards that jeopardize operations supporting national military strategy. This may require diving operations, parachute insertion, or helicopter insertion. These mobility skills, along with responsibility for all underwater ordnance, make Navy EOD unique in the joint force. The Secretary of the Navy is the single manager for all EOD Technology and Training, carrying out these duties primarily through the Navy EOD Technology Center and Navy Explosive Ordnance Disposal School, where all military EOD Technicians receive the same initial training to defeat conventional land and air ordnance as well as improvised explosive devices (IEDs).

MDSUs conduct expeditionary salvage, search, and recovery operations both afloat and ashore. They also perform harbor clearance, de-beaching, underwater cutting and welding, limited underwater ship repair, ship husbandry, and force protection dive support for both ships in port, and port facilities.

Status

Both EOD and MDSU are recapitalizing their authorized equipment inventories with new Tables of Allowance (TOA) approved in 2008. Based on a complete review of their mission requirements, each TOA was realigned with their force structures and standardized, where possible, 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.

Navy EOD Forces are fully integrated into the Counter IED fight in Iraq and Afghanistan. These sailors are currently working at the Division, Regiment, Battalion, and smaller unit-of-action levels conducting both traditional infantry and special operations missions. They are combat enablers who, often by necessity, become direct action forces operating well away from the maritime environment. Some examples include route clearance operations, movement planning, patrolling, ground combat, as well as command and training of joint and multi-national forces.

Developers

Multiple sources.

MCAG
Maritime Civil Affairs Group

Description

Civil Affairs is a "soft power" enabling force working directly with civil authorities and local populations within a combatant commander's area of operations to lessen the impact of military operations imposed during peacetime, contingency operations, and periods of war. Maritime Civil Affairs teams are specially trained with cultural and language skills for a specific region.

The Maritime Civil Affairs and Security Training Command (MCAST) is located in Little Creek, Virginia. Its mission is to assess, plan, and evaluate civil/military affairs activities in the maritime environment. Its areas of expertise include traditional civil affairs functional areas such as public education and public health, but it is regionally aligned and focused on three maritime-specific functions: commercial port operations, harbor and channel construction and maintenance, and marine and fisheries resources. It also assists with planning and coordination for United States country teams, noncombatant evacuation operations, refugee operations, host nation interagency support, and restoration of communications and local infrastructures following military operations or natural disasters.

Status

The MCAG TOA was approved in 2007. MCAG is a part of the Navy Expeditionary Combat Command (NECC).

MCAG Teams provided by NECC, originally headed to AFRICOM, were recently diverted to Haiti to support disaster relief efforts. Their specialized training and flexible organizational structure, typically including a mission commander, communicator, coxswain, constructionman, and corpsman, are ideally suited to support disaster relief missions.

Developers

None

MESF
Maritime Expeditionary Security Force

Description

Formed in 2007, the Maritime Expeditionary Security Force (MESF) combines legacy naval coastal warfare forces—the mobile security force—and is organized into capability-based divisions and detachments ready to deploy at any time to supply highly trained, scalable, flexible, responsive, and sustainable security teams capable of defending mission critical assets in the near-coast environment. It provides worldwide maritime, coastal, and inshore surveillance; security and antiterrorism force protection; ground defense; visit, board, search and seizure support; command, control, communications system and intelligence support; and security for aircraft, airfields, campsites, convoys and convoy routes, ports, harbors, anchorages, approaches, roadsteads, and other inshore or coastal areas of importance. The force also performs other tasks, including detention operations, law enforce-

ment, oil platform security, embarking security teams aboard Navy and merchant vessels for in-transit security protection, and cross-training with foreign national military and police forces.

Status
The MESF Table of Allowance (TOA) has been approved. TOA funding in support of our Navy Expeditionary Combat Enterprise was improved in the current program.

Developers
Multiple sources.

NAVELSG
Navy Expeditionary Logistics Support Group

Description
The Navy Expeditionary Logistics Support Group consists of five Navy Expeditionary Logistics Regiments (NELR), 11 Navy Cargo Handling Battalions (NCHB), one Training & Evaluation Unit (TEU), and one Expeditionary Support Unit (ESU). The NELR and NCHBs are capable of rapid worldwide deployment, trained and equipped to provide effective shore-based logistical support Navy Expeditionary Combat Command (NECC) forces, Navy commanders, and joint commanders. Its overall mission is to provide pier and terminal operations, surface and air cargo handling, specialized supply support, and ordnance handling and management. Specialized capabilities include expeditionary fuel operations, cargo processing to include bulk mail, ordnance reporting and handling, and warehousing. The NCHBs are organized, trained, and equipped to load and offload cargo and ammunition carried in maritime prepositioning and merchant ships in all environments, handle hazardous material pier side and in-stream, perform heavy-lift crane operations, and provide short-haul trucking.

Status
The NAVELSG TOA is in proposed status and is awaiting final approval. This new TOA reflects a significant improvement in Expeditionary Logistics Support.

Developers
Multiple sources.

NMCB
Naval Mobile Construction Battalion

Description
The Naval Construction Force elements provide engineering and combat construction support to Marine Air-Ground Task Force (MAGTF), Navy Combatant Commanders, and other naval and joint forces. 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. Forward deployment of NMCBs enables the surge of task-tailored engineer forces and equipment sets to enhance the MAGTF and other naval and joint

forces on land. In operations other than war, forward-deployed NMCBs 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 of the Navy's forward bases and facilities.

Status
The Navy has developed a long-range plan to recapitalize the Tables of Allowance (TOA) 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, the TOAs will be outfitted with modern and recapitalized tactical vehicles, construction and maintenance equipment, communications gear, infantry items, and field support equipment.

Developers
Multiple sources.

NSW
Naval Special Warfare

Description
The Naval Special Warfare (NSW) community is the Maritime Component of the United States Special Operations Command (USSOCOM) and the Special Operations branch of the Navy. NSW leadership is provided by Commander, Naval Special Warfare Command, who is responsible for strategic vision; doctrinal, operational, and tactical guidance; and training, organizing, and equipping operational and support components of the community.

The community is organized under seven major commands, which include four operational commands, one training command, one tactics and technology development command, and one Reserve Component (RC) command. The four operational commands—Naval Special Warfare Groups (NSWGs)—provide leadership for a total of eight Active Component (AC) SEAL (Sea-Air-Land) Teams, one SEAL Delivery Vehicle (SDV) Team, two Support Activities (SA), three Special Boat Teams, and organic Logistics Support Units and Training Detachments. Two of the NSWGs also provide administrative control of a total of three Naval Special Warfare Units that are homeported forward, and are under the 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 SDV detachment; an SA troop; an EOD platoon; communications, intelligence, cryptological and metrological detachments; Naval Construction Force detachments; and personnel or other detachments tailored for specific missions.

Deployed NSW forces concentrate on direct action and special reconnaissance missions, principally, although not exclusively, in riverine/maritime environments, but are capable of conducting or supporting other core special operations missions in support of joint or naval commanders.

Status
Resources to support the NSW community are principally provided by USSOCOM, but the Navy retains resourcing responsibilities for service common support and capabilities.

Developers
None.

Riverine Squadrons
Navy Expeditionary Combat Command

Description
Formally established in May 2006, the Riverine Group at Navy Expeditionary Combat Command (NECC) in Norfolk has three established Riverine Squadrons: Squadrons One and Two in Norfolk, Virginia; and Squadron Three in Yorktown, Virginia. All three have conducted operations in Iraq.

These riverine squadrons ensure the continuance of legitimate trade, keep lines of communication open, establish and maintain control of rivers and waterways for military and civil purposes and deny their use to hostile forces, and destroy waterborne hostile forces as necessary. They combat sea-based terrorism and other illegal activities, such as transporting components of weapons of mass destruction, hijacking, piracy, and human trafficking. They also conduct shaping and stability operations and train coalition partners in operations, surveillance, and intelligence.

The squadrons primarily use three boats: the Riverine Command Boat, Riverine Patrol Boat and Riverine Assault Boat.

Status
The Riverine TOA will be 95 percent resourced and outfitted by the end FY 2010. A fourth Riverine Squadron focused on Security Force Assistance (SFA) training and manned within the reserve component was funded in PR 11.

Developers
Multiple sources.

SHIPS AND CRAFT

INLS
Improved Navy Lighterage System

Description

The Improved Navy Lighterage System (INLS) is a new generation, modular monohull barge system used to offload rolling stock and cargo from Maritime Prepositioning Force (MPF) and Strategic Sealift Ships over the beach or to an unimproved pier in the event that more robust port facilities are denied, degraded, or unavailable. INLS replaces the aging legacy Navy lighterage system. The INLS consists of powered and non-powered sections that can be configured for a variety of functions. Major variations and components include warping tugs, causeway ferries, a floating causeway pier, and a roll-on/roll-off discharge facility (RRDF). INLS can support both lift on/lift off (LO/LO) and roll-on/roll-off (RO/RO) operations in near-shore operations. The system's improved sea keeping, water jet propulsion, and cargo movement capabilities far surpass the legacy system in speed, maneuverability, cargo throughput, and crew safety.

Status

INLS ACAT III procurement effort continues with great success. The program has reached IOC and is in full rate production. Delivery of the final articles of the system is planned for FY 2010.

Developers

Marinette Marine	Marinette, Wisconsin USA
Middle Trades, Inc.	Charleston, South Carolina USA
Oldenburg Lakeshore, Inc.	Rhinelander, Wisconsin USA

JHSV
Joint High Speed Vessel

Description

The JHSV is an intra-theater lift capability prototyped by the leased vessels Joint Venture (HSV X1), Swift (HSV 2), and Westpac Express (HSV 4676). JHSV will be a high-speed, shallow-draft surface vessel able to rapidly transport medium payloads of cargo and personnel over intra-theater distances, and load/offload without reliance on port infrastructure. It will be capable of speeds in excess of 35 knots and ranges of 1200 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. It is not an assault platform.

Status

The JHSV program was formed by a merger of the Army Theater Support Vessel (TSV) and Naval High Speed Connector (HSC) programs to maximize common capabilities and form a joint platform solution. Navy has been designated the lead DoD component. The Analysis of Alternatives (AoA) was approved in April 2006 and the Capabilities Development Document (CDD) was approved by the Joint Requirements Oversight Council (JROC)

in January 2007. The Detail Design and Construction contract was awarded to Austal USA on November 13, 2008. The lead ship completed production readiness review in FY 2009. Delivery of the first vessel will be to the Army and is expected in 2011.

Developers
Austal USA Mobile, Alabama USA

LCAC SLEP
Landing Craft, Air Cushion Service Life Extension Program

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, the LCAC launches from the well deck, transits at high speed, traverses the surf zone and lands at a suitable place ashore, where it quickly offloads and returns 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 including the 2004-05 tsunami relief and Hurricane Katrina. LCACs are multi-mission craft that could also conduct alternate missions when outfitted with appropriate mission packages. A Service Life Extension Program (SLEP) to extend hull life from 20 to 30 years for 73 LCACs will be accomplished through FY 2017. Additionally, some of the craft have been outfitted with C4I (radar and radios) system upgrades prior to entry into SLEP. As part of SLEP, the Navy will incorporate the following life-cycle enhancements:

- Open-architecture, 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, fully interoperable with in-service and near-term future joint systems now planned
- Engine upgrades (ETF-40B configuration) that will provide additional power and lift particularly in hot environments, reduced fuel consumption, reduced maintenance needs and reduced 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
IOC was achieved in 1986. Contracts for 91 LCACs were approved through FY 1997, with all 91 craft delivered to the fleet by the end of 2001. The LCAC SLEP Program began in late 2000. Five to six SLEPs are planned each year FY 2006-FY 2014, and two SLEPs are planned for FY 2015.

Developers

Textron Marine and Land Systems	New Orleans, Louisiana USA
Avondale Marine	Gulfport, Mississippi USA

SSC
Ship-to-Shore Connector

Description
The SSC is envisioned to provide high-speed, heavy-lift for over-the-horizon maneuver, surface lift, and shipping. The SSC is intended to address the gap in heavy sea-to-shore lift that will emerge as the LCAC SLEP craft reach their end of service life and retire beginning in 2014. The SSC payload design will exceed the current LCAC SLEP payload. The SSC will also target reduced manning requirements and the use of enhanced lift fans, propellers and composite materials.

Status
The Initial Capabilities Document was approved by the Joint Requirements Oversight Council (JROC) in October 2006. An Analysis of Alternatives (AoA) was completed in October 2007 and was approved in early FY 2008. Contracting for the lead unit is scheduled for FY 2011. Delivery of the first craft into the fleet is scheduled for FY 2016.

Developers
To be determined.

LHA(R)
General-Purpose Amphibious Assault Ship (Replacement)

Description
The LHA(R) class will provide forward-presence and power-projection capabilities as elements of U.S. expeditionary strike groups and strike forces. With elements of a Marine landing force, the LHA(R) will embark, deploy, land, control, support and operate helicopters, landing craft, and amphibious vehicles for sustained periods. The LHA(R) will also support contingency-response, forcible-entry and power-projection operations as an integral part of naval, joint, interagency and multinational maritime expeditionary forces. The first LHA replacement is being designed as a variant of the LHD 8. This ship will include LHD 8 enhancements (including hybrid gas turbine-electric propulsion/auxiliaries) and a significant increase in aviation lift, aviation fuel, sustainment,

and maintenance capabilities; space for a Marine Expeditionary Unit (MEU), Amphibious Group (PhibGru), or small-scale Joint Task Force (JTF) staff; a significant increase in service life allowances to support new-generation Marine Corps systems (MV-22, JSF); and survivability upgrades.

Status

In 1999, the Navy conducted a development of options study that ruled out LHA Service Life Extension as a viable option. The Navy and Joint Staff approved and validated the LHA(R) Mission Needs Statement in March 2001, and OSD (AT&L) authorized Milestone A Acquisition Status and entry into Concept Exploration phase in July 2001. Under OSD guidance, the Navy conducted an analysis of alternatives to determine the best method of replacing the remaining LHAs. This study, completed in September 2002, evaluated numerous design alternatives, including: 1) repeat LHD 8 with evolutionary modifications; 2) a longer and wider LHD 8 upgraded to operate the larger and heavier new-generation amphibious systems; and 3) several new ship designs spanning a wide range in size and capability. The Navy and Marine Corps leadership determined a modified LHD with greater aviation focus, including aviation facility enhancements in lieu of a well deck, provided the best balance of affordability, timing, and capability. While previously planned as part of the Maritime Prepostioning Force, these ships will instead be incorporated in the Navy's Assault Echelon. Joint Requirements Oversight Council (JROC) approval was obtained in February 2005 and Milestone B was reached in January 2006. The first LHA(R) was designated LHA 6 by the Under Secretary of the Navy in August 2005. LHA 6 detail design and construction contract was awarded in FY 2007 and delivery is planned in FY 2012.

Developers

Northrop Grumman Ship Systems
Ingalls Operations — Pascagoula, Mississippi USA

LHD 1
Wasp-Class Amphibious Assault Ship

Description

The Wasp-class is comprises eight 40,650-ton full-load, multipurpose 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. The Warp-class ships increase total lift capacity by providing both a flight deck for helicopters and Vertical/Short Take-Off or Landing (V/STOL) aircraft, such as the AV-8B *Harrier* and the MV-22 *Osprey*, and a well deck for both air-cushioned and conventional landing craft. Each ship can embark 1,877 troops (surge) 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 5-7 are modified variants of the class, and design changes include increased JP-5 fuel capacity, C4ISR and self-defense improvements,

fire-fighting and damage-control enhancements, and Women-at-Sea accommodations.

USS Makin Island (LHD 8) incorporates significant design changes including gas turbine (GT) propulsion, electric drive, and all-electric equipment. Two GTs, providing 70,000 shaft-horsepower, replace the two steam plants found on earlier ships in the class, and the electric drive propels the ship while operating at low speeds to increase fuel efficiency. All ships in the class will be modified to support F-35 *Lightning II* Joint Strike Fighter operations.

Status

Eight LHDs have been delivered to the fleet. The eighth and final ship of the class, Makin Island, was commissioned October 24, 2009 in San Diego, California.

Developers

Northrop Grumman Ship Systems
Ingalls Operations Pascagoula, Mississippi USA

LPD 17
San Antonio-Class Amphibious Transport Dock Ship

Description

The San Antonio-class amphibious transport dock ships are optimized for operational flexibility and designed to meet MAGTF lift requirements in the emerging Expeditionary Maneuver Warfare concept of operations. San Antonio-class 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 ships they replace), 34,000 cubic feet for cargo, accommodations for approximately 720 troops (800 surge), and a medical facility (24 beds and two medical and two dental operating rooms). 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 vehicles, and tanks. The LPD 17 aviation facilities include a hangar and flight deck (33 percent larger than Austin-class ships) in order to operate and maintain a variety of aircraft, including current and future rotary-wing aircraft. Other advanced features include the Advance 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) that will link shipboard systems and 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 hu-

man-factors engineering and thus enhance operational capabilities, the Navy estimates that it shaved about $4.5 billion from the program's TOC.

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. A contract award protest was successfully resolved in April 1997. LPD 17 class workload was transferred from Bath Iron Works to Northrop Grumman Ship Systems (NGSS) in June 2002. LPDs 17 through 21 have been delivered, and LPDs 22 through 25 are under construction:

- San Antonio (LPD 17) was delivered in July 2005 and was commissioned in January 2006
- New Orleans (LPD 18) was delivered in December 2006 and was commissioned in March 2007
- Mesa Verde (LPD 19) was delivered in September 2007 and was commissioned in December 2007
- Green Bay (LPD 20) was delivered in August 2008 and was commissioned in January 2009
- New York (LPD 21) was delivered in August 2009 and was commissioned in November 2009
- San Diego (LPD 22) started construction in July 2006 and is expected to deliver in FY 2011

Developers

Northrop Grumman Ship Systems	
Avondale Operations	New Orleans, Louisiana USA
Louisiana Ingalls Operations	Pascagoula, Mississippi USA
Raytheon	San Diego, California USA

MCM 1 MOD
Avenger-Class Mine Countermeasures Ship Modernization

Description

The Avenger-class mine countermeasures ships are primarily used to detect, classify, neutralize, and sweep mines in sea lines of communication and operating areas. These ships are one part of the mine countermeasures "triad." A total of 14 Avenger-class ships were built; nine remain in active service, and three are in the Naval Reserve Fleet (NRF) pending return to active service. The 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 (PPIP) on the Isotta Fraschini main engines and generators for MCM-3 through MCM-14; replacement of the obsolete Mine Neutralization Vehicle with Expendable Mine Neutralization System (EMNS); 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. Other major HM&E alterations include 400-Hz modifications, replacement of aft deck hydraulic equipment with electric equipment, replacement of the diesel

generator analog voltage regulators with digital voltage regulators, and upgrading the common navigation system.

Status
The 14-ship MCM class modernization package commenced in FY 2004. The modernization effort is scheduled for completion by 2010.

Developers

FDGM	Ingleside, Texas USA
Raytheon	Portsmouth, Rhode Island USA

MLP
Mobile Landing Platform

Description
The MLP is a critical link for the employment of forces ashore from over-the-horizon via its organic surface connectors (LCAC/SSC) and surface interface capabilities. Incorporating a float-on/float-off (FO/FO) capability and organic cranes and ramps, the MLP will allow for transport and deployment of a variety of weapons systems and cargo. MLP will be based on the BP Alaska-class Tanker design as opposed to the original "clean sheet" design in order to help reduce ownership costs.

Status
MLP will be procured within the current FYDP, with IOC and incorporation into the Maritime Prepositioning Force in the 2017 timeframe.

Developers

General Dynamics NASSCO	San Diego, California USA

MPF UB
Maritime Prepositioning Force Utility Boat

Description
The Maritime Prepositioning Force Utility Boat (MPF UB) is a commercial-design utility craft used to support personnel movement and logistics during MPF offload operations. The MPF UB will replace most of the existing LCM-8s on board MPF ships and at each Assault Craft Unit (ACU). Additionally, the MPF UB can provide waterborne force protection as well as limited medical evacuation support in a protected environment. The craft, powered by twin diesel engines and water jet propulsion, is capable of speeds in excess of 25 knots over a 300 nautical mile range in sea state 2-plus. A bow ramp facilitates embarking and discharging personnel over a ramp, low pier, or quay.

Status
Production on the MPF UB continues in FY 2010. Eighteen craft have been delivered to end users and MPF ships to date. Procurement and production of all 23 craft will complete in FY 2012.

Developers

Kvichak Marine	Seattle, Washington USA

PC 1 SLEP
Cyclone-Class Patrol Coastal Service Life Extension Program

Description

Cyclone-class Patrol Coastal ships are essential for conducting Theater Security Cooperation (TSC), Maritime Security Operations (MSO), and Intelligence, Surveillance and Reconnaissance (ISR). PCs are uniquely suited to operating with our emerging partner navies and in the depth of water in the green water/brown water "seam." A total of 14 Cyclone-class ships were built. Ten are operating with the U.S. Navy and three with the U.S. Coast Guard. One was commissioned into the Philippine Navy in 2004.

The PC Service Life Extension Program (SLEP) improvements will extend the life of the class to a 30-year expected service life (2023-2026). It corrects the most significant maintenance and obsolescence issues in order to extend the viable life of the ships to 30 years. The program will support significant alterations including establishing a main propulsion diesel engine pool, and replacing diesel generators and reverse osmosis units. A finite element analysis of the hull and subsequent repairs are also planned. Additional Hull, Mechanical & Electrical modifications, and updates to the weapons systems and C4ISR suite are also included.

