



COMMON UI STYLE & INTERACTION GUIDE:

More than Just Another Style Guide

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National Defense Industrial Association, 18th Annual System Engineering Conference, Oct 26-29, 2015



Outline



- HSI Challenge
- CUISIG Overview and Background
- CUISIG Content, Tools and Application
- Impacts
- Way Forward

HSI Challenge



- Conventional style guides emphasize common look and feel of graphical user interfaces (GUIs)
- User interactions are typically not addressed in style guides
- Consistent interactions are even more critical to user performance in a System of Systems to provide:
 - System interoperability
 - Support of operational user workflows
- CUISIG is a tool to proactively mitigate usability risks and negative user feedback



CUISIG Goal & Objectives



- Goal:
 - Provide **common, standardized user interfaces (UIs) across enterprise applications**, incorporating consistency among user interface elements, interactions, and behaviors
- Objectives:
 - Consolidate and align common UI components, elements, behaviors, and user interactions across Space and Naval Warfare Systems Command (SPAWAR) PEOs (C4I, EIS, and Space)
 - Leverage and expand on industry standard and existing program style guides
 - Provide visual examples of UIs
 - Supply sample HSI system-level requirements for incorporation into system baselines
 - Provide decision-making tools to programs, HSI practitioners, and software developers



Overview



- Used data-driven approach to extract common UI categories and elements
- CUISIG is a collection of tools and guidance to support programs, HSI practitioners, and software developers within a system of systems framework
 - Sample HSI system-level requirements
 - Functional user interface guidance
 - Design best practices
 - Visual examples
 - UI verification checklist
 - HSI lessons learned
- Facilitate decision-making by program stakeholders
- Enhances common user experience and standardizes functional UI behaviors



Background



- Developed under the Program Executive Office, Command, Control, Communications, Computers and Intelligence (PEO C4I) Common Services Governance (CSG) IPT led by Space and Naval Warfare Systems Command (SPAWAR) 5.0
- v1.0 completed and released 29 Aug 2014
- As SPAWAR SYSCOM Technical Authority, SPAWAR 5.0 signed a policy directing the use of the CUISIG
- v2.0 completed and released 31 Aug 2015
 - Incorporated v1 feedback from reviewers
 - Converted UI mockups to higher-fidelity prototype tool (i.e. Balsamiq to Axure)
 - Developed 5 new UI sections in conjunction with PMW-240: Forms, help and support, search, visualizations, and notifications



Style Guide Policy Statement



"The CUISIG provides functional user interface (UI) guidance to PORs, non-PORs, and Human Systems Integration (HSI) practitioners and developers. POR and non-POR applications shall use this guide to achieve compliance, interoperability and consistent UI behaviors for the end user."

Space And Naval Warfare Systems Command (SPAWAR) Systems Command (SYSCOM) Technical Authority (TA) Policies For Common User Interface Style Guide

The image shows the cover page of the 'Common Services Governance Policy Statement-Common User Interface Style Guide (CUISIG) Version 1.0'. The document is dated October 16, 2014, and was prepared by the PEO C4I Common Service Governance Integrated Product Team. The cover features the SPAWAR logo at the top, followed by three circular logos: PEO C4I, PEO C5, and the Department of the Navy seal. The text on the cover includes the title, version, date, and preparer. At the bottom, there are distribution and handling notices.

DEPARTMENT OF THE NAVY
SPACE AND NAVAL WARFARE SYSTEMS COMMAND
4331 PACIFIC HIGHWAY
SAN DIEGO CA 92110-3127

5000
Ser 5.0/650
8 Jun 15

From: Commander, Space and Naval Warfare Systems Command

Subj: RELEASE OF SPACE AND NAVAL WARFARE SYSTEMS COMMAND (SPAWAR) SYSTEMS COMMAND (SYSCOM) TECHNICAL AUTHORITY (TA) POLICIES FOR COMMON USER INTERFACE STYLE GUIDE, WEB BROWSER, AND COMMON SOFTWARE HOSTING ENVIRONMENT SYS

