



GEOSTAR™-3

Connecting Our World

Satellite communications service providers rely on affordable, flight-proven satellites for their broadband, television broadcasting, mobile communications, business data networks and other telecommunications missions. Northrop Grumman is an industry pioneer in the design and production of commercial satellites as well as the incorporation of civil and military hosted payloads on commercial spacecraft.

A FULLY REDUNDANT, HIGHLY VERSATILE SPACECRAFT FOR BOTH GEO AND NON-Geo MISSIONS

The GEOSTar-3 satellite platform is a flight-proven medium power class platform that can be flown in both geosynchronous (GEO) and non-geosynchronous orbits. For a 15-year GEO mission, GEOSTar-3 provides up to 8,000 watts of power to the mission payload from its heritage 36 volt regulated power bus. The GEOSTar-3 structure's mass carrying capability

and propulsion system solutions enable optimal use of launch vehicle performance, including opportunities for tandem (stacked) launch and ride sharing scenarios. Customers can purchase a GEOSTar-3 spacecraft alone, or as part of a turn-key solution that includes the integrated satellite (or satellites) and associated launch and early orbit services.

MISSIONS

More than 50 GEOSTar satellites have been delivered or are in production for 23 commercial customers around the globe, and for the US government. While most of these missions have been for a GEO orbit, this includes satellite systems for non-GEO orbits as well. The GEOSTar-3 platform can support payloads exceeding 1,000 kg.

For telecommunications missions, as many as 60 radiatively cooled TWTAs can be accommodated in the payload module. A broad range of deployable reflectors and nadir deck mounted antenna configurations are possible, including single offset and folded optics antennas. Northrop

Grumman has significant experience in the design, build and test of both analog and digital enhanced communications payloads.

GEOSTar-3 is being used for National Security Programs featuring payload systems that have stringent mission requirements for pointing accuracy, maneuverability, and reliability.

The payload envelope of GEOSTar-3 allows customers to consider a larger variety of hosted payload opportunities. The GEOSTar product line has supported critical hosted payload missions for both US and non-US Government customers with civilian and defense applications.

GEOSTar-3 is also at the core of Northrop Grumman's Space Logistics space servicing business, which features life extension service from our flight-proven Mission Extension Vehicle (MEV). The next generation version of this vehicle is the Mission Robotics Vehicle (MRV), which will enable a lower cost life extension solution, and other in-orbit servicing capabilities.

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KEY SPECIFICATIONS

CORE PLATFORM FEATURES

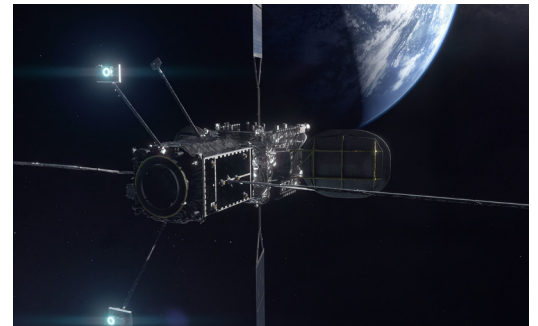
- Orbits: GEO, HEO, MEO
- Payload Mass Capability: 1,000 kg (GEO); higher for other orbits
- Payload Power: Up to 8kW (not including bus)
- Typical Mission Lifetime: >15 years (GEO)
- Single launch and stacked launch capable
- Scalable Primary Structure (size variants to accommodate payload equipment footprint and thermal requirements)
- Attitude Control via 3 axis zero momentum control
 - Star trackers for attitude reference
 - Attitude/rate control with inertial steering capability
- Power System:
 - 36V regulated power bus
 - Extensible solar array power and battery-capacity; modular power distribution
- Propulsion System:
 - All Chemical, All Electric and Hybrid (hybrid uses Bi-Prop for rapid orbit raising)
- Command and Data Handling:
 - Scalable architecture can be tailored to customer preferences for redundancy
 - State of the art flight computer
 - CCSDS protocols
 - CNSSP-12 certification compliant
 - High-level encryption available

SUPPORT SERVICES

Northrop Grumman conducts spacecraft commissioning from its own Mission Operations Center prior to transferring spacecraft control to the customer's operations center. Mission lifetime support is provided by a dedicated Customer Service Organization (CSO) that provides 24/7 access to a staff of highly experienced technical experts.

GEOSTAR VALUE

The GEOSTar-3 platform and product line enhances Northrop Grumman's value proposition to both commercial and government customers. Combining fast delivery, low cost and high reliability with a broadly capable payload envelope, GEOSTar-3 delivers outstanding value across a wide range of mission capabilities.



Flight-proven MEV takes over attitude and orbital maintenance for client satellite (MEV uses a GEOSTar-3 platform)

MORE INFORMATION

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