Status

The 13-ship PC class is undergoing a SLEP that commenced in FY 2008. In 2010, the program expands to include the three hulls that will be returned from the U.S. Coast Guard at the end of FY 2011. The modernization effort is scheduled for completion by 2016.

Developers

Various.

T-AH 19
Mercy-Class Hospital Ships

Description

Mercy-class hospital ships are considered 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 Shaping and Stability Operations, acting as powerful enablers of stability, security, and reconstruction efforts around the globe—underscoring the Navy as a global force for good. Operating from the sea-base, the 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) missions.

Status
The two hospital ships—USNS Mercy (T-AH 19) and USNS Comfort (T-AH 20)—have an expected service life to approximately 2020/21. There is no requirement to replace them at this time although various options for future afloat medical support are being evaluated. As part of the Naval Fleet Auxiliary Force (NFAF) under control of the Military Sealift Command, these ships are maintained in either a Reduced Operating Status (ROS) or Full Operating Status (FOS) 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 FOC within a few days of activation when they are in ROS status. These ships are manned by civilian mariner crews with medical staff augmentation during periods of activation.

Developers
None.

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

Description
The T-AKE Dry Cargo and Ammunition Ship replaces the Kileaua, Mars, and Sirius classes of fleet auxiliaries, all of which are nearing the end of their service lives.

T-AKE provides logistic lift from sources of supply and transfers this cargo at sea to station ships (which serve the combat forces) and other naval forces. As a secondary mission, T-AKE may 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, augmented by military personnel as required. A Navy helicopter aviation detachment or a contractor equivalent using contracted commercial helicopters provides vertical underway replenishment (VERTREP) capability.

Status
The Fixed Price Incentive contract with General Dynamics National Steel and Shipbuilding Company (NASSCO) includes option pricing for up to 14 T-AKE hulls to support both Combat Logistics Force (CLF) and Maritime Prepositioning Force program requirements. Twelve T-AKE hulls are currently on contract. A contract for long lead-time material (LLTM) was awarded for the 13th and 14th hulls in December 2008. IOC was achieved in May 2007 when T-AKE 1 completed Post-Shakedown availability. As of the end FY 2009, nine ships have been delivered.

Developers

General Dynamics National Steel and Shipbuilding Company	San Diego, California USA

SYSTEMS

ABS
Assault Breaching System

Description

The ABS program focuses on development of standoff weapons systems to counter mine and obstacle threats in the surf and beach zones. The program uses a "system-of-systems" approach that includes development and fielding of the Coastal Battlefield Reconnaissance and Analysis (COBRA) mine/obstacle detection system; Countermine System (CMS); and counter-obstacle, precision craft navigation, lane marking, and C4I capabilities. The platform for the COBRA system is the Firescout Vertical Takeoff Unmanned Aerial Vehicle (VTUAV). Platforms for employment of the breaching mechanisms include naval strike and Air Force combat aircraft.

Status

A near-term capability Joint Direct Attack Munition (JDAM) for ABS (JABS) was fielded in FY 2007, with a far-term capability by FY 2016 (IOC). The COBRA Block I system achieved Milestone C for its Block I capability in FY 2009. The counter mine system munition (CMS) achieved Milestone B in 2008 and will reach Milestone C in FY 2015, with IOC in FY 2016.

Developers

Northrop Grumman	Melbourne, Florida USA
Boeing	St. Louis, Missouri USA

AN/WLD-1 RMS
Remote Mine-hunting System

Description

The AN/WLD-1 RMS consists of a semi-submersible, unmanned vehicle that tows AQS-20A sonar to conduct minehunting operations. RMS will be operated from LCS class ships, and can also be operated from DDG 51 Flight IIA destroyers. RMS is designed to be launched using a pre-programmed search pattern, and the system is capable of over-the-horizon operations while minehunting. Once the mission is completed, RMS will return to the ship and data will be downloaded for Post-Mission Analysis (PMA).

Status

Milestone C occurred in FY 2005, and supported an LRIP decision that procured three systems. A second LRIP decision in FY 2006 purchased 4 additional systems. RMS was sent on deployment with USS Bainbridge (DDG 96) in Sept 2007. Remaining testing and evaluation on DDG and LCS platforms is planned for completion in FY 2010.

Developers

Lockheed Martin	Riviera Beach, Florida USA

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 deployed and operated from the MH-60S helicopter as one of five organic Airborne Mine Countermeasures (AMCM) weapon systems on board the Littoral Combat Ship (LCS). The AQS-20A system will also serve as the mine sensor subsystem of the Remote Mine Hunting System (RMS) hosted on board LCS.

Status

Milestone C and 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. OPEVAL is scheduled for FY 2010, with IOC in FY 2011.

Developers

Raytheon Portsmouth, Rhode Island USA

IDS
Biometrics for VBSS and Identity Dominance System

Description

The Identity Dominance System (IDS) program of record is under development to provide biometric and limited forensic collection capabilities for Visit, Board, Search, and Seizure teams conducting Expanded Maritime Interception Operations (EMIO). This program expands naval force capabilities by providing VBSS teams with the ability to verify and/or confirm the identities of known or suspected terrorists and persons of interest through the use of facial recognition, iris scan, and fingerprints. Additionally, the system will have the capability to collect documents and media for further exploitation.

Status

Currently, 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 "match/no-match" analysis. Approximately 200 of these kits were procured in FY 2006/07 and fielded to VBSS capable ships. The initial fielding provided stopgap biometrics capabilities for naval forces. Research and development efforts are underway to develop a robust multi-modal biometric, document and media exploitation capability through the Identity Dominance System program of record. The first successful biometric data collected by a U.S. Navy ship occurred in June 2006.

The Identity Dominance System in development will expand current biometrics capabilities through the development of a rugged, light-

weight 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 the program is scheduled to achieve Milestone B in March 2010.

Developers

Naval Innovative Laboratory	Dahlgren, Virginia USA
Naval Surface Warfare Center	Panama City, Florida USA

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

Description

Improvised explosive devices (IEDs) continue to present a significant threat to U.S. and coalition forces throughout the world and over the full range of military operations. Counter Radio-Controlled IED Electronic Warfare (CREW) encompasses all the mobile 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 needs initiatives meant to address immediate warfighter requirements.

Status

Joint CREW (JCREW), a Navy-led program to develop the next generation of JCREW systems, is expected to reach IOC in 2012. JCREW will deliver capabilities that correct deficiencies in existing CREW systems and address future worldwide RCIED threats. Additionally, JCREW has an open architecture allowing evolution as new threats, advances in technology, and new vehicle requirements are introduced.

Developers

To be determined.

JNBCRS 2 / CBRN Monitoring and Survey Set, Kits and Outfits (CBRN MSSKO)

Description

The Joint Nuclear Biological Chemical Reconnaissance System 2 (JNBCRS 2)/CBRN Monitoring and Survey Set, Kits and Outfits (CBRN MSSKO) was formally established as an acquisition program to provide tactical forces (including Navy VBSS teams) with additional CBRNE/WMD detection and identification capabilities while conducting operations at suspected WMD sites or within confined spaces. The MSSKO set of unique equipment provides basic safety and screening capabilities for Navy VBSS forces while conducting expanded maritime interdiction operations. Specifically, the system provides:

- Detection and Identification Capabilities
- Radiological and Nuclear Material
- Chemical Warfare Agents (CWA) and Biological Warfare Agents (BWA)
- Toxic Industrial Chemicals/Materials (TIC/TIM)

- Oxygen levels and combustible gases
- Some explosives and drugs
- Individual Personnel Protective Equipment (IPPE)
- Integrated Radio/Wireless Communications

Status

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

- Six Canberra AN/UDR Personal Radiation Detectors (PRD)
- Six Handheld Radiation Monitors (HRM)
- One Thermo IdentiFinder Ultra NGM (used to identify isotopes)
- TIC vapor and gas detector / GAMIC 4 Gas Analyzer

The Navy is currently fielding these commercially available off the shelf kits to deploying VBSS capable ships to serve as an interim capability until the JNBCRS 2/MSSKO program reaches IOC, planned for FY 2012.

To fully meet the UON requirements, the Navy is working with the Joint Program Office Chem/Bio Defense (JPEO CBD) to transition the full-spectrum CBRNE/MWD detection requirements of the UON into the JNBCRS2/MSSKO program of record.

Developers

JPM-NBC CA	Aberdeen Proving Ground, Maryland USA
Murtech/iCX	Glen Burnie, Maryland USA

MK 62/63/65 TDD MK 71 Quickstrike Naval 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 are the only mines in the Navy's inventory. They include one dedicated thin-wall mine—the 2,300-pound Mk 65 weapon—and two mines converted from bombs: the Mk 62 500-pound and Mk 63 1,000-pound mines.

Status

Limited in-service support continues for current inventories and funding is in place for algorithm development and procurement of the TDD Mk 71.

Developers

SECHAN Electronics, Inc.	Lititz, Pennsylvania USA

Navy Energy Program

Description

Energy reform is a strategic imperative. The Navy is actively pursuing ways to reduce energy consumption and improve energy efficiency in operations and at shore installations through an ambitious, but well thought out energy strategy. We are leveraging available investment dollars and current technological advances to employ technology that reduces energy demand and increases our ability to use alternative and renewable forms of energy for shore facilities and in our logistics processes. This technology improves energy options for the Navy, today and in the future. Initial interactions with industry and academic institutions in public symposia have generated an enthusiastic response to the emerging strategy.

Additionally, the Secretary of the Navy has stated that the Navy must change the way we do business in order to realize an energy-secure future and that we must lead the federal government in energy initiatives. We have an obligation to do something now about our impact on the environment and ensure that we can take substantive measures to improve our core warfighting capabilities while improving our energy footprint.

The Navy's energy program is aligned with the Secretary of the Navy's five energy targets. Our goal is not only to increase the use of alternatives both tactically and ashore, but also to invest in efficiency enhancement and consumption reduction initiatives that reduce the overall requirement for petroleum. Our energy program will pursue initiatives that advance combat capability and reduce reliance on fossil based energy. Additionally, this strategy will serve to accomplish the goals set in the legislation and executive order for our shore infrastructure and advance Navy leadership in energy security.

Status

The POM 10 program was enhanced for PR 11 to include additional investment to address shore energy legislative requirements and begin investment in tactical energy initiatives to improve energy efficiency, reduce energy consumption, and increase use of alternatives.

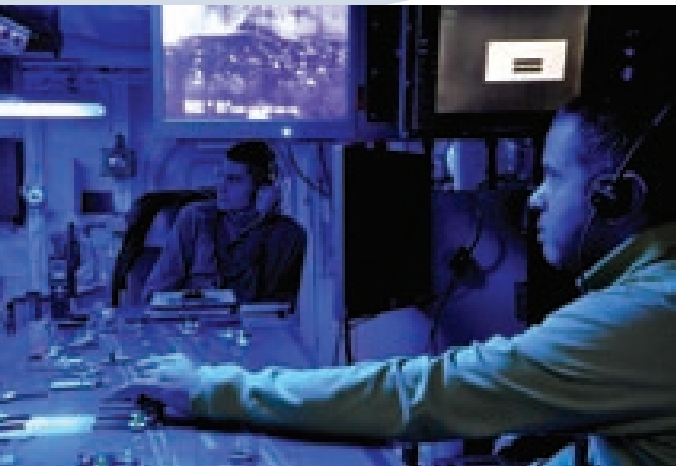
Developers

None.

SECTION 5

COMMAND, CONTROL, COMMUNICATIONS, COMPUTERS, INTELLIGENCE, SURVEILLANCE AND RECONNAISSANCE

"C4ISR" provides the backbone for all naval and maritime operations. It is the "glue" that holds our forces together across the full spectrum of America's involvement in the world—from unobtrusive presence…to humanitarian assistance…to high-tempo combat operations in a major contingency. It also comprises Navy Enterprise-wide strategies, programs, systems, and approaches to providing the needed material to our operating forces, at home and abroad, in the most cost-effective and efficient manner.



ADNS
Automated Digital Network System

Description

ADNS is the shipboard network interface that enables connectivity between the internal ship's network and the outside world via the Radio Frequency (RF) spectrum, and when pier side via land line. ADNS is also installed in Navy Network Operations Centers (NOCs) enabling the NOC to transmit and receive voice and data to and from ships underway or pier side. ADNS provides 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 still 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 is the key enabler for delivering net-centric capabilities that depend upon a robust, dynamic, adaptable, survivable, secure communications.

Status

In FY 2005, all active ships and ashore NOCs 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). Subsequently, in FY 2007 ADNS Increment IIb installations began on unit level ships. In FY 2008, airborne platforms were incorporated into ADNS, bringing network connectivity to additional fleet assets. Increment III Low Rate Initial Production (LRIP) began in FY 2009 with a planned Initial Operating Capability (IOC) for FY 2010. Increment III will be installed in all ships, submarines and ashore NOC and BCA facilities.

Developers

SPAWAR Systems Center	San Diego, California USA
Science Applications International Corporation	Arlington, Virginia USA
Cisco	San Jose, California USA
General Dynamics	Tauton, Massachusetts USA

AIS
Automatic Identification System

Description

The Automatic Identification System (AIS) is a commercial maritime digital broadcast system that continually exchanges voyage and vessel data among network participants over VHF radio frequency, including: vessel identity, position, speed, course, destination, and other data of critical interest for navigation safety and maritime security. International commercial vessels over a specified gross tonnage (GT) (currently 300GT), are mandated by the 1974 IMO International Convention for the Safety of Life at Sea (SOLAS) Treaty to use AIS. U.S. Naval Vessels are exempt. The Navy AIS program collects open-source AIS data that is being broadcast from AIS transceivers on commercial shipping. This open source AIS data (e.g., vessel location, course and speed), combined with other government intelligence and surveillance data, is used onboard Navy platforms afloat to improve safety of navigation and is integrated into the Common Operational Picture (COP) to enhance situational awareness. The AIS data collected by afloat platforms is also aggregated within the Maritime Domain Awareness (MDA)/AIS, Sensor/Server (MASS), located at operational shore sites. The MASS then publishes the data to other unclassified and classified users to support MDA efforts, with particular focus on improving the Navy's maritime security.

Status

The Assistant Secretary of the Navy for Research, Development and Acquisition designated AIS a Rapid Deployment Capability (RDC) on 24 January 2006. Fielding of AIS was initiated under the RDC in response to Presidential guidance for conducting the Global War on Terror (GWOT) and Chief of Naval Operations GWOT implementation guidance for FY 2006. The AIS transitioned to a Program of Record on 24 December 2008 and was designated as an Acquisition Category (ACAT) IV-T program. PEO C4I is the Milestone Decision Authority. AIS Phase 1A has been installed on unit-level ships (e.g., cruisers and destroyers) and provides a basic AIS capability including a laptop computer display on the bridge and connectivity to send unclassified AIS data to shore sites. AIS Phase 2B has been installed on force-level ships (aircraft carriers and amphibs) and allows the direct transfer of AIS track information to the Global Command and Control System via Radiant Mercury. Currently 139 Phase 1A, 23 Phase 2B and four shore AIS systems (Second, Third, Fifth, and Pacific Fleet) have been installed; a shore AIS installation at Sixth Fleet is in progress. The Navy is planning to install AIS aboard 23 remaining surface units (Unit Level AIS) and 71 submarines (Submarine variant AIS).

Developers

L-3 Communications	Orlando, Florida USA
Northrop Grumman	San Diego, California USA
General Dynamics Information Technology	Fairfax, Virginia USA
Sperry Marine Division Northrop Grumman Electronic Systems	Charlottesville, Virginia USA

ATDLS
Advanced Tactical Data Link Systems

Description

The Advanced Tactical Data Link Systems (ATDLS) program provides the tactical data link Command and Control (C2) backbone for U.S. forces and allies and coalition partners. It develops, fields, and supports joint and coalition Tactical Data Link (TDL) capabilities in accordance with the Joint Tactical Data Enterprise Services Migration Plan (JTMP), the DoD roadmap for TDL implementation. The JTMP is a plan to migrate from numerous "stovepipe" non-interoperable tactical data links to a Net Centric, Open Architecture, Internet Protocol (IP)-based, low latency, Joint family of TDL message standards providing access to Tactical Data Enterprise Services and the Global Information Grid (GIG).

Joint TDLs (Link-11, Link-16 and Link-22) include terminals, gateways, networks, and support initiatives that improve connectivity, promote equipment interoperability and provide training and support. Link-11 is used by Navy, Air Force, Army, Marine Corps, and allied ships and aircraft, many of which are also equipped with Link-16. Link-11 is scheduled to be phased out no later than 2015 and replaced with the more capable Link-16. Link-16 is DoD's primary TDL; the Navy is implementing Link-16 in most of its TDL-capable platforms and weapons. Link-22 is a multi-national development effort that will use the same message standard as Link-16, but a less complex waveform, making it more suitable for High Frequency transmission and not restricted to Line-of-Sight communications (a limitation for Link-16).

ATDLS-supported efforts include:

- Terminals: Joint Tactical Information Distribution System (JTIDS), Multifunctional Information Distribution System-Low Volume Terminal (MIDS-LVT), MIDS Joint Tactical Radio System (MIDS JTRS) and the Common Shipboard Data Terminal Set (CSDTS)
- Gateways: Command and Control Processor (C2P), Common Data Link Management System (CDLMS), and Next Generation C2P
- Support Initiatives: Joint Interface Control Officer (JICO) Support System (JSS) and Dynamic Network Management (DNM).

These initiatives allow more effective employment of fleet units by improving timeliness, accuracy, and content of tactical data transfer.

Status

The program descriptions for C2P, CDLMS, DNM, JTIDS, JSS and MIDS in this section of the 2010 *Navy Program Guide* provide the status of each program.

Developers

Data Link Solutions	Cedar Rapids, Iowa USA
ViaSat, Inc.	Carlsbad, California USA
Advanced Programming Concepts	Austin, Texas USA
BAE Systems	Wayne, New Jersey USA

BLII
Base Level Information Infrastructure

Description

Base Level Information Infrastructure (BLII) modernizes antiquated Information Technology (IT) facilities and installs state-of-the-art IT capability where none exist at 14 Outside the Continental of the United States (OCONUS) major fleet concentration bases and stations. BLII is the project that provides the infrastructure, hardware, and software for ONE-NET. 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 installs OCONUS pier IT infrastructure/capability where none exists and modernizes existing pier fiber runs, conduit, junction boxes, brow umbilicals, and associated electronics. Modern pier IT infrastructure enables our forward deployed ships to maintain situational awareness and receive operational and intelligence traffic while performing maintenance or training on their radio frequency systems while pier side.

Status

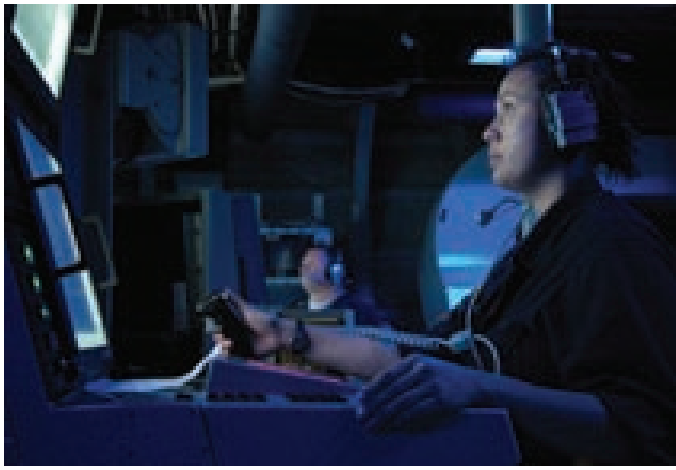
Phase I and II: Completed migration of legacy networks into a BLII/ONE-NET environment that provided services to approximately 23,000 BLII/ONE-NET seats and to nearly 33,000 forward deployed OCONUS Navy users.

There is continuous execution of modernization and refresh to replace outdated infrastructure and network devices (servers, switches, routers, and PCs).

Developers

The BLII program of record is under the cognizance of PEO Enterprise Information Systems; OPNAV N2/N6 and NETWARCOM maintain synchronization in the requirements validations, acquisition, installation and logistic process.

