

SEA STRIKE

PLATFORMS AIRCRAFT

AH-1Z Super Cobra and UH-1Y Huey Upgrade

Description

The AH-1 and UH-1 Upgrade Program will ensure that the MAGTF possesses credible rotary-wing attack and utility support platforms for the next 20 years. The H-1 Upgrade Program will provide 100 UH-1Ys and 180 AH-1Zs to the Warfighter. The H-1 Upgrade Program is designed to reduce life-cycle costs, significantly improve operational capabilities, and extend the service life of both aircraft. 84 percent commonality between the two aircraft 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 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 and 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, 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.

The H-1 Upgrade Program is an economical and comprehensive upgrade of both UH-1N and AH-1W helicopters, which will resolve existing operational safety issues while significantly enhancing the capability and operational effectiveness of the attack and utility helicopter fleet. A key modernization effort, the H-1 Upgrade will provide a bridge until the introduction of an advanced rotorcraft design. Due to substantial operational demands and aircraft attrition, both resulting from the Global War on Terrorism, the Marine Corps has adopted a “build new” strategy for the UH-1Y beginning in FY 2006 and is currently examining a “build new” strategy for the AH-1Z, in order to preclude significant inventory shortfalls.



Status

The preliminary design review was approved in June 1997, and the critical design review was completed in September 1998. LRIP began in the first quarter FY 2004. Five EMD (Engineering and Manufacturing Design) aircraft have been produced, four of which will eventually become fleet assets and one aircraft (without an integrated avionics suite) will be used for live-fire test and evaluation. Operational Evaluation of both aircraft is scheduled to begin in March 2006 at NAWC China Lake. The UH-1Y is scheduled to meet IOC in the fourth quarter of FY 2008 while the AH-1Z will meet IOC in the fourth quarter of FY 2011. Currently, FOC will be met for the UH-1Y in FY 2012 with the AH-1Z in FY 2018.

Developers

Bell Helicopter Textron; Fort Worth and Amarillo, Texas

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 (e.g., roads), and damaged conventional airfields. Two variants of the aircraft are in service operationally: 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, forward-looking infrared set, dual field-of-view TV seeker, and infrared marker provides improved target recognition and identification, while the laser designator and laser spot tracker provide precision targeting capability. Some Litening pods have also been equipped with a video downlink, which allows 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.

In order to maintain a world-class training environment, the two-seat TAV-8B trainers are undergoing an upgrade program that adds new color displays, night vision goggle-compatible lighting, and a more powerful and reliable Rolls Royce Pegasus (408) engine. These improvements are increasing the training capability of the AV-8B fleet replacement squadron, as well as the abilities of our replacement pilots reporting to their fleet squadrons. The enhancements to the Harrier are a critical link for providing continued support to the MAGTF, until the TacAir Integration implementation and Joint Strike Fighter (JSF) transition are complete.

Developers

Boeing; St. Louis, Missouri

E-6 Mercury Airborne Command Post/TACAMO Aircraft

Description

The E-6 platform, derived from the Boeing 707, provides the Commander, U.S. Strategic Command with the command, control, and communications capability needed for execution and direction of strategic forces. Designed to support a robust and flexible nuclear deterrent posture well into the 21st Century, the E-6 performs VLF emergency communications, the 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-6 capability, the Block I modification program was developed. The contract for Block I was awarded to Rockwell Collins in March 2004 and it is designed to repair a number of aircraft deficiencies identified by Strategic Command. IOC is planned for 2010.

Developers

Rockwell Collins; Cedar Rapids, Iowa

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 the strike capabilities of carrier air wings and Marine expeditionary forces, an expeditionary Prowler force has provided AEA capability during numerous joint and allied operations since 1995 against both traditional and non-traditional target sets in support of ground forces. These capabilities continue to be demonstrated in the Global War on Terrorism where EA-6B operations in Afghanistan and Iraq protect coalition forces and disrupt critical communications links. The enormous demands for AEA in Operation



Enduring Freedom and Operation Iraqi Freedom have driven EA-6B utilization rates to record levels.

Status

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

Developers

Northrop Grumman; Bethpage, New York

EA-18G Growler Airborne Electronic Attack Aircraft

Description

The EA-18G Growler will replace the EA-6B Prowler as the Navy’s tactical electronic attack aircraft—the only aircraft of its kind in DoD’s inventory. 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 strike-fighter and self-protection capabilities while providing air-to-air self-escort to free other assets for other strike-fighter tasking.

Status

The EA-18G Growler is on schedule and under budget as it progresses toward its 2009 IOC. The aircraft completed its Critical Design Review (CDR) in April 2005 and will fly its first flight in fourth quarter, FY 2006 with an IOC in 2009. An inventory objective of 90 aircraft is planned to support a 10-squadron force structure. Initial procurement of the first four aircraft begins in FY 2006.

Developers

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

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

Description

The F/A-18 Hornet is Naval Aviation’s principal strike-fighter. This state-of-the-art, multi-mission aircraft serves the Navy and Marine Corps, as well as the armed forces of several allied and friendly countries. Its reliability, maintainability, safety record, high performance, and multiple weapons-delivery capability highlight the Hornet’s success. Budgeted improvements to the original Hornet A/C/D variants have provided significant warfighting improvements, including the addition of the Global Positioning System (GPS), Multi-Functional Information Distribution System (MIDS), AIM-9X Sidewinder/Joint Helmet-Mounted Cueing





System, Combined Interrogator Transponder, Joint Direct Attack Munition/Joint Stand-Off Weapon (JDAM/JSOW) delivery capability, and Digital Communication System for close-air support. The aircraft's weapons, communications, navigation, and Defensive Electronic Countermeasures systems are also being upgraded to ensure combat relevance.

