

Fiscal Year:	FY 2013	Task Last Updated:	FY 06/04/2012
PI Name:	Dinges, David F. Ph.D.		
Project Title:	Markers of Susceptibility to Neurobehavioral Decrements in Space Flight		
Division Name:	Human Research		
Program/Discipline:	NSBRI		
Program/Discipline--Element/Subdiscipline:	NSBRI--Neurobehavioral and Psychosocial Factors Team		
Joint Agency Name:	TechPort:	No	
Human Research Program Elements:	(1) BHP :Behavioral Health & Performance (archival in 2017)		
Human Research Program Risks:	(1) Bmed :Risk of Adverse Behavioral Conditions and Psychiatric Disorders (2) Sleep :Risk of Performance Decrements and Adverse Health Outcomes Resulting from Sleep Loss, Circadian Desynchronization, and Work Overload (IRP Rev F)		
Space Biology Element:	None		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	None		
PI Email:	dinges@pennmedicine.upenn.edu	Fax:	FY 215-573-6410
PI Organization Type:	UNIVERSITY	Phone:	215-898-9949
Organization Name:	University of Pennsylvania		
PI Address 1:	Department of Psychiatry		
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:	2011 Crew Health NNJ11ZSA002NA
Start Date:	10/01/2012	End Date:	09/30/2013
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:	NOTE: End date changed back to 9/30/2015 per NSBRI submission October 2013 (Ed., 10/16/13) NOTE: Original end date was 9/30/2015; Changed to 9/30/13 per NSBRI 6/2/2012 (Ed., 6/4/12)		
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Basner, Mathias (University of Pennsylvania) Goel, Namni (University of Pennsylvania) Rao, Hengyi (University of Pennsylvania) Mignot, Emmanuel (Stanford University) Mollicone, Daniel (Pulsar Informatics, Inc.)		
Grant/Contract No.:	NCC 9-58-NBPF02801		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	<p>This project is responsive to the NSBRI Neurobehavioral and Psychosocial Factors Team goal to validate objective markers of susceptibility to stress, fatigue and neurobehavioral decrements associated with long-duration spaceflight, and to the NASA HRP Behavioral Health and Performance gap to find individual characteristics that predict successful adaptation and performance in an isolated, confined and extreme environment, especially for long duration missions. Sleep loss is common in space flight but there are currently no valid objective markers of the large inter-individual differences in susceptibility to its neurobehavioral effects. To fill this gap, the proposed project will validate promising novel markers of susceptibility to fatigue-related neurobehavioral decrements. This will be accomplished by conducting a factor analysis of a historical database of cognitive, subjective, and physiological responses to acute and chronic sleep loss in healthy adults (N=640), in order to identify core dimensions of neurobehavioral responses to sleep loss. These dimensions will then serve as targets for prospectively assessing the predictive power (separately and in combination) of each of five objective markers that include physiological (brain activity, heart rate variability, salivary amylase), behavioral (time on task performance), and genetic (common polymorphisms) measures for susceptibility to neurobehavioral responses to sleep loss. This prospective validation will be accomplished by adding the predictor markers to three separate studies on sleep deprivation that are underway during the 3-year project timeline. Across the three studies being leveraged there are a total of N=120 healthy adults (diverse in age, gender, ethnicity) on which predictive validation will be performed. Finding valid markers of susceptibility to neurobehavioral deficits from total and chronic partial sleep loss will make it possible to optimize crew resources and fatigue management during long-duration space flight, and it will have substantial benefits for fatigue management in many Earth-based, safety-sensitive operations.</p>
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	0
Task Progress:	New project for FY2013.
Bibliography Type:	Description: (Last Updated: 01/21/2020)