



Antares™

Medium-Class Space Launch Vehicle

LAUNCH
VEHICLE



Medium Class



Overview

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 over 7,000 kg. Internally funded by Orbital, 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. Orbital commenced delivery of cargo to the International Space Station under the NASA Commercial Resupply Services (CRS) contract in 2014. The Antares launch system utilizes Orbital's proven MACH avionics system and many management approaches, engineering standards, production and test processes common to Orbital's family of successful small-class Pegasus® and Minotaur launch vehicles.

The Antares design is being upgraded with newly-built RD-181 first stage engines to provide greater payload performance and increased reliability. Orbital is modifying the rocket's first stage systems in anticipation of hot fire testing in late 2015. The company is currently targeting a return to flight in 2016 with launches projected in the first, second and fourth quarters to fulfill the company's agreement with NASA to deliver supplies to the International Space Station.

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
- Initial launch capability from Wallops Flight Facility (WFF), Virginia
- Also compatible with the Western Range at Vandenberg Air Force Base (VAFB), Eastern Range at Cape Canaveral Air Force Station (CCAFS) and the Kodiak Launch Complex (KLC)

FACTS AT A GLANCE

Medium-class space launch vehicle utilizes systems from other Orbital product lines and Zenit heritage
Over 7,000 kg to low-Earth orbit

Mission Partners

Orbital Sciences Corporation

Prime integrator, systems engineering, avionics, primary structure, testing and software. Overall Stage 1 development and integration.

KB Yuzhnoye/Yuzhmash

Stage 1 core design, production and verification

Energomash

Stage 1 engines

ATK

Stage 2 motor

Expanded View

Payload Fairing

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

Stage 2

- ATK CASTOR® 30B solid motor (CASTOR 120 heritage) with thrust vectoring
- MACH avionics

Optional Stage 2

- ATK CASTOR 30XL solid motor with thrust vectoring

Optional Bi-Propellant Third Stage (BTS)

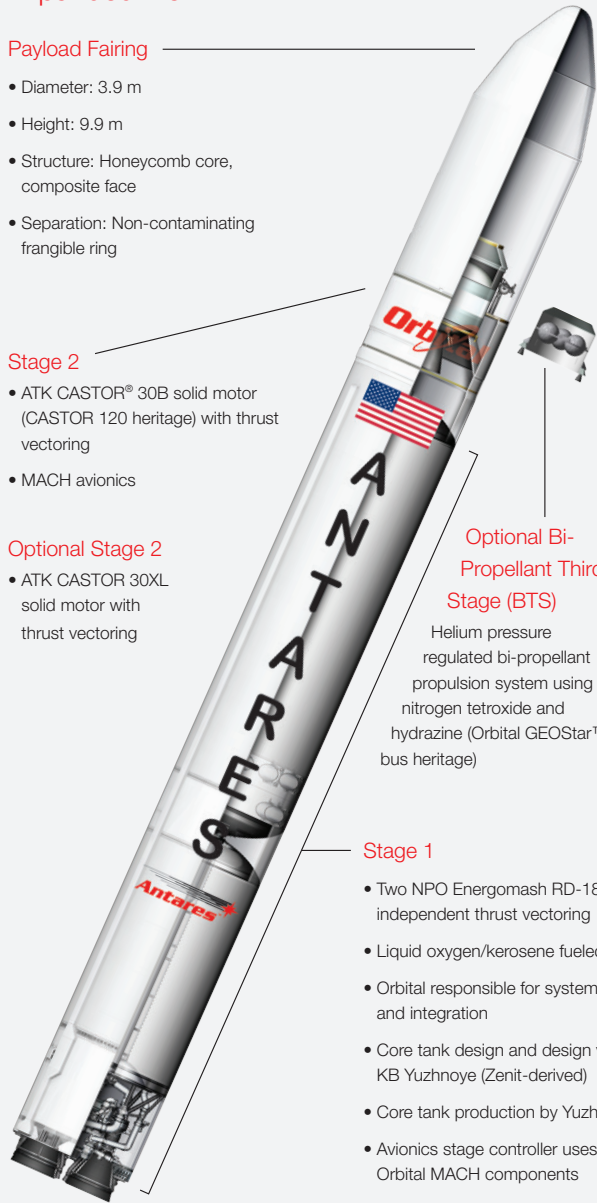
Helium pressure regulated bi-propellant propulsion system using nitrogen tetroxide and hydrazine (Orbital GEOStar™ bus heritage)

Stage 1

- Two NPO Energomash RD-181 engines with independent thrust vectoring
- Liquid oxygen/kerosene fueled
- Orbital 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 Orbital MACH components

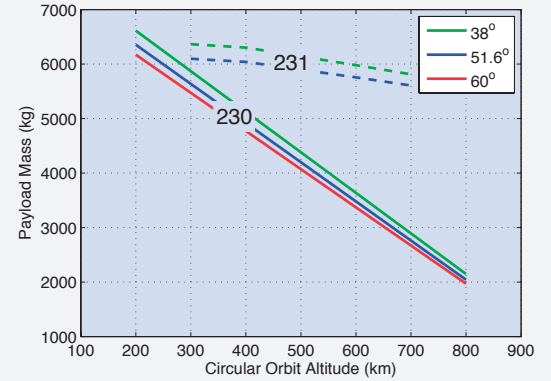
Optional STAR™ 48-Based Third Stage

- ATK STAR 48BV high energy upper stage solid rocket motor
- Thrust vector guidance and control
- 3-axis stabilized satellite orbit insertion

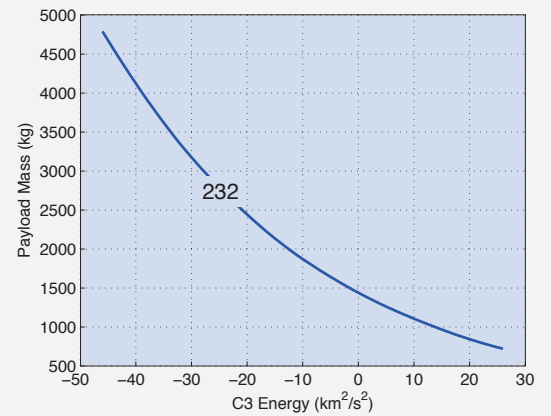


Performance

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	2 – CASTOR 30B Solid Motor 3 – CASTOR 30XL Solid Motor	0 – None 1 – Bi-Propellant Third Stage (BTS) 2 – Star 48-Based Third Stage

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