Status

Although the F/A-18A through D are out of production, the existing inventory of approximately 681 Navy and Marine Corps aircraft will continue to comprise half of Naval Aviation's strike assets through 2012, and will continue to serve in active squadrons until 2023.

Developers

Boeing; St. Louis, Missouri

General Electric; Lynn, Massachusetts

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

Description

The F/A-18E/F Super Hornet provides significant improvements in combat range, payload, survivability, and growth capacity required to keep the strike-fighter force lethal and viable well into the 21st Century. There is extensive commonality of weapons systems, avionics, and software between F/A-18 variants, and the infrastructure supporting the Super Hornet builds upon existing organizations. The F/A-18E/F is replacing the F-14 and early model F/A-18s. The lethality, flexibility, reliability, and survivability of the F/A-18E/F make it the right aircraft to fulfill missions associated with regional and littoral conflicts.

Status

Aircraft F/A-18E-1 first flew on 29 November 1995. Full-rate production deliveries commenced in October 2001. The Navy awarded a multi-year contract, compared to five single-year contracts, for the procurement of 222 aircraft from 2000-2004 and saved the taxpayers more than 7.4 percent (\$700 million). A second multi-year contract was awarded in FY 2004 for 210 aircraft procured in 2005 through 2009, saving the taxpayer more than \$1 billion over the single-year price. In June 2002 the Navy awarded a multi-year contract for the production of 480 engines, saving the taxpayers \$51 million. The first Super Hornet squadron to deploy, VFA-115 (F/A-18E), deployed onboard the USS *Abraham Lincoln* (CVN 72) in the summer 2002 and led strikes into Iraq on the opening night of Operation Iraqi Freedom. The second and third Super Hornet squadrons to deploy, VFA-14 (F/A-18E) and VFA-41 (F/A-18F), deployed onboard the USS *Nimitz* (CVN 68) in the spring 2003. This deployment initiated EOC for the Shared Reconnaissance Pod (SHARP), the Joint Helmet Mounted Cueing System (JHMCS), the Multifunctional Information Distribution System (MIDS), and the Advanced Targeting Forward-Looking Infra-Red (ATFLIR) system. Additionally, ATFLIR achieved IOC with VFA-102 in September 2003. Lot 25 F/A-18E/Fs and above will

have Advanced Mission Computers with computer software using Higher Order Language (HOL). Pacific Fleet aircraft will be based at NAS Lemoore, California. The first Super Hornet squadron was forward deployed to NAF Atsugi, Japan in November 2003. NAS Oceana, Virginia and MCAS Cherry Point, North Carolina have been chosen as the Atlantic Fleet home bases.

Developers

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

F-35 Joint Strike Fighter (JSF)

Description

The F-35 JSF program will deliver a transformational family of next-generation strike aircraft combining stealth and enhanced sensors to provide a lethal, survivable, supportable, and affordable 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 U.S. service and allied needs. The keystone of this effort is a mission systems avionics suite that delivers unparalleled interoperability between U.S. armed services and coalition partners. Agreements for international participation in System Development and Demonstration (SDD) have been negotiated with Australia, Canada, Denmark, Italy, the Netherlands, Norway, Turkey, and the United Kingdom. Security Cooperation Partnership memorandums of understanding have been established with Israel and Singapore.

Status

The JSF is in its fifth year of a planned 12-year SDD program. The 5 May 2005 DAB confirmed that the program’s “re-plan” to ensure weapon systems performance and to reduce weight had been successful. It also required the Cost Analysis Improvement Group (CAIG) to provide a cost estimate update after the JSF Critical Design Review (CDR) in February 2006 and directed the Networks and Information Integration (NII) Overarching Integrated Product Team (OIPT) leader to lead “net-centric” reviews to migrate over time to a full net-centric capability. The first SDD flight is scheduled for fourth quarter FY 2006 (CTOL variant). The first STOVL flight will be in the first quarter FY 2008, and the first CV flight in second quarter FY 2009. The IOC for the Marine Corps is 2012, and 2013 for the Navy. All Key Performance Parameters (KPPs) are projected to be met at IOC. The DoD Base Realignment and Closure Commission (BRAC) 2005 directed that the first JSF Integrated Training Center will be at Eglin Air Force Base.

Developers

Lockheed Martin; Fort Worth, Texas
Pratt Whitney (PW F135 engine); East Hartford, Connecticut





Unmanned Combat Air System (UCAS)

Description

In 2000, the Navy partnered with the Defense Advanced Research Projects Agency (DARPA) to define and demonstrate the value and feasibility of Unmanned Combat Air Vehicles (UCAVs). The Navy directed the demonstration project to explore multi-mission vehicles that cover surveillance/reconnaissance, strike, and suppression of enemy air defenses. The Navy has stressed an initial emphasis on the penetrating surveillance/reconnaissance role, where target identification and precise location capability best leverages the significant Navy investment in stand-off weapons. The primary focus for the Navy remains on carrier basing of the envisioned low-observable, multi-mission unmanned vehicle. In addition, it will reduce risk in other areas in preparation for the follow-on acquisition program. This acquisition program will field aircraft carrier-based Navy UCAVs in the 2018 time frame.

Status

The program is pursuing design for a carrier-based, low-observable, persistent ISR unmanned platform. Planning is now underway for a demonstration phase and follow-on operational assessment. While maintaining the goal of demonstrating a carrier-based multi-mission UCAV, the program intends to develop a C4ISR and command and control architecture for the family of UCAS vehicles.

Developers

To be determined.

