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SPACE OPERATIONS SYMPOSIUM (B6)
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MEDICAL OPERATIONS DURING EXPLORATION-CLASS MISSIONS: CHALLENGES AND INNOVATION STRATEGIES

Abstract

Future manned missions beyond low-Earth orbit (LEO) will be challenging due to the distances traveled as well as the prolonged exposure to extreme conditions. As communications with the ground and access to resources will be limited, long duration missions to the Moon, Mars and asteroids raise concerns as to how medical operations will be performed in the event of a contingency. Despite the extensive crew medical selection process as well as the implementation of preventive countermeasures, medical risks cannot be eliminated, neither can they be predicted. If medical assistance is required in a timely fashion, the communication delays and the impossibility of emergency returns render the current ISS medical operations paradigm of 'stabilization and transportation' inadequate. To ensure crew health and safety, medical operations will evolve from the current ISS telemedicine paradigm to an advanced telemedicine concept for care including a higher reliance on medical autonomy. Innovations in space medicine, including new technologies and procedures, are therefore required to address these new challenges. This paper will present the main concerns related to medical care delivery operations for exploration-class missions. Examples from analog missions conducted by the Canadian Space Agency will be used to illustrate these aspects of space medicine RD for the definition of requirements. Finally, emphasis will be placed on the advantages and impacts of interdisciplinary collaborations between organisations in the development of concepts, tools and techniques for medical care in space. Many overlaps exist between space and terrestrial medicine RD objectives, especially when it comes to remote care. At this stage of technology and concepts development, collaborations can accelerate innovation and increase the impacts of research and spin-offs opportunities.