Mission: GPS IIF-5

Launch Vehicle: Delta 4

Launch Date: February 20, 2014

Launch Window: 8:40 - 8:59 p.m.

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www.spaceflightnow.com

Text by: Justin Ray
Justin@spaceflightnow.com
Design by: Walter Scriptunas II
wscriptunas@gmail.com

Fact SHEET

The 25th flight of the Delta 4 rocket will launch the fifth in a series of Block 2F navigation satellites for the Global Positioning System. Liftoff is scheduled for Feb. 20 at 8:40 p.m. EST, at the start of a 19-minute launch opportunity. The window is timed to deliver the GPS 2F-5 satellite directly into Plane A of the navigation network 11,000 miles above Earth.

The vehicle stands 205 feet tall and produces 1.2 million pounds at liftoff.

The Delta's flight will last three hours and 33 minutes from liftoff until spacecraft separation, firing its cryogenic upper stage in three different burns to reach an initial parking orbit and taking a two-step transfer route to reach the circular GPS orbit tilted 55 degrees to the equator.

GPS 2F-5 will replace the aging spacecraft known as GPS 2A-28 in Plane A, Slot 3 of the constellation. The GPS 2A-28 satellite was launched aboard Delta 249 on Nov. 5, 1997 as the final member of the Block 2A series. It will go into a reserve role in the network for the remainder of its useful life.

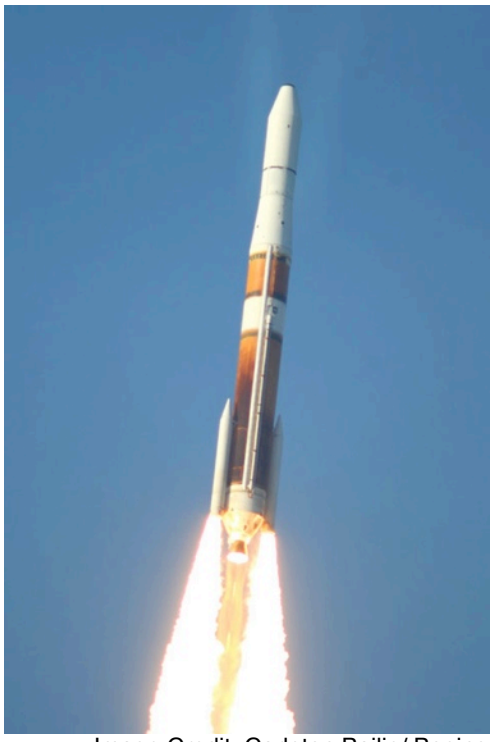


Image Credit: Carleton Bailie/ Boeing

GPS 2F-5 incrementally upgrades the constellation with improved accuracy, enhanced internal atomic clocks, better anti-jam resistance, a civil signal for commercial aviation and a longer design life, all features of the Boeing-build Block 2F series.

This will be the fifth of 12 Block 2F spacecraft being built to form the backbone of the GPS fleet for the next 15 years.

GPS satellites orbit about 11,000 nautical miles above the planet and emit continuous navigation signals that allow users to find their location in latitude, longitude and altitude and determine time. The constellation features six orbital planes with multiple satellites flying in each.

Here's a timeline of the flight's key events:

It will take 3 hours and 33 minutes to deploy the GPS 2F-5 spacecraft into the navigation network, a circular orbit of 11,047 nautical miles at an inclination of 55 degrees.

HR:MM..Eastern...Event

T-0:00:05.0.....RS-68 Engine Ignition

T-0:00:00.1.....SRM Ignition

T+0:00:00.0.....LIFTOFF (Thrust to Weight > 1)

T+0:00:08.0.....Begin Pitch/Yaw Maneuver

T+0:00:46.0.....Mach 1.05

T+0:00:60.4.....Maximum Dynamic Pressure

T+0:01:36.0.....SRM Burnout

T+0:01:40.0.....SRM Jettison

T+0:04:05.6.....MECO

T+0:04:13.0.....First Stage Separation

T+0:04:27.0.....Second Stage Ignition

T+0:04:38.0.....Payload Fairing Jettison

T+0:12:14.0.....First Cutoff Second Stage (SECO 1)

The approximate orbit at SECO 1 is 100 by 215 miles at an inclination of 41.6 degrees

T+0:21:19.0.....First Restart Second Stage

T+0:24:36.7.....Second Cutoff Second Stage (SECO 2)

