

Antares Overview



The Antares program successfully conducted its inaugural test launch on April 21, 2013. There are currently nine more launches on the Antares manifest. The test launch and the Orb-D1 demonstration mission are conducted under the COTS agreement with NASA. Orbital is also under contract with NASA for the CRS program with an eight-mission, \$1.9 billion agreement to deliver cargo to the ISS from 2013 through 2016.

In addition to its work with NASA on the COTS and CRS programs, Orbital is also marketing Antares to civil government, military and intelligence, and commercial customers for dedicated launch services for medium-class satellites.

Antares is a two-stage launch vehicle consisting of a liquid-fueled LOX/RP first stage that is powered by two Aerojet Rocketdyne AJ26 engines. The second stage is an ATK CASTOR 30 solid motor. Antares employs a 9.9 m (32.5 ft.) fairing to protect Cygnus from atmospheric heating as Antares accelerates through Earth's atmosphere.

From its launch site at Wallops Island, Virginia, Antares will be capable of supporting mid-inclination and polar orbiting spacecraft weighing up to approximately 6123 kg (13,500 lb.) and 2495 kg (5,500 lb.), respectively. In addition, Orbital intends to establish a West Coast launch site to optimize Antares performance to high-inclination orbits, boosting its polar orbit capability to about 4309 kg (9,500 lb.).

Antares Launch Vehicle

Antares Launch Vehicle

Payload Fairing

Diameter: 3.9 m (12.8 ft.)

Height: 9.9 m (32.5 ft.)

Structure: Honeycomb core, composite face

Separation: Non-contaminating frangible ring

Cygnus Spacecraft

Stage Two

Designation: CASTOR 30

Diameter: 2.36 m (7.7 ft.)

Thrust: 293.4 kN (Avg.)/395.7 kN (Max.)

Attitude Control: Electromechanical TVC

Separation: Non-contaminating frangible ring

Stage One

Tank Structure: Aluminum

Propulsion: Dual AJ26-62

Propellant: LOX/RP

Thrust: 3265 kN (sea level)

3630 kN (vacuum)

Pressurization: Helium gas

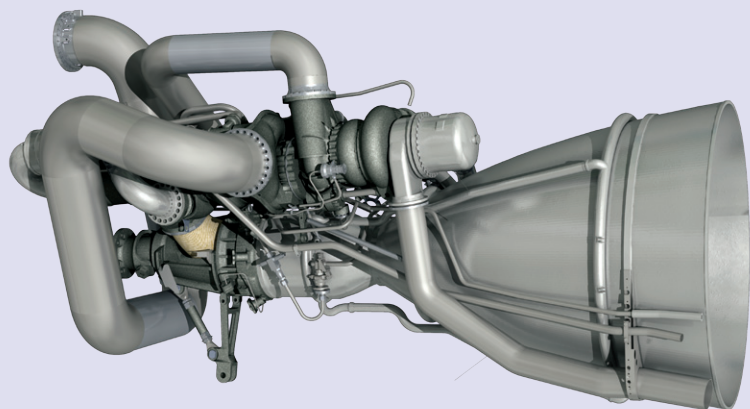
Attitude Control: Hydraulic TVC

Separation: Hold down bolt release



Antares Launch Vehicle

AJ26 Stage One Engines



The Antares first stage is powered by two Liquid Oxygen and Kerosene-fueled AJ26 engines provided by Aerojet Rocketdyne that deliver a combined 3265 kN (734,000 lb.) of thrust at sea level.

The AJ26 was originally designated the NK-33 and was designed and produced during the Soviet era by the Kuznetsov Design Bureau to propel the planned N1 lunar rocket. Modifications made to the engine include the addition of thrust vector control and updates of various Russian systems to current U.S. technology. Each AJ26 engine is sent from the Aerojet Rocketdyne facility in Sacramento, California to the NASA/Stennis Space Center in Mississippi for hot fire acceptance testing, prior to shipment to the Wallops Island, Virginia launch site.

Specifications (each engine)

Height: 3.3 m (10.9 ft.)

Mass: 1590 kg (3,500 lb.)

Thrust: 1633 kN (367,000 lb.) (*sea level*)

Antares Launch Vehicle

Stage One Structure



The Antares stage one structure is designed and manufactured by the Yuznoye Design Bureau of the Ukraine based on Zenit launch vehicle heritage. The stage one core is shipped to the Port of Wilmington, Delaware and transported by truck to the Wallops Island, Virginia launch site for integration with the engines, upper stage avionics and fairing.

Specifications

Length: 27.7 m (90.9 ft.)

Diameter: 3.9 m (12.8 ft.)

Dry Mass: 18600 kg (41,000 lb.)

Capacities:

Liquid Oxygen: 178000 kg (393,000 lb.)

RP Kerosene: 64800 kg (143,000 lb.)

Antares Launch Vehicle

CASTOR® 30 Stage Two Motor



The Antares second stage is powered by a CASTOR 30 solid rocket motor produced and tested at ATK facilities in Utah. The CASTOR 30 motor is based on the proven CASTOR 120 motor that has been utilized in more than a dozen space launch vehicle missions.

Specifications

Length (including nozzle): 3.5 m (11.5 ft.)

Diameter: 2.36 m (7.7 ft.)

Mass (loaded): 13900 kg (30,600 lb.)

Thrust: 293.4 kN (Avg.)/395.7 kN (Max.)