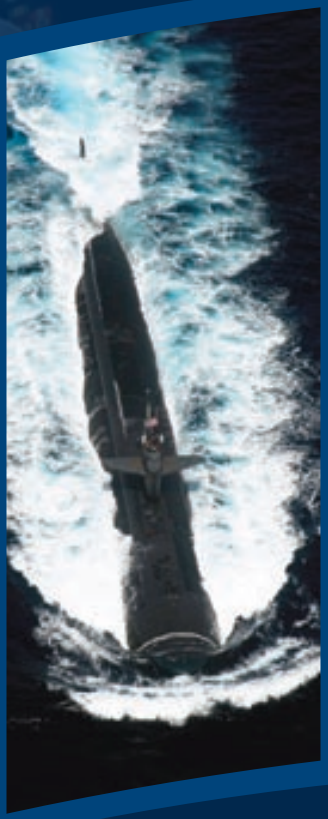
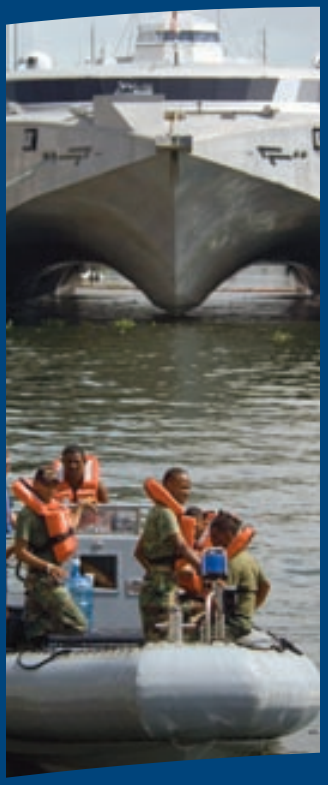
NAVY PROGRAM GUIDE 2009





FOREWORD

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

As the world's preeminent maritime power, the United States Navy provides combat-credible forces to promote stability, protect the homeland, prevent conflict and win our Nation's wars. Alongside the Marine Corps and Coast Guard, our Navy is forward globally, present persistently and engaged actively. Our Navy provides the Nation with value far beyond merely fighting other navies. Our Navy has been involved in small-scale contingency operations and non-combat operations as a steady-state posture for more than 230 years. Along with the Marine Corps, our Navy possesses the unique ability to project power and aid ashore from scalable, sovereign and flexible naval forces that can respond anywhere in the world immediately.

A Cooperative Strategy for 21st Century Seapower describes how our maritime services come together to protect and sustain our way of life. It shows how maritime power is crucial to protecting world-wide security interests in an increasingly interconnected global community. The global community requires free and open access in the global commons that includes the seas, air, space, cyberspace and global markets. The strategy outlines the strong commitment by our Nation's maritime services to work cooperatively with friends, partners and allies to realize the shared aspirations of mutual security, stability and prosperity.

We live in a complex, uncertain and increasingly violent world. The global community faces challenges from climate change, resource competition, energy dependency and economic volatility. Disorder and disruption in key regions result from transnational threats such as terrorism, weapons proliferation, and piracy. Weakened and ungoverned states provide sanctuaries from which these transnational threats spawn. Future warfare will include irregular and conventional threats that will challenge the global security environment.

I am committed to meeting the challenges we face at home and overseas and to providing options to the President and our Nation in peacetime, crisis and conflict. Preventing wars and conflicts is as important as winning them. Our Navy must maintain its capability and capacity to operate and fight among and against irregular and conventional threats.

No other challenge is as imperative for our Navy than defining and building our future force structure. Our Maritime Strategy is the strategic framework for that force structure. We must sustain our forces in the current conflicts, while building a force that supports our future global interests. These interests demand a fleet that can empower our partners, deter our adversaries and defeat our enemies. We must also provide our Sailors, who are proudly serving our Nation at home and abroad, on land and at sea, with the skills, competence and quality of life they need to operate this fleet.

This 2009 edition of *Navy Program Guide* provides specific and useful information on the critical programs and initiatives we are fielding to build a balanced force that is capable of meeting the demands of today and tomorrow.

CHAPTER 1

CHAPTER 2

CHAPTER 3

CHAPTER 1

A COOPERATIVE STRATEGY FOR 21ST CENTURY SEAPOWER

In an historical first, the maritime forces of the United States—the Navy, Marine Corps and Coast Guard—crafted a unified maritime strategy that was unveiled at the International Seapower Symposium at the U.S. Naval War College on 17 October 2007. A Cooperative Strategy for 21st Century Seapower *explains the comprehensive role of the sea services in an era marked by increased globalization and uncertainty. It had been more than 25 years since the Cold-War Navy Maritime Strategy was published, and far-reaching changes at home and overseas drove the articulation of a new strategic framework for maritime forces. The strategy delineates six expanded core capabilities for U.S. Seapower to achieve a balance of peacetime engagement and major combat operations capabilities: Forward Presence, Deterrence, Sea Control, Power Projection, Maritime Security and Humanitarian Assistance and Disaster Response. The first signed by the three sea services, this strategy articulates how U.S. maritime forces operate across the full spectrum of operations—from preventing war to conducting war and to sustaining peace and security.*

INTRODUCTION

The security, prosperity, and vital interests of the United States are increasingly coupled to those of other nations. Our Nation's interests are best served by fostering a peaceful global system comprised of interdependent networks of trade, finance, information, law, people and governance.

We prosper because of this system of exchange among nations, yet recognize it is vulnerable to a range of disruptions that can produce cascading and harmful effects far from their sources. Major power war, regional conflict, terrorism, lawlessness and natural disasters—all have the potential to threaten the U.S. national security and world prosperity.

The oceans connect the nations of the world, even those countries that are landlocked. Because the maritime domain—the world's oceans, seas, bays, estuaries, islands, coastal areas, littorals, and the airspace above them—supports 90 percent of the world's trade, it carries the lifeblood of a global system that links every country on earth. Covering three-quarters of the planet, the oceans make neighbors of people around the world. They enable us to help friends in need and to confront and defeat aggression far from our shores.

Today, the United States and its partners find themselves competing for global influence in an era in which they are unlikely to be fully at war or fully at peace. Our challenge is to apply seapower in a manner that protects the U.S. vital interests even as it promotes greater collective security, stability, and trust. While defending our homeland and defeating adversaries in war remain the indisputable ends of seapower, it must be applied more broadly if it is to serve the national interest.

We believe that *preventing wars is as important as winning wars*. There is a tension, however, between the requirements for continued peacetime engagement and maintaining proficiency in the critical skills necessary to fighting and winning in combat. Maritime forces must contribute to winning wars decisively while enhancing our ability to prevent war, win the long struggle against terrorist networks, positively influence events and ease the impact of disasters.

As they have always been, these critical tasks will be carried out by our people—the key to success in any military strategy. Accordingly, we will provide our people—our Sailors, Marines, and Coast Guardsmen—with the training, education and tools necessary to promote peace and prevail in conflict.

Guided by the objectives articulated in the *National Security Strategy, National Defense Strategy, National Military Strategy* and the *National Strategy for Maritime Security*, the United States Navy, Marine Corps, and Coast Guard will act across the full range of military operations to secure the United States from direct attack; secure strategic access and retain global freedom of action;

strengthen existing and emerging alliances and partnerships and establish favorable security conditions.

Additionally, maritime forces will be employed to build confidence and trust among nations through collective security efforts that focus on common threats and mutual interest in an open, multi-polar world. To do so will require an unprecedented level of integration among our maritime forces and enhanced cooperation with the other instruments of national power, as well as the capabilities of our international partners. *Seapower will be a unifying force for building a better tomorrow.*

CHALLENGES OF A NEW ERA

The world economy is tightly interconnected. Over the past four decades, total sea borne trade has more than quadrupled: 90 percent of world trade and two-thirds of its petroleum are transported by sea. The sea-lanes and supporting shore infrastructure are the lifelines of the modern global economy, visible and vulnerable symbols of the modern distribution system that relies on free transit through increasingly urbanized littoral regions.

Expansion of the global system has increased the prosperity of many nations. Yet their continued growth may create increasing competition for resources and capital with other economic powers, transnational corporations and international organizations. Heightened popular expectations and increased competition for resources, coupled with scarcity, may encourage nations to exert wider claims of sovereignty over greater expanses of ocean, waterways, and natural resources—potentially resulting in conflict.

Technology is rapidly expanding marine activities such as energy development, resource extraction and other commercial activity in and under the oceans. Climate change is gradually opening up the waters of the Arctic, not only to new resource development, but also to new shipping routes that may reshape the global transport system. While these developments offer opportunities for growth, they are potential sources of competition and conflict for access and natural resources.

Globalization is also shaping human migration patterns, health, education, culture and the conduct of conflict. Conflicts are increasingly characterized by a hybrid blend of traditional and irregular tactics, de-centralized planning and execution and non-state actors using both simple and sophisticated technologies in innovative ways. Weak or corrupt governments, growing dissatisfaction among the disenfranchised, religious extremism, ethnic nationalism and changing demographics—often spurred on by the uneven and sometimes unwelcome advances of globalization—exacerbate tensions and are contributors to conflict.

Concurrently, a rising number of transnational actors and rogue states, emboldened and enabled with unprecedented access to the global stage, can cause systemic disruptions in an effort to increase their power and influence. Their actions, often designed to

purposely incite conflict between other parties, will complicate attempts to defuse and allay regional conflict.

Proliferation of weapons technology and information has increased the capacity of nation-states and transnational actors to challenge maritime access, evade accountability for attacks and manipulate public perception. Asymmetric use of technology will pose a range of threats to the United States and its partners. Even more worrisome, the appetite for nuclear and other weapons of mass destruction is growing among nations and non-state antagonists. At the same time, attacks on legal, financial and cyber systems can be equally, if not more, disruptive than kinetic weapons.

The vast majority of the world's population lives within a few hundred miles of the oceans. Social instability in increasingly crowded cities, many of which exist in already unstable parts of the world, has the potential to create significant disruptions. The effects of climate change may also amplify human suffering through catastrophic storms, loss of arable lands and coastal flooding, could lead to loss of life, involuntary migration, social instability and regional crises.

Mass communications will highlight the drama of human suffering, and disadvantaged populations will be ever more painfully aware and less tolerant of their conditions. Extremist ideologies will become increasingly attractive to those in despair and bereft of opportunity. Criminal elements will also exploit this social instability.

These conditions combine to create an uncertain future and cause us to think anew about how we view seapower. No one nation has the resources required to provide safety and security throughout the entire maritime domain. Increasingly, governments, nongovernmental organizations, international organizations and the private sector will form partnerships of common interest to counter these emerging threats.

MARITIME STRATEGIC CONCEPT

This strategy reaffirms the use of seapower to influence actions and activities at sea and ashore. The expeditionary character and versatility of maritime forces provide the U.S. the asymmetric advantage of enlarging or contracting its military footprint in areas where access is denied or limited. Permanent or prolonged basing of our military forces overseas often has unintended economic, social or political repercussions. The sea is a vast maneuver space, where the presence of maritime forces can be adjusted as conditions dictate to enable flexible approaches to escalation, de-escalation and deterrence of conflicts.

The speed, flexibility, agility and scalability of maritime forces provide joint or combined force commanders a range of options for responding to crises. Additionally, integrated maritime operations, either within formal alliance structures (such as the North

Atlantic Treaty Organization) or more informal arrangements (such as the Global Maritime Partnership initiative), send powerful messages to would-be aggressors that we will act with others to ensure collective security and prosperity.

United States seapower will be globally postured to secure our homeland and citizens from direct attack and to advance our interests around the world. As our security and prosperity are inextricably linked with those of others, U.S. maritime forces will be deployed to protect and sustain the peaceful global system comprised of interdependent networks of trade, finance, information, law, people and governance.

We will employ the global reach, persistent presence and operational flexibility inherent in U.S. seapower to accomplish six key tasks, or *strategic imperatives*. Where tensions are high or where we wish to demonstrate to our friends and allies our commitment to security and stability, U.S. maritime forces will be characterized by regionally concentrated, forward-deployed task forces with the combat power to limit regional conflict, deter major power war and, should deterrence fail, win our Nation's wars as part of a joint or combined campaign.

In addition, persistent, mission-tailored maritime forces will be globally distributed in order to contribute to homeland defense-in-depth, foster and sustain cooperative relationships with an expanding set of international partners and prevent or mitigate disruptions and crises.

KEY STRATEGIC IMPERATIVES

- **Limit regional conflict with forward-deployed, decisive maritime power**
- **Deter major-power war**
- **Win our Nation's wars**
- **Contribute to homeland defense in depth**
- **Foster and sustain cooperative relationships with international partners**
- **Prevent or contain local disruptions before they impact the global system**

Regionally Concentrated, Credible Combat Power

Credible combat power will be continuously postured in the Western Pacific and the Arabian Gulf/Indian Ocean to protect our vital interests, assure our friends and allies of our continuing commitment to regional security and deter and dissuade potential adversaries and peer competitors. This combat power can be selectively and rapidly repositioned to meet contingencies that may arise elsewhere. These forces will be sized and postured to fulfill the following strategic imperatives:

Limit regional conflict with forward deployed, decisive maritime power. Today regional conflict has ramifications far beyond the area of conflict. Humanitarian crises, violence spreading across borders, pandemics and the interruption of vital resources are all possible when regional crises erupt. While this strategy advocates a wide dispersal of networked maritime forces, we cannot be everywhere, and we cannot act to mitigate all regional conflict.

Where conflict threatens the global system and our national interests, maritime forces will be ready to respond alongside other elements of national and multi-national power, to give political leaders a range of options for deterrence, escalation and de-escalation. Maritime forces that are persistently present and combat-ready provide the Nation's primary forcible entry option in an era of declining access, even as they provide the means for this Nation to respond quickly to other crises. Whether over the horizon or powerfully arrayed in plain sight, maritime forces can deter the ambitions of regional aggressors, assure friends and allies, gain and maintain access and protect our citizens while working to sustain the global order.

Critical to this notion is the maintenance of a powerful fleet—ships, aircraft, Marine forces and shore-based fleet activities—capable of selectively controlling the seas, projecting power ashore and protecting friendly forces and civilian populations from attack.

Deter major power war. No other disruption is as potentially disastrous to global stability as war among major powers. Maintenance and extension of this Nation's comparative seapower advantage is a key component of deterring major power war. While war with another great power strikes many as improbable, the near-certainty of its ruinous effects demands that it be actively deterred using all elements of national power. The expeditionary character of maritime forces—our lethality, global reach, speed, endurance, ability to overcome barriers to access and operational agility—provide the joint commander with a range of deterrent options. We will pursue an approach to deterrence that includes a credible and scalable ability to retaliate against aggressors conventionally, unconventionally and with nuclear forces.

Win our Nation's wars. In times of war, our ability to impose local sea control, overcome challenges to access, force entry and project and sustain power ashore makes our maritime forces an indispensable element of the joint or combined force. This expeditionary advantage must be maintained because it provides joint and combined force commanders with freedom of maneuver. Reinforced by a robust sealift capability that can concentrate and sustain forces, sea control and power projection enable extended campaigns shore.

Globally Distributed, Mission-Tailored Maritime Forces

The Sea Services will establish a persistent global presence using distributed forces that are organized by mission and comprised of integrated Navy, Marine Corps, and Coast Guard capabilities. This global distribution must extend beyond traditional deployment areas and reflect missions ranging from humanitarian operations to an increased emphasis on counter-terrorism and irregular warfare. Our maritime forces will be tailored to meet the unique and evolving requirements particular to each geographic region, often in conjunction with special operations forces and other interagency partners. In particular, this strategy recognizes the rising importance and need for increased peacetime activities in Africa and the Western Hemisphere.

Contribute to homeland defense in depth. Maritime forces will defend the homeland by identifying and neutralizing threats as far from our shores as possible. From fostering critical relationships overseas, to screening ships bound for our ports, or rapidly responding to any threats approaching our coastline, our homeland defense effort will integrate across the maritime services, the joint force, the interagency community, our international partners and the private sector to provide the highest level of security possible. When directed, maritime forces will promptly support civil authorities in the event of an attack or natural disaster on our shores.

Foster and sustain cooperative relationships with more international partners. Expanded cooperative relationships with other nations will contribute to the security and stability of the maritime domain for the benefit of all. Although our forces can surge when necessary to respond to crises, *trust and cooperation cannot be surged*. They must be built over time so that the strategic interests of the participants are continuously considered while mutual understanding and respect are promoted.

A key to fostering such relationships is development of sufficient cultural, historical and linguistic expertise among our Sailors, Marines and Coast Guardsmen to nurture effective interaction with diverse international partners. Building and reinvigorating these relationships through Theater Security Cooperation requires an increased focus on capacity-building, humanitarian assistance, regional frameworks for improving maritime governance and cooperation in enforcing the rule of law in the maritime domain.

Additionally, the Sea Services must become adept at forging international partnerships in coordination with the other U.S. services and government departments. To this end, the Global Maritime Partnerships initiative seeks a cooperative approach to maritime security, promoting the rule of law by countering piracy, terrorism, weapons proliferation, drug trafficking and other illicit activities.

Prevent or contain local disruptions before they impact the global system. Maritime forces will work with other to ensure an adequate level of security and awareness in the maritime domain. In doing so, transnational threats—terrorists and extremists; proliferators of weapons of mass destruction; pirates; traffickers in persons, drugs, and conventional weapons; and other criminals—will be constrained.

By being there, forward deployed and engaged in mutually beneficial relationships with regional and global partners, maritime forces will promote frameworks that enhance security. When natural or manmade disasters strike, our maritime forces can provide humanitarian assistance and relief, joining with interagency and non-governmental partners. By participating routinely and predictably in cooperative activities, maritime forces will be postured to support other joint or combine forces to mitigate and localize disruptions.

IMPLEMENTING THE STRATEGY

To successfully implement this strategy, the Sea Services must collectively expand the core capabilities of U.S. seapower to achieve a blend of peacetime engagement and major combat operations capabilities.

CORE CAPABILITIES OF U.S. MARITIME FORCES

- **Forward Presence**
- **Deterrence**
- **Sea Control**
- **Power Projection**
- **Maritime Security**
- **Humanitarian Assistance and Disaster Response**

Expanded Core Capabilities

Although the Sea Services conduct many missions, the following six capabilities comprise the core of U.S. maritime power and reflect an increase in emphasis on those activities that prevent war and build partnerships.

Forward Presence. Maritime forces will be forward deployed, especially in an era of diverse threats to the homeland. Operating forward enables familiarity with the environment, as well as the personalities and behavior patterns of regional actors. Mindful of the sovereignty of other nations, this influence and understanding contributes to effective responses in the event of crisis. Should peacetime operations transition to war, maritime forces will have already developed the environmental and operational understanding and experience to quickly engage in combat operations. Forward presence also allows us to combat terrorism as far from our shores as possible. Where and when applicable, forward-deployed maritime forces will isolate, capture or destroy terror-

ists, their infrastructure, resources and sanctuaries, preferably in conjunction with coalition partners.

Deterrence. Preventing war is preferable to fighting wars. Deterring aggression must be viewed in global, regional and transnational terms via conventional, unconventional and nuclear means. Effective Theater Security Cooperation activities are a form of extended deterrence, creating security and removing conditions for conflict. Maritime ballistic missile defense will enhance deterrence by providing an umbrella of protection to forward-deployed forces and friends and allies, while contributing to the larger architecture planned for defense of the United States. Our advantage in space—upon which much of our ability to operate in a networked, dispersed fashion depends—must be protected and extended. We will use forward-based and forward-deployed forces, space-based assets, sea-based strategic deterrence and other initiatives to deter those who wish us harm.

Sea Control. The ability to operate freely at sea is one of the most important enablers of joint and interagency operations, and sea control requires capabilities in all aspects of the maritime domain, including space and cyberspace. There are many challenges to our ability to exercise sea control, perhaps none as significant as the growing number of nations operating submarines, both advanced diesel-electric and nuclear propelled. We will continue to hone the tactics, training and technologies needed to neutralize this threat. We will not permit conditions under which our maritime forces would be impeded from freedom of maneuver and freedom of access, nor will we permit an adversary to disrupt the global supply chain by attempting to block vital sea-lines of communication and commerce. We will be able to impose local sea control wherever necessary, ideally in concert with friends and allies, but by ourselves if we must.

Power Projection. Our ability to overcome challenges to access and to project and sustain power ashore is the basis of our combat credibility. Our advantages will be sustained through properly sized forces, innovative technologies, understanding of adversary capabilities, adaptive joint planning processes and the proficiency and ingenuity of our Sailors, Marines and Coast Guardsmen. We will maintain a robust strategic sealift capability to rapidly concentrate and sustain forces, and to enable joint and/or combined campaigns. This capability relies on the maintenance of a strong U.S. commercial maritime transportation industry and its critical intermodal assets.

Maritime Security. The creation and maintenance of security at sea is essential to mitigating threats short of war, including piracy, terrorism, weapons proliferation, drug trafficking, and other illicit activities. Countering these irregular and transnational threats protects our homeland, enhances global stability and secures freedom of navigation for the benefit of all nations. Our maritime forces enforce domestic and international law at sea through established protocols such as the *Maritime Operational*

Threat Response Plan (MOTR). We also join navies and coast guards around the world to police the global commons and suppress common threats.

Humanitarian Assistance and Disaster Response. Building on relationships forged in times of calm, we will continue to mitigate human suffering as the vanguard of interagency and multinational efforts, both in a deliberate, proactive fashion and in response to crises. Human suffering moves us to act, and the expeditionary character of maritime forces uniquely positions them to provide assistance. Our ability to conduct rapid and sustained non-combatant evacuation operations is critical to relieving the plight of our citizens and others when their safety is in jeopardy.

Implementation Priorities

Implementation of this strategy will require that the Sea Services demonstrate flexibility, adaptability and unity of effort in evolving to meet the enduring and emerging challenges and opportunities ahead. Specific initiatives in support of this strategy must be vetted and tested over time through experimentation, wargaming and continued operational experience, with periodic oversight and unified guidance provided by the senior leaders of the Sea Services. While many initiatives must come to fruition to enable this strategy, three areas will receive priority attention.

CRITICAL IMPLEMENTATION PRIORITIES

- **Improve Integration and Interoperability**
- **Enhance Awareness**
- **Prepare Our People**

Improve Integration and Interoperability. The combatant commanders' increased demand for mission-tailored force packages requires a more integrated approach to how maritime forces are employed.

Marines will continue to be employed as air-ground task forces operating from amphibious ships to conduct a variety of missions, such as power projection, but they will also be employed as detachments aboard a wider variety of ships and cutters for maritime security missions. Sailors, Marines and Coast Guardsmen, teamed in various combinations of security forces, mobile training teams, construction battalions, health services, law enforcement and civil affairs units to conduct security cooperation and humanitarian assistance missions, illustrate adaptive force packaging.

Homeland defense is the most obvious example of the requirement for greater integration. It is not sufficient to speak of homeland defense in terms of splitting the responsibilities and authorities between the Navy and the Coast Guard along some undefined geographical boundary. Rather, the Sea Services must—and will—work as one wherever they operate in order to defend the United States. Consistent with the *National Fleet Policy*, Coast Guard forces must be able to operate as part of a joint task

force thousands of miles from our shores, and naval forces must be able to respond to operational tasking close to home when necessary to secure our Nation and support civil authorities. Integration and interoperability are key to success in these activities, particularly where diverse forces of varying capability and mission must work together seamlessly in support of defense, security and humanitarian operations.

