

**INTEGRATING SCIENCE PAYLOADS WITHIN THE LUNAR TRANSPORTATION ARCHITECTURE: RESULTS OF THE NASA CEV UNPRESSURIZED CARGO STUDY – THE USER CASE.** R. Lewis<sup>1</sup>, <sup>1</sup>NASA Goddard Space Flight Center, Greenbelt, Maryland 20771, ruthan.lewis@nasa.gov.

**Introduction:** The critical need to accommodate transportation and operation of science payloads and investigations in support of NASA's Vision for Exploration cannot be overemphasized. Beginning in October 2006, a study was conducted by NASA to develop a concept of operations and draft Level II requirements for adding unpressurized cargo delivery capability to the Crew Exploration Vehicle Service Module in support of Lunar and International Space Station missions. Within the study, an investigation of potential specific science, applied science, engineering, technology development, and education payloads based on input from a vast array of potential future users was conducted. The investigation led to the derivation of an on-going user-case database as well as conceptual technical designs and accommodations to support the mission needs of the users. Definition of the desired orbit parameters were not constrained, in that utilization of low Earth, translunar, lunar, and beyond lunar orbits are possible. Additionally, investigations were open as to the choice of operational location such as on the Crew Exploration Vehicle itself, transfer to/from ISS, and/or deployed from the vehicle. Technical parameters including the nature and application of the payload, operational data (mass, power, volume, data, etc.) as well as technical readiness were compiled.

A brief overview of precedent science payload accommodations from Apollo to ISS eras and the transfer of lessons learned to current and future science needs and applications will be discussed. A summary, including specific examples and statistics, of the current science user database will be presented along with conceptual payload carrier designs and requirements to support the designs. Also, current and future status and actions to pursue and continue the refinement and implementation of the on-going database and requirements will be discussed.