

## DELTA IV WGS-7 MISSION

WGS-7, the first Block II Follow-on satellite, supports communications links in the X-band and Ka-band spectra. While Block I and II satellites can instantaneously filter and downlink up to 4.575 MHz from 39 primary channels, WGS-7 can filter and downlink up to 5.375 MHz from 46 primary channels.

As with the Block II satellites, WGS-7 includes a high-bandwidth radio frequency (RF) bypass capability, which allows for larger bandwidth allocations to users. Depending on the mix of ground terminals, data rates, and modulation and coding schemes employed, a single WGS satellite can support data transmission rates between 2.1 and 3.6 Gbps.

WGS-7 also allows for up to ~800 MHz of additional bandwidth through the use of "Redundant Port Activation."

WGS has 19 independent coverage areas, 18 of which can be positioned throughout its field-of-view. This includes eight steerable/shapeable X-band beams formed by separate transmit/receive phased arrays; 10 Ka-band beams served by independently steerable diplexed antennas; and one transmit/receive X-band Earth-coverage beam. WGS can tailor coverage areas and connect X-band and Ka-band users anywhere within its field-of-view.

Five globally-located Army Wideband SATCOM Operations Centers provide 24/7 payload monitoring and command and control of the WGS constellation. Each Global Satellite Configuration and Control Element has the capability to control up to three satellites at a time.

Spacecraft platform control and anomaly resolution is accomplished by the 3rd Space Operations Squadron at Schriever Air Force Base in Colorado Springs, CO.

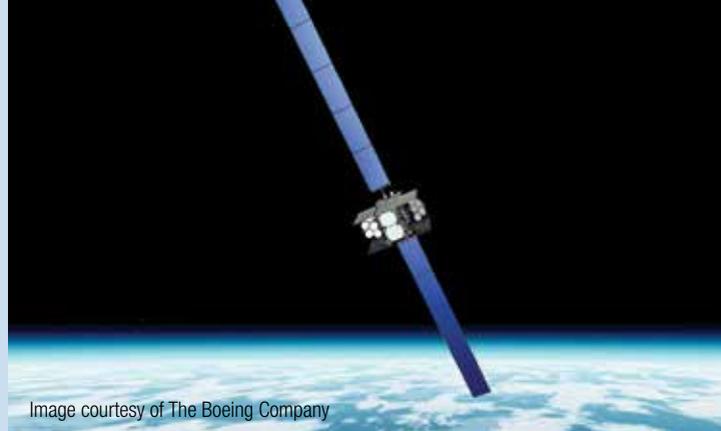


Image courtesy of The Boeing Company



### Payload Fairing (PLF)

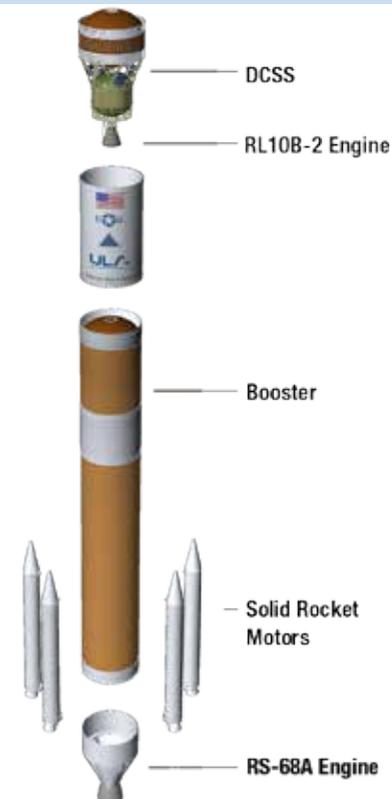
The PLF is a composite bisector (two-piece shell), 5-meter diameter fairing. The PLF encapsulates the spacecraft to protect it from the launch environment on ascent. The vehicle's height, with the 47-ft tall PLF, is approximately 217 ft.

### Delta Cryogenic Second Stage (DCSS)

The DCSS stage propellant tanks are structurally rigid and constructed of isogrid aluminum ring forgings and spun-formed aluminum domes. It is a cryogenic liquid hydrogen/liquid oxygen-fueled vehicle, and uses a single RL10B-2 engine that produces 24,750 lbf of thrust. The DCSS cryogenic tanks are insulated with a combination of spray-on and bond-on insulation, and helium-purged insulation blankets. An equipment shelf attached to the aft dome of the DCSS liquid oxygen tank provides the structural mountings for vehicle electronics.

### Booster

The Delta IV booster tanks are structurally rigid and constructed of isogrid aluminum barrels, spun-formed aluminum domes and machined aluminum tank skirts. Delta IV booster propulsion is provided by the RS-68A engine system which burns cryogenic liquid hydrogen and liquid oxygen which delivers 702,000 lbf of thrust at sea level. The booster's cryogenic tanks are insulated with a combination of spray-on and bond-on insulation and helium-purged insulation blankets. The booster is controlled by the DCSS avionics system, which provides guidance, flight control. Four solid rocket motors (SRM) generate the additional thrust required at liftoff, with each SRM providing about 230,000 lbf of thrust.