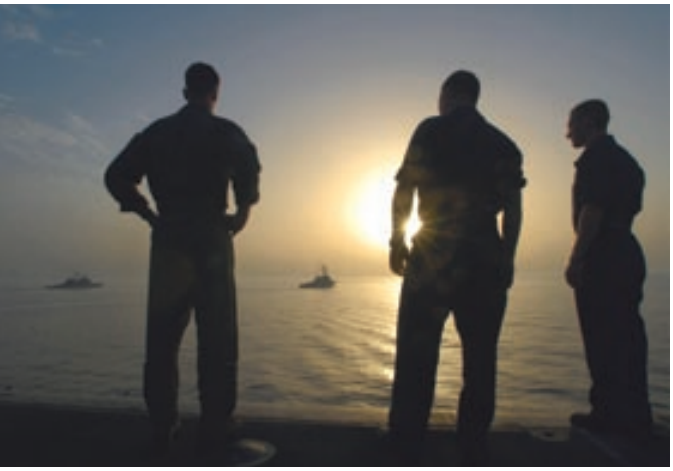
Expanded cooperation with their maritime forces of other nations requires more interoperability with multinational partners possessing varying levels of technology. The *Global Maritime Partnership* initiative will serve as a catalyst for increased international interoperability in support of cooperative maritime security.

Achieving the requisite level of integration and interoperability will demand a high degree of coordination among service headquarters staffs to fulfill their responsibilities of providing, training and equipping forces. Furthermore, Navy and Marine Corps component commanders and Coast Guard functional commanders will play a central role in determining how maritime forces are organized, deployed and employed. This role involves identification of combatant commander requirements and articulation of how their respective service capabilities can be integrated in innovative ways to meet those requirements. Close coordination among, if not outright integration of, maritime components may be required to do this effectively. At all echelons of command, we must enhance our ability to conduct integrated planning, execution and assessment.

Enhance Awareness. To be effective, there must be a significantly increased commitment to advance *maritime domain awareness* (MDA) and expand *intelligence, surveillance and reconnaissance* (ISR) capability and capacity. New partnerships with the world's maritime commercial interests and the maritime forces of participating nations will reduce the dangerous anonymity of sea-borne transport of people and cargoes. Great strides have already been taken in that direction, and the *National Strategy for Maritime Security* has mandated an even higher level of interagency cooperation in pursuit of effective MDA. Maritime forces will contribute to enhance information sharing, underpinning and energizing our capability to neutralize threats to our Nation as far from our shores as possible.

Critical to realizing the benefits of increased awareness is our ability to protect information from compromise through robust information assurance measures. Such measures will increase international partner confidence that information provided will be shared only with those entities for which it is intended.

Adversaries are unlikely to attempt conventional force-on-force conflict and, to the extent that maritime forces could be openly challenged, their plans will almost certainly rely on asymmetric attack and surprise, achieved through stealth, deception or ambiguity. Our ISR capabilities must include innovative ways to penetrate the designs of adversaries and discern their capabilities and



vulnerabilities while supporting the full range of military operations. We must remove the possibility of an adversary gaining the initiative over forward-deployed forces and ensure we provide decision makers with the information they need to deter aggression and consider escalatory measures in advance of such gambits.

Prepare Our People. Given the distributed nature of the forces executing this strategy, we must properly prepare Sailors, Marines and Coast Guardsmen for the challenges and opportunities ahead. We are creating a dispersed force under decentralized authority in a world of rapid information exchange. Maritime forces will normally operate in a less concentrated manner than they do today, and junior leaders will be entrusted with a higher level of responsibility and authority for carrying out important aspects of strategically important missions. Junior personnel will be required to interact with a far greater variety of U.S. and multinational partners and indigenous populations than their predecessors. Professional development and unit training must be refined accordingly. Operations as an integrated team require improved mutual understanding of respective service or agency capabilities and cultures, which can be achieved through expanded interagency teaming of students and instructors throughout training, education and staff assignments.

Similarly, if we are to successfully partner with the international community, we must improve regional and cultural expertise through expanded training, education and exchange initiatives.

Significantly, this strategy requires new ways of thinking—about both empowering individual commanders and understanding the net effects of dispersed operations. Such operations require a broadly shared responsibility among: the on-scene commander responsible for ensuring actions are in accordance with the commander's intent; the higher commander responsible for providing intent and guidance to subordinates; the parent service of dispersed forces responsible for ensuring that units are trained, equipped and culturally prepared for the missions they will undertake; and, finally, the regional commanders responsible for determining appropriate force levels and readiness postures.

CONCLUSION

This strategy is derived from a thorough assessment of the Nation's security requirements. It does not presume conflict but instead acknowledges the historical fact that peace does not preserve itself. Looking across the wide maritime domain, it calls for a broad portfolio of core capabilities to support our vital interests, realized by well-trained, highly motivated and ably-led people.

The strategy focuses on *opportunities*—not threats; on *optimism*—not fear; and on *confidence*—not doubt. It recognizes the challenges imposed by the uncertain conditions in a time of rapid change and makes the case for the necessity of U.S. seapower in the 21st Century.

As a declaratory strategy, this document challenges the Sea Services to evolve an expanded range of integrated capabilities to achieve enduring national strategic objectives. Further experimentation, operational experience and analysis are necessary, as is sea service commitment to building upon the ideas this document puts forward. However, the Sea Services cannot do this alone. The diverse elements of the greater maritime community must be inspired and supported as they invest to secure peace and prosperity across the maritime domain.

The Sea Services commit to continuing the process of collaborative strategy implementation in the years ahead. United States seapower is a force for good, protecting this Nation's vital interests even as it joins with others to promote security and prosperity across the globe.

- **This 2009 edition of the Chief of Naval Operations' *Navy Program Guide* provides information on how we will provide the people, technologies, systems, ships, submarines and aircraft needed to ensure task, mission and strategic success in the years and decades to come.**
- **Chapter 2 explains the process by which we move from vision and requirements to reality and the capabilities needed to carry out our global roles, missions and tasks.**
- **Chapter 3 provides detailed information on critical acquisition and modernization programs that are vitally important to the Navy's and the Nation's future.**
- **Finally, the Appendix lists summary data on our worldwide missions and operations that have kept the peace and responded to crisis and conflict when vital U.S. interests, citizens and friends were in danger.**

CHAPTER 2

FROM STRATEGIC VISION…TO HULLS IN THE WATER

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 options to influence events**
- **Navy ships, aircraft and people are inherently flexible and adaptable**
- **Navy is the strategic reserve force for our nation 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 pirates, to terrorists, to submarines and aircraft carriers. Today, our Navy's global reach and permanent forward presence in domains from undersea to cyberspace uniquely equip it to influence events around the world, create opportunities to promote security and stability, and deny opportunities for our adversaries to commit aggression.

As described in *A Cooperative Strategy for 21st Century Seapower*, American security and prosperity in a globalized world are linked inextricably to the security and prosperity of other nations. The United States will continue to be a leader to which others look to preserve and protect stability and security in our global system of interdependent networks of trade, finance, information, law and governance. Maintaining our freedom of action and access around the globe is as much of a requirement for the peaceful functioning of our global system as it is for the conduct of military operations. This requires continuous presence and engagement throughout the world through the forward deployment of U.S. joint forces.

OUR STRATEGIC CONCERNS

- **The seas remain vital to our national security and prosperity**
- **A highly interconnected world presents challenges and opportunities**
- **Global trends predict increasing disruption and disorder in our security environment**
- **In an increasingly multi-polar world, we strive for cooperation over competition**

Current and Future Challenges

Our country has fought seven years of conflict overseas while deterring aggression, assuring our allies and partners, and providing a hedge against the conflicts we are most likely to face in the future. Global trends indicate increasing disruption and disorder that, if left unaddressed, could evolve into tomorrow's major conflicts.

Empowered by the proliferation of modern high-tech conventional weapons and internet and cell phone communications, terrorists, rogue states and non-state actors now use weapons and tactics once only available to larger nations. The blending of irregular and conventional threats and tactics is a challenge our Navy and other armed services will increasingly face.

The small, irregular conflicts that characterize today's current fight require an accumulation of military, political, and economic successes to win. Our Navy is a flexible and adaptive force that contributes across the full spectrum of operations, with the joint force and with interagency organizations, to prevent conflicts and win our nation's wars. Since the 1800s, the Navy has maintained a forward presence for maritime security, humanitarian interventions, power projection, and sea control, without requiring a footprint ashore.

In addition to today's irregular conflicts, our Navy provides a hedge against the conflicts our nation is likely to face in the future. We face rising and resurgent regional actors who are growing their military capabilities, particularly those designed to deny access to the global maritime, air, and cyber commons. Our Navy also helps deter threats from countries that have, or are developing, nuclear weapons and/or ballistic missiles. The Navy's continued global presence with capabilities that can shape, deter and respond helps prevent conflict and assure our partners and treaty allies.

Our Navy's ability to support and protect globally dispersed units enables our nation to promote security and stability without infringing on the sovereignty of our partners. Foreign sensitivities to U.S. military presence ashore have steadily been increasing, making access to land bases less reliable in the future. Navy ships, aircraft and personnel are not constrained by host-nation support and are able to provide the Nation with a full range of engagement, deterrence and assurance capabilities from the sea.

The basis of Navy's program to meet current and future strategic challenges is anchored in executing the Maritime Strategy, which is aligned with the National Defense Strategy.

Navy Capability and Capacity

The size of our Navy is based on the missions and operations the force must be able to conduct. For the global U.S. Navy, force size must also take into account the multiple regions of the world the force must cover at any given time. In addition to large-scale conventional and irregular surge operations, force sizing must include steady state cooperative security, homeland defense and deterrence operations. Additionally, the desired response time of forces affects the type, number and location of naval presence forces needed to provide leaders the flexibility to seize opportunities for influence or deterrence. A timely and effective response is key to shaping global events.

Demand for naval forces is always greater than 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 for individual platforms to perform more demanding missions such as anti-submarine warfare, ballistic missile defense, or air strikes. Our Navy understands this and continues to shape the force to meet the needs of the future. Examples include restarting the DDG-51 Class of ships to address the

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

growing submarine and ballistic missile threat and truncating the DDG-1000 Class since its combat capabilities are not as relevant to today's conflict and likely future challenges. Other examples include fielding the Littoral Combat Ship to fill capability gaps in mine warfare and anti-submarine warfare, and the Joint High Speed Vessel to improve inter-theater lift capacity. Our Navy is also providing relevant capabilities and needed capacity through innovative modernization of ships and aircraft and the creative employment of our forces.

The Maritime Strategy calls for increased cooperative security and engagement operations. Our Navy has seen an increasing demand from Combatant Commanders for maritime security operations and proactive humanitarian assistance, such as operations *Continuing Promise* in Latin America, Pacific Partnership in South East Asia and the Africa Partnership Station in West Africa. Our current Fleet of multi-mission ships, aircraft, and Sailors provides versatile capability to conduct multiple missions from disaster relief, to peacetime engagement, to ballistic missile defense, and support to forces in Iraq and Afghanistan. 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 come together in highly integrated operations requiring concentrated combat power. When operating in combat, aircraft carriers and amphibious ships sortie forces to find and fight adversaries and secure maritime or shore regions. Sea control 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 using communication networks, common 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 gather to provide a formidable air defense shield for coalition forces at sea or on land. Similarly, attack submarines are able to conduct surveillance off foreign shores, 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 rejoin the strike group to clear mines or kill enemy submarines and surface combatants.

Our Navy is also developing capabilities primarily intended for security and assistance missions. Riverine squadrons will focus on training partner navies to improve maritime security of coastal and inland waterways. Maritime security and engagement utilize Navy ships as a home base from which a variety of U.S. interagency, international partners and non-governmental organization activities can operate for extended periods in areas that lack port infrastructure. The Joint High Speed Vessel will provide this flexible capability, along with other multi-mission platforms such as surface combatants and amphibious ships.

Core Capabilities

The strength of the U.S. Navy lies in its ability to rapidly and flexibly transition among multiple core capabilities or deliver 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, including war.

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 friends to improve their capabilities, and, when needed, respond to crises and disasters.

A major advantage of sea-based forces is their ability to reach areas other forces cannot reach, and do so without infringing on sovereignty or a 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 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 ensure them of expect prompt retaliation. Our Navy provides the most responsive and flexible capabilities to assure allies of U.S. support and deter those who would do harm. The ability of deployed ships, submarines and aircraft to remain forward signals to aggressors that a rapid, scalable 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 alienating allies through infringement on their sovereignty.

Against nuclear-armed nations, our Navy provides each element of the new strategic triad: offensive strike, defense, and respon-

sive systems to develop and maintain nuclear capability. 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 aggressors the unacceptable consequences of hostility, and the inevitability that their efforts will be unsuccessful.

Sea Control is an important enabler in joint and interagency operations and it 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 denying it to our adversaries.

Today, access is challenged by the proliferation of submarines and anti-ship cruise missiles, which had been previously employed by major powers but are now gaining use among smaller states and non-state actors. These threats are combined with "low-tech" weapons, such as improvised mines and vessel-borne explosive devices, to threaten security in the maritime commons. In the 21st century, sea control entails more than just the surface of the ocean; it includes activities beneath the surface, in the air above the sea and along the electromagnetic spectrum within the operating area.

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

Submarines and aircraft conduct the bulk of anti-submarine warfare and anti-surface warfare in our Navy. 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 decision superiority 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 can be a significant force multiplier in our efforts to establish Maritime Domain Awareness.

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. Today, our Navy provides and trains the majority of the Department of Defense's cyberspace operators.

Power Projection by the Navy-Marine Corps team, enabled by sea control and forward presence, uniquely overcomes political 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, weapons and systems can conduct attacks ranging from small-scale raids to extensive campaigns, while forward-deployed naval forces provide the proximity and presence to carry out these operations on little notice and over extended periods.

The wide range of power naval forces project gives our nation's leaders 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 increases in 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 a need for forces ashore. Surface ships and submarines contribute to power projection with cruise missiles and naval gunfire.

Protected by sea control ships and aircraft, and supported by strike platforms, our Navy's Fleet of amphibious and preposition ships can rapidly transport and sustain joint forces ashore to take and control littoral land areas. In addition to supporting Marines, the ships at sea can 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 and counter 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 partner with 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 medical, dental, and veterinary care, emergency food and water, water production, basic sanitation, transportation, shelter, and the restoration of public infrastructure. These capabilities are also used proactively to provide humanitarian as-

sistance, build security capacity and improve relationships with new partners. Navy hospital ships *and large-deck amphibious ships* have deployed predictably 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 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 "decision superiority", that is, combining ISR networks and command and control to provide commanders prompt, real-time and responsive information, and enable coordinated action. To achieve effective decision superiority, 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.

OUR SUSTAINMENT CONCERNS

- **A balanced force across procurement, readiness and manpower accounts is imperative**
- **The shipbuilding and aviation industrial bases are national assets that must be preserved**
- **Rising manpower costs pressurize the operation and recapitalization options of our Fleet**

Our Navy's ships, aircraft and people are underway, deployed globally every day—including more than 13,000 Sailors on the ground in Central Command and about 8,000 Sailors on Individual Augmentee assignments supporting the current fight worldwide. Our Sailors are providing critical skills in intelligence, reconstruction, computer network attack and exploitation, medical, 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 seven years of conflict has taken a toll on the life expectancy of our ships and aircraft.

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 1980s reach the end 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 shrunk significantly over the past 20 years.

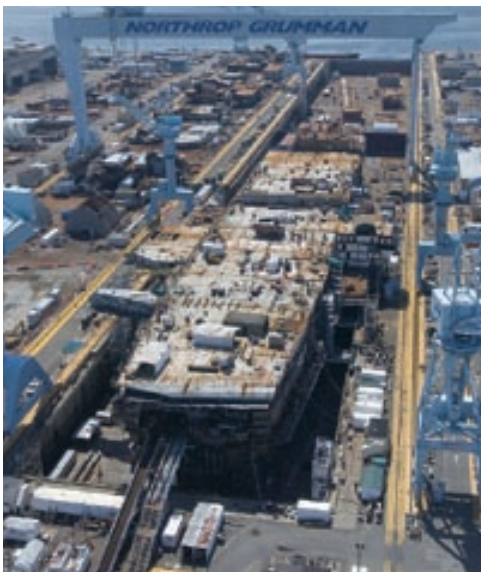
The value of robust domestic shipbuilding and aircraft industries cannot be overstated. In addition to making what our Navy needs, the direct and indirect benefits to employment and the larger national economy are significant.

Rising manpower costs continue to challenge our ability to maintain a balanced force, but we remain committed to the well-being of our greatest asset: our all-volunteer force of Sailors and the family members who support them. Our commitment includes developing and fielding first-rate physical and mental health care for our Sailors, especially those who have been wounded or injured in the current fight, and to caring for the families of all who serve.

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 ships, aircraft and Sailors uniquely apply capability, as they have done for centuries, to protect Americans and the global system upon which the U.S. and its partners, friends and allies depend.

Chapter 3 describes 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.



CHAPTER 3

REQUIREMENTS TO CAPABILITIES

NAVAL AVIATION

Naval aviation is a vital contributor to each core capability. Carrier-based aircraft, such as the F/A-18 Hornet, EA-6B Prowler and E-2C Hawkeye, provide forward presence, sea control and power projection, with unmatched striking power against targets at sea and ashore. The E-6 Mercury aircraft is a critical component of the Nation's strategic deterrent capability. The H-60 series of helicopters and P-3 Orion aircraft provide sea control by carrying out Anti-Submarine Warfare (ASW) and Anti-Surface Warfare (ASUW) tasks, while also conducting patrols to support maritime security operations. Many Navy aircraft also have cargo and search and rescue capabilities that can support humanitarian-assistance and disaster-response missions. These manned aircraft are complemented by advanced unmanned aerial vehicles and are key contributors to the capabilities of the U.S. Navy and Marine Corps.

AIRCRAFT

AH-1Z and UH-1Y Upgrades

Description

The AH-1 and UH-1 Upgrade 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 that 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 replaces the current two-bladed rotor system on the UH-1N and AH-1W aircraft with a new four-bladed, all-composite rotor system, coupled with a sophisticated fully integrated, state-of-the-art glass cockpit. In addition to the new main rotor system and cockpit, the H-1 Upgrade will incorporate a new performance-matched transmission, a four-bladed tail rotor drive system and upgraded landing gear for both aircraft. The integrated glass cockpit with modern avionics systems will provide a more lethal platform, as well as enhanced joint interoperability through the digital architecture. 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 (LRIP) 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) which 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 will deploy in support of OIF/OEF in 2009 with the 13th Marine Expeditionary Unit (MEU). Phase IIA concluded in the summer 2008. UH-1Y Full-Rate Production (FRP) and AH-1Z Lot V LRIP were approved September 2008. AH-1Z Phase IIB OPEVAL was underway in early 2009 to address technical deficiencies identified in Phase IIA. The AH-1Z is on schedule to meet IOC in the third quarter of FY 2011. Full Operational Capability (FOC) for the UH-1Y is FY 2012, and FOC for the AH-1Z is FY 2018.

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 provides offensive air support to the MAGTF. 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 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 upon 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 H2.0 enables the AV-8B to employ both 1,000- and 500-pound variants of the Joint Direct Attack Munition 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, FLIR 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. Some Litening pods have also been equipped with a video downlink, which enables real-time video to be sent to ground-based commanders and forward-air controllers. This facilitates time-sensitive targeting and reduces the risk of fratricide and collateral damage.

Developers

Boeing — St. Louis, Missouri USA

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 will provide persistent maritime ISR. BAMS UAS is a long-endurance-class UAS that will operate from land-based sites around the world, most likely co-located with the current P-3

aircraft or its planned successor, the P-8. Because BAMS UAS and the P-3/P-8 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 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 (nmi). 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 System Development and Demonstration (SDD) initiated in August 2008. Milestone C is scheduled for 2013 and IOC is expected in FY 2015.

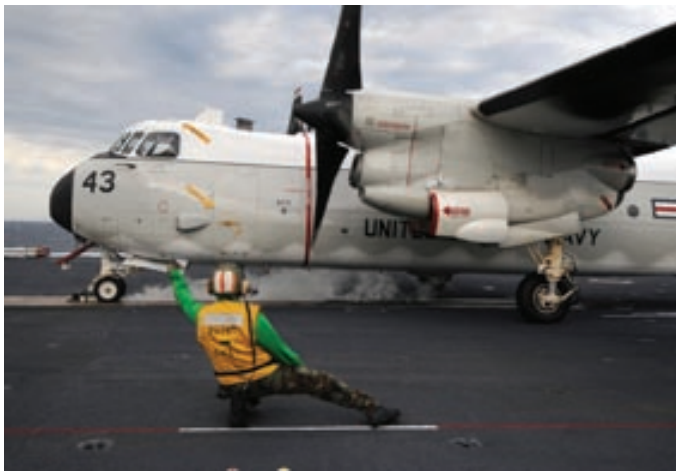
Developers

Northrop Grumman Palmdale, California USA

C-2A 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 over a distance of 1,000 nm. 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 cargo 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 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 are: Structural Enhancements, aircraft rewire, Avionics Systems improvements and a new propeller system. SLEP will make the C-2A a viable and economi-

cally maintainable platform until it is replaced. Additionally, as mandated by Congress and CNO, two passenger carrying safety requirements are being integrated into the C-2A: 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 the DoD Directive 4500.56. Senior Leaders require air transport that has secure communications and security. In early 2009, four C-37s (Gulfstream V), two C-20Ds (Gulfstream III) aircraft and one C-20A (Gulfstream III) provide executive transport services. The C-37 Gulfstream V aircraft has replaced the VP-3A, substantially lowering operating costs. The C-37 meets all known International imposed Air Traffic Management communications, navigation, and surveillance requirements through FY 2014.

Status
The first C-37 aircraft was delivered in 2001. A second aircraft was procured in 2004, and two more were placed on contract in 2005. The first aircraft was delivered to the Navy in August 2002 and is now based at Hickam AFB, Hawaii. The second C-37 arrived in February 2005, the third in May 2006, the fourth in September 2006, and these are all based at NAF Washington, DC. Additionally, the Navy acquired a surplus C-20A from the Air Force in order to meet Commander Naval Forces Europe (CNE) 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 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 con-

figuration), at ranges greater than 3,000 nmi at Mach 0.8 cruise speed. The ability to simultaneously carry cargo pallets and passengers maximizes 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 are in inventory in early 2009, 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, Florida; 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 Navy Unique Fleet Essential Airlift (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 Commanders 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. An earlier upgrade effort for the legacy C-130T's known as the Avionics Modernization Program (AMP) was cancelled because of excessive cost and upgrade timeline for a legacy airframe with low reliability. The current fleet is Communications Navigation Surveillance/Air Traffic Management (CNS/ATM) compliant through FY 2014. In early 2009, 19 aircraft were in the inventory, stationed in NAS JRB Willow Grove, Pennsylvania; NAS Brunswick, Maine; 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 larger 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 features. The CH-53K will be capable of externally lifting 27,000 pounds to a range of 110 nautical miles and dropping this cargo in a landing zone at a pressure altitude of 3,000 feet—capability improvements that more than double the current CH-53E abilities. Additionally, the CH-53K will be capable of carrying a normal load of 30 combat loaded troops. The CH-53K enables rapid, decisive operations and the early termination of conflict by projecting and sustaining forces to distant anti-access, area-denial environments. The current Marine Corps heavy-lift aircraft, the CH-53E (designed in the 1960s and introduced in 1980 as an engineering change proposal to the CH-53D), has developed significant fatigue life, interoperability, maintenance supportability and performance degradation concerns. In order to support MAGTFs and Joint Task Forces (JTFs) in the 21st Century Joint environment, an improved CH-53 is required to maintain the Marine Corps' heavy-lift capability through the year 2025 and beyond.

