THE VALUE OF PERFORMANCE.

NORTHROP GRUMMAN

Antares™

Medium-Class Space Launch Vehicle

Designed to provide responsive and low-cost access to space, Antares is a two-stage vehicle (with optional third stage) that provides low-Earth orbit (LEO) launch capability for payloads weighing up to 8,000 kg. Internally developed by Northrop Grumman, Antares completed a risk reduction mission and a demonstration of commercial re-supply services for the International Space Station (ISS) under a NASA Commercial Orbital Transportation Services (COTS) agreement in 2013. Northrop Grumman commenced delivery of cargo to the International Space Station under the NASA Commercial Resupply Services 1 (CRS1) contract in 2014 and will continue to fly CRS1 missions to 2019. In early 2016, Northrop Grumman was selected to continue cargo deliveries under the CRS2 contract. Missions under CRS2 will commence in 2019 and continue to 2024.

The Antares launch system utilizes Northrop Grumman's proven MACH avionics system and many management approaches, engineering standards, production and test processes common to Northrop Grumman's family of successful small-class Pegasus® and Minotaur launch vehicles. The Antares design features newly-built RD-181 first stage engines that provide robust payload performance and excellent reliability. The second stage features internally designed and built elements, including the CASTOR® 30XL solid rocket motor, advanced composite structures, including the large payload fairing, and an avionics section populated with common MACH hardware components.

Key Features

Incorporates both solid and liquid stages and flight-proven technologies

Provides substantial payload performance into a variety of low inclination low-Earth and sun-synchronous orbits and interplanetary trajectories

Streamlined vehicle/payload integration and testing via simplified interfaces reduce time from encapsulation to lift-off

3.9 meter fairing accommodates large payloads

Capable of launching single and multiple payloads

Launch capability from Wallops Flight Facility (WFF), Virginia

Up to 8,000 kg to low-Earth orbit

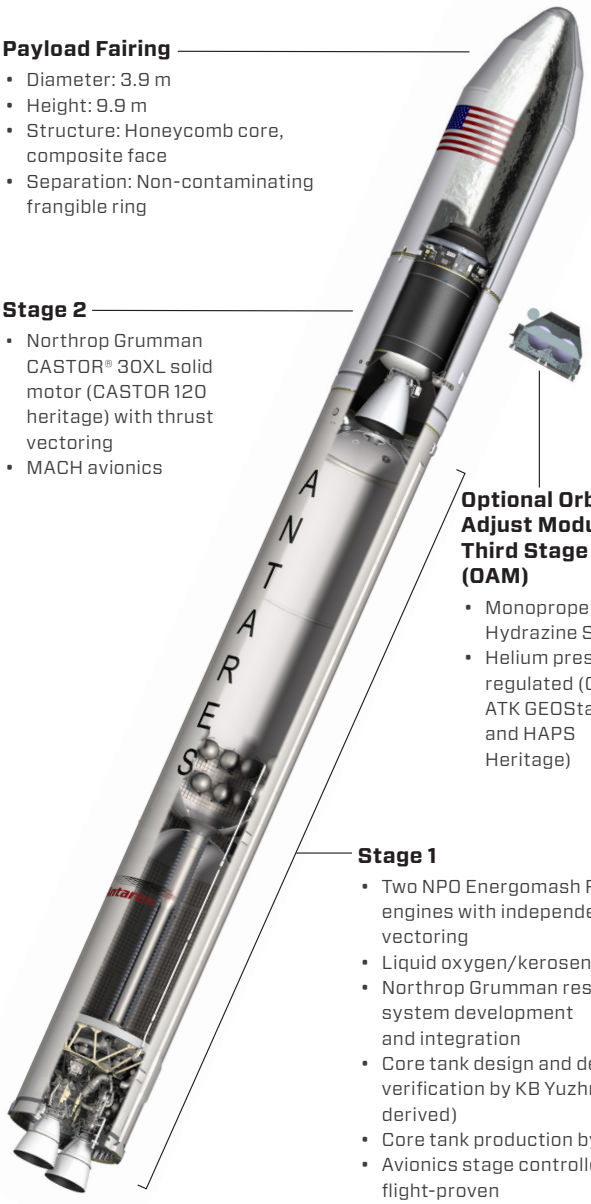
Mission Partners

Northrop Grumman
Prime integrator, systems engineering, avionics, primary structure, testing and software. Overall Stage 1 development and integration, Stage 2 motor, composite structures