The ULA team is proud to be the launch provider for the WGS-7 mission with the U.S. Air Force Space Command's Space and Missile Systems Center (AFSPC/SMC).

This mission is the seventh installment of the Wideband Global SATCOM (WGS) system. WGS satellites are an important element of a new high-capacity satellite communications system providing enhanced communications capabilities to our troops in the field for the next decade and beyond. WGS enables more robust and flexible execution of Command and Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR), as well as battle management and combat support information functions. The WGS constellation augments the service available through the UHF Follow-on satellite by providing enhanced information broadcast capabilities.

The ULA team is focused on attaining Perfect Product Delivery for the WGS-7 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).

My thanks to the entire ULA team, as well as our suppliers and our USAF customer, for their hard work and commitment to mission success.

Go Delta, Go WGS!

**Jim Spornick**  
Vice President, Atlas and Delta Programs



### America's Ride to Space

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 90 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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## MISSION OVERVIEW

- 98<sup>th</sup> ULA Launch
- 30<sup>th</sup> Delta IV Launch
- 7<sup>th</sup> WGS Satellite Launch
- 5<sup>th</sup> Delta IV Medium+ (5,4) Launch



America's Ride to Space

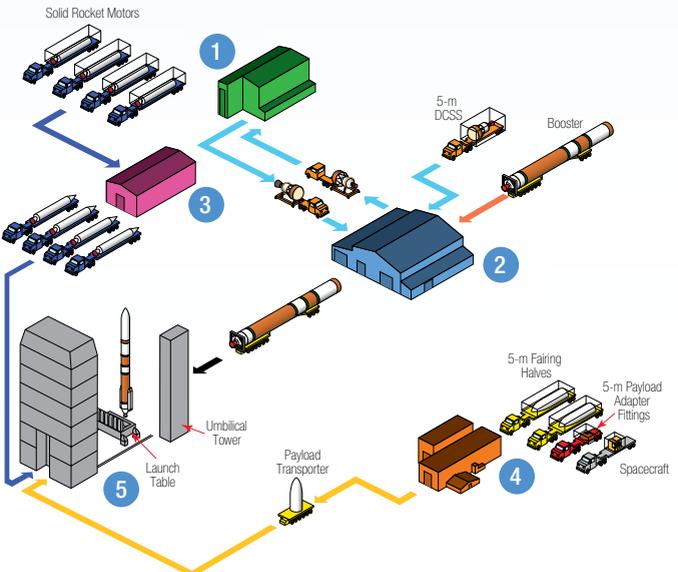
# DELTA IV PRODUCTION AND LAUNCH

- 1 De Soto, CA**  
— RS-68A Engine Fabrication at Aerojet Rocketdyne
- 2 Brigham City, UT**  
— Solid Rocket Motor Fabrication at Alliant Technologies
- 3 Denver, CO**  
— ULA Headquarters & Design Center Engineering
- 4 Decatur, AL**  
— Booster, Payload Fairing and Second Stage Fabrication
- 5 West Palm Beach, FL**  
— RL10 Engine Fabrication at Aerojet Rocketdyne



