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MQ-8B Fire Scout Vertical Unmanned Aerial System

Northrop Grumman Corporation's Fire Scout vertical unmanned aerial system (VUAS) will provide unprecedented situational awareness and precision targeting support for the Services of the future.

The Fire Scout VUAS, based on the Schweizer Model 333 manned helicopter, can autonomously take off and land on any aviation-capable warship and at unprepared landing zones in proximity to the forward edge of the battle area.

The Fire Scout vertical takeoff and landing tactical unmanned aerial vehicle (VTUAV) system includes advanced control segment facilities that encompass the U.S. Navy's tactical control system (TCS) software for control of the Fire Scout from ship or land. A modular mission payload capable of continued growth and the highly reliable Fire Scout meet or exceed all performance criteria requested.

With vehicle endurance greater than eight hours, Fire Scout will be capable of continuous operations providing coverage 110 nautical miles from the launch site. A baseline payload that includes electro-optical/infrared sensors and a laser designator/laser rangefinder enables Fire Scout to find tactical targets, track and designate targets, accurately provide targeting data to strike platforms and perform battle damage assessment.

Acting as a communications node within the proposed network-centric warfare battlespace of the future, Fire Scout will increase the effectiveness and flexibility of other platforms.

Northrop Grumman won a competitively awarded engineering and manufacturing development contract to develop the RQ-8A variant of Fire Scout in February 2000 for the U.S. Navy under the VTUAV program. Flight testing begun in 2002 and formed the basis for the development of the MQ-8B enhanced endurance and capability variant.

In August 2003, the MQ-8B Fire Scout was selected as Class IV unmanned air system for the U.S. Army's Future Combat System. The FCS Fire Scout will be a key element of the Army's tactical intelligence, surveillance, reconnaissance and targeting architecture, providing real-time imagery and data collection and dissemination at the brigade level. Under a 10-year contract from the Boeing Company and Science Applications International Corporation, the Army's FCS lead systems integrators, Northrop Grumman will develop the required UAS architecture, produce MQ-8B Fire Scout air vehicles, perform system tests and evaluations, and help develop long lead future requirements.

On Dec. 17, 2003, the 100th anniversary of manned flight, Fire Scout made its own history by completing its 100th consecutive successful flight. This milestone flight took place at Webster Outlying Field near Naval Air Station Patuxent River, Md. where Fire Scout flew a flawless mission in preparation for continuing flight operations onboard the USS Denver (LPD-9). The flight capped 18 months of successful Fire Scout system development, testing and flight demonstrations during which the UAV system accumulated approximately 75 flight hours.

In March 2004 the U.S. Navy contracted with Northrop Grumman to formally develop the MQ-8B Fire Scout variant for use on the Littoral Combat Ship (LCS). The MQ-8B air vehicles for both the Navy and the Army use a common airframe but equipped with communications and payloads specific to each service needs. The MQ-8B air vehicles feature a four-blade rotor system (versus the RQ-8A's three-blade design), improved airfoil blades and several performance enhancements that enable more than eight hours endurance with a standard payload.

In April 2004, Northrop Grumman broke ground on a new Unmanned Systems Center at Trent Lott International Airport in Moss Point, Miss. The company uses the new 100,000+ square foot facility to produce MQ-8B Fire Scouts for the U.S. Navy and the U.S. Army, as well as subassembly work for the U.S. Air Force RQ-4B Global Hawk unmanned reconnaissance system.

Start of aircraft production at the Moss Point facility began Jan. 3, 2006, when Northrop Grumman received the first MQ-8B Fire Scout airframe from its teammate, Schweizer Aircraft Corporation. This airframe was the first Fire Scout assembled at the Moss Point facility.

The U.S. Navy and Northrop Grumman wrote a new chapter in naval aviation history Jan. 16-17, 2006, when two RQ-8A Fire Scout VUASs completed nine autonomous shipboard landings on board USS Nashville (LPD 13) off the coast of Naval Air Station Patuxent River, Md. This test marked the first time a Navy UAS performed vertical landings on a moving ship without a pilot controlling the aircraft. After it was launched from the naval air station, the Fire Scout flew to the designated test area, where the USS Nashville was waiting for the air vehicle to land and take off under its own control. The flight was monitored from a ship-based control station called a tactical control system, and the air vehicle was guided onto the ship using an unmanned air vehicle common automatic recovery system.

