MISSION

A United Launch Alliance (ULA) Delta IV Heavy rocket will deliver NASA's Parker Solar Probe to an interplanetary trajectory to the sun. Liftoff will occur from Space Launch Complex-37 at Cape Canaveral Air Force Station, Florida. NASA selected ULA's Delta IV Heavy for its unique ability to deliver the necessary energy to begin the Parker Solar Probe's journey to the sun.

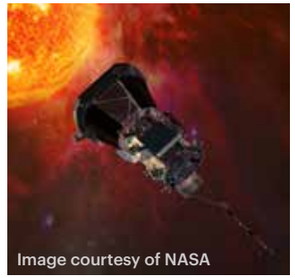


Image courtesy of NASA

The Parker Solar Probe will make repeated journeys into the sun's corona and trace the flow of energy to answer fundamental questions such as why the solar atmosphere is dramatically hotter than the sun's surface, what accelerates the solar wind that blows outward through the solar system and what is the source of high-energy solar particles. Parker Solar Probe will make 24 elliptical orbits of the sun and use seven flybys of Venus to shrink the orbit closer to the sun during the seven-year mission.

The probe will fly seven times closer to the sun than any spacecraft before, a mere 3.9 million miles above the surface which is about 4 percent the distance from the sun to the Earth. At its closest approach, Parker Solar Probe will reach a top speed of 430,000 miles per hour or 120 miles per second, making it the fastest spacecraft in history. The incredible velocity is necessary so that the spacecraft does not fall into the sun during the close approaches. Temperatures will climb to 2,500 degrees Fahrenheit, but the science instruments will remain at room temperature behind a 4.5-inch-thick carbon composite shield.

The mission was named in honor of Dr. Eugene Parker, an astrophysicist who discovered solar wind in 1958.

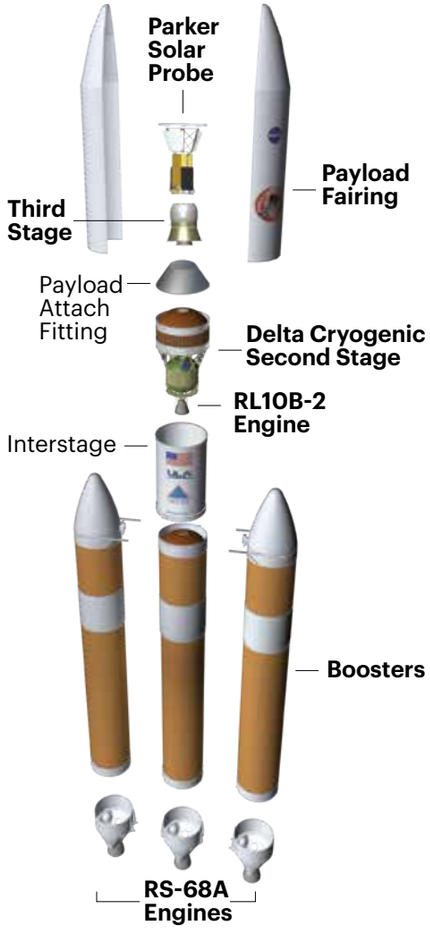
LAUNCH VEHICLE

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 62.7-ft tall PLF, is approximately 233 ft.

Third Stage
Built by Northrop Grumman Innovation Systems, this stage includes a transition ring, avionics, STAR 48BV motor, aft skirt and a launch vehicle adapter. The avionics assembly provides attitude control of the stage while the flight-proven STAR 48BV motor provides a 1.9 mi/s velocity increase.

Delta Cryogenic Second Stage (DCSS)
The DCSS 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, with a single RL10B-2 engine that produces 24,750 lb 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.

Boosters
The Delta IV booster tanks are structurally rigid and constructed of isogrid aluminum barrels, spun-formed aluminum domes and machined aluminum tank skirts. Booster propulsion is provided by three liquid hydrogen and liquid oxygen-burning RS-68A engines. Each RS-68A engine produces 702,000 lbs of thrust for a combined total liftoff thrust of more than 2.1 million pounds. Booster cryogenic tanks are insulated with a combination of spray-on and bond-on insulation and helium-purged insulation blankets. The boosters are controlled by the DCSS avionics system, which provides guidance and flight control.



DELTA IV HEAVY

With three common booster cores, the Heavy is the largest in the Delta IV fleet and is the nation's proven heavy lifter, delivering high-priority missions for the U.S. Air Force, National Reconnaissance Office and NASA. The Delta IV Heavy also launched NASA's Orion spacecraft on its historic Exploration Flight Test (EFT-1) in 2014.

