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 Information Presentation DRP has two main goals: make information processing easier and more effective, leading to more efficient crew performance. A summary of the studies performed in FY08 are provided below. FY09 studies will build on FY08 experiments, attempting to validate previous results, compare results with speech alarms, and examine the impacts of hearing these sounds in a suit.

**DISPLAYS – Visual 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.

- For large data groupings, such as the 16-label group, data-alignment is faster than left-alignment.
- In high fidelity displays, there was no difference in search times between left and data-aligned labels.

**Label Orientation**

The purpose of the study was to investigate the effects of label orientation.

<table>
<thead>
<tr>
<th>0° (horizontal)</th>
<th>90° left</th>
<th>90° right</th>
<th>marquee</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEXT</td>
<td>TEXT</td>
<td>TEXT</td>
<td>TEXT</td>
</tr>
</tbody>
</table>

**FY09 Studies**

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.

**Studies Planned for FY09**

Follow-up on the FY08 vibration study to examine the effects of different font sizes and line spacing, color.

**EVA OPERATIONS**

**Study on HMD use in lunar lighting**

Gloved Dexterity and Tactility

Demonstration of spatially localized beacons

**VIBRATION STUDIES**

- Orion-Ares exposure will be at levels that may exceed the 0.25 g limit imposed by earlier programs during ascent.
- There is a serious risk that higher vibration will cause unacceptable degradation of human performance, due to part 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 gx, .15 gx, .30 gx, .5 gx, or .7 gx.

**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.

**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.