C2P/CDLMS
Command and Control Processor/Common Data Link Management System



Description

The CDLMS initiative extends the functionality of the Command and Control Processor (C2P) by consolidating several functions previously performed by separate systems and subsystems and providing improved Human Machine Interface (HMI) and Link maintenance. CDLMS also incorporates the Link Monitoring System (LMS) along with supporting the initial phase of development of the Common Shipboard Data Terminal Set (CSDTS). The CSDTS initiative provides the next-generation Link-11 data terminal that replaces legacy Link-11 terminal hardware as well as incorporates Multi-Frequency Link-11 (MFL), Satellite Link-11 and supports the initial Dual Net Link-11. Re-hosting the C2P within CDLMS provides the same functionality in Commercial Off The Shelf (COTS) hardware—the UYQ-70 console—which makes the system easier and less expensive to upgrade. The

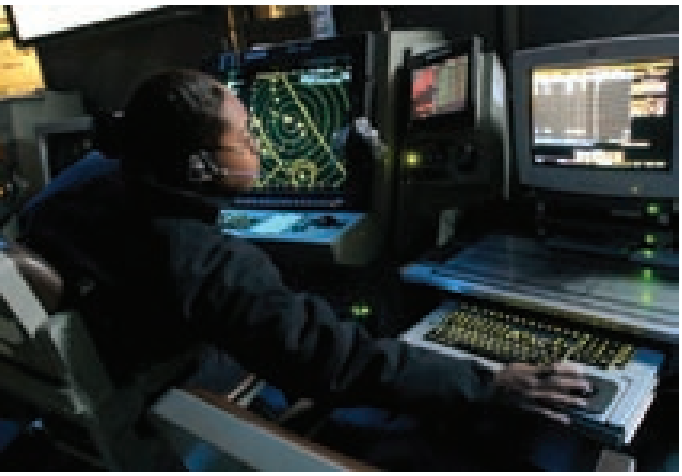
CDLMS integrates the CSDTS and C2P (Rehost) in a set of Versa Module Eurocard (VME) cards to provide consolidated displays and controls to monitor multi-TDL networks simultaneously. The CDLMS/ C2P(R) program has fielded the USQ-86 (V), consisting primarily of an UYQ-70 EPS housing four VME chassis. Three of these are populated with VME card sets for the following: C2P(R), CSDTS, and the Link Management/ Monitoring Component. This hardware configuration supports the transformation to Next Generation Command and Control Processor (NGC2P), which introduces the Beyond Line of Sight Capability Joint Range Extension (JRE), and designed to introduce Link-22. CDLMS has successfully completed Aegis and SSDS Combat System Integration and Test (CSIT) and is currently being installed. NGC2P successfully completed OPEVAL in FY 2007. CSDTS implementation is ongoing, enabled by, but separate from, CDLMS/C2P(R).

Status

C2P Model 4 successfully completed OPEVAL in 1994; Model 5 completed OPEVAL in 2000. The C2P is fully fielded with the capability of being re-hosted as software within the Common Data Link Management System (CDLMS) and Next-Generation C2P (NGC2P). NGC2P achieved MS C in FY 2005. It completed testing and was approved for Full Rate Production in FY 2008. Fielding is in progress.

Developers

General Dynamics Information Technology	Fairfax, Virginia USA
DRS Inc.	Wyndmoor, Pennsylvania USA



CANES
Common Afloat Network Enterprise System

Description

Consolidated Afloat Network Enterprise System (CANES) will provide a consolidated Unclassified through Top Secret Sensitive Compartmented Information (SCI), robust, survivable, secure, scalable Service Oriented Architecture (SOA) for an afloat Common Computing Environment (CCE) network hosting applications and enterprise services. Applications and enterprise services pertinent to efficient data flow across warfare mission areas are being migrated from point-to-point and stand-alone hardware infrastructures to the more interoperable CANES CCE that encompasses ships, submarines, and Maritime Operations Centers (MOCs).

CANES is designed to replace vulnerable and obsolete existing afloat networks, including the Integrated Shipboard Network Systems (ISNS), Combined Enterprise Regional Information Exchange Maritime (CENTRIXS-M), SCI Networks, and submarine local area networks (SubLANs).

The CANES fielding plan is based on a four-year hardware refresh baseline and a rolling two-year application software upgrade baseline. This approach focuses on cost-control over acquisition, contracting, testing, and lifecycle sustainment by consolidating configuration management baselines, logistics, and training into a unified program.

Status
The CANES Material Development Decision was approved in November 2008 and the Request for Proposal (RFP) was released in April 2009 to support planned IOC in FY 2012 and FOC in FY 2020. Forty-six applications are scheduled to migrate to CCE/CANES.

Developers
To be determined.

CENTRIXS–M
Combined Enterprise Regional Information Exchange System Maritime

Description
CENTRIXS-M is the maritime variant of CENTRIXS—a web-centric government-off-the-shelf/commercial-off-the-shelf (GOTS/COTS) capability that permits multinational information exchange by providing e-mail, web services, collaboration, and products such as Global Command and Control System Integrated Imagery and Intelligence (GCCS-I3), components for the operational and tactical Common Operational Picture (COP), and Common Intelligence Picture (CIP) between maritime forces and joint, Allied, coalition and interagency partners. CENTRIXS-M enables ship-to-ship and ship-to-shore web replication, secure e-mail, and chat over satellite communications (SATCOM). It also provides a ship-to-shore SATCOM IP path to complement existing ship-to-ship e-mail capabilities and enable communications with coalition and Allied forces using a combination of network switches, routers, crypto, servers, PCs, and commercial network technologies. CENTRIXS supports seven enclaves: CENTRIXS Four Eyes (AUSTRALIA/CANADA/U.K./U.S.); CENTRIXS-J (Japan); CENTRIXS-K (Korea); NATO Initial Data Transfer System (NIDTS); Global Counter Terrorism Task Force (GCTF); Combined Naval Forces CENTCOM (CNFC); and Multi Coalition Forces Iraq (MCFI). Due to the criticality of coalition operations, CENTCOM requires all ships deploying to the region have CENTRIXS-M capability. CENTRIXS-M, currently fielded as a standalone network, will be consolidated into the Consolidated Afloat Networks and Enterprise Services (CANES) when that system is fielded.

Status
CENTRIXS-M became a Program of Record during the first quarter of FY 2006. Increment 0 Milestone C was achieved during the second quarter of FY 2007. Initial Operational Capability for Increment 0 was achieved in fourth quarter FY 2007, with full operational capability expected in fourth quarter FY 2013. Increment 1 Milestone C was completed in July FY 2009. In early 2010, CENTRIXS-M is installed on 143 of 160 Navy ships.

Developers
Engineering, development, integration, installation, training, and life cycle support will be accomplished through Navy and Defense Department activities.

COMSATCOM
Commercial Satellite Communications

Description

The Commercial Satellite Communications program includes: (1) the Commercial Broadband Satellite Program (CBSP); (2) the Commercial Wideband Satellite Program (CWSP); (3) the Inmarsat B High Speed (HSD) Program; (4) the Television Direct-To-Sailors (TV-DTS) program; and (5) the Iridium Program. The primary purpose of CBSP, CWSP, and Inmarsat B HSD is to provide the terminals and architecture for augmentation of bandwidth requirements in the fleet that are not otherwise available from Military Satellite Communications (MILSATCOM). This includes SATCOM terminals that deliver voice, video, data, and imagery requirements to the warfighter at-sea, e.g., NIPRNET, SIPRNET, JWICS, JCA, Telephones, and Video Teleconferencing. The primary purpose of TV-DTS is for Quality of Life in the fleet to include Video and Audio Programming. For the Navy, this includes the topside antenna only. The space segment is provided by Armed Forces Radio & Television Service (AFRTS) and the below-decks equipment and programming is provided by the DEFMEDIACEN. The primary purpose of Iridium as part of the CNO N2/N6 program of record includes paying Navy's share of the must-pay corporate bill for Operations and Maintenance (O&M) of the DoD Gateway in Hawaii. Defense Information Systems Agency (DISA) is the Program Manager for Iridium and is responsible for O&M of the DoD Gateway in Hawaii. A small amount of funding is also included to maintain a Help Desk (SPAWAR Atlantic) for new Navy users desiring to acquire Iridium. All users are responsible for paying for the Iridium Handsets, ancillary equipment, as well as airtime.

Status

Fielding for CBSP as of the end of FY 2009 included 15 of 235 ships complete, with the remaining ships continuing to operate with legacy CWSP and Inmarsat. Transitioning to CBSP includes 27 CWSP and 174 Inmarsat. One hundred thirty-two ships continue to operate with the legacy TV-DTS antenna system. Iridium includes funding Navy's share of the corporate bill to pay for Operations and Maintenance of the DoD Gateway in Hawaii. This supports approximately 3,000 Navy users of Iridium.

Developers

CWSP: Harris Corporation	Melborne, Florida USA
INMARSAT: NERA	London, England
CBSP SSV: CVG, Inc.	Chantilly, Virginia USA
CBSP ULV/FLV: Harris Corporation	Melborne, Florida USA
TV-DTS: NERA	
Iridium: Iridium, LLC	

DCGS–N
Distributed Common Ground System–Navy

Description

Distributed Common Ground System-Navy (DCGS-N) Increment One is the Navy component of the Department of Defense (DoD) DCGS family of systems (FoS). DCGS-N is the Navy's primary Intelligence, Surveillance, Reconnaissance, and Targeting (ISR&T) support system, providing processing, exploitation, and dissemination (PED) 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 will replace all legacy JSIPS-N (Joint Service Imagery Processing System-Navy) and TES-N (Tactical Exploitation System-Navy) systems.

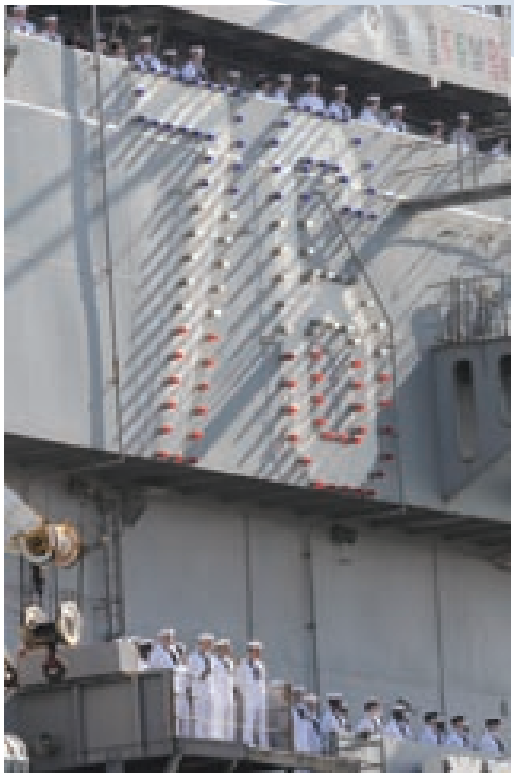
In 2007, the DCGS-N program was realigned to fit into the CANES Common Computing Environment (CCE)/Core Enterprise Services (CES) architecture. The Initial Operational Capability (IOC) of Increment One will be in the fourth quarter of FY 2010, with the installation of DCGS-N Increment One, Block One on the USS Ronald Reagan (CVN 76). The Increment One follow-on system, DCGS-N Increment Two, planned for FY 2015, 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 makes maximum use of COTS and 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 the other Service and Agency DCGS systems.

Status

Between FY 2009 and FY 2013, 36 DCGS-N Increment One systems will be installed on aircraft carriers (CVN), large-deck amphibious assault ships (LHA/LHD), fleet command ships (LCC), intelligence training centers and school house facilities, and at shore-based numbered fleet Maritime Operations Centers (MOC) reach-back support sites. Increment Two (software) will be tested and fielded in FY 2015 as part of CANES.

Developers

SAIC	McLean, Virginia USA
BAE Systems	Rancho Bernardo, California USA
L-3 Communications/Titan	Chantilly, Virginia USA
Raytheon	Garland, Texas USA



DJC2
Deployable Joint Command and Control

Description

Deployable Joint Command and Control Capability (DJC2) is a standardized, rapidly deployable, scalable, and reconfigurable Joint Command and Control (C2) and collaboration Combat Operations Center that is made available to Regional Combatant Commanders (COCOMs) and their joint component commands. 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 Joint Task Force (JTF) Combat Operation Center. It has been used for contingencies like the Burma cyclone, Sumatra tsunami, Pakistan earthquake, Hurricane Katrina, and the Lebanon evacuation Joint Task Force operations. DJC2 supports the Navy Strategic Plan by extending the Joint Sea Base ashore for rapid, dynamic joint operations.

The DJC2 currently has four modular tent/mobile shelter configurations that mate with each other and iteratively build up C2 capability during the first phases of a joint operation. Possible configurations include a Rapid Response Kit (five to 15 seats), En Route (ten to 20 seats carried on board a C-130 airframe), Early Entry (20 to 40 seats), and Core (60 seats). A fully fielded DJC2 configuration can be set up in less than 24 hours, with a footprint of approximately 40,000 square feet, and includes self-generated power, environmental control, shelters, infrastructure, trailers, communications equipment, C2 applications, office automation and collaboration software applications with operator workstations (laptop computers, chairs, tables), displays, intercommunications, local area networks and access to wide area networks. The DJC2 program is currently delivering to the Combatant Commanders 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 organization/private volunteer organization (NGO/PVO) realms
- Robust, scalable, and rapidly deployable, including autonomous en-route and rapid response kit capabilities
- Spiraling into the design and fielding evolving technology to meet Combatant Commander and Joint Task Force emerging requirements

Status

The DJC2 program attained FOC with the delivered six operational Core systems to U.S. Southern Command (1 Core), U.S. European Command (1 Core), U.S. Pacific Command (1 Core) and U.S. Army South (1 Core), U.S. Southern European Task Force (Airborne, 1 Core) and III Marine Expeditionary Force (1 Core). Current funding supports hardware sustainment, refresh and technology-insertion efforts, such as Everything Over Internet Protocol (now called IP Convergence).

Developers

L-3 Communications	Panama City, Florida USA
ARINC	Panama City, Florida USA
CSC	Woodbridge, Virginia USA
GTRI	Atlanta, Georgia USA
Radiance	Huntsville, Alabama USA
General Dynamics Information Technology	Panama City, Florida USA

DMS
Defense Messaging System

Description

The DMS initiative is an OSD-mandated program designed to eliminate the multitude of expensive "stovepipe" legacy record messaging systems and provide organizational message traffic between operational units. DMS architecture has been derived from the Multi-command Required Operational Capability (MROC) requirements and has been targeted to provide the armed services and agencies with a high assurance messaging capability. DMS provides messaging, directory, and management services.

Status

The Current DoD implementation of the DMS client-server architecture will shut down in FY 2010, after migration to the web-based Navy Regional Enterprise Messaging System (NREMS) is complete. NREMS will continue to provide record message service for General Service (GENSER) Secret and below traffic. Shore commands with a Top Secret Collateral (TS/C) requirement will send/receive TS/C messages via the Pentagon Telecommunications Center's (PTC) Automated Message Handling System (AMHS). The Navy has two NREMS GENSER enclaves (Secret and Sensitive but Unclassified (SBU)) at each Naval Computer and Telecommunications Area Master Station (NCTAMS). NCTAMS Pacific is located in Wahiawa, Hawaii, and NCTAMS Atlantic is located in Norfolk, Virginia. The NREMS SBU enclave is scheduled to be decommissioned in March 2010 upon successful completion of the COMNAVNETWARCOM Messaging Reduction Initiative, which is planned to transition non-Command and Control (C2) administrative messages to alternative mechanisms designed to exchange Official Information via existing military network capabilities (Wiki, Chat, Blog, Web-portals and Command E-mail with PKI security measures). NREMS will be consolidated to a multi-classification (Secret and below) enclave on SIPRNet to service Command and Control (C2) and Combat Support message traffic only. The NREMS SBU enclave will be repurposed to support the Tactical (Afloat) community and will incorporate existing fleet SIPRNET Messaging (FSM) functionality into a Tactical NREMS to posture the Navy to take advantage of evolving technologies and allow the eventual decommissioning of the legacy Naval Modular Automated Communications System (NAVMACS) variants on board surface ships. The functionality of NAVMACS will be incorporated in a Common Computing Environment (CCE) of the Consolidated Afloat Networks Enterprise System (CANES) in the future (FY 2013 and beyond). The current legacy translation functionality provided by a Tactical Messaging Gateway (TMG) at each NCT-

MAS, will be migrated from the Navy unique environment into DISA's multi-Service National Gateway Center (NGC) during the third quarter of FY 2010 and the two existing TMG systems will be secured prior to October 2010.

Developers

Lockheed Martin	Manassas, Virginia USA

DNM
Dynamic Network Management

Description

Dynamic Network Management (DNM) increases Link 16 network effectiveness and throughput and provides the warfighter greater flexibility in the use of the Link 16 network. DNM will facilitate automated net entry/exit of additional platforms. DNM will provide a real-time capability to adjust Link 16 network allocation to meet evolving network changes in the theater. DNM reduces Link 16 network oversubscription and will enable fully ad-hoc, dynamic network operations on Link 16, variable update and throughput rates, and expanded network throughput with sub-net operations. DNM also provides support for networked weapons, sensor networking, time-critical targeting, and time-critical strike. DNM includes the following capabilities: Time Slot Reallocation (TSR), TSR Combined Network Participation Groups (CNPG), expanded stacked netting and Multi-netting.

Status

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 in FY 2010, and MIDS on Ship (MOS) in FY 2011. CNPG is scheduled for MS C in FY 2011, IOC in FY 2011, and FOC in FY 2014. Expanded stacked netting is scheduled for IOC in FY 2013, and FOC in FY 2015.

Developers

SPAWARSYSCEN	San Diego, California USA
Northrop Grumman	San Diego, California USA
BAE Systems	Wayne, New Jersey USA
Warner Robins	Robins, Georgia USA

DoD Teleport

Description

DoD Teleport links the satellite communications space segment with the shore infrastructure and provides tactical users a worldwide communications interface to the Global Information Grid (GIG). Through multiple radio frequency media (military and commercial bands), Teleport provides inter-theater reach-back into the Defense Information Systems Network (DISN) and service C4I systems, as well as intra-theater communications support for tactical users. In 2001, DoD designated the Navy as the

Teleport Requirements Sponsor. Teleports are located at six primary sites and one secondary site: 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

Teleport is completing its second generation of installs with an FOC in March/April 2009; this will provide access to the GIG for users of current SATCOM systems. Generation Three is expected to begin fielding in FY 2010 with a projected FOC of FY 2013. Teleport Generation Three will fully integrate interfaces to the Advanced EHF (AEHF) System, the Mobile User Objective System (MUOS), and Wideband Global Satellite (WGS) System, thus completing implementation of Internet Protocol (IP)/Net-Centric capability.

Developers

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

EHF/NMT
Extremely High Frequency/Navy Multi-Band Terminal

Description

The Navy Multi-band Terminal (NMT) is the future Navy Satellite Communications (SATCOM) terminal that will provide Extremely High Frequency (EHF) and Super High Frequency (SHF) transport service for Navy ships, submarines, and shore stations. NMT replaces the AN/USC-38 Follow-on Terminal (FOT) and the WSC-6 terminals. NMT supports a variety of protected and wideband command-and-control communications applications (e.g., secure voice, imagery, data, and fleet broadcast systems). NMT will allow access to current military SATCOM satellites to include: protected EHF SATCOM services available on Milstar, EHF payloads onboard Ultra High Frequency Follow-On satellites, and interim Polar EHF payloads and wideband service on the Defense Satellite Communications System (DSCS) satellites and to the follow-on Advanced EHF (AEHF) and Wideband Gapfiller Satellites (WGS). Three international partners, Canada, UK and the Netherlands, plan to procure a variant of the NMT.

Status

NMT received Milestone B approval in October 2003. Initial NMT fielding is planned for FY 2011, with a planned initial operational capability in FY 2012.

Developers

NESP, FOT and NMT:	
Raytheon	Marlborough, Massachusetts USA

GBS
Global Broadcast Service

Description

The Global Broadcast Service (GBS) is an extension of the Global Information Grid that provides worldwide, high capacity, one-way transmission of video (especially from Unmanned Aerial Vehicles), imagery and geospatial intelligence products, and other high-bandwidth information supporting the nation's command centers and joint combat forces in-garrison, in-transit, and deployed within global combat zones. GBS interfaces with other communications systems to provide relief to overburdened/saturated satellite networks and provides information services to previously unsupportable (due to low bandwidth) users. GBS is the only MILSATCOM system capable of disseminating large quantities of informational products such as imagery, intelligence, and missile-warning data as well as weather, joint, and service-unique news, education, training, video, homeland defense data, and other desired information to the fleet. It provides fleet and strike group commanders with real time, broad bandwidth satellite receive capability, up to 23.5 Mbps per channel on Ultra High Frequency (UHF) Follow-On (UFO) satellites and 45Mbps with Wideband Global Satellite (WGS). GBS provides support to U.S. allies, coalition forces and non-DoD governmental organizations. GBS also supports Range of Warfare Command and Control (ROWC2) situations and enables delivery of information products while operating in Emissions Control (EMCON) or data denied environments.

Status

GBS is installed in aircraft carriers, amphibious 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 (IP) technology, which enables users to request real-time data via an alternate ADNS off-ship system for delivery via GBS, which significantly enhances the warfighter's situational awareness. During FY 2010, the Navy GBS program plans to complete fielding to Los Angeles-class submarines, begin fielding 26 additional unit level cruiser/destroyer systems, and begin the initial system-wide technology refresh.

Developers

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

GCCS–M
Global Command and Control System–Maritime

Description

Global Command and Control System–Maritime (GCCS-M) is the Navy's premier Command and Control System and is the maritime component of the Department of Defense's Global Command and Control System (GCCS) Family of Systems. GCCS-M is used at every echelon of command for planning, coordinating, and executing operational and tactical warfighting missions. GCCS-M is a system of computers and software that receives, displays, correlates, fuses, and maintains geo-location track information on friendly, hostile, and neutral land, sea, and air forces. GCCS-M integrates and displays that information with available intelligence and environmental information. This geo-located and fused picture of tracks is then provided to joint, coalition, and allied forces and interagency partners. GCCS-M serves as the Navy's primary information technology system for interfacing with more than 75 joint and naval systems to exchange data among approximately 20,000 users for near real-time situational awareness critical to operational and tactical analysis and decision-making for controlling U.S., Allied, and multinational forces.

