Fiscal Year:	FY 2009	**Task Last Updated:**	FY 08/18/2009
PI Name:	Czeisler, Charles A. M.D., Ph.D.		
Project Title:	Operational Evaluation of a Photic Countermeasure to Improve Alertness, Performance, and Mood During Night-Shift Work on the 105-Day Study (105-Day Russian Chamber Study)		
Division Name:	Human Research		
Program/Discipline:	NSBRI		
Program/Discipline--Element/Subdiscipline:	NSBRI--Human Factors and Performance Team		
Joint Agency Name:		**TechPort:**	Yes
Human Research Program Elements:	(1) **BHP**:Behavioral Health & Performance (archival in 2017)		
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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City:	Boston	**State:**	MA
Zip Code:	02115-5804	**Congressional District:**	8
Comments:			
Project Type:	Ground	**Solicitation / Funding Source:**	Directed Research
Start Date:	02/01/2009	**End Date:**	01/31/2010
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):	Barger, Laura (Harvard--Brigham and Women's Hospital) Wright, Kenneth (University of Colorado) Lockley, Steven (Harvard--Brigham and Women's Hospital) Ronda, Joseph (Harvard--Brigham and Women's Hospital)		
Grant/Contract No.:	NCC 9-58-HFP00002		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	The success of long-duration missions depends on the ability of the crew to be alert and maintain high levels of cognitive function while operating complex, technical equipment. Optimal human health, performance and safety during spaceflight requires sufficient sleep and synchrony between the circadian pacemaker which regulates the timing of sleep, endocrine function, alertness and performance and the timing of the imposed sleep-wake schedule. Crew members of the 105-day experiment will be required to work one night shift every fifth night. This schedule will likely result in sleep loss and circadian misalignment, especially when lighting conditions are similar to those experienced during spaceflight. Mission controllers will work 24-hour shifts, also resulting in both sleep loss and circadian misalignment. It has been well documented in laboratory and field studies that both working the night shift and working extended-duration shifts result in negative effects on alertness, performance and mood. This study will validate the efficacy and operational feasibility of a lighting countermeasure to improve alertness and performance during night-shift work occurring during long-duration space missions. Specific Aims 1. Evaluate the feasibility of monitoring sleep and circadian neuroendocrine rhythms during the 105-day experiment. 2. Test the hypothesis that sleep, alertness, performance and mood will be impaired during acute circadian misalignment associated with night-shift work operations. 3. Test the hypothesis that alertness, performance and mood of crew members exposed to shorter wavelength light (between 485 to 525 nm) during the night shift in the console monitoring room will be significantly better than when those same crew members are exposed to intermediate (545 to 555 nm) or longer (620 to 690 nm) wavelength light during the night shift. 4. Test the hypothesis that the alertness, performance and mood of the external mission controllers will be impaired during the final third of their extended-duration, 24-hour work shift as compared with the first third of that same work shift. 5. Test the hypothesis that the alertness, performance and mood of external missions controllers exposed to shorter wavelength light during the final third of their extended-duration work shift will be significantly better than when those same crew members are exposed to intermediate or longer wavelength light during the night shift. Throughout the 105-day experiment, a variety of measurements will be obtained to assess sleep, performance, alignment of the circadian system, and melatonin levels. If a lighting countermeasure proves effective, it could negate or reduce the need for pharmaceutical interventions, with potentially lingering side effects, during long missions. A lighting countermeasure could also be beneficial in other unusual non-24 hour lighting cycles and may negate the effects of fatigue on work performance.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	
Task Progress:	New project for FY2009.
Bibliography Type:	Description: (Last Updated: 12/13/2023)