First Launch: Dec. 21, 2004
Launches to date: 9

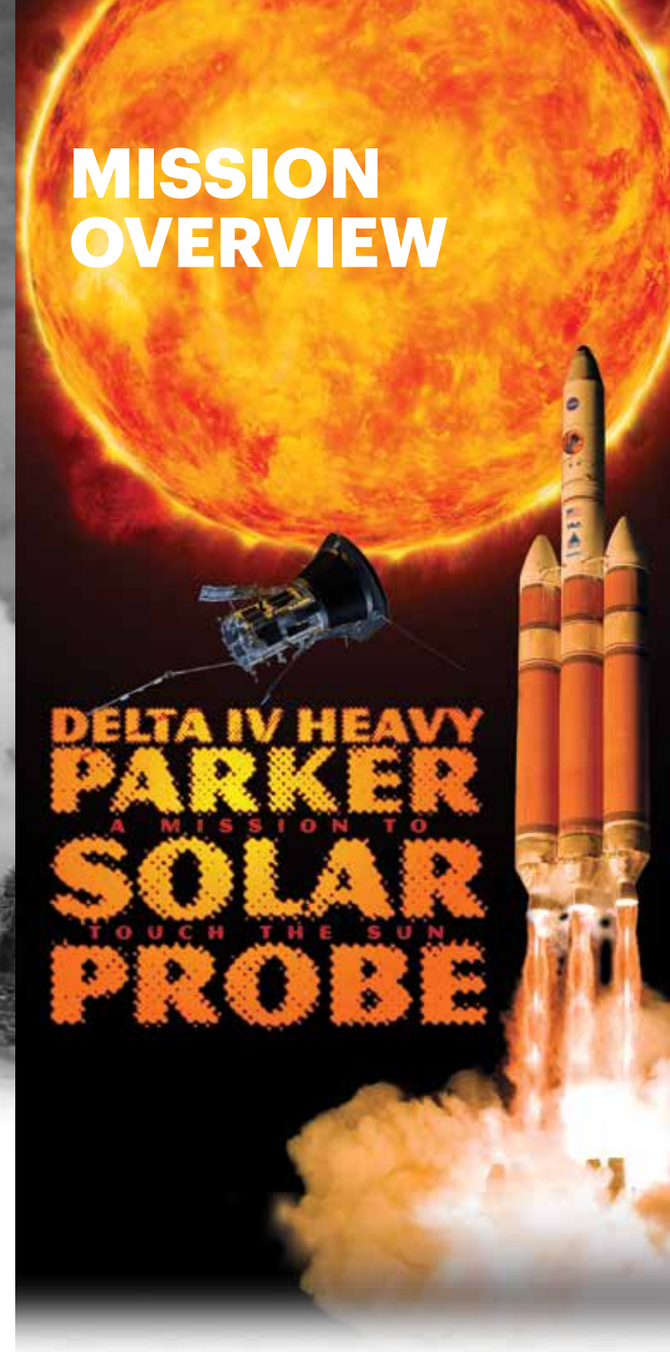
Performance to GTO: 14,210 kg (31,330 lb)
Performance to LEO-Reference: 28,370 kg (62,540 lb)

MISSION SUCCESS

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 128 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.

