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Is Space R&D Truly Fostering A Better World For Our Future? (2)

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DEVELOPING A FRAMEWORK FOR COLLABORATION AND INNOVATION IN MENTAL HEALTH RESEARCH BETWEEN SPACE AND EARTH DOMAINS: LEARNING FROM CASE STUDIES OF NASA TECHNOLOGY TRANSFER

Abstract

In spaceflight, humans are exposed to a variety of psychological stressors due to living in isolated and confined environments (ICE) for an extended period of time. Living in ICE (such as a confined spacecraft) can lead to increased risk for developing anxiety and depression, and these effects are exacerbated as spaceflight duration increases. These challenges are driving extensive research and development (RD) on interventions to support behavioral health and performance for astronauts, especially on future deep space missions (like NASA's Artemis Program). There are also various parallels to mental health challenges faced by terrestrial communities that live or work in ICE (e.g. rural communities, Arctic/Antarctic communities, submariners, etc.). Entities across the space and terrestrial mental health sectors recognize these synergistic needs and opportunities to transfer valuable knowledge and technology for advancing the efficacy, fidelity, and accessibility of mental health support tools or systems. However, while opportunities for knowledge and tech transfer (KTT) in mental health for ICE are intuitively understood, the ability to track, examine, and facilitate transfer is often difficult to perform given the highly variable nature of the resources to be transferred (e.g. knowledge, processes, tools, systems, facilities). Additionally within the United States, the space and terrestrial medicine sectors have unique regulatory and financial structures that steer knowledge sharing and incorporation at different stages of development. Therefore, it is difficult to consistently assess the benefits or value gained from KTT and evaluate the mechanisms that drive transfer. This work seeks to address these gaps by descriptively examining documented examples from NASA's technology transfer resources (NASA Spinoff publications, patent portfolio, software catalog) that focus on mental health or cognitive assessment systems that have been transferred in some capacity. A system architecture (SA) analysis is performed to describe the transfer ecosystems that facilitated KTT, including the stakeholders involved, transfer mechanisms utilized (forms), transfer activities conducted (functions), and benefits or outputs produced. This empirical analysis informs the development of a framework for future collaborative innovation between space and Earth domains that maximizes the impact of knowledge generated and shared on mental health RD. Additionally, this systematic examination will inform the future development of metrics to evaluate collaboration and the value of KTT particularly in a mental health context. Advancing and refining a collaboration framework and metrics of evaluation will help to accelerate and maximize the impact of RD generated in support of both human spaceflight endeavors and terrestrial mental health.