The goal of the Information Presentation Directed Research Project (DRP) is to address design questions related to the presentation of information to the crew. The major areas of work, or subtasks, within this DRP are: 1) Displays, 2) Controls, 3) Electronic Procedures and Fault Management, and 4) Human Performance Modeling. This DRP is a collaborative effort between researchers at Johnson Space Center and Ames Research Center.

**ABSTRACT**

The purpose of the study was to investigate the effects of label orientation. The study examined the effects of label alignment in small and large data groupings: 4, 8, and 16 label/value pairs, as well as high fidelity displays. The task was to find a value that corresponded to a target label.

**DISPLAYS – Auditory displays**

**FY08 Studies**

**Label Alignment**

Three studies investigated the effects of label alignment in small and large data groupings: 4, 8, and 16 label/value pairs, as well as high fidelity displays. The task was to find a value that corresponded to a target label.

**Studies Planned for FY09**

Follow-up on alignment studies from FY08, further investigating left-aligned versus data-aligned labels for performance differences. The experimental task will be varied, and eye tracking will be used to gather higher precision data. Investigate methods of distinguishing between labels and values, such as colors, spaces, and bolding. Investigate methods of indicating “clickable” areas on a display. Investigate tradeoffs between color-coding on text versus color-coding on an associated symbolic.

**Readability under vibration**

Follow-up on the FY08 vibration study to examine the effects of different fonts and sizes, line spacing, and color. Complete preparations and training for the Vibration Readability DSO (first flight scheduled for Feb 2009). Perform a detailed comparative analysis between data collected in a vibration only condition with data collected in +g vibration (from separately funded effort occurring in Fall 2008) to determine the added value of the centrifuge, and the data lost without the high-g environment. Investigate the feasibility of performing eye tracking under vibration.

**EVA OPERATIONS**

**Study on HMD use in lunar lighting**

Collaboration with Orion lighting expert in the lighting lab

**Gloved Dexterity and Tactility**

First study to look at glove dexterity in high pressure environment

**Demonstration of spatially localized beacons**

First study to look at glove dexterity in high pressure environment

**VIBRATION STUDIES**

**On-orbit exposure will be at levels that may exceed the 0.25 g limit imposed by earlier programs during ascent**

**Vibration performance degradation of human performance, in part to decrements in visual function**

**Present study began the process of quantifying this risk by examining how different vibration levels impact ability to make speeded yes/no responses to alphanumeric symbology while in a semi-supine position**

**5 blocks of 60 self-paced trials, 40 with vibration, 20 without**

**Each block at one vibration level: 0 g, 0.15 g, 0.30 g, 0.5 g, or 0.7 g**

**Letter processing task (8 participants)**

Orient to magenta box

Do the three letters in the middle row form a word or a non-word?

Press one button for “Yes”, another for “No”

**Results**

Errors increased with increased vibration

There were more errors for smaller compared to larger font

Vibration effects appeared at smaller vibrations levels for 10 pt font than 14 pt font

No significant differences between vibration effects on lexical decision and magnitude comparison tasks

No effects of vibration on follow-up trials

Response times showed very similar pattern to errors

**Conclusions**

For both number and letter processing, performance is significantly worse at both 0.5 g and 0.7 g for 10 pt font and at 0.7 g for 14 pt font.

Vibration levels above 0.3 g (0-to-peak) will significantly compromise the processing of alphanumeric symbology in the currently anticipated Orion display viewing conditions.