ATLAS V MORELOS-3 MISSION

An Atlas V 421 rocket will deliver the Morelos-3 mission to a geo-synchronous transfer orbit (2588 x 19323 nmi). The United Launch Alliance (ULA) Atlas V is provided by Lockheed Martin Commercial Launch Services. Liftoff will occur from Space Launch Complex 41 at Cape Canaveral Air Force Station, FL.

Morelos-3 will be the second of two communications satellites that comprise the Mexsat communications satellite system. Mexsat is a constellation of satellites owned by Mexico's Secretaría de Comunicaciones y Transportes (Ministry of Communications and Transportation) and operated by Telecomunicaciones de México (Telecommunications of Mexico) that delivers advanced telecommunications throughout Mexico.

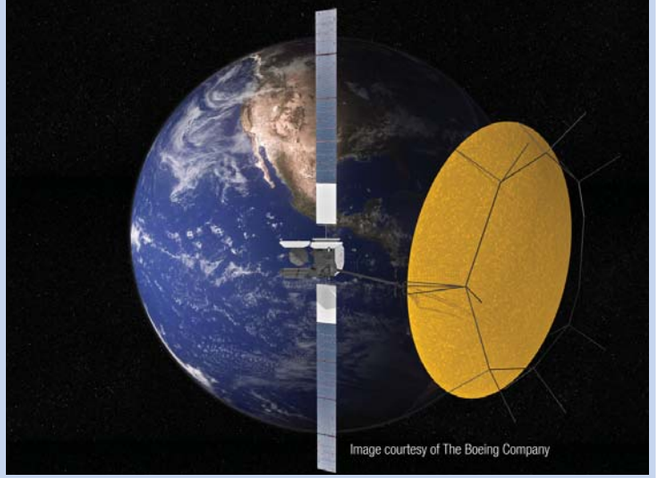
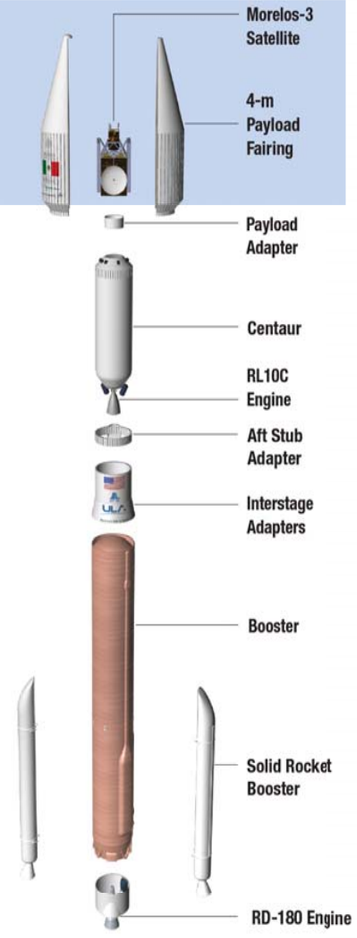


Image courtesy of The Boeing Company

The Mexsat program is an end-to-end satellite communications system that provides 3G+ communications services to mobile terminals across multiple platforms. The system consists of two satellites, two ground sites, associated network and spacecraft operations centers, and reference user terminals. Satellite services include education and health programs, voice, data, video, and internet services. The Mexsat program provides communications to rural zones as a complement to other networks and will also provide secure communications for Mexico's national security needs.

Morelos-3 is a 702HP geomobile satellite built by The Boeing Company. The 702HP satellite will supply 14 kilowatts of power through 5-panel solar array wings using high-efficiency ultra triple-junction gallium arsenide solar cells. It will also carry a 22-meter L-band reflector that enables connectivity to handheld terminals, complemented by a 2-meter Ku-band antenna. The Boeing-built Morelos-3 is designed for a 15-year service life.



Payload Fairing (PLF)

The Morelos-3 satellite is encapsulated in the 4-m (14-ft) diameter Extended Payload Fairing (EPF). The EPF 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 195 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 22,300 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. Two solid rocket boosters (SRB) generate the additional power required at liftoff, with each SRB providing 380,000 lb of thrust. 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 Lockheed Martin Commercial Launch Services and ULA team is proud to be the launch provider for the Secretaría de Comunicaciones y Transportes de México (Ministry of Communications and Transportation of Mexico) Morelos-3 satellite. Morelos-3 is an important element of the Mexsat program, Mexico's next-generation telecommunications system.