Status

The program is at post-Milestone (MS) B. The program conducted Preliminary Design Review during the fourth quarter FY 2008. Initial Operational Capability is planned for FY 2015. The USMC program of record requirement is 156 aircraft. The aircraft requirement will grow to support the Marine Corps force structure growing to 202,000 personnel. U.S. Navy and Foreign Military Sales participation is still to be determined.

Developers

Sikorsky Aircraft Corporation Stratford, Connecticut USA

E-2C/D
Hawkeye Airborne Early Warning Aircraft

Description

The E-2 Hawkeye is the Navy's airborne surveillance and command-and-control 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 under way an extensive upgrade and development program to improve the capability of the aircraft, as it is a critical element in an overall joint theater air and missile defense program. Two upgrades will ensure that Hawkeyes keep pace with changing tactical environments: the E-2C Hawkeye 2000 (HE-2K) and the E-2D Advanced Hawkeye (AHE) aircraft that 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 (MCU), Cooperative Engagement Capability (CEC), Improved Electronic Support Measures (ESM), Joint Tactical Information Distribution System (JTIDS), Global Positioning System (GPS) and data and voice satellite communications. The MCU greatly improves weapons systems processing power enabling incorporation of CEC. In turn, CEC-equipped Hawkeyes 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.

The E-2D Advanced Hawkeye is equipped 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 umbrella to protect high-priority areas and U.S. and coalition forces. The E-2's systems are fully interoperable with the Airborne Warning and Control System (AWACS) and ground-based systems for a seamless joint architecture. 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 will be delivered to the Navy in 2009. Two E-2D Advanced Hawkeye System Development and Demonstration (SDD) aircraft were in flight test in early 2009. The first flight took place in August 2007, and an operational assessment was completed October 2008.

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 (USSTRATCOM) with the command, control and communications capability for execution and direction of U.S. strategic forces. Designed to support a robust and flexible nuclear deterrent posture well into the 21st Century, the E-6B performs Very Low Frequency (VLF) emergency communications, the U. S. Strategic Command Airborne Command

Post mission and Airborne Launch Control of ground-based ICBMs. It is the Navy's only survivable means of nuclear command and control.

Status

In order to sustain and improve E-6B capability, the Navy developed the Block I modification program. The contract for Block I was awarded to Rockwell Collins in March 2004, and it is designed to repair several aircraft deficiencies identified by USSTRATCOM. Initial Operating Capability 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 USSTRATCOM's migration of Nuclear Command and Control (C2) to a distributed, network/IP-based global C2 system as an airborne node. IP/BE IOC is set for 2012; Block II IOC, for 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 in support of ground forces during numerous joint and allied operations since 1995. These capabilities continue to be demonstrated by EA-6B operations in Afghanistan and Iraq to protect coalition forces and disrupt critical enemy communication links. The demand for AEA in Operations Enduring Freedom and Iraqi Freedom has driven EA-6B utilization rates to record levels.

Status

The Improved Capability (ICAP) III upgrades 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.

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 DOD's 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 will 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, and is currently undergoing test and development at NAS Patuxent River, Maryland. 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.

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. The EP-3E roadmap focuses on three elements: P-3 to EP-3E conversions; EP-3E modernization; and inventory sustainment until replacement capability (EP-X) can be fielded.

P-3 to EP-3E conversions: The P-3 to EP-3 conversion program completed in FY 2007 and 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 Internet Protocol (IP) based Sensitive Compartmented Information (SCI) network capable and includes improved Electronic Intelligence (ELINT) and Communications

Intelligence (COMINT) capabilities, multi-platform geo-location capabilities, advanced Special Signals Collection capability and 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 GWOT. 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 the replacement capability (EPX) 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 Operational Requirements Document (ORD) was approved on 10 June 2005. The JCC Development/Production Contract was awarded on 29 June 2005. The EP-3E will be modernized to a common configuration and sustained until Navy EPX reaches IOC.

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
	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

EPX
EP-3E Replacement Aircraft

Description

The Navy's airborne SIGINT capability resident in the EP-3E will be recapitalized in the EPX program. The EPX will be capable of multiple operational configurations, meeting a combination of onboard and off-board collection, processing and reporting scenarios. The new platform will use joint standards and architectures to achieve interoperability across the Global Information Grid. This transformational process will allow for optimum use of external processing while maintaining exploitation, fusion and dissemination capabilities within the battlespace. The EPX and

supporting concept of operations will allow for better use of critical personnel assets, deployability with a smaller footprint, and will be efficiently upgraded through incremental integration of emerging technologies. In its role as an Intelligence, Surveillance, Reconnaissance, and Targeting (ISRT) system, EPX will provide real-time Intelligence Preparation of the Environment (IPE), Indications and Warning (I&W), Anti-Surface Warfare (ASuW) targeting support, Direct Threat Warning (DTW) and Information Operations support. The strength of the EPX concept is in the persistence and flexibility that it will provide to joint and maritime commanders in maritime and littoral environments. Self-deployable anywhere in the world, EPX will provide timely and accurate SIGINT, IMINT and RADINT collection; threat detection; target acquisition and tracking; and Positive Identification (PID) and accurate geolocation of highly mobile and fixed targets in all environments. The range and variety of the EPX sensor suite will ensure maximum intelligence gathering and dominant situational awareness for commanders at all echelons throughout the objective force battle space.

Status
The EP-3E will be modernized and upgraded to a common configuration for sustainment until EPX is fielded. The Analysis of Alternatives will be updated in FY 2009.

Developers
To be determined.

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 A-6 and A-7 and the Navy and 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 compared to 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 December 2008, the Navy and Marine Corps had 103 F/A-18A, 26 F/A-18B, 363 F/A-18C and 135 F/A-18D aircraft in service and test roles, and two NF/A-18C and two NF/A-18D versions in permanent test roles. Hornets equip 31 active Navy and Marine Corps and five 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 and more than adequate carrier-based landing weight, range, endurance and ordnance-carrying capabilities compared to 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, 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 enhanced avionics when they become available, 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, Joint Helmet-Mounted Cueing System (JHMCS); JDAM and JSOW; AIM-9X missile; SHARP Shared Reconnaissance Pod; and 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.

Status

The first Super Hornet squadron completed transition to the F/A-18F in 2003 and then permanently forward-deployed to Japan. As of December 2008, there were 161 F/A-18E models and 202 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 5th-generation strike aircraft, combining stealth and enhanced sensors to provide lethal, survivable and supportable tactical jet aviation strike fighters that complement the F/A-18E/F. 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 specific 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 interna-

tional participation in System Development and Demonstration (SDD) have been negotiated with Australia, Canada, Denmark, Italy, the Netherlands, Norway, Turkey and the United Kingdom. Security Cooperation Partnership memorandums of understanding have been established with Israel and Singapore.

Status

The JSF is in its eighth year of a planned 12-year SDD program. The first STOVL variant SDD flight was on 11 June 2008. The first CV flight is scheduled for first quarter FY 2010. The Marine Corps has scheduled IOC in 2012 and the Navy in 2015. 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 (PW F135 engine)	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; command-and-control augmentation; battlefield illumination; tactical aero-medical evacuation; and combat search and rescue support. With its increase in speed, altitude, range, performance, state-of-the-art flight station (which includes two heads-up displays, night vision lighting, an augmented crew station, fully integrated digital avionics), enhanced air-to-air refueling capability, and aircraft survivability enhancements, the KC-130J provides the MAGTF commander with multi-mission capabilities well into the 21st Century.

Status

The USMC requirement is for 79 KC-130Js. The legacy fleet of 51 KC-130F and R model aircraft has been retired, with 28 KC-130T model aircraft yet to be replaced. The 2009 current KC-130J inventory is 34 KC-130Js.

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 Naval Helicopter Concept of Operations for the 21st Century. 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 with its suite of sensors and weapons that include dipping sonar, electronic support measures, advanced Forward Looking InfraRed (FLIR) and precision air-to-surface missiles. The MH-60S will provide mine warfare support and will partner with the MH-60R for surface warfare missions carrying the same FLIR 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 and entered Full Rate Production. The MH-60S entered full-rate production in August 2002 and in early 2009 is undergoing scheduled block upgrades for Armed Helicopter and airborne mine countermeasure missions.

Developers

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

MQ-8B VTUAV
Fire Scout Vertical Takeoff and Landing Tactical Unmanned Aerial Vehicle

Description

VTUAV Fire Scout supports a vital requirement to sustain and improve maritime intelligence, surveillance and reconnaissance (ISR) capabilities for naval forces in traditional, joint and coalition operations. It is part of the manned/unmanned aviation module supporting the Littoral Combat Ship (LCS). Fire Scout provides day/night real-time intelligence, surveillance and reconnaissance; target acquisition; communications relay; and battlespace management supporting the core LCS missions of surface, mine and anti-submarine operations.

Status

The VTUAV Fire Scout program will complete development and operational testing on board the USS *McInerney* (FFG-8), prior to

integration with and operations from LCS. Fire Scout will IOC on the *McInerney* in September 2009 and on the LCS in FY 2012.

Developers

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

MV-22
Osprey Tilt-Rotor Aircraft

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 Vietnam-era 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. The Air Force and U.S. Special Operations Command (USSOCOM) are procuring a Special Operation Forces (SOF) variant of the CV-22.

Status

With MS III complete and the program approved for Full Rate Production, the V-22 entered a congressionally approved Joint five-year Multi-Year Procurement (MYP) in FY 2008. IOC was declared for the MV-22 in June 2007. The fourth squadron was in transition in early 2009. Three MV-22 squadrons have successfully completed combat tours in Iraq performing well in all mission sets. The first operational MV-22 squadron is preparing to make its first shipboard expeditionary deployment in FY 2009. CV-22 IOC is planned for FY 2009.

Developers

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

Naval Aviation Training Aircraft

Description

Commander, Naval Air Training Command's (CNATRA) training aircraft inventory includes the T-34C TurboMentor, T-6 Texan II, T-2 Buckeye, T-45 Goshawk, TH-57, T-44 Pegasus, TC-12 Huron and 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-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. Avionics upgrades are being inserted into the production line (T-6B), and the 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-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 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-wing training platform used at NAS Whiting Field. Upgrades to the TH-57 currently underway include energy attenuating seats, exceedence warning systems and a digital cockpit with Night Vision Goggle (NVG) capability, guaranteeing aircraft availability and relevance through 2030.

The T-44A Pegasus and the TC-12 Huron are 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, twinjet aircraft that has been in naval service since the early 1990s. The primary mission of the Sabreliner is to conduct intermediate and advanced training for Strike/Strike-Fighter Naval Flight Officers (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 using 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 platforms. The new program is planned for IOC at NAS Pensacola in FY 2011.

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

Developers

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

N-UCAS
Navy Unmanned Combat Aircraft System

Description
The Navy Unmanned Combat Air System (N-UCAS) evolved from the joint Navy/Air Force development program called J-UCAS. The 2006 Quadrennial Defense Review (QDR) and other program decisions restructured the J-UCAS program. Program management and associated technologies were transferred to the Navy in August 2006. The initial efforts in the N-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 ship-board 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 November 2009. 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 Demo and conclude by 2013.

Status
The Navy is planning and conducting a Capabilities-Based Assessment that will evaluate and define potential future Strike/C4ISR capability circa 2025. This study will inform investment decisions for any future operational system design and capability requirements to conduct multiple missions.

Developers

Northrop Grumman Integrated Systems	El Segundo, California USA

P-3C
Orion Modification, Improvement and Sustainment

Description

The P-3C Orion provides anti-submarine warfare (ASW), anti-surface warfare (AUSW) and Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR) capabilities to naval and joint commanders, including support for carrier strike groups and expeditionary strike groups. Squadrons are based in Jacksonville, Florida; Whidbey Island, Washington and Kanehoe Bay, Hawaii. As a result of BRAC 2005, squadrons based in Brunswick, Maine, will be relocated to Jacksonville.

The Navy's P-3 roadmap focuses on three areas: Inventory sustainment, modernization and re-capitalization by the P-8A Multi-Mission Maritime Aircraft (MMA) 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. A program of Special Structural Inspections (SSIs), which will allow extension of P-3 service life, started in FY 2003. More comprehensive inspections and preemptive repairs were performed under the Enhanced Special Structural Inspection (ESSI) program that started in FY 2004 and is now complete. The Special Structural Inspection-Kit (SSI-K) program that started in FY 2005 is similar to ESSI but has expanded scope and includes use of new design/materials to increase fail-safe margins. These programs will allow sustainment of the P-3 fleet until the MMA starts replacing the P-3C in 2013.

Modernization: The Anti-Surface Warfare Improvement Program (AIP) provides enhanced sensor, C4ISR and weapon capabilities. The program includes the incorporation of improved C4I systems, advanced imaging radar, infrared/electro-optic sensor, improved Electronic Support Measures (ESM) system, improved weapons capability and enhanced survivability measures. AIP aircraft are equipped with the USQ-78B acoustic processor for improved littoral ASW effectiveness.

The P-3C Update III Block Modification Upgrade Program (BMUP) converts P-3C Update II and II.5 aircraft to the Update III system architecture. BMUP aircraft are also equipped with the USQ-78B.

Status

Eighty-three SSIs are complete and 39 ESSIs are complete. Seventy-two of 72 AIP aircraft have been delivered (one has been struck). Twenty-five BMUP aircraft have been delivered.

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 Poseiden Multi-Mission Maritime aircraft (MMA) will replace the P-3C Orion aircraft. 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 on-board mission suite with unmanned aerial vehicles and satellite-based systems and sensors to assure maritime domain awareness. It will provide unparalleled persistent undersea warfare capability as well as significant anti-surface warfare and intelligence, surveillance, and reconnaissance (ISR) capability. P-8A will leverage global logistics support infrastructure and established advanced training applications to provide both higher availability and improved warfighting readiness.

Status

MMA achieved Milestone B (entry into System Development and Demonstration) in 2004, and the Navy selected the McDonnell-Douglas Corporation, a wholly owned subsidiary of the Boeing Company, as the single system integrator. P-8A completed Preliminary Design Review in November 2005, Critical Design Review in June 2007 and Design Readiness Review in August 2007. The program is on track for Milestone C in mid-FY 2010 and Initial Operational Capability 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 providing tactical commanders with day and night, battlefield and maritime reconnaissance in support of Marine Expeditionary 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 Marine Unmanned Aerial Vehicle Squadron (VMU), totaling three. Each VMU will operate three systems and be task-organized to operate independently, under the distributive ops concept. A fourth Marine Vehicle Unmanned Aerial Vehicle Squadron (VMU), VMU-4, will stand up in FY 2011 and will be part of the reserve component.

Status

The Army provides configuration management, training, RDTE and production contract. VMU 3 stood up during the fourth quarter of FY 2008. The Tactical Common Data Link (TCDL) and Laser Designator capability are under Army RDTE and are planned for FY 2009-11 upgrade.

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 that 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 the 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 A/B/C/D variants and Super Hornet E/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 High-speed Anti-Radiation Missile (HARM). HARM is the 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 project 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. 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 Memorandum of Agreement (MoA) for cooperative development of AGM-88E.

Status

The AGM-88E is an ACAT-IC program with a planned IOC in November 2010. AARGM was successfully demonstrated as an ATD and "Quick Bolt" Advanced Concept Technology Demonstration (ACTD) sponsored by the U.S. European Command (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 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. AMRAAM maintains air superiority through Pre-Planned Product Improvement (P3I) programs. This modernization plan includes clipped wings for the internal carriage, a propulsion enhancement program, increased warhead lethality and enhanced electronic counter-countermeasures (ECCM) capabilities through hardware and software upgrades. The missile has improved capabilities against low- and high-altitude targets in an advanced threat environment. AMRAAM is expected to be the sole Medium/Beyond Visual Range (M/BVR) missile after the AIM-7 Sparrow enters inactive status in 2015. The Department of the Navy is investigating follow-on options for BVR missile capabilities.

Status

The AIM-120C7 missile variant is a product of P3I and reached IOC in FY 2008. AIM-120C7 completed production in FY 2008 as AIM-120D production began. 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 Navy aircraft to attack targets at increased standoff distances, using GPS and INS for guidance. All JSOW variants share a common body but can be configured for use against area targets or bunker penetration. The JSOW Unitary (JSOW-C) variant adds an Imaging InfraRed Seeker and Autonomous Target Acquisition (ATA) to attack point targets with precision. 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 lowercost ordnance.

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

Developers
Raytheon Tucson, Arizona USA

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

Description
The AIM-9X Sidewinder is a joint Navy/Air Force program that provides a major upgrade to the existing AIM-9M missile by integrating a staring focal plane array seeker, an extremely agile airframe and state-of-the-art signal processors. This enhanced capability results in significantly improved target acquisition, missile kinematics and improved infrared counter-countermeasures performance. The AIM-9X Pre-Planned Product Improvement (P3I) Program will result in short-range missile air superiority well into the 21st Century. Coupled with the Joint Helmet-Mounted Cueing System, the Sidewinder's high off-boresight capability revolutionizes employment of these air-to-air missiles. The AIM-9X is planned for the F-35 Joint Strike Fighter, and is integrated on the FA-18A+/C/D Hornet and FA-18E/F Super Hornet. The AIM-9X is a short-range complement to the beyond-visual range capability requirements of the future.

Status
Achieving IOC in February 2004, the missile is being produced as part of Lot 8 and is ahead of schedule. The Block II missile will have an enhanced target set, improved kinematics, datalink, Lock-On-After-Launch and through-the-weather capability. AIM-9X BLOCK II production will begin in FY 2009.

Developers
Raytheon Tucson, Arizona USA

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

Description
JDAM is a multi-service program—lead by the Air Force—with GPS/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 Navy and Air Force joint effort, with the latter acting as the lead. LGBs use MK-80/BLU General Purpose and the BLU-109 penetrator 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 GPS/INS guidance capability.

Addressing an urgent operational need, the Navy and 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 moving targets until 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 IOC'd in September 2007 on the AV-8B and F/A-18 with planned future integration on the F-35. Approximately 7,500 Dual Mode Kits and 5,600 DAMTC Kits will be procured.

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

AVIATION SENSORS

AAR-47 MAWS
Missile-Approach Warning System

Description

The AAR-47 is a passive missile-approach warning system consisting of four sensor assemblies, a central processing unit and a control indicator. Employed on helicopters and transport aircraft, the AAR-47 MAWS warns of threat-missile approach by detecting radiation associated with the rocket motor and automatically initiates flare expenditure. The MAWS provides attacking missile declaration and sector direction finding and is interfaced directly to the ALE-39/47 countermeasures dispenser. The fully fielded AAR-47(V)2 upgrade improved missile warning performance, added laser warning functionality and reduced operations and support costs of legacy AAR-47 systems. AAR-47A(V)2 adds dynamic blanking to mitigate impacts of ship flares on missile warning performance. Without the AAR-47, helicopters and fixed-wing aircraft have no infrared missile detection capability.

Status

AAR-47A(V)2 is in full rate production and has nearly completed installs Navy/Marine Corps wide. Expected IOC is in FY 2010. Work has begun on an advanced IR Missile Warning, a Hostile Fire Warning Sensor and a laser-based countermeasure, which were demonstrated by the Tactical Aircraft Directed Infra-Red Counter-Measure (TADIRCM) Advanced Technology Demonstration (ATD) and Early Operational Assessment (EOA). This revolutionary technology will likely replace the AAR-47.

Developers

Alliant Defense Electronic Systems	Clearwater, Florida USA
Solid State Scientific Corporations	Nashua, New Hampshire USA

ALR-67(V)3 RWR
Advanced Special Radar Warning Receiver

Description

The ALR-67(V)3 is a radar-warning receiver 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 AESA program achieved Initial Operational Capability in 2007. 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. 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

ASD-12V SHARP
Shared Reconnaissance Pod

Description

The SHARP is carried on the F/A-18E/F Super Hornet to support strike warfare, amphibious warfare and anti-surface warfare decision-making. SHARP provides near-real time, dual-band electro-optical/infrared (EO/IR) medium-altitude standoff imagery. SHARP incorporates National Imagery Transmission Format (NITF) formatted day/night digital imagery using the USQ-123 Common Data Link-Navy (CDL-N) for real-time connectivity.

Status

SHARP EO/IR reached IOC in September 2006 and is being sustained.

Developers

Raytheon	Indianapolis, Indiana USA
Recon Optical Inc.	Barrington, Illinois USA
L-3 Communications	Salt Lake City, Utah 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 enhanced capability to detect, track and attack air and ground targets. Laser-guided and GPS standoff weapons systems and higher-altitude attack profiles require improved performance over the current AAS-38/46 NITE Hawk Targeting FLIR. The ATFLIR provides a quantum leap in operational effectiveness to support 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 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. The Navy procured 82 ATFLIRs in FY 2007, with additional procurement to continue through FY 2009.

Developers

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

IDECM Blk 2: ALQ-214 On Board Jammer and ALE-50 towed decoy

IDECM Blk 3: ALQ-214 On Board Jammer and ALE-55 Fiber Optic Towed Decoy

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

Status

Blk 1 IOC in FY 2002; Blk 2 IOC in FY 2005; and Blk 3 IOC scheduled for FY 2009. 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

Description

The Joint Mission-Planning System (JMPS)—previously designated NavMPS—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 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 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 and 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. 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. 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. 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 CVN 78-class aircraft carriers, JSF and N-UCAS. Sea-based JPALS will also be installed on all air-capable surface ships, most CVN air wing aircraft (FA-18E/F, EA-18G, E-2C/D, C-2A and MH-60R/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-aviation 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 CVN 78, the lead ship of the CVN 21 new-design aircraft carrier program.

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 data collected during flight to conduct post-flight analysis of aircrew and aircraft systems performance. MFOQA requires no additional equipment and no additional tasking. After each flight, aircrew can remove the data collection card, take it to the squadron ready room and load in the data to squadron computers. Using MFOQA software, the aircrew can replay the flight in animation, noting geographic position, instrument readings and aircraft performance parameters. Maintenance personnel can perform diagnostic analysis of the aircraft systems, aircrews can self-evaluate and squadron leadership can manage flight procedures and safety and training issues. The ultimate payoff will be increased readiness. Data from each flight are 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 with significant benefits to maintenance, operations, safety and training.

Status
MFOQA completed MS B in FY 2007 and is scheduled for MS C in FY 2010. The first MFOQA use by a deployed squadron is scheduled for FY 2010.

Developers
U.S. Naval Air Systems Command — Patuxent River, Maryland USA

TBMCS
Theater Battle Management Core System

Description
Theater Battle Management Core System (TBMCS) is used to schedule, plan and fly aircraft missions in the joint air space. TBMCS is an Air Force program used by all services for Air Command and Control (C2). TBMCS provides automated C2 and decision-support tools to improve the planning, preparation and execution of joint air combat capabilities. A TBMCS Host (FORCE Level) provides the capability to produce the Air Tasking Order (ATO).