UNCLASSIFIED CIG-POL-CUISG-14-01

Ref: (a)
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SPAWAR

PEO C4I

PEO C5

**Common Services Governance
Policy Statement-Common User Interface Style Guide
(CUISIG)
Version 1.0
Date
October 16, 2014
Prepared by:
PEO C4I Common Service Governance Integrated Product Team**

DISTRIBUTION STATEMENT D: Distribution to Department of Defense and U.S. DoD contractors for administrative/operational use only (October 16, 2014). All other requests for this document will be referred to Program Executive Office, Command, Control, Communications, Computers, Intelligence (PEO C4I).

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Signed into policy by SPAWAR 5.0 Chief Engineer
8 Jun 2015

- Extracted common UI categories and elements through analysis of:
 - HSI heuristic review findings
 - User-centered design recommendations and user stories
 - Existing program style guides
 - Industry style guides
 - HSI industry standards
- Determined scope of guidance and other content with inputs from:
 - Program managers
 - HSI practitioners
 - System architects
 - Engineering representatives from several Programs of Record (PORs)

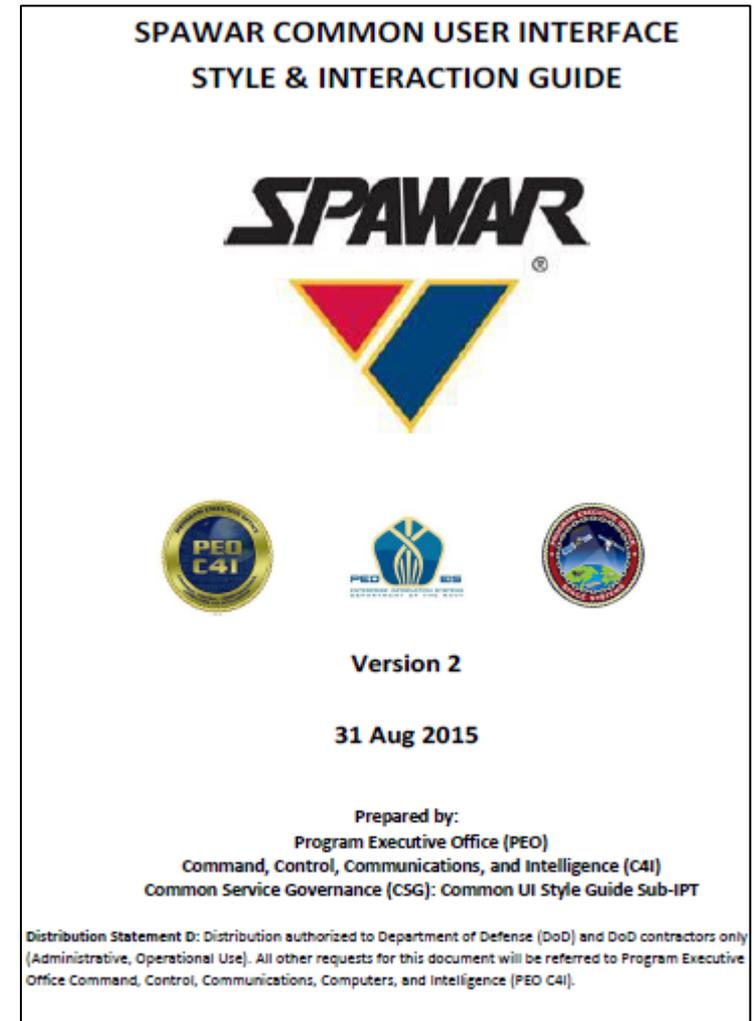
What it is...

