

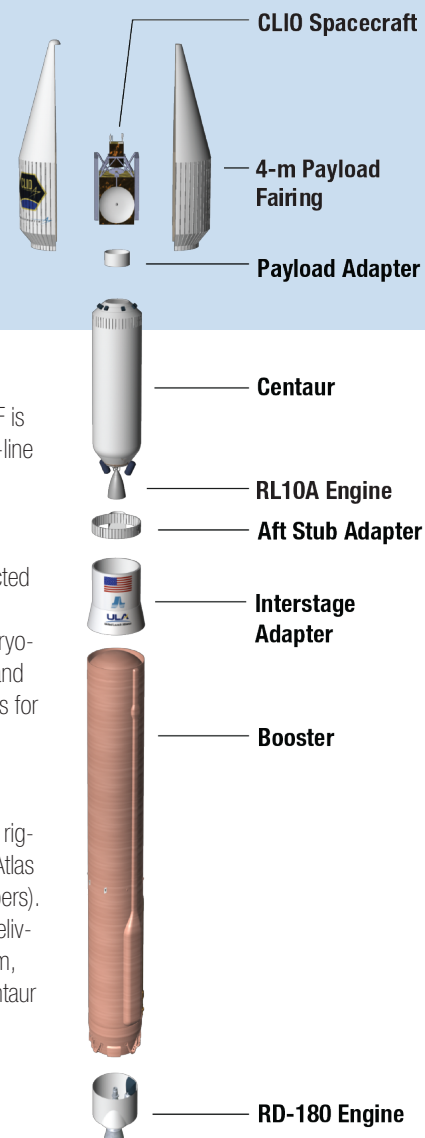
ATLAS V

A United Launch Alliance Atlas V 401 launch vehicle will deliver the CLIO spacecraft to orbit for Lockheed Martin Space Systems Company. Liftoff will occur from Space Launch Complex 41 at Cape Canaveral Air Force Station, FL.

Since 1957, the Atlas rocket has been an integral part of the United States' space program, supporting national defense missions, launching Mercury astronauts to orbit, and sending spacecraft to the farthest reaches of the solar system. Over its nearly six decades, the Atlas booster has undergone a series of continuous improvements, culminating in the current Atlas V Evolved Expendable Launch Vehicle (EELV). Designed in partnership with the U.S. Air Force, the modular design of the Atlas V allows for multiple configurations to meet specific customer requirements.

All Atlas V launch vehicles consist of a common core booster first stage, a Centaur second stage, and either a 4-m-diameter or a 5-m-diameter payload fairing. To accommodate larger spacecraft requiring additional thrust at liftoff, one to three solid rocket boosters (SRB) can be added to the Atlas V 4-m vehicle, while the Atlas V 5-m vehicle can support up to five SRBs.

Flexibility, reliability and 100% mission success are the hallmarks of the Atlas V system, making it the launch vehicle of choice for the full range of customer requirements.



Payload Fairing (PLF)

The CLIO spacecraft is encapsulated in the 4-m (14-ft) diameter large payload fairing (LPF). The LPF 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 189 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 RL10A-4-2 engine producing 22,300 lb 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.



The ULA team is proud to launch the CLIO mission on an Atlas V 401, from Space Launch Complex 41, for Lockheed Martin Space Systems Company.

