Fiscal Year:	FY 2014	**Task Last Updated:**	FY 08/27/2013
PI Name:	Holden, Kritina Ph.D.		
Project Title:	Effects of Long-duration Microgravity on Fine Motor Control Skills		
Division Name:	Human Research		
Program/Discipline:	HUMAN RESEARCH		
Program/Discipline--Element/Subdiscipline:			
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 (2) **HSIA**:Risk of Adverse Outcomes Due to Inadequate Human Systems Integration Architecture (3) **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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PI Organization Type:	NASA CENTER	**Phone:**	281-483-8829
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PI Web Page:			
City:	Houston	**State:**	TX
Zip Code:	77058-3607	**Congressional District:**	22
Comments:			
Project Type:	FLIGHT	**Solicitation / Funding Source:**	Directed Research
Start Date:	10/01/2013	**End Date:**	12/30/2016
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 JSC
Contact Monitor:	Whitmore, Mihriban	**Contact Phone:**	281-244-1004
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Flight Program:	ISS		
Flight Assignment:	ISS NOTE: Change in title to "Effects of Long-duration Microgravity on Fine Motor Control Skills" from "Effects of Long-duration Microgravity on Fine Motor Skills: 1-year ISS Investigation" per E. Connell/SHFH HRP (Ed., 8/19/15) NOTE: Risk/Gaps per E. Connell/HRP (Ed., 3/20/14) NOTE: Start date changed to 10/1/13 (from 6/25/13) per M. Whitmore/JSC (Ed., 2/24/14)		
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Thompson, Shelby (NASA JSC/Lockheed Martin) Sandor, Aniko (NASA JSC/Lockheed Martin)		
Grant/Contract No.:	Directed Research		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	This proposal focuses on the research opportunity afforded by the 2015 year-long mission of two crewmembers on ISS. Fine motor skills will be critical during long-duration space missions, particularly those skills needed to interact with new technologies required for autonomous operations in next-generation space vehicles, spacesuits, and habitats. Few, arguably no studies have been completed to investigate this type of functional fine motor performance in microgravity. There has also not been a complete, systematic study of fine motor performance to include different phases of microgravity adaptation, long-term microgravity, and the sensorimotor recovery period after transition to Earth gravity (post landing). In addition, the studies conducted to date have not been conclusive regarding the effects of microgravity on fine motor control. An ideal research plan to address this challenge would include an operational or highly representative environment available for testing long-duration performance in microgravity (greater than 6 months), and 20-30 subjects who can provide data pre-environment (baseline), during various phases of the test environment, and post-environment. The upcoming 1-yr ISS mission will provide the desired environment, but will offer only 2 in-flight subjects. It is unknown at this time whether there will be additional 1-yr flight opportunities in the future. While the statistical challenges of using only 2 subjects cannot be ignored, there are experimental designs tailored for these situations. In addition, the opportunity to systematically collect fine motor performance data throughout a long-duration mission is of great value. It will add to our knowledgebase and provide a vastly improved capability to judge the risk of performance decrements due to long-duration microgravity. The proposed investigation will also supplement two other sensorimotor 1-yr investigations by providing an additional measure of functional performance post-flight, and a new sensorimotor functional test in-flight. These data will contribute to closure of several research gaps and may drive in-flight mitigations and/or design decisions for future vehicles/habitats. Specific Aims: Aim 1: Determine the effects of long-duration microgravity on fine motor performance. • How does fine motor performance in microgravity trend/vary over the duration of a year-long space mission? • How does fine motor performance on orbit compare with that of a closely matched subject on Earth? Aim 2: Determine the effects of different gravitational transitions on fine motor performance. • How does performance trend/vary before and after gravitational transitions, including the periods of early flight adaptation, and very early/near immediate post-flight periods?
Rationale for HRP Directed Research:	This research is directed due to a time constraint. This proposal focuses on the research opportunity afforded by the 2015 year-long mission of two crewmembers aboard the International Space Station (ISS).
Research Impact/Earth Benefits:	
Task Progress:	New project for FY2014. (Ed. note 2/24/14--start date changed from 6/25/2013 to 10/1/2013 so that task now started in FY2014 instead of FY2013.)
Bibliography Type:	Description: (Last Updated: 10/29/2023)