- Functional UI guidance
- Software-centric
- Technology agnostic
- SPAWAR Policy
- Tailorable to program needs
- UI development guidance and tools

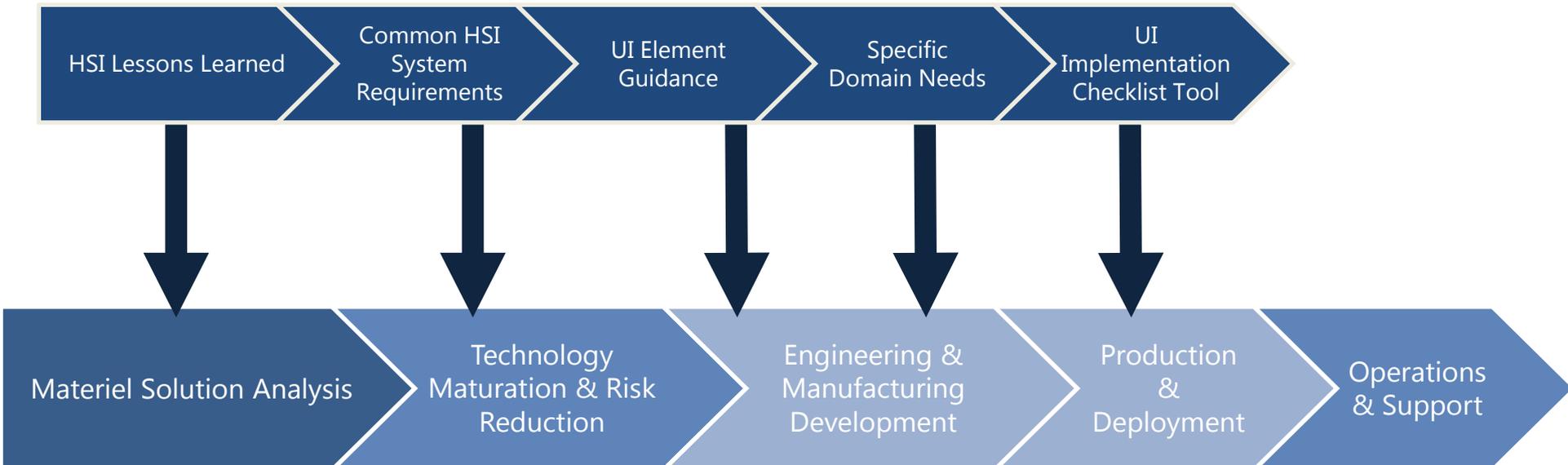
What it is not...

- Style Sheet
- Software Development Kit (SDK)
- "Colors, buttons, and menus"
- One-size-fits-all

- Common HSI System Requirements
- HSI Lessons-Learned
- UI Element Guidance
- Specific Domain Needs
 - C4I and EIS Programs
- UI Implementation Checklist Tool



- CUISIG Content & Tools applied throughout Systems Engineering lifecycle



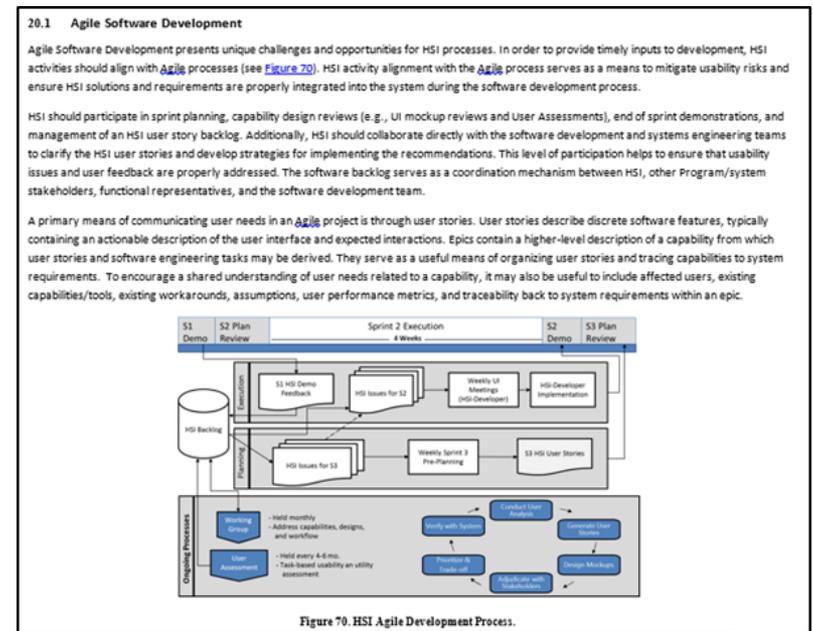
Content & Tools: Common HSI System Requirements



