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SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)
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DESIGN AND DEVELOPMENT OF A MICROGRAVITY STOWAGE SYSTEM SPECIFIC FOR DEEP SPACE EXPLORATION

Abstract

The University of Alabama in Huntsville (UAH) Mechanical and Aerospace Engineering (MAE) Department is partnering with the National Aeronautics and Space Administration (NASA) and professional manufacturing facilities, in order to design, manufacture, and demonstrate a microgravity stowage system to be installed in a NASA habitat concept demonstrator at Marshall Space Flight Center (MSFC). The project is in response to the NASA X-Hab (eXploration Habitat) Innovation Challenge 2013 to be completed during the 2012-2013 academic year. The goal is to design a stowage system for a Deep Space Habitat (DSH) to be delivered to MSFC in May 2013. The purpose of the project is to provide relevant, real world engineering experience to the design team members while engaging the engineering students in the creation of innovative design solutions specific to extended duration missions to deep space environments. The project also provides team members the opportunity to partner with NASA engineers and other experts in the aerospace industry. In addition, the UAH developed design may be implemented as part of a future expedition in a NASA flight Habitat. Specifically, the team will work to design and manufacture a microgravity random access stowage and rack system, which will be used to house food, medical, hygiene, maintenance, and other supplies for astronauts on a future space mission. An integral part of the project will be to develop solutions specific for deep space environments for long term use. This was achieved by engaging the team members with NASA professionals, stimulating an exchanging of knowledge from low earth orbit exploration and novel concepts from the team members that addressed

the rising challenge of deep space exploration. The 2013 Innovation Challenge spurred the undergraduate engineering students to become knowledgeable in the requirements of deep space exploration designs in order return to lunar orbit and beyond. The present paper provides a detailed description of the UAH design, how it was integrated within the habitat concept demonstrator, and the impact of deep space challenges upon undergraduate education.