National Aeronautics and Space Administration

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Science

NASA Langley Research Center

Athena

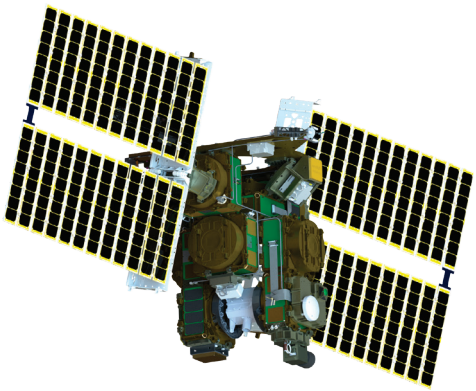
As Agencies Align, Athena Brings Wisdom and Strategy

NASA, the U.S. Space Force and NOAA have strategically aligned efforts to gain wisdom from Athena — a SmallSat that will demonstrate the ability of NovaWurks SensorCraft architecture to support future missions. Athena serves as a pilot opportunity for transformational activities by demonstrating energy budget measurements at the top-of-atmosphere (TOA) from space on a new type of satellite host.

> Athena will demonstrate the critical science measurement, but also an architecture that is adaptable and more cost-effective for the taxpayer and the government - Kory Priestley, principal investigator for Athena at Langley.

Athena teams at each organization are gaining technical knowledge from the hardware, but also in conducting business with partners and streamlining processes for a more robust and rapid development.

New Architecture, Big Rewards



Taking cues from human biology, specifically the structure and interactions of cells, NovaWurk's Hyper-Integrated Satlets, or HISat's, are engineered to aggregate, share resources, and conform to different sizes and shapes. The cellular architecture of the craft allows greater flexibility with payload designs and concepts, dropping the price-point, yielding greater access to space and multiple orbits to exploit observational capability.

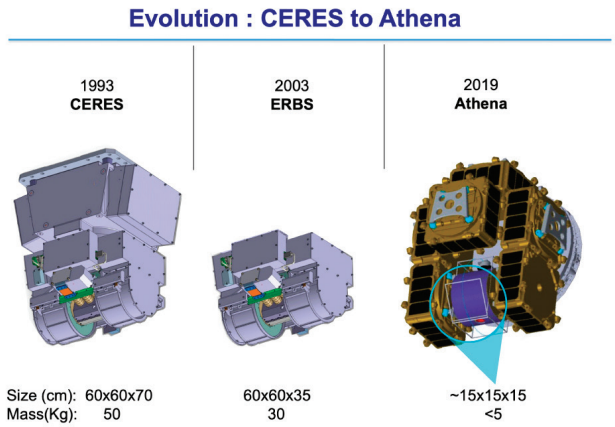
"We're really merging the capabilities of the HISat's and the payload," Priestley said. "So, our payload doesn't need to bring as many resources to the overall effort."

Given the seamless integration of the payload, sensor and the host craft, teams are easily finding new and needed science applications and collaborations that Athena can provide for future science missions.

A Small Science Payload Evolved from CERES

Satellites such as Terra and Aqua were as big as school buses. ”The complete Athena HISat platform will be about as big as the electric toy car my granddaughter drives around in,” Priestley said.

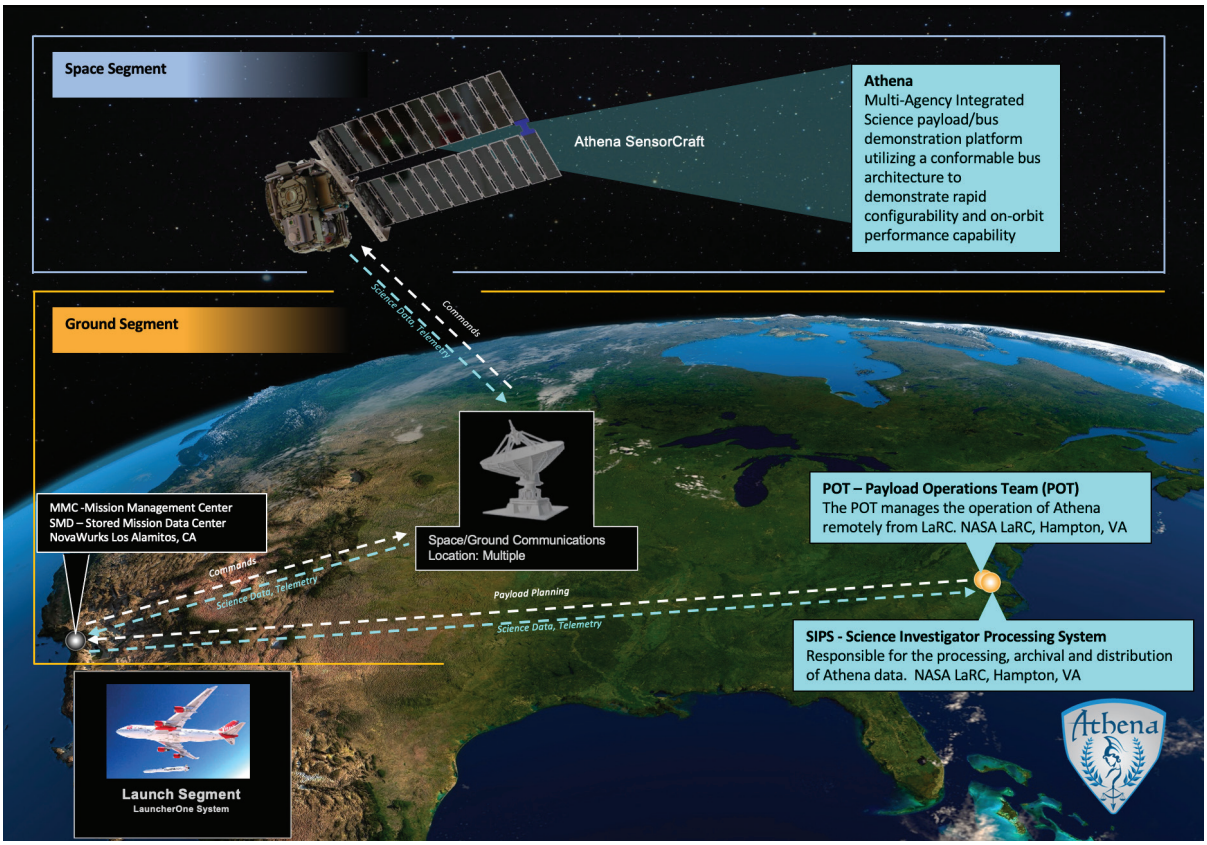
In 2020, NASA Langley delivered the Athena payload to NovaWurks. The payload consists of an Optical Module and a Calibration Module built with spare parts from NASA’s CERES mission, and a newly developed Sensor Electronics Assembly.



New Path to Launch

Athena is a one year mission that was selected to launch on the Virgin Orbits LauncherOne system tentatively in summer/fall 2023. LauncherOne is a two-stage orbital launch vehicle developed and flown by Virgin Orbit that began operational flights in 2021. It is an air-launched rocket, designed to carry smallsat payloads of up to 300 kg (660 lb) into Sun-synchronous orbit (SSO), following air launch from a carrier aircraft at high altitude.

Once in orbit, NASA’s Athena will collocate measurements with CERES instruments on other NASA spacecraft to demonstrate the capability of sustaining critical Earth Radiation Budget observations measurements well into the future.



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Langley Research Center
100 NASA Road
Hampton, VA 23681-2199

www.nasa.gov

NP-2022-08-034-LaRC