- *Description*: 110 sample HSI system-level requirements mapped to UI categories and elements
 - Impact to user performance specified (e.g., reduced workload)
- *Intended Use*: Inclusion in system requirements baseline
- *Primary Users*: Programs, HSI practitioners
- *Impact*: HSI risks are mitigated in design, development, integration, and training

Req. #	Section	UI Category	UI Element	Requirement	Spec Text	Impact to User
92	18.1.2	Geographic Display Drawings	Zooming and panning while drawing	The system shall provide the capability for users to pan the geographic display.		Improved Workflow
93	18.2	Geographic Display Drawings	Lines	The system shall display a preview of the line being drawn between the last point drawn and current cursor location.		Enhanced Information Accessibility

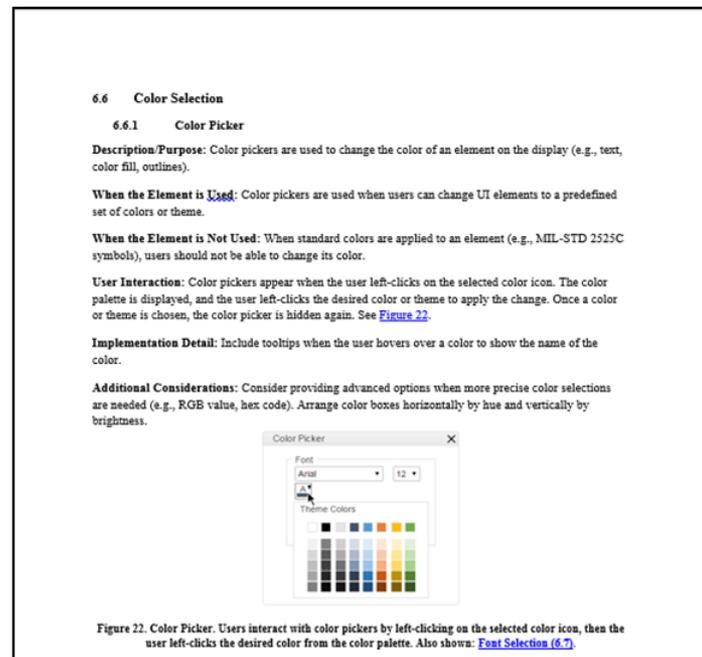
- *Description:* Process-oriented HSI best practices
 - Agile Software Development
 - HSI Program Planning
 - User Needs and Workflow Analysis
 - Design and Development
 - Planning User Interactions
 - Iterative User Interactions Methods
 - Data Dissemination
 - User Data Prioritization
 - Training Analysis, Design, and Assessment
 - Test and Evaluation
- *Primary Users:* HSI practitioners, Programs
- *Impact:* Focused on minimizing risk throughout the entire system acquisition lifecycle



Content & Tools: Functional UI Element Guidance

- *Description:* Functional guidance for commonly-used UI elements across 16 categories
 - UI Category
 - UI Element
 - Description/Purpose of the Element
 - When the Element is Used
 - When the Element is not Used
 - User Interaction with the Element
 - Implementation Details
 - Additional Considerations
 - UI Element Mockups

- *Intended Use:* Guidance for design and implementation of UIs
- *Primary Users:* Software developers, HSI practitioners
- *Impact:* Usable and functionally-consistent UIs within and between systems



Content & Tools: Functional UI Element Guidance, cont.



UI Category

6 Data Entry and Editing

UI Element

6.3.1 Date Pickers

Hyperlink to Related Guidance

- Description/Purpose
- When Element is Used
- When Element is not Used
- Implementation Detail
- Additional Considerations

Description/Purpose: Date pickers allow users to select a date from a calendar.

