

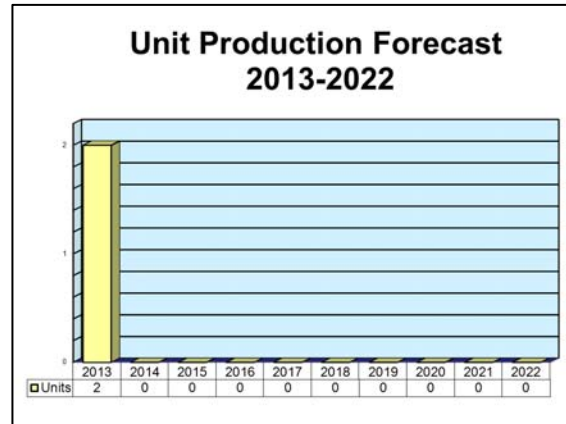
ARCHIVED REPORT

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Enhanced Polar System

Outlook

- Both EPS payloads delivered to USAF in 2013
- EPS payloads will be integrated into unidentified host spacecraft
- Launch date is classified for the host spacecraft



Orientation

Description. The Enhanced Polar System is a planned constellation of two advanced military communications payloads.

Sponsor. The U.S. Air Force MILSATCOM Joint Program Office at the Space and Missile Systems Center at Los Angeles Air Force Base, California, will oversee the Enhanced Polar System program.

Status. Boeing and Northrop Grumman each received a six-month, \$1.5 million systems definition contract in mid-2006.

Total Produced. None

Application. The Enhanced Polar Satellites will provide 24-hour-a-day next-generation military communications above 65° N.

Price Range. The FY10 Department of Defense budget request allocated approximately \$253 million for RDT&E for the Enhanced Polar System.

Contractors

Prime

Boeing Defense, Space & Security	http://www.boeing.com/boeing/bds/ , PO Box 516, St Louis, MO 63166 United States, Tel: + 1 (314) 232-0232, Fax: + 1 (314) 777-1096, RDT+E (EPS Payload Study)
Northrop Grumman Aerospace Systems, Space Systems	http://www.northropgrumman.com/capabilities/space/ , 1 Space Park, Redondo Beach, CA 90278 United States, Tel: + 1 (310) 812-4321, Fax: + 1 (310) 813-7548, RDT+E (EPS Payload Study)

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Enhanced Polar System

Technical Data

Design Features. The Enhanced Polar System (EPS) will consist of two advanced military communications payloads covering the North Polar region. The EPS will fill gaps in the northern region, providing 24-hour-a-day protected military communications for ships, submarines, aircraft, or others operating above 65° N.

EPS will consist of EHF payloads hosted aboard unspecified satellites. EPS will incorporate shared

next-generation technology from both Advanced EHF (AEHF) satellites and TSAT. Some of the technologies currently planned to be designed into the EPS include Extended Data Rate (XDR) capabilities, protected EHF- and Ka-band, and laser satellite communications (lasercom).

Program Review

Background. In 1992, the Milstar Satellite Communications System was restructured, eliminating the requirement for the system to provide polar coverage. This deletion left the military with unwanted communications gaps, and the Air Force was directed to find a more cost-effective plan for polar communications. In late 1994, the DoD officially recognized its need for protected polar communications, a finding shared by the Requirements Oversight Council in July 1995. The council subsequently approved an interim communications system until a long-term solution could be developed.

Interim Polar System. The interim solution was a planned constellation of three unspecified satellites, each hosting a modified Boeing communications payload originally planned for the Navy's Ultra High-Frequency satellite system. The first satellite was launched in 1998. With the launch of the second satellite in 2007, the network was declared operational.

The interim satellites provide 24-hour-a-day protected communications in the North Polar region, though they fall short of DoD communications system requirements.

An early EPS design consideration proposed the use of advanced communications payloads aboard host satellites, as was done with the interim system. It was determined that such a design would fail to meet DoD requirements, however – notably, the need for nuclear hardening. The EPS would have to be a completely new design, separating itself from the interim satellites.

