Fiscal Year:	FY 2022	**Task Last Updated:**	FY 07/01/2022
PI Name:	Dinges, David F. Ph.D.		
Project Title:	NSCOR for Evaluating Risk Factors and Biomarkers for Adaptation and Resilience to Spaceflight: Emotional Valence and Social Processes in ICC/ICE Environments		
Division Name:	Human Research		
Program/Discipline:			
Program/Discipline--Element/Subdiscipline:	HUMAN RESEARCH--Behavior and performance		
Joint Agency Name:		**TechPort:**	No
Human Research Program Elements:	(1) **HFBP**:Human Factors & Behavioral Performance (IRP Rev H)		
Human Research Program Risks:	(1) **BMed**:Risk of Adverse Cognitive or Behavioral Conditions and Psychiatric Disorders (2) **Team**:Risk of Performance and Behavioral Health Decrements Due to Inadequate Cooperation, Coordination, Communication, and Psychosocial Adaptation within a Team		
Space Biology Element:	None		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	None		
PI Email:	dinges@pennmedicine.upenn.edu	**Fax:**	FY
PI Organization Type:	UNIVERSITY	**Phone:**	215-898-9949
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City:	Philadelphia	**State:**	PA
Zip Code:	19104-4209	**Congressional District:**	2
Comments:			
Project Type:	GROUND	**Solicitation / Funding Source:**	2016-2017 HERO NNJ16ZSA001N-Crew Health (FLAGSHIP, OMNIBUS). Appendix A-Omnibus, Appendix B-Flagship
Start Date:	09/05/2017	**End Date:**	07/31/2023
No. of Post Docs:	2	**No. of PhD Degrees:**	0
No. of PhD Candidates:	1	**No. of Master' Degrees:**	0
No. of Master's Candidates:	0	**No. of Bachelor's Degrees:**	8
No. of Bachelor's Candidates:	16	**Monitoring Center:**	NASA JSC
Contact Monitor:	Whitmire, Alexandra	**Contact Phone:**	
Contact Email:	alexandra.m.whitmire@nasa.gov		
Flight Program:			
Flight Assignment:	NOTE: End date changed to 7/31/2023 per L. Barnes-Moten/JSC (Ed., 4/7/21)		
Key Personnel Changes/Previous PI:	July 2022 report: no personnel changes July 2021 report: 1) Replaced Dr. Pete Roma with Dr. Suzanne Bell as Co-Investigator/Institutional PI at Johnson Space Center (JSC). 2) Added Dr. Sheena Dev as Co-Investigator. July 2020 report: Previous CoI Jason Schneiderman is no longer working on the project. 1) Replaced Dr. Tom Williams with Dr. Pete Roma as Co-Investigator/Institutional PI at Johnson Space Center (JSC). 2) Replaced Dr. Tom Williams with Dr. Bradley C. Nindl as NSCOR Co-Director. 3) Replaced Dr. Brandon Vessey as Co-Investigator with Dr. Lauren Landon as Co-Investigator at JSC. 4) Added Dr. Alexandra Whitmire as Co-Investigator. 5) Added Diana Arias to role of Support for initiating Wyle subcontracts at JSC. 6) Replaced Dr. Sarah McGuire with Dr. Mathias Basner as NSCOR ICARUS Site Environmental Lead in Dr. Dinges' Lab at the University of Pennsylvania. 7) Added Dr. Brian Martin to role of Co-Investigator in Dr. Nindl's laboratory at the University of Pittsburgh. 8) Added Meaghan E. Beckner to role of PhD Research Fellow in Dr. Nindl's laboratory at the University of Pittsburgh. 9) Added Nathaniel Hodgson, PhD to		

	role of Post-Doc in Dr. Hensch's laboratory Harvard Boston Children's Hospital. 10) Added Gervasio Batista, PhD to role of Post-Doc in Dr. Hensch's laboratory at Harvard Boston Children's Hospital.