KB Yuzhnoye/Yuzhmash
Stage 1 core design, production and verification

NPO Energomash
Stage 1 engines

Expanded View



Payload Fairing
- Diameter: 3.9 m
- Height: 9.9 m
- Structure: Honeycomb core, composite face
- Separation: Non-contaminating frangible ring

Stage 2
- Northrop Grumman CASTOR® 30XL solid motor (CASTOR 120 heritage) with thrust vectoring
- MACH avionics

Optional STAR™ 48BV-Based Third Stage

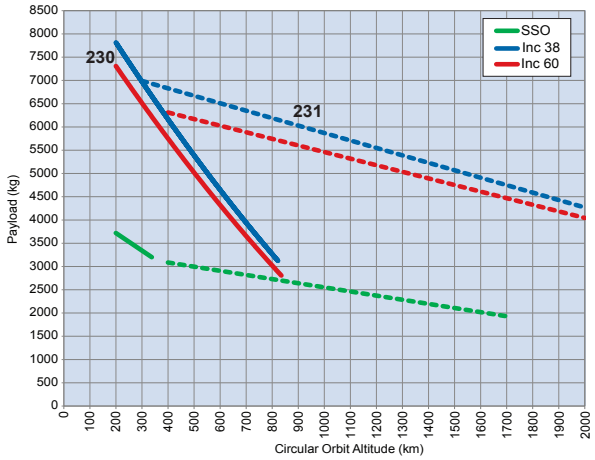
Optional Orion 38-Based Third Stage
- Northrop Grumman Solid Rocket Motor Upper Stages
- Thrust vector guidance and control
- 3-axis stabilized satellite orbit insertion

Optional Orbit Adjust Module Third Stage (OAM)
- Monopropellant Hydrazine System
- Helium pressure regulated (Orbital ATK GEOStar Bus and HAPS Heritage)

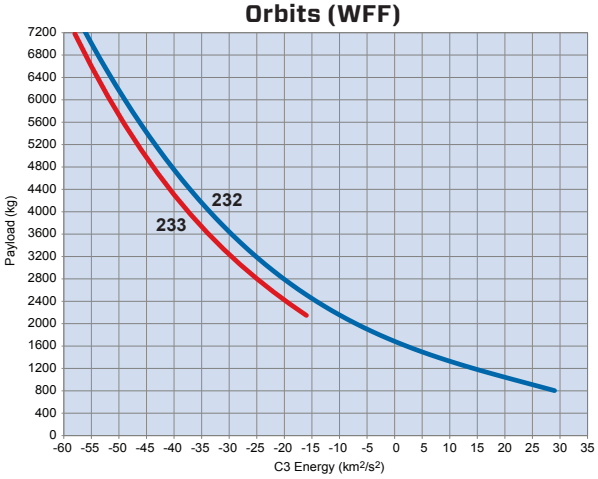
Stage 1
- Two NPO Energomash RD-181 engines with independent thrust vectoring
- Liquid oxygen/kerosene fueled
- Northrop Grumman responsible for system development and integration
- Core tank design and design verification by KB Yuzhnoye (Zenit-derived)
- Core tank production by Yuzhmash
- Avionics stage controller uses flight-proven Northrop Grumman MACH components

Performance

Antares Performance to Circular Orbits (WFF)



Antares Performance to 38° High Energy Orbits (WFF)



Antares Configuration Numbering

First Stage	Second Stage	Third Stage
2 – Two NPO Energomash RD-181 LOX/ Kerosene Fueled Engines	3 – CASTOR® 30XL Solid Motor	0 – None 1 – Orbital Adjust Module (OAM) 2– STAR 48-Based Third Stage 3 – Orion 38-Based Third Stage

More Information

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