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Task Description:	NOTE: Continues "Computational Model for Spacecraft/Habitat Volume (Spacecraft Optimization Layout and Volume (SOLV))" with PI Dr. Sherry Thaxton due to Dr. Thaxton's move to Human Factors & Behavioral Performance Deputy Element Scientist, as of 2/5/2017. A key design challenge for future long-duration exploration missions is determining the appropriate volume of a spacecraft/habitat to accommodate habitability functions and ensure optimal crew health, performance, and safety. Because spacecraft/habitat volume directly drives mass and cost, this information is needed early in the design process. This proposal is in response to the NASA Research Announcement (NRA) NNJ13ZSA002N A.2.i: Computational Modeling and Simulation for Habitat/Vehicle Design and Assessment, and it addresses the Human Research Program (HRP) Program Requirements Document (PRD) Risk of Incompatible Vehicle/Habitat Design. The objective of this proposal is to develop a constraint-driven, optimization-based model that can be used to estimate and evaluate spacecraft/habitat volume. The computational model development will be completed through four Specific Aims: Estimate spacecraft/habitat volume based on mission parameters and constraints, provide layout assumptions for a given volume, assess volumes based on a set of performance metrics, and inform risk characteristics associated with a volume. To accomplish this, the proposed team has been structured to leverage expertise from diverse fields, including architecture and habitation design, human factors engineering, industrial engineering, optimization-based modeling, and simulation. The proposed work will also leverage technical products developed from the HRP-hosted 2012 Habitable Volume Workshop, as well as work performed in the follow-on exploratory project in 2013, including critical task volume estimations and input/output definitions for the computational model. Lessons learned from the development of the Integrated Medical Model (IMM) developed by the Exploration Medica Leapability Elem		
Rationale for HRP Directed Research:			
Research Impact/Earth Benefits:	Earth industries that are concerned with habitability in confined environments for long durations (e.g., shipping, submarines, oil and gas rigs, Antarctic research stations) may benefit from the task-based approach in development for determining overall volume needs.		
Task Progress:	New project for FY2017. NOTE: Continues "Computational Model for Spacecraft/Habitat Volume (Spacecraft Optimization Layout and Volume (SOLV))" with PI Dr. Sherry Thaxton due to Dr. Thaxton's move to Human Factors & Behavioral Performance Deputy Element Scientist, as of 2/5/2017. See that project for previous reporting.		
Bibliography Type:	Description: (Last Updated: 06/06/2018)		