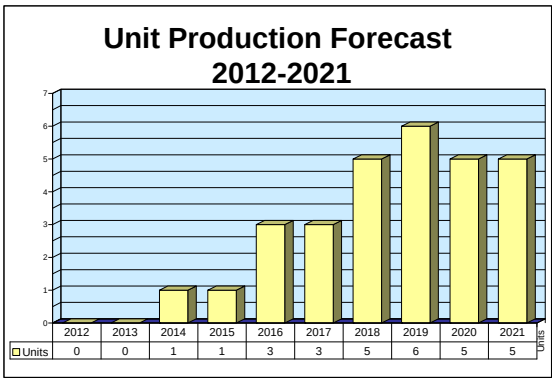
ACERTS

Outlook

- In March 2011, Northrop Grumman confirmed that the ASTAMIDS name had been changed to ACERTS
- Under the ACERTS banner, the payload has a new focus on counter-improvised explosive device (C-IED) service
- ACERTS may appear in service on a manned helicopter or an alternative to the MQ-8B Fire Scout UAV



Orientation

Description. The Airborne Counter-Explosive, Reconnaissance, and Targeting System (ACERTS) (formerly the Airborne Surveillance, Target Acquisition and Minefield Detection System [ASTAMIDS]) is an electro-optical, infrared, laser designation, countermine, and counter-improvised-explosive-device sensor.

Sponsor

Northrop Grumman Integrated Systems
Airborne Ground Surveillance & Battle Management Systems

U.S. Army
PM-Close Combat Systems (CCS)
Attn: SFAE-AMO-CCS
Picatinny, NJ 07806-5000
USA
Tel: + 1 (973) 724-2740
Web site: http://www.pica.army.mil/pmccs

Status. The U.S. Army terminated the ASTAMIDS platform – the Northrop Grumman MQ-8B Fire Scout UAV – and remaining ASTAMIDS and SAR/GMTI interface and integration efforts on the Class IV UAV. Northrop Grumman relaunched the system as ACERTS.

Total Produced. It is estimated that seven or eight pre-production units were delivered.

Application. The main U.S. platform for ASTAMIDS was the U.S. Army Class IV Fire Scout unmanned aerial vehicle. ACERTS/ASTAMIDS can also be flown on helicopters.

Price Range. Forecast International estimates a speculative price range for ACERTS/ASTAMIDS of between $950,000 and $2 million, depending on the variant and quantity purchased. According to U.S. FY10 Army procurement documents, the unit price of ASTAMIDS is $1.793 million for a three-piece lot. It's expected that a larger quantity buy would be less expensive, with the price increasing if options are added, such as user-specific software, training, spares, and manuals.

Contractors

Prime

Northrop Grumman Aerospace Systems, Battle Management and	http://www.as.northropgrumman.com, 2000 NASA Blvd, PO Box 9650, Melbourne, FL

ACERTS

Engagement Systems	32902-9650 United States, Tel: + 1 (321) 951-5000, Prime

Subcontractor

APOGEN Technologies	http://www.apogentech.com, 7545 Metropolitan Dr, San Diego, CA 92108 United States, Tel: + 1 (619) 294-6982, Fax: + 1 (619) 294-3567 (Multi-Spectral Imager (MSI) and Laser Illuminator (LI))
DRS Imaging and Targeting Solutions	http://www.drs-ds.com, 1060 Valley View St, Cypress, CA 90630 United States, Tel: + 1 (714) 220-3800, Fax: + 1 (714) 220-3801, Email: marketing@drseosg.com (Multi-Spectral EO Sensors -VNIR/MWIR)

Comprehensive information on Contractors can be found in Forecast International's "International Contractors" series. For a detailed description, go to www.forecastinternational.com (see Products & Samples/Governments & Industries) or call + 1 (203) 426-0800.

Contractors are invited to submit updated information to Editor, International Contractors, Forecast International, 22 Commerce Road, Newtown, CT 06470, USA; rich.pettibone@forecast1.com

Technical Data

Design Features. The Airborne Counter-Explosive, Reconnaissance, and Targeting System (ACERTS) (formerly The Airborne Surveillance, Target Acquisition and Minefield Detection System [ASTAMIDS]) is an electro-optical, infrared, laser designation, countermine, and counter-improvised-explosive-device sensor for use on UAVs and helicopters.

