

Return to the Moon (02)  
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LESSONS IDENTIFIED FROM THE CONCEPTUAL DESIGN CONCEPT OF A LUNAR ORBIT  
RENDEZVOUS ARCHITECTURE LUNAR LANDER**Abstract**

A cross-disciplinary team of scientists and engineers applied expertise gained during the Altair Lunar Lander development to the conceptual design of a lunar lander for a dual launch, lunar orbit rendezvous architecture lunar lander. In the LOR design reference mission (DRM), the first launch places the lunar lander into a 100km circular lunar orbit, and it loiters there until the crew arrives in the Multi-purpose Crew Vehicle (MPCV) 120 to 180 days later. From a lunar lander specific perspective, this DRM, which removes the lunar orbit insertion burn from the lander requirements, opens some design alternatives that were not available to the Altair project team. The conceptual design process yielded a number of interesting debates, some of which could be significant design drivers in a detailed lunar lander design. These issues include: uncrewed loiter duration operations, configuration alternatives, functional requirements, integrated system effects associated with various subsystem specific design alternatives, design for in-space repairability, and extravehicular vehicle (EVA) operations. This paper will summarize how these issues are a common set of issues that any future crewed lunar lander design must take into consideration.