Status

On 30 March 2001, the GCCS-M program was 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 a software-based evolutionary acquisition program with development and implementation progressing in increments. In keeping with Department of Defense regulations for evolutionary acquisition programs, the acquisition plan 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. Increment 1, which was formerly known as GCCS-M Version 4.0 and prior, is in the Operations and Support Phase. Increment 2, which was formerly known as GCCS-M Version 4.1, is in the Engineering and Manufacturing Development phase. Per MDA direction in the Acquisition Decision Memorandum (ADM) of 8 July 2005, the GCCS-M Program Manager was authorized to initiate GCCS-M Increment 2. GCCS-M is fully funded to deliver Increment 2 capabilities, with Initial Operational Capability and first operational fielding on a U.S. Navy ship in the fourth quarter FY 2010.

Developers

Northrop Grumman Space & Mission Systems	San Diego, California USA
SPAWAR Systems Center	San Diego, California USA

HFIP/SNR
High Frequency Internet Protocol and Subnet Relay

Description

High Frequency Internet Protocol (HFIP) and Subnet Relay (SNR) provide allied, coalition and national maritime units with a direct platform-to-platform tactical networking capability using legacy Ultra High Frequency (UHF) and High Frequency (HF) radios. Since the two technologies operate efficiently with current legacy equipment, they are cost-effective solutions for achieving tactical Internet Protocol (IP) networking at sea. HFIP and SNR enable 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. 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. Both systems enable 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).

Status

In 2007, the USS Harry S. Truman (CVN 75) Carrier Strike Group deployed with HFIP and SNR. During the next five years, the Navy plans to install HFIP and SNR on approximately 243 ships, submarines, and aircraft. Final Operational Capability is planned for FY 2016.

Developers

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

IA
Information Assurance

Description

Information Assurance (IA) is defined as measures that protect and defend information systems by ensuring their availability, integrity, authentication, confidentiality, and non-repudiation. This includes providing for restoration of information systems by incorporating protection, detection and reaction capabilities. IA is a supporting capability for Information Operations (IO). The Information Systems Security Program (ISSP) is the Navy's primary Information Assurance (IA) program responsible for the management of Department of Navy (DoN) Information Security (INFOSEC) and Communications Security (COMSEC) research and development. ISSP provides systems security engineering to Navy Information Systems, secure voice devices for secure communication capability between shore and sea, and products that secure electronic transactions, providing data integrity and

confidentiality for sensitive information used by Navy and Joint warfighters afloat and ashore. The Navy has embraced an IA "Defense-in-Depth" strategy to protect Navy networks by employing multiple layers of protection starting at the desktop. The IA Technical Framework (IATF) has been adopted and divides ISSP resources into three fundamental categories: technology, operations and people. IATF provides a documented source of technical solutions and guidance mapped to the Defense-in-Depth goals. Selection, training and retention of network security specialists are vital elements of our ISSP. ISSP technology focuses on development, acquisition, implementation, upgrade of the IA products and services such as firewalls, guards, Virtual Private Networks (VPN), intrusion detection systems, Electronic Key Management Systems (EKMS), Key Management Infrastructure (KMI), Public Key Infrastructure (PKI) and Common Access Cards (CAC). The ISSP also develops funds and acquires new modern cryptographic equipment and technology necessary to support Navy and Joint Service high-performance systems and system applications.

Status

The Navy's IA program is in service. Navy IA/ISSP is a collection of related non-ACAT programs that address the full spectrum of Information Assurance. These programs are in various phases of the acquisition process, from concept development through capability sustainment. Navy's IA program will continue to provide national cryptographic equipment, products and services in alignment with the DoD Information Assurance program.

Developers

General Dynamics C4 Systems	Scottsdale, Arizona USA
Ultra/Flight Line	Rochester, New York USA
MYKOTRONIX	Torrance, California USA
L-3 Communications	Canton, Massachusetts USA

The Space and Naval Warfare Systems Command (SPAWAR) provides operational support to Navy warfighter by disseminating IA information and providing technical services.

IBS/JTT
Integrated Broadcast Service/Joint Tactical Terminal

Description

Integrated Broadcast Service (IBS) is a system-of-systems that will migrate the Tactical Receive Equipment (TRE) and Related Applications Data Dissemination System (TDDS), Tactical Information Broadcast Service (TIBS), Tactical Reconnaissance Intelligence Exchange System (TRIXS) and Near-Real-Time Dissemination (NRTD) system into an integrated service with a common message format. The IBS will send data via communications paths such as Ultra High Frequency (UHF) SATCOM and via networks over Super High Frequency (SHF), Extremely High Frequency (EHF) and Global Broadcast Service (GBS). This program supports Indications and Warning (I&W), surveillance, and targeting data

requirements of tactical and operational commanders and targeting staffs across all warfare areas. Joint Tactical Terminal (JTT) is being upgraded to become interoperable with the new Common Interactive Broadcast (CIB) UHF that employs the new Common Message Format (CMF) and Demand Assigned Multiple Access (DAMA) Integrated Waveform (IW). The Navy is also pursuing an Internet Protocol (IP)-based IBS transmission system, called Network Enabled IBS (NEIBS), which will provide for receipt of the IBS data over IP networks.

Status

The Navy commenced shipboard installations of JTT in FY 2001 and 83 JTTs have been fielded as of 2009. The transition to the next-generation broadcast services is expected to begin in FY 2012 with the delivery of upgrade kits from the manufacturer. NEIBS is beginning development of the necessary requirements and logistics paperwork to establish a program of record. Initial Operational Test and Evaluation (IOT&E) for NEIBS is expected to occur in FY 2012.

Developers

IBS: L-3 Communications — Fairfax, Virginia USA
JTT: Raytheon Systems — St. Petersburg, Florida USA

JSS
Joint Interface Control Officer (JICO) Support System

Description

The JSS is a toolset that facilitates the ability of the Joint Interface Control Officer (JICO) to plan the Multi-Tactical Data Link Architecture (MTA), manage and monitor the Multi-Tactical Data Link Network (MTN) and its data exchange among the U.S. Armed Services and allies/coalition forces as appropriate in support of the joint forces commander. Using dynamic network management capabilities and the network control technology, the JICO can accommodate required changes to the operating network, including unplanned entry and egress of Link-16 platforms. In his role as the manager of the MTN, the JICO manages, maintains and monitors Link-16 and the near real time Common Tactical Picture; and responds to the requirements of the Joint Data Network (JDN) manager. JSS consists of a baseline of common modular hardware, software, computer operating system, documentation, training, and both local and remote JICO Data Repositories (JDR). JSS is intended to be located in those operational and platforms for the joint force commander to exercise control of data link interfaces at the Joint, Regional and Sector level.

Status

JSS is USAF Program of Record. Milestone C is scheduled for February/March 2010, to be followed by a Multi-services Operational Test and Evaluation (MTO&E) in the summer 2010 and a full-rate production decision in September 2010. The Capabilities Production Document (CPD) was approved in August 2008, and USAF FOC is planned for FY 2012.

Developers

Northrop Grumman — Reston, Virginia USA

JTIDS
Joint Tactical Information Distribution System

Description

The Joint Tactical Information Distribution System (JTIDS) Class 2 Terminal provides a Link 16 capability for command and control (C2) aircraft, ships, and ground sites. JTIDS terminals transmit and receive secure, high capacity and jam-resistant digital data and voice employing spread spectrum, Time Division Multiple Access (TDMA), and National Security Agency (NSA) approved encryption. Joint and Coalition Forces use JTIDS to maintain a fused, comprehensive, timely and consistent Common Tactical Picture. JTIDS employs the Link 16 (TDL-16) message standard.

Status

JTIDS terminals will be updated for cryptographic modernization and frequency remapping to address NSA and DoD/DoT mandates with an IOC of FY 2015. Program management and acquisition authority for JTIDS is under the Link 16 Network Program in PEO C4I.

Developers

GEC-Marconi Electronics Systems	Wayne, New Jersey USA
Rockwell-Collins Avionics	Cedar Rapids, Iowa USA
Northrop Grumman	Bethpage, New York USA

JTRS
Joint Tactical Radio System

Description

Joint Tactical Radio System (JTRS) will be a software-programmable, multi-band, multi-mode family of networked radios capable of simultaneous voice, data, and video communications. The program will migrate more than 25 radio families, encompassing thousands of radio systems, to the JTRS family of radio systems. All radios will be compliant with Software Communications Architecture (SCA), a single, open-system architecture. JTRS will be developed with a focus toward integrated Global Information Grid (GIG) transformational capabilities and will be backward compatible with selected legacy radio systems.

Status

The Navy is principally involved with the Airborne, Maritime/Fixed Station (AMF) program. In March 2008, the AMF program received Milestone B approval and awarded its contract. The AMF program will deliver two form factors: (1) AMF–Small Airborne (AMF-SA) and (2) AMF–Maritime/Fixed Station (AMF-M/F). The AMF-M/F will be installed on ships and submarines and at shore stations throughout the Navy. The AMF-M/F Increment 1 capabilities are Ultra High Frequency Demand Assigned Multiple Access Satellite Communications (UHF DAMA SATCOM) and the Mobile User Objective System Satellite Communications (MUOS). Milestone C and concurrent Low Rate Initial Production (LRIP) approval is anticipated in FY 2012.

Developers

Lockheed Martin	Chantilly, Virginia USA

Mark XIIA IFF
Mode 5 Identification Friend or Foe

Description

The Mark XIIA Mode 5 Identification Friend or Foe (IFF) 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 the Mode 4 of interrogators, transponders, and processors. Mode 5 is based on NATO STANAG 4193 and a JROC-approved requirement and is compatible with all U.S. and international civil IFF requirements. This Navy ACAT II program is based on the improved Mark XII Cooperative IFF Operational Requirements Document, dated 27 April 2001, for improved Mark XII Cooperative IFF transponders to be installed on more than 3,000 ships and Navy/Marine Corps aircraft, as well as non-Advanced Tactical Data Link capable units.

Status

Mode 5 Interogator equipment will be fielded on select ships and aircraft, including MH-60R, E-2D, F/A-18 C/D and F/A-18E/F/G. Development of the Mode S interrogation capability began in FY 2008. Mode S is a civilian Air Traffic Management format mandated for use in European airspace. Initial Operational Test & Evaluation is scheduled for FY 2010 and IOC is scheduled for FY 2011, with FOC expected in 2019. The Navy is the lead service for Mode 5 cryptographic modernization and developing a Joint Mode 5, and is synchronizing fielding with the Army and Air Force. Mark XIIA IFF upgrade (Mode 5) IOT&E will begin Feb 2011.

Developers

BAE Systems	Greenlawn, New York USA
General Dynamics Decision Systems	Scottsdale, Arizona USA

MIDS-LVT
Multi-functional Information Distribution System

Description

MIDS-LVT is a joint multi-national cooperative development program to design, develop, produce and support a tactical information distribution system equivalent to Joint Tactical Information Distribution System (JTIDS), but in a low-volume, lightweight, compact terminal designed for fighter aircraft, helicopters, ships, and ground sites. MIDS-LVT is the most widely used Link-16 terminal in the DoD and NATO. The United States is the MIDS-LVT program leader, with Germany, Spain, Italy, and France as full partners in all program phases. As a Preplanned Product Improvement (P3I) of the JTIDS Class 2 Terminal, the MIDS-LVT employs the Link-16 (TADIL-J) message standard of Navy/NATO publications. MIDS-LVT is fully interoperable with JTIDS and MIDS Joint Tactical Radios System (JTRS) and was designed in response to current aircraft, surface ship, submarine, and ground-host volume and weight constraints. The solution variants—

MIDS-LVT(1) through LVT(11)—support Navy, Marine Corps, and Air Force aircraft; Navy ships; Army Patriot, THAAD, MEADS, and other mobile ground-based defense systems; Air Force and Marine Corps ground-based command and control platforms; and potentially other tactical aircraft and ground-based systems. As of early 2010, 5,115 MIDS LVTs have been delivered, and MIDS-LVTs are integrated in 76 platforms within the five partners and 39 Foreign Military Sales customer nations.

Status

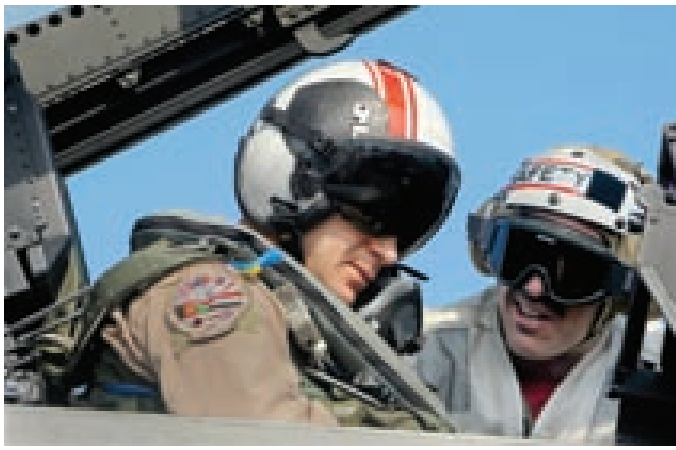
The program entered the engineering, management, and development (EMD) phase in December 1993. MIDS was approved for Low Rate Initial Production (LRIP) in FY 2000 and reached IOC on the F/A-18C/D *Hornet* in FY 2003. Within the Navy, MIDS is being procured in 2010 and through the FYDP for F/A-18 C/D/E/F, 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 incorporate cryptographic modernization and frequency remapping to address NSA and DoD/DoT mandates, with a planned IOC of FY 2015.

Developers

ViaSat	Carlsbad, California USA
Rockwell-Collins	Cedar Rapids, Iowa USA
Data Link Solutions	Wayne, New Jersey USA
EUROMIDS	Paris, France

An International consortium, MIDSCO, developed MIDS-LVT and EUROMIDS will be the European producer of MIDS terminals

MIDS-JTRS
Multi-functional Information Distribution System Joint Tactical Radio System



Description

MIDS JTRS is an engineering change proposal (ECP) to the MIDS Low Volume Terminal (L VT) that migrates the capabilities to a Joint Tactical Radio System Software Communication Architecture-compliant terminal. The MIDS JTRS will provide Link-16, TACAN, and J Voice and three additional channels for future growth to JTRS waveforms. The terminal will incorporate the NSA and DoT/DoD Link-16 cryptographic modernization and frequency remapping mandates. Additionally, MIDS JTRS Link-16 capabilities include enhanced throughput (providing data rates up to 1.1 Mbps) and Time Slot Reallocation.

Status

MIDS JTRS is in testing and integration on its lead platform, the F/A-18. The MIDS JTRS Milestone C Decision is planned for November 2009 with IOC in the F/A-18 planned for the fourth quarter FY 2010.

Developers

ViaSat	Carlsbad, California USA
Data Link Solutions	Cedar Rapids, Iowa USA

MUOS
Mobile User Objective System

Description

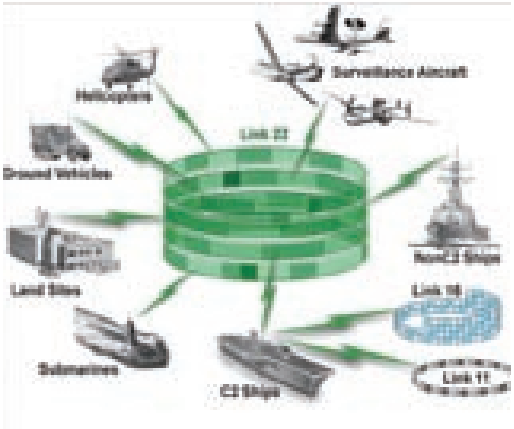
Mobile User Objective System (MUOS) is the next generation Ultra High-Frequency (UHF) satellite that initially supplements and later replaces the current Ultra-High Frequency Follow-On (UFO) constellation. MUOS has both a legacy UHF payload that provides the same capability as the current UHF constellation (UFO) as well as a new MUOS waveform payload that provides significant improvement in the number of accesses and data rate. The MUOS constellation of four geo-synchronous satellites plus a spare uses commercial technology to the greatest degree possible. It will provide netted, point-to-point, and broadcast services of voice, video, and data worldwide. MUOS has been designated a DoD Space Major Defense Acquisition Program (MDAP). Target users are unified commands and joint task force components, DoD and non-DoD agencies, and allied and coalition mobile users who need to communicate while on the move.

Status

Preliminary Design Review and Critical Design Review are completed. The key Decision Point-C occurred in August 2006, and Build Approval was granted in February 2008. The first MUOS satellite is scheduled to reach On-Orbit Capability in December 2011.

Developers

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



NATO Improved Link-11

Description

NATO Improved Link Eleven (NILE)/ Link-22, fulfills a North Atlantic Treaty Organization (NATO) Operational Staff Requirement to develop a digital data link with the aim of increasing the timeliness of tactical information transfer even in a dense and hostile communications threat environment. The system is capable of using both fixed-frequency and frequency-hopping waveforms in both the Ultra High Frequency (UHF) and High Frequency (HF) bands. While designed to replace Link-11 on these media,- and to provide a more robust tactical Beyond Line of Sight (BLOS) capability, the Link-22 message set is also more aligned with and to complement Link-16, easing multi-link operations. Modern automated network management capabilities minimize the pre-planning requirements associated with Link-16 Networks. Link-22 has been developed to fulfill the operational requirement to exchange tactical data between tactical data systems and to exchange necessary network management data. Link-22 incorporates F-series and J-series message standards, using a Dynamic Time Division Multiple Access (DTDMA) protocol that automates the network congestion management to ensure message traffic flow. Additional capabilities, such as Late Network

Entry (LNE), strong waveforms and error correction, automatic message relay, distributed protocols, and secure communications, enhance Link-22 system robustness.

Status

NILE Partner nations have fielded Link-22 on limited ship and shore sites. NILE/Link-22 could be an incremental change in the Next Generation Command and Control Processor (NGC2P) program.

Developers

Northrop Grumman	San Diego, California USA
VIASAT	Carlsbad, California USA
Space and Naval Warfare Systems Center	San Diego, California USA

NAVSTAR GPS
Global Positioning System

Description

The NAVSTAR GPS 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 requirements include the integration of GPS in more than 300 surface ships and submarines and 5,100 aircraft; integration of shipboard combat systems with the Navigation Sensor System Interface (NAVSSI), the follow-on GPS Positioning, Navigation and Timing System (G-PNTS); and anti-jam protection for high-priority combat platforms through the Navigation Warfare (NAVWAR) program. GPS plays an important role not only in precise navigation, but also in providing precise time to precision strike weapons, naval surface fire support systems, and ship C4I systems. NAVSSI is the shipboard system that collects, processes, and disseminates position, velocity, and timing data to weapons systems and C4I and combat support systems on board surface warships. It hosts embedded card-based GPS receivers. G-PNTS is under development as a replacement to NAVSSI. G-PNTS will use next-generation GPS receivers—initially the Selective Availability Anti-Spoofing Module (SAASM) to be followed by M-code—to ensure that Navy ships will be capable of using improved GPS signals being broadcast from the latest GPS satellites. NAVWAR provides anti-jam antennas to protect both air and sea naval platforms against GPS interference in order to ensure a continued high level of mission effectiveness in a GPS jamming environment.

Status

Initial naval platform GPS installations are complete. The program supports development and integration of conformal anti-jam antennas into F/A-18E/F/G series aircraft and continues the installation of NAVSSIs on select Navy surface combatants, with an expected Full Operational Capability (FOC) in FY 2014. Milestone B for G-PNTS is expected in the second half of FY 2010. In late FY 2009, the Navy received its initial deliveries of the digital GPS replacement anti-jam antenna, Advanced Digital Antenna Production (ADAP), in support

of initial developmental/operational testing (DT/OT) on select Navy surface ships and aircraft as an enhancement to their naval warfare capabilities.

Developers

Rockwell-Collins	Cedar Rapids, Iowa USA
Raytheon	Los Angeles, California USA
Trimble Navigation	Sunnyvale, California USA
Litton Data Systems	San Diego, California USA

Navy ERP
Navy Enterprise Resource Planning

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. All Navy organizations using Navy ERP will thus work using the same structures that provide the foundation for a Navy business backbone. Navy ERP is being delivered in two releases. Finance/Acquisition Solution (Release 1.0) provides the Navy with unprecedented financial transparency and 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. 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. The Navy ERP Program elected to use an ERP product from SAP Corporation, the largest provider of ERP solutions in the world. Following four successful pilot programs, Navy moved forward to implement SAP's Finance and Supply Chain capability across the SYSCOMs, beginning with NAVAIR in 2007.

Status

In accordance with the approved ERP Capability Production Document (CPD), Initial Operating Capability (IOC) was reached in May 2008. Program remains fully funded to deliver the Finance/Acquisition Solution (Release 1.0) and the Single Supply Solution (Release 1.1). Navy ERP "Go-Live" took place, as scheduled, at SPAWAR on 1 October 2009. Finance/Acquisition Solution (Release 1.0) was previously deployed at NAVAIR (October 2007) and NAVSUP (October 2008). NAVSUP is scheduled to deploy the Single Supply Solution (Release 1.1) beginning February 2010 at NAVICP with all NAVSUP sites (FISC sites) and complete by the end of FY 2012. NAVSEA is scheduled to deploy Finance/Acquisition (Release 1.0) to its General Fund sites on 1 October 2010 followed by deployment to its Working Capital Fund sites on 1 October 2011.

