

IAF/IAA SPACE LIFE SCIENCES SYMPOSIUM (A1)
Interactive Presentations - IAF/IAA SPACE LIFE SCIENCES SYMPOSIUM (IP)

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ABSTRACT: AN APPROACH TO APPROPRIATE AND DIGNIFIED ASTRONAUT DEMISE
MANAGEMENT FOR MARS MISSIONS.

Abstract

An overall examination of the specific logistical, environmental, psychological and cultural difficulties in managing an astronaut demise during a mission to Mars. To date, astronauts who have died during spaceflight have been entire crews rather than individuals. No astronaut crew has had to manage the death of a crewmate in flight as well as the management of a deceased individual until return to Earth for burial. With the increase in mission duration length as well as increased distance from Earth this eventuality becomes more likely to occur. This paper examines the potential management process if a single astronaut crew member died during a Mars mission and the various approaches that may be employed to deal with this eventuality. The paper looks at three specific hypothetical scenarios where a single astronaut crew member passes away 1) on the outbound journey to Mars, 2) during a mission on Mars itself and 3) on the inbound journey back to Earth.

The paper deals with certifying a death in space, coroner jurisdiction and a possible pathway for investigations of space deaths. It discusses the logistics of safe and appropriate storage of an astronaut corpse aboard a module in terms of appropriate cooling and managing biohazard risk. It examines the difficulties with ejection from a moving module. The problematic nature of astronaut burial on Mars is explored including the management of potential biohazard waste and the risk of contaminants to Martian soil in the mission area. The logistics of appropriate site selection and controlled cremation, burial or deliberate decomposition are reviewed with reference to the ethics of environmental preservation. The investigation process into deaths on long duration space flight is highlighted and the possibilities around death certification and jurisdiction are explored. Finally, the psychological impact on remaining crew and morale implications of the demise of a crewmate is examined and potential strategies to manage this are reviewed.