ABSTRACT
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.

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.

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

- 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.

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 symbol/icon.

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

- Horizontal labels improve reading time compared to vertical labels.
- Additional label orientation studies are needed and being planned so that a solid design recommendation can be made.

DISPLAYS – Auditory displays
Three studies examined the suitability of candidate alarm sounds for four types of alarms: class 1 emergency (fire-smoke and depressurization), class 2 warning and class 3 caution. Crew participants were asked to rate the sounds on a 5-point suitability scale.
- Emergency (Class 4): This is the most serious type of event. It is used in a life threatening condition that requires immediate action in order to protect the crew.
- Warning (Class 2): This is less serious than emergency. It is used in a situation that requires immediate correction to avoid loss or a major impact to mission or potential loss of crew.
- Caution (Class 3): This is a situation of less time critical nature, but with a potential for further degradation if crew attention is not given.

Results indicate that the most suitable alarm sound types are based on currently-used alarms.
- Crew results differed from the non-crew slightly (different caution alarm was selected).
- Recommended alarm sounds will be modified per ISO recommendations to reduce the startling effect and accommodate sleeping crew.

Studies Planned for FY09
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.

Speech Communication Under Vibration
This is a new area of work that will begin in FY09. The question of interest is: To what extent will the intelligibility of crewmembers’ speech communication with ground control during launch be degraded as a result of vibration? If speech communication intelligibility from crew to ground is degraded sufficiently, there are important implications for developing displays for non-verbal means of communication during launch. The need is particularly severe during launch since solutions to off-nominal conditions may require descriptions of situations and acknowledgment of commands under high vibration conditions.