Fiscal Year:	FY 2015	**Task Last Updated:**	FY 11/20/2014
PI Name:	Cowings, Patricia S. Ph.D.		
Project Title:	Pre-flight Training of Autonomic Responses for Mitigating the Effects of Spatial Disorientation During Spaceflight		
Division Name:	Human Research		
Program/Discipline:			
Program/Discipline--Element/Subdiscipline:	HUMAN RESEARCH--Biomedical countermeasures		
Joint Agency Name:		**TechPort:**	Yes
Human Research Program Elements:	(1) **HHC**:Human Health Countermeasures		
Human Research Program Risks:	(1) **Sensorimotor**:Risk of Altered Sensorimotor/Vestibular Function Impacting Critical Mission Tasks		
Space Biology Element:	None		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	None		
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Zip Code:	94035	**Congressional District:**	18
Comments:			
Project Type:	GROUND	**Solicitation / Funding Source:**	2013 HERO NNJ13ZSA002N-Crew Health OMNIBUS
Start Date:	10/01/2014	**End Date:**	02/28/2016
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 ARC
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Flight Program:			
Flight Assignment:	NOTE: End date change to 2/28/2016 from original end date of 9/30/2015, per A. Chu/ARC (Ed., 9/30/15)		
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Toscano, William Ph.D. (NASA Ames Research Center)		
Grant/Contract No.:	Internal Project		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	Space motion sickness is characterized by symptoms of spatial disorientation, nausea, and vomiting. It affects approximately 70% of the crew during space travel and symptoms are commonly treated with intramuscular injections of promethazine. However, this countermeasure has had limited effectiveness and produces unwanted side-effects that include drowsiness and impaired performance. This study addresses Program Requirements Document (PRD) Risks: Risk of Therapeutic Failure due to Ineffectiveness of Medication; Risk of Impaired Control of Spacecraft, Associated Systems and Immediate Vehicle Egress due to Vestibular/Sensorimotor Alterations Associated with Spaceflight. Integrated Research Plan (IRP) Gap SM11: Can crewmember spatiomotor abilities be more accurately predicted and countermeasures and training techniques developed to mitigate spatial disorientation during spaceflight? The purpose of the proposed research is to evaluate an alternative countermeasure for mitigating symptoms without the side effects commonly observed with anti-motion sickness medications. Autogenic-Feedback Training Exercise (AFTE) is a 6-hour physiological training program that has proven to be a highly efficient and effective method for enabling people to monitor and voluntarily control up to 20 of their own physiological responses, thereby suppressing motion sickness symptoms. In an earlier flight study, three astronauts were given AFTE during preflight training and three other astronauts participated as controls and were given a pharmacologic treatment. Shuttle crews were required to record data during launch, waking hours on mission days 1 to 3, and during reentry. They were required to practice AFTE for 15-minute inflight and apply control if symptoms occurred. Our findings indicate that 2 of the 3 astronauts receiving AFTE were successful at controlling symptoms in flight, while 2 of 3 controls were severely debilitated despite given anti-motion sickness medications. The Physiological Adaptation Training (PAT) facility at Johnson Space Center (JSC) is currently used to pre-adapt astronauts to unusual sensory stimulation similar to that experienced in space. This study will examine the physiological responses to these stimuli and establish a capability providing AFTE to users within the PAT facility. Specific Objectives: 1) To determine individual baselines of physiological responses and tolerances to spatial disorientation in PAT; and 2) To evaluate AFTE effects for mitigating symptoms and improving tolerances to spatial disorientation. Methods: Establish capability for providing remote AFTE training at JSC and develop a protocol for testing participants in PAT. The study will include two groups of men and women, 12 subjects per group: (1) Treatment - AFTE + PAT and (2) Control - PAT only. Each group will receive 2 exposures to PAT at four week intervals. Subjects in the treatment group will receive 6-hours AFTE training in control of symptoms before exposure 2. Deliverable: Peer-reviewed journal article(s). We anticipate results of this study will demonstrate that AFTE provides crews with significantly better protection from the effects of spatial disorientation than adaptation training alone and without the side-effects of medication, thereby improving health, safety, and operational efficiency.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	
Task Progress:	New project for FY2015.
Bibliography Type:	Description: (Last Updated: 11/08/2023)