A ULA Atlas V 401 rocket will launch the Cygnus™ spacecraft on the initial leg of its cargo resupply mission to the International Space Station. Liftoff will occur from Space Launch Complex 41 at Cape Canaveral Air Force Station, FL.

Orbital ATK developed the Cygnus advanced maneuvering spacecraft to perform ISS cargo delivery missions under the Commercial Resupply Service (CRS) contract with NASA. Orbital ATK is under contract to deliver 28,600 kg (63,052 lb) of cargo over the life of the CRS-1 contract. At a total weight of 7,400 kg (16,315 lb), OA-6, which includes 3,513 kg (7,745 lb) of cargo and the external deployer carrying Cubesats, will be the heaviest payload to launch aboard an Atlas V vehicle.

Cygnus is a low-risk design incorporating elements drawn from Orbital ATK and its partners’ existing, flight-proven spacecraft technologies. Cygnus consists of a Common Service Module (SM) and a Pressurized Cargo Module (PCM). The SM is assembled and tested at Orbital ATK’s Dulles, VA, satellite manufacturing facility and incorporates systems from Orbital ATK’s flight-proven LEOStar™ and GEOStar™ satellite product lines. The PCM is based on the Multi-Purpose Logistics Module (MPLM), developed and built by Thales Alenia Space of Italy.

The OA-6 mission is the second consecutive Cygnus flight onboard the Atlas V, following an extremely successful OA-4 mission in December 2015. The Cygnus spacecraft for the OA-6 mission is the first to fly the Saffire experiment, developed and built by NASA’s Glenn Research Center, that tests properties of combustion in microgravity, and the first to fly an external deployer carrying Cubesats, that will be deployed after separation from the ISS. It is the second flight of Orbital ATK’s enhanced Cygnus featuring a larger PCM with increased cargo capacity and an optimized Service Module design including Orbital ATK’s lightweight UltraFlex solar arrays.

### Payload Fairing (PLF)
The Cygnus spacecraft is encapsulated in the 4-m (14-ft) diameter extra extended payload fairing (XEPF). The XEPF is a bisector (two-piece shell) fairing consisting of aluminum skin/stringer construction with vertical split-line longerons. The vehicle’s height with the PLF is approximately 194 ft.

### Centaur
The Centaur second stage is 10 ft in diameter and 41.5 ft in length. Its propellant tanks are constructed of pressure-stabilized, corrosion resistant stainless steel. Centaur is a liquid hydrogen/liquid oxygen- (cryogenic-) fueled vehicle. It uses a single RL10C engine producing 22,900 lbf of thrust. The cryogenic tanks are insulated with a combination of helium-purged insulation blankets, radiation shields, and spray-on foam insulation (SOFI). The Centaur forward adapter (CFA) provides the structural mountings for the fault-tolerant avionics system and the structural and electrical interfaces with the spacecraft.

### Booster
The Atlas V booster is 12.5 ft in diameter and 106.5 ft in length. The booster’s tanks are structurally rigid and constructed of isogrid aluminum barrels, spun-formed aluminum domes, and intertank skirts. Atlas booster propulsion is provided by the RD-180 engine system (a single engine with two thrust chambers). The RD-180 burns RP-1 (Rocket Propellant-1 or highly purified kerosene) and liquid oxygen, and delivers 860,200 lb of thrust at sea level. The Atlas V booster is controlled by the Centaur avionics system, which provides guidance, flight control, and vehicle sequencing functions during the booster and Centaur phases of flight.

### Performance to GTO: 4,750 kg (10,470 lb)
### Performance to LEO-Reference: 9,800 kg (21,600 lb)
ATLAS V PRODUCTION AND LAUNCH

1. Denver, CO - ULA Headquarters & Design Center Engineering
2. Harlingen, TX - Payload Fairing, Boattail, Centaur Forward Adapter, Alt Stub Adapter & Launch Vehicle Adapter Fabrication
3. Decatur, AL - Booster Fabrication & Final Assembly, Centaur Tank Fabrication & Centaur Final Assembly
4. West Palm Beach, FL - RL10 Engine Fabrication at Aerojet Rocketdyne West Palm Beach, FL
5. Khimki, Russia - RD-180 Engine Fabrication at NPO Energomash

MISSION PROFILE AND GROUND TRACE

Event | Time (seconds) | Time (hr:min:sec)
--- | --- | ---
RD-180 Engine Ignition | 2.7 | 00:00:02.7
Liftoff (Thrust to Weight > 1) | 1.1 | 00:00:01.1
Begin Pitch/Yaw Maneuver | 18.4 | 00:00:18.4
Mach 1 | 82.6 | 00:01:22.6
Maximum Dynamic Pressure | 93.8 | 00:01:33.7
Atlas Booster Engine Cutoff (BECO) | 256.5 | 00:04:15.5
Atlas Booster/Centaur Separation | 261.5 | 00:04:21.5
Centaur Main Engine Start (MES-1) | 271.5 | 00:04:31.5
Payload Fairing Jettison | 275.5 | 00:04:35.5
Centaur First Main Engine Cutoff (MEO-1) | 1,089.5 | 00:18:09.5
Cygnus Separation | 1,258.5 | 00:20:58.5

Prelaunch Altitude: 124.1 km | Apogee Altitude: 124.2 km | Inclination: 51.6 deg | Flight Attitude: 44.4 deg

**Delta Operations Center** | **Atlas Operations Center**

Vertical Integration Facility | Vertical Integration Facility
Spacecraft Processing Facility | Spacecraft Processing Facility
Launch Vehicle | Launch Vehicle
Mobile Launch Platform (MLP) | Mobile Launch Platform (MLP)
Centaur LO2 Storage | Centaur LO2 Storage
High Pressure Gas Storage | High Pressure Gas Storage
Booster LO2 Storage | Booster LO2 Storage
Pad Equipment Building (PEB) | Pad Equipment Building (PEB)
Pad ECS Shelter | Pad ECS Shelter

**Platform Transporter**

**Launch Vehicle Integrated and Testing, spacecraft mate and integrated operations**

**Centaur Tank Fabrication & Centaur Final Assembly**

**Centaur First Main Engine Cutoff (MEO-1)**

**Payload Fairing Jettison**

**RD-180 Engine Ignition**

**Liftoff (Thrust to Weight > 1)**

**Begin Pitch/Yaw Maneuver**

**Mach 1**

**Maximum Dynamic Pressure**

**Atlas Booster Engine Cutoff (BECO)**

**Atlas Booster/Centaur Separation**

**Centaur Main Engine Start (MES-1)**

**Payload Fairing Jettison**

**Centaur First Main Engine Cutoff (MEO-1)**

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**Event**

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**Time (hr:min:sec)**

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