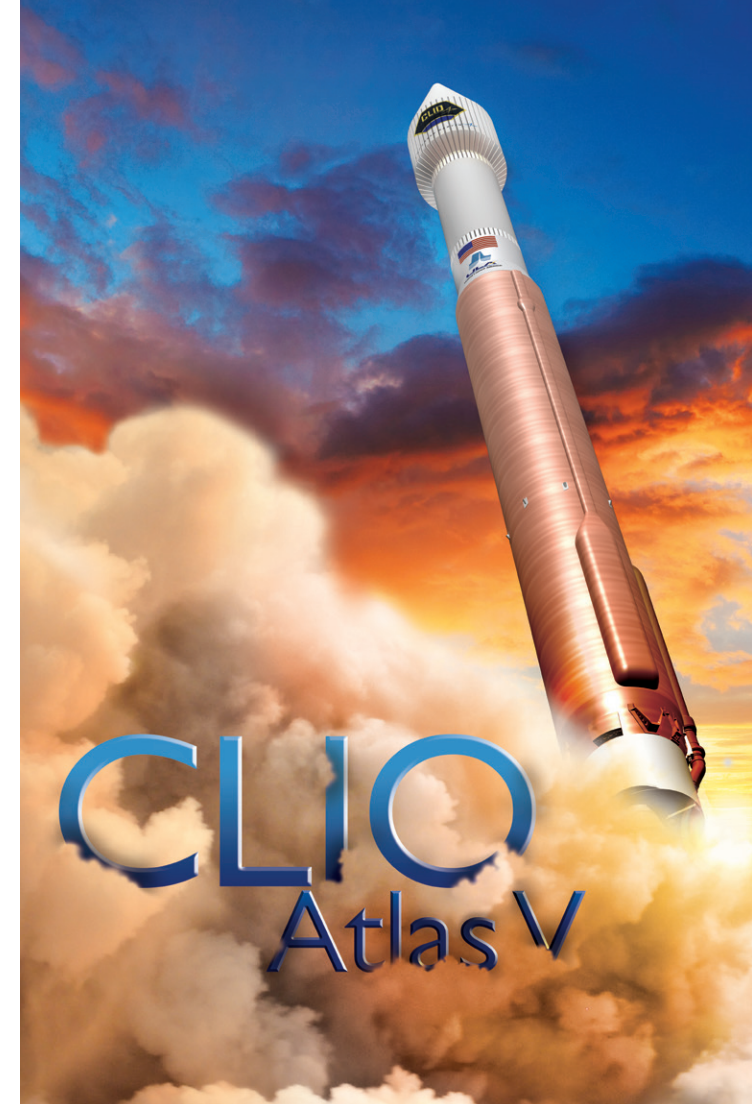
The ULA team is focused on attaining Perfect Product Delivery for the CLIO mission, which includes a relentless focus on mission success (the perfect product) and also excellence and continuous improvement in meeting all of the needs of our customers (the perfect delivery).

We sincerely thank the entire team, which consists of Lockheed Martin, their U.S. government sponsor, ULA, and major suppliers of ULA.

Go Atlas, Go Centaur, Go CLIO!

Jim Spornick

Jim Spornick
Vice President, Atlas and Delta Programs



MISSION OVERVIEW

- 25th Atlas V 401 Configuration Launch
- 49th Atlas V Launch
- 60th ULA Launch from Cape Canaveral
- 88th Overall ULA Launch



With more than a century of combined heritage, United Launch Alliance is the nation's most experienced and reliable launch service provider. ULA has successfully delivered more than 85 satellites to orbit that provide critical capabilities for troops in the field, aid meteorologists in tracking severe weather, enable personal device-based GPS navigation and unlock the mysteries of our solar system.

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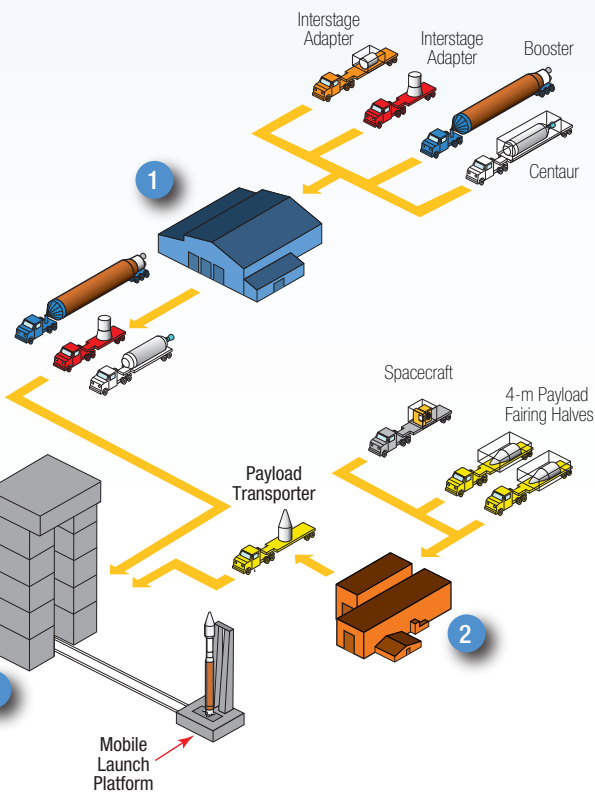


