Task Book Report Generated on: 04/23/2024

Pisser:         Oman, Charles M. Ph.D.           Project Title:         Advanced Displays for Efficient Training and Operation of Robotic Systems—Incomplication of Program Discipline.         Image: Program Discipline of Program Discipline.         SDRRI Trains—Sensoriantor Adaptation Train.         Image: Program Discipline of Program Discipline of Program Discipline.         No.         No.         Image: Program Discipline of Program Disciplin	Fiscal Year:	FY 2007	Task Last Updated:	FY 11/29/2007
Division Name:   SURRI Teams	PI Name:	Oman, Charles M. Ph.D.		
Program/Discipline:         NSBRI Team           Program/Discipline-Element/Subdiscipline:         NSBRI Team-Sensorimotor Adaptation Team           Joint Agency Name:         Tech Port:         No           Juman Research Program Elements:         (1) SHFH: Space Haman Factors & Habitability (archival in 2017).         Immail (2) Sensorimotor Risk of Adverse Outcomes Due to Inadequate Human Systems Integration Architecture (2) Sensorimotor Risk of Altered Sensorimotor Vesibular Function Impacting Critical Mission Tasks           Space Biology Cross-Element         None         Fax: PY 617-258-8111           Space Biology Special Category:         None         Fax: PY 617-258-8111           P1 Email:         commanzionit celu         Fax: PY 617-258-8111           P1 Granization Type:         UNIVERSITY         Phone:         617-253-7508           P1 Address 1:         Depurtment of Aeronautics and Astronautics         Program 254 (197-258-8111)         Phone:         617-253-7508           P1 Address 2:         7 Massachusetts Avenue 37-219         Plant         Maximal Marchitecture (197-201)         Program Program Program Risks         Maximal Marchitecture (197-201)           City:         Combridge         State:         MA         MA           P1 Organization Type:         GROUND         Solicitation / Funding Source:         Space:         Space:         Space:           Surf Deta	Project Title:	Advanced Displays for Efficient Training and Operation of Robotic Systems		
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Discipline: None Space Biology Special Category: None PI Email: comandmit.edu Fax: FY 617-258-8111 PI Organization Type: UNIVERSITY Phone: 617-253-7508 Organization Name: Massachusetts Institute of Technology PI Address 1: Department of Aeronautics and Astronautics PI Address 2: 77 Massachusetts Avenue 37-219 PI Web Page: City: Cambridge State: MA Zip Code: 02139-4301 Congressional District: 7 Comments: Project Type: GROUND Solicitation / Funding Source: 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 Sachelor's Candidates: No. of Master' Degrees: No. of Bachelor's Candidates: No. of Master' Degrees: No. of Bachelor's Candidates: Monitoring Center: NSBRI Contact Monitor: Contact Email: Flight Program: Flight Assignment: Key Personnel Changes/Previous PI: COI Name (Institution): Liu, Andrew (Massachusetts Institute of Technology) Voung, Laurence (Massachusetts Institute of Technology) Voung, Laurence (Massachusetts Institute of Technology) Porformance Goal No.:	Space Biology Element:	None		
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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:

**Task Description:** 

- 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)