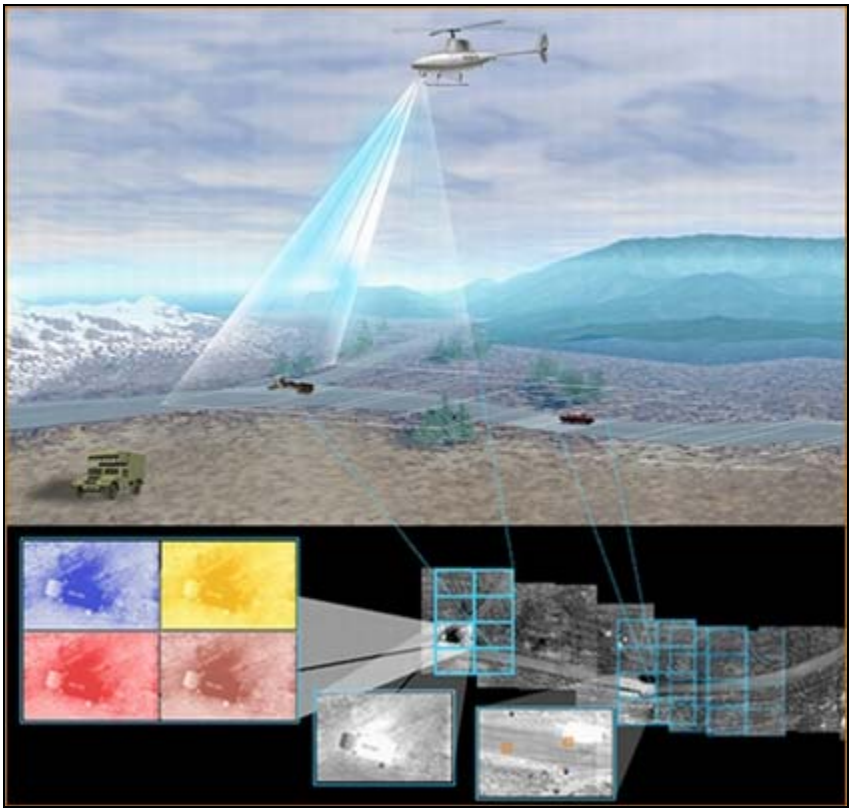
The ACERTS uses quad-prism aperture-splitting technology with the aid of an integrated illuminator and target laser rangefinder and laser designator. Change-detection algorithms have also been inserted into the FCS program to address improvised explosive devices and single on-route mines.

ACERTS provides day/night reconnaissance, surveillance, and target acquisition to detect, locate, and designate combat targets with accuracy to support precision-guided weapons engagement. It detects patterned surface-emplaced mines, patterned recently buried mines, and randomly scattered mines that may present a barrier to mobility. The payload has the capability to detect obstacles, combat vehicles, and other combat targets, including camouflaged targets.

ACERTS is delivered as two components: the Airborne Payload and the Tactical Ground Segment. The AP contains sensors, lasers, automatic image tracking, and the TGS contains the off-payload software.

Variants/Upgrades

High-Altitude ACERTS/ASTAMIDS. Northrop Grumman has stated that the ACERTS/ASTAMIDS design can support alternate UAV higher-altitude mission applications with minor lens modifications. This lens modification adds a small amount of weight to the payload.



ASTAMIDS Concept

Source: U.S. Army, PM Close Combat Systems (CCS)

Program Review

Background. According to "Searching for Land Mines," an article published in April 1996 in *Mechanical Engineering-CIME*, the Mechanical Engineering Society's professional journal, the ASTAMIDS program began circa 1992 and was a four-year, $40-$50 million R&D program. Raytheon reported that the company was awarded a 32-month ASTAMIDS contract worth $22.5 million in 1993.

More information was forthcoming in a report presented by the U.S. Army Night Vision and Electronic Sensors directorate at an International Society for Optical Engineering (SPIE) conference in April 1997. According to "ASTAMIDS Minefield Detection Performance at Aberdeen Proving Ground Test Site," the ASTAMIDS program was using two parallel technical approaches: passive thermal IR sensor technology and an active multichannel sensor utilizing passive thermal IR co-registered with near-IR laser polarization data. Development efforts were concentrated in three areas: mine/minefield detection algorithms, hardware to execute algorithms in real time, and detection performance measurement.