Transformational Communications Architecture Created

By 2001, the issue of bandwidth availability throughout the entire DoD communications network was of great concern, leading to the formation of the Transformational Communications Office (TCO) in 2002, which was given the task of creating next-generation communications architecture. The TCO presented an overall architecture based on a network of

satellites utilizing advanced technologies such as laser optical communications links. The system also called for the use of three payloads on board unnamed satellites in polar orbit to provide communications links in the North Pole. The third satellite was later dropped.

Study Contracts Awarded to Boeing and Northrop Grumman

In April 2006, the Air Force awarded payload study contracts to Boeing Integrated Defense Systems of St. Louis, Missouri, and Northrop Grumman Space Technology of Redondo Beach, California. The six-month contracts were worth \$1.5 million each. Boeing reported that there existed a 14-month, \$8 million Phase II contract option that would include delivery of a completed system architecture, a system engineering master plan, and a complete risk-management plan.

EPS development, fabrication, integration, and testing began in FY08.

TSAT Canceled

In April 2009, then-U.S. Secretary of Defense Robert Gates announced plans to cancel the TSAT program and instead purchase more of a different type of communications satellite. TSAT had been planned to dramatically increase the amount of bandwidth available for military users and would have included laser intersatellite links. However, even after scaling down the program's technological risks, the Pentagon concluded that it was more cost effective to cancel TSAT and instead buy two additional Advanced EHF satellites, currently under development by Lockheed Martin. The Pentagon has spent about \$1.5 billion on TSAT to date and had planned to award a contract for the space segment to either Boeing or Lockheed Martin in 2009.

CDR Completed, Testing Begins. In FY10, the EPS completed Critical Design Review (CDR). In FY11, the

Enhanced Polar System

DoD acquired the payload engineering models from the developer and began testing and integration work.

In February 2013, Northrop Grumman delivered the first of two payloads to the U.S. Air Force. The second

payload was delivered in June of that year. Following delivery of the payloads, the DoD began integrating them into the host satellites.

Funding

Funding for the Enhanced Polar System is provided under U.S. Air Force PE#0603432F: Polar MILSATCOM line item. Through FY13, that line item resided in Budget Activity 4. Starting in FY14, the DoD moved the line item to Budget Activity 5. Figures below are from the FY14 budget request.

U.S. FUNDING

	FY12 AMT	FY13 AMT	FY14 AMT	FY15 AMT	FY16 AMT	FY17 AMT	FY18 AMT
0603432F Polar MILSATCOM BA4	103.1	120.68	-	-	-	-	-
0605432F Polar MILSATCOM BA5	-	-	124.81	96.78	73.4	52.24	25.14

All \$ are in millions.

Timetable

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
Oct	2003	Transformational Communications Architecture revealed
Apr	2006	Study contracts awarded to Boeing and Northrop Grumman
	FY10	Critical design review (CDR) completed
Feb	2013	Delivery of first payload to U.S. Air Force
Jun	2013	Delivery of second payload to U.S. Air Force
	2016/18	Possible launch of satellite carrying EPS payloads

Forecast Rationale

The Pentagon considers satellites that can enable 24-hour anti-jam and low-probability-of-intercept communications capability to be vital to U.S. Department of Defense operations. The DoD is currently using two payloads that were developed as an interim solution after the MILSATCOM program was canceled in 1992. With those satellites in orbit, attention has turned to deploying new payloads under the Enhanced Polar System (EPS) program. Under the EPS

program, the DoD wants to deploy two EHF payloads on undisclosed satellites orbiting Earth in a polar orbit.

The two payloads were delivered to the U.S. Air Force in February and June 2013. The Air Force will now begin integrating the payloads with their host satellites. The launch date is classified for the host spacecraft; launches could speculatively take place in between 2015 and 2018.

Ten-Year Outlook

ESTIMATED CALENDAR YEAR UNIT PRODUCTION												
Designation or Program	High Confidence					Good Confidence			Speculative			Total
	Thru 2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	
Northrop Grumman Information Systems												
Enhanced Polar System	0	2	0	0	0	0	0	0	0	0	0	2
Total	0	2	0	0	0	0	0	0	0	0	0	2