Our teams are focused on attaining Perfect Product Delivery for the Morelos-3 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).

Our thanks to the entire launch team, including our suppliers, as well as our mission partner — the Ministry of Communications and Transportation of Mexico — for their hard work and commitment to mission success.

Go Atlas, Go Centaur, Go Morelos-3!

Jim Sponnick
Vice President, Atlas & Delta Programs
United Launch Alliance

Steve Skladanek
President, Lockheed Martin Commercial Launch Services

America's Ride to Space

With more than a century of combined heritage, ULA is the nation's most experienced and reliable launch service provider. ULA has successfully delivered more than 95 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.

Join the conversation:

ULALaunch.com
lockheedmartin.com/mexsat

MISSION OVERVIEW

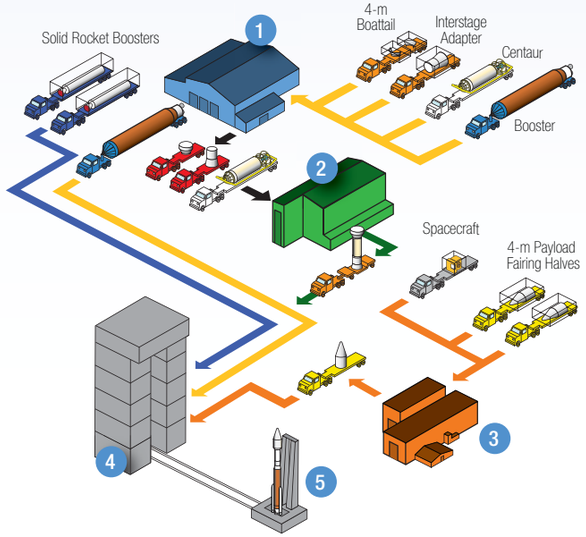
- 5th Atlas V 421 Launch
- 57th Atlas V Mission
- 100th ULA Launch