ASTAMIDS Not Ready

In the FY97 defense-spending bill, $12 million was set aside for "the continuation of ASTAMIDS, as a top Army priority." In 1997, however, the Army had not certified ASTAMIDS for operations in Bosnia because both the Raytheon and Northrop Grumman systems were unable to meet requirements. Reportedly, the main problem was the inability of the software to interpret sensor data. Consequently, Congress cut ASTAMIDS funding in FY98.

Flight International reported in early 1998 that a Northrop Grumman ASTAMIDS mounted on a Black Hawk helicopter was unable to detect mines in Bosnia's overgrown minefields. It was believed that ASTAMIDS would operate better in freshly laid minefields that were not covered with high vegetation.

In February 1998, the Army issued a stop-work order to Raytheon. Northrop Grumman was allowed to continue work under the Countermine Advanced Concept Technology Demonstration program.

System Design and Development Phase

In 2002, the U.S. Army issued a Request for Proposals for Block 1 ASTAMIDS, and in April 2003, Northrop Grumman was awarded a four-year, $41.8 million System Design and Development (SDD) contract.

Northrop Grumman stated in April 2003 that ASTAMIDS featured a combined advanced EO/IR sensor and a next-generation quad-prism aperture-splitting MSI sensor. L-3 Communications WESCAM provided the EO/IR sensor, and Science & Engineering Associates (now Apogen Technologies) developed the MSI sensor. The sensors were integrated into an L-3 Communications' step-stare gimbal, which was installed aboard an Army UAV. Northrop Grumman Integrated Systems lists other key team members as Northrop Grumman Mission Systems of Virginia, Arete Associates of Florida, and California's PAR Government Systems. The team members are jointly contributing to a multi-algorithm combined approach.

Meanwhile, *Military Procurement International* reported that Northrop Grumman awarded L-3 Communications WESCAM an $8.4 million contract in August 2003 to supply its M11 digital video EO/IR countermine step-stare sensor system over the four-year SDD phase. In December 2004, Northrop Grumman issued an SDD contract to DRS Sensors & Targeting for seven targeting and countermine surveillance suites suitable for UAV applications. The target parameters included an overall weight of 75 pounds and a 13.5-inch gimbal. These units are for vehicle qualification, laboratory use, and vehicle testing.

Fire Scout Selected for FCS

Also in 2003, Northrop Grumman's Fire Scout vertical takeoff and landing unmanned air vehicle was selected to meet the Class IV UAV requirement of the U.S. Army's Future Combat System (FCS) program.

Army Increases Mission Scope

In April 2005, the full name of the ASTAMIDS program was changed from Airborne Standoff Minefield Detection System to Airborne Surveillance, Target Acquisition, and Minefield Detection System.

The same month, according to Northrop Grumman, the ASTAMIDS program was expanded, at the Army's request, beyond its initial countermine mission to include reconnaissance, surveillance, target acquisition (RSTA), and target designation capabilities. DRS Sensors & Targeting is providing the "new" airborne payload (AP) that incorporates these functions. A February 2007 article in *Military Aerospace and Electronics* reported that the AP consists of multi-spectral EO sensors covering the visible, near-infrared, and mid-wave infrared spectrum, plus mission-specific hardware, software, and firmware components that collect and analyze imagery and data. The AP then transmits the information via the network datalink to the FCS ground control station.

Northrop Grumman believed that the added RSTA capabilities were worth an additional $26 million above the $55 million previously awarded to the company.

Deliveries Begin, Testing to Start Soon

A February 2007 article in *Military Aerospace and Electronics* reported that ASTAMIDS was in System Design and Development (SDD).

Bob Viviano, vice president and general manager, DRS, said in September 2007 that the first Integrated Avionics Unit prototype was scheduled to be delivered in October 2007, and the AP1 prototype for flight-testing was to be finished in December 2007. Viviano added that two more DRS units were scheduled for delivery in summer 2008 for qualification testing. The last three units, which were expected to be production representative, were to be given to Northrop Grumman by September 2008. It is assumed these deliveries are complete.

Milestones

In April 2008, ASTAMIDS flew from Northrop Grumman's facility in Melbourne, Florida, aboard a modified Army UH-1H Huey helicopter. All four "first-flight objectives" were achieved, and control of the gimbals via the developmental Tactical Ground Segment software was demonstrated. Northrop Grumman stated that since then, the team has been flight-testing the system's RSTA and countermine capabilities.

In September 2008, ASTAMIDS flew for the first time aboard a UAV, a Northrop Grumman-owned MQ-8B Fire Scout P6. The team, located in a ground-based control center, used a tactical common datalink to operate ASTAMIDS while it was airborne.

