



GEOSTAR™-3

A Fully Redundant Spacecraft Bus Designed for Geosynchronous Missions

The GEOSTAR-3 satellite platform represents an evolutionary growth of Northrop Grumman's GEOSTAR-2 platform, providing an incremental expansion of the flight-proven GEOSTAR-2 product line. EPS enhancements include an increase in battery capacity and in solar array power, enabling GEOSTAR-3 to provide up to 8,000 watts of power to the payload at end-of-life. The larger solar arrays and additional battery capacity retain the 100 percent successful flight heritage 36 volt regulated power bus. The GEOSTAR-3 bus structure's mass carrying capability and propellant tank accommodation enable optimal use of launch vehicle performance, and can include tandem launch missions that use heritage

bi-propellant apogee engines to ensure fast and reliable orbit raising. For heavier missions, a flight proven electric propulsion system will replace the heritage IMPEHTS for stationkeeping operations.

PAYLOAD ACCOMMODATIONS

The GEOSTAR-3 Bus can accommodate payloads of up to 1,000 kilograms and 8,000 watts. As many as 72 radiatively cooled TWTAs, or a greater combination of radiatively and conductively cooled TWTAs can easily be accommodated on the platform. The total payload conductive thermal dissipation is scalable up to 4,300 watts. The platform can accommodate a broad range of deployable reflectors and nadir antenna configurations, enabling compelling payload solutions. The expanded payload envelope of GEOSTAR-3 also allows customers to consider a larger universe of hosted payload opportunities.

MISSION LIFE

As with the GEOSTAR-2, the GEOSTAR-3 satellite is designed with conservative margin beyond 15 years, taking into account damaging effects of the geosynchronous environment. The typical limitation of mission duration is on-board fuel for orbit maintenance station-keeping. Fuel life can be optimized and extended to well over 15 years, based on launch vehicle selection. Northrop Grumman has several delivered satellites with predicted fuel life in excess of 20 years.

MISSION SERVICES

Customers can purchase a GEOSTAR-3 spacecraft bus alone, or as part of a turn-key service that includes an integrated satellite, operations and launch vehicle. Northrop Grumman conducts spacecraft commissioning from its own ground station prior to transferring spacecraft control to the customer's operations center.

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SPECIFICATIONS

CORE BUS FEATURES

Payload Mass Capability:	Up to 1,000 kg (single)
Orbit:	Geosynchronous
Typical Mission Lifetime:	>15 years
Delivery:	24 months after receipt of order (payload dependent)
Single Launch Compatibility:	Ariane 5, Falcon 9, H-IIA, Proton, Sea Launch, Land Launch
Dual Launch Compatibility:	Ariane 5, Proton, Falcon

STRUCTURE

Bus Dimensions (HxWxL):	3.0 to 3.9 m*x 2.1 m x 2.3 m
Construction:	Composite/Al
Power Subsystem	
Payload Power:	8,000 W
Bus Voltage:	36 VDC (nominal)
Solar Arrays:	Multi-junction GaAs cells
Batteries:	Li-Ion

ATTITUDE CONTROL SUBSYSTEM

Stability Mode:	3-axis; zero momentum
Propulsion Subsystem	
Transfer Orbit Propulsion:	Liquid Bi-propellant; hybrid; electric
On Orbit:	Monopropellant or all electric

COMMAND & DATA HANDLING SUBSYSTEM

Flight Processor:	BAE RAD750
Interface Architecture:	MIL-STD 1553B, CCSDS *Extensible payload module height

MISSION SERVICES

- Mission Analysis
- Payload Integration
- Testing and Verification
- Launch Vehicle Integration
- Launch Operations
- Mission Operation
- Safety & Mission Assurance

LOW COST LAUNCH OPPORTUNITIES

The GEOSTar-3 Bus is designed to maintain compatibility with all commercially available launch vehicles. The ability to launch on

multiple vehicles gives customers greater flexibility and lower launch cost access to space. The propellant tanks on GEOSTar-3 support a larger delta-V to orbit than typical GEO satellites, which allows GEOSTar-3 to make optimal use of launch vehicle performance capability. In addition, GEOSTar-3 adds the opportunity to dual-manifest two spacecraft on select launch vehicles, with each spacecraft configured to fulfill its mission independently after launch. This creates an opportunity for dramatic launch cost savings. Whether designed for a single-launch or dual-launch campaign, GEOSTar-3 offers a significant increase in payload mass capability.

HERITAGE AND VERSATILITY

GEOSTar-3 was designed around the concept of scalability and customer options, while still maintaining the use of standardized, qualified components and subsystems. The C&DH system of the GEOSTar family has been upgraded to provide more capability to support advanced mission requirements. The EPS system of the GEOSTar family, while retaining the heritage 36V regulated bus architecture, offers expandable capability to support GEOSTar-3 class payload power requirements. The dual-manifest launch capability introduced with GEOSTar-3 uses the same highly reliable, short duration bi-propellant orbit raise propulsion system that has enjoyed success on over 30 GEOSTar-2 spacecraft. GEOSTar-3 has options for battery and solar array size, payload module height and station-keeping thruster selection that allow Northrop Grumman to provide customers with the best balance of satellite and launch cost, mission lifetime and payload performance. With its expanded payload carrying capability, enhanced C&DH functionality and larger EPS system, GEOSTar-3 also offers customers the largest hosted payload envelope in the GEOSTar family.

VALUE

GEOSTar-3 further enhances Northrop Grumman's value proposition to its customers, combining fast delivery, low cost and high reliability with a larger payload envelope and low cost launch alternatives.

MORE INFORMATION

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