Fiscal Year:	FY 2010	**Task Last Updated:**	FY 02/07/2011
PI Name:	Moore, Steven T. Ph.D.		
Project Title:	Assessment of Operator Proficiency Following Long-Duration Spaceflight		
Division Name:	Human Research		
Program/Discipline:	HUMAN RESEARCH		
Program/Discipline--Element/Subdiscipline:	HUMAN RESEARCH--Biomedical countermeasures		
Joint Agency Name:		**TechPort:**	No
Human Research Program Elements:	(1) **HHC**:Human Health Countermeasures		
Human Research Program Risks:	(1) **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		
PI Email:	s.moore@cqu.edu.au	**Fax:**	FY
PI Organization Type:	UNIVERSITY	**Phone:**	212-241-1943
Organization Name:	Mount Sinai School of Medicine		
PI Address 1:	Human Aerospace Laboratory		
PI Address 2:	Department of Neurology		
PI Web Page:			
City:	New York	**State:**	NY
Zip Code:	10029	**Congressional District:**	14
Comments:	NOTE: PI moved to Central Queensland University, Australia, July 2016.		
Project Type:	FLIGHT	**Solicitation / Funding Source:**	2008 Crew Health NNJ08ZSA002N
Start Date:	06/02/2009	**End Date:**	06/01/2012
No. of Post Docs:	2	**No. of PhD Degrees:**	
No. of PhD Candidates:	1	**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:	Norsk, Peter	**Contact Phone:**	
Contact Email:	Peter.norsk@nasa.gov		
Flight Program:	Pre/Post Flight		
Flight Assignment:			
Key Personnel Changes/Previous PI:	Co-Principal Investigator is Hamish MacDougall/University of Sydney (Australia).		
COI Name (Institution):	MacDougall, Hamish (University of Sydney (Australia))		
Grant/Contract No.:	NNX09AL14G		
Performance Goal No.:			
Performance Goal Text:			
Task Description:	Long-term exposure to microgravity has the potential to negatively impact the ability of crewmembers to navigate and land the crew exploration vehicle and perform post-landing surface operations on Mars. Based on our NASA-funded research on head-eye coordination during simulated shuttle landings and automobile control, we will implement a battery of tests, to be performed seated pre- and post-flight on ISS crewmembers, that target physiological mechanisms potentially underlying post-flight deficiencies in manual control. We will develop a portable testing device utilizing a chair mounted on a 6 degree-of-freedom motion base, suitable for implementation at Russian or US post-landing data collection sites. Sensorimotor tests target the vestibulo-ocular reflex, vestibulo-collic reflex, pursuit, dynamic visual acuity, motion perception and manual dexterity. In addition, we will adapt a subset of the computer-based cognitive Test of Basic Aviation Skills, used in pilot selection by the US Air Force, that have demonstrated a significant correlation with subject performance during actual flight training. The results from these test batteries will be correlated with astronaut performance on two operationally-relevant simulator tasks: control of an automobile and teleoperation of a		

	robotic arm. Our primary aim is to define the effects of long-duration spaceflight on operator proficiency, and identify microgravity-related sensorimotor or cognitive deficits (or combinations thereof) associated with degradation of operator effectiveness. Successful completion of this study will not only fill the IRP gap SM6, but provide a basis for countermeasure development that could be incorporated into pre- and in-flight training.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	The techniques developed as part of this grant have potential application to assessment and rehabilitation of patients with a variety of neurological conditions, such as stroke.
Task Progress:	Progress 9/30/2009 - 4/7/2010 This project requires the development of three full motion simulators to perform both sensorimotor tests and operator proficiency assessments during simulated landings in a T-38 jet, driving a car, operating a lunar/mars rover, and teleoperation of a robotic arm. The systems are to be based at the Human Aerospace Laboratory at Mount Sinai School of Medicine in New York, Johnson Space Center in Houston, and the University of Sydney. The New York and Sydney systems are being used to develop and test experimental hardware and software. The Houston system is for pre- and post-flight testing. In the first 6 months of funding (from September 30 2009) three motion bases (CKAS V7 6D0F Stewart platform) have been procured and installed in New York, Houston, and in Dr. Hamish MacDougall's laboratory at the University of Sydney. Development of the simulator cabin (including subject seating and visual displays) is currently being conducted in Sydney. The display system has been completed and installed in all 3 simulators, based on three short-throw digital laser projectors (Benq MP515ST). The flight system (at JSC) has successfully completed the Test Readiness Review and is now 'man-rated' by NASA safety. Final installation of the control pod, with steering wheel, pedals and joystick, will take place in April 2011 at JSC.
Bibliography Type:	Description: (Last Updated: 09/07/2020)