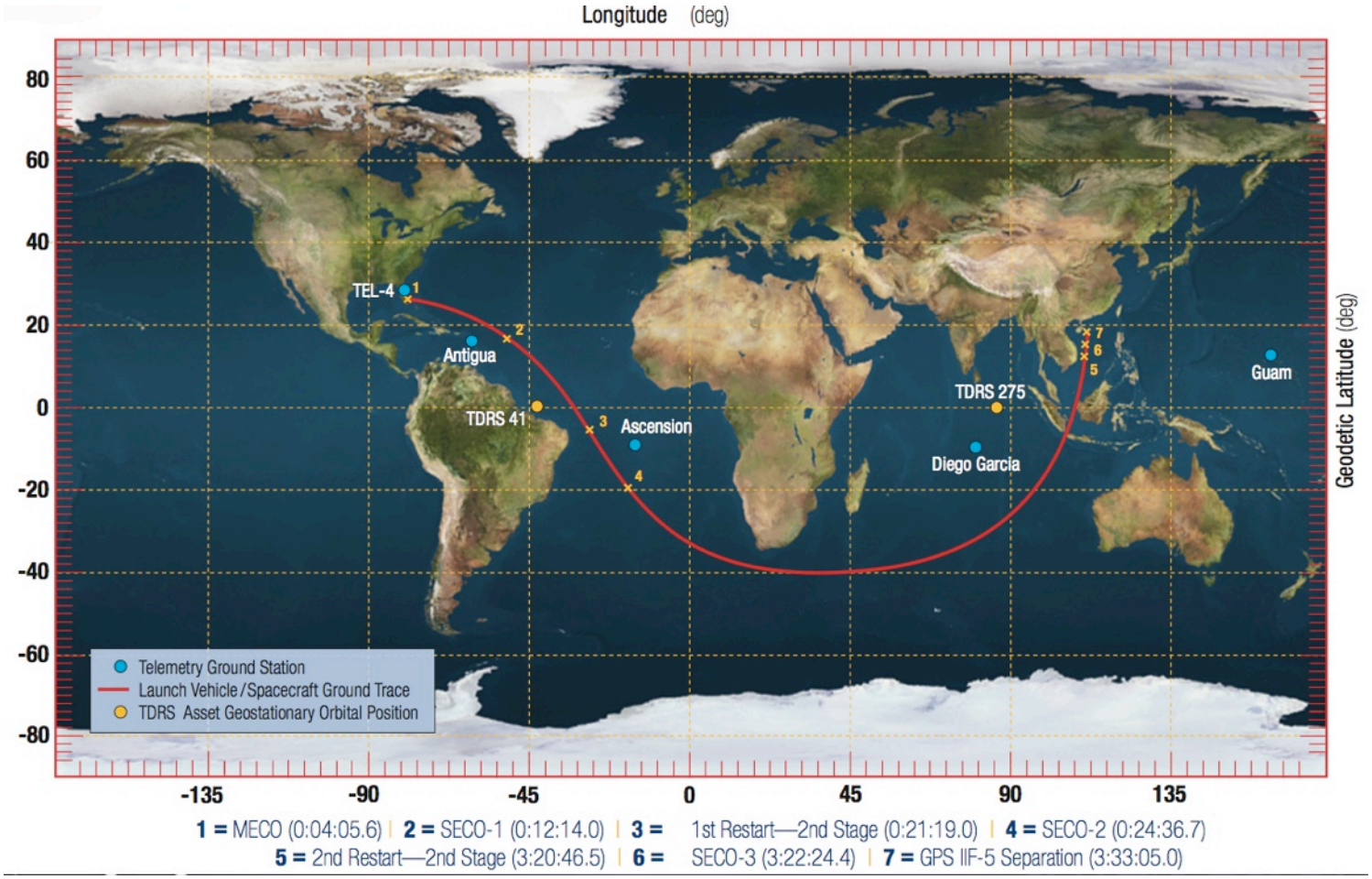
The approximate orbit at SECO 2 is 130 by 11,000 miles at an inclination of 43 degrees

T+3:20:46.5.....Second Restart Second Stage

T+3:22:24.4.....Third Cutoff—Second Stage (SECO 3)

T+3:33:05.0.....Spacecraft Separation

The approximate orbit at SECO 3 is circular at 11,047 nautical miles at an inclination of 55 degrees.



Delta 4 Facts

This will be:

- The 365th Delta rocket launch since 1960
- The 25th Delta 4 rocket mission since 2002
- The 10th Medium+ 4,2 configuration to fly
- The 39th main engine from RS-68 family used
- The 37th-38th GEM-60 solid rocket motors flown
- The 444th production RL10 engine to be launched
- The 28th RL10B-2 engine launched
- The 20th Delta 4 rocket launch from Cape Canaveral
- The 21st use of Delta 4 by the Air Force
- The 67th Evolved Expendable Launch Vehicle flight
- The 79th United Launch Alliance mission since 2006
- The 18th Delta 4 under the ULA banner
- The second ULA launch this year
- The first launch of the Delta family in 2013
- The 65th GPS satellite to launch
- The 53rd GPS launch on a Delta rocket
- The fifth GPS Block 2F satellite
- The fourth Block 2F launch on Delta

