PURPOSE

The goal of the Information Presentation Directed Research Project (DRP) is to address design questions related to the presentation of displays and controls for exploration missions. It must be prepared to select the text formats, label styles, alarms, electronic procedure designs, and cursor control devices that provide for optimal crew performance on exploration tasks. The major areas of work, or subtasks, within the Information Presentation DRP are: 1) Controls, 2) Displays, 3) Procedures, and 4) EVA Operations.

AUTHORS


(NASA Ames Research Center)

CONTROLS – Cursor Control

The unique environmental conditions encountered by crewmembers on space missions (vibration, varied g-levels, vacuum requiring pressurized conditions) may require a more flexible design of control devices than can be used during ground-based experiments. One of the goals of the DRP is to evaluate the performance ofcrewmembers using different control devices in order to develop a user-friendly design. Two types of tasks were evaluated: 1) wrapped labels, where the label was wrapped around a cylinder, and 2) data-aligned labels, where the label was aligned with the data on the display.

DISPLAYS - Label orientation

Text orientation: Results from these studies will form display standards for the Orion Display Format Standards document, as well as other Constellation documentation (SHF, HHS).

DISPLAYS - Label alignment

Vehicle displays are often made up of multiple columns of labeled text. Design decisions on alignment of these columns of text can have considerable impact on the results of the design study. Therefore, the goal of this work is to evaluate the impact of different alignment decisions on display readability, as well as on the performance of crewmembers.

PROCEDURES

An Electronic Procedure Viewer (EPV) is one of the most operationally critical interfaces for next-generation crewed space vehicles, particularly for matrix fault isolation and recovery operations. We recently completed a human-in-the-loop evaluation of two fault management concepts, one (BESI) where the EPV is functionally integrated with an Advanced Caution and Warning (ACW) System, and another less advanced concept (ELSI) with its functional connections between the EPV and the ACW System.

DISPLAYS - Auditory alarms

The goal of this study was to investigate the effects of alerts based on the International Civil Aviation Organization (ICAO) classes using suitability ratings.

EVA OPERATIONS

Working in extravehicular activity (EVA) poses great challenges in terms of displays, controls, and suit informatics, especially in the harsh lunar environment. This is a new scenario for FY19. Work will be completed in the areas of:

- suit display design
- multi-handed and fine-motor control during gloved operations
- near-eye and auditory displays