COI Name (Institution):	Basner, Mathias M.D., Ph.D. (University of Pennsylvania) Bilker, Warren Ph.D. (University of Pennsylvania) Chouker, Alexander M.D. (University of Munich) Elliott, Mark Ph.D. (University of Pennsylvania) Feiveson, Alan Ph.D. (NASA Johnson Space Center) Flanagan, Shawn Ph.D. (University of Pittsburgh) Gehrman, Philp Ph.D. (University of Pennsylvania) Gunga, Hanns-Christian M.D. (Charite - Universitatsmedizin Berlin) Gur, Ruben Ph.D. (University of Pennsylvania) Kuehn, Simone Ph.D. (University Clinic Hamburg-Eppendorf) Landon, Lauren Ph.D. (KBR/NASA Johnson Space Center) Nindl, Bradley Ph.D. (University of Pittsburgh) Roalf, David Ph.D. (University of Pennsylvania) Stahn, Alexander Ph.D. (University of Pennsylvania) Hensch, Takao Ph.D. (Boston Children's Hospital) Whitmire, Alexandra Ph.D. (KBR/NASA Johnson Space Center) Martin, Brian Ph.D. (University of Pittsburgh) Bell, Suzanne T Ph.D. (Behavioral Health & Performance Lab at KBR/NASA JSC) Dev, Sheena Ph.D. (Behavioral Health & Performance Lab at KBR/NASA JSC)
Grant/Contract No.:	80NSSC17K0644
Performance Goal No.:	
Performance Goal Text:	
Task Description:	NASA's vision for successful long-duration exploration missions (LDEM) depends on optimizing human performance, adaptability, and resiliency to reduce individual and crew behavioral risks. To date, the major emphasis in optimizing astronauts for their tolerance to prolonged spaceflight has involved human health and performance countermeasures as well as technologies and tools to ensure safety during exploration. However, considerable evidence suggests that there are individual differences among astronauts in their vulnerabilities to the various stressors of spaceflight. The goal of the proposed NSCOR (NASA Specialized Center of Research) is to obtain novel information that will help identify individuals who are resilient to the stressors of prolonged human spaceflight, thereby ensuring successful completion of exploration missions and the preservation of astronaut health over the life of the astronaut. This NSCOR project leverages the NIMH (National Instsitute of Mental Health) Research Domain Criteria (RDoC) heuristic framework to conduct experimental studies to identify biological domains (molecular, circuitry, physiology) and behavioral domains that relate to individual adaptation and resiliency (as well as behavioral vulnerability) in spaceflight-relevant isolated confined and extreme environments (ICC and ICE). The NSCOR focuses specifically on differences among astronauts in their tolerance of and adaptability to simulated conditions of prolonged spaceflight that impact behavioral health and performance. The NSCOR will provide novel information on the extent to which behavioral and biological factors can be identified that predict astronauts who can maintain positive mood, proactive social processes, a high level of performance and personal well-being, while coping with confinement, meaningless work, limited social support, and living in the extreme environmental conditions of space. By utilizing the RDoC framework, three different human confinement analogs and an animal model, the NSCOR will generate data converging on biomarkers of neurobehavioral and neurobiological resilience to the spaceflight conditions. Such a discovery will help in selecting astronauts most likely to maintain human health and performance during long-duration exploration missions.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	This project will benefit the spaceflight community, specifically humans involved in spaceflight, by providing information that will help characterize the three less well-understood NIMH RDoC domains related to positive valence, negative valence, and social processes as they relate to performance, adaptation, and resilience of individuals living and working in ICC/ICE environments. We will identify predictive indicators and biomarkers for resilience and adaptation in individuals to aid in selection and individualized countermeasure development with the goal to maintain and optimize performance capability and behavioral health during Long Duration Exploration Missions.
Task Progress:	Across the NASA Specialized Center of Research (NSCOR) human research sites, there has been a high rate of subject compliance to acquisition of behavioral and biological measures including surveys, magnetic resonance imaging (MRI) scans, blood draws, and cognitive tasks. During the reporting period (9/5/2021-9/5/2022), the Neumayer Station (in Antarctica) and the Isolation and Confinement Analog Research Unit for Spaceflight (ICARUS) facility at the University of Pennsylvania completed data collection. The NASA Human Exploration Research Analog (HERA) facility resumed data acquisition in September 2021.
Bibliography Type:	Description: (Last Updated: 04/26/2024)