LEOSTAR™-3

SPECIFICATIONS
SPACECRAFT FEATURES
Design Life: Fully Redundant, 5-year design life Pts 0.97
Structure: Aluminum frame with honeycomb panels.
Attitude Control System: Wheel based 3-axis Zero
Momentum Bias with magnetic momentum
desaturation. Star tracker, IMU, and coarse sun
sensors. Instrument in the loop accommodated

Standard ACS performance:
Pointing accuracy 21 arcsec three sigma
Pointing knowledge 5 arcsec three sigma
Pointing Stability 0.7 arcsec/sec over 2.5 sec
Jitter 1.2 arcsec three sigma
Below 500Hz
Slew 180 degrees in 9.5 minutes

Propulsion: Hydrazine monopropellant blowdown
Tank capacity: 438 kg
Delta V: 322 m/s based on 3030 kg
Launch wet mass

Command & Data Handling: Fully redundant cPCI
Integrated Electronics Module for spacecraft
component interfaces and instrument state of health
telemetry interfaces. Separate Payload Interface
Electronics (P/E) for instrument science data
interfaces. Separate solid-state recorder.

Power system: Series switched direct energy transfer.
Solar array 4180W at 5 years.

Communication:
Command (NEN): 1 kbps or 32 kbps S-Band
Command (SN): 1 kbps S-Band
SOH telemetry (NEN) 32 kbps or 1 Mbps S-Band
SOH telemetry (SN): 4, 8, 16, 32 kbps S-Band
Mission data: 384 Mbps X-Band

Thermal: Cold-biased passive thermal control
design with thermostatically or software-controlled
and FPGA-controlled heater circuits for precision
temperature stability.

Additional Capabilities: Larger launch mass and
Instrument size (Launch Vehicle dependent)
Higher instrument power
Improved pointing with instrument in the loop
Higher rate communications at Ka-Band
Mission operations

MORE INFORMATION
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DS-66

GEOEye-1 Commercial Earth Imaging Satellite

NASA's Fermi Gamma Ray Telescope Observatory

NORTHROP
GRUMMAN
LEOSTAR™-3

Our LEOSTar-3 spacecraft is a high performance, versatile and expandable vehicle for space and earth science missions, remote sensing, and commercial applications. LEOSTar-3 spacecraft have flown on Pegasus®, Minotaur, Delta II and Atlas V, and are compatible with other launch vehicles including Falcon 9 and Antares™. The spacecraft, most often flown in low earth orbit, is readily adaptable to HEO, GEO, MEO, lunar, earth trailing or lagrange points. The scalability of the LEOSTar-3 allows expansion of the standard capacity, higher mass, higher power, or larger instruments or suites of instruments. We have accommodated instrument suites with masses to 3000 kg and as many as seven different instruments.

FACILITIES AND SERVICES

We manufacture spacecraft in our Dulles, Virginia; Gilbert Arizona; and Redondo Beach California facilities. Each facility possesses the floor space to integrate the spacecraft and observatory including the capability to maintain contamination sensitive instruments under purge and to operate at a class 10k level. Each site is able to perform EMI/EMC, thermal vacuum, acoustic and vibration testing to qualify an observatory environmentally. Additionally our Dulles Mission Control Center can provide mission operations for LEOSTar-3 missions.

PAYLOAD ACCOMMODATION

Mass: 850 kg standard. Up to 3000kg flown.
Power: 580W orbit-average-power standard. The scalable spacecraft power system can accommodate higher power payloads.
Data interface: Two LVDS at 588 Mbps standard. RS422, 1553, SpaceWire available.
Mission data storage: Up to 4Tb
Thermal: Instrument deck thermally isolated from spacecraft. Cold side unobstructed with two-pi steradian view to space.
Instrument Mounting: Instrument deck on top of spacecraft.
Instrument Volume: 2.11m high by 3.55m diameter standard excluding instrument deck in an 4m Atlas fairing. Other configurations possible. Launch Vehicle fairing dependent.
LEOSTAR™-3

LEOSTar-3 Stowed Configuration With Instrument Volume

More Instrument Volume Available in Conical Portion of Fairing

Instrument Volume

LV Coordinate System

Some Secondary Instrument Volume on SC

Dimension in Meters

Instrument Volume

+Y

+X

+Z

3.55 m

1.78 m

2.44 m

2.6 m

9.6 m

2.4 m

11.9 m

LEOSTar-3 On-orbit Configuration

Legend

Months 4 8 12 16 20 24 28 32 36 40 44 48 52 56

SRR/MDR ▼ PDR ▼ CDR ▼ IIRR ▼ PER ▼ PSR ▼ OAR

Preliminary Design

Detail Design

Spacecraft A&T

Observatory I&T

Ship and Launch

On-orbit Test

* Task durations include schedule reserves
LEOSTAR™-3 MISSIONS

LANDSAT 9
Mission: Earth resources monitoring
Launch: 2021
Status: In development

JPSS-2, 3, & 4 - JOINT POLAR SATELLITE SYSTEM-2, 3, & 4
Mission: Earth science
Launch: 2022, 2024, 2026; ATLAS-V, Falcon 9 or Delta IV
Status: In development

ICESAT-2 - ICE, CLOUD AND LAND ELEVATION SATELLITE-2
Mission: Earth science
Launch: September 15, 2018; Delta II
Status: Operational. Performing baseline mission

LANDSAT 8
Mission: Earth resources monitoring
Launch: February 11, 2013; Atlas V
Status: Baseline mission complete, currently in extended operations

GEOEYE-1
Mission: Commercial Earth Imaging
Launch: September 6, 2008; Delta II
Status: Baseline mission complete, currently in extended operations

FERMI GAMMA-RAY SPACE TELESCOPE
Mission: Gamma-ray observation
Launch: June 11, 2008; Delta II
Status: Baseline mission complete, currently in extended operations

C/NOFS - COMMUNICATION/NAVIGATION OUTAGE FORECASTING SYSTEM
Mission: Technical demonstration
Launch: April 16, 2008; Pegasus XL
Status: Retired and re-entered 11/25/15

NFIRE - NEAR FIELD INFRARED EXPERIMENT
Mission: Technical demonstration
Launch: April 24, 2007; Minotaur I
Status: Retired and re-entered 11/4/15

SWIFT
Mission: Gamma-ray burst detection
Launch: November 20, 2004; Delta II
Status: Baseline mission complete, currently in extended operations

CORIUS
Mission: Meteorological science
Launch: January 6, 2003; Titan II
Status: Baseline mission complete, currently in extended operations

REUVEN RAMATY HIGH ENERGY SOLAR SPECTROSCOPIC IMAGER
Mission: High energy solar physics
Launch: February 2, 2002; Pegasus XL
Status: Retired August 16, 2016

MIGHTYSAT II.1
Mission: Technology demonstration
Launch: July 19, 2000; Minotaur I
Status: Mission completed

DS1 - NEW MILLENNIUM DEEP SPACE 1
Mission: Technology demonstration and planetary exploration
Launch: October 24, 1998; Delta II
Status: Mission completed

*Unclassified Missions Only*