VH-71A Presidential Helicopter Replacement

Description

The VH-3D/VH-60N presidential helicopter replacement, recently designated VH-71A, is a conventional helicopter based on the Agusta Westland EH-101. It will provide safe and timely transportation for the President and Vice President of the United States, foreign heads of state, and others as directed by the White House Military Office. When the President is onboard Marine One, this aircraft is the Commander-in-Chief's primary command and control platform and must provide him with the flexibility and capabilities necessary to execute the duties of his office. Its capabilities, which will be delivered in two increments, are split into four functional areas: aircraft operations, communications, survivability, and Presidential accommodations. VH-71A will have increased capabilities in these areas, while retaining core capabilities carried forward from the VH-3D and VH-60N.

Status

Milestone B/C Defense Acquisition Board held on 12 January 2005. Milestone B was approved for Increment I and II System Development and Demonstration (SDD). Milestone C was approved for five pilot production Increment I aircraft. The SDD Contract for Increment I and II was awarded to Lockheed Martin on 28 January 2005.

Developers

Lockheed Martin's team includes;
Agusta Westland (design)
Bell Helicopter (production)
General Electric (engines)
Lockheed Martin Systems Integration; Owego, New York



SURFACE AND EXPEDITIONARY WARFARE SHIPS AND CRAFT

AIRCRAFT CARRIERS

Nimitz (CVN 68) and CVN 21 Program

Description

The nine *Nimitz*-class nuclear-powered aircraft carriers currently in active service comprise three-quarters of the Navy's aircraft carrier force. Since USS *Nimitz* (CVN 68) was commissioned in 1975, these ships have been replacing our aging, fossil-fueled carriers on a one-for-one basis. In doing so, they have preserved and re-capitalized aircraft carrier strike group force levels to meet Fleet Response Plan (FRP) and presence requirements for Combatant Commander in support of national goals. The mission of the *Nimitz*-class aircraft carrier is to support and operate aircraft that engage in attack, survey, and conduct electronic warfare against sea-borne, air-borne, and land-based targets in support of Joint and Coalition forces. America's carriers are forward-deployed throughout the world in support of U.S. strategy and commitments. Our carriers are also playing an increasingly important role as the Navy adjusts its emphasis toward littoral regions, and forward-deployed, land-based forces are brought home to the United States.

Since the baseline *Nimitz* design was finalized in the 1960s, little has been invested in research and development that could have incrementally incorporated leading-edge technologies and systems into these premier capital ships. It is primarily for this reason that the Navy has embraced a program to develop, acquire, and operate a new design aircraft carrier to replace all U.S. carriers in service today. In 1993, the Navy established a future sea-based air platforms working group to investigate the requirements and available technologies and systems—to ensure that a new class of aircraft carriers could capture elements of the Revolutions in Military and Business Affairs. Based on these initial studies, the Navy established the CVN 21 Program to develop an evolutionary-design, next-generation, nuclear-powered aircraft carrier. The lead ship of the CVN 21-class, CVN 78, is scheduled for delivery to the Fleet in 2015. This class of aircraft carriers will incorporate such features as: a new, more efficient nuclear propulsion plant, an Electro-Magnetic Aircraft Launch System (EMALS), Advanced Arresting Gear (AAG), and a nearly three-fold increase in electrical generation capacity over that of *Nimitz*-class carriers. These improvements, coupled with an expanded Flight Deck and other topside changes designed to increase operational efficiency, will provide higher sortie generation rates. At the same time, manpower requirements for the ship and air wing will be significantly reduced from today's levels.

Quality of life improvements for the crew are also a primary focus during the design phase for CVN 21, as it is anticipated that this



class of aircraft carrier will sail the world's oceans for the next 100 years. The principal design objectives for the ships of the CVN 21 Program are to provide a flexible infrastructure that will facilitate the insertion of new warfighting capabilities as they evolve and continue to reduce total ownership costs during each carrier's 50-year service life. Meeting these objectives are a high priority for the Navy, and will ensure aircraft carriers remain the centerpiece of *Sea Power 21*—capable of meeting the daunting operational requirements into the next century.

Status

There are nine *Nimitz*-class nuclear-powered aircraft carriers in active service as of 2006. USS *George H.W. Bush* (CVN 77), the tenth and final ship of the class, is currently under construction at the Northrop Grumman Newport News Shipyard in Newport News, Virginia. CVN 77 is scheduled for launch in October 2006, with delivery expected in November 2008. CVN 77 is a modified-repeat of the USS *Ronald Reagan* (CVN 76) and will be the numerical replacement for USS *Kitty Hawk* (CV-63), which retires in 2008 after 47 years of service. Aircraft carriers subsequent to CVN 77 will belong to the CVN 21-class, with delivery of the lead ship, CVN 78, scheduled for 2015. CVN 79, the second ship of the CVN 21, is scheduled for delivery in 2019.

CVN 78 is the numerical replacement for the Navy's first nuclear-powered aircraft carrier, USS *Enterprise* (CVN 65), which is scheduled for decommissioning in 2013 after more than 52 years of operational service.

Developers

Northrop Grumman; Newport News, Virginia



SUBMARINES

Advanced SEAL Delivery System (ASDS)

Description

This combat submersible is 65 feet long, is operated by a two-man crew, and can carry Navy SEAL personnel or other Special Operations Forces (SOF). The ASDS is a multi-mission platform capable of personnel delivery or intelligence operations. It is launched from one of two host submarines, USS *Charlotte* (SSN 766) or USS *Greeneville* (SSN 772), much like the Deep Submergence Rescue Vehicle (DSRV). The ASDS eliminates the extended exposure to water and increased atmospheric pressure inherent with in-service wet submersible SEAL Delivery Vehicles (SDVs) and carries improved sensors and communications equipment, resulting in improved personnel and equipment performance.

Status

The first ASDS is home ported with SEAL Delivery Vehicle Team





ONE (SDVT ONE) in Pearl Harbor, Hawaii. The ASDS completed OPEVAL in the summer of 2003 and conducted training exercises in the Pacific—proving the capability to operate from a forward operating base. Progress toward building the full complement of ASDSs is dependent on improving the operational reliability of ASDS Hull 1. Future SSGNs and *Virginia* (SSN 774)-class submarines will host the ASDS as the program proceeds.

