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HUMAN AND ENVIRONMENTAL RESEARCH MATRIX FOR EXPLORATION OF SPACE  
(HERMES) PROJECT**Abstract**

The emerging commercial spaceflight industry has brought forth numerous companies planning and operating their own space launch vehicles and space destinations. The hazards of spaceflight bring profound challenges to human health and performance, and the spaceflight operators carrying a wider variety of the human population into space will likely bring a fractured data management environment creating a unique challenge of how to best standardize management of the human health and performance data needed to keep astronauts healthy. The Translational Research Institute for Space Health (TRISH) is developing the Human and Environmental Research Matrix for Exploration of Space (HERMES) project to be a semi-autonomous, vehicle agnostic, data management infrastructure with capability to 1) seamlessly aggregate medical, research, operational, and environmental data, 2) store said data in an efficient manner that allows for 3) access and distribution of the data to human users for human interpretation, to algorithmic users such as artificial intelligence agents, and to downstream spacecraft that also have HERMES infrastructure.

HERMES allows for a shift in how data is managed. By emphasizing data interface standards that are publicly available, HERMES can serve as an aggregation and distribution nexus to move data from source to storage to destination should they comply with documented data interface and vocabulary coding standards. The integration of medical, research, operational, and environmental data allows for analysis and understanding of the astronaut's health status and performance by human or algorithmic users. Should HERMES be deployed ubiquitously, a new data management model is possible where an astronaut's "data center of gravity" can follow them as they move from one spacecraft environment to another giving subsequent operating environments access to the history of the astronaut from prior spacecraft.

TRISH has funded development of two HERMES prototypes that have successfully demonstrated the functions and capabilities above. Further development will continue to deploy, test, and validate HERMES' capabilities in spaceflight environments and high-fidelity Earth-based space analogs. HERMES can support organizations that operate multiple non-standardized transportation vehicles and remote/extreme/limited resource locations such as NASA's Artemis Program, national Antarctic programs, and rural underserved communities where collection, storage, and analysis of the population's data is important to their health and wellbeing.

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