SSP 50005
Revision C

9.6 HUMAN COMPUTER INTERFACE REQUIREMENTS

The Human Computer Interface requirements related to on orbit operations will conform to SSP 50313.

9.6.1 USABILITY PRINCIPLES

9.6.1.1 CONSISTENCY

The look and style of the user interaction shall be consistent within and across all displays.

9.6.1.2 ERROR TOLERANCE

A. User actions which could result in unintended negative consequences (e.g., loss of data) shall be safeguarded (e.g., confirmation dialog boxes).

B. Error messages shall provide the information required to begin the corrective action process.

9.6.1.3 HELP

A. Help shall be accessible to the user at all times (e.g., on screen, electronic procedure viewer, on board documentation). On screen is the preferred method of providing help.

B. Noncontext specific help shall include the capability to perform a keyword search.

9.6.1.4 FEEDBACK

A. Visual feedback shall accompany every user action.

B. The capability to disable auditory feedback shall be provided.

C. Auditory feedback shall be redundant with visual feedback.

D. Auditory feedback on noncaution and warning interfaces shall be differentiated from the alarms and tones reserved for the caution and warning system.

E. When a process is initiated, feedback shall be provided (e.g., an “hourglass” cursor is appropriate to indicate work in progress).

F. When a process has completed, feedback shall be provided (e.g., with a message or other visual indication).

G. If flashing is used to attract attention, a method of suppressing the flash shall be provided.
SSP 50005
Revision C

H. Animation for aesthetic purposes only shall not be used.

9.6.1.5 NAVIGATION

A. The display hierarchy shall be indicated (e.g., onscreen or onboard documentation).

B. Users shall be able to return to the top level of an application with a single action.

9.6.1.6 CONTENT AND ORGANIZATION

A. Primary information required for performing the task shall be on the main task display.

B. Supplemental or secondary information shall be provided upon user request.

C. Data shall be shown in the format required for the task (i.e., use the same unit of measure and same presentation order and sequence).

D. Information shall be grouped according to purpose or function. Methods for grouping information include using spatial distance, shape coding, lines, color coding or other means consistent with the application.

E. Information used in a sequence shall be organized in either a left to right or top to bottom orientation.

F. Titles, headers, and labels shall be used on all windows, data items, and onscreen controls.

9.6.2 GENERAL DESIGN REQUIREMENTS

9.6.2.1 KEYBOARD INPUT

A. Keyboard equivalents (shortcut keys) shall be available.

B. Keyboard equivalents shall be displayed (e.g., keyboard, menu item or button label).

C. If function keys are used, a help file or other onboard documentation shall provide information on function key labels, mappings, and functionality.

D. Keyboard equivalents (e.g., F1 = Help) shall be defined as specified in SSP 50313, section 13.
SSP 50005
Revision C

9.6.2.2 CURSOR CONTROL INPUT

A. The user shall have the capability to use a cursor control device.

B. A secondary method of input shall be provided (e.g., keyboard).

C. The leftmost device button shall be used for object selection.

D. The major dimension of the cursor shall be at least 0.25 inches.

E. The relation between a cursor shape and function shall be consistent across applications.

F. At least three types of cursors shall be supported - a pointing cursor (e.g., arrow), a text placeholder cursor (e.g., “I beam”) and a busy cursor (e.g., hourglass). Additional types of approved cursors can be found in SSP 50313, section 13.

G. The pointing cursor shall not blink.

H. The pointing cursor shall maintain its size and image quality across all screen and display locations.

I. The cursor shall be visually distinct against the display background.

J. There shall be only one cursor in a window at a time.

9.6.2.3 LANGUAGE AND TERMINOLOGY

A. Display text shall be written in the English language (unless otherwise approved).

B. All acronyms and abbreviations will adhere to SSP 50254.

C. Definitions for all acronyms and abbreviations used within an application shall be available in a help file or other onboard documentation.

9.6.2.4 TEXT

A. A minimum of one character space shall be left blank vertically above and below critical information, with a minimum of two character spaces left blank horizontally before and after.

B. If proportionally spaced fonts are used, a horizontal blank space shall be considered to be the space occupied by the number “0” (zero).