Developers
SAP America, Inc. Newtown Square, Pennsylvania USA

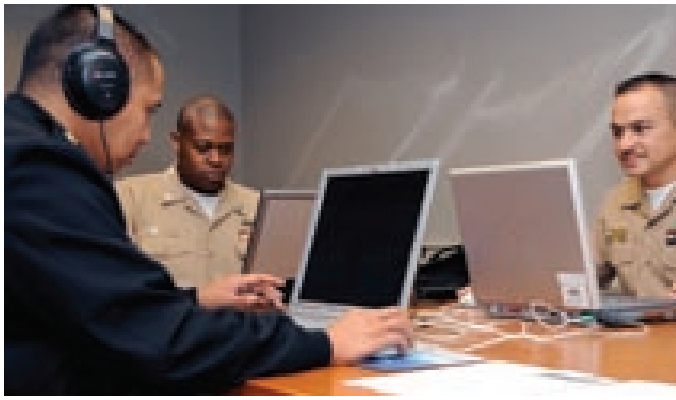
NGEN
Next-Generation Enterprise Network

Description
The Next-Generation Enterprise Network (NGEN) will be the follow-on to the Navy and Marine Corps Intranet (NMCI). NGEN is the first step towards achieving the Department of the Navy's (DoN) future vision of a fully integrated Naval Networking Environment (NNE) enabling government ownership and operation of the network.. NGEN will provide a secure and reliable enterprise-wide voice, video, and data networking environment that meets the warfighter's needs, enabling command and control (C2) in conjunction with Consolidated Afloat Network Enterprise Services (CANES) and providing a capability to access data, services, and applications anywhere worldwide. NGEN will arm the warfighter for success on the network-centric battlefield by enabling secure, reliable and adaptable global information exchange across the full spectrum of operations. For the Marine Corps, the joint task force concept extends to critical infrastructure and warfighting services needed to conduct diverse C2 functions as a DoD Land Component and will be supported by Marine Air-Ground Task Force (MAGTF) IT Centers.

Status
NGEN has approved requirements documents and has passed acquisition Gate 3. Program Manager NGEN is seeking acquisition authority for the "Continuity of Services" contract, Milestone Decision Authority status and continues work towards the Acquisition Strategy. A phased NGEN implementation is planned. NGEN Block 1 will provide the Department of the Navy with Command and Control of the Network, will pace the NIPRNet threat, and will lead the SIPRNet threat. In addition, the DoN will work toward subsequent increments that will add increased warfighting capabilities, adaptability, and reliability.

Developers
To be determined.

NMCI
Navy Marine Corps Intranet



Description
The Navy Marine Corps Intranet (NMCI) is a long-term initiative between the Department of the Navy and the private sector to deliver a single, integrated, department-wide network for Navy and Marine Corps shore commands. The NMCI contract procures service-wide IT services and provides the shore network infrastructure within the Continental United States (CONUS). NMCI provides comprehensive, end-to-end, information services for video, voice communications, and data for DoN military and civilian personnel. NMCI connects to the Global Information Grid, making the DoN workforce more efficient and productive and better able to support critical warfighting missions.

Status
NMCI implementation continues until the contract expires on 30 September 2010. Approximately 99 percent of the initial transition seats have been delivered, and the Navy and Marine Corps are 99 percent complete.

Developers
The NMCI contract was originally awarded to a team of contractors led by Electronic Data Systems (EDS), which is now owned by Hewlett Packard. The remainder of the contractor team comprises MCI (communications circuits), Microsoft (operating systems and desktop software), Dell (desktop hardware and servers), WAMNET (network architecture), Cisco (switching and network devices), and Raytheon (information assurance).

NTCSS
Naval Tactical Command Support System

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. As the logistics management cornerstone of the Sea Basing pillar of Sea Power 21, 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 will be developed and implemented under sponsorship of functional and fleet managers. Such planned initiatives include: 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, GCSS-MC and 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 increased efficiencies and reduced 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 and Marine Air Logistics Squadrons has been achieved. FOC for ships and submarines will be achieved in FY 2010. An optimized NTCSS capability, targeted for aircraft squadrons, began Full Rate Production in FY 2007 and will achieve FOC in FY 2011. Upon full FOC, a Tech Refresh Phase will replace antiquated NTCSS hardware/software and maintain compliance with DoD/DoN Information Assurance and Baseline Reduction mandates.

Developers

The COTS hardware is being procured 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.

OA
Open Architecture

Description

OA is transforming Navy business acquisition and sustainment processes. A broad, operationally focused open architecture definition means having the business environment that encourages collaborative competition for third-party developers to replace or add a capability module anywhere, anytime in a system. The objective is rapid, affordable translation of fleet requirements into fleet capabilities. Open business practices are a cost-effective means to that end.

Status

The Surface Navy has programmed dedicated funding for OA since 2003. The Aegis Combat System Modernization plan started with a technical undertaking to implement an open architecture design by decoupling hardware from software for cost-effective COTS sustainment. 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 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, including:

Lockheed Martin	Moorestown, New Jersey USA
	Syracuse, New York USA
	Eagan, Minnesota USA
Sippican	Marion, Massachusetts USA
Advanced Acoustic Concepts	Hauppauge, New York USA

BAE Systems	
General Dynamics Advanced Information Systems	Fairfax, Virginia USA Arlington, Virginia USA
General Dynamics Bath Iron Works	Bath, Maine USA
Northrop Grumman Ship Systems	Pascagoula, Mississippi USA
Northrop Grumman PRB Systems	Goleta, California USA
Raytheon	St. Petersburg, Florida USA Sudbury, Massachusetts USA San Diego, California USA
Raytheon Missile Systems	Tucson, Arizona USA
Space and Naval Warfare Systems Center	San Diego, California USA
Johns Hopkins University Applied Physics Laboratory	Laurel, Maryland USA
SECHAN Electronics	Lititz, Pennsylvania USA
Integrated Combat Systems Test Facility	Dam Neck, Virginia USA
Naval Surface Warfare Center	Dahlgren, Virginia USA Port Hueneme, California USA
Naval Undersea Warfare Center	Keyport, Washington USA Newport, Rhode Island USA

ONE-Net
OCONUS Navy Enterprise Network

Description

The OCONUS Navy Enterprise-Network (ONE-NET) is the equivalent to the Navy Marine Corps Intranet (NMCI) in the United States. It is a fully complemented, integrated, and interoperable network that consists of standard hardware, software, and Information Assurance suites governed by operational and administrative policies and procedures. It is the medium that enables the rapid and reliable transfer of official classified and unclassified messages, correspondence, e-mail and data. ONE-NET provides e-mail, print, storage, directory, and internet services, and help desk and enterprise management for a projected 23,000 seats, meeting fleet commanders' requirements and vast performance and security improvements compared to legacy networks. When fully deployed, ONE-NET will displace all OCONUS legacy networks and yield the same level of security as NMCI. Theater Network Operation and Security Centers (TNOSC) at Yokosuka, Naples, and Bahrain are the Network Operations Centers (NOCs) for their respective regions.

Status

Naval Network Warfare Command (NNWC) owns and operates the three TNOSCs and 11 local Network Operations Security Centers (NOSCs) servicing the ONE-NET customers. Requisite staffing with the necessary skill sets are in place and currently providing critical network service: NIPRNet, 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.

Developers

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.

SCI Networks

Description

Intelligence analysts on ships access National and Service Strategic and Tactical databases critical for Special Intelligence needed to execute their "Indications & Warning" role in the "Kill Chain" process via Sensitive Compartmented Information (SCI) Networks. The SCI Networks program will merge with Integrated Shipboard Network System (ISNS), Combined Enterprise Regional Information Exchange System Maritime (CENTRIXS-M), and Submarine Local Area Network (SubLAN) into the Consolidated Afloat Networks and Enterprise Services (CANES), which will provide the network infrastructure and core services in a Service Oriented Architecture (SOA) and Multi-Level Security (MLS) environment. SCI Networks (previously known as TACINTEL II/SCI ADNS) is a system of IP-capable, network-centric, automated, communication capabilities with real-time receipt and transmission of Special Intelligence (SI) and SCI data that meet established Information Assurance (IA) Computer Security criteria. The SCI Networks program provides hardware infrastructure and core enterprise services to exchange time-sensitive cryptologic sensor and intelligence data among afloat and shore-based units. The SCI Networks program uses open-architecture standards and is thus a critical element in the Navy's evolving concept of network-centric warfare. The full capability will include voice, video, and data transfer among SCI-capable ships and submarines, with gateways to shore nodes. Under the submarine phase of the program, the SCI Networks program brings the Top Secret enclave to submarines in addition to the SCI enclave. SCI Networks is the lead program for implementing the SI/SCI portion of the Joint Maritime Communications Strategy (JMCOMS) under the C4I Networks initiative. SCI Networks interface with DCGS-N, GCCS-M, Tactical Cryptologic Systems, and other Special Intelligence systems. SCI Networks program has been designated as an evolutionary program allowing for continued growth and expansion through future technology insertion.

Status

Installation of the Shore Network Operations Center Facilities and Build 2 ship hardware is complete. Software Release 2.2 began fielding in the second quarter FY 2003 and reached FOC in FY 2005. Future incremental hardware and software upgrades will provide the following capabilities: "Defense in Depth" security, Submarine Version (includes the TS Enclave), Packet Prioritization, Direct Ship-to-Ship Network Services, Quality of Service, Interface to Defense Messaging System (DMS), an Interface Afloat to DMS, VoIP, and the Airborne EDM version.

Developers

SAIC — Arlington, Virginia USA

TACMOBILE
Navy Tactical/Mobile System

Description

The Navy Tactical/Mobile (TacMobile) 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 area of responsibility. The TacMobile systems that support these missions are Tactical Operations Centers (TOCs) (formerly Tactical Support Centers), Mobile Tactical Operations Centers (MTOCs) (formerly Mobile Operations Control Centers), 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 airwings. 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 and 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. In recent world events, JMAST systems have supported overseas operations, Humanitarian and Disaster Relief (HA/DR) efforts, Non-combatant Evacuation Operations (NEO), and other Overseas Contingency Operations (OCO).

Status

The Required Operational Capabilities (ROC) and Projected Operational Environment (POE) document for the Joint Mast Ashore Support Team (JMAST) was signed in September 2008. The ROC/POE document for the Mobile Tactical Operations Centers (MTOCs) was signed October 2008. TacMobile Increment 2.0 Low Rate Initial Production (LRIP) was authorized in June 2008 to field new capabilities such as CENTRIX, GBS, and HF-IP without eliminating existing C4I capabilities. Increment 2.0 incorporates warfighter interface (WFI) capabilities for TOC/MTOC activities plus communication upgrades needed for MTOCs to support P-3C operations.

TacMobile Increment 2.0 fielding was authorized in June 2009 to field new capabilities such as CENTRIX, GBS, and HF-IP without eliminating current C4I capabilities. Increment 2.0 incorporates WFI capabilities for TOC/MTOC activities plus communication upgrades needed for MTOCs to support current P-3C *Orion* operations. TacMobile

Increment 2.1 is currently in development and will incorporate P-8A MMA mission support and systems interfaces as well as critical communications upgrades. Requirements gathering, review, and analysis are underway for TacMobile Increment 3 to incorporate capabilities to support P-8A Increment 2 and Broad Area Maritime Surveillance (BAMS) Unmanned Aircraft System (UAS), as well as to enable more efficient and rapid information flow across the Navy's sensor grid through implementation of tactical Service Oriented Architecture (SOA) extensions to the Global Information Grid (GIG).

Developers

Eagan McAllister	
Associates EMA	Charleston, South Carolina USA
MANTECH	Charleston, South Carolina USA
L-3 Communications	Charleston, South Carolina USA
SRC	Charleston, South Carolina USA
Northrop Grumman (PRB Systems)	Hollywood, Maryland USA

TC2S
Tomahawk Command and Control System

Description

The Tomahawk Command and Control System is the primary mission planning and strike planning and execution system for the Tomahawk cruise missile. The mission planning system is installed ashore at the Cruise Missile Support Activities (CMSA) in Norfolk, Hawaii and PJHQ Northwood (UK), and afloat in all U.S. aircraft carriers. To support the Navy's move to a Maritime Headquarters/Maritime Operating Center (MHQ/MOC) centric operational infrastructure, Mission planning systems along with strike execution components have been installed in numbered Fleet MHQ/MOCs. Subcomponents of TC2S, the Mission Distribution System (MDS), Tomahawk Communications System (TCOMMS) and Tomahawk Communications Interface Processor (TCIP) are the primary Strike Planning and Execution tools and are installed at all Tomahawk C2 nodes, ashore and afloat, and in all ship and submarine launch platforms. TC2S allows planners to exploit the full capabilities of the Tomahawk missile in either deliberate planning conditions or for battlefield time-sensitive planning operations.

Status

The latest version, TC2S 4.2, improves joint interoperability and imagery processing. All Tomahawk missiles fired operationally from Operation Desert Storm to Operation Iraqi Freedom 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	La Jolla, California USA

Telephony

Description

Telephony Suite Replacement and Modernization funding ensures that all telephony equipment under the 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 telephony project replaces obsolete telephony suite hardware and maintains currency of firmware and software in accordance with policy and procedures set forth in DoD Instruction 8100.3, Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 6212.01 and CJCSI 6215.01B. The majority of the Navy's telephone switches are Defense Switch Network (DSN) switches. These switches provide on-base Federal Telephone System (FTS) local and long distance calling service as well as world-wide DSN connectivity.

Status

Telephony hardware and software procurement and installation is under the cognizance of PEO C4I. However, Navy policy states that procurement of hardware and software can be executed only through the Defense Information Systems Agency Joint Interoperability Test Command (DISA JITC). Telephone switch replacement efforts are underway in Jacksonville, Mayport, Kings Bay, Port Hueneme, and Point Mugu.

Developers

Navy policy is to procure only hardware and software from the DISA JITC tested/certified/interoperable "Approved Product List."

TIS
Trusted Information Systems

Description

The Trusted Information Systems (TIS) program facilitates sharing of critical information across security domains and among Allied, Coalition and Interagency partners. TIS includes the Radiant Mercury (RM) and Joint Cross Domain Exchange (JCDX) systems. Both systems are Director of Central Intelligence Directive 6/3 Protection Level 4 (PL-4), Multi-level Secure (MLS) certified, providing unique cross-domain information sharing capabilities from Top Secret Sensitive Compartmented Information (TS/SCI) to General Service (GENSER) and GENSER to Unclassified.

RM provides a fully-automated, bi-directional, multiple input/output channel capability, that can be serial or network connected, to sanitize, transliterate, downgrade, and guard classified, formatted information to users at lower classification levels. RM also processes unformatted message types and imagery utilizing reliable human review (semi-automated). RM is deployed to more than 330 sites worldwide, including all combatant commands, aircraft carriers and large-deck amphibious warships, Shared Early Warning and Blue Force Tracking, and numerous Air Force and Army sites as well as national agencies.

JCDX is the DoD's only comprehensive multi-level C4I system certified to connect to multiple networks at multiple security levels. JCDX serves as the backbone automated information system providing accredited manual and automatic exchange of multi-level Common Operational Picture (COP), email, imagery, and event-by-event data dissemination. The system provides MLS C4I and cross-domain services to U.S. Joint Intelligence Centers and is the national-level defense intelligence system for the United Kingdom and Australia as well as the service-level operational intelligence system for Japanese Maritime Defense Forces and the Republic of Korea Navy.

Status

Direct Navy support of JCDX was phased out at the end of FY 2009 and the system will be replaced by the Global Command and Control System (GCCS) Integrated Imagery and Intelligence (I3) system. JCDX Foreign Military Sales customers and Maritime Surveillance System (MSS) sites are assessing the impact of this decision. The Navy has agreed to extend JCDX Foreign Military Sales support through FY 2014 to support FMS and MSS customers. Other developments within TIS are focused on migrating RM's certified MLS capabilities into a Service Oriented Architecture and integrating with additional afloat, joint, and coalition-network architectures. As the Executive Agent of the multi-service RM program, the Navy will continue to oversee RM support to more than 330 locations worldwide.

Developers

Accenture	San Diego, California USA
Lockheed Martin	Denver, Colorado USA
Booz-Allen-Hamilton	Chantilly, Virginia USA

TSw
Tactical Switching

Description

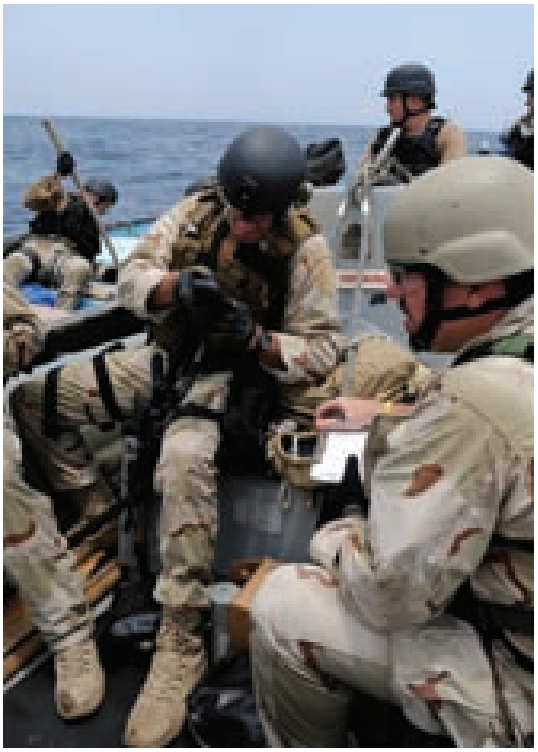
Tactical Switching (TSw) is the key enabling mechanism for the execution of Automated Digital Network System (ADNS) and replaces obsolete shore-based equipment with current government- and commercial-off-the-shelf (GOTS/COTS) products that comply with both Department of Defense (DoD) Global Information Grid (GIG) and Teleport architectures and have demonstrated interoperability with DoD and joint systems. TSw provides for the shore segment interconnect of an end-to-end dynamic bandwidth management, Internet Protocol (IP) and Channel Access Protocol capability to deploying tactical units, such as aircraft carrier and expeditionary strike groups. Tactical Switching system capabilities allow flexible, secure, and reliable communications for voice, video, and data applications.

Status

Navy Tactical Wide Area Network (NTWAN) began in the third quarter FY 2009 and is on schedule for complete implementation by the end of FY 2010. The transition architectures are being developed and evaluated with a proposed Initial Operating Capability (IOC) in FY 2015.

Developers

PEO C41	San Diego, California USA
SPAWAR Systems Center Atlantic	Charleston, South Carolina USA
Northrop Grumman	Arlington, Virginia USA



UFO
UHF Satellite Communications Follow-On

Description

The Ultra High Frequency (UHF) Follow-On (UFO) constellation consists of eight satellites that replaced the Fleet Satellite (FLTSAT), Gapfiller and Leased Satellite (LEASAT) UHF constellations. UFO provides worldwide, narrowband, unprotected netted, point-to-point and broadcast service of voice, video and data using 5 and 25 KHz UHF channels. UFO also provides a protected Fleet Broadcast using an Extremely High Frequency (EHF) uplink and UHF downlink with an anti-jam capability on the uplink. UFO satellites four through 11 carry an EHF payload that provides anti-jam capability on the uplink and downlink. Protected services include netted, point-to-point and broadcast service of voice and data. The EHF payload also provides an anti-jam telemetry tracking and control (TT&C) uplink capability. UFOs 8-10 include a Global Broadcast Service (GBS) payload which uses direct broadcast technology to provide a very high data rate to many users via small terminals. UFO 11 includes a Dual Digital Receive Unit (DRU). The activation of UFO 11's Dual DRU at the beginning of FY 2009 has effectively increased the number of available 25 kHz channels by nine (from 24 to 33) and increased the number of available 5 kHz channels by three (from 20 to 23).

Status

Of the 11 satellites that have been launched, eight were operational at the end FY 2009. A Gapfiller (UFO 11) was launched in December 2003 to maintain constellation availability at the minimally acceptable 70 percent through 2010. The failures in orbit of UFO 3 in June 2005 and UFO 9 in August 2006 have increased the likelihood of a gap in 70 percent coverage before the first Mobile User Objective System (MUOS) satellite becomes operational.

Developers

Boeing Satellite Systems	Los Angeles, California USA
SPAWAR Systems Command	San Diego, California USA

USW–DSS
Undersea Warfare–Decision Support System

Description

The overall objective for Undersea Warfare Decision Support System (USW-DSS) is to support the Chief of Naval Operations' "Vision for ASW Superiority" by enabling net-centric USW Knowledge Dominance. That vision states "ASW superiority will be created by a coordinated, networked force of submarines, sur-

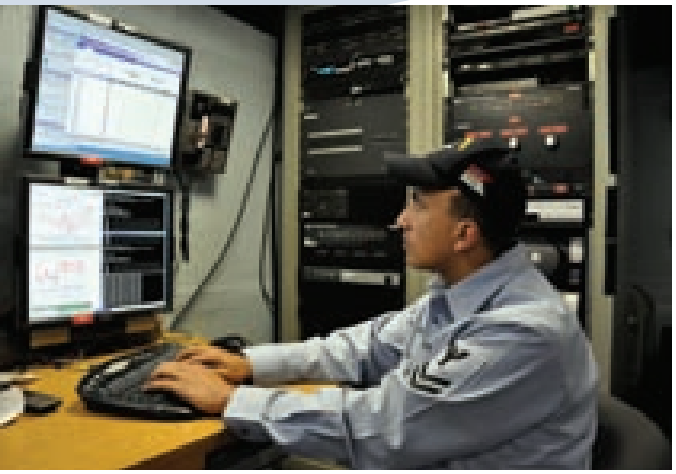
face ships, aircraft, and Integrated Undersea Surveillance System (IUSS) assets" with "common and unambiguous views that yield unprecedented operational and tactical situational awareness." USW-DSS is maturing solutions to support CNO's vision by using the incremental Advanced Acoustic Rapid Commercial-off-the-shelf 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. USW-DSS provides capabilities to shorten command and control (C2) decision processes from detection to engagement. These Undersea Warfare decision support tools use a Service Orientated Architecture (SOA) encompassing existing computing hardware and communication links comprised of sensor data from air, surface, submarine, theater, and surveillance platforms to provide rapid confidence in the decision processes between sensors and weapons. The capabilities delivered by USW-DSS are critical for the Sea Combat Commander (SCC), Theater USW Commander (TUSWC), and Anti-Submarine Warfare Commander (ASWC) to fulfill the requirement for 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, as well as reduced redundancy of USW Tactical Decision Aids.

