

Fiscal Year:	FY 2014	Task Last Updated:	FY 08/04/2014
PI Name:	Basner, Mathias M.D., Ph.D.		
Project Title:	Neurostructural, Cognitive, and Physiologic Changes During a 1-year Antarctic Winter-Over Mission		
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		
Space Biology Element:	None		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	None		
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Zip Code:	19104-4209	Congressional District:	2
Comments:			
Project Type:	GROUND	Solicitation / Funding Source:	2013 HERO NNJ13ZSA002N-Crew Health (FLAGSHIP & NSBRI)
Start Date:	08/01/2014	End Date:	07/31/2017
No. of Post Docs:	No. of PhD Degrees:		
No. of PhD Candidates:	No. of Master' Degrees:		
No. of Master's Candidates:	No. of Bachelor's Degrees:		
No. of Bachelor's Candidates:	Monitoring Center: NASA JSC		
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Flight Program:			
Flight Assignment:			
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Bilker, Warren (University of Pennsylvania) Dinges, David Ph.D. (University of Pennsylvania) Elliott, Mark Ph.D. (University of Pennsylvania) Goel, Namni Ph.D. (University of Pennsylvania) Gur, Ruben Ph.D. (University of Pennsylvania) Satterthwaite, Theodore M.D. (University of Pennsylvania) Johannes, Bernd Ph.D. (German Aerospace Center (DLR), Institute of Aerospace Medicine) Mollicone, Daniel Ph.D. (Pulsar Informatics, Inc.)		
Grant/Contract No.:	NNX14AM81G		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	<p>This proposal primarily addresses the BMed3 Gap on the nature and duration of cognitive performance changes in-flight and post mission, by assessing neurostructural, cognitive, behavioral, physiologic, and psychosocial changes in maximally N=24-28 crewmembers during a 10-12 month Antarctic winter-over in Concordia station, and in the same number of controls matched to crewmembers based on age, gender, and educational attainment. State-of -the-art quantitative structural and functional magnetic resonance imaging (both resting-state and activated), diffusion tensor imaging, and arterial spin labeled fMRI will be performed in crewmembers and controls 4 months before, immediately after, and 6 months after the mission. During the mission, crewmembers will wear a wrist-watch like device that measures movement activity and proximity to other devices 24/7 to investigate sleep-wake behavior and crew cohesion. Once monthly, subjects will perform the Cognition test battery to quantify changes in cognitive performance. Cognition was specifically designed for high-aptitude astronauts and astronaut surrogates. It consists of 10 brief, validated neuropsychological tests that cover a wide range of cognitive domains. A 24-hour, two-electrode ECG will be performed monthly to investigate systematic changes in heart rate, heart rate variability, objectively assessed workload and sleep fragmentation with time-in-mission. Behavioral alertness will be assessed with a 3 min. Psychomotor Vigilance Test (PVT) on a weekly basis along with brief surveys to assess subjective ratings of mood, workload, stress, sleep quality, tiredness, sickness, and conflicts among crewmembers. The results will be compared with findings from Mars520 and ISS, as many of the variables to be gathered overlap with those successfully obtained by our team in these and other space analog environments. After this project we will have a much better understanding whether, to what extent, and for how long neurostructural and neurofunctional changes are induced in subjects over-wintering in the isolated and confined space analog environment of Concordia station.</p>
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	
Task Progress:	New project for FY2014.
Bibliography Type:	Description: (Last Updated: 04/05/2024)