Developers

Northrop Grumman; Annapolis, Maryland

SSGN Nuclear-Powered Guided-Missile Submarine

Description

The first four of the *Ohio* (SSBN 726)-class Trident fleet ballistic missile submarines (SSBNs) are being converted to nuclear-powered guided missile and special-operations submarines (SSGNs). The *Ohio*-class SSBN is one of the Navy's contributions to the nation's strategic deterrent posture. The first eight *Ohio*-class were configured to carry 24 Trident I/C4 submarine-launched ballistic missiles (SLBMs). The ninth ship, the USS *Tennessee* (SSBN 734) and all later ships are armed with the Trident II/D5 missile system. Trident missiles are capable of carrying Multiple Independently Targeted Reentry Vehicles (MIRVs); in operation Trident II/D5 missiles have been declared at eight MIRV warheads while Trident I/C4 missiles have been declared at six under the Strategic Arms Reduction Treaty (START). All 18 of the *Ohio*-class SSBNs have been commissioned; the final ship of the class, the USS *Louisiana* (SSBN 743), joined the fleet in FY 1997. In FY 2000, the last four of the original eight ships began conversion to carry the Trident II/D5 missile. USS *Alabama* is the last ship to undergo D5 conversion which began in 2006.

The first four *Ohio*-class SSBNs are being converted to the SSGN configuration and will be able to carry up to 154 Tomahawk (TLAM/TACTOM) land-attack missiles to conduct large-volume strike with surprise. While on station, with unparalleled nonprovocative persistent presence, the SSGN will prepare the knowledge battlespace using UUVs and other sensors to enable access for follow-on forces. The SSGN will also have the capability to support a Special Operations Force (SOF) contingent of up to 66 personnel for an extended period of time, providing clandestine insertion and retrieval via built in lockout chambers, dry deck shelters, or the Advanced SEAL Delivery System (ASDS). Operating with two crews and using the existing Trident infrastructure will allow this potent warfighting capability to have a 70 percent in-theater presence. Additionally, the large payload and ocean interface of 24 seven-foot diameter tubes will allow these transformational submarines to leverage future payloads and sensors, thereby increasing the submarine force's future capabilities.

Status

The first two ships, the USS *Ohio* (SSBN 726) and USS *Florida* (SSBN 728), began their refueling and conversion overhauls in FY2003. The USS *Michigan* (SSBN 727) and USS *Georgia* (SSBN 729) began their refueling and conversion overhauls in FY 2004 and FY 2005, respectively. The USS *Ohio* delivered to the Navy at the end of 2005. The first SSGN will be operational in FY 2007. The anticipated cost for all four SSGN conversions is approximately \$4 billion.

Developers

General Dynamics Electric Boat; Groton, Connecticut

SENSORS**AIRBORNE****APG-79 Active Electronically Scanned Array (AESA)****Radar System****Description**

APG-79 AESA Phase I upgrade provides multi-mode function flexibility while enhancing performance in the air-to-air arena, hostile electronic countermeasures environments, and air-to-ground targeting functions. Phase II will provide significant electronic warfare improvements to target hostile emitters while providing aircraft electronic protection and electronic attack functions. Growth provisions will allow for reconnaissance capability through the use of synthetic aperture radar technology and improved hardware and software.

Status

The APG-79 completed subcontractor competition in November 1999, and the Engineering and Manufacturing Development (EMD) contract was awarded in February 2001 to reach IOC in 2006. AESA Total Phase I program procurement is 415 systems, 280 forward fit and 135 retrofit. AESA Milestone C and LRIP II approval was received in January 2004, for initial delivery with Lot 27 Super Hornets in FY 2005.

Developers

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





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

Description

The ATFLIR will provide the F/A-18A+/C/D/E/F with a significantly enhanced capability to detect, track, and attack air and ground targets. New laser-guided and GPS standoff weapons systems and higher-altitude attack profiles require improved performance over the current AAS-38/46 Targeting FLIR. The ATFLIR is designed to provide a quantum leap in operational effectiveness to fully 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 determined to be operationally suitable and effective, and was recommended for further fleet introduction. ATFLIR achieved IOC with VFA-102 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 will procure 66 ATFLIR in FY 2005. Program objective is 477 systems.

Developers

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



ASQ-12V Shared Reconnaissance Pod (SHARP)

Description

The SHARP replaces the F-14 Tactical Airborne Reconnaissance Pod System (TARPS) and will be carried on the F/A-18F to support strike warfare, amphibious warfare, and anti-surface warfare decision-making. SHARP provides near-real time, dual-band EO/IR medium and high altitude standoff imagery. SHARP incorporates NITF formatted day/night digital imagery utilizing the USQ-123 Common Data Link-Navy (CDL-N) for real time connectivity. SHARP deployed with VFA-41 in support of Operation Iraqi Freedom in 2003 and with VFA-102 as part of the forward-deployed naval forces in Japan.

Status

SHARP Milestone III is scheduled for FY 2006, with IOC in October 2006.

