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INNOVATION IN SPACE ACCESS: HISTORY OF UNIQUE CAPABILITIES BEGUN WITH ATLAS, CENTAUR, AND DELTA AND THE CONTINUING INNOVATION ON VULCAN

Abstract

The Atlas and Delta launch vehicles have enabled an incredible number of firsts thanks to continuous innovation. The Delta launch vehicle evolved from the Thor intermediate-range ballistic missile in the 1950's. Similarly, Atlas started as the world's first intercontinental ballistic missile fielded shortly after Delta in 1957. 60 years of continuous improvement and innovation have yielded the modern Atlas V and Delta IV rockets supporting national Security, Civil and Commercial missions. In 1958 Atlas launched the first prototype communication satellite that paved the way for modern communication satellites. With a focus on reliability, Delta was the workhorse of America's early space launch program, able to loft 290 kg to LEO. Delta science missions paved the way for our first human flights, and in 1962 Atlas launched the Mercury capsules carrying the first American astronauts into Earth orbit. Beginning in 1962, the high energy LH2/LO2 Centaur was introduced in partnership with NASA to support lunar and interplanetary missions. The Surveyor missions launched on Centaur in the early 1960's were precursors to later Apollo moon landings. Atlas, Centaur, and Delta have launched probes to the Moon, every planet in our solar system, the Sun, and even the Kuiper belt and interstellar space. Atlas and Delta have launched all 73 GPS satellites that have gone operational, enabling a $100B global economy and services all of us rely on. Vulcan is building on the Atlas and Delta legacy of innovation and serving cust$