On Feb. 13-24, 2006, at the U.S. Army's Yuma Proving Ground in Arizona, Northrop Grumman, in conjunction with the Office of Naval Research, successfully demonstrated the ability to extend communications range and capability using the RQ-8A Fire Scout. This event also marked Fire Scout's 200th flight, another milestone toward development of the Navy's VTUAV. Testing for the program, called Beyond Line-of-Sight Tactical UAS Communications Relay, successfully demonstrated that a tactical UAS can be used to enable over-the-horizon communications relay, allowing ground troops on the move and battlefield commanders to share uninterrupted voice, data and real-time video.

In August 2006, the U.S. Navy awarded Northrop Grumman a \$135.8 million modification to a previously awarded contract for the Fire Scout VTUAV program. The award definitized the remaining portion of the work to complete the program's systems development and demonstration (SDD) phase through 2008.

In May 2007, the U.S. Department of Defense announced that MQ-8B Fire Scout VTUAV reached Milestone C, signifying the beginning of its low-rate initial production phase. The Fire Scout is the first unmanned aircraft system (UAS) within the U.S. Navy and the third UAS of all U.S. military branches to meet Milestone C in the Defense Department acquisition process.

In May 2007, Northrop Grumman also successfully performed an engine run of the first U.S. Army MQ-8B Fire Scout, the Class IV Unmanned Aerial System in the Army's Future Combat Systems (FCS), at the company's Unmanned Systems Center in Moss Point, Miss. The engine run was a significant milestone for the FCS program. It marked completion of final assembly of the initial manufacturing phase of the first Army Fire Scout.

In August 2007, in cooperative effort between the U.S. Navy, U.S. Army, U.S. Marine Corps and Northrop Grumman, a Navy MQ-8B Fire Scout VTUAV was transported in a Marine Corps KC-130T aircraft from Moss Point Miss to Patuxent River, Md. The Navy MQ-8B Fire Scout was first loaded onto the KC-130T followed by an Army MQ-8B Future Combat System (FCS) Class IV UAV. Only the Navy Fire Scout was airlifted, but loading both vehicles demonstrated that a KC-130T tandem loadout is possible. Because transportation requirements for the KC-130 are the most restrictive, this flight certification will be updated to include other aircraft such as the C-5 and C-17. The vehicles were loaded using 100% common procedures for both services, further demonstrating the versatility of the Fire Scout design. This activity allowed the Army to review and validate MQ-8B FCS Class IV UAV transport requirements early in the development process.

In December 2007 the MQ-8B Fire Scout initiated flight testing using a Test and Training Control Segment. This control segment is a shelterized version of the exact consoles and other equipment being integrated into Littoral Combat Ships (LCS) for operational use of the MQ-8B Fire Scout.

The control segment integrates the latest Tactical Control Segment (TCS) software designed and produced by Raytheon's Intelligence and Information Systems business. This new software release, known as B2V4, incorporates updates from RQ-8A Fire Scout flight experience and incorporates provisions for both the baseline FLIR Systems BRITE Star II electro-optical and infrared (EO/IR) payload and the Northrop Grumman COBRA multi-spectral mine detection payload.

Additional payloads will be integrated into the air vehicle and control segment in the future. The plug and play capability of TCS software and the air vehicle interface software will allow seamless integration of future payloads with MQ-8B Fire Scout.

The current phase of flight test for the VTUAV program covers operations with the new control segment and land based shipboard recovery system testing using UCARS (UAV Common Automatic Recovery System) in preparation for the sea trials in 2009.

In February 2008, the U.S. Navy announced that they would integrate the MQ-8B Fire Scout VTUAV onto another air-capable ship before it reaches the Littoral Combat Ship (LCS). The Fire Scout is still slated to go aboard the LCS, and the Navy remains committed to transitioning the Fire Scout in that direction.

The Fire Scout is a key enabler for LCS and significantly contributes to its designated warfare mission areas of anti-submarine warfare, surface warfare and mine warfare. The modular nature of the ship to accomplish the designated mission is perfectly complemented by the Fire Scout and its modular mission payload capability. However, due to changes in the LCS development schedule, the Navy intends to conduct the Fire Scout Operational Evaluation (OpEval) aboard a FFG-7, *Oliver Hazard Perry* class ship. This will provide the fleet with unmanned aerial system support as soon as possible.

