

Life Support Systems for a New Lunar Lander

Molly Anderson¹, and Henry Rotter², Imelda Stambaugh³
NASA Johnson Space Center, Houston, Texas, 77058

and

Evan Yagoda⁴Jacobs Technology, Houston, Texas, 77058

A life support system concept has been developed for a new NASA lunar lander concept. The ground rules and assumptions driving the design of this vehicle are different from the Constellation Altair vehicle, and have led to a different design solution. For example, this concept assumes that the lander vehicle arrives in lunar orbit independently of the crew. It loiters in lunar orbit for months before rendezvousing with the Orion Multi-Purpose Crew Vehicle (MPCV), resulting in the use of solar power for this new lander, rather than fuel cells that provided product water to the life support system in the Altair vehicle. Without the need to perform a single Lunar Orbit Insertion burn for both the lander and the MPCV, the modules do not have to be centered in the same way, so the new lander has a smaller ascent module than Altair and a large habitat rather than a small airlock. This new lander utilizes suitport technology to perform EVAs from the habitat, which leads to significantly different requirements for the pressure control system. This paper describes the major trades and resulting concept design for the life support system of a new lunar lander concept.

¹Vehicle Engineering Lead, NASA Johnson Space Center, EC2

²Altair ECLSS Architect, NASA Johnson Space Center, C104

³Life Support Lead, NASA Johnson Space Center, EC2

⁴ Life Support Engineer, Jacobs Technology at NASA JSC, JE44