EEMUA 201 guidelines

The EEMUA 201 guideline, while being less practical, has a solid foundation of principles; it lacks metrics and performance criteria and most harmonization between 191 and 201. It also lacks details on today's movement to gray-scale graphics, use of object-oriented symbols for building graphics.

Clarity

It should be self-evident what the purpose of the display format is. Graphics, text and numeric displays should be clear, easy to read, and it should be obvious to what they refer. Cool and subdued colors should be used in normal operation to allow bright colors, which will stand out, to be used in abnormal situations.

Consistency

All graphic indicators, text and color coding should be consistent, not only within a display format, but between display formats in the hierarchy. The operation of a control (e.g. hotspot) should have the same effect on all display formats. A good design framework specifies consistent display locations for common objects, such as titles, navigation aids and object labels. Information should be arranged in displays to support simultaneous viewing and interaction requirements that are needed for critical monitoring and control tasks. Display layout affects the ability of users to quickly identify key components and relationships. Layouts should capitalize on maximizing operator retention of information in short-term memory.

Display layouts are consistent and appropriate to process behaviors. The presentation of information follows explicit, consistent visual coding, navigation and layout schemes.

Secondary information, such as analyzer values, calculated values, and interaction buttons, should not be placed wherever there is room, causing its location to vary from display to display. Consistency decreases the time and error in locating critical information. New displays should use the same format as existing ones so users can anticipate the display structure.

The size of objects should be appropriate to their importance in the process. Showing the relative size of objects should be followed when such information is relevant to the safe operation of the process, for example, when the size of an object indicates the magnitude of caustic material that could potentially escape.

Information clusters are used to show important groupings and relations between objects. The size and spacing of objects facilitates identification of related things. Related information is grouped together in a way that shows the association or relationship, thus making it easier to remember. Topography and physical laws should be observed in the arrangement of information elements. For example, process flow should map consistently onto information displays and devices that are arranged on the monitors and console in left to right flow patterns.

For non-schematic displays, the direction of flow should emphasize left to right and top to bottom, consistent with the culture's practice for reading text. Hence, layout of information should reflect desired scanning or reading flow.

Similar processes in parallel trains should be distinguishable with visual coding.
In supporting navigation to operating displays (i.e., for real-time monitoring and control), the update rates should average 1 second and not exceed 3 seconds. It is unacceptable to display a blank screen between updates.

Navigation to different levels of detail should not exceed three levels for operating displays. Information should be arranged in displays to support simultaneous viewing and interaction requirements anticipated for critical monitoring and control tasks.

Variety

A limited variety of display techniques should be used, so that the operators can become familiar with them easily.

Feedback

Any control or other action on a display format should give feedback to the operator to give awareness that the system is performing the requested task or, indeed, is giving an error. The feedback needs to be nearly instantaneous. Feedback on completion of the action—or its failure—may also be required.

Robustness

Where interface action is taken by the operator, the system should be designed so it can cope with incorrect key strokes/mouse clicks and so the operator can return to the original position if need be. Any significant change will require confirmation or duplication of the data.

Failure

Failure of a display or of items on the display should be immediately apparent to the operator.

Redundancy

Multiple information display should be avoided, unless this is required to achieve specific reliability requirements or as determined by task analysis.

Demand verses Status

Indications should make clear which values are showing actual plant status and which are indicating setpoints or demanded values.

Spatial Variation

If situations exist where several displays depict similar process units, it can be beneficial to place similar objects in different positions to help differentiation between the units.

Operator fatigue and glare from screens

Research has determined that traditional graphics (those having traditional black backgrounds and over use of color) are considered low performance. The black background promotes glare

issues, which then encourages operators to turn the control room lights out, causing fatigue and promoting sleep, resulting in shift-worker performance issues. The over use of color produces poor situation awareness and reduces the operators ability to prioritize work and identify abnormal situations.

High performance graphics have cool and subdued colors during normal operation allowing brighter colors which will stand out, to be used for abnormal situations. The standard background color is grey RGB 210, 210, 210. HUE SAT LUM 160, 0, 198.