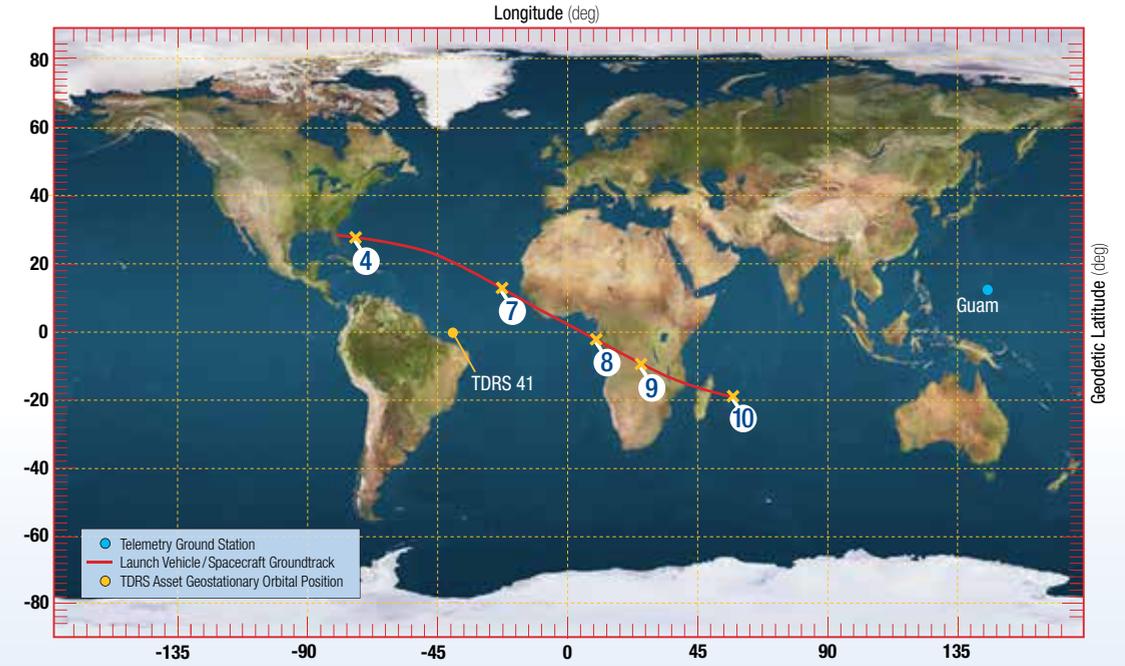
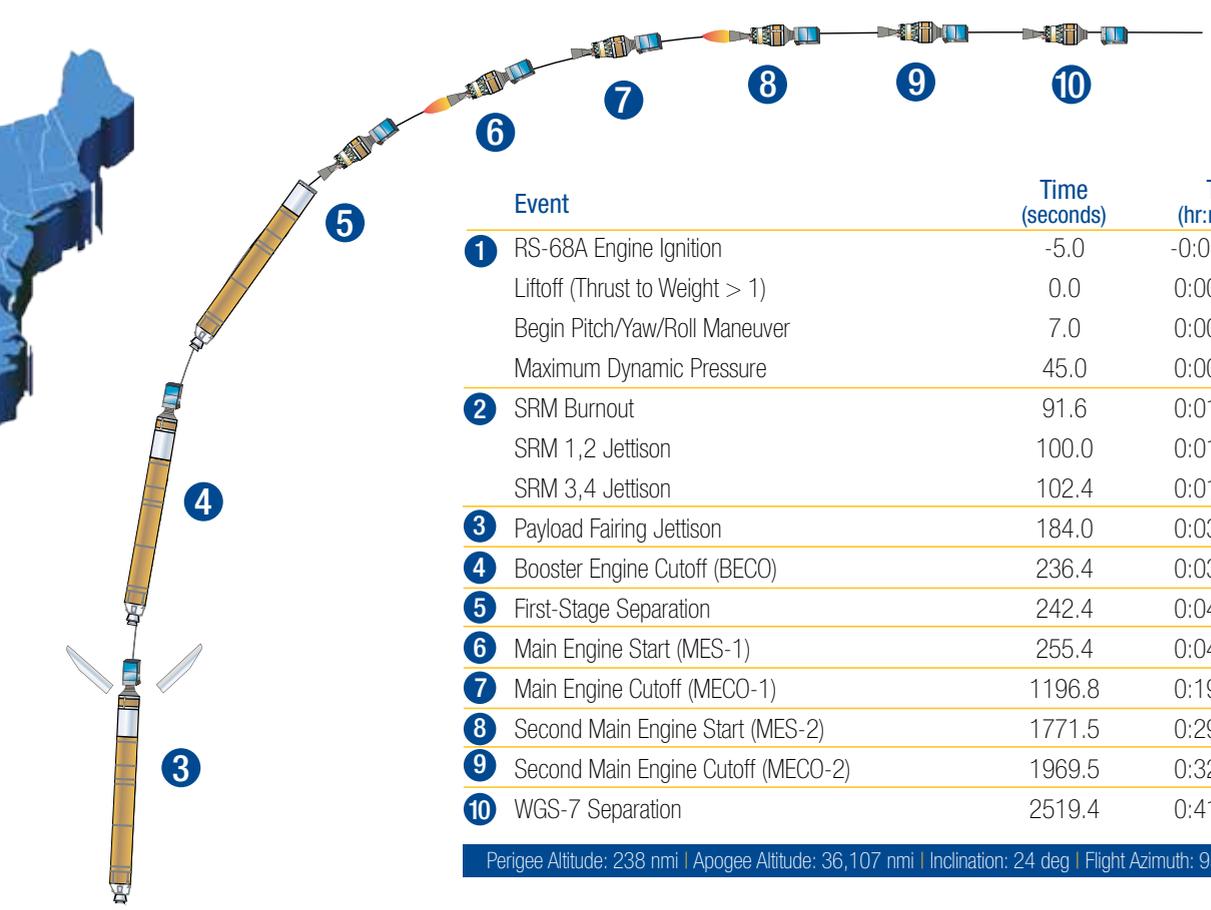
- 1 Delta Operations Center (DOC)** | Launch Control Center and Mission Director's Center
- 2 Horizontal Integration Facility** | Receiving, inspection and integration
- 3 Receipt Inspection Shop** | Receiving, inspection and processing
- 4 Spacecraft Processing Facility** | Spacecraft processing, testing and encapsulation
- 5 Mobile Service Tower** | Launch vehicle integration and testing, spacecraft mate and integrated operations

- 1 Mobile Service Tower (MST)**
- 2 Launch Vehicle**
- 3 Launch Table**
- 4 Fixed Umbilical Tower (FUT)**
- 5 Lightning Protection Towers**
- 6 LH2 Storage Tank**
- 7 L02 Storage Tank**



Space Launch Complex-37

# MISSION PROFILE AND GROUND TRACE



All Values Approximate