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NAVIGATING OUR CISLUNAR BACKYARD ENABLED BY ACES

Abstract

How will humans expand our presence into our very own backyard: cislunar space - the space between Earth and the Moon? What could we do if long duration, propulsive, powered, spaceflight was an everyday occurrence? United Launch Alliance (ULA) is developing technology today to enable cislunar exploration, development, science and industry.

ULA's new upper stage, ACES (Advanced Cryogenic Upper Stage), is currently in development and enables long duration missions and electric power during flight. ACES is fully reusable, refuelable, and is first of its kind. This revolutionary technology results in revolutionary capability. Reusing and refueling ULA's upper stage in orbit allows scientists, explorers, industry, and government to access and utilize cislunar space as easily as driving down the road. Regular and flexible cislunar transportation facilitates access to multiple identified resources and the yet undiscovered opportunities beyond Earth.

ACES builds on the flight proven Centaur upper stage, currently flown on Atlas V launch vehicles. Differences between ACES and Centaur will be discussed in this paper, to include power and propulsion subsystems, fuel choices, volume, thrust and a development update. ACES enables transportation throughout cislunar space.