



## ***AEHF Payload***

*Assured, protected,  
survivable communications*



**THE VALUE OF PERFORMANCE.**

***NORTHROP GRUMMAN***

# AEHF Payload

The U.S. Air Force's Advanced Extremely High Frequency (AEHF) system is the nation's next-generation military strategic and tactical relay system, which will deliver survivable, protected communications to U.S. forces and selected allies worldwide. When fully operational, the system will consist of four crosslinked satellites, a ground mission control center and user terminals. Currently three satellites are on orbit and operating. Space vehicles 4-6 are on contract being readied for launches in FY17, FY18, and FY19 respectively.

The AEHF system provides joint, interoperable, assured connectivity for warfighters in operations in all levels of conflict — a capability not available through other planned military communication networks. AEHF provides greater capacity and more flexible coverage than its predecessor, Milstar, while assuring operational continuity through compatibility with the Milstar constellation.

Under contract to Lockheed Martin, the AEHF prime contractor and overall space system manager, Northrop Grumman builds and integrates the AEHF payload that consists of processors, antennas, radio frequency subsystems and crosslinks. The payload delivers the new XDR (Extreme Data Rate) communications services, providing data rates up to 8.192 Mbps per user, Milstar LDR (Low Data Rate) services (75-2,400 bits per second), and Milstar MDR (Medium Data Rate) services (4.8 Kbps-1.544 Mbps).

AEHF delivers the flexible connectivity-on-demand needed to achieve 21st century objectives — swift, decisive outcomes based on information dominance. On-orbit processing provides the flexibility needed to rapidly establish and reconfigure networks to meet dynamic command and control requirements.

## Unmatched protection against jamming, intercept and detection

Electronically steerable antenna beams and flexible channel-to-beam mapping allow the delivery of capacity when it's needed, where it's needed. EHF frequencies, onboard digital processing, and highly directional antennas reduce the probability of jamming and intercept, assuring secure, reliable communications. Satellite crosslinks enable flexible global communications without the need for fixed site ground gateways.

## Flexibility to support current and future joint operations and missions

Rapidly deployable airborne, maritime, vehicular, and man-packable AEHF terminals put this connectivity in warfighters' hands worldwide, delivering communications anytime, anywhere.

The system is compatible with existing protected terminals and will support future terminals as they are deployed.

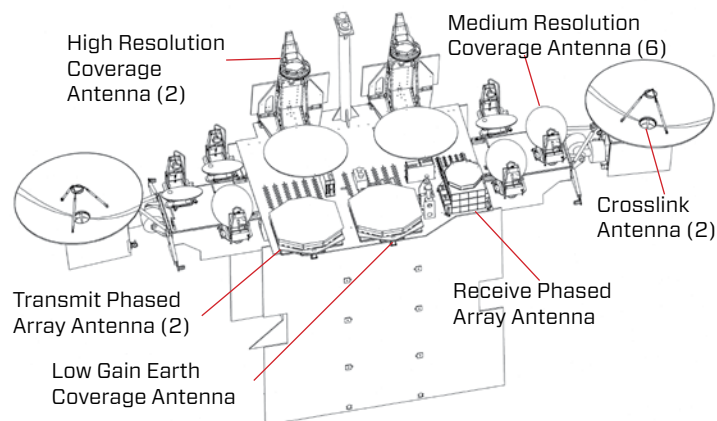
## High performance for global and theater needs

The AEHF antenna suite provides several coverages that are tailored to meet unique warfighting requirements. Low gain earth coverage antennas deliver communications anywhere

within the satellite's footprint. The phased array antenna provides super high-gain spot beams, enabling worldwide unscheduled access for all users, including small portable terminals and submarines.

Six medium resolution coverage antennas (MRCA) are provided by dwelling spot beam antennas, and up to 24 time-shared MRCA coverages are provided by phased array antennas. These are designed to support dispersed user groups worldwide such as naval carrier groups, special operations and submarines. Two high resolution coverage area antennas enable tactical and strategic operations in the presence of in-beam jamming.

## AEHF: secure command and control for the 21st century



	Milstar (LDR & MDR)	AEHF (XDR)
Frequency	EHF (44 GHz) uplink SHF (20 GHz) downlink	EHF (44 GHz) uplink SHF (20 GHz) downlink
Data Rates	75 bps - 1.544 Mbps	75 bps - 8.192 Mbps
System Security	Terminal-to-terminal COMSEC TRANSEC-governed frequency hopping	Terminal-to-terminal COMSEC TRANSEC-governed frequency hopping
Inter-operability	Milstar LDR & MDR modulation modes	Milstar LDR, MDR & XDR modulation modes
Antenna Coverages	1 earth coverage beam 5 agile beams 2 narrow and 1 wide spot beams 2 nulling spot beams 6 spots (distributed user coverage)	1 earth coverage beam 4 agile beams 24 time-shared spot beams 2 nulling spot beams 6 dwelling spot beams
Crosslinks	2 per satellite (each bi-directional) ~10 Mbps	2 per satellite (each bi-directional). Compatible with Milstar & AEHF requirements ~60 Mbps

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