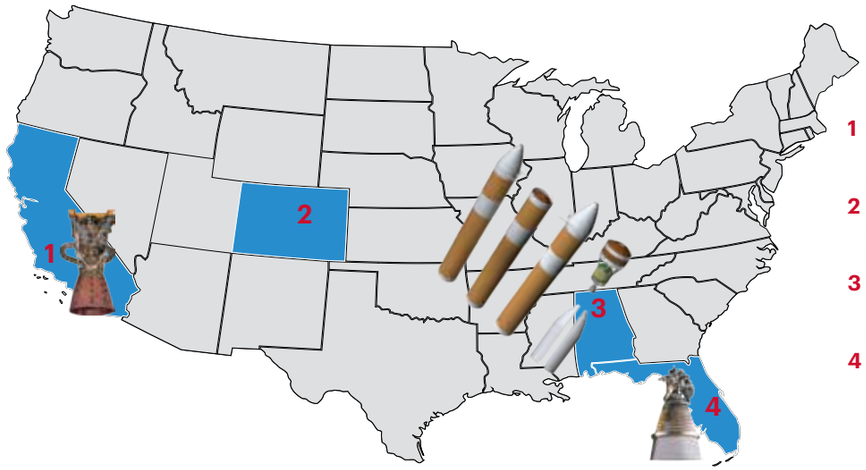
ulalaunch.com

MISSION OVERVIEW



ULA™

PRODUCTION



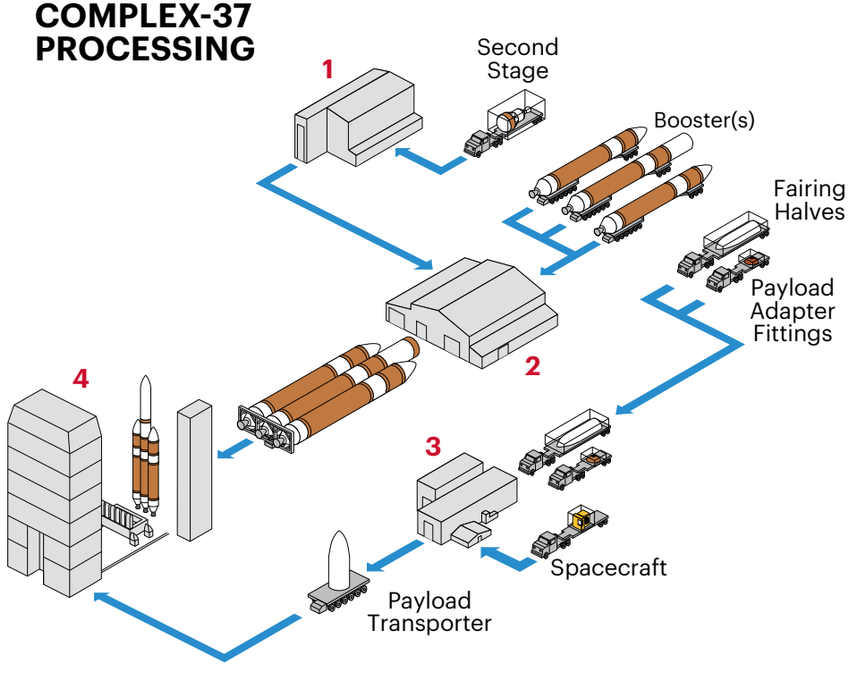
1 De Soto, CA
RS-68A Engine Fabrication at Aerojet Rocketdyne

2 Denver, CO
ULA Headquarters & Design Center Engineering

3 Decatur, AL
Booster, Payload Fairing and Second Stage Fabrication

4 West Palm Beach, FL
RL10 Engine Fabrication at Aerojet Rocketdyne

SPACE LAUNCH COMPLEX-37 PROCESSING

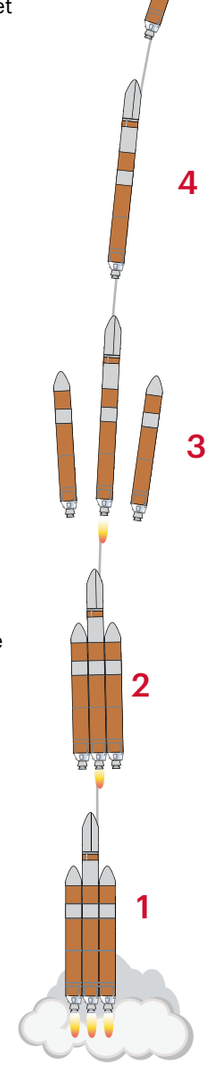


1 Delta Operations Center
Mission Director's Center & Second Stage Processing

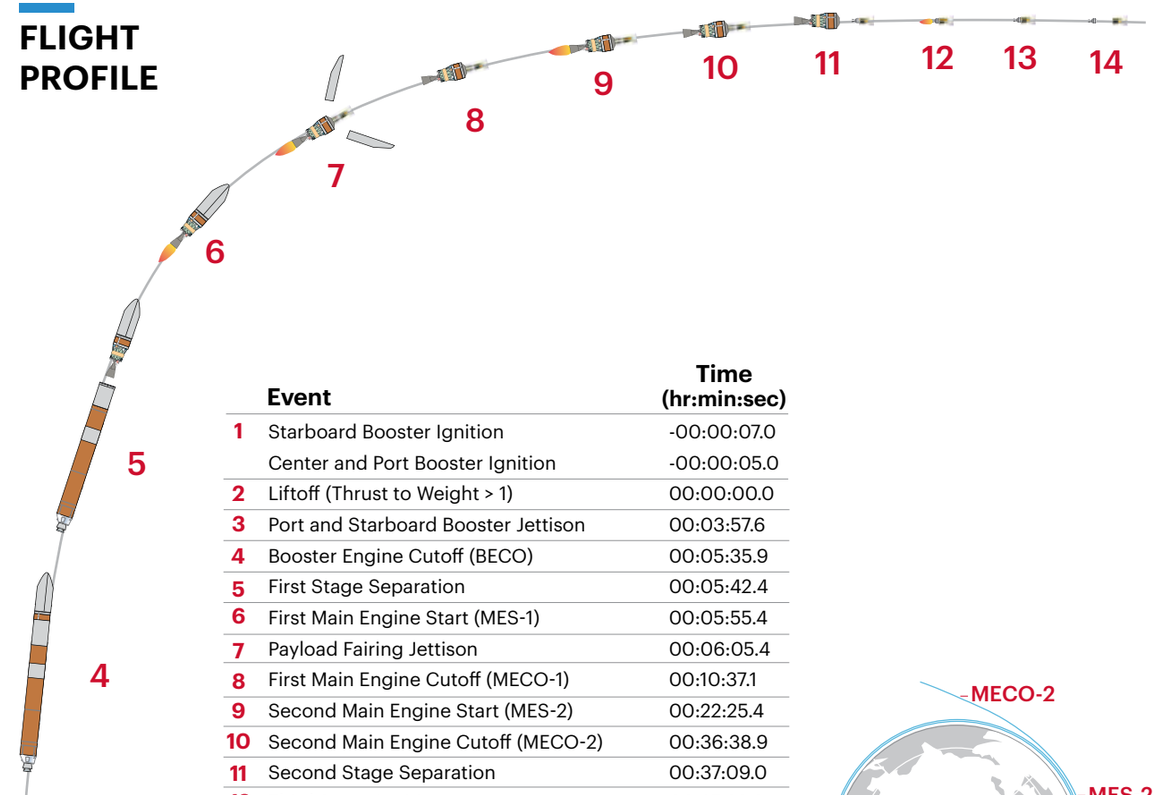
2 Horizontal Integration Facility
Receiving, Inspection & Vehicle Integration