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 selected shore sites, including Maritime Operations Centers. The current program is focused on upgrading to the Joint standard TBMCS V1.1.3 (SUN server based), which will replace legacy TBMCS V1.1 (a Navy-unique Hewlett-Packard server based system) on all but two 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 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 ashore and afloat control systems. 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* and will IOC with the Fire Scout in FY 2009.

Developers
System Integrator: Raytheon Systems Falls Church, Virginia USA

SURFACE COMBATANTS

The Navy's multi-mission surface combatants are highly flexible and adaptable, contributing to all of the Navy's core capabilities. A warship that provides power projection and forward presence one day can deliver humanitarian aid the next, as the USS *McFaul* (DDG-74) demonstrated when it delivered humanitarian supplies to the Republic of Georgia following that country's conflict with Russia. Guided-missile cruisers (CGs), destroyers (DDGs) and frigates (FFGs) form the front line for sea control, providing Anti-Submarine Warfare (ASW), Anti-Surface Warfare (ASUW) and Anti-Air Warfare (AAW) capabilities. They also maintain maritime security through Maritime Interception Operations (MIO). Surface combatants receiving logistical support from auxiliary ships provide a sustained forward presence and are able to project power with strike capabilities in the form of guns and land-attack missiles. Some of those same cruisers and destroyers are equipped to protect land and sea forces from ballistic missiles and serve as a deterrent force by challenging the ability of rogue states to launch ballistic-missile attacks. Nuclear-powered aircraft carriers (CVNs) embark tactical aircraft that provide a broad range of capabilities.

SHIPS

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

Description

The 22 *Ticonderoga* (CG-47)-class guided missile cruisers have a combat system centered on the Aegis Weapon System and the SPY-1 A/B multi-function, phased-array radar. *Ticonderoga*-class cruisers provide multi-mission offensive and defensive capabilities, and operate independently or as part of carrier strike groups, expeditionary strike groups and surface action groups in support of global operations. The *Ticonderoga* combat system includes the Standard Missile (SM-2), land-attack systems, advanced anti-submarine and anti-surface warfare systems, embarked sea-control helicopters and robust command-control-and-communications systems in a potent, multi-mission warship. In addition, these cruisers are equipped with the Mk-45 5in/54 Gun Weapon System and the Mk-41 Vertical Launching System (VLS), giving them a significant surface fire capability with 5-inch gun ammunition, the Tomahawk Land-Attack Cruise Missile (TLAM) and, in the future, the Tactical Tomahawk (TACTOM).

The Cruiser Modernization (CG MOD) program will include hull, mechanical and electrical (HM&E) upgrades (manpower and maintenance reductions and improved quality of life features) as well as combat systems (CS) upgrades, including an Open Architecture computing environment upgrade. Specific improvements include upgrades in: air dominance (cooperative engagement capability, SPY radar upgrades); maritime force protection (Phalanx Close-in Weapons System (CIWS 1B), Evolved Sea Sparrow Missile (ESSM), Mk 53 Nulka Active Expendable Decoy (AED) System, SPQ 9B radar set); undersea warfare (SQQ 89A(V)15); and mission life extension (Integrated Ship's Control (ISC), all-electric auxiliaries, weight and moment modifications). Three cruisers are currently outfitted with the Aegis Ballistic Missile Defense engagement capability, while the remaining 19 cruisers are viable candidates to be upgraded to conduct ballistic missile defense. The Cruiser Modernization warfighting improvements using an Open Architecture design will extend the Aegis combat system's capabilities against projected threats well into the 21st Century.

Status

Cruiser Modernization commenced in FY 2008. Five ships have completed the HM&E upgrades and the USS *Bunker Hill* (CG-52) will complete the first combined HM&E/CS modernization availability in FY 2009.

Developers

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

CG(X)
Next-Generation Cruiser

Description

The Next-Generation Guided Missile Cruiser, CG(X), is envisioned as a highly capable, multi-mission surface combatant tailored for air and missile defense and Joint air control operations. CG(X) will provide maritime dominance, independent command and control and forward presence and will operate both independently and as an integral component of joint and combined forces. The CG(X) design and development program features evolutionary acquisition and incremental development practices to incorporate an advanced radar system and state of the day combat and engineering systems. CG(X) will be the follow-on to the *Ticonderoga* (CG-47) cruisers that will reach the ends of their 35-year service lives beginning in 2021. (The oldest Aegis cruiser still in service, the USS *Bunker Hill* CG-52, was commissioned in September 1986.) Current Navy campaign and Joint missile defense analysis has demonstrated that CG(X) will be an enabler of the Maritime Strategy by defending Joint forces at sea and ashore against ballistic and cruise missile attack.

Status

The Joint Requirements Oversight Council (JROC) validated the Maritime Air and Missile Defense of the Joint Forces Initial Capabilities Document (ICD) in May 2006. The Navy was designated as the lead service for Concept Refinement Phase of acquisition and directed an Analysis of Alternatives (AoA), which has continued into 2009. The AoA will be used to determine a preferred hull alternative weighed in the context of capabilities and tradeoffs between hull form, interceptors, air and missile defense systems, sensors, other combat systems, employment and costs.

Developers

To be determined.

CVN-68 and CVN-21
Aircraft Carrier Programs

Description

Ten *Nimitz* (CVN-68)-class nuclear-powered aircraft carriers are in active service. Since the USS *Nimitz* was commissioned in 1975, these ships have replaced, on a one-for-one basis, an aging fleet of non-nuclear carriers. In doing so, they have allowed the Navy to maintain an operational fleet that meets the Fleet Response Plan (FRP) commitments, as well as the presence requirements for Combatant Commanders in support of national goals.

The mission of the aircraft carrier is to support and operate the aircraft that conduct attack, early warning, fleet air defense, 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 car-

riers 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 follow-on to the *Nimitz* class is CVN-21, a new class of carrier that, while similarly sized, has upgraded hull, mechanical, electrical and electronics capabilities. CVN-21 aircraft carriers will incorporate such advanced features as: a new, more efficient nuclear propulsion plant; an Electro-Magnetic Aircraft Launch System (EMALS); Advanced Arresting Gear (AAG); and a nearly threefold increase in electrical-generation capacity compared to a *Nimitz*-class carrier to accommodate EMALS and AAG and to provide for electrical load margin to support future technologies. These improvements, coupled with a slightly expanded flight deck and other topside changes designed to increase operational efficiency, will enable significantly higher aircraft 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 in life-cycle cost savings per ship throughout a 50-year service life, again when compared to a *Nimitz*-class carrier.

Status

The USS *George H. W. Bush* (CVN-77), the tenth and final *Nimitz*-class carrier, was commissioned on 10 January 2009 and is currently undergoing final construction and trials.

The CVN-21 program is underway, and will procure aircraft carriers on a five-year build cycle.

Developers

Northrop Grumman Ship Systems Newport News, Virginia USA

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

Description

The DDG-51 guided-missile destroyers have combat systems centered on the Aegis Weapon System (AWS) and the SPY-1D (V) multi-function, phased-array radar. The *Arleigh Burkes*' combat system includes the MK-41 Vertical Launching System (VLS), an advanced anti-submarine warfare system, advanced anti-air warfare missiles and Tomahawk Land-Attack cruise Missiles. Incorporating all-steel construction and gas-turbine propulsion, DDG-51 destroyers provide multi-mission offensive and defensive capabilities, and can operate independently or as part of carrier strike groups, surface action groups and expeditionary strike groups. The Flight IIA variants currently under construction incorporate facilities to support two embarked helicopters, significantly enhancing the ship's capabilities.

Status

By the end of FY 2010, 61 of 62 of the original *Arleigh Burke* destroyer acquisition program, will have been delivered and

the Navy will have restarted the production line for additional DDG-51 class ships. The newest ships will field Aegis combat system Baseline 7 Phase 1R, which incorporates Cooperative Engagement Capability (CEC), the Evolved Sea Sparrow Missile (ESSM) and the improved SPY-1D (V) radar, as well as advanced open architecture combat systems using commercially developed processors and display equipment. Any future procurement will replace the Aegis Baseline 7.1R with the Open Architecture Advanced Capability Build (ACB) 12 Aegis Combat System, which was developed for the DDG Modernization program. The machinery control system has also been redesigned, and the new system will field for the first time in DDG-111. Aegis destroyers and cruisers will continue to constitute the majority of Navy surface combatants for the first half of the 21st Century.

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

The *Arleigh Burke* (DDG-51)-class guided-missile destroyers will undergo a mid-life modernization (DDG MOD) 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, which include new gigabit ethernet connectivity in the engineering plant, a Digital Video Surveillance System (DVSS), the Integrated Bridge System (IBS), an advanced galley and other habitability and manpower reduction modifications. A complete Open Architecture computing environment will be the foundation for warfighting improvements in the second phase for each ship. The upgrade plan consists of an improved Multi-Mission Signal Processor (MMSP) to accommodate Aegis Ballistic Missile Defense (BMD) capability and an improvement to radar performance in the littoral regions. The Single Integrated Air Picture (SIAP) Integrated Architecture Behavior Model (IABM) and Naval Integrated Fire Control-Counter Air (NIFC-CA) capabilities resident in the new computer program will provide the Navy warfighter with the ability to better understand the joint battlespace and employ weapons to the full extent of their capabilities. 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), Phalanx Close-In Weapons System (CIWS) Blk 1B, the Surface Electronic Warfare Improvement Program (SEWIP), SSX-1 Electronic Warfare Suite and Mk-53 Nulka Active Expendable Decoy (AED) System, The MK-41 Vertical Launching System (VLS) will be upgraded to support the Aegis BMD interceptor,

the Standard Missile-3 (SM-3), and newer variants of the Standard Missile family. 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. The HM&E phase and the Combat System phase of DDG Modernization will be accomplished on each ship approximately two years apart.

Status

The HM&E modifications have been included in the latest two new-construction *Arleigh Burke* destroyers (DDGs 111-112). This design in new construction maximizes risk reduction and proofs these alterations in the builders' yards. DDG Modernization concentrates initially on the Flight I and II ships (hulls 51-78). However, the intent is to continue this 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 Multi-Mission Destroyer

Description

The DDG-1000 is a multi-mission destroyer, designed to provide precision strike and sustained volume fires to support joint forces inland and conduct independent attacks against land targets. DDG-1000 will be armed with the Advanced Gun System (AGS), which fires precision-guided Long-Range Land-Attack Projectiles (LRLAP). For even longer-range strike missions, DDG-1000 will carry Tactical Tomahawks (TACTOM) housed in a Peripheral Vertical Launch System (PVLS). DDG-1000 capabilities in undersea, surface and air warfare are designed for enhanced performance in the littoral environment.

DDG-1000 will use multi-spectral (radar, infrared, acoustic, magnetic and visual) signature reduction to render it significantly less detectable to potential adversaries than our legacy fleet. The DDG-1000 design features an Integrated Power System (IPS) to provide power for advanced, electric-drive propulsion systems as well as high-powered combat systems and ship service loads. An open-architecture distributed combat system will support a "plug-and-fight" environment. Current elements of the DDG-1000 combat system include the modular and highly survivable PVLS, the AGS and the Dual-Band Radar (DBR) suite that comprises the SPY-3 Multi-Function and Volume-Search Radars. Other DDG-1000 features include an advanced hull form, optimal manning based on comprehensive human-systems integration and human-factors engineering studies, extensive automation, advanced apertures and dramatic reductions across the entire spectrum of signatures (radar, acoustic, magnetic, and infrared). Once validated on board

DDG-1000, appropriate technologies will be incorporated into other surface combatants.

Status
The program successfully completed nine of ten Engineering Development Models for new technologies and is transitioning those technologies into production. The Navy is working out contracts that will allow building of all three DDG-1000 class ships at the Bath Iron Works in Maine.

Developers

General Dynamics Bath Iron Works	Bath, Maine USA
Raytheon Systems	Sudbury, Massachusetts USA
BAE Systems	Minneapolis, Minnesota USA

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

Description
The *Oliver Hazard Perry* (FFG 7)-class guided-missile frigates are capable of operating as integral elements of a carrier strike group or surface action group. They are primarily used today to conduct maritime interception operations, presence missions and counter-drug operations. A total of 55 *Perry*-class ships were built—51 for the U.S. Navy and four for the Royal Australian Navy. Of the 51 ships built for the United States, 21 remain in active commissioned service and nine are in the Navy Reserve Force in early 2009.

FFG MOD corrects the most significant maintenance and obsolescence issues in order to maintain the ships through their full 30-year service lives. The modernization package includes replacement of four obsolete Ship Service Diesel Generators (SSDG) with commercial off-the-shelf (COTS) SSDGs; replacement of obsolete evaporators with COTS Reverse-Osmosis (RO) units to make fresh water from seawater; and replacement of the existing trackway boat davit with a COTS Slewing Arm Davit (SLAD). Other major HM&E alterations remaining include ventilation modifications and Auxiliary Machinery Room #3 fire-fighting sprinkler modifications.

Status
The 30-ship FFG MOD program commenced in FY 2003 and is scheduled for completion by 2011.

Developers

General Dynamics Bath Iron Works	Bath, Maine USA

Littoral Combat Ship *Freedom* (LCS-1)-Class

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 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

In May 2004, the Navy awarded two contracts options to Lockheed Martin and General Dynamics to build the LCS ships. The USS *Freedom* (LCS-1), the Lockheed Martin ship, was commissioned in November 2008 and has commenced post-delivery test and trials. The *Independence* (LCS-2), the General Dynamics ship, is under construction at Austal USA in Mobile, Alabama, with an expected completion in mid-2009. The first mine countermeasures mission package delivered September 2007, and the first "spirals" of the anti-submarine warfare and surface warfare packages delivered in September and July 2008, respectively.

Developers

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

WEAPONS

AGS
Advanced Gun System

Description

The 155mm AGS is planned for installation in the *Zumwalt* (DDG-1000)-class multi-mission destroyers 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 DDG-1000 Naval Surface Fire Support 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. Fully integrated into the DDG-1000 design concept, AGS will also meet reduced-manning and radar-signature requirements.

Status

The program started in FY 1999. The first gun system is scheduled for delivery to support the first DDG-1000 fleet delivery in FY 2013.

Developers

BAE Systems — Minneapolis, Minnesota USA

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

Description

The TLAM is the Navy's, all-weather, long-range, subsonic land-attack cruise missile deployed on surface warships and attack and guided-missile submarines. The Block IV Tactical Tomahawk (TACTOM) preserves Tomahawk's long-range precision-strike capability while significantly increasing responsiveness and flexibility. TACTOM improvements include in-flight retargeting, over-battlefield loiter, improved jamming tolerance and additional payloads.

TLAM Block III missiles are still deployed in the fleet and 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

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 six-barreled 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 integrates forward-looking infrared (FLIR) that provides defense against asymmetric threats like small, fast, surface craft, slow-flying aircraft, and Unmanned Aerial Vehicles through the addition of an integrated FLIR capability.

The 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 a Phalanx Block 1B CIWS 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.

The 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 and is capable of autonomously searching, detecting, tracking and engaging threats.

Status

More than 250 MK 15 Phalanx CIWS systems are deployed in the U.S. Navy. The 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 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-32 MOD 1 Gun Upgrades
Stabilized 25-mm Chain Gun

Description

This program upgrades the MK-38 Mod 1 25-mm chain gun by adding stabilization, remote operation, fire control and an electro-optical sensor. These additions significantly expand the gun's effective range, lethality and nighttime capability. The program

reduces risk for surface ship self-defense by engaging asymmetric threats to ships at close range. Scenarios include protection in port, at anchor, transiting choke points or while operating in restricted waters. It provides the capability to bridge current and future targeting and weapons technology in a close-range force-protection environment. While the upgrade program was originally conceived as a quick fix for the ships that are last in line to receive the Close In Weapon System (CIWS) BLK 1B upgrade, the operating forces requested expanding the program to include all surface combatants and amphibious ships.

Status

Upgrades to guided-missile cruisers (CGs) and dock landing ships (LSDs) are scheduled for completion in FY 2009, with additional ship classes to follow in subsequent years.

Developers

BAE Systems	Louisville, Kentucky USA
Rafael USA	Haifa, Israel

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 5in/54 gun that 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 included in new-construction units of the *Arleigh Burke* DDG-51 class of ships starting with the USS *Churchill* (DDG-81) and is being back-fitted to the *Ticonderoga* (CG-47)-class cruisers as part of their Cruiser Modernization package. In early 2009, 27 destroyers and one cruiser were equipped with the 5-inch/62-caliber gun.

Developers

Raytheon	Mukilteo, Washington USA

Naval Surface Fire Support

Description

The Extended Range Munition (ERM) program was terminated in early 2008 because of technical issues associated with the program. As a result, the Navy is conducting an Analysis of Alternatives (AoA) to determine potential Naval Surface Fire Support (NSFS) materiel solutions to address validated joint capability 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 expected to be completed in 2009.

Developers

None

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

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 carrier and amphibious assault ship (LHD/LHA) classes and is being installed on the newest LHA-6 class. The MK-57 air-defense Target Acquisition System (TAS) is a combined volume search radar with a control element that determines threat evaluation and weapon assignment for RIM-7. ESSM is the next generation of Sea Sparrow missiles, replacing the RIM-7P, and is currently deployed on *Arleigh Burke* (DDG-51) Flight IIA Aegis destroyers. ESSM is the self-defense weapon for DDG-1000, CVN and LHA-6 ships, as well as for Aegis cruisers and destroyers receiving Aegis Modernization. ESSM is a kinematic upgrade to the RIM-7P missile. Upgrades consist of a more powerful rocket motor, a tail control section for quick response on VLS ships, an upgraded warhead and a quick-reaction electronic upgrade. Operational in 2004, ESSM is procured as part of the NATO Sea Sparrow Consortium involving 10 NATO countries.

Status

ESSM has an In-Service Support Memorandum of Understanding in place. Initial operational capability occurred in FY 2004 with fleet introduction on an *Arleigh Burke* Flight IIA destroyer. ESSM was introduced in CVN-class ships in FY 2008.

Developers

Raytheon Tucson, Arizona USA

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

Description

The SM-2 is the Navy's primary air-defense weapon. The SM-2 Block III/IIIA/IIIB configurations are all-weather, ship-launched, medium-range surface-to-air missiles in service with the Navy and nine allied navies. SM-2 Block III/IIIA/IIIB missiles are launched from the MK-41 Vertical Launching System (VLS) installed in Aegis cruisers and destroyers. Block III features improved performance against low-altitude threats and optimizes the trajectory-shaping 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 resulting from a new directional warhead and addition of a Moving Target Indicator (MTI) 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/MU) to enhance IIIB performance against low-altitude, supersonic maneuvering threats.

Status

Block IIIB is the only variant in production for the U.S. Navy. Block IIIBs are being produced as new all-up rounds and as upgrades from older Block III and IIIA. The Block IIIA missiles are still produced for Foreign Military Sales missiles through the 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) guidance and an active-optical proximity and contact fuse. RAM has minimal shipboard control systems and is autonomous after launch. Effective against a wide spectrum of existing threats, 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, will provide increased kinematics against maneuvering threats and improved RF detection against low probability of intercept threats. Through 2008, the RAM pro-

gram has a successful intercept rate of 95 percent in more than 160 live flight tests. 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 *Tarawa*-class (LHA-1) and *Wasp*-class (LHD-1) amphibious assault ships, *Whidbey Island*-class (LSD-41) and *Harpers Ferry*-class (LSD-49) dock landing ships, aircraft carriers (CVN) and *San Antonio*-class (LPD-17) landing platform dock ships. RAM is also planned for CVN-77, LHD-8, LHA-6 and the Lockheed Martin variant Littoral Combat Ship USS *Freedom* (LCS-1).

Block 1A is at full-rate production. The Block 2 missile is currently in development and is scheduled for first delivery in FY 2012.

Developers

Raytheon	Tucson, Arizona USA
RAMSYS GmbH	Ottobrunn, Germany

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

Description

The 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 navy 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-radar cross-section, improved kinematics, and advanced electronic countermeasures. The SM-6 ERAM acquisition strategy is characterized as a low-risk development approach that leverages the SM-2 Block IV/IVA program Non-Developmental Items and Raytheon's Advanced Medium Range Air-to-Air Missile (AMRAAM) Phase 3 active seeker program managed by the Naval Air Systems Command. The SM-6 missile will be fielded on DDG 51 and CG-52 class ships as well as future surface combatants. In June and September 2008, the program conducted two successful live-fire tests of the SM-6 at the White Sands Missile Range, which resulted in "skin-to-skin" intercepts of the targets.

Status

The Navy established the SM-6 Extended-Range Air Defense program in FY 2004, with an FY 2010 initial operational capability. SM-6 is planned to enter low-rate initial production in 2009.

Developers

Raytheon	Tucson, Arizona USA

SENSORS AND COMBAT SYSTEMS

ACDS
Advanced Combat Direction System

Description

ACDS is a centralized, automated command-and-control system. An upgrade from the Naval Tactical Data System (NTDS) for aircraft carriers (CVN) and large-deck amphibious ships (LHA/LHD), it provides the capability to identify and classify targets, prioritize and conduct self-defense engagements and exchange track information and engagement orders within the battle group and among different service components in the joint theater of operations via tactical data links (Link-4A, Link-11 and Link-16). ACDS is a core component of non-Aegis/non-SSDS combat systems.

Status

Development is complete. CVN ACDS ships will transition to the Ship Self Defense System, but several ACDS Block 0/1 ships (LHAs 1- through 5 and LHDs 1 through 6) will remain in their current configuration until they are decommissioned. The Navy will use an open architecture system to sustain interoperability through the Common Network Interface (CNI). CNI is being installed in the remaining ACDS Block 0 LHA/LHDs to augment the expeditionary strike group command staff with operational situational awareness by improving networking and consolidation of disparate applications. One of the most important applications, CNI open system design enables in ACDS ships is the Single Integrated Air Picture (SIAP) Integrated Architecture Behavior Model (IABM). This joint SIAP application will provide for common distributed processing of air tracks between current CEC ships and aircraft and all IABM-equipped units in the joint force.