ATLAS V PRODUCTION AND LAUNCH

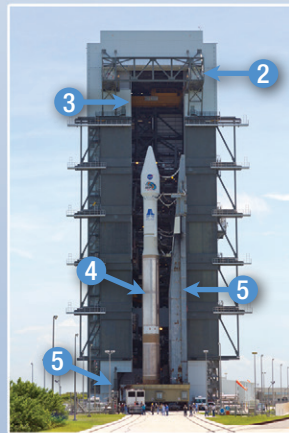
- 1 Denver, CO**
– ULA Headquarters & Design Center Engineering
- 2 Harlingen, TX**
– Payload Fairing, Payload Fairing Adapter, Booster Adapter & Centaur Adapter Fabrication
- 3 Decatur, AL**
– Booster Fabrication & Final Assembly, Centaur Tank Fabrication & Centaur Final Assembly
- 4 West Palm Beach,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



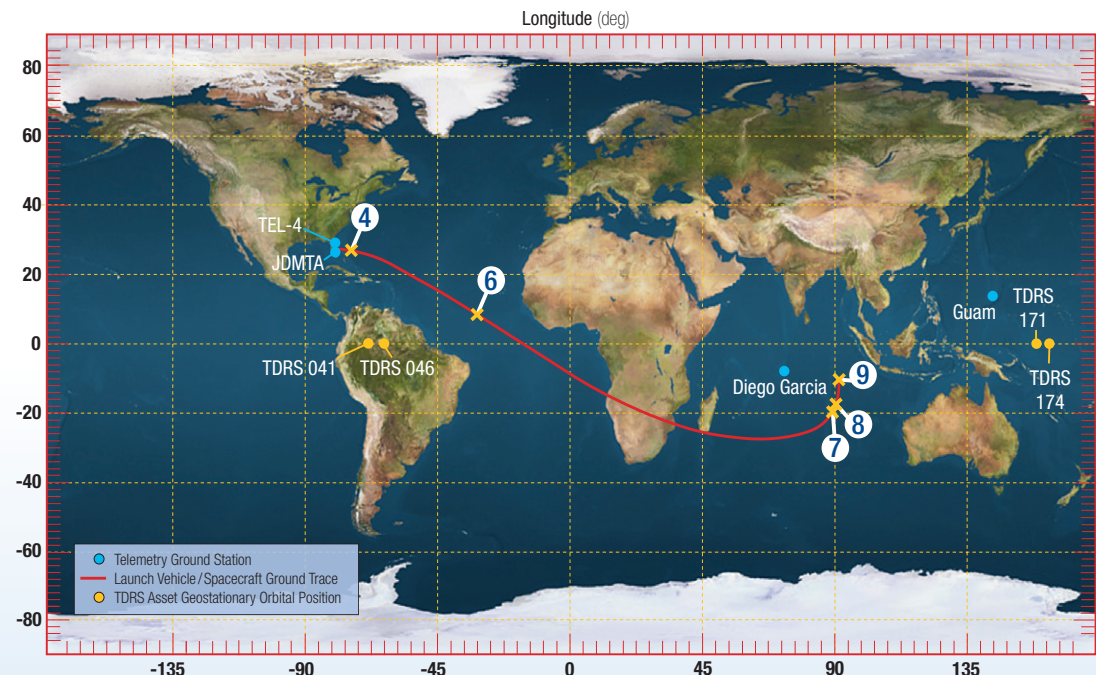
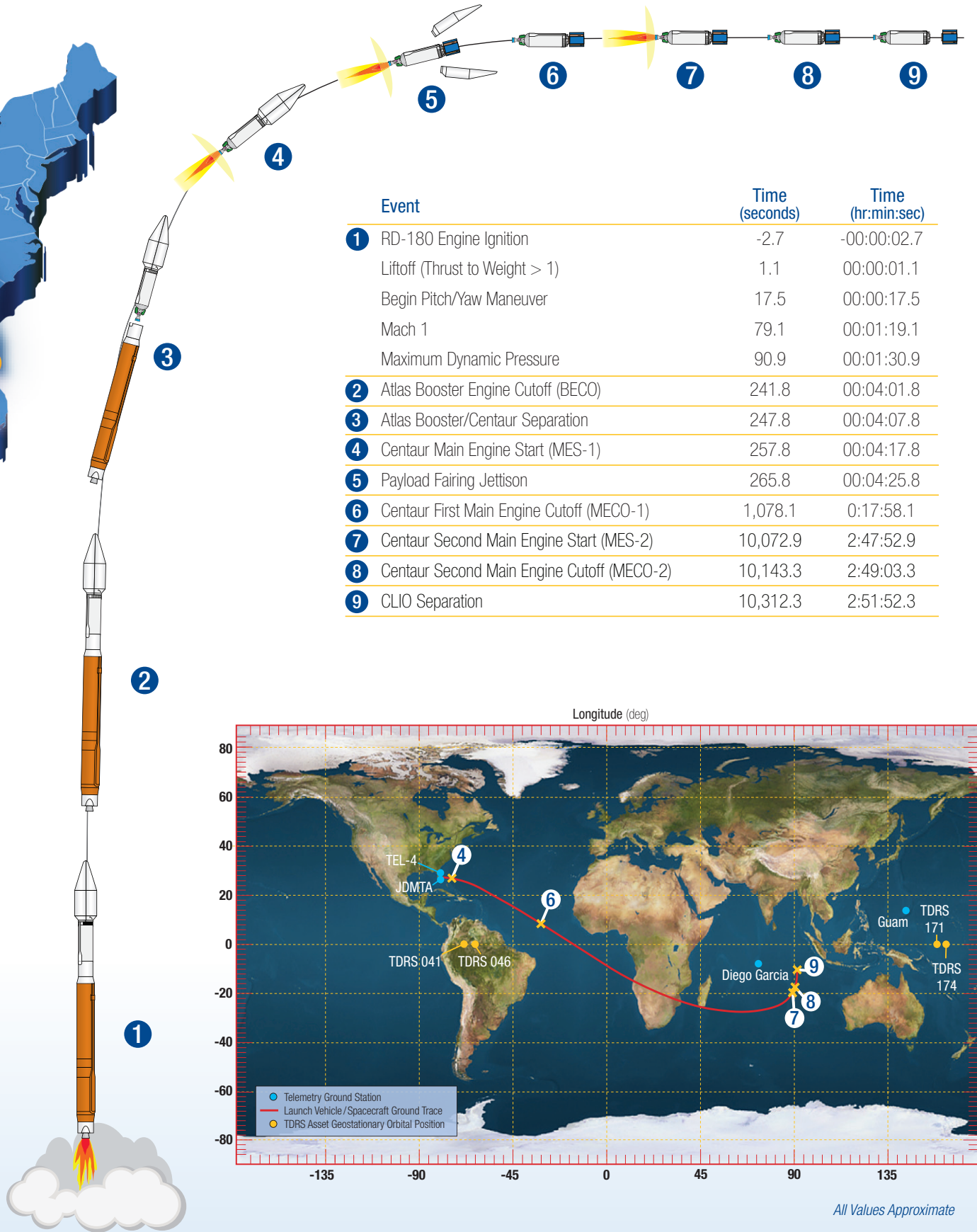
- 1 Atlas Spaceflight Operations Center (ASOC)** | Launch Control Center and Mission Director's Center
- 2 Spacecraft Processing Facility** | Spacecraft processing, testing and encapsulation
- 3 Vertical Integration Facility** | Launch vehicle Integration and testing, spacecraft mate and integrated operations



- 1 Vertical Integration Facility (VIF)** (See inset)
- 2 Bridge Crane Hammerhead**
- 3 Bridge Crane**
- 4 Launch Vehicle**
- 5 Mobile Launch Platform (MLP)**
- 6 Centaur LO₂ Storage**
- 7 High Pressure Gas Storage**
- 8 Booster LO₂ Storage**
- 9 Pad Equipment Building (PEB)**
- 10 Pad ECS Shelter**



MISSION PROFILE AND GROUND TRACE



All Values Approximate