When the Element is Used: Date pickers are used for selecting recent or near-term dates. They are also useful when day of the week is important.

When the Element is Not Used: A date picker should not be used when a date is very far in the past or future.

User Interaction: Users left-click a [Command Icon \(4.3\)](#) (i.e., calendar icon) to display date picker calendar. Date and time entry are frequently combined in a UI. Pre-populated time fields may be used in place of time entry fields when only a subset of times are available for selection. See [Figure 19](#).

Implementation Detail: Dates that are user entered, such as with date pickers, it should be displayed to the user using the MM DD YYYY format (e.g., 07/04/2015 for July 4, 2015).

Additional Considerations: Users should also be able to enter the date in the input field to bypass the date picker. If the entered date will be displayed to another user, follow the [Date Display \(2.3\)](#) guidance.

UI Mockup



Figure 19. Date picker. Users interact with date pickers by left-clicking the calendar command icon and selecting a date from the pop-up calendar. Also shown: [Command Icon \(4.3\)](#) and [Text Entry Field \(6.1\)](#).

Content & Tools: Domain-Specific Guidance



- *Description:* Addresses specific needs for:
 - PEO EIS (e.g., user-activated in-line help)
 - PEO C4I (e.g., geographic display drawings)
- *Intended Use:* Design and implementation reference
- *Primary Users:* HSI practitioners, software developers
- *Impact:* Consistent user experience across Enterprise systems

18 Geographic Display Drawings

For this document, drawings are defined as anything that the user places on a geographic display. Drawing as defined here does not include system-generated display items.

18.1 Placing Drawings

Implementation Detail: The nature of the drawing will determine the type of placement. For symbols (e.g., tropical cyclone symbol), ensure a preview of the symbol is visible over the geographic display prior to placement of the symbol.

For line or shape drawings, the user left-clicks points on the geographic display that will later serve as control points for editing. The line or symbol should reflect where the user has already clicked. To complete a drawing with multiple control points, the user double left-clicks at the last point, and the drawing becomes set.

18.1.1 Moving Drawings

Implementation Detail: Ensure users are able to move any drawing on the geographic display by left-clicking to select and dragging the drawing. Allow for movement of multiple drawings by allowing multiple-selection.

18.1.2 Zooming and Panning While Drawing

Implementation detail: When moving, editing, or placing a drawing, allow zooming and panning on the geographic display. Zooming should allow the use of keyboard shortcuts or the mouse scroll wheel. An effort should be made to allow for panning using the mouse (left-click and drag); however, if this is not technically feasible, keyboard shortcuts should be enabled.

18.1.3 Editing

Implementation Detail: Double left-clicking on any part of the drawing enables edit mode, enabling size, color, control points, rotation handles, flipping functionality, and visual display options. A selected item should be increased in visual saliency as compared to non-selected items. For standard (e.g., 2525-C Military Standard symbols) size, typically using a locked aspect ratio size, and opacity may be edited in most cases.

Color should not be editable for standard symbols. Horizontal and vertical size, locked aspect ratio, color, and opacity may all be edited for non-standard symbols. For lines and polygons, users are able to edit control point position by dragging points to the desired position. Line thickness, color, and style (e.g., dashed lines) are also editable features of lines and polygons. Once all edits are complete, a single left-click off the drawing will exit the edit mode.

18.1.4 Snap-to

Implementation Detail: Enable users to snap together anchor points of separate drawings in order to create cleaner, contiguous drawings. When a user moves a drawing toward another drawing's anchor point, or moves an anchor point when editing a drawing, the closest anchor point snaps to the non-moving drawing.

During the movement, the affected anchor points should become highlighted to inform the user of which points will snap together. In some cases, this feature may not be desired. Include the ability to toggle this feature on or off.

