

IAF HUMAN SPACEFLIGHT SYMPOSIUM (B3)
Human Space & Exploration (8)

Author: Mr. Andrew Crocker
Dynerics, United States, andy.crocker@dynerics.com

DYNETICS HUMAN LANDING SYSTEM: OVERVIEW AND STATUS OF THE DEVELOPMENT OF
A LUNAR TRANSPORTATION ARCHITECTURE**Abstract**

Dynerics, Inc. (Dynerics) leads a team of experienced industry partners to build a Human Landing System to safely ferry astronauts to areas of the Moon never explored before and back to support a sustained human presence on the Moon. The Dynerics Human Landing System (DHLS) design meets and, in many cases, exceeds NASA's requirements for a sustainable lunar lander and also offers near-term reusability and features that provide robustness to the lander capability. DHLS can be the backbone of a sustained lunar exploration program that establishes an ongoing presence off the Earth and builds the capabilities for human missions to Mars and deep space.

The central element of the DHLS is called the Descent/Ascent Element (DAE). The DAE functionally consists of a Crew Module (CM), which provides a safe crew living and working environment, and the Autonomous Logistics Platform for All-Moon Cargo Access (ALPACA), which contains propulsion; landing and docking; vehicle management; guidance, navigation, and control (GNC); power; communications; and thermal control. The ALPACA uses liquid oxygen/liquid methane (LOX/LCH₄) propellants for a high-performance, compact vehicle. For uncrewed missions, the CM may be replaced by other large payloads that can be carried to the lunar surface and/or to other cis-lunar destinations.

Dynerics' design is focused on crew safety and mission success. A low-slung CM allows direct surface access for crew, payloads, and equipment without the use of tall ladders or the complexity of elevators, cranes, or robotics. It can also support many other missions beyond crew transport. It can place payloads directly onto the lunar surface without cranes or other infrastructure. Alternatively, it can pick up cargo from the surface for transport to lunar orbit. DHLS could be a central element for a propellant depot on or near the Moon. Dynerics is also designing its system to be reusable from the start, with only minor design changes needed from the first to later versions to enable full system reusability. This paper will provide an overview of the DHLS and a status of its development.