Developers

Raytheon	San Diego, California USA
Space and Naval Warfare Systems Center	San Diego, California USA
General Dynamics Advanced Information Systems	Fairfax, Virginia USA
Combat Direction System Center	Dam Neck, Virginia USA
Naval Surface Warfare Center	Dahlgren, Virginia USA
	Port Hueneme, California USA

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 (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 late-ascent, mid-course, and early-descent phases of their exo-atmospheric trajectories. Additionally, Aegis BMD provides surveillance and tracking ca-

pability against long-range ballistic missile threats. Together, these capabilities contribute to robust defense-in-depth for U.S. and allied forces as sea and ashore, 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 national 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

In early 2009, three Aegis cruisers and 15 destroyers have the capability to engage threat ballistic missiles using SM-3 missiles and to cue the national BMDS using their Long-Range Surveillance and Tracking (LRS&T) systems. These ships are deployed throughout the globe, available to conduct active defense against short- and medium-range ballistic missiles and to cue the BMDS in defense of the homeland. The ongoing Aegis Modernization program is the vehicle that will provide Aegis BMD capability to all of the remaining Aegis destroyers and to selected Aegis cruisers beginning in 2012. In November 2008, an SM-3 fired from the USS *Russell* (DDG-59) successfully intercepted a separating ballistic missile target outside the earth's atmosphere. This was the 13th successful SM-3 intercept since January 2002. In February 2008, the USS *Lake Erie* (CG-70) fired an SM-3 missile to intercept a failed U.S. satellite in the first intercept of a target using data generated exclusively from other BMDS sensors. In June 2008, *Lake Erie* successfully engaged a short-range ballistic missile target using the Aegis BMD 3.6.1 computer program and a modified SM-2 Block IV missile. The entire SM-2 Block IV inventory (100 missiles in early 2009) is being modified for the terminal ballistic missile defense mission, allowing Aegis BMD ships to destroy ballistic missiles in their terminal phase of flight in the defense of the sea base and of friendly forces ashore. The latest iteration of the weapons system, Aegis BMD 3.6.1, will be installed in all 18 BMD-capable Aegis ships by June 2009. This program upgrade provides the ability to engage a ballistic missile threat within the Earth's atmosphere. This endo-atmospheric capability results in multiple engagement opportunities against each ballistic missile, creating a more lethal-layered defense against enemy ballistic missiles.

Developers

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

AMDR
Air and Missile Defense Radar

Description

AMDR is a multi-function, active-phased array radar capable of search, detection and tracking of airborne and ballistic missile targets and missile-engagement support. 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 a future surface combatant and the second increment in support of the next-generation guided-missile cruiser CG(X). AMDR key technologies—including High-Power Amplifiers and Transmit/Receive modules, an Active Array physical architecture, large-aperture Digital Beamforming 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 battlespace (area air defense) and in defense against ballistic missiles.

Status

AMDR is being developed as a competitive program and will enter the Technology Development phase in FY 2009. This phase will focus on development of the complex S-band radar technologies that are scalable to meet radar sensitivities for specific platform mission requirements.

Developers

To be determined. As many as 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 2009.

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. CEC interfaces the weapons capabilities of each CEC-equipped ship and aircraft in the strike group to support integrated engagement capability. By simultaneously distributing sensor data on airborne threats to each ship within a strike group, CEC extends the range at which a ship can engage hostile tracks to beyond the radar horizon, significantly improving area, local and self-defense capabilities. CEC enables a strike group or joint task force to act as a single, geographically distributed combat system. CEC provides the fleet with greater defense in-depth and the mutual support required to confront evolving threats of anti-ship cruise missiles and theater ballistic missiles.

Status

IOC for the shipboard CEC system (USG-2) was declared in FY 1996. USG-2 TECHEVAL and OPEVAL were successfully completed between 1998-2001 following extensive development and testing of shipboard combat systems with which CEC interfaces. Full rate production for USG-2 shipboard and low rate initial production for USG-3 airborne equipment sets were approved in 2002. In early 2006, CEC systems had been installed in 46 ships (Aegis CGs and DDGs, carriers and amphibious ships) and 26 E-2C Hawkeye 2000 aircraft. Total future CEC installation is planned in approximately 275 ships, aircraft and land units, including E-2D Advanced Hawkeye aircraft and CVN-21 and DDG-1000 ships. The current acquisition strategy implements a Pre-Planned Product Improvement (P3I) incorporating Open Architecture-based hardware with re-hosted existing software. The P3I hardware supports reduced cost, weight, cooling and power objectives and is more extensible to the other Armed Services. This initiative culminated in the competitive design and production of the CEC Signal Data Processor, which has successfully completed installation and is proceeding through testing onboard the USS *Sterett* (DDG-104). Navy has coordinated with the Joint Staff, OSD and other Services to explore potential multi-Service avenues for CEC capability implementation that will expand sensor netting track data availability to meet a variety of warfighter requirements across various platforms. This effort has resulted in the implementation of CEC into ground mobile systems, including the Marine Corps' Composite Tracking Network (CTN) and Army's Joint Land Attack Cruise Missile Defense Elevated Netted Sensor (JLENS).

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 and reusable and can identify simultaneously 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 Polymerace Chain Reaction (PCR) system in the medical spaces of all aircraft carriers and large-deck amphibious assault ships.

Status
JBAIDS has been issued to the U.S. Army and Air Force; shipboard installations will occur starting in 2009, with final installation scheduled in 2013.

Developers

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

JBPDS
Joint Biological Point Detection System

Description
The JBPDS is a biological point detector that can provide near-real-time biological detection and identification. The system has application to Navy forces that have a mission of sustained operations in a CBR environment, CBR reconnaissance or peacetime force protection. JBPDS will provide detection, warning and presumptive identification information on the presence of certain biological warfare hazards. Due to detection and identification time requirements, the JBPDS system will provide "detect-to-treat" information for personnel in the immediate vicinity of the detector and "detect to warn" information for personnel downwind from the detector. Once activated, the JBPDS provides continuous monitoring of the air for a period of 12 hours before requiring human intervention for maintenance. JBPDS will also capture, contain and provide suspect samples for confirmatory analysis. Confirmatory testing of the sample will be performed at a designated "gold standard" lab facility, either afloat or ashore. Transport of samples from the JBPDS unit to a designated confirmatory lab requires extensive sample packaging procedures and a strict chain of custody.

Status
The program attained the full-rate production decision in October 2008. The Navy has purchased 100 systems, of which 23 have been installed, with final installation scheduled in 2015.

Developers

JPM-Bio-Detection	Edgewood, Maryland USA
General Dynamics	Charlotte, North Carolina USA

NFCS
Naval Fires Control System

Description
NFCS 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 July 2005 and 25 have been installed through early 2009. Program development and procurement are on track for installation on DDGs 81-112.

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 (ASCMs). The Nulka decoy employs a broadband radio frequency repeater mounted on a hovering rocket platform. After launch, the Nulka decoy radiates a large, ship-like radar cross-section 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.

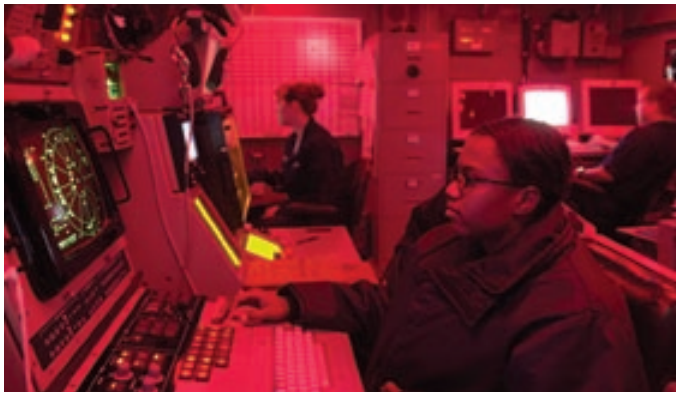
Status
The system has been installed on more than 100 U.S. Navy ships as of early 2009. Remaining installations will be completed by fall 2010.

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 that is installed on surface warships (CG/DDG/FFG), aircraft carriers (CVN) and amphibious assault (LSD/LPD/LHA/LHD) ships, with total fleet-wide population of 170 systems in early 2009. Block 1A replaces the SLQ-32 processor with an Electronic Surveillance Enhancement (ESE) processor and the display console with a UYQ-70. ESE and UYQ-70 are integrated with Improved Control and Display



software. Block 1B also improves the Human Machine Interface of the SLQ-32 and adds Specific Emitter Identification (SEI) capability that provides extremely accurate platform identification. The SEI is deployed in both a stand-alone SSX-1 (Block 1B1) and integrated (Block 1B2) configuration. 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

An Acquisition Decision Memorandum of 13 August 2002 authorized SEWIP to proceed with Block 1A and initiate development of future blocks. Block1A Stand-Alone ESE achieved a Milestone C/low-rate initial production decision on 31 January 2005 and achieved full-rate production in August 2006. Block 1B1 and 1B2 received Milestone C approval in December 2008. Block 1B3 (HGHS) will test in FY 2011 and enter full-rate production in 2012.

Developers

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

SIAP/IABM
Single Integrated Air Picture/Integrated Architecture Behavior Model

Description

The Naval SIAP (the air track portion of the Common Operational Picture) consists of common, continuous and unambiguous tracks of airborne objects. The SIAP is achieved by real-time and near-real-time data processed identically throughout the force in systems behaving consistent with the IABM and consists of correlated air tracks—"one object = one track"—and associated track attribute information. IABM is being developed in conjunction with the SIAP Joint Program Office. The delivered SIAP capability will satisfy mandated joint requirements for track completeness, ID completeness, track ambiguity, commonality and assigned ID correctness. Implementation of the SIAP IABM is a prerequisite to minimize the probability of fratricide, provide joint combat identification and enable Joint Integrated Fire Control to provide for accurate employment of weapons to meet the threat.

Status

The Naval SIAP engineering and integration efforts are supported by the respective PEOs in the Aegis, SSDS, E-2 and CAC2S (Marine Corps) communities. The designated naval pathfinder programs for IABM integration are Aegis, E-2 Hawkeye, CAC2S and SSDS. The Navy and Marine Corps will continue systems engineering efforts with planned initial operating capability in the 2016-2017 timeframe.

Developers

Lockheed Martin	Moorestown, New Jersey USA
Raytheon	San Diego, California USA
Northrop Grumman	Bethpage, New York USA
Boeing	Lexington Park, Maryland USA
General Dynamics Advanced Information Systems	Fairfax, Virginia USA

SPQ-9B
Phased-Array 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 envelope. SPQ-9B integrates with the Ship Self-Defense System (SSDS) MK-2 on aircraft carriers and amphibious assault ships, enabling ASCM defense capabilities to pace the evolving worldwide threat. The SPQ-9B is also an integral part of the cruiser modernization program, providing an ASCM cue to the Aegis Combat System.

Status

The SPQ-9B is being fielded in conjunction with the SSDS MK-2 and cruiser modernization.

Developers

Northrop Grumman	Melville, New York USA

SPY-1
Aegis Multi-Function Phased-Array Radar

Description

The SPY-1 S-Band radar system is the primary air and surface radar for the Aegis Combat System installed in the *Bunker Hill* (CG-52)—Baseline 2 and subsequent *Ticonderoga* (CG-47) cruisers—and *Arleigh Burke* (DDG 51)-class warships. It is a multi-function, passive phased-array radar capable of search, automatic detection, transition to track, tracking of air and surface targets and missile engagement support. The fifth variant of this radar, 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 SPY-1 series radars are also used to detect, track and engage theater ballistic missiles on select Aegis cruisers and destroyers.

Status

Currently, the SPY-1A, SPY-1B, SPY-1D and SPY-1D(V) radar variants are fielded and supported. The SPY-1D (V) littoral radar upgrade supersedes the SPY-1D in new-construction Flight

IIA destroyers. Operational testing and evaluation was completed in the fall of 2005. 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 SPY-1D(V) capability to all SPY-1D DDGs. MMSP upgrades on DDGs will be fielded through DDG Modernization.

Developers

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

SPY-3 MFR
Advanced Multi-Function Radar

Description

The SPY-3 Multi-Function Radar is an X-band active phased-array radar designed to meet all horizon search and fire control requirements for future classes of ships, such as the *Zumwalt* (DDG-1000) multi-mission destroyer and new-design CVN-21 aircraft carriers. 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 new ship-design requirements for reduced radar cross-section, significantly reduced manning and total ownership cost reduction. The SPY-3 MFR will be fielded with the S-band Volume-Search Radar (VSR) as an integrated radar suite, together referred to as the Dual-Band Radar (DBR).

Status

Two MFR Engineering Development Model radar arrays were installed and tested at the Wallops Island land-based test facility and on board the Self-Defense Test Ship in 2006. MFR is currently installed at the DDG-1000 Wallops Island Engineering Test Center along with the VSR to begin radar test and integration events. MFR was scheduled to radiate in early 2009 and will undergo integration test events with VSR in September 2009. MFR development, testing and production schedules are planned to support equipment delivery schedules for DDG-1000 and CVN-21 ships. DBR Operational Evaluation will occur with DDG-1000 testing.

Developers

Raytheon Electronic Systems	Sudbury, Massachusetts USA

SSDS
Ship Self-Defense System

Description

The SSDS is a centralized, automated command-and-control system. An upgrade from the Advanced Combat Direction System (ACDS) for aircraft carriers (CVNs) and large-deck amphibious ships (LHA/LHD), SSDS provides an integrated combat direction system for all carriers and 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

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, the Navy plans to periodically upgrade SSDS via COTS Technology Insertion and Preplanned Product Improvement (P3I). SSDS MK-2, which is programmed for aircraft carriers, LHD-7 and 8, LHA-6 and *San Antonio* (LPD-17) class ships, has completed design and is continuing with follow-on at-sea testing. Fielding will be completed 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

The Surface Ship Torpedo Defense consists of the Anti-Torpedo Torpedo (ATT) Defensive System, the SLQ-25 "Nixie" towed torpedo countermeasure, expendable acoustic decoys and 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.

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

For cruisers and destroyers, the ATT Defense System will modify the SQQ-89A(V)15 and the SLQ-25 Nixie to improve Torpedo Detection, Classification and Localization (TDCL) and to introduce the autonomous hard-kill ATT. The Nixie TDCL subsystem will consist of a towed flexible high- power active sonar source, a receive array and associated software. Leveraging existing non-developmental Nixie hardware reduces cost and facilitates installation of TDCL capability on High-Value Units (HVUs), such as aircraft carriers and amphibious assault ships. The TDCL subsystems will pass information to a tactical decision aid, which will provide defensive recommendations including the option to launch ATTs.

Status

The ATT Defense System will concurrently develop both the TDCL subsystem as well as the ATT. Prototype TDCL and ATT systems have been successfully tested at sea. Incremental TDCL demonstrations have validated the towed active source and receive array approach. Incremental ATT demonstrations have tested ATT salvo capability. The Initial Operational Capability (IOC) system will integrate the ATT on cruisers and destroyers to leverage organic capability thereby minimizing technical risk and maximize opportunities for ship services during Developmental and Operational Testing (DT/OT). This capability will be delivered to HVUs within three years of its IOC on cruisers and destroyers.

Upgrades to the 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 torpedo self defense. The SQQ-89A(V)15 is the Commercial-Off-The-Shelf (COTS) Open Architecture (OA) program of record that upgrades the following subsystems for 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 SQQ-89A(V)15 provides revolutionary ASW warfighting improvements that include:

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

Status

The DDG modernization program upgrades DDGs 51 to 78 with SQQ-89A(V)15 and will deliver the first systems in FY 2012; three systems will deliver per year until complete in FY 2021. The A(V)15 program of record upgrades legacy systems on DDG-79 to DDG-90 and completes the A(V)15 conversion on DDGs 91 to 112. The cruiser modernization program upgrades the CGs 59 to 73 to SQQ-89A(V)15 with the first two installs in 2012 then three per year until complete in FY 2017. The SQQ-89A(V)15 IOC is FY 2009. As a near-term adjunct capability, Scaled Improved Performance Sonar (SIPS) systems were purchased and installed on Pacific fleet DDGs and CGs. In FY 2008, the Navy accelerated the development of an advanced high-fidelity ASW synthetic trainer in the A(V)15, which will IOC in FY 2011. Future ASW combat system developments will occur on a two-year software upgrade cycle, and on a four-year hardware upgrade cycle. The first software upgrade is planned for FY 2011 and the first hardware upgrade is planned for FY 2013.

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 (TLAMs). TTWCS also introduces the ability for firing units to plan Block III and Block IV GPS-only missions, retarget Block IV TLAMs to alternate targets and monitor missiles in flight. The upgraded system reduces the number of equip-

ment racks required aboard surface ships, introduces common software for the various Tomahawk-capable platforms (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. And, 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. TTWCS V5 incorporates the Tomahawk Integrated Training Architecture, changes for Cruiser Modernization, and the addition of SSGN and *Seawolf* (SSN-21) and *Virginia* (SSN-774)-class submarines. The next software build of the weapons system will be called TTWCS Viability. This revision will improve C4I interoperability, provide compatibility for DDG-1000, update computer hardware and performance and align TTWCS with DoD mandates.

Status

Completed System Requirements Review (SRR) in November 2008. Incremental Design Review is scheduled for June 2009.

Developers

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

UQQ-2 SURTASS
Surveillance Towed Array Sensor System

Description

The SURTASS capability in early 2009 is resident in 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 twin-line passive-sonar acoustic array. The twin-line system is the world's 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

VSR
S-Band Volume Search Radar

Description

The VSR is an S-band active phased array radar designed to meet all above-horizon detection and tracking requirements for new-build ships, specifically the DDG-1000 and CVN-21 classes. VSR will provide long-range situational awareness with above-horizon detection and air control (marshalling) functionality, replacing the functions of today's SPS-48E three-dimensional and SPS-49 two-dimensional 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 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 to begin radar test and integration events. VSR was scheduled to radiate in early 2009 and will begin integration test events with MFR in September 2009. VSR development, testing and production schedules are aligned with the DDG-1000 and CVN-21 programs' shipbuilding schedules. VSR will be fielded with the 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.

Developers

Raytheon Electronic Systems	Sudbury, Massachusetts USA
Lockheed Martin Maritime Sensors & Systems	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 onboard USNS *Impeccable* (T-23) and the leased R/V *Cory Chouest*. Development continues for the Compact LFA (CLFA) system employing smaller and 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 April 2007. This FSEIS addressed legislative changes to the Marine Mammal Protection Act and pertinent deficiencies raised by the District Court.

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: 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, with fleet upgrades planned through 2015: upgrading COTS hardware and

meeting open-architecture requirements to improve interoperability and reliability in the latest model, BFTT T46D. Additionally, BFTT T46D will be Navy's first step toward developing a Total Ship Training Capability (TSTC).

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 uses a NAVSEA "RIP Team" that 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 and the management of CBRND IPE, and manages Anti-Terrorism/Force Protection (AT/FP) equipment for the Military Sealift Command (MSC).

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 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 Phantom II). To represent evolving future threats, the Navy has initiated a program to develop and field the sea-skimming subsonic-to-supersonic Multi-Stage Supersonic Target (MSST). The Navy is also intending to replace the BQM-74E with the follow on Subsonic Aerial Target (SSAT), which is planned to begin development in 2009. Additionally, the Navy is partnering with the Air Force to develop the QF-16 (Fighting Falcon aircraft) to replace the QF-4.

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 2009 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 2009 and fielding is planned for 2013. The last production contract for the BQM-74E will be awarded in early 2009. The joint Air Force/Navy 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 2009 to provide realistic training and test capability against high-speed threat-representative targets.

Developers

Northrop Grumman	Rancho Bernardo, California USA
Orbital Sciences	Chandler, Arizona USA
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. CPS is integrated into the heating ventilation and air conditioning (HVAC) systems to provide 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 was installed on more than 80 ships as of early 2009. 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. Plans show that 116 ships will have CPS by FY 2013, increasing the total number of ships presently outfitted by more than 60 percent.

Developers

Naval Surface Warfare Center — Dahlgren, Virginia USA

SSEE
Ship Signal Exploitation Equipment Increment E

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 on cruisers and aircraft carriers. The SSQ-137 Ship Signal Exploitation Equipment Increment E is a shipboard Information Operations (IO) system that provides commanders with threat, search and identification information. SSEE provides deployed forces with an afloat IO/IW system/sensor. SSEE is a Commercial-Off-The-Shelf/Non-Developmental Item (COTS/NDI) program that is easily reconfigured and 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 E is in full-rate production and is expected to attain FOC in FY 2010.

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 Commercial-Off-The-Shelf (COTS) systems with current and future force-protection initiatives and combat system technologies to provide 360-degree situational awareness. A prototype system installed in the USS *Ramage* (DDG-61) employed COTS-based products interfaced with the ship's existing navigation radar. Its key components include electro-optical/infrared 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 provided the functional demonstration of SPS capability and helped define the formal requirements for SPS.

Status
SPS Block 0, Acoustic Hailing Device fielding, is underway in early 2009. SPS Block 1 installations were completed in FY 2008 to assess the command-and-control core and EO/IR sensing system. Block 3 will field in FY 2009 and will represent the full SPS capability.

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

TSTS
Total Ship Training System

Description

TSTS initially will be a high-fidelity combat systems tactical trainer that replaces BFTT. Using an open architecture, service-oriented architecture and COTS/GOTS/NDI/government-licensed software, TSTS will deliver the necessary functionality required to support ship, individual and team units through sustainment training and readiness requirements.

Status

TSTS will field to Aegis cruisers and destroyers as part of the Aegis Modernization Program starting in the FY 2013-2014 timeframe.

Developers

To be determined.

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) provide 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 (SSBN) 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 control treaty requirements.

Each year, one of the *Ohio*-class SSBNs enters a shipyard for mid-life overhaul and nuclear reactor refueling. Each ship spends about 27 months in the shipyard before returning to the fleet. This refueling program extends the life of these ships and ensures that *Ohio* SSBNs will remain a ready and credible deterrent into the future.

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* 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 and the SSBN.

Status

Eighteen *Ohio*-class SSBNs were built and commissioned, and the final ship of the class, the USS *Louisiana* (SSBN-743), joined the fleet in FY 1997. The first four *Ohio* SSBNs were converted to enhanced land-attack, strike and Special Forces platforms (SSGNs). The remaining 14 *Ohios* are being re-capitalized via Engineered Refueling Overhauls (ERO), 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 is scheduled to complete in the spring 2009.

Developers

General Dynamics Electric Boat — Groton, Connecticut USA

SSGN-726

Nuclear-Powered Guided-Missile Submarine

Description

The first four of the *Ohio*-class fleet ballistic missile submarines (SSBNs) have been converted to nuclear powered guided missile submarines (SSGNs). The *Ohio*-class SSGN's ability to support high-volume strike operations and long-duration, high-capacity Special Operations Force (SOF) operations in direct support of regional combatant commander requirements is critical to the Navy's core capabilities of power projection and deterrence. These SSGNs can carry up to 154 Tomahawk Land-Attack Missiles (TLAM) to conduct covert, large-volume precision strikes. Additionally, these submarines have the capability to support clandestine insertion and retrieval missions for as many as 66 Special Operations Forces for extended periods of time. Operating with two crews, each SSGN is designed to have a 70 percent in-theater presence. With large payload capability and the flexibility of 22 seven-foot diameter reconfigurable missile tubes, these submarines will be able to transform rapidly as a host for future payloads and sensors to combat the next generation of threats.

Status

All four SSGNs completed conversion and have been delivered to the operational fleet. *Ohio* (SSGN-726) completed the maiden 15-month SSGN deployment in December 2008. *Florida* (SSGN-728) and *Michigan* (SSGN-727) deployed in 2008, and *Georgia* (SSGN-729) will deploy later in 2009.

Developers

General Dynamics Electric Boat Groton, Connecticut USA

SSN-774

Virginia-Class Nuclear-Powered Attack Submarine

Description

The *Virginia* (SSN-774)-class submarines are specifically designed for multi-mission littoral and regional operations, as well as the performance of traditional open-ocean anti-submarine and anti-surface missions. These submarines have advanced acoustic technology and are configured to conduct intelligence-collection and surveillance missions, Special Operations Forces insertion/extraction, irregular warfare, sea control, land attack, and mine reconnaissance. The *Virginia* Class is specifically configured to adapt easily to special missions and emerging requirements. The ships are built using a modular construction process that allows construction, assembly, and testing of systems prior to installation in the ship's hull, thereby reducing costs, minimizing rework, and simplifying system integration. The ship's modular design also facilitates technology insertion both in future ships during new-construction and existing ships, enabling the *Virginia*-class submarines to keep pace with emerging threat capabilities throughout their 30-year service lives.

