Fiscal Year:	FY 2012	**Task Last Updated:**	FY 10/05/2011
PI Name:	Basner, Mathias M.D., Ph.D.		
Project Title:	Individualized Real-Time Neurocognitive Assessment Toolkit for Space Flight Fatigue		
Division Name:	Human Research		
Program/Discipline:	NSBRI		
Program/Discipline--Element/Subdiscipline:	NSBRI--Neurobehavioral and Psychosocial Factors Team		
Joint Agency Name:		**TechPort:**	Yes
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		
PI Email:	basner@pennmedicine.upenn.edu	**Fax:**	FY
PI Organization Type:	UNIVERSITY	**Phone:**	215-573-5866
Organization Name:	University of Pennsylvania		
PI Address 1:	Department of Psychiatry, Division of Sleep and Chronobiology		
PI Address 2:	423 Service Dr, 1013 Blockley Hall		
PI Web Page:			
City:	Philadelphia	**State:**	PA
Zip Code:	19104-4209	**Congressional District:**	2
Comments:			
Project Type:	GROUND	**Solicitation / Funding Source:**	2010 Crew Health NNJ10ZSA003N
Start Date:	10/01/2011	**End Date:**	09/30/2015
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:**	NSBRI
Contact Monitor:		**Contact Phone:**	
Contact Email:			
Flight Program:			
Flight Assignment:			
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Dinges, David (University of Pennsylvania) Gur, Ruben (University of Pennsylvania Health System) Mott, Christopher (Pulsar Informatics, Inc.) Mollicone, Daniel (Pulsar Informatics, Inc.)		
Grant/Contract No.:	NCC 9-58-NBPF02501		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	This project addresses the NSBRI Human Factors and Performance Team goal to develop tools to assess crew performance in real-time and evaluate countermeasures to mitigate the effects of fatigue, circadian misalignment and work-overload. It has secondary relevance to the Neurobehavioral and Psychosocial Factors and Sensorimotor Adaptation Teams. It is responsive to the critical need to identify how a range of cognitive functions of astronauts can be affected in space flight by fatigue alone, its interaction with other risk factors and conditions (e.g., elevated CO2, intracranial pressure, space fog), and countermeasures. The project will deliver a comprehensive, software-based, neurocognitive toolkit. By building on state-of-the-art neuropsychological test development, the toolkit will permit evaluation of a full range of cognitive functions using brief (1-5 min), validated procedures. The tests include, but go beyond, what is currently measured by WinSCAT and the Reaction Self Test on ISS. Importantly, the toolkit will permit rapid assessment of performance in cognitive, social-emotional and sensorimotor domains. Real-time performance assessment algorithms will be individualized to each astronaut's norm, and adjusted for learning using a data modeling approach, in order to optimize individual and team performance relative to the effects of fatigue and related cognitive impacts. The toolkit will facilitate identification of underlying neural mechanisms affected when cognitive deficits are identified, by using tests selected on the basis of published fMRI studies that identify the specific brain regions subserved by each test. Toolkit development will begin at TRL 5/CRL 6, and progress from laboratory, to space analog (NEEMO), to ISS (TRL 7/CRL 8). The resulting comprehensive, neuroscience-validated, cognitive test battery for real-time evaluation of astronauts in space will be an essential detection technology for effective fatigue countermeasure management of astronaut performance in space. The link to neuroscience will yield directions for mechanisms of cause and potential interventions.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	
Task Progress:	New project for FY2012.
Bibliography Type:	Description: (Last Updated: 04/05/2024)