Fiscal Year:	FY 2007	**Task Last Updated:**	FY 11/29/2007
PI Name:	Oman, Charles M. Ph.D.		
Project Title:	Advanced Displays for Efficient Training and Operation of Robotic Systems		
Division Name:	Human Research		
Program/Discipline:	NSBRI Teams		
Program/Discipline--Element/Subdiscipline:	NSBRI Teams--Sensorimotor Adaptation Team		
Joint Agency Name:		**TechPort:**	No
Human Research Program Elements:	(1) **SHFH**:Space Human Factors & Habitability (archival in 2017)		
Human Research Program Risks:	(1) **HSIA**:Risk of Adverse Outcomes Due to Inadequate Human Systems Integration Architecture (2) **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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Organization Name:	Massachusetts Institute of Technology		
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City:	Cambridge	**State:**	MA
Zip Code:	02139-4301	**Congressional District:**	7
Comments:			
Project Type:	GROUND	**Solicitation / Funding Source:**	2007 NSBRI-RFA-07-01 Human Health in Space
Start Date:	09/01/2007	**End Date:**	08/31/2011
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:**	NSBRI
Contact Monitor:		**Contact Phone:**	
Contact Email:			
Flight Program:			
Flight Assignment:			
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Liu, Andrew (Massachusetts Institute of Technology) Natapoff , Alan (Massachusetts Institute of Technology) Young, Laurence (Massachusetts Institute of Technology)		
Grant/Contract No.:	NCC 9-58-SA01301		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	The long term objectives of this project are: 1. To develop tests of astronaut spatiomotor abilities that predict the need for remedial training or performance in final telerobotic qualification tests; and 2. To improve teleoperation training techniques and develop new teleoperator interfaces that improve the efficiency of teleoperation training and flight operations. Specific aims are: 1. To improve NASA teleoperation training efficiency by scientifically customizing remedial training based on the measured spatial abilities of individual astronauts. We propose an experiment to determine whether NASA Johnson Space Centers (JSC) current Robotic Aptitude Assessment test predicts the need for remedial work in Generic Robotic Training and Shuttle PDRS manipulator training or whether, as we expect, additional psychometric testing will sharpen performance predictions. 2. To perform a series of experiments using the Massachusetts Institute of Technology (MIT) Remote Manipulation System Simulator to quantify how a trainees individual spatial and manual control abilities, use of camera views and choice of hand controller reference frame impacts learning and final level of performance as primary operator. Secondary operator performance in a clearance detection and estimation task is assessed using a signal detection/situation awareness probe paradigm. 3. To develop and evaluate two interactive interfaces for future in-space and lunar surface operations: * An improved, user-controllable work area spatial situation display; and * A new head-gesture controlled method for switching between camera views, thereby reducing or eliminating the requirement for multiple monitors in telerobotic workstations. The short psychometric spatial ability test subjects we employ are sensitive to cognitive impairments and are candidates for Flight Medicine fitness-for-duty tests for astronaut telerobotic system operators. Our approach builds on evidence from our prior research that specific spatial abilities are correlated with teleoperation performance metrics.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	
Task Progress:	New project for FY2007.
Bibliography Type:	Description: (Last Updated: 01/02/2024)