Status

The ships are being built under a 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 ship, with integration and delivery of completed submarines alternating between EB and NGNN. Construction of the USS *Virginia* (SSN-774) began in FY 1998, and the ship was commissioned in October 2004. Four other *Virginia*-class submarines have also been commissioned through 2008: the USS *Texas* (SSN-775) in September 2006; USS *Hawaii* (SSN-776) in May 2007; USS *North Carolina* (SSN-777); in May 2008; and USS *New Hampshire* (SSN-778) in October 2008. *New Hampshire* was delivered eight months ahead of schedule. *New Mexico* (SSN-779) is expected to deliver in 2009. Four other ships (SSNs 780-783) are under construction and will deliver between 2010 and 2013. In FY 2009, the Navy awarded a Multi-year Procurement contract for the *Virginia*-Class "Block III" ships. These submarines incorporate design for affordability changes that include a redesigned bow that replaces the spherical sonar array with a Large Aperture Bow (LAB) array and replaces the 12 Vertical Launch System (VLS) tubes with two large-diameter tubes that can carry Tomahawk Land-Attack Missiles or other payloads.

Developers

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

Submarine Rescue (SRC-SRDRS)

Description

The Submarine Rescue Diving and Recompression System (SRDRS) replaced the Deep Submergence Recovery Vehicle (DSRV) as the primary submarine rescue platform for the Navy. The SRDRS is a government-owned, contractor-operated system, capable of rapid, worldwide deployment and mobilization on vessels of opportunity. The SRDRS consists of three distinct systems:

(1) The Assessment Underwater Work System (AUWS) provides the Atmospheric Diving System (ADS2000), a one-atmosphere, no-decompression manned diving system capable of depths to 2,000 feet for the main purpose of clearing and preparing a submarine hatch for seating the Pressurized Rescue Module System (PRMS).

(2) The Pressurized Rescue Module System provides a manned, tethered remotely piloted vehicle capable of rescuing personnel from a stricken submarine to depths of 2,000 feet.

(3) The Surface Decompression System (SDS) will enable personnel transfer under pressure for surface decompression following rescue from a pressurized submarine environment.

Status

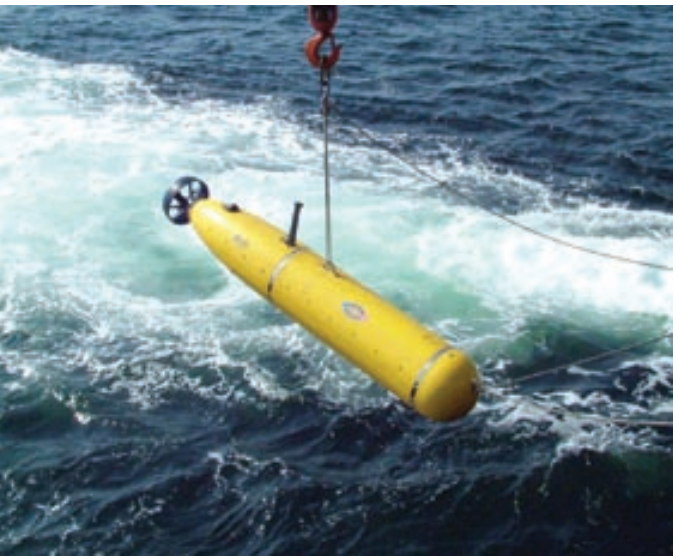
On September 30, 2008 the Navy declared the SRDRS system to have "DSRV equivalence" in submarine rescue through the successfully tested capabilities of two (AUWS and PRMS) of its three

systems. These new systems, now serving as the Navy's submarine rescue capability, are collectively known as the Submarine Rescue System-Rescue Capable System (SRS-RCS). In June 2008, the SRS-RCS successfully conducted an operational evaluation (OPEVAL) during BOLD MONARCH 2008, a submarine rescue exercise off the coast of Arendal, Norway.

Development of the final system of the SRDRS (SDS) is ongoing and planned to be introduced in FY 2013.

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 Navy acquisition programs are fielding field UUV systems to improve capabilities to enable Assured Access. The 2004 Navy UUV Master Plan prioritizes UUV missions and maps those missions to four distinct vehicle classes by size. The three highest-priority UUV missions—Intelligence, Surveillance and Reconnaissance; Mine Countermeasures; and Anti-Submarine Warfare—are the focus of current R&D efforts. The Navy is pursuing an aggressive experimentation program to deliver warfighting capability to the fleet in an incremental manner, taking the lessons learned and feeding these lessons into the acquisition programs. Additionally, several concept development efforts are underway to lay out a conceptual framework for unmanned systems, including UUVs, as they complement manned platforms in the Navy inventory.

Status

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

Developers

Boeing	Anaheim, California USA
Woods Hole Oceanographic Institution	Woods Hole, Massachusetts USA
Bluefin Robotics	Cambridge, Massachusetts USA
Hydroid	Pocasset, Massachusetts
Lockheed Martin, Perry Technologies	Sunnyvale, California USA

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 sole weapon that U.S. submarines use against submarines and surface ships. The ADCAP was authorized for full production in 1990 and the final new-production 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 inventory.

The first ADCAP torpedo (MOD 5) featured sophisticated sonar, all-digital guidance and control systems, digital fusing systems and propulsion improvements for the Mk-48 torpedo. The next incremental upgrade to the ADCAP (MOD 6) improved the guidance and control system and improved torpedo acoustic stealth. The most recent increment (Mod 7 Common Broadband Advanced Sonar System (CBASS)) includes a new broadband sonar system and shallow water performance improvements. The CBASS upgrade to the ADCAP was part of an international development 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 Navy's foreign military sales program.

Status

The Navy continues to procure CBASS hardware for eventual conversion of all MK-48 ADCAP torpedoes through the life of the program. In parallel, the Torpedo Spiral Development program will continue to improve torpedo performance through software upgrades in challenging areas such as the shallow-water diesel submarine threat. The MK-48 ADCAP is and will remain the Navy's primary submarine-launched torpedo through 2026

Developers

Raytheon Systems — 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* (SSBN-726)-class submarines were configured to carry 24 Trident I/C4 missiles SLBMs. The ninth ship, the USS *Tennessee* (SSBN-734) and all later ships are 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. Trident missiles are capable

of carrying W76 or W88 Multiple Independently Targeted Reentry Vehicles (MIRVs). 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.

Status

The D5 life-extension program will redesign and replace aging missile electronics and guidance systems in existing missiles, and procure 108 additional missiles to meet long-term inventory requirements associated with the *Ohio*-class SSBN and its replacement submarine.

Developers

Lockheed Martin — Sunnyvale, California USA

SUBMARINE SENSORS

BQQ-10
Acoustic Rapid COTS Insertion (ARCI)

Description

ARCI replaces existing legacy submarine sonar systems with more capable and flexible Commercial-Off-The-Shelf (COTS)-based Open Architecture (OA), 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/OA technologies and systems enables frequent, periodic updates to both software and hardware with little or no impact on submarine operational availability. COTS-based processors allow computer power growth at a rate commensurate with the commercial industry state of the practice. 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

Recent, real-world encounters have consistently demonstrated the overwhelming success of this program to sustain U.S. acoustic superiority. Continuous improvements via the advanced processor build and technical insertion processes 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 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 and TB-34 Submarine Towed Arrays

Description

All submarines are equipped with towed array sensors. The sensors are long cables containing sound-detecting hydrophones that can be towed far behind the ship, removing the sensors from the ship's self noise and increasing the ship's ability to detect sounds from other ships and submarines. The towed arrays are referred to as "thin-line" and "fat-line," a reference to the diameter of the cable. The TB 33 submarine thin-line towed array is the follow-on replacement for the TB 29 series thin-line towed array. It is a fiber-optic array designed to have the same capabilities of the TB 29 series towed array, but with superior reliability. TB-33 will be back-fit on *Los Angeles* (SSN-688 and SSN-688I), *Seawolf* (SSN-21) and SSGN-class submarines, and will be forward-fit on the *Virginia* (SSN-774)-class submarines.

The TB 34 submarine fat-line towed array is the follow on replacement to the TB 16 series fat line towed array. It is a COTS-based telemetry array that will exceed the capabilities of the TB 16 series array it replaces by having a larger frequency range and improved littoral operating capabilities. TB-34 will be back-fit on *Los Angeles* (SSN-688 and 688I), *Seawolf* (SSN-21) and SSGN-class submarines, and will be forward-fit on *Virginia* (SSN-774) class submarines.

Status

TB-33 is scheduled for two Low-Rate Initial Production (LRIP) units in FY 2009, with Full-Rate Production (FRP) beginning in FY 2010. TB-33 Technical Evaluation (TECHEVAL) and Operational Evaluation (OPEVAL) are both scheduled for FY 2010. One TB-34 LRIP unit was procured in FY 2008 with a second LRIP procured in FY 2009. TB-34 TECHEVAL and OPEVAL are currently scheduled for the FY 2009.

Developers

Chesapeake Sciences Corporation	Millersville, Maryland USA

SUBMARINE EQUIPMENT AND SYSTEMS

Common Submarine Radio Room (CSRR)

Description

Based on the Exterior Communications System (ECS) architecture developed for the *Virginia* (SSN-774)-class submarines, the CSRR modernizes the radio rooms on *Seawolf* (SSN-21), *Ohio* (SSBN/SSGN-726) and *Los Angeles* (SSN-688)-class submarines. CSRR is an upgradeable, scaleable open-architecture network framework combined with common antennae that ultimately simplifies communication connectivity. The system uses network-centric, IP-based components in place of legacy, hardwired function-specific pieces of equipment. 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

SubLAN provides separate Secret, Top Secret, Sensitive Compartmentalized Information (SCI) and Unclassified LANs with full network services and connectivity. It integrates non-tactical subsystems and applications, including the Navy Enterprise Portal and back-fit versions of *Virginia* (SSN-774)-class Web-enabled "paperless submarine" applications. It accommodates hardware/software upgrades and technology insertion for the life of the submarine, providing end-to-end connectivity for all tactical and non-tactical subsystems, enabling battle force/JTF interoperability and ship-wide access to the common operating picture, JWICS/SIPRNET/NIPRNET e-mail and web browsing, battle force chat, and other collaborative tools. 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), which will provide the network infrastructure and core services in a Service Oriented Architecture and Multi-Level Security environment.

Status

SubLAN 1 installations commenced in FY 2004 and will complete in FY 2011. SubLAN 2 installations will commence in FY 2009 and are planned to complete in FY 2013, with a transition to CANES in FY 2014.

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 (SubHDR)

Description

The SubHDR mast group upgrades the submarine Extremely High Frequency (EHF) Low Data Rate (LDR) capability, adds EHF Medium Data Rate (MDR) capability, provides new military Super High Frequency (SHF) access and enables reception of the Global Broadcast Service (GBS). It provides submarines with worldwide, high-capacity communications in the EHF and SHF bands. This system supports current and emerging information-transfer requirements of the multi-mission, highly mobile, covert submarine platforms supporting Joint, naval and allied forces engaged in regional or global missions.

Status

Installations are in progress, with all classes of submarines to have the HDR installed by the end of FY 2010.

Developers

Raytheon	Marlboro, Massachusetts USA

Submarine Survivability

Description

Submariners today use passive means to remove carbon dioxide from a disabled submarine's atmosphere, enabling survival up to seven days following a casualty. Current developments include improving the passive scrubbing capabilities by the introduction of new Lithium Hydroxide (LiOH) canisters and more accurately monitoring a disabled submarine's atmosphere with the introduction of the Analox Sub Mk IIP atmosphere analyzer.

Status

Installation of passive scrubbing curtains on board all submarines is complete. Newly developed flat-sheet LiOH canisters are being phased into the initial outfitting for the *Virginia* (SSN-774) Class. Procurement and installation of the Analox Sub Mk IIP hyperbaric atmosphere analyzer will be completed on all submarines in FY 2009.

Developers

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

Submarine Escape (SEIE)

Description

To facilitate emergency escape from depths as deep as 600 feet, all submarines are being outfitted with Mk-10 Submarine Escape and Immersion Equipment (SEIE) suits, improved air-delivery systems, and improved hatch-operating systems. In addition to increasing the depth capabilities of escape, the suit provides thermal protection and individual life rafts for surface abandonment or escape.

Status

Installation is complete for the *Los Angeles* (SSN-688)-class submarines; *Seawolf* (SSN-21)-class installations were completed in January 2008. The remaining *Ohio* (SSGN/SSBN-726)-class installations will be completed In FY 2009. The *Virginia* (SSN-774) 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 common combat control system for the U.S. Submarine Force's *Los Angeles*, *Seawolf* and *Virginia* SSN and *Ohio* SSGN classes. The system incorporates tactical control of the environment external to the submarine, weapon control for Tomahawk missiles and torpedoes, and internal submarine Tactical Local Area Network (TacLAN) functions into a single procurement program. BYG-1 is an open-architecture system that will be updated continuously with hardware and software enhancements to address COTS obsolescence and capability improvements as defined by the Advanced Processor Build process. Hardware upgrades, scheduled approximately every four years, are referred to as Tech Insertion (TI) kits. The TI upgrades provide the baseline for all future BYG-1 procurements. Software updates, scheduled approximately every two years and called advanced processing builds (APBs), incorporate capability upgrades in between the hardware upgrades. The TI/APB model enables to submarine force to inject immediately-improved, state-of-the-practice hardware and software that will prevent obsolescence.

Status

The BYG-1 is being procured and will 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 Fixed Distributed Surveillance (FDS) 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

Various COTS suppliers.

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 the Maritime Prepositioning Force, or MPF—as well as 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, and their capacity to provide equipment and supplies ashore enables them to quickly respond to world crises. Riverine and expeditionary security forces provide maritime security in coastal and inland waterways, protecting ships and maritime infrastructure. In addition to amphibious and MPF ships, Joint High-Speed Vessels (JHSV), hospital ships (T-AH) 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

Explosive Ordnance Disposal (EOD) units are tasked with providing the fleet 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. Other tasks include providing combat-ready explosive ordnance disposal and diving and salvage forces to the fleet, eliminating ordnance hazards that jeopardize operations in support of national military strategy and salvaging or recovering ships, aircraft and weapons lost or damaged in peacetime or combat.

Mobile diving and salvage units (MDSU) conduct expeditionary salvage and search and recovery both afloat and ashore. They also perform harbor clearance, salvage and de-beaching, underwater cutting and welding, limited demolition, limited underwater ship repair, ship husbandry and force protection dive support for 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, for example, Man-Transportable Robotic Systems, unmanned underwater vehicles and Mk-16 Underwater Breathing Apparatus, were included for EOD units.

Developers

Multiple sources.

MESF
Maritime Expeditionary Security Force

Description

The Maritime Expeditionary Security Force (MESF) stood up in 2007 and combines legacy naval coastal warfare forces, the mobile security force and Visit, Board, Search and Seizure (VBSS) Level III teams. It 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; VBSS 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 secondary tasks including detention operations, law enforcement, 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 is under review in 2009 to properly equip the force for the expeditionary security requirements of worldwide crisis-response and combat operations.

Developers
Multiple sources.

NAVELSG
Navy Expeditionary Logistics Support Group

Description
The Navy Expeditionary Logistics Support Group consists of 12 cargo-handling battalions and two supply-support battalions that are trained and equipped to deploy anywhere in the world and provide effective shore-based logistical support to naval operating forces. Its overall mission is to provide advanced-base cargo handling, transportation and supply support to Navy and Marine Corps operational units.

Navy cargo-handling battalions provide logistics support and focus on port operations or air cargo. Each is organized, trained and equipped to load and offload cargo and ammunition carried in maritime prepositioning and merchant ships in all environments, operate ocean cargo terminals, handle hazardous material pier side and in stream, conduct port terminal operations, perform heavy lift crane operations and provide short-haul trucking. They are also capable of loading and offloading cargo carried in military-controlled aircraft and operating an expeditionary air cargo terminal.

Status
The NAVELSG TOA is under review and modification to better reflect a more streamlined reorganization of the force.

Developers
Multiple sources.

NMCB
Naval Mobile Construction Battalion

Description
Naval Construction Force elements provide engineering and combat construction support to the Marine Air-Ground Task Force (MAGTF) and other naval and joint forces. NMCBs conduct missions providing presence, developing partner nation capacity and supporting humanitarian-assistance/disaster-response efforts.

In operations other than war, forward-deployed Naval Mobile Construction Battalions—NMCBs or "Seabees"—hone construction skills through humanitarian-assistance and disaster-response operations, participate in foreign engagement exercises, and complete construction projects that support sustainment, restoration and modernization of the Navy's forward bases and facilities. When required during conflict, 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.

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.

Riverine Squadrons
Navy Expeditionary Combat Command

Description
Since the riverine force was formally established in May 2006, the Navy Expeditionary Combat Command (NECC) has stood up Riverine Group One in Norfolk, Virginia, and three riverine squadrons: Squadrons One and Two in Norfolk and Squadron Three in Yorktown, Virginia. All three have conducted operations in Iraq.

The 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
Build up and replenishment of the Riverine TOA continues.

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 and Strategic Sealift Ships over the beach or to an unimproved pier in the event more robust port facilities are denied, degraded or unavailable. INLS replaces the aging legacy Navy Lighterage (NL) system. The new system, which consists of powered and non-powered sections, 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 (RO/RO) discharge facility or RRDF. INLS can support both lift on/lift off (LO/LO) and RO/RO operations in near-shore regions. INLS is also envisioned to support legacy vessels of the Maritime Prepositioning Force (Future) squadron. The system's improved sea-keeping, water-jet propulsion and cargo movement capabilities far surpass the current NL in speed, maneuverability, cargo throughput and crew safety.

Status

INLS is in Full Rate Production (FRP) with last article expected to be delivered in FY 2010. At the end of 2008, six of 14 MPF ships are loaded with INLS.

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. Leased high-speed vessels such as *Joint Venture* (HSV-X1), *Swift* (HSV-2) and *West Pac Express* (HSV-4676) have demonstrated the ability to rapidly embark and transport combat forces during advanced concept technology demonstration testing. JHSV is not an assault platform, but provides intra-theater lift capability for company-sized units, including personnel, equipment and supplies, in support of global crisis-response and combat operations and theater security cooperation plans. Design and cost analysis of the JHSV is ongoing, but the leased vessels are capable of speeds in excess of 40 knots and ranges greater than 1,200 nautical miles fully loaded. In addition, the shallow-draft characteristics will enable the JHSV to operate effectively in littoral areas and access small, austere ports.

Status

The JHSV program resulted from the 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 was approved in April 2006 and the Capabilities Development Document was Joint Requirements Oversight Council (JROC) approved in January 2007. The lead ship contract is expected to be awarded in FY 2009. The Navy plans to increase the charter of JHSVs from two to four, until the lead ship delivers in 2011.

Developers
To be determined.

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

The program's IOC was achieved in 1986. The buy was completed with all 91 craft delivered to the fleet by the end of 2001. Nine that were in Deep Reduced Operating Status were terminated in FY 2006, and two are held for R&D. The LCAC SLEP began in late 2000. Five to six SLEPs are planned each year through 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

LCC(R) Command Ship Replacement

Description

LCC(R) will replace the afloat command and control (C2) capability provided by the current *Blue Ridge* (LCC-19) class. It will support the full range of missions and functions of a Maritime Operations Center (MOC) in support of the forward-deployed Fleet Commanders, Joint Force Maritime Component Commander (JFMCC) and Combined Joint Task Force (CJTF). The in-theater C2 capability this program provides is vital to supporting Commanders' staff's presence, persistence and speed of decision.

Status

The Joint Requirements Oversight Council (JROC) validated the Command Ship Replacement Initial Capabilities Document in July 2008. The Analysis of Alternatives is scheduled to be completed in April 2009. The AoA will provide analysis to determine LCC(R)'s C4ISR capabilities, combat systems, hull form, employment and costs.

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 (e.g., a gas turbine propulsion plant and all-electric auxiliaries) and a significant increase in aviation lift, sustainment, and maintenance capabilities; space for a MEU, PHIBGRU or small-scale JTF staff; a significant increase in service life allowances for new-generation Marine Corps systems (MV-22, JSF); and substantial survivability upgrades.

Status

Milestone B was reached in January 2006. The first LHA(R) was designated LHA-6 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* (LHD-1) class comprises eight 40,650-ton full-load, multi-purpose amphibious assault ships whose primary mission is to provide embarked commanders with command and control capabilities for sea-based maneuver/assault operations as well as employing elements of a landing force through a combination of helicopters and amphibious vehicles. The *Wasp* class also has several secondary missions, including power projection and sea control. The LHD-1 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. The Navy awarded the LHD-8 construction contract in April 2002. The ship has significant design changes that incorporate gas-turbine propulsion and all-electric auxiliary equipment.

Status

Seven LHDs have been delivered to the fleet. The newest LHD, the USS *Iwo Jima* (LHD-7), was commissioned on 30 June 2001. The eighth ship of the class, *Makin Island* (LHD-8) is under contract, and the Navy anticipates delivery of the ship in FY 2009.

Developers

Northrop Grumman Ship Systems
Ingalls Operations Pascagoula, Mississippi USA

LPD-17
San Antonio-Class Amphibious Transport Dock Ship

Description

The *San Antonio* (LPD-17) is an amphibious transport dock ship optimized for operational flexibility and designed to meet MAGTF lift requirements in the emerging naval expeditionary combined-arms concept of operations. The *San Antonio* LPDs are 684 feet in length, with a beam of 105 feet, a maximum displacement of 25,000 long tons and a crew of approximately 360. Four turbocharged diesels with two shafts and two outboard-rotating controllable-pitch propellers generate a sustained speed of 22-plus knots. Other ship characteristics include 25,000 square feet of space for vehicles (more than twice that of the *Austin* LPD-4 class it replaces), 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 that can transport cargo, personnel, Marine vehicles and tanks. The LPD-17 aviation facilities include a hangar and flight deck (33 percent larger than *Austin* class) 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 links shipboard systems and embarked Marine Corps platforms and significant quality of life improvements.

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. LPD-17 class workload was transferred from Bath Iron Works to Northrop Grumman Ship Systems (NGSS) in June 2002. At the end 2008, LPDs 17 through 19 have delivered and LPDs 20 through 24 were under construction.

Developers

Northrop Grumman Ship Systems

Avondale Operations	New Orleans, Louisiana USA
Ingalls Operations	Pascagoula, Mississippi USA
Raytheon	San Diego, California USA

MCM-1 MOD
Avenger-Class Mine Countermeasures Ship Modernization

Description

The *Avenger* (MCM-1)-class Surface Mine Countermeasures (SMCM) 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" that includes Airborne MCM helicopters and Explosive Ordnance Disposal divers. 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 by the end of FY 2009.

SMCM MOD corrects the most significant maintenance and obsolescence issues in order to maintain the ships through their full 30-year service lives. The MCM-1 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-1 class modernization package commenced in FY 2004 and is scheduled for completion by 2010.

