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| **Fiscal Year:** | FY 2010 | **Task Last Updated:** | FY 07/24/2009 |
| **PI Name:** | Wood, Scott J. Ph.D. | | |
| **Project Title:** | Effect of Sensorimotor Adaptation Following Long-Duration Spaceflight on Perception and Control of Vehicular Motion | | |
| **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:** | scott.j.wood@nasa.gov | **Fax:** | FY |
| **PI Organization Type:** | NASA CENTER | **Phone:** | (281) 483-6329 |
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| **City:** | Houston | **State:** | TX |
| **Zip Code:** | 77058 | **Congressional District:** | 36 |
| **Comments:** | NOTE: PI returned to NASA JSC in January 2017. PI was at Azusa Pacific University from August 2013 – January 2017; prior to August 2013, PI was at NASA JSC. | | |
| **Project Type:** | GROUND | **Solicitation / Funding Source:** | 2008 Crew Health NNJ08ZSA002N |
| **Start Date:** | 10/01/2009 | **End Date:** | 09/30/2012 |
| **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):** | Harm, Deborah ( NASA Johnson Space Center )<br>Clement, Gilles ( USTI )<br>Oman, Charles ( Massachusetts Institute of Technology )<br>Reschke, Millard ( NASA Johnson Space Center )<br>Young, Laurence ( Massachusetts Institute of Technology )<br>Merfeld, Daniel ( Massachusetts Eye and Ear Infirmary )<br>Burbank, Daniel ( NASA Johnson Space Center )<br>Robinson, Stephen ( NASA Johnson Space Center ) | | |
| **Grant/Contract No.:** | Internal Project | | |
| **Performance Goal No.:** | | | |
| **Performance Goal Text:** | | | |

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| **Task Description:** | This investigation addresses the question of how sensorimotor adaptation following long duration spaceflight contributes to impaired ability to navigate and land the crew exploration vehicle or operate other equipment on the surface of Mars following the 6 months of microgravity travel time. We hypothesize that adaptive changes in how inertial cues from the vestibular system are integrated with other sensory information leads to perceptual disturbances and impaired manual control during transition to a new gravity environment. The first aim is to quantify control performance using functionally relevant tasks on a multi-axis motion simulator. The second aim is to examine the relationship between motion perception measures and manual control performance. We predict that greater perceptual errors will correspond with greater decrements in manual performance. The third aim is to develop mathematical models that can assess the operational implications for spatial disorientation and impaired sensorimotor control on landing tasks during future exploration class missions. The fourth aim is to quantify the time course of recovery of manual control performance through the initial week following long-duration flights. The information gained on recovery time constants will help determine if sensorimotor countermeasures for early Mars operations will be needed, and will have implications for return to duty decisions (e.g., driving) following return to Earth. Results from this study will be used to recommend what landing aids (e.g., enhanced visual displays) will be most effective as a countermeasure for impaired manual performance. |
| **Rationale for HRP Directed Research:** | |
| **Research Impact/Earth Benefits:** | |
| **Task Progress:** | New project for FY2010. |
| **Bibliography Type:** | Description: (Last Updated: 03/08/2024) |