Developers

Raytheon; Indianapolis, Indiana
Recon/Optical; Barrington, Illinois
L-3 Communications Systems West; Salt Lake City, Utah



SUBSURFACE

BYG-1 Submarine Combat Control System**Description**

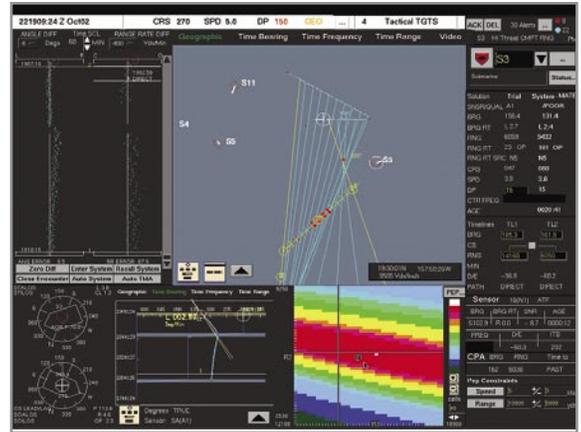
The BYG-1 is the combat control system common across all submarine platforms (except *Ohio*-class (SSBN 726)) which incorporates tactical control, weapon control, and Tactical Local Area Network (TacLAN) functions into a single procurement program. BYG-1 allows the submarine Navy to rapidly update the ship safety tactical picture, integrates the common tactical picture into the battle group, improves torpedo interfaces, and provides tactical Tomahawk capability. BYG-1 systems will be updated continuously with hardware enhancements to address COTS obsolescence and capability improvements as defined by the Advanced Processor Build (APB) process. These updates are referred to as Tech Insertion (TI) kits and are differentiated by year of development (i.e., TI00, TI04, and so on). The TI upgrades provide the baseline for all future BYG-1 procurements. In addition, this budget also provides tech insertion “kits” to update existing BYG-1 platforms.

Status

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

Developers

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



WEAPONS

AIRBORNE

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

The latest evolution of the HARM weapon system is the Navy's AGM-88E AARGM. The AGM-88E is an ACAT-IC SDD program with a planned IOC in FY 2009. AARGM was successfully demonstrated as an ATD and Quick Bolt ACTD sponsored by European Command. The AGM-88E project upgrades legacy HARM with a new guidance section incorporating multi-sensor, multi-spectral digital anti-radiation homing detection capability, GPS/INS guidance, and a millimeter wave terminal seeker. AARGM also includes a netted situation awareness/targeting capability and weapon impact assessment reporting via direct connectivity with national technical means. The U.S. DoD and the Ministry of Defense of the Republic of Italy have signed an international Memorandum Of Agreement for the cooperative development of the AGM-88E. 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 the legacy HARM.

The legacy HARM program was a joint-service program with the Navy as the lead service. 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. The AGM-88B (Block IIIA) and the AGM-88C (Block V) are the current fielded fleet configurations of the HARM.

Status

FY 1992 was the last year of production of Navy all-up HARM rounds. The AGM-88E AARGM planned IOC is FY 2009. The AGM-88E program plans conversion of 1,750 older AGM-88B weapons for the F/A-18C/D/E/F and EA-18G aircraft.

Developers

AARGM: ATK; Woodland Hills, California

HARM: Raytheon; Tucson, Arizona

AGM-154 Joint Standoff Weapon (JSOW)

Description

A new family of Stand-off Outside Point Defense (SOPD) weapons was added to the fleet with the introduction of the JSOW in 1999. A joint Navy/Air Force weapon-development program, with the Navy as the lead service, JSOW replaces five types of the aging air-to-ground weapons currently in the naval inventory. With war-proven effectiveness, the JSOW family of precision-guided weapons allows naval aircraft to attack targets at increased stand-off distances, greatly increasing aircraft and aircrew survivability. The JSOW is usable in adverse weather conditions and gives aircrews the ability to attack multiple targets in a single sortie. The JSOW family uses a common weapon body or "truck" for all variants. The AGM-154A variant carries BLU-97 combined-effect bomblets for use against area targets. The AGM-154C (Unitary) was developed with a penetration warhead (BROACH).

Status

AGM-154A reached IOC in 1999, and the AGM-154C variant reached IOC in FY 2005. Procurement of JSOW C continues across the FYDP with a total of 2,765 units FY 2006-2011.

Developers

Raytheon; Tucson, Arizona



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

Description

A major modification to the AIM-9M Sidewinder, the AIM-9X is a joint USN/USAF program that upgrades the missile with a staring focal plane array in the seeker, an extremely agile airframe, and state-of-the-art signal processors resulting in enhanced target acquisition and missile kinematics, and improved infrared counter-countermeasures capabilities. The missile will provide U.S. fighters with air superiority well into the 21st Century. When coupled with the Joint Helmet-Mounted Cueing System, the Sidewinder's high off-boresight capability will revolutionize the way these air-to-air missiles are employed. Current integration is underway for both these systems onboard the F/A-18A+/C/D Hornet and the F/A-18E/F Super Hornet. Integration is planned for the Joint Strike Fighter (JSF)

Status

Operational testing was completed in summer 2003. The first LRIP contract deliveries began in September 2002 with the second and third LRIPs awarded in November 2002 and November 2003, respectively. Approval for the fourth LRIP was received July 2003 and the full-rate production contract was awarded in November 2004. AIM-9X Block II is a P3I program that will incorporate a new AOTD and datalink. This will double the maximum range and greatly increase weapons effectiveness throughout the weapons engagement zone. Block II production will begin with the Lot 8 contract award with deliveries beginning in 2009. The program funds 1,116 AIM-9X missiles in the FYDP, including 165 in FY 2006.

Developers

Raytheon; Tucson, Arizona

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

Description

The AIM-120 AMRAAM missile is currently deployed on the F/A-18A+/C/D Hornet and the F/A-18E/F Super Hornet, and will be deployed on the EA-18G and Joint Strike Fighter (JSF) aircraft. Joint Air Force and Navy procurement of AMRAAM continues and deliveries of the AIM-120C-7 are under way. The AIM-120C Pre-Planned Product Improvement (P3I) Program is a key factor in maintaining medium-range air superiority. This modernization plan includes clipped wings for internal carriage, a propulsion enhancement program, increased warhead lethality, and enhanced electronic counter-countermeasures (ECCM) capabilities through hardware and software upgrades. Ultimately, AMRAAM will be the Department of the Navy's sole Medium/ Beyond Visual Range (M/BVR) missile. As part of the continuing weapons neck-down strategy, the radar-guided AIM-54C Phoenix has been phased out. The AIM-7 Sparrow will be phased out by the end of the FYDP and no further software or hardware improvements are planned for this legacy weapon.