Developers

FDGM	Ingleside, Texas USA
Raytheon	Portsmouth, Rhode Island USA

MPF(F)
Maritime Prepositioning Force (Future)

Description

The Maritime Prepositioning Force (Future) (MPF(F)) squadron is a key component of the overall global prepositioning posture. Its operational capability, when combined with other joint forces, can be employed across the full Range of Military Operations (ROMO), from supporting Major Combat Operations (MCO) to rapidly responding to smaller contingency operations such as Humanitarian Assistance/Disaster Relief (HA/DR).

MPF(F) is a highly scalable capability. Each ship class of the squadron will be able to operate independently or in tandem with other ship classes to provide different combinations of capability. An MPF(F) squadron provides capabilities beyond that of the existing Maritime Prepositioning Squadron (MPSRON), including

arrival and assembly at-sea, employment of combat-ready forces from over the horizon, persistent sustainment of forces operating ashore, ship-to-ship cargo transfer, surface connector interfaces, organic aviation interfaces, organizational and selected intermediate maintenance for tilt-rotor/rotary-wing aircraft and surface connectors, organizational and intermediate vehicle/equipment maintenance, selective offload, brigade level command and control and at-sea medical care.

The full MPF(F) squadron consists of three Mobile Landing Platforms (MLP), three MPF(F) Large Medium Speed Roll-on/Roll-off (LMSR) ships, three Auxiliary Dry Cargo/Ammunition Ships (T-AKE), three aviation-capable large-deck amphibious ships (LHA/D) and two legacy sealift ships (T-AK).

MLP: The MPF(F) MLP is the critical link for the employment of forces ashore from over the horizon via its organic surface connectors (LCAC/SSC) and surface interface capabilities.

T-AKE: The MPF(F) T-AKEs provide continuous sea-based sustainment to forces operating ashore from their selectively offloadable cargo holds.

Aviation Platforms (LHA/D): The MPF(F) aviation platforms contribute to the command and control, vertical employment, and sustainment of the Marine Expeditionary Brigade. These ships provide a base afloat for supporting rotor wing/tilt rotor aviation operations.

MPF(F) LMSR: The MPF(F) LMSRs provide the main equipment prepositioned capacity for the squadron. Along with the MLP, they are also the primary platform for the conduct of arrival and assembly at sea, ship-to-ship cargo transfer, ground equipment maintenance and reconstitution.

MPF(F) T-AK: The legacy sealift ships in MPF(F) are loaded with the required equipment and supplies to stand-up and support a forward base ashore for the Marine Expeditionary Brigade Air Combat Element fixed-wing aviation assets.

Status

The MPF (F) Increment One Capabilities Development Document (CDD) received Joint Requirements Oversight Council (JROC) approval in March 2008. This Increment supports the T-AKE (lead ship in FY 2009) and MLP (lead ship in fiscal year 2010). Increments Two and Three will be addressed during FY 2009.

Developers

To be determined.

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 is powered by twin diesel engines and water jet propulsion and can reach speeds in excess of 25 knots over a 300nmi 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 2009. Fourteen craft have been delivered to end users and MPF ships. Procurement and production of all 23 craft will complete in FY 2012.

Developers

Kvichak Marine — Seattle, Washington USA

SSC
Seabase-to-Shore Connector

Description

A replacement for the LCAC, 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 ends of service lives and retire beginning in 2014. The SSC payload design will exceed the current LCAC SLEP payload.

Status

The Joint Requirements Oversight Council approved the Initial Capabilities Document in October 2006. Delivery of the first craft into the fleet is scheduled for FY 2016.

Developers

To be determined.

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

Description

The *Cyclone* (PC-1)-class Patrol Coastal Ships conduct Theater Security Cooperation (TSC), Maritime Security Operations (MSO) and Intelligence, Surveillance and Reconnaissance (ISR) tasks. PCs are suited to operating with our emerging partner navies and in the shallow depths of water found in the "green water/brown water" seam. A total of 14 *Cyclone*-class ships were built. In early 2009, ten

were operating with the U.S. Navy and three with the Coast Guard. One was given to the Philippines in 2004.

The PC Service Life Extension Program (SLEP) improvements will extend the life of the class to 30-year expected service life. The program includes establishing a main propulsion diesel engine pool, replacing diesel generators and reverse-osmosis units. A finite element analysis of the hull and subsequent repairs are also planned. Additional HM&E modifications, updates to the weapons systems and the communications, computers, command, control, intelligence, surveillance and reconnaissance (C4ISR) suite are also included.

Status
The 13-ship PC class is undergoing a life extension package that commenced in FY 2008 and is scheduled for completion by 2016.

Developers
Various.

T-AH 19
Mercy-Class Hospital Ships

Description
The two T-AH 19 *Mercy*-Class hospital ships are national strategic assets that are employed in support of Combatant Commander 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 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. The hospital ships provide a highly visible, engaged, and reassuring presence when deployed for Theater Security Cooperation (TSC) tasking or when called to respond to humanitarian assistance or disaster relief (HA/DR).

Status
USNS *Mercy* and *Comfort* have expected service lives 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 (MSC), these ships are maintained in either a Reduced Operating Status (ROS) ready for quick mobilization to Full Operating Status (FOS) in response to mission tasking and COCOM requests. Generally, one hospital ship is scheduled for a 120-150 day TSC deployment per year. Periodic maintenance is performed to ensure both ships are able to meet full operational capability within a few days of activation when they are in ROS status. These ships are manned by a civilian mariner (CIVMAR) crews with medical staff augmentation when activated.

Developers
None.

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

Description

The *Lewis and Clark*-class T-AKE-1 ships replace the *Kilauea* (T-AE-26), *Mars* (T-AFS-1) and *Sirius* (T-AFS-8) classes of fleet auxiliaries, all of which are nearing the ends of their service lives. T-AKEs provide logistic lift of supplies, transferring cargo at sea to station ships which serve the combat forces. T-AKEs also 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, who are augmented by military personnel as required. A Navy aviation detachment or equivalent, provides vertical underway replenishment (VERTREP) capability.

Status

The existing 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 the Combat Logistics Force (CLF) and Maritime Prepositioning Force (Future) program. Twelve T-AKE hulls are on contract in early 2009. A contract for long-lead-time material was awarded for the 13th and 14th hulls in December 2008. The program achieved initial operational capability in May 2007, when T-AKE 1 completed Post-Shakedown Availability.

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. A near-term capability using the Joint Direct-Attack Munition (JDAM) for ABS (JABS) was fielded in FY 2007 with an enhanced far-term capability by FY 2015. The platform for the COBRA system is the Fire Scout VTUAV. The platforms for employment of the breaching mechanisms include Navy strike and Air Force combat aircraft.

Status

The COBRA Block I system achieved Milestone B in FY 2006 and will achieve Milestone C in mid- Quarter 2009. The Counter-Mine System munition (CMS) achieved Milestone B in 2008 and will reach Milestone C in FY 2014, with IOC projected for FY 2015.

Developers

Northrop Grumman — Melbourne, Florida USA

ALMDS
Airborne Laser Mine Detection System

Description

The ALMDS is an organic, high-area coverage, electro-optic Airborne Mine Countermeasures (AMCM) laser system that detects, classifies and localizes floating and near-surface moored sea mines. Deployed from the MH-60S helicopter, ALMDS will satisfy the Navy's need for a quick-response, wide-area, organic MCM system that can rapidly detect and classify mine-like contacts for subsequent prosecution. This capability will be critical in littoral zones, confined straits, choke points, operating areas and amphibious objective areas. ALMDS offers a much greater area search rate than other types of AMCM equipment, and it represents a capability that does not exist in the 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 2009.

Developers

Northrop Grumman	Melbourne, Florida 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. Remotely operated AMNS devices are intended for previously detected mine locations where it will reacquire and neutralize identified targets. They will be fully integrated into the MH-60S avionics architecture.

Status

Beginning in FY 2003, AMNS systems have been procured for the MH-53E to provide a near-term contingency airborne neutralization capability. Follow-on AMNS system integration work for the MH-60S began in FY 2003 and will continue through a projected FY 2009 IOC for the AMNS on the MH-60S.

Developers

Lockheed Martin	Syracuse, New York USA
STN Atlas	Bremen, Germany
Raytheon	Portsmouth, Rhode Island 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 resident in the carrier/expeditionary strike group 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 Navy Littoral Combat Ships.

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, and developmental testing is ongoing.

Developers

Raytheon	Portsmouth, Rhode Island USA

IDS
Biometrics for VBSS and Identity Dominance System

Description

Biometrics for Visit, Board, Search and Seizure (VBSS) teams is a program that improves biometric identification capabilities for teams conducting Expanded Maritime Interception Operations (EMIO). This provides VBSS teams with the ability to collect data through facial image, iris scans and fingerprints. The Identity Dominance System (IDS) currently in development will have a lighter-weight system, with improved storage capabilities, capable of collecting higher quality data on land or at sea.

Status

Currently, VBSS teams use COTS biometrics equipment to collect and transmit biometric information. Approximately 200 of these kits were procured in FYs 2006 and 2007. The Navy continued biometrics capability development with the Joint Biometrics Task Force, and the first successful biometric data collection by a U.S. Navy ship occurred in June 2006.

The IDS Capability Development Document was approved by the Joint Requirements Oversight Council (JROC) in September 2008, and will achieve Milestone B in FY 2009.

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) are a threat to U.S. forces around the world and across of military operations. Counter Radio-Controlled IED Electronic Warfare (CREW) encompasses all of the mobile and fixed-site protection systems employed to counter IEDs that are either armed or initiated by radio-command signals. Current CREW systems were acquired largely by non-developmental urgent needs initiatives meant to address immediate warfighter requirements. Joint CREW (JCREW) is a Navy-led program to develop the next-generation of Joint CREW systems. JCREW corrects deficiencies in existing CREW systems and address future worldwide radio-controlled IED threats. Additionally, JCREW will have an open architecture, allowing evolution as new threats, advances in technology and new vehicle requirements are introduced.

Status
JCREW has been approved for the release of the request for proposal, with contract award anticipated in 2009. JCREW is expected to reach IOC in 2012.

Developers
To be determined.

MK-62/63/65 TDD MK-71
Quickstrike Naval Mines

Description
The in-service Quickstrike family of aircraft-delivered shallow-water bottom mines is being enhanced by procurement of the programmable multiple-influence Target Detection Device (TDD) MK-71. Engineering development efforts include new advanced TDD algorithms for ship detection, classification and localization against likely threats, including quiet diesel-electric submarines, mini-subs, fast patrol boats and air-cushioned vehicles. The Quickstrike mines include one dedicated weapon (MK-65, 2,300-pound mine) and two mines converted from bombs (MK-62 500-pound and MK-63 1,000-pound mines). Because of the bomb-conversion options, aircraft carrier air wings have the flexibility to conduct mining operations without the need to carry mines as additional ordnance.

Status
Limited in-service support continues for inventories of in-service NK-57/58 TDDs. MK-71 TDD is expected to reach IOC in early 2009.

Developers
SECHAN Electronics, Inc. Lititz, Pennsylvania USA

OASIS
Organic Airborne and Surface Influence Sweep

Description
The OASIS system will provide the strike group with an organic, high-speed, magnetic/acoustic influence minesweeping capabil-

ity to neutralize sea mine threats in areas where mine hunting is impossible due to mine burial or high bottom clutter. The OASIS system is one of five Airborne Mine Countermeasures (AMCM) systems under development that will be deployed and operated from the MH-60S helicopter.

Status
The program was restructured in POM-2010 in order to test the newly redesigned sensor head. The new IOC is to be determined.

Developers
EDO Corporation New York, New York USA

RAMICS
Rapid Airborne Mine Clearance System

Description
The RAMICS will fire a Mk 258 Mod 1 30mm supercavitating projectile from a Mark 44 Bushmaster II gun to neutralize surface and near-surface mines. RAMICS will be hosted on board the MH-60S helicopter as one of five developing Airborne MCM (AMCM) systems organic to the strike group. The system has a supercavitating tungsten projectile that 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 has a fire-control system with targeting algorithms coupled with a Light Detection and Ranging (LIDAR) system that locates and targets the mines and provides aiming coordinates to the gun's fire control system for immediate and positive mine neutralization.

Status
Procurement of systems begins upon successful aircraft integration, scheduled for FY 2010.

Developers
Northrop Grumman Melbourne, Florida USA

WLD-1 RMS
Remote Mine-Hunting System

Description
The WLD-1 RMS consists of an semi-submersible, unmanned vehicle that tows an AQS-20A mine-hunting sonar. RMS was tested on the USS *Bainbridge* (DDG-96), but will be operated from *Freedom* (LCS-1)-class ships. RMS is designed to be launched with a pre-programmed search pattern, and the system is capable of over-the-horizon mine-hunting. Once the mission is completed, RMS returns to the ship and data will be downloaded for post-mission analysis.

Status
Milestone C occurred in FY 2005 and supported an LRIP decision that procured three systems. A second LRIP decision in FY 2006 acquired four more systems. RMS was operated from *Bainbridge* during a September 2007 deployment. Remaining testing and evaluation will be completed in the FY 2010 timeframe.

Developers
Lockheed Martin Riviera Beach, Florida USA

C4ISR

C4ISR—Command, control, communications, computers, intelligence, surveillance and reconnaissance—is the backbone for all naval and maritime operations. It enables all of the Navy's capabilities, ensuring that information is collected, processed, disseminated and received in support of operations ranging from forward presence to power-projection in support of combat operations. It includes integrated communications and information technology systems and the connectivity needed to and ensure the mission success of our naval forces. Whether the information needed is intelligence on the location of enemy forces, requisitions for repairs parts and supplies or orders from commanders, the Navy's C4ISR network supports all operations afloat and ashore.

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 pierside 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 pierside. 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. ADNS Increment III 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 Network Operations Centers facilities were equipped with either ADNS Increment I or II. In FY 2006, ADNS Increment IIa/b installations began on aircraft carriers, large-deck amphibious assault ships and fleet commander flagships (force-level ships). Increment III Low Rate Initial Production (LRIP) will begin in FY 2009 with a planned Initial Operating Capability (IOC) for FY 2010. Increment III will be installed in all ships, submarines and ashore NOCs.

Developers

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

AIS
Automatic Identification System

Description

The Automatic Identification System (AIS) is the International Maritime Organization (IMO)-mandated civilian maritime Very High Frequency (VHF) transponder system that continuously transmits and receives identification and intentions data between ships and from ship to shore. AIS improves maritime safety by reducing the difficulty of identifying ships in low visibility, at night and at a distance by continuously transmitting ship-unique identifier, position, course, speed and other information to nearby

ships and Vessel Traffic Service stations. Although warships are exempted from the requirement to transmit AIS, the Navy collects AIS data to improve ship safety and develop a more complete Common Operational Picture (COP). AIS is a data source to Maritime Domain Awareness (MDA), and the sharing of AIS data with partner nations contributes to improved maritime security, situational awareness and navigation safety.

Status

The Assistant Secretary of the Navy for Research, Development and Acquisition on 24 January 2006 designated AIS a Rapid Deployment Capability (RDC). Fielding of AIS transceivers was initiated under the RDC in response to Presidential guidance for conducting global crisis-response and combat operations and CNO guidance for FY 2006. AIS Phase 1A is being installed on unit-level ships (e.g., cruisers, destroyers and submarines) and provides a basic AIS capability that includes a laptop computer display on the bridge and connectivity to send unclassified AIS data to shore sites. AIS Phase 2B is being installed on force-level ships (aircraft carriers and amphibious ships) and allows the direct transfer of AIS track information to the Global Command and Control System via Radiant Mercury. In early 2009, 147 Phase 1A, 20 Phase 2B and five shore AIS systems (Second, Third, Sixth and Pacific Fleet) have been installed. Additionally, 23 stand-alone AIS transceivers have been installed on submarines. The Navy is planning to install AIS on board remaining surface units (unit-level AIS), E-2C, P-3C and SH-60 aircraft. The AIS RDC will transition to an acquisition Program of Record during FY2009.

Developers

L-3 Communications	Orlando, Florida USA
Northrop Grumman	San Diego, California USA

ATDLS
Advanced Tactical Data Link Systems

Description

The Advanced Tactical Data Link Systems (ATDLS) family of programs provides the tactical data link command-and-control (C2) backbone for U.S., 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 and Link-16) 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. 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 individual program descriptions for C2P, CDLMS, DNM, JTIDS, JSS and MIDS in this section of Chapter 3 provide the status of each program in early 2009.

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 exists at 14 Outside the Continental United States (OCONUS) major fleet concentration bases and stations. BLII is the program of record 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 at 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
Bringing users to the new physical infrastructure and migrating these users onto ONE-NET is nearing completion for Phase I. Follow-on actions will include infrastructure build out/modernization to enable the migration of all OCONUS Navy users onto ONE-NET (Phase II). Refreshment of Network devices (servers, switches, routers) and PCs will begin in FY 2009.

Developers
The BLII program of record is under the cognizance of PEO Enterprise Information Systems; OPNAV 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

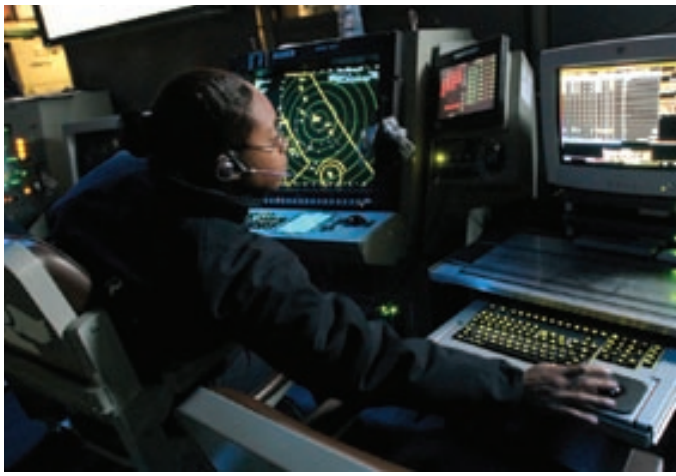
Description
The C2P serves as the interface and data translator between the surface warship's Combat Direction System (CDS) and Tactical Data Links (TDLs). It is a "gateway" that forwards data between Link-11 and Link-16. The CDLMS initiative supports the Advanced Tactical Data Link Systems (ATDLS) program, extending the functionality of the 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) and supports 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) and 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—that 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 will introduce Link-22.

Status
The C2P is fully fielded with the capability of being re-hosted as software within the CDLMS and Next-Generation C2P (NGC2P). CDLMS has successfully completed testing and is approved for Full Rate Production. It attained IOC in February 2008 and is expected to reach FOC in FY 2012.

Developers

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

CANES
Common Afloat Network Enterprise System



Description

Common 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 (SubLAN).

The CANES fielding plan is based on a four-year hardware refresh baseline and a rolling two-year application software upgrade baselines. 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 a draft Request For Proposal (RFP) was released in December 2008. A final RFP was scheduled for release in early 2009 to support planned IOC in FY 2012 and FOC in FY 2018.

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 and collaboration. Other CENTRIXS products include 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 Internet Protocol (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). In early 2009, the Pacific Region Network Operations Center (PRNOC) was the only network hub for CENTRIXS connectivity. Due to the criticality of coalition operations, CENTCOM requires that all ships deploying to the region have CENTRIXS-M capability. CENTRIXS-M, currently fielded as a stand-alone network and software, will be consolidated into the Consolidated Afloat Networks and Enterprise Services (CANES) when that system is fielded. Increment I will provide simultaneous access to multiple enclaves on a single workstation.

Status

CENTRIXS-M became a program of record during the first quarter FY 2006. Increment 1 Milestone C was achieved during the second quarter FY 2007. Initial Operational Capability for Increment 1 was achieved in fourth quarter FY 2007, with full operational capability expected in fourth quarter FY 2013. CENTRIXS-M is currently installed on all Navy ships.

Developers

Hardware for procurement and development of CENTRIXS is under the cognizance of SPAWAR PEO C4I PMW 160 as well as OPNAV N6. These organizations identify and implement the latest technologies to ensure proper implementation into the program. 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 Program supplements existing military satellite capability, such as the WSC-6, until the various military satellite programs achieve the capability and capacity required to meet the voice, data, video and imagery requirements of the warfighter-at-sea. This program provides a significant and vital capability enabling access to email, telephones and video teleconferencing—a key enabler for Command and Control and Quality of Life. The program of record includes: (1) The Commercial Wideband Satellite Program (CWSP), formerly known as Challenge Athena; (2) INMARSAT B High-Speed Data (HSD); (3) Television Direct-to-Sailor (TV-DTS); and (4) Iridium. The next-generation Commercial SATCOM terminal, referred to as the Commercial Broadband Satellite Program (CBSP), is being developed as a Rapid Deployment Capability (RDC). CBSP will increase bandwidth provided to .881Mbps for small ships (PC/MCM/FFG), 3.6 Mbps for unit-level ships (CG/DDG/LPD-4/LSD/MSC with military detachments) and 21.4Mbps for force-level ships (CVN/LHA/LHD/LCC/LPD-17). Commercial SATCOM terminals (CBSP, CWSP and INMARSAT B HSD) are enablers providing voice, video, data and imagery circuit requirements. The CBSP terminal uses commercial satellite connectivity and Commercial-Off-The Shelf/Non-Developmental Item (COTS/NDI) equipment. Commercial SATCOM augments bandwidth that is not otherwise available from Military Satellite Communications (MILSATCOM). Iridium is a handheld Satellite Phone that in early 2009 includes more than 2,600 users. Primary uses are Continuity of Operations (COOP) and emergency communications.

Status

CBSP began fielding in CY 2008 as a replacement for CWSP and INMARSAT B HSD, which are in sustainment. CWSP includes the WSC-8 terminal that was installed on 28 ships in early 2009; INMARSAT B HSD was installed on more than 220 ships. The program of record funds the Navy's share of the Operations and Maintenance (O&M) for the Iridium DoD Gateway in Hawaii. Navy Iridium users fund satellite handsets and airtime with OPTAR accounts.

Developers

Harris Corporation	Melbourne, Florida USA
NERA	London, England
CVG, Inc.	Chantilly, Virginia USA
Iridium, LLC	Bethesda, Maryland USA

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 that provides intelligence, surveillance, reconnaissance data exploitation and analysis capabilities and targeting support capabilities for coordinate-seeking weapons. DCGS-N operates at the General Services (GENSER) and Sensitive Compartmented Information (SCI) security levels. DCGS-N Increment One will replace all legacy Joint Service Imagery Processing-Navy (JSIPS-N) and Tactical Exploitation System-Navy (TES-N) systems.

In 2007, based on the emergence of the Consolidated Afloat Networks and Enterprise Services (CANES) concept, the DCGS-N program was realigned to fit into the CANES Common Computing Environment (CCE)/Core Enterprise Services (CES) architecture. DCGS-N (Increment Two–FY 2013) will ultimately be hosted, primarily as software, by CANES as part of the Navy's long-term vision for consolidation of C4I networks and services. DCGS-N will make maximum use of COTS, mature GOTS and Joint services software, tools and standards to build 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, as many as 36 DCGS-N Increment One systems will be installed on aircraft carriers (CVN), large-deck amphibious assault ships (LHA/LHD), fleet command ships (LCC), guided-missile submarines (SSGN), intelligence training centers and school house facilities, and at shore-based Numbered Maritime Operations Centers (MOC) reach-back support sites. Increment Two will be tested and fielded in FY 2013-2014 as part of CANES.

