

<b>Fiscal Year:</b>	FY 2016	<b>Task Last Updated:</b>	FY 07/05/2016
<b>PI Name:</b>	Barshi, Immanuel Ph.D.		
<b>Project Title:</b>	Effects of Long-Duration Spaceflight on Training Retention		
<b>Division Name:</b>	Human Research		
<b>Program/Discipline:</b>	HUMAN RESEARCH		
<b>Program/Discipline--Element/Subdiscipline:</b>	HUMAN RESEARCH--Space Human Factors Engineering		
<b>Joint Agency Name:</b>	<b>TechPort:</b>	No	
<b>Human Research Program Elements:</b>	(1) <b>HFBP</b> :Human Factors & Behavioral Performance (IRP Rev H)		
<b>Human Research Program Risks:</b>	(1) <b>BMed</b> :Risk of Adverse Cognitive or Behavioral Conditions and Psychiatric Disorders (2) <b>HSIA</b> :Risk of Adverse Outcomes Due to Inadequate Human Systems Integration Architecture (3) <b>Team</b> :Risk of Performance and Behavioral Health Decrements Due to Inadequate Cooperation, Coordination, Communication, and Psychosocial Adaptation within a Team		
<b>Space Biology Element:</b>	None		
<b>Space Biology Cross-Element Discipline:</b>	None		
<b>Space Biology Special Category:</b>	None		
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<b>Zip Code:</b>	94035-1000	<b>Congressional District:</b>	18
<b>Comments:</b>			
<b>Project Type:</b>	FLIGHT,GROUND	<b>Solicitation / Funding Source:</b>	Directed Research
<b>Start Date:</b>	10/01/2013	<b>End Date:</b>	09/30/2019
<b>No. of Post Docs:</b>	3	<b>No. of PhD Degrees:</b>	
<b>No. of PhD Candidates:</b>	1	<b>No. of Master' Degrees:</b>	
<b>No. of Master's Candidates:</b>	0	<b>No. of Bachelor's Degrees:</b>	
<b>No. of Bachelor's Candidates:</b>	0	<b>Monitoring Center:</b>	NASA JSC
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<b>Flight Program:</b>	ISS		
<b>Flight Assignment:</b>	ISS NOTE: End date changed to 9/30/2019 per E. Connell/JSC HRP (previously 12/30/2016); title also changed to "Effects of Long-Duration Spaceflight on Training Retention" (previously "Effects of Long-Duration Spaceflight on Training Retention: 1 Yr ISS Investigation")--[Ed., 10/4/17 and 5/7/18, per info sent July 2017] NOTE: Risk/Gaps per E. Connell/HRP (Ed., 3/20/14) NOTE: Start date changed to 10/1/13 (from 5/22/13) per M. Whitmore/JSC (Ed., 2/24/14)		
<b>Key Personnel Changes/Previous PI:</b>			
<b>COI Name (Institution):</b>	Byrne, Vicky ( Lockheed Martin-NASA Johnson Space Center ) Holden, Kritina ( Lockheed Martin-NASA Johnson Space Center ) Vessey, Brandon ( Wyle/NASA Johnson Space Center ) Hurst, Victor ( Wyle/NASA Johnson Space Center ) Dempsey, Donna ( NASA/JSC/SF311 )		

<b>Grant/Contract No.:</b>	Directed Research
<b>Performance Goal No.:</b>	
<b>Performance Goal Text:</b>	
<b>Task Description:</b>	<p>This proposal focuses on the research opportunity afforded by the 2015 year-long mission of two crewmembers aboard the International Space Station (ISS). Given that only two crewmembers will be spending the full year in space, the research proposed here is more of a case study than a typical research project. However, using repeated measures within-subject design, important insights can be gained concerning the retention and transferability or generalizability of material learned, as well as the effectiveness of Earth-based pre-launch training. In addition, information obtained in this research could help in the design of proper intervals for onboard refresher training, and suggest domains best served by Just-In-Time training (JITT).</p> <p>This proposal will be led by the Space Human Factors Engineering (SHFE) Element within the Human Research Program (HRP). The outcomes from this study will address gaps within the SHFE Element, as well as within the Behavioral Health and Performance (BHP) and Exploration Medical Capability (ExMC) Elements, and will be a cooperative effort with those Elements. Products and tools developed by these Elements in their work under HRP will be leveraged to benefit the proposed research.</p> <p>The specific aims are as follows:</p> <p>Aim A. Test the retention and transfer of specific technical content learned pre-launch to assess the need for and possible schedule of onboard refresher and JIT training.</p> <p>Aim B. Compare the process of knowledge/skill decay on orbit with that of a closely-matched subject on Earth.</p> <p>Aim C. Collect naturalistic data from onboard crew and ground control personnel on training-related crew performance including: performance errors, requests for ground support, need to review material previously learned, and training success stories.</p>
<b>Rationale for HRP Directed Research:</b>	<p>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).</p>
<b>Research Impact/Earth Benefits:</b>	<p>To date, we have not been able to collect data in flight to document the effectiveness of preflight crew training. Crewmembers have been largely successful in their performance, but that success could have primarily been the result of excellent innate capabilities, extreme motivation, and “as needed” support from mission control. Many studies have documented the processes of skill decay and the forgetting of acquired knowledge. However, all these studies have been conducted on Earth.</p> <p>It is an understatement to say that space is a very different environment than the one people are accustomed to on Earth. Yet, almost all current crew training is done on Earth. Zero-G is only one aspect of the difference that cannot be properly simulated in Earth-based training, but it is a feature of space operations that may have significant impact on the effectiveness of Earth-based training and on the ability of crewmembers to retain their knowledge and to acquire new skills in space.</p> <p>In addition to zero-G, the phenomenon of space adaptation, the stresses of confinement, noise, reduced-quality sleep, and the ever-present threat to basic survival are all factors that affect people’s behavior and cognitive capabilities. Little to no data are available on how people learn in space or how retention and retrieval of Earth-based training are affected by being in space over a long period of time.</p>
<b>Task Progress:</b>	<p>Training the US crew member for the ISS 1YM was completed on schedule. Training of USOS (US Orbital Segment) crew members for Standard Duration Missions was started. Several USOS crew members signed the Informed Consent Form to participate in the study. However, following cuts in crew time imposed on the Program after the launch of the 1YM, the study was suspended and no on-orbit data were collected. Furthermore, training of crew members for following increments was also suspended.</p>
<b>Bibliography Type:</b>	Description: (Last Updated: 01/11/2021)