



DELTA IV HEAVY SUCCESSFULLY LAUNCHES NROL-91

A United Launch Alliance (ULA) Delta IV Heavy rocket performed the NROL-91 mission in service to the National Reconnaissance Office (NRO) and the Space Force's Space Systems Command (SSC). Liftoff occurred from Space Launch Complex-6 at Vandenberg Space Force Base, California.

Launch Date and Time: Sept. 24, 2022 at 3:25:30 p.m. PDT (6:25:30 p.m. EDT; 2225:30 UTC).

Go Delta IV Heavy! Go NROL-91!

LAUNCH WEBCAST



LIVE UPDATES

Last Updated: Oct 08 00:26

Oct 08 00:26

DELTA IV HEAVY NROL-91 LAUNCH

09.24.22 3:25:30 p.m. PDT

158th ULA Launch 100% Successful

1st Delta IV Heavy Mission

Launched on First Attempt

Very Precise Payload Recovery

Only Rocket Capable of Launching NROL-91

Segment of Payload

Long March 5

Orion

Endeavour

0

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ULA

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· Sep 29, 2022

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To keep up to speed with updates to the launch countdown, dial the ULA launch hotline at 1-877-852-4321.

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#DeltaIVHeavy #NROL91

MISSION OVERVIEW

A United Launch Alliance (ULA) Delta IV Heavy rocket is launching the NROL-91 mission for the National Reconnaissance Office (NRO). Liftoff will occur from Space Launch Complex-6 at Vandenberg Space Force Base, California.

When the United States needs eyes and ears in critical places where no human can reach – be it over the most rugged terrain or through the most hostile territory – it turns to the NRO. The NRO is the Department of Defense organization responsible for developing, acquiring, launching and operating America's reconnaissance satellites, as well as operating associated data processing facilities in support of national security.

The NRO uses a variety of satellites to meet mission needs—from small sats to more traditional, larger satellites. This allows the NRO to pursue a hybrid architecture designed to provide global coverage against a wide range of intelligence requirements, carry out research and development efforts, and assist emergency and disaster relief efforts in the U.S. and around the world. The NRO never loses focus on who they are working to protect: our nation and its citizens.

LAUNCH VEHICLE

Payload Fairing (PLF)

The payload fairing 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 63-ft (19.2-m) long PLF, is approximately 233 ft (71.0 m).

Delta Cryogenic Second Stage

The Delta Cryogenic Second Stage is a cryogenic liquid hydrogen/liquid oxygen-fueled vehicle, powered by a single RL10C-2-1 engine that produces 24,750 lbs (110.1 kilo-Newtons) of thrust. The DCSS propellant tanks are structurally rigid and constructed of formed aluminum plate, spun-formed aluminum domes and aluminum ring forgings. The tanks are insulated with a spray-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 three Delta IV Heavy common booster core (CBC) 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 throttleable RS-68A engine system which burns cryogenic liquid hydrogen and liquid oxygen, with each of the three booster engines delivering 705,250 lbs (312.3 kilo-Newtons) 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.

A diagram showing the components of the Delta IV Heavy rocket. It includes a 5-m Payload Fairing, a Spacecraft (Generic), a Payload Attach Fitting, a Delta Cryogenic Second Stage, an RL10C-2-1 Engine, an Interstage, Boosters, and RS-68A Engines.

FLIGHT PROFILE

A diagram showing the flight profile of the Delta IV Heavy rocket. The rocket is shown in various stages of flight, from liftoff to payload fairing jettison. A table below the diagram lists the events and their corresponding times.

Event	Time (hr:min:sec)
1 RS-68A Engine Ignition	-0:00:05.0
Liftoff (Thrust to Weight > 1)	0:00:00.0
Begin Pitch/Yaw Maneuver	0:00:10.0
Mach 1	0:01:21.0
Maximum Dynamic Pressure	0:01:19.6
2 Port and Starboard Booster Cutoff	0:03:56.3
3 Port and Starboard Booster Jettison	0:03:58.5
4 Booster Engine Cutoff (BECO)	0:05:37.0
5 First-Stage Separation	0:05:43.5
6 Main Engine Start (MES-1)	0:05:56.4
7 Payload Fairing Jettison	0:06:06.5

SPACE LAUNCH COMPLEX-6 // PROCESSING

Space Launch Complex-6 (SLC-6), the West Coast home of the Delta IV rocket at Vandenberg Space Force Base in California, is a classic launch pad design with a Fixed Umbilical Tower (FUT) and a Mobile Service Tower (MST). The stages of the rocket are assembled in the nearby Horizontal Integration Facility (HIF), then rolled to the pad for attachment of the payload, final testing and the countdown. The site also features a Mobile Assembly Shelter (MAS) that provides full enclosure of the rocket from the weather during pre-launch preparations. The MST and the MAS are retracted to unveil the rocket prior liftoff.

A diagram showing the processing flow at Space Launch Complex-6. It includes a Fixed Launch Platform, Mobile Assembly Shelter, Horizontal Integration Facility, and Mobile Service Tower. The flow is indicated by arrows showing the movement of the rocket components through the facilities.

- 1. Remote Launch Control Center (RLCC)**
Launch Control Center & Mission Director's Center
- 2. Horizontal Integration Facility (HIF)**
Receiving, Inspection & Second Stage Integration
- 3. Spaceflight Processing Facility**
Spacecraft Processing, Testing & Encapsulation
- 4. Mobile Service Tower (MST)**
Launch Vehicle Integration & Testing, Spacecraft Mate & Integrated Operations

PRODUCTION

A map of the United States showing the production locations for the Delta IV Heavy rocket. The locations are marked with icons and numbers: 1. Canoga Park, CA (Aerojet Rocketdyne), 2. Denver, CO (ULA Headquarters & Design Center Engineering), 3. Decatur, AL (Booster, Payload Fairing and Second Stage Fabrication), and 4. West Palm Beach, FL (RL10C-2-1 Engine Fabrication at Aerojet Rocketdyne).

- 1. Canoga Park, CA**
RS-68A Engine Fabrication at Aerojet Rocketdyne
- 2. Denver, CO**
ULA Headquarters & Design Center Engineering
- 3. Decatur, AL**
Booster, Payload Fairing and Second Stage Fabrication
- 4. West Palm Beach, FL**
RL10C-2-1 Engine Fabrication at Aerojet Rocketdyne

MEDIA // DOWNLOADS

FLICKR ALBUM

A thumbnail image for a Flickr album of the Delta IV Heavy NROL-91 launch. It features the rocket launching with a large plume of fire and smoke. The text "DELTA IV NROL-91" is at the top, and "ULA" is at the bottom.