Northrop Grumman reports that in August 2009, an MQ-8B Fire Scout successfully demonstrated its RSTA/ISR capabilities at Yuma Proving Ground, Arizona. This RSTA/ISR demonstration was conducted with the use of a high magnification electro-optical/infrared (EO/IR) payload, which

includes a long-range laser designator and laser rangefinder (LD/LR).

After an autonomous launch, Fire Scout demonstrated its ability to find, fix, and track hostile forces during a real-time operational scenario in complex terrain at night. Full-motion video was relayed down to ground operators in real time over a Tactical Common Data Link (TCDL). Although not specifically mentioned, the payload was most likely ASTAMIDS.

Full and Final Settlement

In October 2008, Northrop Grumman said the ASTAMIDS program had an estimated total value of $123 million. The following month, the Army awarded Northrop Grumman $39 million to make full and final settlement for cost growth and change orders under the ASTAMIDS SDD contract.

Efforts Terminated

In January 2010, the Army terminated the Class IV UAV program. U.S. Army FY11 Research Development, Test & Evaluation (RDT&E) budget documents state that in FY10, the military began ASTAMIDS initial flight tests, but terminated the remaining ASTAMIDS sensor effort in January 2010. The Army also terminated remaining ASTAMIDS and SAR/GMTI interface and integration efforts on the Class IV UAV.

In November 2010, Northrop Grumman was awarded a $12.3 million contract for SDD efforts for ASTAMIDS Block 1. The contract called for the work to be completed the same month.

High Flyers/IEDs/Hellfire

Northrop Grumman has said that ASTAMIDS can also support higher-altitude UAV mission applications with a minor lens modification. Although this lens modification adds a small amount of weight to the 75-pound gimbaled payload, it still weighs less than many other, larger electro-optical infrared gimbaled payloads currently in use.

To widen the ASTAMIDS' market, Northrop Grumman may look to alternate UAV platforms for future business.

In other applications, ASTAMIDS can be used to detect mines and other devices. DRS Technologies' Vice President Tim Harrison has been quoted as saying that ASTAMIDS is capable of detecting recently buried mines. In some situations, it could detect newly buried improvised explosive devices (IEDs) and be used for counter-IED missions.

Proving Harrison's conjecture, in September 2010, Northrop Grumman completed a series of 12 daytime and nighttime flight tests as part of a U.S. Army evaluation. The ASTAMIDS was flown on a Northrop Grumman-owned MQ-8B Fire Scout.

ASTAMIDS flew over target areas in order to demonstrate the system's counter-IED capability, road-following capabilities, and large area precision mapping capabilities. While in flight, the system successfully detected simulated IEDs, and also demonstrated that it could act as a target designator for Hellfire missiles.

Name Change

In the March 2011 issue of Northrop Grumman's *Aerospace Now*, the company revealed that ASTAMIDS had been redesignated the Airborne Counter-Explosive, Reconnaissance, and Targeting System (ACERTS). The article went on to detail the work of an Aerospace Systems engineering team to transform the existing minefield aerial sensor into a counter-improvised explosive device (C-IED) sensor.

ACERTS was re-focused for C-IED in August 2009, when the system was selected as one of a set of 12 sensors to be evaluated by the Joint IED Defeat Organizations (JIEDDO). The effort finished with the flight of the system on board a U.S. Army UH-1 helicopter in August 2010.

Contracts/Orders & Options

Contractor	Award ($ millions)	Date/Description
Northrop Grumman Integrated Systems	41.8	Apr 2003 – A four-year contract to develop and demonstrate the U.S. Army's ASTAMIDS program. Contract awarded by U.S. Army Communications and Electronics Command. (DAAB15-03-C-0013)
L-3 Communications (WESCAM)	8.4	Aug 2003 – Contract awarded by Northrop Grumman for state-of-the-art M11 digital video electro-optical/Infrared countermine step-stare sensor system over a four-year period for ASTAMIDS.
DRS Sensors & Targeting Systems	Not disclosed	Dec 2004 – Contract awarded by Northrop Grumman for seven state-of-the-art targeting and countermine surveillance suites for ASTAMIDS.
Northrop Grumman	5.5	Apr 2005 – Contract modification to incorporate reconnaissance, surveillance, and target acquisition and laser designation functionality into ASTAMIDS Block 1. Work completed in Oct 2009. U.S. Army Communications-Electronics Command Center, Alexandria, VA, was the contracting activity. (DAAB15-03-C-0013)
Northrop Grumman	39.1	Nov 2008 – Contract modification to make full and final settlement of cost growth and change orders under the contract. This contract is for SDD of the ASTAMIDS block. Work was completed by Dec 31, 2009. U.S. Army CECOM Acquisition Center, Washington, was the contracting activity. (DAAB15-03-C-0013)
Northrop Grumman	12.3	Nov 2010 – Contract is for the SDD of the ASTAMIDS Block I. Work was completed by Nov 30, 2010. CECOM Contracting Center, Washington, was the contracting activity. (DAAB15-03-C-0013)