Status

As of early 2010, USW-DSS has delivered a mix of two increments on a total of 19 platforms. These increments include Advanced Capability Build 1 (ACB-1) for Mission Planning capabilities and ACB-2 for Mission Planning, Mission Execution, and Tactical Picture, 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 COMPACFLT fielding requirements. The Initial Operating Capability and Operational Assessment for ACB-2 are scheduled for third quarter FY 2010. Development for the third increment of USW-DSS, ACB-3, started in FY 2010 and is scheduled to field with CANES in FY 2012. ACB-3 will transition an Office of Naval Research project called Decision Support for Dynamic Target Engagement to take the next step in coordinating all ASW sensors for a single, composite track picture, capable of fire control. 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, VA USA
Adaptive Methods Inc.	Centerville, VA USA
DDL OMNI Engineering LLC.	McLean, VA USA
QuinetiQ North America	McLean, VA USA



WSC-6(V)
Super High-Frequency Satellite Communications

Description

The Super High Frequency (SHF) Satellite Communications (SATCOM) Program includes the AN/WSC-6(V)5/7/9 terminals, the X-Band Kit Upgrade to the Extremely High Frequency (EHF) Follow on Terminal (FOT) installed on submarines, and the Enhanced Bandwidth Efficient Modem (EBEM). The SHF SATCOM AN/WSC-6 terminal is the primary SATCOM terminal in the fleet, providing the bandwidth for voice, video, data, and imagery requirements for the warfighter—NIPRNET, SIPRNET, JWICS, JCA, video teleconferencing, and telephones. This terminal has been in the fleet since the early 1990s. The Navy Multiband Terminal (NMT) (AN/WSC-9) will begin replacing the AN/WSC-6 terminal in the FY 2012 timeframe.

Status

As of the end of FY 2009, there were 121 AN/WSC-6 terminals installed in the fleet. They are expected to continue in operation until FY 2017, when completely replaced by the next-generation Navy Multiband Terminal (AN/WSC-9). EBEM is the current modem for static point-to-point operations in conjunction with the AN/WSC-6 terminal, the AN/WSC-8 terminal, and the next-generation Navy Multiband Terminal. A total of 235 modems that have been installed in the fleet through 2009. The X-band upgrade to the EHF FOT terminals has been procured; installation began in FY 2009 and will complete in FY 2010.

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

APPENDIX A

NAVY-MARINE CORPS CRISIS RESPONSE AND COMBAT ACTIONS

Dates	Location/Operation/Mission	U.S. Naval Forces
Jan 1991	Somalia Operation Eastern Exit Non-combatant evacuation	USS Guam (LPH 9) Amphibious Ready Group USS Trenton (LPD 14) Amphibious Ready Group Marine Corps Force Recon, NSW/SEAL forces*
Nov 1991 - May 1993	Haiti/Guantanamo Bay Operation Able Manner/Safe Harbor Humanitarian Assistance to Haitian refugees	USS Tortuga (LSD 46) USMC 2nd Force Service Support Group Seabees*
Jan 1992 - Mar 2003	Iraq/Arabian Gulf Operation Northern Watch Operation Southern Watch Maritime Intercept Operations Continuing enforcement of no-fly zone in response to Iraqi provocations and support for UN sanctions	USS Carl Vinson (CVN 70) Battle Group USS Belleau Wood (LHA 3) Amphibious Ready Group USS Enterprise (CVN 65) Battle Group USS Theodore Roosevelt (CVN 71) Battle Group USS Constellation (CV 64) Battle Group USS Carl Vinson (CVN 70) Battle Group USS Kitty Hawk (CV 63) Battle Group USS John F. Kennedy (CV 67) Battle Group USS Abraham Lincoln (CVN 72) Battle Group USS Shreveport (LPD 12) 31st Marine Expeditionary Unit (SOC)* Nuclear attack submarines Coast Guard law enforcement detachments Maritime patrol aircraft
Aug 1992 - Feb 1993	Kenya/Somalia Operation Provide Relief Humanitarian Assistance	11th Marine Expeditionary Unit (SOC)* USS Tarawa (LHA 1)
Dec 1992 - May 1993	Somalia Operation Restore Hope Humanitarian support	USS Ranger (CV 61) Battle Group USS Tripoli (LPH 10) Amphibious Ready Group 15th Marine Expeditionary Unit (SOC)* Military Sealift Command ships, Seabees*
July 1993 - Dec 2004	Adriatic Sea/Balkans Operation Deny Flight Operation Sharp Guard Operation Provide Promise Operation Joint Guard Operation Deliberate Guard No-fly zone enforcement and Maritime Intercept Operations	Carrier Battle Groups/Surface Action Groups Amphibious Ready Groups Marine Expeditionary Units (SOC)* Marine aircraft detachments (Aviano) Maritime patrol aircraft (Sigonella) Nuclear attack submarines Coast Guard law enforcement detachments
Jan 1993 - Mar 1994	Somalia Operation Sustain Hope Humanitarian support	Carrier Battle Groups Amphibious Ready Groups I MEF* elements Military Sealift Command ships
June 1993	Iraq/Red Sea TLAM missile strikes	USS Peterson (DD 969) USS Chancellorsville (CG 62) USS Theodore Roosevelt (CVN 71) Battle Group

Dates	Location/Operation/Mission	U.S. Naval Forces
Oct 1993	Somalia Humanitarian support	USS America (CV 66) Battle Group USS Guadalcanal (LPH 7) Amphibious Ready Group
Nov 1993 - Aug 1994	Haiti Operation Support Democracy UN blockade operations	Surface action groups/Amphibious Ready Groups NSW/SEAL forces* Maritime patrol aircraft Coast Guard cutters, patrol boats
Apr - Aug 1994	Rwanda/Mombasa-relief effort/ Operation Distant Runner Operation Support Hope Non-combatant evacuation	USS Peleliu (LHA 5) Amphibious Ready Group 11th Marine Expeditionary Unit (SOC)* USS Tripoli (LPH 10) Amphibious Ready Group 15th Marine Expeditionary Unit (SOC)*
Apr 1994 - Ongoing	Caribbean, Eastern and South Pacific Support for JIATF East and West and JTF-6 Drug Interdiction	USS Rentz (FFG 46) USS Stump (DD 978) USS Crommelin (FFG 37) USS Estocin (FFG 15) USS McCampbell (DDG 85) USS Hayler (DD 997) USS John L. Hall (FFG 32) USS McInerney (FFG 8) USS McCluskey (FFG 41) USS Stephen W. Groves (FFG 29) USS Samuel B. Roberts (FFG 58) USS George Philip (FFG 12) USS Doyle (FFG 39) USS Gettysburg (CG 64) USS De Wert (FFG 45) USS Ford (FFG 54) USS Steven W. Groves (FFG 29) USS Curts (FFG 38) USS John L. Hall (FFG 32) USS Thach (FFG 43) USS Robert G. Bradley (FFG 49) USS McInerney (FFG 8) USS Rodney M. Davis (FFG 60) USS Momsen (DDG 92) USS Halsey (DDG 97) USS Rentz (FFG 46)
Sep 1994	Haiti intervention Operation Restore Democracy	USS Dwight D. Eisenhower (CVN 69) USS America (CV 66) USS Wasp (LHD 1) Amphibious Ready Group Military Sealift Command ships Seabees*
Oct 1994	Iraq/Arabian Gulf/Red Sea Operation Vigilant Warrior Deterrence/support to Kuwait	USS George Washington (CVN 73) Battle Group USS Tripoli (LPH 10) Amphibious Ready Group 15th Marine Expeditionary Unit (SOC)* Military Sealift Command ships
Oct 1994 - Mar 1995	Haiti Operation Uphold Democracy Nation-building	Military Sealift Command ships Patrol craft Seabees*

Dates	Location/Operation/Mission	U.S. Naval Forces
Feb - Mar 1995	Somalia Operation United Shield Withdrawal of UN Forces	USS Belleau Wood (LHA 3) Amphibious Ready Group USS Essex (LHD 2) Amphibious Ready Group I MEF* elements
June 1995	Adriatic Sea/Bosnia Rescue of "Basher 52" Captain Scott O'Grady, USAF	USS Theodore Roosevelt (CVN 71) Battle Group USS Kearsarge (LHD 3) Amphibious Ready Group 24th Marine Expeditionary Unit (SOC) TRAP* Shore-based Navy/Marine Corps aircraft (Aviano)
Aug - Sep 1995	Adriatic Sea-Bosnia strikes Operation Deliberate Force	USS Theodore Roosevelt (CVN 71) Battle Group USS America (CV 66) Battle Group USS Kearsarge (LHD 3) Amphibious Ready Group Shore-based Navy/Marine Corps aircraft (Aviano)
Aug 1995	Iraq/Arabian Gulf Operation Vigilant Sentinel Deterrence/support to Kuwait	USS Abraham Lincoln (CVN 72) Battle Group USS New Orleans (LPH 11) Amphibious Ready Group I MEF* elements
Nov 1995 - Dec 1996	Adriatic/Balkans Operation Joint Endeavor Dayton peace accord enforcement	Carrier Battle Groups/Amphibious Ready Groups Military Sealift Command ships Nuclear attack submarines Shore-based Navy/Marine Corps aircraft (Aviano)
Mar 1996	China/Taiwan-Freedom of Navigation, Regional Stability	USS Independence (CV 62) Battle Group USS Nimitz (CVN 68) Battle Group
Apr - Aug 1996	Liberia/Central African Republic Non-combatant evacuation	USS Guam (LPH 9) ARG 22nd Marine Expeditionary Unit (SOC)* USS Ponce (LPD 15) Special Purpose Marine Air Ground Task Force
Sep 1996	Iraq Operation Desert Strike Suppression of Air Defenses	USS Carl Vinson (CVN 70) Battle Group Surface warships Nuclear attack submarines
Mar - June 1997	Adriatic/Adriatic Operation Silver Wake Non-combatant evacuation Embassy security	USS Nassau (LHA 4) Amphibious Ready Group Surface warships, and other amphibious ships 26th Marine Expeditionary Unit (SOC)* and other FMF LANT elements
Apr - May 1997	Iran/Iraq/Arabian Gulf Deterrence/support of UN disarmament inspections	Middle East Task Force USS Nimitz (CVN 68) Battle Group USS George Washington (CVN 73) Battle Group USS Independence (CV 62) Battle Group USS Peleliu (LHA 5) Amphibious Ready Group 13th Marine Expeditionary Unit (SOC)* USS Guam (LPH 9) 24th Marine Expeditionary Unit (SOC)* Coast Guard Cutters
Aug 1997	Guam Korean Air Lines Flt. 801 Disaster Recovery Operations	Naval Mobile Construction Battalion 133

Dates	Location/Operation/Mission	U.S. Naval Forces
Nov 1997	Doha, Qatar Operation Silent Assurance Enhance security for U.S. citizens and facilities during Middle East/ North Africa Conference	13th Marine Expeditionary Unit (SOC)*
Feb 1998	Iraq/Arabian Gulf Deterrence/support of UN disarmament inspections	USS George Washington (CVN 73) Battle Group USS Independence (CV 62) Battle Group USS Guam (LPH 9) Amphibious Ready Group
June 1998	Adriatic Sea/Albania/Macedonia Exercise Determined Falcon NATO demonstration exercise to support Kosovo cease fire	USS Wasp (LHD 1) Amphibious Ready Group 26th MEU (SOC)* aviation elements
Aug 1998	Nairobi, Kenya and Dar Es Salaam, Tanzania, response to terrorist bombings of U.S. embassies	Marine Corps Fleet Antiterrorist Security Team Fleet Antiterrorist Support Team platoons Seabees*
Aug 1998	Khartoum, Sudan/Red Sea and Afghanistan/Indian Ocean Anti-terrorist strikes	Unspecified U.S. naval vessels
Nov 1998	Honduras/Central America Joint Task Forces Bravo and Aguila Disaster relief following Hurricane Mitch	I MEF* assets Seabees*
Dec 16 - 22, 1998	Iraq Operation Desert Fox Strikes against Iraqi sites suspected of WMD production	USS Enterprise (CVN 65) Battle Group USS Carl Vinson (CVN 70) Battle Group USS Belleau Wood (LHA 3) 31st Marine Expeditionary Force USS Ardent (MCM 12) USS Dextrous (MCM 13)
Mar - June 1999	Kosovo/Former Republic of Yugoslavia Operation Allied Force Ensure Yugoslav withdrawal from Kosovo, safe return of displaced people	USS Enterprise (CVN 65) Battle Group USS Theodore Roosevelt (CVN 71) Battle Group USS Kearsarge (LHD 3) Amphibious Ready Group 26th Marine Expeditionary Unit
Apr - Aug 1999	Albania Operation Shining Hope Humanitarian relief to refugees from Former Republic of Yugoslavia	USS Inchon (MCS 12) Task Group Seabees*
June 1999 - Ongoing	Kosovo/Federal Republic of Yugoslavia Operation Joint Guardian Peace-keeping mission to establish and maintain a secure environment in Kosovo, ensure demilitarization treaty compliance	USS Kearsarge (LHD 3) Amphibious Ready Group 26th Marine Expeditionary Unit 24th Marine Expeditionary Unit VP-8
Aug 1999	Turkey/Sea of Marmara Operation Avid Response Provide humanitarian relief to earthquake victims	USS Kearsarge (LHD 3) Amphibious Ready Group

Dates	Location/Operation/Mission	U.S. Naval Forces
Sep - Nov 1999	East Timor/Philippine Sea Operation Stabilize Peacekeeping mission/provided communication and logistical support	USS Mobile Bay (CG 53) USNS Kilauea (T-AE 26) USS Belleau Wood (LHA 3) USS Peleliu (LHA 5) 11th Marine Expeditionary Unit 31st Marine Expeditionary Unit
Sep 1999	Atlantic Coast Assistance to Hurricane Floyd victims	USS John F. Kennedy (CV 67)
Oct 1999	Atlantic Coast Search and Recovery Mission for EgyptAir Flight 990	USS Grapple (ARS 53) USS Austin (LPD 4) USS Oriole (MHC 55) USNS Mohawk (T-ATF 170) MH-14 Det 2
Jan - Mar 2000	Venezuela Search and rescue and humanitarian assistance after intense storms	II MEF* detachment
Feb 2000	California Coast Search and Recovery Mission for Alaska Air Flight 261	USS Fife (DD 991) USS Jarrett (FFG 33) USS Cleveland (LPD 7) M/V Kellie Chouest Military Sealift Command units Maritime patrol aircraft EODGRU One UCT-2 MDSU SDGO
Feb 2000 - May 2002	East Timor Support of US Support Group East Timor (USGET) and UN Transition Administration - East Timor (UNTAET) Humanitarian Assistance	Medical Support Teams Amphibious Ready Groups Marine Expeditionary Units Helicopter Support Squadron 5 Detachment 1
July 2000	Wildfires in U.S. West Assistance to firefighters	3d Battalion, 11th Marines, I MEF*
Aug 2000	Bahrain Gulf Air Airbus 320 Crash Search and Recovery Mission	USNS Catawba (T-ATF 168) USS Oldendorf (DD 972 USS George Washington (CVN 73) HCSS 2, Det 2
Oct 2000	Yemen Operation Determined Response Support of USS Cole damaged in terrorist attack	USS Tarawa (LHA 1) USS Donald Cook (DDG 75) USS Hawes (FFG 53) USS Duluth (LPD 6) USS Anchorage (LSD 36) USNS Catawba (T-ATF 168) 13th Marine Expeditionary Unit (SOC)* Platoons from 1st and 2nd FASTs*

Dates	Location/Operation/Mission	U.S. Naval Forces
Feb 2001	India Disaster relief to earthquake victims	USS Cowpens (CG 63)
Aug 2001	Wildfires in U.S. West Assistance to firefighters	II MEF* personnel
Aug - Nov 2001	Hawaii Recovery of Japanese fishing/ training vessel Ehime Maru	Mobile Diving and Salvage Unit 1 Remotely Operated Vehicles
Sep 2001 - Ongoing	Operation Noble Eagle Response to terrorist attacks on World Trade Center and Pentagon Homeland Defense	USNS Comfort (T-AH 20) USNS Denebola (T-AKR 289) USS John F. Kennedy (CV 67) CVBG USS George Washington (CVN 73) CVBG USCG Units USS John C. Stennis (CVN 74) CVBG 6 Cyclone-class PCs Aegis cruisers and destroyers
Oct 2001 - Ongoing	Afghanistan and other counterterrorism operation sites around the globe Operation Enduring Freedom Strike and combat operations against terrorist forces Coastal patrol and maritime homeland security	USS Enterprise (CVN 65) Battle Group USS Carl Vinson (CVN 70) Battle Group USS Theodore Roosevelt (CVN 71) Battle Group USS Kitty Hawk (CV 66) Battle Group USS John C. Stennis (CVN 74) Battle Group USS John F. Kennedy (CV 67) Battle Group USS Peleliu (LHA 5) ARG USS Bataan (LHD 5) ARG USS Bonhomme Richard (LHD 6) ARG USS Constellation (CV 64) Battle Group USS Abraham Lincoln (CVN 72) Battle Group USS Harry S. Truman (CVN 75) Battle Group USS Nimitz (CVN 68) USS Mount Whitney (LCC 20) USS George Washington (CVN 73) Battle Group USS Nassau (LHA 4) ARG USS Essex (LHD 2) ARG USS O'Kane (DDG 77) USS Chafee (DDG 90) USS Mount Whitney (LCC 20) USS Dwight D. Eisenhower (CVN 69) Carrier Strike Group USS Chosin (CG 65) USS Ingraham (FFG 61) USS Boxer (LHD 4) Expeditionary Strike Group 15th Marine Expeditionary Unit USS Oak Hill (LSD 51) USS Roosevelt (DDG 80) USS Vicksburg (CG 69) USS Trenton (LPD 14) USS Hue City (CG 66) USS James E. Williams (DDG 95) USS Saipan (LHA 2) USS Taylor (FFG 50) USS Ashland (LSD 48) USS Nassau (LHA 4) Expeditionary Strike Group 22nd Marine Expeditionary Unit USS Ronald Reagan (CVN 76) Carrier Strike Group

Dates	Location/Operation/Mission	U.S. Naval Forces
		USS Gonzalez (DDG 66) USS Peleliu (LHA 5) Expeditionary Strike Group 11th Marine Expeditionary Unit USS Iwo Jima (LHD 7) Expeditionary Strike Group 24th Marine Expeditionary Unit USS Wasp (LHD 1) Expeditionary Strike Group USS Ardent (MCM 12) USS Dextrous (MCM 13) USS Cardinal (MHC 60) USS Chinook (PC 9) USS Typhoon (PC 5) USS Whirlwind (PC 11) USS Raven (MHC 61) USS Sirocco (PC 6) USS Firebolt (PC 10)
Oct 2001 - Ongoing	Mediterranean Operation Active Endeavour NATO response to 9/11 Monitoring Shipping / Intelligence Exchange	USS Elrod (FFG 55) USS Hawes (FFG 53) USS Underwood (FFG 36) USS Mahan (DDG 72) USS Doyle (FFG 39) USS Dewert (FFG 45) Elements of U.S. 6th Fleet USS Arleigh Burke (DDG 51) USS Simpson (FFG 56) USS Elrod (FFG 55) USS Boone (FFG 28) USS Ross (DDG 71) USS Monterey (CG 61) USS Carr (FFG 52) USS Porter (DDG 78)
Jan - Apr 2002	Strait of Malacca Ship protection	USS Ford (FFG 54) USS Cowpens (CG 63)
Feb - May 2002	El Salvador	NMCB-7
Feb - July 2002	Philippines Joint Task Force 510 Training and support in pursuit of terrorists. Transitioned to Joint Special Ops Task Force - Philippines Conducts humanitarian/ civic action programs	USS Germantown (LSD 42) III MEF* Naval Construction Task Group
Mar 2002	Eastern Afghanistan Operation Anaconda Ground operation against Al Qaida, Taliban strongholds	Navy SEAL Forces Marine Helicopters
June 2002	Rescue of merchant ship crew off coast of Oman	USS Vicksburg (CG 69)
Dec 2002	Assistance to Guam following Super Typhoon Pongsona	Naval Military Construction Battalion 74 USS Frank Cable (AS 40)