Status

Deliveries of the AIM-120C began reaching the fleet in 1996. The AIM-120C-7 configuration is a product of P3I Phase 3 and is scheduled to achieve IOC in FY 2006. Continued procurement of the joint AMRAAM, with a P3I Phase 4 contract for the AIM-120D missile, will provide significant network-centric warfare capability, GPS, improved high-off-boresight capability, and missile kinematics. Phase 4 AMRAAM is scheduled to IOC in FY 2008. Planned procurement across the FYDP is 841 missiles, including 101 in FY 2006.

Developers

Raytheon; Tucson, Arizona

GBU-10/12/16/24 Laser-Guided Bomb (LGB)

Description

The LGB is a joint Navy/Air Force effort with the Air Force as the lead/executive service for procurement. An LGB is comprised of an MK-80/BLU-series warhead fitted with a laser-guidance kit, consisting of a Computer Control Group (CCG) mounted on the nose of the bomb body and a rear-mounted Airfoil Group (AFG). The warhead is initiated by an electronic fuse housed in the aft section of the bomb body. The seeker, housed in the CCG, senses laser energy and sends signals to the CCG canards to guide the weapon to the reflected energy spot. The laser energy can be applied to the target by ground or airborne designators, and even self-designated by laser-configured aircraft. LGBs include Paveway I, which has been retired; Paveway II, the current variant (GBU-10, 12, and 16) that uses MK-80/BLU series general-purpose bomb bodies; and Paveway III (GBU-24) that uses the BLU-109 bomb body and incorporates state-of-the-art guidance and control features. Paveway II LGBs are designated GBU-12 (500-pound class), GBU-16 (1,000-pound class), and GBU-10 (2,000-pound class). In response to an urgent USMC request for a through-the-weather, precision weapon the DoN awarded a contract for a Dual Mode Laser Guided Bomb kit to Lockheed Martin in November 2005. The resultant precision strike weapon will provide increased range, and allow delivery through adverse weather utilizing GPS/INS and Laser guidance systems.

Status

Approximately 19,000 Dual Mode Kits will be procured through the life of the program.

Developers

Raytheon; Tucson; Arizona

Lockheed Martin; Bethesda, Maryland

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

Description

The JDAM is a multi-service program, with the Air Force as the lead service, for a strap-on, Global Positioning System (GPS)-aided, Inertial Navigation System (INS) guidance kit to improve the accuracy of existing 500-pound, 1,000-pound, and 2,000-pound general-purpose and penetrator bombs (BLU-109) in all weather conditions. JDAM is a true force multiplier, allowing a single aircraft to attack multiple targets from a single release point, and has been proven in operations in Iraq, Kosovo, and Afghanistan.

Status

LRIP for the 2,000-pound kits began in FY 1997, and Milestone III was reached in FY 2001. The 1,000-pound JDAM kit reached IOC in FY 2002, and IOC for the 500-pound weapon occurred during the second quarter of FY 2005. Procurement of JDAM continues across the FYDP, with 19,420 kits programmed.

Developers

Boeing; St. Louis, Missouri



SUBSURFACE, SURFACE, AND EXPEDITIONARY

Advanced Gun System (AGS)

Description

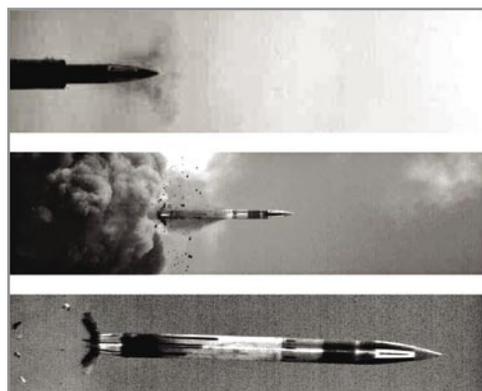
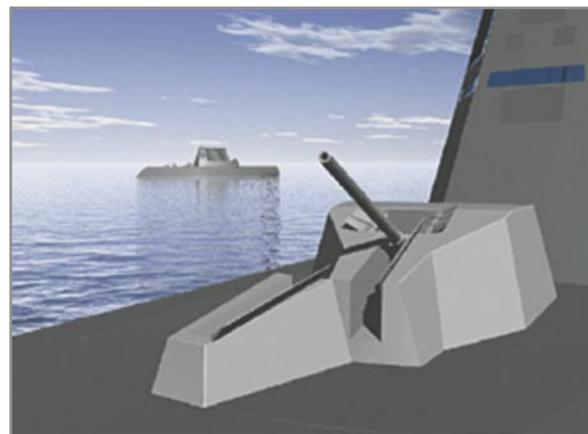
The 155mm AGS is planned for installation in DD(X) (see separate program summary) to provide precision, volume, and sustained fires in support of distributed joint and coalition forces ashore. AGS is a fully integrated, automatic gun and magazine weapon system that will support the DD(X) Naval Surface 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. AGS, fully integrated into DD(X), is designed to meet the reduced manning and radar-signature requirements of DD(X) ship program.

Status

The program started in FY 1999 and is an integral part of the DD(X) program. The first gun system is scheduled for delivery to support the first DD(X) fleet delivery in FY 2012.

