

Fiscal Year:	FY 2019	Task Last Updated:	FY 04/22/2019
PI Name:	Stirling, Leia Ph.D.		
Project Title:	HCAAM VNSCOR: Responsive Multimodal Human-Automation Communication for Augmenting Human Situation Awareness in Nominal and Off-Nominal Scenarios		
Division Name:	Human Research		
Program/Discipline:			
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) 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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Comments:	NOTE: PI moved to University of Michigan in fall 2019; previous affiliation was Massachusetts Institute of Technology		
Project Type:	GROUND	Solicitation / Funding Source:	2017-2018 HERO 80JSC017N0001-BPBA Topics in Biological, Physiological, and Behavioral Adaptations to Spaceflight. Appendix C
Start Date:	04/01/2019	End Date:	12/31/2019
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:	Williams, Thomas	Contact Phone:	281-483-8773
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Flight Program:			
Flight Assignment:			
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Kim, So Young Ph.D. (NASA Jet Propulsion Laboratory) Luo, Victor M.S. (NASA Jet Propulsion Laboratory) Miller, David Ph.D. (Massachusetts Institute of Technology)		
Grant/Contract No.:	80NSSC19K0703		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	<p>This task is part of the Human Capabilities Assessments for Autonomous Missions (HCAAM) Virtual NASA Specialized Center of Research (VNSCOR).</p> <p>The objective of this research is to provide recommendations for augmenting human situation awareness (SA) and task performance through multimodal displays and communication pathways based on empirical evidence. Specifically, we will evaluate the effectiveness of several multimodal Virtual Reality (VR) techniques in providing spatial and temporal SA to a human operator controlling multiple semi-autonomous agents. Our testbed will simulate a Long-Duration Exploration Mission (LDEM) inspection task using the ground-based Massachusetts Institute of Technology (MIT) Synchronized Position Hold, Engage, Reorient, Experimental Satellites (SPHERES) platform enhanced with NASA Jet Propulsion Laboratory (NASA-JPL) automatic scene reconstruction capability. A human study will be conducted with the human supervisor providing commands to the SPHERES using images rendered in a virtual environment. The results of this project will provide empirical evidence for revising portions of NASA-STD-3001 and the NASA Human Integration Design Handbook (HIDH) that guide interface design for effective SA and task performance. There is a need to expand current guidance on responsive displays, especially when integrated with VR technologies, to enable SA for relevant operational tasks.</p> <p>The proposed project will integrate current NASA-JPL technology within a small robotic satellite testbed to examine the bi-directional communication between the human-robot team to enable improved SA. We propose the following specific aims: (1) Integrate and extend existing capabilities at JPL and MIT into a testbed for examining information communication between human-autonomy teams and (2) Evaluate SA, trust, and task performance within a ground-based study with selected communication modalities and information displays.</p>
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	
Task Progress:	New project for FY2019.
Bibliography Type:	Description: (Last Updated: 11/09/2023)