INFORMATION PRESENTATION
Human Research Program - Space Human Factors and Habitability
Space Human Factors Engineering Project

AUTHORS
K.L. Holden1 (PI), A. Sándor1, S.G. Thompson1, R.S. McCann2, M.K. Kaiser2, D.R. Begault2, B.D. Adelstein2, B.R. Beutter2, L.S. Stone2

DISPLAYS - Cursor Control Devices
The unique environmental conditions encountered by crewmembers on space missions (vibration, varied g-levels, vacuum requiring pressurized suits) translate into special design requirements for crew interaction with information presented on computer displays. Cursor control devices (CCDs) must be specially designed to function under the variable, harsh conditions of space.

Next Steps
Additional studies need to be done to further evaluate vertical text style, incorporating more complex display, additional practice, and time pressure.

Impact
Results from these studies will form display standards for the Orion Display Format Standards document, as well as other Constellation documentation (HSIR, HIDH).

PROCEDURES

- An Electronic Procedure Viewer (EPV) is one of the most operationally critical interfaces for two-generation crewed space vehicles, particularly for maximizing test 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 (CAW) System, and another less advanced concept (ELSI) with its functional connections to the EPV power and the CAW system.

- ELSIE Fault management Display: At the outset of procedure navigation.
- Participants made fault diagnoses by integrating information from CAW fault messages (over-left section of display) color-coded information (caution, warning, or alert) and list of faults found in EPV.
- Fault management display shows the point where participants fault management display shows the point where participants have diagnosed malfunction and are starting to work procedures.

- Blue ("Current Focus") line is one of many cues to help operator navigate through the steps in the procedure checklist.

- BESI Fault Management Display at the outset of Procedure Navigation.
- Advanced Caution and Warning System interfaces include "Root Cause List" where automated malfunction diagnosis is provided.
- Major bar highlights system component associated with automated diagnosis.
- Fault management display shows the point where participants have diagnosed malfunction and are starting to work procedures.
- Number of steps reduced by 60% due to automated checks for sensor failures.

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