Developers

BAE Systems; Minneapolis, Minnesota





Tactical Tomahawk Weapon Control System (TTWCS)

Description

TTWCS is the next significant upgrade to the current Advanced Tomahawk Weapon Control System (ATWCS). TTWCS introduces the ability for firing units to plan missions, retarget missiles to alternate pre-planned targets and monitor missiles in-flight. The upgraded system reduces the number of equipment racks required aboard surface ships, introduces common software for the various Tomahawk capable platforms (DDG, CG, SSN, SSGN, and U.K. SSN), reduces overall reaction and engagement planning time, improves operator interaction with the system, and provides an integrated training capability at all levels. Furthermore, TTWCS builds upon the ATWCS open system architecture to provide for future growth, eliminates stand-alone Tomahawk desktop computers, and enhances command-and-control interoperability. TTWCS also provides firing units the onboard ability to plan Global Positioning System (GPS) missions for both the Block III and Block IV Tomahawk Missiles and retarget in-flight missions to new GPS coordinates for the Block IV missile. TTWCS is fully compatible with all versions of the Tomahawk Land Attack Missile.

Status

The TTWCS Block III weapon control system capability reached IOC in 2003, allowing TTWCS to fire Block IV missiles. Full Block IV IOC occurred in 2004 with introduction of the Tactical Tomahawk missile. The USS *Stethem* (DDG 63) launched a Block III and several Block IV Tomahawk missiles using the new TTWCS Version 4, successfully testing Launch Platform Mission Planning (LPMP). LPMP enables individual ships and submarines to plan and execute Tomahawk cruise missile strikes with both the Block III and Tactical Tomahawks. TTWCS Version 5 continues to enhance the Tactical Tomahawk Weapon System capabilities and is expected to IOC in the Fall of 2006. SSGNs will also be outfitted with TTWCS with a scheduled IOC of 2007. TTWCS functionality is also currently planned for installation on the DD(X) combatant.

Developers

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

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

Description

The TLAM is the Navy's premier, all-weather, long-range, subsonic land-attack cruise missile deployed on surface warships and attack submarines. Block IV Tactical Tomahawk (TACTOM), BGM-109E/UGM-109E, an upgrade from the original TLAM Block III missile, preserves Tomahawk's long-range precision-strike capability while significantly increasing responsiveness and flexibility at significantly lower cost. TACTOM improvements include:

- > In-flight retargeting
- > Ability to loiter over the battlefield and to respond to emergent targets
- > Ability to monitor the health and status of the missile in flight via a satellite data link
- > Battle Damage Indication Imagery capability that gives a digital look-down "snapshot" of the battlefield and sends it via satellite data link
- > Global Positioning System (GPS) mission planning onboard the launch platform, enabling the shooter to plan and rapidly execute strike missions against emergent battlefield targets
- > Improved anti-jam GPS that minimizes the susceptibility to jamming
- > A missile design that allows for alternative payloads, including smart sub munitions, a penetrator warhead, and multiple response warhead

The TACTOM program began in FY 1998 and full IOC occurred in FY 2004. The Navy completed the first ground test of the TACTOM missile in 2002, vertically launching the missile, which flew a fully guided 550-mile flight using the GPS and digital scene matching area correlation navigation updates. Eight flight tests from both surface ships and attack submarines demonstrated all system capabilities. Current plans call for the Navy to procure more than 3,000 TACTOM missiles. Additional TACTOM procurement is constrained by fiscal priorities. TLAM Block III BGM-109 and UGM-109 missiles are still deployed in the Fleet. Block III TLAM Missiles undergo periodic recertification and maintenance to assure their continued viability.

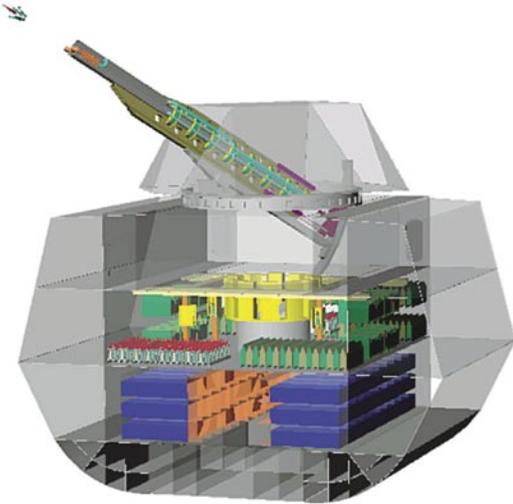
Status

LRIP I and II are complete. Raytheon Missile Systems began missile deliveries in May 2004 and is currently delivering LRIP III missiles. The full-rate production contract signed on 18 August 2004 was the Navy's first multi-year contract for weapons procurement and will procure approximately 2,000 missiles. To date, more than 180 missiles have been delivered to the Fleet.

Developers

Raytheon Missile Systems; Tucson, Arizona





Electromagnetic Railgun

Description

The Electromagnetic Railgun is a long range, direct/indirect fire weapon system that uses a hypersonic electromagnetic-launched guided projectile with kinetic energy lethality. It will provide long-range naval surface fires support (200-300nm), provide significantly shorter time-of-flight than current land-attack missile systems, and high-lethality (energy-on-target).

Status

A part of the Office of Naval Research Innovative Naval Prototype Program, the Railgun is being evaluated for naval applications using Science & Technology funding.

Developers

To be determined.