Dates	Location/Operation/Mission	U.S. Naval Forces
Dec 2002 - Ongoing	Horn of Africa/Djibouti Joint Task Force Horn of Africa Detect, disrupt, defeat transnational terrorist groups	Commander, Carrier Strike Group SIX USS Mount Whitney (LCC 20) 24th Marine Expeditionary Unit (SOC)* USS Iwo Jima (LHD 7) ARG USS Peleliu (LHA 5) ESG USS Belleau Wood (LHA 3) ARG USS Nassau (LHA 4) ARG Naval Mobile Construction Battalions Naval Special Warfare units Navy Medical Forces
Feb - Mar 2003	Texas Shuttle Columbia Disaster Recovery	Navy Mobile Diving and Salvage Team 2 Mobile Diving and Salvage Unit 2, Det. 409
Mar 2003 - Ongoing	Persian Gulf, Mediterranean Sea Operation Iraqi Freedom	USS Enterprise (CVN 65) Carrier Strike Group USS Theodore Roosevelt (CVN 71) Carrier Strike Group USS Harry S. Truman (CVN 75) Carrier Strike Group USS George Washington (CVN 73) Carrier Strike Group USS Nimitz (CVN 68) Carrier Strike Group USS John F. Kennedy (CV 67) Carrier Strike Group USS Constellation (CV 64) Carrier Strike Group USS Kitty Hawk (CV 63) Carrier Strike Group USS Abraham Lincoln (CVN 72) Carrier Strike Group USS Tarawa (LHA 1) Expeditionary Strike Group USS Wasp (LHD 1) Expeditionary Strike Group USS Essex (LHD 2) Expeditionary Strike Group USS Iwo Jima (LHD 7) Expeditionary Strike Group USS Belleau Wood (LHA 3) Expeditionary Strike Group USS Nassau (LHA 4) Expeditionary Strike Group USS Bataan (LHD 5) USS Bonhomme Richard (LHD 6) USS Boxer (LHD 4) USS Kearsarge (LHD 3) USS Saipan (LHA 2) USS Carter Hall (LSD 50) USS Anchorage (LSD 36) USS Ashland (LSD 48) USS Comstock (LSD 45) USS Pearl Harbor (LSD 52) USS Rushmore (LSD 47) USS Tortuga (LSD 46) USS Gunston Hall (LSD 44) USS Higgins (DDG 76) (w/Task Force 150) USS Fletcher (DD 992) (w/ Task Force 150) USS Rodney Davis (FFG 60) (w/Task Force 150) HSVX-1 Joint Venture USNS Comfort (T-AH 20) Nuclear Attack Submarines EA-6B Expeditionary Aircraft Squadrons P-3C Maritime Patrol Aircraft Squadrons EP-3 Surveillance Aircraft Squadrons Navy Unique Fleet Essential Airlift aircraft Cargo Handling Battalions Naval Coastal Warfare units

Dates	Location/Operation/Mission	U.S. Naval Forces
		Naval Mobile Construction Battalions Navy Special Warfare units Navy Medical Forces 1st Marine Expeditionary Force 2nd Marine Expeditionary Brigade 15th Marine Expeditionary Unit 31st Marine Expeditionary Unit USS Mount Whitney (LCC-20) USCG Cutters Fleet Hospital (FH) Dallas USS Dwight D. Eisenhower (CVN 69) Carrier Strike Group USS Ardent (MCM 12) USS Dextrous (MCM 13) USS Cardinal (MHC 60) USS Chinook (PC 9) USS Typhoon (PC 5) USS Whirlwind (PC 11) USS Raven (MHC 61) USS Sirocco (PC 6) USS Firebolt (PC 10) USS Oak Hill (LSD 51) USS Roosevelt (DDG 80) USS Vicksburg (CG 69) USS Trenton (LPD 14) USS Hue City (CG 66) USS James E. Williams (DDG 95) USS Taylor (FFG 50) USS Ashland (LSD 48) 13th Marine Expeditionary Unit (MEU) 22nd Marine Expeditionary Unit (MEU) USS Ronald Reagan (CVN 76) Carrier Strike Group USS Gonzalez (DDG 66) USS Peleliu (LHA 5) Expeditionary Strike Group 11th Marine Expeditionary Unit (MEU) 24th Marine Expeditionary Unit (MEU) USS John C. Stennis (CVN 74) Carrier Strike Group USS Bataan (LHD 5) Expeditionary Strike Group USS Bonhomme Richard (LHD 6) Expeditionary Strike Group
July 2003	Liberia	Fleet Antiterrorism Security Team (FAST) Security of American, Allied Citizens
Dec 2004	Humanitarian Assistance and Disaster Relief to Philippines	Joint Task Force 535

Dates	Location/Operation/Mission	U.S. Naval Forces
Dec 2004 - Mar 2005	Operation Unified Assistance	USS Abraham Lincoln Carrier Strike Group USS Fort McHenry (LSD 43) USS Essex (LHD 2) USS Bonhomme Richard (LHD 6) Expeditionary Strike Group USS Hue City (CG 66) Combined Support Force 536 USNS Mercy (T-AH 19) USNS Tippecanoe (T-AO 199) 15th Marine Expeditionary Unit USMC 9th Engineer Support Battalion Naval Mobile Construction Battalion 7 Environmental/Preventive Medicine Unit 6 USCG personnel Joint POW/MIA forensic team
Aug - Oct 2005	U.S. Gulf Coast Hurricane Relief Effort	USS Harry S. Truman (CVN 75) USS Bataan (LHD 5) USS Iwo Jima (LHD 7) USS Shreveport (LPD 17) USS Tortuga (LSD 46) USS Whidbey Island (LSD 41) USS Grapple (ARS 53) USNS Comfort (T-AH 20) USNS Arctic (T-AOE 8) Naval Mobile Construction Battalion 40 2nd MEF* Helicopter Sea Combat Squadron 28 22nd Seabee* Readiness Group Beach Master Unit 2 Assault Craft Unit 2 Mobile Diving and Salvage Unit 2 Helicopter Anti-Submarine Squadron Light 43
Oct 2005 - Mar 2006	Pakistan Earthquake Relief Effort	USS Tarawa (LHA 1) USS Pearl Harbor (LSD 52) USS Cleveland (LPD 7) USS Chosin (CG 65) Combined Joint Task Force 76 Commander, Task Force 53 Helicopter Sea Combat Squadron 26 Naval Mobile Construction Battalion 3 Naval Mobile Construction Battalion 4 Naval Mobile Construction Battalion 74 Helicopter Mine Countermeasures 15 Fleet Logistics Support Squadron (VR) 56
Jan 2006 - Ongoing	Extended Maritime Interdiction Operations	USS Pinckney (DDG 91) USS Chung-Hoon (DDG 93) USS Momsen (DDG 92) USS Halsey (DDG 97) USS Rentz (FFG 46)

Dates	Location/Operation/Mission	U.S. Naval Forces
Jan 2006 - Ongoing	Maritime Counter Terrorism Support to Operation Enduring Freedom – Philippines Support to Joint Special Operations Task Force – Philippines	Combined Joint Task Force 515 Commander, Task Force 75 USNS GySgt Fred W. Stockham (T-AK 3017) HSV 2 Swift USS Rentz (FFG 46) USS Chung Hoon (DDG 93) USS Halsey (DDG 97) USS Pinckney (DDG 91) USS Momsen (DDG 92) USS Lassen (DDG 82) USS Juneau (LPD 10) Helicopter Anti-Submarine Squadron 10 Helicopter Anti-Submarine Squadron Light 37 Helicopter Anti-Submarine Squadron Light 43 Mobile Security Squadron 7
Feb - Mar 2006	Leyte Island Mudslide Relief Effort	Commander, Task Force 76 USS Essex (LHD 2) USS Harpers Ferry (LSD 49) USS Curtis Wilbur (DDG 54) 31st Marine Expeditionary Unit
Feb - Aug 2006	PACOM Presence/RIMPAC	USS Abraham Lincoln (CVN 72) USS Mobile Bay (CG 53) USS Russell (DDG 59) USS Shoup (DDG 86) Carrier Strike Group 9 COMDESRON 9 Helicopter Anti-Submarine Squadron Light 47 Explosive Ordnance Disposal Mobile Unit 11 Det 1
Apr - May 2006	Partnership of the Americas	USS George Washington (CVN 73) Carrier Air Wing 17 USS Monterey (CG 61) USS Stout (DDG 55) USS Underwood (FFG 36)
May - Jul 2006	Limited Defense Operations Taepo Dong 2	COMSEVENTHFLT USS Curtis Wilbur (DDG 54) USS Fitzgerald (DDG 62) USS John S McCain (DDG 56) USS Russell (DDG 59)
May - Sep 2006	USNS Mercy Medical Civil Action Program	Commander, Task Force 10 Commander, Task Group 10.1 Commander, Task Group 10.2 Commander, Task Unit 10.1.1 Commander, Task Unit 10.2.1 COMPHIBRON 7 USNS Mercy (T-AH 19) USNS Niagra Falls (T-AFS 3) Medical Treatment Facility MERCY Helicopter Sea Combat Squadron 25 Naval Mobile Construction Battalion 40 Mobile Security Squadron 7 Fleet Logistics Support Squadron 51

Dates	Location/Operation/Mission	U.S. Naval Forces
Jul - Sep 2006	Joint Task Force Lebanon Operation Strengthen Hope	USS Iwo Jima (LHD 7) USS Wasp (LHD 1) USS Nashville (LPD 13) USS Trenton (LPD 14) USS Whidbey Island (LSD 41) USS Hue City (CG 66) USS Barry (DDG 52) USS Gonzalez (DDG 66) USS Mount Whitney (LCC/JCC 20) HSV Swift (HSV 2) 24th Marine Expeditionary Unit
Mar - Sep 2007	Partnership of the Americas	USS Pearl Harbor (LSD 52) DESRON 40 USS Mitscher (DDG 57) USS Samuel B. Roberts (FFG 58)
May - Sep 2007	Pacific Partnership	USS Peleliu (LHA 5) Naval Mobile Construction Battalion 7/ACB 1
Jun 2007	West African Training Cruise (WATC)	Underwater Construction Team
Jun - Oct 2007	Humanitarian Assistance Deployment	USNS Comfort (T-AH 20) COMDESRON 24 Helicopter Sea Combat Squadron 28 DET 2 Mobile Security Detachment 26 Combat Camera Naval Mobile Construction Battalion 133 Interpreter USFF Band Oceano Team Medical Staff Augmentation Fleet Public Affairs
Jun - Oct 2007	Global Fleet Station	HSV Swift (HSV 2)
Aug 2007	Minneapolis Bridge Collapse	Mobile Diving and Salvage Unit 2 Combat Camera Underwater Construction Team 1
Aug 2007		Hurricane Dean SEPLOs REPLOs Combat Camera
Sep 2007	Hurricane Felix	USS Wasp (LHD 1) USS Samuel B. Roberts (FFG 58) NEPLO
Oct - Nov 2007	SOCAL Wild Fire Fighting	Combat Camera P-3 W/ Full Mission Video Tactical Common Data Link Det Helicopter Sea Combat Squadron 85 HH-60 Det ACB 1 NEPLOs Fire Trucks W/Fire Fighting Personnel
Nov 2007	Tropical Storm Noel	NEPLOs

Dates	Location/Operation/Mission	U.S. Naval Forces
Nov 2007	Tropical Cyclone Bangladesh	USS Kearsarge (LHD 3) 22nd Marine Expeditionary Unit (SOC)* USS Essex (LHD 2) USS Tarawa (LHA 1)
Nov 2007 - Feb 08	Africa Partnership Station	USS Fort McHenry (LSD 43) Naval Mobile Construction Battalion 40 USS Annapolis (SSN 760) HSV Swift (HSV 2)
Nov 2007 - Dec 2008	Anti Piracy Operations in the Horn of Africa	Numerous ships assigned to Commander, Task Force 150
Nov 2007- Nov 2008	Development and Reconstruction of Afghanistan	Carrier Airwing 8 USS Theodore Roosevelt (CVN 71) Individual Augmentees / GWOT Support Assignments
Feb 2008	Southern Partnership Station	HSV Swift (HSV 2)
Feb 2008	Rogue Satellite Shoot Down	USS Lake Erie (CG 70)
Apr - Jun 2008	Continuing Promise 2008 Humanitarian Civic Assistance (HCA) U.S. Southern Command (SOUTHCOM)	USS Boxer (LHD 4) COMPHIBRON 5 Fleet Surgical Team 5 U.S. Public Health Service Navy SEABEE Construction Battalion Maintenance Unit 303 Helicopter Mine Countermeasures Squadron 14 Marine Medium Helicopter Squadron 764 Tactical Air Control Squadron 11 Special Marine Air Ground Task Force 24 Helicopter Sea Combat Squadron 23 Assault Craft Unit 1 Fleet Survey Team Maritime Civil Affairs Team 205 Beach Master Unit 1 Fleet Public Affairs
Apr - Oct 2008	Partnership of the Americas 2008 U.S. Southern Command (SOUTHCOM)	USS George Washington (CVN 73) COMDESRON 40 USS Farragut (DDG 99) USS Forrest Sherman (DDG 98) USS Kauffman (FFG 59)
May - June 2008	Pacific Partnership	USNS Mercy (T-AH 19) USS Peleliu (LHA 5)
June, Oct - Nov 2008	Southern California Wildfires	Navy Emergency Preparedness Liaison Officers Helicopter Sea Combat Squadron 85 (HSC-85)
Jun - Sep 2008	Navy Dive Southern Partnership Station 2008 Multinational Maritime Partnership U.S. Southern Command (SOUTHCOM)	USNS Grasp (T-ARS 51)

Dates	Location/Operation/Mission	U.S. Naval Forces
Aug - Nov 2008	Continuing Promise 2008 Humanitarian Civic Assistance (HCA) U.S. Southern Command (SOUTHCOM)	USS Kearsarge (LHD 3) COMPHIBRON 8 Fleet Surgical Team 4 U.S. Public Health Service Navy SEABEE Construction Battalion Maintenance Unit 202 Air Force Civil Engineering Squadron 5 Navy Assault Craft Unit 2 Naval Beach Group 2 Maritime Civil Affairs Squadron 2 Helicopter Sea Combat Squadron 28 Marine Heavy Helicopter Squadron 464 Fleet Public Affairs
Aug 2008	Russia / Georgia Conflict – Humanitarian Assistance	USS Mount Whitney (LCC 20) USS McFaul (DDG 74)
Aug 2008	Hurricane Gustav Recovery Operations	Naval Facilities Engineering Command Fleet & Family Support Center
Sep 2008	Haiti Disaster Relief (DR) U.S. Southern Command (SOUTHCOM)	USS Kearsarge (LHD 3) COMPHIBRON 8 Fleet Surgical Team 4 U.S. Public Health Service Navy SEABEE Construction Battalion Maintenance Unit 202 Air Force Civil Engineering Squadron 5 Navy Assault Craft Unit 2 Naval Beach Group 2 Maritime Civil Affairs Squadron 2 Helicopter Sea Combat Squadron 28 Marine Heavy Helicopter Squadron 464 Fleet Public Affairs
Sep - Oct 2008	Air Force B-52 Salvage & Recovery Ops Guam	USNS Sioux (T-ATF 171)
Oct 2008 - Apr 2009	Counter Illicit Trafficking (CIT) OPS U.S. Southern Command (SOUTHCOM)	USS Samuel B. Roberts (FFG 58) USS Underwood (FFG 36) USS Rodney M. Davis (FFG 60)
Nov 2008 - Apr 2009	Southern Partnership Station 2008/2009 Multinational Maritime Partnership U.S. Southern Command (SOUTHCOM)	HSV Swift (HSV 2)
Dec 2008 - Feb 2009	Counter Illicit Trafficking (CIT) OPS U.S. Southern Command (SOUTHCOM)	USNS Saturn (T-AFS 10)
Dec 2008 - Ongoing	Operation Iraqi Freedom CTF-IM	USS Nitze (DDG 94) USS Lake Champlain (CG 57) USS Halyburton (FFG 40) USS Paul Hamilton (DDG 60) USS John Paul Jones (DDG 53) USS Milius (DDG 69) USS Decatur (DDG 73) USS Port Royal (CG 73) USS Hopper (DDG 70) USS Benfold (DDG 65) USS Chinook (PC 9) USS Typhoon (PC 5)

Dates	Location/Operation/Mission	U.S. Naval Forces
		USS Whirlwind (PC 11) USS Sirocco (PC 6) USS Firebolt (PC 10)
Dec 2008	WESTPAC / MCPI / UNSCR Operation Enduring Freedom - Afghanistan (Struggle Against Violent Extremism) (Maritime Security Operations) (Partnership, Strength & Presence)	USS The Sullivans (DDG 68) USS Dwight D Eisenhower (CVN-69) Carrier Strike Group USS Ronald Reagan (CVN-76) Carrier Strike Group USS Nimitz (CVN-68) Carrier Strike Group USS Iwo Jima (LHD-7) Expeditionary Strike Group USS Bataan (LHD-5) Expeditionary Strike Group USS Boxer (LHD-4) Expeditionary Strike Group USS Bonhomme Richard (LHD-6) Expeditionary Strike Group 13th Marine Expeditionary Unit (MEU) 22nd Marine Expeditionary Unit (MEU) 11th Marine Expeditionary Unit (MEU) USS San Antonio (LPD 17) USS Carter Hall (LSD 50) USS New Orleans (LPD 18) USS Lake Champlain (CG 57) USS Chung-Hoon (DDG 93) USS Comstock (LSD 45) USS Bataan (LHD 5) USS Ponce (LPD 15) USS Fort McHenry (LSD 43) USS Cleveland (LPD 7) USS Rushmore (LSD 47) USS Ramage (DDG 61) USS Monterey (CG 61) USS Mason (DDG 87) USS Nitze (DDG 94) USS Mahan (DDG 72) USS Milius (DDG 69) USS Gettysburg (CG 64) USS Vicksburg (CG 69) USS Vella Gulf (CG 72) USS Chancellorsville (CG 62) USS Howard (DDG 83) USS Rentz (FFG 46) USS Ingraham (FFG 61) USS DeWert (FFG 45) USS Hopper (DDG 70) USS Benfold (DDG 65) USS Ardent (MCM 12) USS Dextrous (MCM 13) USS Gladiator (MCM 11) USS Scout (MCM 8) USS Sampson (DDG 102) USS Gridley (DDG 101) USS James E Williams (DDG 95) USS Thach (FFG 43) USS Decatur (DDG 73) USS Paul Hamilton (DDG 60) USS John Paul Jones (DDG 53) USS Porter (DDG 78) USS Bainbridge (DDG 96) USS Chosin (CG 65) USS Pinckney (DDG 91)

Dates	Location/Operation/Mission	U.S. Naval Forces
Jan - Dec 2009	Counter-Piracy Operations in the GOA (Gulf of Aden) / HOA (Horn of Africa) Somali Basin / Arabian Sea	Numerous U.S. and Combined Maritime Force ships assigned to CTF-151 USS The Sullivans (DDG 68) USS Lake Champlain (CG 57) USS Chung-Hoon (DDG 93) USS Vicksburg (CG 69) USS James E Williams (DDG 95) USS Thatch (FFG 43) USS Anzio (CG 60) USS Bainbridge (DDG 96) USS Rentz (FFG 46) USS Ingraham (FFG 61) USS Winston S Churchill (DDG 81)
Jan - Dec 2009	Standing NATO Maritime Group (SNMG)	USS Halyburton (FFG 40) USS Donald Cook (DDG 75) USS Stephen W Groves (FFG 29)
15 Feb 2009- 05 Apr 2009	WESTPAC / DYNAMIC SPRING/LDO	COMPACFLT COMSEVENTHFLT CTF 70 DESRON 15 USS Shiloh (CG 67) USS Cowpens (CG 63) USS Hopper (DDG 70) USS John S McCain (DDG 56) USS Curtis Wilbur (DDG 54) USS Fitzgerald (DDG 62) USS Stethem (DDG 63)
Apr 2009	Maersk Alabama Piracy/ Rescue	USS Bainbridge (DDG 96) USS Halyburton (FFG 40) USS Boxer (LHD 4)
	Summit of the Americas Support Caribbean	USS Winston S. Churchill (DDG 81) USS Hawes (FFG 53) COMDESRON 26
Apr - Jul 2009	Continuing Promise 2010 Humanitarian Civic Assistance (HCA) U.S. Southern Command (SOUTHCOM)	USNS Comfort (T-AH 20) COMPHIBRON 6 Fleet Surgical Team 4 U.S. Public Health Service Helicopter Sea Combat Squadron 26 Navy SEABEE Construction Maintenance Battalion Unit 202 Maritime Civil Affairs Squadron 2 U.S. Air Force Band Fleet Public Affairs
Apr - May 2009	Unitas Gold 2009 U.S. Southern Command (SOUTHCOM)	COMDESRON 40 USS Mesa Verde (LPD 19) USS Doyle (FFG 39) USS Kauffman (FFG 59) USS Donald Cook (DDG 75) USS Oscar Austin (DDG 79) USS Ashland (LSD 48) USS Winston S. Churchill (DDG 81) USS San Jacinto (CG 56) USS Forrest Sherman (DDG 98) USS John L. Hall (FFG 32)