According to the current schedule, the Navy will conduct Technical Evaluation on the Fire Scout on the FFG-7 in the fall 2008 and OpEval in the summer 2009. The Fire Scout will reach Initial Operating Capability soon after OpEval in 2009. The Navy will continue to support LCS Initial Operational Test and Evaluation (IOT&E) efforts in fiscal year 2011.

Fire Scout VTUAV restructuring is in the best interests of the Fleet and the U.S. Navy Fire Scout program because it enables the Navy to continue supporting LCS integration and will provide a more mature system for LCS deployments.

In August of 2008, Northrop Grumman rolled out and flew its company-owned MQ-8B Fire Scout VUAS designated as "P6." The first flight was conducted at the Webster Field Annex portion of Naval Air Station Patuxent River, Md. P6 is part an on-going effort to expand upon the development capabilities of the MQ-8B Fire Scout.

The first flight of P6 was a significant milestone showing that the company owned MQ-8B Fire Scout is ready to support system demonstrations with a variety of payloads. Demonstration flights will continue at Webster Field, Naval Air Station Patuxent River, Md. and at Yuma Proving Ground, Ariz.

Also in August of 2008, the Navy Fire Scout VTUAV completed its first flight with the BRITE Star II electro-optical/infrared payload using a Tactical Common Data Link (TCDL) at Webster Field, Naval Air Station Patuxent River, Md. in Sept.

The Fire Scout TC DL, developed by Cubic Corporation, provides real-time wide-band imagery and other information to the land- or ship-based control segment. For shipboard use, the airborne TC DL will communicate with the ship's TC DL terminal. A Fire Scout payload interface unit allows the TC DL and payload interface to remain independent of flight-critical functions. This permits future payloads to be easily integrated without impacting flight critical functionality.

The BRITE Star II payload, built by FLIR Systems, Inc., is a combat-proven, long-range multi-sensor targeting and target designation system for the Navy's Fire Scout. It is common with the U.S. Marine Corps Huey-1N/Y program and is a derivative of FLIR's BRITE Star and Star SAFIRE targeting systems. The BRITE Star(r) II version provides high-resolution color and monochrome imagery and has a high-power laser range finder and laser designator.

In September of 2008, Northrop Grumman demonstrated radar capability at the Yuma Proving Ground on its company-owned Fire Scout designated as "P6." The flight demonstrated Fire Scout's ability to search for, detect, and track multiple targets during a test surveillance mission. The demonstration took place using a non-developmental Telephonics RDR-1700B search, surveillance, tracking and imaging radar system. The flight was the first of several radar demonstrations that will include an over-water search trial.

Also in September of 2008, Fire Scout moved into the second year of low-rate initial production (LRIP) with a \$32.9 million contract award from the U.S. Navy's Naval Air Systems Command. The company received the award recently for the second of three planned LRIP buys.

A U.S. Department of Defense Acquisition Decision Memorandum for Milestone C authorized LRIP 1 for the Fire Scout VTUAV. A series of program milestones needed to be met in order for Fire Scout to qualify for the LRIP 2 award. Key requirements included a demonstration of Fire Scout electro-optical/infrared capability using a Tactical Common Data Link, which was successfully completed in August of 2008.

Fire Scout Industry Team

The Fire Scout industry team includes the following members and is managed by the Navy's PMA-266 Unmanned Vehicles program office, Program Executive Office, Strike Warfare and Unmanned Aviation, at Patuxent River, Md.:

- Cubic Defense Applications – communications
- FLIR Systems, Inc. – Brite STAR II payload
- GE Fanuc – vehicle management computer
- Kearfott Inc. – guidance and navigation
- Lockheed Martin Corporation – ship integration
- Raytheon Company – tactical control system
- Rockwell Collins – avionics
- Rolls-Royce Corporation – engine
- Sierra Nevada Corporation – unmanned common automatic recovery system
- Schweizer Aircraft Corporation – airframe

Technical Specifications

Length Folded	22.87 ft (7.0 m)
Rotor Diameter.....	27.50 ft (8.4 m)
Height.....	9.42 ft (2.9 m)
Gross Weight	3,150 lbs (1,428.8 kg)
Engine	Rolls-Royce, Model 250-C20W
Speed.....	125+ knots
Ceiling.....	20,000 ft (6.1 km)
Total Flight Time with Baseline Payload	8+ hours
Total Flight Time with 500 lb Payload.....	5+ hours
Payloads	EO / IR / LD BRITE Star II
.....	UHF / VHF Comm Relay
.....	COBRA Mine Detector
.....	Airborne Comm Package

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