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A PORTABLE, PRESSURIZED MEDEVAC DEVICE FOR EARTH, MARS, AND BEYOND

Abstract

As the space sector moves toward human missions to increasingly distant locations, space medical capabilities must evolve to support increasingly complex mission parameters, particularly as it applies to Extravehicular Activity (EVA) support. At present, a major trauma or decompression event during surface EVA would be catastrophic, possibly leading to loss of mission or loss of crew. Contingency planning on EVA is necessary to mitigate such events. Currently, there are very few options to respond to this type of emergency. The present paper describes a novel, portable evacuation device designed to maintain a pressurized environment while allowing for medical intervention and transport to more definitive care. Using this “Golden Bubble,” an injured astronaut can be quickly and easily enclosed in a clean-air environment. Simultaneously, the device allows for transport and easy access for treatment while maintaining pressurization. The apparatus is easy to carry, easily deployed, and capable of sustaining a casualty long enough to stabilize them and transport them safely to higher care. The present paper describes the need, design considerations and trade-offs, initial prototyping and testing of the Golden Bubble device, and concludes by looking toward next steps in testing and development, with an eye toward additional applications in austere environments on Earth.