Near Field Infrared Experiment (NFIRE)

missile phenomenology data collection satellite

NFIRE is the key component of our Kinetic Energy Boost Phase research program which began with a study and mission system engineering of approaches for boost phase intercept of ICBMs. Sponsored by the Missile Defense Agency (MDA), NFIRE will gather near field, high resolution phenomenology data that will assist in development of boost phase intercept systems. NFIRE will also assess the viability of a laser communications system for missile defense applications.

NFIRE is composed of a low-Earth orbiting satellite with an onboard Track Sensor Payload and TESAT Laser Communication Terminal, plus two ground-based Mission Operations Centers (MOCs). General Dynamics is the system integrator, and is also responsible for the design and manufacture of the spacecraft, payload integration, full satellite system testing including EMI/EMC and environmental, configuration of the MOCs, and a year of on-orbit operations support. General Dynamics also leads the Mission Assurance and Systems Engineering Integrated Product Teams.

Features

- 494 kg (1089 lbm) at Launch
- 503 W EOL Solar Array, Body Mounted
- Three-Axis Stabilized, Zero Momentum Biased
- Modular Architecture with cPCI backplane
- Externally Mounted Components for Easy Access
- Track Sensor Payload (IR and Visible Light)
- TESAT Laser Communication Terminal Payload
- 495 km (267 naut mi) Circular Orbit @ 49.0° Inclination
- 40 Gbit Solid State Recorder for Payload Data Storage
- General Dynamics' Responsibilities Include Full System Integration and Development of Two Mission Operation Centers
- Two-Year Design Life

Performance Characteristics*

General	Dimensions, Stowed: 2.65 m x 1.31 m dia (8.69 x 4.30 ft) Orbit: 495 km (267 naut mi) @ 49.0° inclination Propellant On Board: Blowdown hydrazine, 114 kg capacity Reliability/Life (predicted): 0.85 @ 2 years Launch Vehicle: OSP Minotaur
Mass & Power	Launch Mass: 494 kg (1089 lbm) Bus Mass: 248 kg (547 lbm) Bus Power: 230 W in cruise mode Solar Array: Triple junction GaAs, body mounted, 503 W EOL Battery: 16 amp-hr NiH2 CPV
C&DH	Single string, functionally redundant, RAD750 CPU Modular architecture with cPCI backplane 40 Gbit solid state recorder for science data storage
ADCS	3-axis stabilized, Zero Momentum Biased (ZMB) On-board attitude determination with star trackers, IRUs, and GPS Pointing Accuracy (3σ): 360 arcsec Pointing Knowledge (3σ): 14.8 arcsec Ephemeris Accuracy (3σ): 19 meters
Structure & Thermal	Aluminum primary bus structure Externally mounted components for easy access Riveted aluminum frame with honeycomb panels Passive cold-biased thermal system, thermostatically-controlled heaters
Comm Links	SGLS Narrowband DL: 40.96 kbps SOH SGLS Narrowband UL: 2 kbps commands, AFSCN X-Band Wideband PL Data DL: 51.2 Mbps, USN SGLS Wideband PL Data DL: 1.024 Mbps, AFSCN, TCP/IP Auxiliary SGLS Wideband UL Receiver: 1.024 Mbps, TCP/IP
Instrument Info	Track Sensor Visible spectrum, Si CCD Long Wave Infrared, HgCdTe (MCT) hybrid Medium and Short Wave Infrared, InSb Laser Communications Terminal 5" aperture full hemisphere pointing Mass: 30 kg Power Consumption: 130 W Optical data rate: to > 5 Gbps Modulation: BPSK Detection: Coherent, homodyne

*Data reflects actual performance, or current best estimates, as of: 2/21/06, Rev A

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