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IAF HUMAN SPACEFLIGHT SYMPOSIUM (B3)
Interactive Presentations - IAF HUMAN SPACEFLIGHT SYMPOSIUM (IP)

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MARS-TX • MOVABLE – CAN BE RELOCATED TO DIFFERENT CUSTOMERS WITHIN THE FACILITY • ANALOG – FLIGHT LIKE EMULATOR FACILITATING OPERATIONAL AND TESTING EXPERIENCES • RESOURCE – RECONFIGURABLE, MULTIFUNCTIONAL TOOL ENABLING DIVERSE CUSTOMER

Abstract

NASA and its international partners have developed a robust architecture for a sustainable and affordable lunar presence. However, recently NASA and its industry partners have identified several significant gaps in the surface mobility and integration concept architecture. These identified gaps are identified in the NASA M2M Architecture Definition Document (ADD), Lunar Architecture Summary, and numerous industry white papers. This semester I designed a high-fidelity emulator based on existing habitat designs such as HALO capable of enhancing end to end testing and accelerating design studies across the lunar economy. Specifically, MARS-TX examines the ECLSS and crew systems elements required to efficiently move crew and cargo from landers to points of interest while minimizing infrastructure requirements. A dedicated emulator also enables lunar surface industry collaborators to explore logistics, mobility, and ISRU transportation solutions. These activities are essential components in laying the foundations for lunar exploration and a sustained Artemis campaign. The goal of this analog design is ultimately risk reduction while enhancing efficient design and test cycles. The proposed TAMU emulator is known as MARS-TX and will be housed at the new TAMU exploration park facility in Houston. • Movable – Can be relocated to different customers within the facility • Analog – Flight like emulator facilitating operational and testing experiences • Resource – Reconfigurable, multifunctional tool enabling diverse customer scenario testing and verification of diverse requirements • System – Capable of emulating a diverse range of lunar surface system interfaces from crew ingress/egress, robotic interface, ISRU storage and cargo load/offload

TAMU, working with Northrop Grumman Systems Corporation, will build a system providing the following functions: -Hi-fi physical emulation tool supporting end to end lunar test scenarios -Provide structure, thermal, power, data and communications to lunar surface customers -Validate technologies and mission ops scenarios for the Moon and Mars -Facilitate integration of lunar systems, operations and logistics -Validate HALO ECLSS and Crew Systems product applicability for lunar applications -Explore inter element interface standards and operations