Timetable

Month	Year	Major Development
	1992	Start of ASTAMIDS R&D program
Sep	1993	Raytheon and Westinghouse (now Northrop Grumman) awarded competing ASTAMIDS R&D contracts
Fall	1997	Northrop Grumman ASTAMIDS undergoes testing in Bosnia
Feb	1998	U.S. Army issues stop-work order to Raytheon
Aug	2002	U.S. Army issues a Request for Proposals for Block 1 ASTAMIDS
Apr	2003	Northrop Grumman awarded ASTAMIDS SDD phase contract
	2003	Northrop Grumman's Fire Scout selected as the Army's FCS Class IV UAV
Jan	2004	Northrop Grumman awarded eight-year, $115 million Fire Scout contract
Apr	2005	U.S. Army expands scope of ASTAMIDS program
April	2008	ASTAMIDS equipped UH-1H Huey helicopter (modified) makes first flight
Sep	2008	ASTAMIDS flies on a UAV for the first time
Sep	2009	ASTAMIDS LRIP begins
Jan	2010	U.S. Army Fire Scout program terminated; Fire Scout is an ASTAMIDS platform
Mar	2011	ACERTS name and C-IED role change revealed

ACERTS

Worldwide Distribution/Inventories

This program was a **U.S. Army** program only. With the cancellation of the Army's Fire Scout, the system may now be made available to a wider range of customers.

Forecast Rationale

ASTAMIDS originated as a U.S. Army program to equip its MQ-8B Fire Scout with counter-mine and target designation capabilities. The Army's Fire Scout was canceled, and in FY11, procurement documents showed no ASTAMIDS procurement request.

In March 2011, Northrop Grumman revealed ASTAMIDS' new name and a new focus. The system was rebranded the Airborne Counter-Explosive, Reconnaissance, and Targeting System (ACERTS) and had gained a new purpose as a counter-improvised-explosive-device (C-IED) sensor.

Fire Scout Future

The U.S. Army has dropped its version of the Fire Scout, which is dire news for ACERTS/ASTAMIDS sales. While the U.S. Navy is still purchasing Fire Scouts, they will fly with a sensor package that does not include ASTAMIDS.

Northrop Grumman is now looking for overseas Fire Scout sales.

At various times, Australia, Germany, Israel, Japan, Norway, South Korea, Spain, and the United Kingdom have expressed interest in the Fire Scout. Nonetheless, it is unclear whether an international Fire Scout would be equipped with ACERTS, a Navy package, or a different sensor suite, sold as an international sales variant. Purchasing nations may also want to use indigenous systems.

Helicopters/Alternative UAVs/C-IED

Even without the Fire Scout, ACERTS sales remain possible with the payload as part of the sensor suite of manned helicopters and/or alternate UAVs.

The system has flown on board a U.S. Army Bell UH-1 helicopter while participating in counter-improvised explosive device (C-IED) development. This proved the ACERTS' utility in a manned flight situation, and also expanded its capabilities with an added C-IED role.

ACERTS' C-IED mode has also been tested aboard an MQ-8B, on which it successfully confirmed locations of simulated roadway IEDs.

With or without continuing development support and production contracts from the U.S. Army, Northrop Grumman may still find customers interested in ACERTS. Forecast International tentatively projects deliveries beginning in late 2015 or early 2016.

Ten-Year Outlook

ESTIMATED CALENDAR YEAR UNIT PRODUCTION

Designation or Program	High Confidence				Good Confidence				Speculative			
	Thru 2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
Northrop Grumman Aerospace Systems												
ACERTS <> Worldwide												
	0	0	0	1	1	3	3	5	6	5	5	29
Total	0	0	0	1	1	3	3	5	6	5	5	29