3 Spacecraft Processing Facility
Spacecraft Processing, Testing & Encapsulation

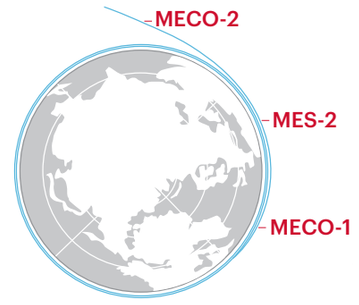
4 Mobile Service Tower
Launch Vehicle Integration & Testing, Spacecraft Mate & Integrated Operations



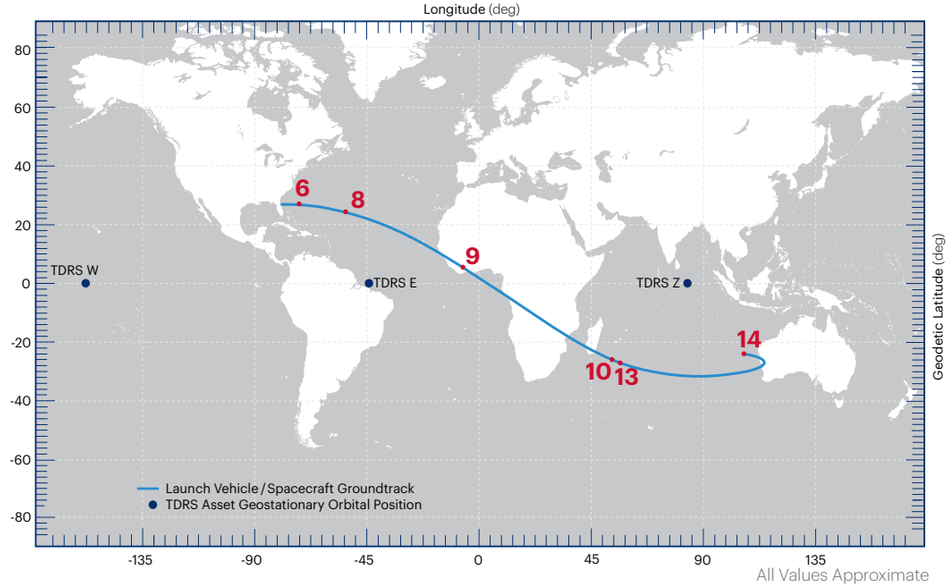
FLIGHT PROFILE



	Event	Time (hr:min:sec)
1	Starboard Booster Ignition	-00:00:07.0
	Center and Port Booster Ignition	-00:00:05.0
2	Liftoff (Thrust to Weight > 1)	00:00:00.0
3	Port and Starboard Booster Jettison	00:03:57.6
4	Booster Engine Cutoff (BECO)	00:05:35.9
5	First Stage Separation	00:05:42.4
6	First Main Engine Start (MES-1)	00:05:55.4
7	Payload Fairing Jettison	00:06:05.4
8	First Main Engine Cutoff (MECO-1)	00:10:37.1
9	Second Main Engine Start (MES-2)	00:22:25.4
10	Second Main Engine Cutoff (MECO-2)	00:36:38.9
11	Second Stage Separation	00:37:09.0
12	Third Stage Ignition	00:37:29.0
13	Third Stage Burnout	00:38:58.0
14	Parker Solar Probe Separation	00:43:18.0



Parker Solar Probe Orbit at Separation
C3: 153.79 (km^2/s^2) | DLA: -24.03 deg | RLA: 222.90 deg | Flight Azimuth: 94.06 deg



All Values Approximate