1.3 PREDICTING ADAPTATION TO ALTERED GRAVITY

Summary
This proposal is in response to a NASA and NSBRI Research Announcement and aims to develop a pre-flight sensorimotor adaptability assessment program that will identify those individuals who are likely to experience difficulty with gravitational transitions and sensorimotor adaptation and validate interventions or countermeasures. ETC will be involved in year 2 of the 3 year effort as a testing facility to support manual control tasking and subjective orientation testing in hyper-G.

Objectives

- To determine if individual differences exist in the ability to adapt to changing environmental parameters, including gravity
- To determine if such adaptability can be estimated quantitatively by measurements of subjective orientation and performance during closed loop manual control tasks
- To determine if the adaptability measured in transitions from 1-G to hyper-gravity (1.5-3-G) will *predict* adaptability in transition form 1-G to hypo-gravity (0-G, 1/6-G, or 3/8-G)

Customer/Partner
The testing of the proposed assessment tool will incorporate a collaborative effort of four different groups, MIT, The Massachusetts Ear and Eye Infirmary's Jenks Vestibular Research Laboratory, the Zero-G Corporation and ETC.

Status
Proposal submitted to National Space Biomedical Research Institute (NSBRI) in December 2011. Results of grant solicitation expected in Spring 2012 for research beginning in Fall 2012.

Future Publications
Annals New York Academy of Sciences
Journal of Vestibular Research
Aviation Space and Environmental Medicine

1.4 TRANSFERENCE OF VIRTUAL REALITY BASED SENSORIMOTOR ADAPTATION TO REAL WORLD MOTION ENVIRONMENTS

Summary
The goal of the project is to develop methods for adapting individuals in one environment (on Earth) that will lead to training benefits that will carry over to other environments (e.g. space). Furthermore, our goal is to develop an adaptation training protocol that is robust in that benefits can be applied to a wide range of conditions, including zero gravity, fractional gravity, and hyper-gravity. To accomplish this we propose to use VR and sustained G centrifuge motion platforms to determine if training in VR can lead to resistance to adverse effects in real motion environments

Objectives

- Investigate adaptation training transference using VR and gravity transitions
- Determine if desensitization training is motion type specific
- Test the hypothesis that multiple degrees-of-freedom training will lead to resistance to adverse sensorimotor effects across a wide range of test conditions

Customer/Partner
St. Peter's College partnered with ETC

Status
Proposal submitted to National Space Biomedical Research Institute (NSBRI) in December 2011. Results of grant solicitation expected in Spring 2012 for research beginning in Fall 2012.

Future Publications
Aviation Space and Environmental Medicine
American Institute of Aeronautics and Astronautics (AIAA)