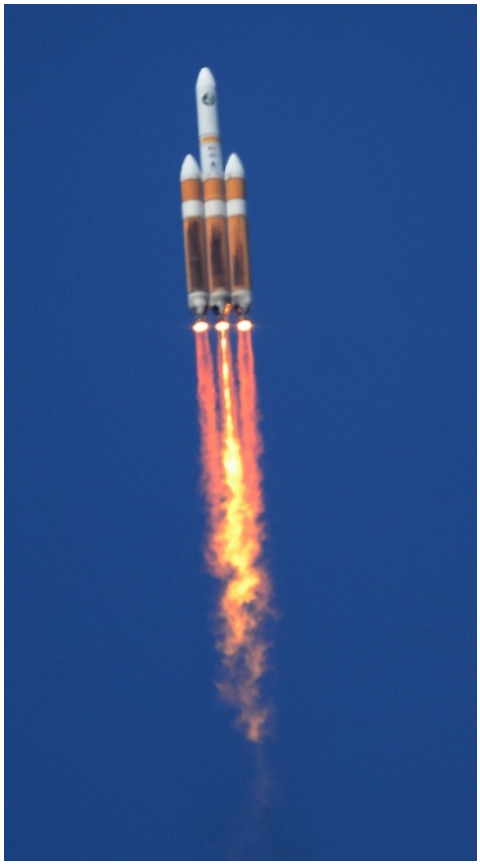


Image Credit: Gene Blevins/ LA Daily News

This is the 25th launch of a Delta 4 rocket, the commercially-developed Evolved Expendable Launch Vehicle fielded in 2002 by Boeing, then merged into operator United Launch Alliance's fleet in 2006.

Launching the nation's largest and sophisticated spy satellites to weather observatories and communications satellites, the Delta 4 rocket has been used to deploy U.S. government spacecraft the majority of the time.

The Heavy configuration has flown seven times, six operationally, the haul massive spacecraft into orbit for the Air Force and National Reconnaisance Office. The satellites have included the final Defense Support Program missile-warning craft, a host of eavesdropping spy satellites and two electro-imaging surveillance birds.

The most-used vehicle has been the Medium+ (4,2) configuration, which has flown nine times. It features a four-meter upper stage and fairing plus two strap-on solid rocket boosters. The version flew the first Delta 4 launch with the commercial Eutelsat W5 telecommunications satellite, plus three GPS birds, three GOES weather satellites and two NRO craft.

The configuration used to launch the Pentagon's Wideband Global SATCOM communications satellites is the Medium+ (5,4), which has a five-meter upper stage and four strap-on boosters for extra thrust. It has flown four times.

Then there's the plain Medium vehicle, which flew three times in the early days of the program to launch DSCS communications satellites and DMSP weather craft.

And a sole flight of the Medium+ (5,2) rounds out of the family of modular launchers with a five-meter upper stage and only two solids. It carried an NRO radar imaging satellite.

Delta 4 Launch Vehicle

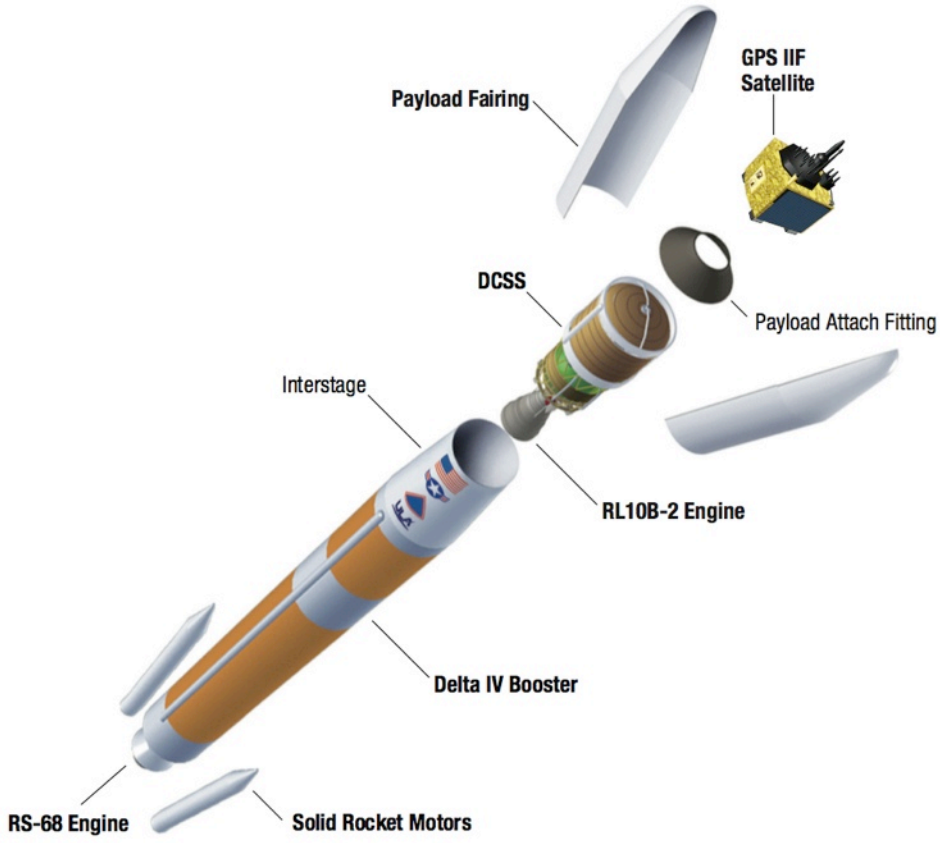


Image Credit: United Launch Alliance