Developers

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

DJC2
Deployable Joint Command and Control

Description

Deployable Joint Command and Control (DJC2) is a standardized, rapidly deployable, scalable and reconfigurable Joint Command and Control (C2) and collaboration Combat Operations Center that is made available to Geographic Combatant Commanders and their joint component commands. DJC2 can support 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 such as the Burma cyclone and Hurricane Katrina.

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 (2 to 15 seats), En Route (6 to 12 seats transported by C-17 or C-130 aircraft), 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, and 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 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 and 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 that provide organizational message traffic between operational units. The DMS architecture has been derived using the Multi-command Required Operational Capability (MROC) requirements to a high-assurance capability for messaging, directory and management services to DoD and partner agencies. DMS provides secure, reliable and timely exchange of organizational messaging in support of Command and Control requirements.

Status

Navy is transitioning to a web-based interface known as the Navy Regional Enterprise Messaging System (NREMS). This transition eliminates costly client/server architecture and consolidates the DMS service providers from 22 sites down to two. The transition to NREMS will be completed in 2009 for DMS Ashore. DMS Proxy afloat is currently in progress and expected completion is 2010.

Developers

Lockheed Martin Manassas, Virginia USA

DNM
Dynamic Network Management

Description

Dynamic Network Management supports the ATDLS program and will increase Link-16 network effectiveness and throughput and provide the warfighter greater flexibility in the use of Link-16. DNM will facilitate automated net entry/exit of additional platforms in the future, including weapons with a Link-16 capability, and will provide a real-time capability to adjust Link-16 network allocation to meet evolving changes in the theater. DNM is essential to reduce Link-16 network oversubscription. DNM will also enable fully ad-hoc, dynamic network operations on Link-16, Internet Protocol (IP) over Link-16, variable update and throughput rates and expanded network throughput. It also provides essential support for networked weapons, senor networking, time-critical targeting and time-critical strike. DNM includes the following capabilities: Time Slot Reallocation (TSR), TSR Receipt Compliance (TSR RC), TSR Combined Network Participation Groups (CNPG), expanded stacked netting and multi-netting.

Status

Time Slot Reallocation (TSR) achieved Initial Operational Capability (IOC) on ships in the C2P and JTIDS programs in FY 2007, and is scheduled to field on MIDS on Ships (MOS), E2C, EA6B and H-60 platforms in FY 2009. TSR RC and CNPG are scheduled for MS C in FY 2010, IOC in FY 2011 and FOC in FY 2014. Expanded stacked netting is scheduled for MS C in FY 2012, IOC in FY 2013 and FOC in FY 2015.

Developers

SPAWARSYSCEN	San Diego, California USA
Northrop Grumman	San Diego, California 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 Navy as the Teleport Requirements Sponsor. Teleports are located at six primary sites and one secondary site. The Navy operates and maintains Teleports at Wahiawa, Hawaii; Northwest, Virginia; Lago Patria, Italy; and Bahrain. Non-Navy Teleport sites are located at Fort Buckner, Okinawa, Japan; Camp Roberts, California; and Landstuhl/Ramstein, Germany.

Status

Teleport is currently completing its second generation of installs with an FOC in the spring 2009 that 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, and will complete 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 USC-38 Follow-on Terminal (FOT) and 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 on board UHF Follow-On satellites; 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, U.K. 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
Global Broadcast Service (GBS) delivers high-speed, one-way flow of large volumes of information to proliferated, low-echelon, geographically dispersed 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 while providing support to U.S. allies, coalition forces and non-DoD governmental organizations. GBS can augment and interface with other communications systems to provide a virtual two-way network. GBS delivers high-speed, near-real-time receipt of imagery and data to the warfighter, and reduces over-subscription of various other MILSATCOM systems.

Status
The Navy is fielding receive-suites on aircraft carriers, larger-deck amphibious ships, command ships, cruisers, destroyers and all submarines. Architectural enhancements permit improved sharing and reallocation of broadcast coverage and bandwidth between, users, information product, media types, and security levels. During FY 2009, the Navy GBS program plans to complete submarine fielding, begin the initial system-wide technical refresh and begin the initial phase of cruiser and destroyer forward fits.

Developers
USAF Space and Missile
Systems Center El Segundo, California USA
Raytheon El Segundo, California USA

GCCS–M
Global Command and Control System–Maritime

Description

GCCS-M is the Navy's means 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. GCCS-M is the maritime variant of a family of global command and control (C2) systems comprising computers and software used at every echelon of command for coordinating operational, warfighting and intelligence missions. The maritime variant is used at the operational and tactical levels and is scalable to user requirements. GCCS together with GCCS-M is a system of computers and software that receives, displays, correlates, fuses and maintains geo-locational track information on friendly, hostile and neutral land, sea and air forces and integrates it with available intelligence and environmental information for joint, coalition and allied forces and interagency partners. GCCS-M will continue to evolve, incorporating the technological advances made possible by Net-Centric Enterprise Services (NCES) and joint programs such as the Net-Enabled Command Capability (NECC) as these joint programs deliver capability that can be implemented to naval afloat and ashore sites.

Status

The GCCS-M program was designated an ACAT-1AC program in March 2001. GCCS-M Version 3.1.2.1 was released to the fleet in FY 2001 and included major enhancements to GCCS-M's intelligence and warfighting software applications that overcame initial latency barriers. GCCS-M 4.0 completed Operational Test on the USS Nimitz (CVN-68), COMPACFLT HQ and COMSUBPAC HQ and was approved for full-rate production in FY 2005. GCCS-M 4.0 is a significant hardware; software and capability upgrade to the GCCS-M 3.X version and is synchronized with rollout of other GCCS variants by joint commands and other Services. By early 2009 estimates, GCCS-M 4.X will complete fielding to designated warships and ashore sites by late FY 2013. GCCS-M 4.1 version is a software-only upgrade that began fielding in early FY 2009, with improved security and interoperability features. In early 2009, GCCS-M is installed on 264 ships and submarines throughout the Navy and at 37 sites ashore, to include the Chief of Naval Operations Navy Command Center, five fleet commander's maritime operations centers (MOCs) and Allied/NATO sites.

Developers

Various governmental and commercial sources.

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 350 ships, submarines and aircraft.

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. The 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 warfighters 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 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 UHF SATCOM and via networks over SHF, EHF and 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 DAMA

Integrated Waveform (IW). 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 2001 and 83 JTTs have been fielded as of early 2009. The transition to the next-generation broadcast services is expected to begin in 2011 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

Joint Interface Control Officer (JICO) Support System (JSS) is a critical "tool set" enabling the JICO to plan, monitor and manage the multi-Tactical Data Link (TDL) network in support of the Joint Force 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 this role as the manager of the multi-TDL network, the JICO contributes to maintaining the near-real-time Common Tactical Picture and responds to the requirements of the Joint Data Network (JDN) manager.

Status

Milestone C for JSS is scheduled in FY 2009 to support a planned IOC and full rate production in FY 2010. Navy JSS FOC is expected in FY 2012.

Developers

Northrop Grumman	Reston, Virginia USA

JTIDS
Joint Tactical Information Distribution System

Description

Joint Tactical Information Distribution System (JTIDS) Class 2 Terminal provides a Link-16 capability that supports the ATDLS program. JTIDS, an OSD-directed joint program, is a digital information-distribution system that provides rapid, crypto-secure, jam-resistant (frequency-hopping) and low-probability-of-exploitation tactical data and voice communication at a high data rate to U.S. Navy tactical aircraft and ships and Marine Corps units. It is the first implementation of the Link-16 Joint Mes-

sage Standard (J-series) and provides the single, near real-time, joint datalink network for information exchange among joint and combined forces for command and control of tactical operations. JTIDS provides capabilities for common-grid navigation and automatic communications relay and has been integrated into numerous platforms and systems, including: U.S. Navy aircraft carriers, cruisers, destroyers, amphibious assault ships, E-2C Hawkeye aircraft and EP-3 Aries aircraft; U.S. Air Force Airborne Warning and Command System (AWACS) aircraft; and U.S. Marine Corps Tactical Air Operations Centers (TAOCs) and Tactical Air Command Centers (TACCs). Foreign country participants include the United Kingdom, Canada, Australia, Germany, France, Saudi Arabia, Japan and NATO.

Status

JTIDS terminals entered Full Rate Production in 1995 and achieved FOC in 2006. JTIDS production has been complete since 2002. The program is in sustainment and upgrade.

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

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 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 is intended to be installed on ships, submarines and shore stations. 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 Mode 4 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. The Mark XIIA will be installed on more than 3,000 platforms, including ships and Navy/Marine Corps aircraft (e.g., MH-60R, E-2D and F/A-18C/D/Ef.G) as well as non-Advanced Tactical Data Link-capable units.

Status

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. IOC is scheduled for FY 2010 and FOC expected in 2019. 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.

Developers

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

MIDS-LVT
Multi-functional Information Distribution System

Description

Multi-functional Information Distribution System (MIDS-LVT) is a multinational cooperative development program that supports the Advanced Tactical Data Link System (ATDLS) program by designing, developing and producing 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 and with applications in helicopters, ships, submarines and ground sites. The United States is the MIDS-LVT program leader with Germany, Spain, Italy and France entering into a European partnership, called EUROMIDS. Navy procurement is targeted for F/A-18 Hornet aircraft as the lead aviation platform. MIDS-LVT is a pre-programmed product improvement and replacement for JTIDS, providing identical capabilities at reduced size, weight and cost. As a Preplanned Product Improvement (P3I) of the JTIDS Class 2 Terminal, the MIDS-LVT employs the Link-16 (TADIL-J) message standard of U.S. Joint/NATO publications. MIDS-LVT is fully interoperable with JTIDS and was designed in response to current aircraft, surface ship, submarine and ground-host volume and weight constraints. The solution variants—MIDS-LVT (1), MIDS-LVT (2) and MIDS-LVT

(3)—support Navy, Marine Corps, and Air Force aircraft; Navy ships; Army Patriot, THAAD, MEADS and other ground-based defense systems; Air Force and Marine Corps ground-based command and control platforms; and potentially other tactical aircraft and ground-based systems. The MIDS-LVT (1) variant will be used in the MIDS on Ship (MOS) program providing the Link-16 capability to new-construction surface warships.

Status

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. MIDS is being procured for F/A-18C/D/E/F/G aircraft. The Air Force F-15 fighter variant, MIDS-LVT (3), is in Full Rate Production (FRP) and has reached IOC. The Army variant, LVT-2, entered FRP in September 2003. MIDS on ships achieved IOC in FY 2008.

Developers

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

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

The Multi-functional Information Distribution System Joint Tactical Radio System (MIDS-JTRS) program migrates the capabilities of the MIDS-Low Volume Terminal (LVT) to a Joint Tactical Radio System Software Communication Architecture-compliant terminal. MIDS-JTRS will be a four-channel software programmable radio capable of processing Link-16 on one dedicated channel and other JTRS waveforms on the remaining three channels. MIDS-JTRS capabilities will include Link-16, TACAN and J Voice, and will also incorporate three Link-16 enhancements: Link-16 frequency remapping, Enhanced Throughput and crypto modernization.

Status

The MIDS-JTRS program was First Article Qualification and Development Flight Test in January 2009. A milestone is scheduled for April/May 2009 to approve an LRIP purchase of 51 terminals. A FRP decision will occur late in FY 2009 after operational testing is complete.

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 constellation. MUOS has both a legacy UHF payload that provides the same capability as one satellite in the current UHF constellation (UHF Follow-On) as well as a new MUOS waveform payload that will provide a 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. 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 2011.

Developers

Lockheed Martin	Sunnyvale, California USA
Boeing	El Segundo, California USA
General Dynamics	Scottsdale, Arizona 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 more than 3,700 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 currently under development as a replacement to NAVSSI. G-PNTS will use next-generation GPS receivers (initially Selective Availability Anti-Spoofing Module (SAASM) to be followed by M-code) to ensure the U.S. 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 currently 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 FOC in FY 2014. Milestone C for G-PNTS is expected in the second half of FY 2009. The digital GPS replacement anti-jam antenna, Advanced Digital Antenna Production (ADAP), is expected to be at milestone C in the first half of FY 2009 in support of initial fielding on selected Navy surface ships 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 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 providing 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-wide solution supporting budgeting, billing, external procurement, 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, the Navy moved forward to implement SAP's Finance and Supply Chain capability across the Navy's Systems Commands, beginning with the Naval Air Systems Command in 2007.

Status
Initial Operating Capability (IOC) was reached on May 12, 2008. Navy ERP "Go-Live" took place, as scheduled, at NAVSUP on October 1, 2008. NAVSUP achieved Full Operational Tempo on October 25, 2008. NAVAIR (deployed October 2007) finished its first annual close on October 10, 2008.

Developers
SAP America Newtown Square, Pennsylvania USA

NGEN
Next-Generation Enterprise Network

Description
Next-Generation Enterprise Network (NGEN) will be the follow-on to the Navy and Marine Corps Intranet (NMCI). NGEN is the first step toward achieving the Department of the Navy's future vision of a fully integrated Naval Networking Environment (NNE). 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.

Status
The Program Manager NGEN is seeking acquisition authority for the "Continuity of Services" contract, Milestone Decision Authority status, and continues work toward the acquisition strategy.

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 (DoN) 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 the United States (CONUS) for the Navy's Network Environment (NNE) architecture. NMCI provides comprehensive end-to-end information services for data, video and voice communications for DoN military and civilian personnel and connects to the GIG.

Status
NMCI implementation continues. Approximately 98 percent of initial transition seats have been delivered; Navy is 98 percent complete and Marine Corps is 97 percent complete.

Developers
The NMCI contract was awarded to a team of contractors led by Electronic Data Systems (EDS).

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. 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 management ashore using a consolidated database as part of a broader initiative to Move Workload Ashore and reduce shipboard manpower; integrating organizational and intermediate aviation maintenance applications into a single software baseline; and expanding the user base to include naval expeditionary forces. As a result, the Navy and Marine Corps will realize increased efficiencies and reduced total ownership costs.

Status
NTCSS is 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 by FY 2010. An optimized NTCSS capability, targeted for aircraft squadrons will achieve FOC by FY 2011. Upon reaching 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
Open Architecture (OA) is transforming business acquisition and sustainment processes for the Surface Navy. A broad, operationally focused open architecture definition means having the business environment that encourages collaborative competition for developers to replace or add a capability module 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.

All surface combatant combat systems 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. By expanding third-party developers' involvement using the SBIR program, the Rapid Capability Insertion Program (RCIP) will deliver cost-effective, common capability quickly and more efficiently to the fleet.

Status
Development of OA capabilities and processes is ongoing.

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 Outside Continental United States (OCONUS) Navy Enterprise-Network (ONE-NET) is the OCONUS equivalent to 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, help-desk and enterprise-management for a projected 23,000 seats, meeting fleet commander stated requirements and vast performance and security improvements compared to existing 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, Japan, Naples, Italy 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 ONE-Net hardware and software is procured and installed in conjunction with the Base Level Information Infrastructure (BLII) program, and is under the cognizance of Program Executive Office (Enterprise Information Systems). CNO N6N and NNWC maintain close synchronization in the requirements validation, acquisition, installation and logistics process.

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. SCI Networks 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) that 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) are 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. 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, SCI Networks brings the Top Secret and SCI enclaves to the submarines. 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 has been designated as an evolutionary program allowing for continued growth and expansion through future technology insertion.

Installation of the Shore Network Operations Center Facilities and Build 2 ship hardware is complete. Software Release 2.2 began fielding in second quarter of 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 an Airborne EDM version.

Developers

SAIC — Arlington, Virginia USA

TACMOBILE
Navy Tactical/Mobile System

Description

The Navy Tactical/Mobile (TacMobile) System provides evolutionary system and equipment upgrades to support Maritime Sector Commanders' Maritime Patrol Aircraft (MPA) operational areas with the capability to plan, direct and control the tactical operations of joint and naval expeditionary forces and other assigned units within their respective area of responsibility. These missions are supported by the Tactical Support Centers (TSCs), the Mobile Operations Control Centers (MOCCs) and the Joint Mobile Ashore Support Terminal (JMAST). TSCs, MOCCs and JMAST systems provide commanders with the capability to plan, direct and control the tactical operations of joint and naval expeditionary Forces and other assigned units within their respective area of responsibility.

To support this capability, each TSC, MOCC and JMAST system is a "system-of-systems" comprising a Command, Control and Intelligence (C2I) component, a communications component, a mobility/facilities component, a common services component and, in the case of TSC and MOCC, a warfighter interface component.

TSCs and MOCCs provide operational support through a robust capability to conduct post-mission analysis of collected sensor data to provide verification of target detections, detection of additional target data, feedback to aircraft sensor operators and pre-mission preparation and target briefing for crews. Services provided include analysis and correlation of diverse sensor information; data management support; command decision aids; rapid data communication; mission planning and evaluation; and dissemination of surveillance data and threat alerts to operational users ashore and afloat.

Status

TacMobile Increment 1.0 fielding was completed in 2007. 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 current C4I capabilities. Increment 2.0 will incorporates warfighter interface (WFI) capabilities for TSC/MOCC activities plus communication upgrades needed for MOCCs to support current P-3C Orion operations.

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

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 Land-Attack cruise Missile. The Mission Planning system is installed ashore at the Cruise Missile Support Activities (CMSA) in Norfolk, Hawaii and PJHQ Northwood (U.K.) and afloat in all U.S. aircraft carriers. To support the Navy's move to a focused Maritime Operating Center (MOC) operational infrastructure, Mission Planning systems along with Strike Execution components will be installed in numbered-fleet 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 TLAM capabilities in either deliberate planning conditions or for battlefield time-sensitive planning operations.

Status

The latest version, TC2S 4.1, has been installed at all CMSAs and MOCs. The next revision, TC2S 4.2, is schedule to reach IOC in March 2009, improving joint interoperability and imagery processing.

Developers

COMGLOBAL	San Jose, California USA
Boeing	St. Louis, Missouri USA
BAE Systems	San Diego, California USA
SAIC	La Jolla, California USA

TIS
Trusted Information Systems

Description

The Trusted Information Systems (TIS) program facilitates sharing of critical information among multinational and interagency partners with allied, coalition and U.S. forces across security domains. TIS includes both 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 (SCI) to General Services (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 using reliable human review (semi-automated). RM

is deployed to more than 225 sites worldwide, including all combatant commands, aircraft carriers and large-deck amphibious warships, Shared Early Warning, Blue Force Tracking and numerous Air Force and Army sites, as well as national agencies.

JCDX is 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 multilevel 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.

Status

Direct Navy support of JCDX will be phased out by the end FY 2009 and replaced by the Global Command and Control System (GCCS) Integrated Imagery and Intelligence (I3). 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 Services 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 225 locations worldwide.

Developers

Maxim Systems	San Diego, California USA
Northrop Grumman Mission Systems	Arlington, Virginia 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 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

Initial installs will begin in the third quarter FY 2009 with complete CT WAN implementation by the end FY 2010. The transition architectures are being developed and evaluated with a proposed IOC in FY 2015.

Developers

PEO C41	San Diego, California USA
SSC 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 to provide an anti-jam capability on the uplink. UFO satellites 4 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.

Status

Of the 11 satellites that have been launched, eight were operational in early 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 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

Undersea Warfare-Decision Support System (USW-DSS) provides capabilities to shorten command and control (C2) decision process for detection-to-engagement across multiple platforms, including those with low-bandwidth communications or intermittent connectivity. The USW-DSS decision support tool uses

a Service Orientated Architecture (SOA) encompassing existing communication links, networks and contact pictures comprised of sensor data from air, surface, submarine, theater and surveillance platforms to connect sensors and weapons. The capabilities delivered by USW-DSS are critical not only for the Sea Combat Commander (SCC) but also for the 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 multiple ASW platforms. USW-DSS will provide common and improved visualization, integrated USW platform sensor data sharing, reduced data entry, improved sensor performance predictions, data fusion and reduced redundancy across USW Tactical Decision Aids (TDA). The program will provide a greater understanding of the undersea battlespace by allowing the entire force (aircraft carrier/expeditionary strike group, theater or other) to have a common and thorough understanding of the battlespace with characterized uncertainties.

Status

USW-DSS is installed as a mission planning capability on 17 platforms. USW-DSS uses a spiral-development process to deliver ASW capabilities rapidly to the fleet by leveraging the use of increments that successively improve upon each other with input from prototypes, the warfighter and ASW exercises. A new increment (TI-2) in early 2009 was in development to address capability gaps identified by several ASW exercises and warfighter input. TI-2 fields a USW Common Tactical Picture (CTP) in FY 2009. It will provide an initial set of critical ASW visualization and data-exchange capabilities as the foundation for a clear, timely and accurate depiction of the ASW battlespace. Follow on increments will improve upon the common tactical picture and dynamic mission planning capabilities of TI-2 with a robust set of battle space management tools.

Increment TI-2 will be fielded with the Common Computing Environment (CCE) and Service Orientated Architecture (SOA) components of the Integrated Shipboard Network System (ISNS). Follow on increments will be fielded with the Consolidated Afloat Network and Enterprise Services (CANES). Software Components of USW-DSS will integrate with the submarine combat system and air Integrated Tactical Picture (ITP). A complete stand-alone hardware and software system will also be fielded on platforms that will not receive ISNS or CANES—at task forces based on shore sites, as well as on select surface platforms—so the Sea Combat Commander can effectively command and control his forces while coordinating with the TUSWC.

Developers

Multiple Navy and university labs and industry participants will perform the various developer and manufacturer roles.

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

Description

The Super High Frequency (SHF) Satellite Communications (SATCOM) WSC-6(V) terminal has been the backbone of fleet communications since the mid-1990s, providing primary satellite capacity (bandwidth) for voice, data, video and imagery requirements ensuring Sailor and Marine email, telephone and video teleconferencing—a key enabler for effective command and control and quality of life. The WSC-6(V) and parabolic antenna enables Navy ships to access the Defense Satellite Communications System (DSCS) for reliable, secure, beyond line-of-sight information exchange at medium-to-high data rates. This capability is sustained by upgraded and new WSC-6 terminal variants and by enhancements to the attack submarine High Data Rate Antenna.

Status

There are several WSC-6 variants deployed in the fleet and in sustainment. The WSC-6(V)9 is a single-termination, dual-band (C/X) terminal developed to provide wideband, high data-rate capability. The WSC-6(V)9 terminal will complete fielding on all guided-missile destroyers in FY 2009. All WSC-6(V) variants will be equipped with the Enhanced Bandwidth Efficient Modem (EBEM) (tactical variant) in the FY 2009 timeframe. Future terminal plans include the Navy Multi-Band Terminal (NMT).

Developers

Raytheon	Marlborough, Massachusetts USA
Harris	Melbourne, Florida 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)
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)
Aug - Nov 2008	Operation *Continuing Promise*, U.S. Southern Command (SOUTHCOM)	USS *Kearsarge* (LHD 3)
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 - Oct 2008	Air Force B-52 Salvage & Recovery Ops Guam	USNS *Sioux* (T-ATF 171)

* 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

DEPARTMENT OF THE NAVY
WASHINGTON D.C.

http://www.navy.mil/navydata/policy/seapower/spne08/top-spne08.html