

Fiscal Year:	FY 2016	Task Last Updated:	FY 10/06/2015
PI Name:	Oman, Charles M. Ph.D.		
Project Title:	Design and Evaluation of Automated Electronic Checklists for Robotics Operations		
Division Name:	Human Research		
Program/Discipline:			
Program/Discipline--Element/Subdiscipline:	HUMAN RESEARCH--Space Human Factors Engineering		
Joint Agency Name:	TechPort:	No	
Human Research Program Elements:	(1) HFBP :Human Factors & Behavioral Performance (IRP Rev H)		
Human Research Program Risks:	(1) HSIA :Risk of Adverse Outcomes Due to Inadequate Human Systems Integration Architecture		
Space Biology Element:	None		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	None		
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Zip Code:	02139-4301	Congressional District:	7
Comments:			
Project Type:	GROUND	Solicitation / Funding Source:	2014-15 HERO NNJ14ZSA001N-Crew Health (FLAGSHIP & NSBRI)
Start Date:	10/01/2015	End Date:	09/30/2017
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		
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Flight Program:			
Flight Assignment:			
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Liu, Andrew Ph.D. (Massachusetts Institute of Technology)		
Grant/Contract No.:	NNX15AW35G		
Performance Goal No.:			
Performance Goal Text:	<p>The primary objective of this project is to provide empirical evidence supporting design guidelines for automated electronic checklists for robotics operations. We use International Space Station (ISS) robotic arm operations as our proxy for general arm or rover operations but we will develop scenarios that test a crew's ability to operate more autonomously than in ISS operations.</p> <p>The proposed project will have the following two specific aims:</p> <ol style="list-style-type: none"> 1. Develop a prototype display for supporting robotics operations that integrates the electronic procedures with the displays for performing robotics tasks. The design process will begin with a hierarchical task analysis approach to drive out functional and information requirements for the display. Lessons learned from the development of aviation electronic checklists will also be considered in the design. We will also augmented our prototype design with the 		

Task Description:	<p>capability for automated execution of the procedural steps. This prototype will be built on the MIT (Massachusetts Institute of Technology) ISS robotics simulation that has previously been used in several National Space Biomedical Research Institute (NSBRI) projects.</p> <p>2. Complete human-in-the-loop studies that investigate the following questions concerning design choices for the integrated display:</p> <p>a. Does the prototype electronic checklist enable the same or better situation awareness during task execution while minimizing mental workload when compared to current practice?</p> <p>b. What is an appropriate allocation for procedural step execution between human operator and automation for both nominal operations and off-nominal time-critical operations? How does the reliability of the automation affect the ideal allocation of steps?</p> <p>c. Does the use of automated procedural step execution increase or decrease the information requirements when executing multiple procedures?</p> <p>The project results will provide a design method, implementation guidelines, and supporting empirical evidence for designing electronic checklists for other tasks.</p>
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	
Task Progress:	New project for FY2016.
Bibliography Type:	Description: (Last Updated: 01/02/2024)