C. Sans serif fonts shall be used as the primary font on all displays.

D. The standard, default text font size shall be equivalent to 12 point on a screen resolution of 1024 x 768.
SSP 50005
Revision C

E. The primary color for text shall be black.
F. Text labels which indicate an unavailable function shall be gray (dithered).
G. When emergency color coding is used with text (e.g., a red background), the text shall be white on the red background.
H. Whenever text is selected, the visual indication of the selection shall be a reverse video of the text.
I. All text shall be shown in mixed case, except acronyms.
J. System and error message text shall not flash.

9.6.2.5  NUMBERS

A. The number of digits shown beyond the decimal point shall be the minimum number required for the task (e.g., if only two decimal places are required to perform a task, only display two decimal places.)
B. Numerical data shall be aligned on the decimal point.
C. For decimals between –1.0 and 1.0, a leading zero shall be shown (e.g., display 0.43 rather than .43).
D. The U. S. system of commas and decimal points shall be used (e.g., 9,999.99).
E. The metric system shall be the predominant unit of measurement presented on displays, although capability may be provided to switch between English and metric units.

9.6.2.6  DATE AND TIME INFORMATION

A. A capability shall be provided to display date and time information in Greenwich Mean Time format.
B. Date and time information shall be shown in a consistent location (e.g., upper right hand corner of display).

9.6.2.7  USE OF COLOR

A. Colors shall be used as specified in SSP 50313, appendix B.
B. The use of red and yellow shall be used only for the display of caution and warning objects and icons as defined in SSP 50313, appendix B.
C. The VDT color rendition shall be defined by Red-Green-Blue (RGB) values.
SSP 50005
Revision C

D. For color discrimination (e.g., when colored objects are viewed side by side) on VDTs, the R, G, or B value spacing shall be a minimum of 50 in RGB count.

E. For color identification (e.g., when colored objects are not viewed side by side) on VDTs, the R, G, or B value spacing shall be a minimum of 85 in RGB count.

F. As a symbolic code, color shall be redundant with at least one other coding technique.

9.6.2.8 DATA SECURITY AND PRIVACY

If security and privacy of data is required, there shall be the capability of restricting access.

9.6.3 DISPLAY OBJECT DESIGN REQUIREMENTS

9.6.3.1 TITLES, HEADERS AND LABELS

A. Each window, dialog box, and data item shall have a unique identifier.

B. The background color of the title, header, or label shall be the same as the background color on which it appears. For example, if a header is placed in an area with a gray background, the background color of the header itself shall also be gray.

C. Display titles shall be consistent with the menu item or button label that was used to access that display.

D. Whenever a display object or menu item is not available, the text label and object outline (if appropriate) shall be gray (dithered) to indicate that it is not available for selection.

E. Labels shall be located adjacent to the data they describe.

9.6.3.2 WINDOWS

A. All windows shall have a title bar containing a title.

B. The window title shall be consistently justified within a system of displays.

C. If all of the information within a display does not fit within the window, a method shall be provided to access all of the information (e.g., scrolling).

D. All primary windows shall be modeless.
9.6.3.3 DIALOG BOXES

A. Dialog windows shall not be resizable.

B. Dialog windows shall contain at least one button to acknowledge or cancel the operation.

C. Positive response buttons in a dialog window shall be placed first.

D. If a negative response button is included in a dialog window, it shall be placed second.

E. Canceling response buttons in a dialog window shall be placed last (or second to last if there is a “Help” button).

F. If a “Help” button is included, it shall be the last button on the right.

9.6.3.4 TABLES

A. All tables shall have a title which appears centered above the table.

B. Each row and column of a table shall have a label.

C. Labels for the row variables in matrix tables shall be located in the left most column.

D. Labels for the column variables shall be located in the top row.

E. The row and column labels shall be visible while scrolling horizontally and vertically.

F. Alphabetic and alphanumeric columns of data shall be left justified.

G. Numeric columns of data shall be right justified by either the fixed decimal point or implied decimal point (i.e., whole numbers).

H. In tables with greater than seven rows or columns, a blank line, dots, or other distinctive feature shall be inserted after every fifth row or column.

9.6.3.5 GRAPHS

A. Out of range values or user specified, off nominal values shall be identified (e.g., via color change) in tasks where there is a need to discriminate between such values.