18.2 Lines

User Interaction: Lines are drawn point-by-point with the line filling in after placing each subsequent point on the map. In addition, when a user is placing the

Content & Tools: UI Implementation Checklist



- *Description:* 450 items mapped to CUISIG UI categories and elements
- *Intended Use:* Tool to assess degree of UI functional compliance with guidance
- *Primary Users:* HSI practitioners, software developers, and testers
 - System Engineering Technical Review (SETR)
 - Software developer UI review
 - Capability assessment / UI competitive analysis
 - Requirements verification and validation
- *Impact:* Usable and functionally-consistent UIs within and between systems

No.	UI Category	UI Element	Description	Criteria Met? (Yes, No, Partial, N/A)	Justification (Applicable if Criteria is not met)
107	Controls (5)	Radio Buttons (5.2)	Left-click the radio button or its associated text label to make the selection.		
108	Controls (5)	Radio Buttons (5.2)	A previously made selection can be deselected.		
109	Controls (5)	Radio Buttons (5.2)	Radio buttons and their associated text labels are vertically aligned with other UI elements.		
110	Controls (5)	Checkboxes (5.3)	Checkboxes are used for multiple non-mutually exclusive options.		
111	Controls (5)	Checkboxes (5.3)	Checkboxes are selected by either left-clicking the checkbox itself or its text label.		
112	Controls (5)	Checkboxes (5.3)	Left-clicking a checked box deselects that option.		
113	Controls (5)	Checkboxes (5.3)	Checkboxes and their associated labels are vertically aligned with other UI elements.		
114	Controls (5)	Collapsible Sections (5.4)	Collapsible sections are used for information that is not required or not immediately relevant to the user.		

Content & Tools: Style & Interaction Guide Use

	Systems Engineering	Software Developers	HSI Practitioners	Testers
Common HSI System Requirements	✓		✓	
Lessons Learned	✓		✓	
Functional UI Guidance		✓	✓	
Domain-Specific Guidance		✓	✓	
User Interface Implementation Checklist		✓	✓	✓



Content & Tools: Anticipated Impact



- Increases consistency and interoperability across Enterprise systems
- Improves usability within and between programs
- Optimizes design, development, and training time
- Increases compliance with HSI best practices and industry standards

Way Forward



- Develop interactive web-based style guide to include:
 - Configuration management
 - Search
 - Interactive UI examples
 - Links to reference documents
 - Source code
 - Custom style guide creation and export (subset of sections/elements)
- Update content based on style guide use and feedback
- Provide design and interaction guidance unique to mobile platforms

Search

Navigation

Interactive UI Prototype
UI Element Guidance

Interactive UI Checklist Tool



Summary



- CUISIG increases UI design guidance, consistency, and interoperability across systems
- CUISIG guidance applied across 2 PEOs on 8 programs
- Way forward:
 - Implementation of a web-based tool
 - Mobile UI considerations

Acknowledgements

Thank you to the following individuals and organizations who significantly contributed to development of the Common UI Style and Interaction Guide:

- Josh Gomer, Ph. D. (SPAWAR Atlantic)
- Ana Borja (SPAWAR 5.0)
- Mr. Pat Roche, Head, Mission Architecture (SPAWAR 52100)
- Petra Alfred, (Pacific Science and Engineering Group)
- Matthew Kelly, (Pacific Science and Engineering Group)
- PEO C4I Common Services Governance IPT

This work was supported and sponsored through contract N00178-06-D-4837-NS02 from the Space and Naval Warfare Systems Command



BACKUP

- **UI Category:** Highest-level functional grouping of UI elements with similar characteristics.
- **UI Element:** The UI control that the user interacts with.
- **Description/Purpose:** Definition of a UI element and why is it used.
- **When Element Used:** The circumstances under which a developer would choose to implement a particular UI element.
- **When Element Not Used:** The circumstances under which the UI element should not be implemented.
- **User Interaction:** Functional description of the UI element. What is the expected interaction with the element and what impact might that interaction have on other areas of the UI.
- **Implementation Detail:** Specific guidance/instruction for implementation of the element.
- **Additional Considerations:** Notes that may be useful in the implementation of the UI element.
- **Figures:** Example mockups that support description of UI elements.