Dates	Location/Operation/Mission	U.S. Naval Forces
Apr - Oct 2009	Southern Seas 2009 U.S. Southern Command (SOUTHCOM)	COMDESRON 40 USS Doyle (FFG 39) USS Kauffman (FFG 59) USS Ford (FFG 54)
	Counter Illicit Trafficking (CIT) OPS U.S. Southern Command (SOUTHCOM)	USS Gary (FFG 51) USS Carr (FFG 52) USS Hawes (FFG 53) USS Simpson (FFG 56) USS Newport News (SSN 750)
May - Oct 2009	Counter Illicit Trafficking (CIT) OPS U.S. Southern Command (SOUTHCOM)	USS Jarrett (FFG 33) USNS Robert E. Peary (T-AKE 5)
May - 30 Sep 2009	WESTPAC / Pacific Partnership 2009 / FHA & TCP	USNS Richard E Byrd, CDS 21
17 Jun- 07 July 2009	WESTPAC / MCPI / UNSCR	CTF 72 DET USS McCampbell (DDG 85)
Jun - Jul 2009	Air France Flight #447 Recovery OPS South Atlantic	Supervisor of Salvage and Diving (SUPSALV) NAVOCEANO
Jun - Aug 2009	Amphibious Southern Partnership Station 2009 Multinational Maritime Partnership U.S. Southern Command (SOUTHCOM)	USS Oak Hill (LSD 51) COMDESRON 2 22nd Marine Expeditionary Unit Navy Combat Camera
Aug 2009	Taiwan / Typhoon Morakot Recovery / FHA	USS Denver (LPD 9), CH-53s
27 Sep -13 Oct 2009	Republic of the Philippines / Tropical Storm Ketsana / FHA	USS Harpers Ferry (LSD 49) USS Tortuga
29 Sep - 4 Oct 2009	America Samoa / Tsunami Relief / HA	USS Ingraham (FFG 61)
02 Oct -17 Oct 2009	Indonesia / FHA	CTF 76 COMPHIBRON 11 USS Denver (LPD 9) USS McCampbell (DDG 85) USNS Richard E Byrd (T-AKE 4) USNS Walter S. Diehl (T-AO 193) CTF 72 DET 31 MEU 11 MEU
30 Oct - 07 Nov 2009	WESTPAC / MCPI / UNSCR	USS Ingraham (FFG 61)
Oct - Dec 2009	Amphibious Southern Partnership Station 2009 Multinational Maritime Partnership U.S. Southern Command (SOUTHCOM)	USS Wasp (LHD 1) COMDESRON 40 Marine Heavy Helicopter Squadron 461 Fox Company 2nd Battalion 9th Marines 8th Communication Battalion 8th Engineering Support Battalion Marine Dental Echelon

Dates	Location/Operation/Mission	U.S. Naval Forces
Oct 2009 - Apr 2010	Counter Illicit Trafficking (CIT) OPS U.S. Southern Command (SOUTHCOM)	USS McInerney (FFG 8) USS McClusky (FFG 41)
Oct 2009 - May 2010	Oceanographic Southern Partnership Station 2009/2010	USNS Henson (T-AGS 63)
Nov 2009 - Mar 2010	Oceanographic Southern Partnership Station 2009/2010	USNS Sumner (T-AGS 61)
Nov - Nov 2009	Divi Airlines Plane Crash Recovery OPS Southern Caribbean	USNS Henson (T-AGS 63)
Jan - Apr 2010	USS Carl Vinson Southern Seas 2010 U.S. Southern Command (SOUTHCOM)	USS Carl Vinson (CVN 70) COMCARSTRKGRU 1
Jan 2010 - Ongoing	Operation Unified Response / Haiti Earthquake Relief	USS Carl Vinson (CVN 70) USS Bataan (LHA 5) USS Gunston Hall (LSD 44) USS Fort McHenry (LSD 43) USS Carter Hall (LSD 50) USS Normandy (CG 60) USS Underwood (FFG 36) 22nd Marine Expeditionary Unit (MEU 22) USS Nassau (LHD 4) USS Mesa Verde (LPD 19) USS Ashland (LSD 48) 24th Marine Expeditionary Unit (MEU 24) USS Higgins (DDG 76) USS Bunker Hill (CG 52) USNS Comfort (T-AH 20) USNS Grasp (T-ARS 51) USNS Henson (T-AGS-63) USNS Sacagawea (T-AKE 2) USNS Sumner (T-AGS-61) USNS 1st LT Jack Lummus (T-AK 3011) USNS PFC Dewayne T. Williams (T-AK 3009) USNS Big Horn (T-AO-198)
Feb - Apr 2010	USS Freedom Early Deployment U.S. Southern Command (SOUTHCOM)	USS Freedom (LCS 1)

* 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

AADC	Area Air Defense Commander
AARGM	Advanced Anti-Radiation Guided Missile
AAW	Anti-Air Warfare
ABNCP	Airborne Command Post
ACAT	Acquisition Category
ACAT IAM	Major automated information system acquisition category
ACB	Amphibious Construction Battalion
ACCES	Advanced Cryptologic Carry-on Exploitation System
ACDS	Advanced Combat Direction System
ACS	Aerial Common Sensor
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
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
ASUW	Anti-Surface Warfare
ASW	Anti-Submarine Warfare
ASWC	Anti-Submarine Warfare 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
AT- FLIR	Advanced Targeting Forward-Looking Infrared
ATM	Asynchronous Transfer Mode
ATT	Anti-Torpedo Torpedo
ATWCS	Advanced Tomahawk Weapon Control
AWACS	Airborne Warning and Control System
AWS	Advanced Wideband System
BAH	Basic Allowance for Housing
BAMS	Broad Area Maritime Surveillance
BDI	Battle Damage Indication
BDII	Battle Damage Indication Imagery
BFCAPP	Battle Force Capability Assessment and Programming Process
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
BRAC	Base Realignment and Closure
C2(P)	Command and Control Processor
C2(R)	Command and Control Processor (Re-Host)
C3	Command, Control, and Communications
C3I	Command, Control, Communications, and Intelligence
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
CAS	Close Air Support
CB	Chemical, Biological
CBASS	Common Broadband Advanced Sonar System
CBR	Chemical, Biological, and Radiological
CBRND	Chemical, Biological, Radiological, Nuclear Defense
CCD	Center for Career Development
CCG	Computer Control Group
CCP	Common Configuration Program

CCS	Combat Control System
CDA	Commercially-Derived Aircraft
CDD	Capabilities Development Document
CDHQ	Central Command Deployable Headquarters
CDL-N	Common Data Link, Navy
CDLMS	Common Data Link Management System
CDLS	Common Data Link System
CDR	Critical Design Review
CDS	Combat Direction 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
CG(X)	Next Generation Cruiser
CIE	Collaborative Information Environment
CIO	Chief Information Officer
CIWS	Close-In Weapon System
CJF	Commander, Joint Forces
CLF	Combat Logistics Force
CLIP	Common Link Integration Processing
CM	Cryptographic Modernization
CMCO	Counter Mine Counter Obstacle
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
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
COS	Class of Service
COTS	Commercial-Off-The-Shelf, also Cargo Offload and Transfer System
CPD	Capabilities Production Document
CSAR	Combat Search and Rescue
CSDTS	Common Shipboard Data Terminal Set
CSG	Carrier Strike Group
CSIT	Combat System Integration and Test
CSRB	Critical Skills Retention Bonus
CSRR	Common Submarine Radio Room
CSWP	Commercial Satellite Wideband Program
CTAPS	Contingency Tactical Automated Planning System (for TACS)
CTF	Component Task Force, or, Commander Task Force
CTOL	Conventional Takeoff and Landing
CTP	Common Tactical Picture
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
CVN(X)	Next-Generation Nuclear-Powered Aircraft Carrier
D5E	Destruction, degradation, denial, disruption, deceit, and Exploitation
DAB	Defense Acquisition Board
DARPA	Defense Advanced Research Projects Agency
DBRS	Dual-Band Radar Suite
DCA	Defensive Counter-Air
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
DD	Destroyer
DD 21	21st Land-Attack Destroyer
DD(X)	Next Generation Destroyer
DEM/VAL	Demonstration/Validation
DF	Direction Finding
DDG	Guided Missile Destroyer
DIB	DCGS Integration Backbone
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
DISA	Defense Information Systems Agency
DISN	Defense Information Systems Network
DJC2	Deployable Joint Command and Control (program)
DLS	Decoy Launching System
DMR	Digital Modular Radio
DMS	Defense Message System
DMSP	Defense Meteorology Satellite Program
DNM	Dynamic Network Management
DNS	Director, Navy Staff
DiD	Defense-in-Depth
DoD	Department of Defense
DoN	Department of the Navy
DOTMLPF	Doctrine, Organization, Training, Materiel, Leadership, Personnel, and Facilities
DPRIS/ PRS	Defense Personnel Record Imaging System/EM-Electronic Military Personnel Record System
DSCS	Defense Satellite Communications System
DRPM	Direct-Reporting Program Manager
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
ECM	Electronic Countermeasures
ECCM	Electronic Counter-Countermeasures
ECP	Engineering Change Proposal
ECS	Exterior Communication System
EDS	Electronic Data Systems
EFV	Expeditionary Fighting Vehicle
EHF	Extremely High Frequency
EIS	Environmental Impact Statement
EKMS	Electronic Key Management System
ELINT	Electronic Intelligence
ELC	Enhanced Lethality Cartridge
EMD	Engineering and Manufacturing Development
EMPRS	Electronic Military Personnel Record System
EMW	Expeditionary Maneuver Warfare
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
ERGM	Extended-Range Guided Munition
ERM	Extended Range Munition
ERNT	CNO Executive Review of Navy Training
ESE	Electronic Surveillance Enhancement
ESG	Expeditionary Strike Group
ESM	Electronic Support Measures
ESSI	Enhanced Special Structural Inspection
ESSM	Evolved Sea Sparrow Missile
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
FFG	Guided Missile Frigate
FFSP	Fleet and Family Support Program
FHLT	Fleet High-Level Terminal
FIE	Fly-In Echelon
FITC	Fleet Intelligence Training Center
FLIR	Forward-Looking Infrared
FLTSAT	Fleet Satellite
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	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
GMF	Ground Mobile Force (Air Force)
GOTS	Government-Off-The-Shelf
GPS	Global Positioning System
GT	Gas Turbine
GWOT	Global War on Terror
HARM	High-Speed Anti-Radiation Missile
HD/LD	High-Demand/Low-Density
HDR	High Data-Rate
HF	High Frequency
HGHS	High Gain High Sensitivity
HLCAC	Heavy Lift Landing Craft, Air Cushion
HM&E	Human, 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
IA	Information Assurance
IATF	IA Technical Framework
IBS	Integrated Broadcast Service
I&W	Indications & Warning
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
IDSN	Integrated Digital Switching Network
IDTC	Inter-Deployment Training Cycle
IETM	Interactive Electronic Technical Manual
IFF	Identification, Friend or Foe
IMINT	Imagery Intelligence
INLS	Improved Navy Lighterage
INS	Inertial Navigation System
IO	Information Operations
IOC	Initial Operational Capability Development
IP	Internet Protocol
IPDS	Improved Point Detector System
IPPD	Integrated Product and Process Development
IPS	Integrated Power System
IPT	Integrated Process Team
IPR	Interim Program Review
IR	Infrared
IRST	Infrared Search and Track
IS	Information Systems
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
JCIDS	Joint Capabilities Integration and Development System
JCM	Joint Common Missile
JCS	Joint Chiefs of Staff
JC2-MA	Joint Command and Control - Maritime Applications
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
JHMCS	Joint Helmet Mounted Cueing System
JFN	Joint Fires Network
JFNU	Joint Fires Network Unit
JIC	Joint Intelligence Center
JICO/JSS	Joint Interface Control Officer Support System
JMCIS	Joint Maritime Command Information System
JHDA	Joint Host Demand Algorithm
JMAST	Joint Mobile Ashore Support Terminal
JMCOMS	Joint Maritime Communications Strategy
JMLS	Joint Modular Lighterage System
JMOD	Joint Airborne SIGINT Architecture Modification
JMPS	Joint Mission Planning System
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
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
JWICS	Joint Worldwide Intelligence Communications System
JTRS	Joint Tactical Radio System
JTT	Joint Tactical Terminal
J-UCAS	Joint Unmanned Combat Air System
KDP	Key Decision Point
KPP	Key Performance Parameter
LAMPS	Light Airborne Multipurpose System
LAN	Local Area Network
LANT	Atlantic
LANTIRN	Low-Altitude Navigation and Targeting Infrared At Night
LCAC	Landing Craft, Air Cushion
LCB	Lateral Conversion Bonus
LCC	Amphibious Command Ship
LCGR	Launch Control Group Replacement
LCS	Littoral Combat Ship
LCU(R)	Landing Craft Utility ship (replacement)
LD/HD	Low-Density/High Demand
LIDAR	Light Detection and Ranging System
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
LHA-R	Amphibious Assault Ship-Replacement
LGB	Laser-Guided Bomb
LHD	Amphibious Assault Ship
LHT	Lightweight Hybrid Torpedo
LIDAR	Light Detection and Ranging
LMRS	Long-Term Mine Reconnaissance System
LMS	Local Monitor Station
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
LRIP	Low Rate Initial Production
LRLAP	Long-Range Land-Attack Projectile
LSD	Dock Landing Ship
LSS	Littoral Surveillance System
LST	Task Landing Ship
LVT	Low-Volume Terminal
MA	Maritime Applications
MAGTF	Marine Air-Ground Task Force
MARCEMP	Manual Relay Center Modernization Program
MAST	Mobile Ashore Support Terminal
MATT	Multi-mission Airborne Tactical Terminal
MAWS	Missile Approach Warning System
M/BVR	Medium/Beyond Visual Range missile
MCEN	Marine Corps Enterprise Network
MCM	Mine Countermeasures
MCAS	Marine Corps Air Station
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
MCU	Mission Computer Upgrade
MDA	Missile Defense Agency
MDR	Medium Data Rate
MDS	Multi-function Display System
MEB	Marine Expeditionary Brigade
MEDAL	Mine Warfare and Environmental Decision Aids Library
MEF	Marine Expeditionary Force
METOC	Meteorological and Oceanographic Sensors
MEU	Marine Expeditionary Unit
MEU(SOC)	Marine Expeditionary Unit (Special Operations Capable)
MF/HF/ VHF/UHF	Medium/High/ very High/ Ultra High Frequency
MFL	Multi-Frequency Link
MFR	Multi-Function Radar
MFTA	Multi-Function Towed Array
MHC	Coastal Mine Hunter
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
MILSTAR	Military Strategic and Tactical Relay Satellite
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
MNS	Mission Need Statement, also Mine Neutralization System
MOA	Memorandum of Agreement
MOCC	Mobile Operational Command Control Center
MOD	Modification
MOU	Memorandum of Understanding
MPA	Maritime Patrol Aircraft
MPF(F)	Maritime Prepositioning Force(Future)
MPG	Maritime Prepositioning Group
MPS	Maritime Prepositioning Ship, or, Mission Planning System
MRMS	Maintenance Resource Management System
MRUUV	Mission-Reconfigurable Unmanned Undersea Vehicle
MS	Mess Management Specialist (enlisted classification)
MSC	Military Sealift Command
MTI	Moving Target Indicator
MUOS	Mobile User Objective System
MWR	Morale, Welfare, and Recreation
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 [sensor]
NavMPS	Naval Mission Planning System
NAVSSI	Navigation Sensor System Interface
NAVSEA	Naval Sea Systems Command
NAVSECGRU	Naval Security Group
NAVSUP	Naval Supply Systems Command
NAVWAR	Navigation Warfare
NCDP	Naval Capabilities Development Process
NCES	Net-Centric Enterprise Services
NCFS	Naval Fires Control System
NCO	Network-Centric Operations
NCP	Naval Capability Pillar, or, Naval Capability Plan
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
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
NGNN	Northrup Grumman Newport News
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
N/JCA	Navy/Joint Concentrator Architecture
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
NNSOC	Naval Network and Space Command
NOAA	National Oceanographic and Atmospheric Administration
NOC	Network Operation Center
NPDC	Naval Personnel Development Command
NPOESS	National Polar-Orbiting Operational Environmental Satellite System
NRF	Naval Reserve Force
NRL	Naval Research Laboratory
NROC	Navy Requirements Oversight Council
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
NSIPS	Navy Standard Integrated Personnel System
NSPG	Navy Strategic Planning Guidance
NSSMS	NATO Sea Sparrow Missile System
NSSN	New Attack Submarine (Virginia SSN 774 Class)
NSTC	Naval Service Training Command
NSW	Naval Special Warfare
NSWC/DD	Naval Surface Warfare Center/ Dahlgren Division
NSWC/PH	Naval Surface Warfare Center/Port Hueneme
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 (USMC)
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
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
OSIS	Ocean Surveillance Information System
OSS	Operational Support System
OT	Operational Testing
OT&E	Operational Testing and Evaluation
P3I	Pre-Planned Product Improvement
PAC	Pacific
PACE	Program for Afloat College Education
PAS	Processing and Analysis Segment
PEO	Program Executive Office (and Officer)
PERSTEMPO	Personnel Tempo
PDM	Program Decision Memorandum
PDR	Preliminary Design Review
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
POM	Program Objective Memorandum
POR	Program of Record
PPBE	Planning, Programming, Budgeting, and Execution process
PPBS	Planning, Programming, and Budgeting System
PTAN	Precision Terrain Aided Navigation
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
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
RMS	Remote Minehunting System
RNSSMS	Rearchitectured NATO Seasparrow Missile System
RO	Reverse Osmosis
ROS	Reduced Operating Status
RRDD	Risk Reduction and Design Development
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
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
SATCOM	Satellite Communications
SCA	Software Communications Architecture
SCC	Sea Combat Commander
SCI	Sensitive Compartmented Information
SCN	Shipbuilding and Conversion (Navy) [funding]
SDAP	Special Duty Assignment Pay
SDD	System Development and Demonstration (phase)
SDTS	Self-Defense Test Ship
SDV	Swimmer (or SEAL) Delivery Vehicle
SDVT	Swimmer (or SEAL) Delivery Vehicle Team
SEAD	Suppression of Enemy Air Defense
Seabee	Naval Construction Battalion
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
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
SOA	Sustained Operations Ashore
SOAD	Standoff Outside Area Defense
SOAP	Simple Object Access Protocol

SOC	Special Operations Cable, also 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
SRB	Selective Reenlistment Bonus
SRC	Submarine Rescue Chamber
SRDRS	Submarine Rescue Diving Recompression System
SS	Sensor Subsystem
SSEE	Ship's Signals Exploitation Equipment
SSI	Special Structural Inspection
SSI-K	Special Structural Inspection-Kit
SSIPS	Shore Signal and Information Processing Segment
SSBN	Nuclear-Powered Ballistic Missile Submarine
SSG	Strategic Studies Group
SSGN	Guided Missile Submarine
SSDS	Ship Self-Defense System
SSK	Diesel-electric/ Advanced Air Independent Submarine
SSMIS	Special Sensor Microwave Imager/Sounder (Air Force)
SSN	Nuclear-Powered Submarine
SSO	Special Security Office
SS-SPY	Solid State- SPY (radar)
SSST	Supersonic Sea-Skimming Target
START	Strategic Arms Reduction Treaty
STEP	Standardized Tactical Entry Point
STOM	Ship-To-Objective Maneuver
STOVL	Short Take-Off and Vertical Landing
STT	Submarine Tactical Terminal
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
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
T-AO	Oiler (MSC-operated)
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
TAMD	Theater Air and Missile Defense
TAMPS	Tactical Automated Mission Planning System
TAOC	Tactical Air Operations Center (Marine Corps)
TAP	Tactical Training Theater Assessment Planning
TARPS	Tactical Airborne Reconnaissance Pod System
TCDL	Tactical Common Data Link
TCGR	Track Control Group Replacement
TCP	Transmission Control Protocol
TCS	Tactical Control System, or, Time-Critical Strike
TCT	Time-Critical Targeting
TDA	Tactical Decision Aid
TDD	Target Detection Device
TDLS	Tactical Data Link System
TDMA	Time Division Multiple Access
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
TFW	Task Force Web
TI	Tach Insertion
TIBS	Tactical Information Broadcast Service
TIDS	Tactical Integrated Digital System
TIMS	Training Integrated Management System
TIS	Trusted Information System
TIS	Tactical Interface Subsystem
TLAM	Tomahawk Land-Attack Cruise Missile
TLR	Top Level Requirements
TOA	Total Obligational Authority, or, Tables of Allowance (Seabee)
TOC	Total Ownership Costs
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
TRIXS	Tactical Reconnaissance Intelligence Exchange System
TS	Top Secret
TSC	Tactical Support Center
TTWCS	Tactical Tomahawk Weapon Control System
TUSWC	Theater Undersea Warfare Commander
UAV	Unmanned Aerial Vehicle
UCAV	Unmanned Combat Air Vehicle
UCT	Underwater Construction Team
UDDI	Universal Description, Discovery, and Integration
UFO	Ultra High Frequency Follow-On
UHF	Ultra High Frequency
UOES	User Operational Evaluation System
UNITAS	Annual US - South American Allied Exercise
UNREP	Underway Replenishment
USD/AT&L	Under Secretary of Defense for Acquisition, Technology, and Logistics
USPACOM	United States. Pacific Command
URL	Unrestricted Line
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
VCNO	Vice Chief of Naval Operations
VERTREP	Vertical (underway) Replenishment

VHA	Variable Housing Allowance
VIXS	Video Information Exchange System
VLF/LF	Very Low Frequency/Low Frequency
VLS	Vertical Launching System
VME	Versa Module Eurocard
VPN	Virtual Private Network
VSR	Volume Search Radar
VSW	Very Shallow Water
V/STOL	Vertical/Short Take-Off and Landing
VTOL	Vertical Take-Off and Landing
VTC	Video Teleconferencing
VTM	Video Tele-Medicine
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