B. Whenever it is not feasible to label each object that is coded (e.g., line graph with many lines), a legend shall be provided.

C. Graphs depicting high to low quantities shall show components oriented from top to bottom (preferred) or right to left.
9.6.3.6 ICONS AND SYMBOLS

A. The choice of an icon or symbol shall not contradict highly overlearned associations.

B. Users shall have access to the referent (meaning) of every symbol and icon.

9.6.3.7 SELECTABLE OBJECTS

A. All software controls that are selectable shall be visually distinct (e.g., appear to have raised surfaces).

B. The visual indication of the selection of a momentary versus a toggle control shall be distinct (e.g., momentary highlight versus “pushed in” appearance).

C. Items which are not available (e.g., grayed out) shall not be selectable until they return to an “available” state.

D. Labels for selectable objects that lead to an intermediate dialog box requiring user input, (rather than resulting in the immediate execution of a command), shall be clearly indicated. For example, menu bar items leading to an intermediate dialog box may be indicated by an ellipses (i.e., “. . .”).

E. If there is a need to accommodate a touchscreen, the minimum selectable object size shall be 10 millimeters x 10 millimeters.

9.6.3.8 MENUS

A. Available commands shall be presented to the user for selection (e.g., as in a menu).

B. Menus shall consist of between two and fifteen selections.

C. Even if all of the items within a cascaded menu are unavailable, the menu choice leading to the cascaded menu shall be available (i.e., not be grayed out).

D. No more than four levels of cascading shall be used in menus.

E. A cascade menu shall be identified by a cascade marker alongside the menu name (e.g., an arrowhead).
SSP 50005
Revision C

9.6.3.9 FIELDS

A. A data entry or input field shall be a rectangle with a black border on a white background.
B. A display or output field that is not editable shall be a rectangle with a black border, on a background color that is the same color as the window on which it is displayed.
C. Each data field shall include the unit of measure.
D. Alphanumeric key input to an input field shall be echoed within 100 milliseconds of entry.
E. Data values shall be updated to an output field no more than five times per second.
F. The format and content of data entry information in procedures, cue cards and displays shall be consistent.
G. When data entry fields are used, a placeholders cursor shall be positioned by the system at the first data entry field to which the user has to provide input.
H. When filling in a series of input fields, the "Tab" key shall advance the cursor to the next field.
I. When filling in a series of input fields, the "Shift Tab" sequence shall return the cursor to the previous field.
J. The system shall allow users to directly place the cursor into any data entry field.
K. Data entry shall require an explicit completion action (e.g., an "OK" button) after completing one or more items in a dialog box.
L. "Insert mode" (i.e., text is inserted by moving text to the right) shall be the default for data entry tasks.
M. Cut, copy, and paste shall be available for data entry tasks.
N. The user shall not be required to enter data already available to the software.
O. Default values shall be displayed in data fields.
P. The system shall provide the user (ground controllers and crew) with the capability to permanently replace the default value in a data field.
Q. Replacement of a default value in a data field shall require confirmation by the user.

R. The user shall not be required to enter case specific entries.

S. Where the entry is fixed length or fixed format, the field shall indicate the length or format using symbols (e.g. "Date (mm/dd/yyyy): __ __/__ __ __ __").

9.6.3.10 MESSAGES

9.6.3.10.1 SYSTEM MESSAGES

A. System messages shall appear in a consistent location on the screen.

B. There shall be a visual indication of the applications which are currently active.

C. The system shall inform the user of the current operational mode.

D. A short processing delay (estimated to be one to five seconds) shall be indicated (e.g., with a "busy" cursor that displays whenever the cursor is positioned within the delayed window).

E. If the estimated processing delay is longer than five seconds, an indication that processing is in progress shall be provided (e.g., progress bar).

F. An estimated processing delay in excess of two minutes shall be accompanied by a text message explaining that there will be a long delay.

G. System messages shall be time stamped.

9.6.3.10.2 ERROR MESSAGES

A. The system shall perform input validation and error checking for correct format, legal value, or range of values on all data entries that have a predefined set of values.

B. The system shall notify the user of any input errors within two seconds from data entry.

C. Error messages shall be placed on the display close to the point of the error and in a designated, consistent area of the display.

A.2 ABBREVIATIONS AND ACRONYMS

RGB Red-Green-Blue