Extended-Range Munition (ERM)

Description

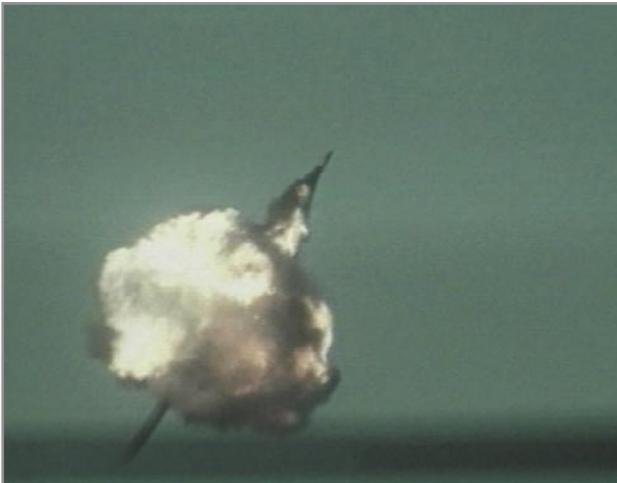
The ERM is a rocket-assisted projectile capable of carrying a Unitary blast-fragment warhead with an associated height-of-burst fuse. The 100 pound-plus aerodynamic projectile is five inches in diameter and 61 inches in length and uses a coupled Global Positioning System/Inertial Navigation System (GPS/INS) guidance system. The guidance system is resistant to jamming, enabling the ERM to attack targets in an electronic countermeasures environment. Its long range and accurate GPS targeting capability will improve Naval Surface Fire Support (NSFS) and provide gunfire support for expeditionary operations, suppression, and destruction of hostile anti-shipping weapons and air defense systems in support of the joint land battle.

Status

Milestone I/II was reached in July 1996, allowing the ERM to enter EDD. Developmental work continues as the program overcomes technical challenges. Work also continues on increasing lethality, designing the highly accurate guidance system that can withstand the harsh environment encountered during a gun firing, and other areas to provide cost-effective, accurate, and lethal munitions that meet NSFS requirements. Competition to award final phase of EDD will take place in the first quarter of FY 2006.

Developers

To be determined.



MK-45 Mod 4 Five-Inch/62-Caliber Gun System Upgrade

Description

The MK-45 Mod 4 5-inch 62 Gun will significantly enhance Naval Surface Fire Support (NSFS) capabilities, significantly improve maintenance procedures, and provide fire mission flexibility for anti-surface and anti-air warfare. The 5-inch (127mm)/62-caliber MK-45 Mod 4 Gun incorporates structural improvements to accommodate higher energies required to fire Extended-Range Munitions (ERM) and the current inventory of conventional 5-inch ballistic ammunition. Modifications include a longer (62-caliber) barrel, an Ammunition Recognition System, a Gun/ERM interface and a digital control system. Modifications to the ammunition magazine for the MK-45 Mod 4 Gun have also been developed to facilitate stowage of the larger ERM rounds and assist shipboard ammunition handling personnel with handling and loading the heavier rounds. The MK-45 Mod 4 Gun is currently being forward-fit in *Arleigh Burke* (DDG 51)-class Aegis destroyers (DDGs 81-112).

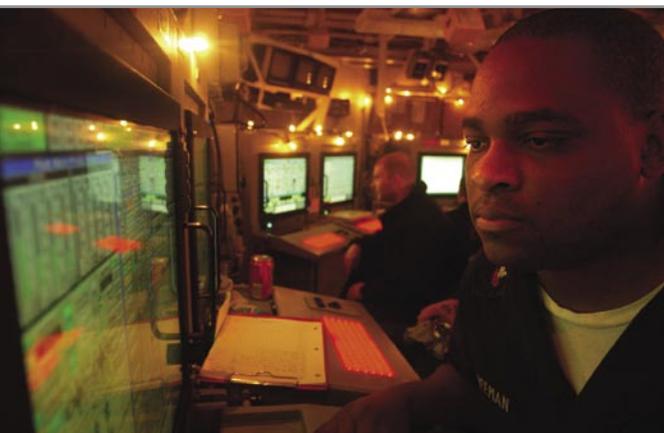
Status

Milestone I/II was reached in January 1996, allowing the MK-45 Mod 4 Gun to enter EMD. The Navy awarded the MK-45 Mod 4 Gun design and development contract on 5 February 1996. Three MK-45 Mod 4 kits have been produced to facilitate development and testing. The first kit was installed in a proof of concept gun, which successfully completed testing in July 1997 at the Naval Surface Warfare Center, Dahlgren (NSWC/DD) Virginia. All critical exit criteria associated with land-based testing were met allowing for LRIP approval on 12 April 1999. The gun completed testing with conventional rounds in 2003 and was approved to fire conventional ammunition per 24 April 2004 Milestone C decision. The gun will be evaluated for ERM functionality in parallel with the ERM test schedule. There are currently 16 DDG 51 destroyers equipped with the MK-45 Mod 4 Gun. The program's procurement rate has been balanced within available resources.

Developers

BAE Systems (formerly United Defense Limited Partnership);
Minneapolis, Minnesota





Naval Fires Control System (NFCS)

Description

The NFCS is the enabler for surface land-attack in network centric warfare operations. It automates shipboard land-attack battle-management duties, and communicates with the ground force's primary fire support command and control network, the Advanced Field Artillery Tactical Data System (AFATDS). NFCS will be interoperable with joint C4ISR systems, providing the mission-planning and fire-support coordination functions required to support expanded mission capability afforded by the extended range and precision accuracy of the improved MK-45 Mod 4 (5-inch/62-caliber) gun, Extended Range Munition (ERM), and the Advanced Gun System (AGS).

Status

Milestone III was reached on 6 December 2004 which authorized full-rate production of NFCS with a limited fleet introduction. The system achieved IOC 5 July 2005. Program development and procurement is on track for installation on DDGs 81-112. A total of 32 systems are planned for fielding FY 2005-2011.

Developers

Naval Surface Warfare Center; Dahlgren, Virginia
Space and Naval Warfare Systems Center; San Diego, California

Naval Undersea Warfare Center; Keyport, Washington
General Dynamics Information Systems; Arlington, Virginia
GEC-Marconi Electronics Systems; Wayne, New Jersey