America's Ride to Space

ATLAS V PRODUCTION AND LAUNCH

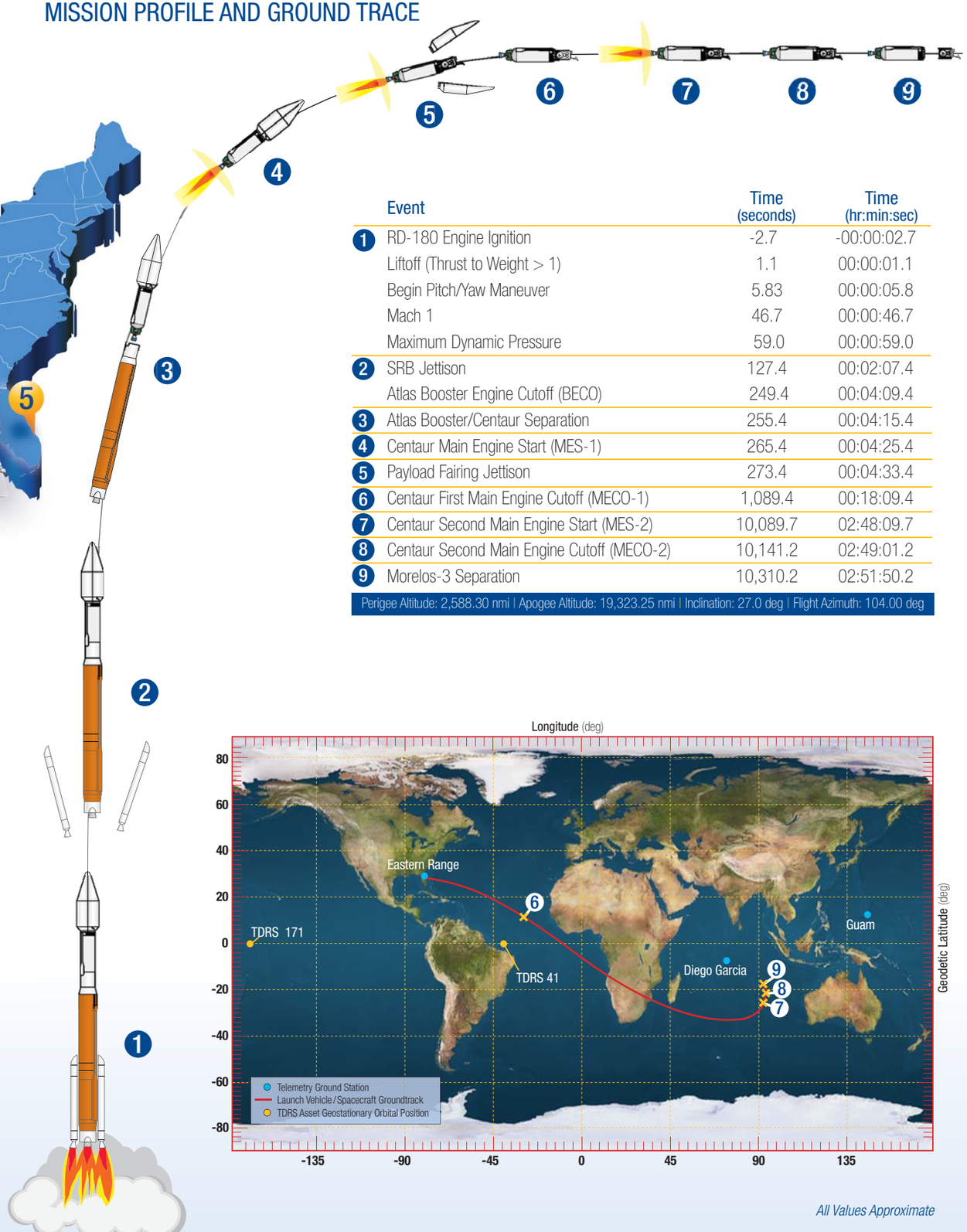
1. **Sacramento, CA**
   – Solid Rocket Booster Fabrication at Aerojet Rocketdyne
2. **Denver, CO**
   – ULA Headquarters & Design Center Engineering
3. **Harlingen, TX**
   – Payload Fairing, Payload Fairing Adapter, Booster Adapter & Centaur Adapter Fabrication
4. **Decatur, AL**
   – Booster Fabrication & Final Assembly, Centaur Tank Fabrication & Centaur Final Assembly
5. **West Palm Beach, FL**
   – RL10C Engine Fabrication at Aerojet Rocketdyne
6. **Khimki, Russia**
   – RD-180 Engine Fabrication at NPO Energomash

1. **Atlas Spaceflight Operations Center (ASOC)** | Launch Control Center and Mission Director's Center
2. **Delta Operations Center** | ISA, Centaur, Boattail Vertical Integration
3. **Spacecraft Processing Facility** | Spacecraft processing, testing and encapsulation
4. **Vertical Integration Facility** | Launch vehicle Integration and testing, spacecraft mate and integrated operations
5. **Mobile Launch Platform**



1. **Vertical Integration Facility** (VIF) (See inset)
2. **Bridge Crane Hammerhead**
3. **Bridge Crane**
4. **Launch Vehicle**
5. **Mobile Launch Platform** (MLP)
6. **Centaur LO_2 Storage**
7. **High Pressure Gas Storage**
8. **Booster LO_2 Storage**
9. **Pad Equipment Building** (PEB)
10. **Pad ECS Shelter**

MISSION PROFILE AND GROUND TRACE



	Event	Time (seconds)	Time (hr:min:sec)
1	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	5.83	00:00:05.8
	Mach 1	46.7	00:00:46.7
	Maximum Dynamic Pressure	59.0	00:00:59.0
2	SRB Jettison	127.4	00:02:07.4
	Atlas Booster Engine Cutoff (BECO)	249.4	00:04:09.4
3	Atlas Booster/Centaur Separation	255.4	00:04:15.4
4	Centaur Main Engine Start (MES-1)	265.4	00:04:25.4
5	Payload Fairing Jettison	273.4	00:04:33.4
6	Centaur First Main Engine Cutoff (MECO-1)	1,089.4	00:18:09.4
7	Centaur Second Main Engine Start (MES-2)	10,089.7	02:48:09.7
8	Centaur Second Main Engine Cutoff (MECO-2)	10,141.2	02:49:01.2
9	Morelos-3 Separation	10,310.2	02:51:50.2

Perigee Altitude: 2,588.30 nmi | Apogee Altitude: 19,323.25 nmi | Inclination: 27.0 deg | Flight Azimuth: 104.00 deg

All Values Approximate