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Author: Ms. Jacqueline Cortese
Blue Origin LLC, United States, jcortese@blueorigin.com

Mr. A.C. Charania
Blue Origin LLC, United States, acharania@blueorigin.com

THE ORIGINS OF NASA'S HUMAN LANDING SYSTEM PROGRAM

Abstract

Prior to 2017, small lunar programs were underway at the National Aeronautics and Space Administration (NASA) like Resource Prospector – a rover to detect and excavate lunar volatiles – and the Lunar Cargo Transportation and Landing by Soft Touchdown (CATALYST) initiative – which allowed NASA to enter into no-exchange of funds agreements with small lunar lander developers. At this time, NASA's overarching objective was to land crew on Mars, so lunar programming, while existent, was limited across the overall portfolio of the agency.

On December 11, 2017, the then Administration released Space Policy Directive-1 (SPD-1), which directed NASA to focus on sending American astronauts back to the Moon in the near-term, and eventually to Mars. However, in the months prior to SPD-1, the agency was already hard at work assessing approaches for development of the critical piece of the architecture – the next generation of lunar landing capabilities.

These efforts took shape in a number of ways over the years, spawning programs like Commercial Lunar Payload Services (CLPS) and the Next Space Technologies for Exploration Partnerships (NextSTEP) Appendix E for human landing risk reduction. Outside of NASA, these activities captured the enthusiasm of industry, the engagement of the United States Congress, and the interest of the international community. In September 2019, these efforts peaked with the release of the solicitation for NASA's hallmark Human Landing System (HLS) Program – which challenged U.S. industry to propose integrated, end-to-end crew transportation systems to and from the lunar surface.

This paper examines the origins and evolution of next-generation lunar lander development in the United States culminating in the HLS program, and the outlook for a sustainable, international presence on the lunar surface.