A United Launch Alliance (ULA) Delta II 7420-10 rocket will deliver the Ice, Cloud and land Elevation Satellite-2 (ICESat-2) spacecraft to a 250 nmi (463 km), near-circular polar orbit. Liftoff will occur from Space Launch Complex-2 at Vandenberg Air Force Base, California.

ICESat-2, with its single instrument, the Advanced Topographic Laser Altimeter System (ATLAS), will provide scientists with height measurements to create a global portrait of Earth’s third dimension, gathering data that can precisely track changes of terrain including glaciers, sea ice, forests and more. ATLAS is a photon-counting laser altimeter that advances technology from the first ICESat mission launched on a Delta II in 2003 and operated until 2009. Our planet’s frozen and icy areas, called the cryosphere, are a key focus of NASA’s Earth science research. ICESat-2 will help scientists investigate why, and how much, our cryosphere is changing in a warming climate, while also measuring heights across Earth’s temperate and tropical regions and take stock of the vegetation in forests worldwide. The ICESat-2 mission is implemented by NASA’s Goddard Space Flight Center (GSFC). Northrop Grumman built the spacecraft. NASA’s Launch Services Program at Kennedy Space Center is responsible for launch management.

In addition to ICESat-2, this mission includes four CubeSats which will launch from dispensers mounted to the Delta II second stage. The CubeSats were designed and built by UCLA, University of Central Florida, and Cal Poly. The miniaturized satellites will conduct research in space weather, changing electric potential and resulting discharge events on spacecraft and damping behavior of tungsten powder in a zero-gravity environment.

**LAUNCH VEHICLE**

**Payload Fairing (PLF)**

The PLF is a composite bisector (two-piece shell) 10-ft diameter fairing. The PLF encapsulates the spacecraft to protect it from the launch environment on ascent. The vehicle’s height with the 10-ft PLF is approximately 132 ft.

**Second Stage**

The Delta II second stage is a hypergolic (Aerozine 50 and Nitrogen Tetroxide) fueled vehicle with propellant tanks constructed of corrosion-resistant stainless steel. It uses a single AJ10-118K engine producing 9,850 lb of thrust. The second stage’s guidance section provides the structural support for the propellant tanks, the PLF, mountings for vehicle electronics and the structural and electronic interfaces with the spacecraft.

**Booster**

The Delta II booster is 8-ft in diameter and approximately 87-ft in length. The booster’s fuel and oxidizer tanks are structurally rigid and constructed of stiffened isogrid aluminum barrels and spun-formed aluminum domes. The booster is completed by the centerbody, which joins the fuel and oxidizer tanks and the LO2 skirt. Propulsion is provided by the RS-27A engine which burns RP-1 (Rocket Propellant-1 or highly purified kerosene) and liquid oxygen, and delivers 200,000 lb thrust at sea level. The booster is controlled by the second-stage avionics system which provides guidance and flight control during flight.

**Graphite Epoxy Motors (GEMs)**

The Delta II 7420-10 launch vehicle uses four GEMs, approximately 40 in. in diameter and 42-ft in length. The GEMs are constructed of a graphite-epoxy composite and are jettisoned by structural thrusters.

**DELTA II**

For nearly 30 years, the reliable Delta II rocket has been an industry workhorse, launching critical capabilities for NASA, the Air Force and customers around the world. From its origin as the launch vehicle for the first Global Positioning System (GPS) satellites to science and interplanetary satellites, including Mars rovers Spirit and Opportunity, to vital commercial communication and imaging satellites, the Delta II rocket has truly earned its place in space history.

First Launch: February 14, 1989

Launches to date: 154

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 125 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.

**MISSION SUCCESS**

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