

Interaction Requirements Analysis (IRA)

Product Information Note

An Interaction Requirements Analysis (IRA) is a workshop-based method of developing operator-centric graphics for control systems. The process was instituted by the Abnormal Situation Management (ASM®) Consortium and refined by Honeywell. Our IRA services deliver a graphical hierarchy specifically designed for the end-user process to eliminate operator errors and improve performance.

Importance of Human-Machine Interface (HMI) Planning and Design

Capital investments for new control system deployment or migration often include development of a new operating display environment. Traditionally, contractor companies or services providers use Piping & Instrumentation Diagrams (P&IDs) or prior graphics in the new design. However, the team of operators must use the new process displays for an extended period.

For a successful change of the HMI environment, it is essential to gain operator acceptance. This starts with involving operators in the design process.

What Problems are Addressed by IRA?

- Many graphics were originally derived from P&ID's. These drown operators in extraneous details and reduce situation awareness.
- The IRA workshop eliminates multiple failure modes, which ASM Consortium Research has carefully studied.
- Operators are often reluctant to accept new graphics without a clear demonstration that the changes will simplify their work. The IRA workshop enlists them to drive the process with Honeywell facilitation.
- Helps customers make optimum use of new console technology and hardware, using full span of control view as recommended by ASM.



FEATURES & BENEFITS

Our Approach

- Operator-centric consulting workshop and structured design process
- Rapid method using Honeywell User Experience (HUE) tools
- ASM-based methodologies
- Enhanced by Honeywell with advanced console design, standard builds and Experion® Orion capabilities

Deliverables

- Functional Design Specification (FDS)
- Detailed Design Specification (DDS)
- Level 1 graphics and Key Performance Indicators (KPIs)
- Level 2 graphics
- Examples of Level 3 and Level 4 graphics

Operator and System Benefits

- Improved situational awareness
- Improved decision-making
- Shorter issue resolution time
- Best-in-class displays to support operator performance
- Rationalized graphics

How it Works

The process of IRA services is divided into several key steps:

1. The first step is a pre-workshop phase where the Honeywell facilitation team reviews the process documents and typical procedures, and meets with the customer team over a telecon.
2. The next step is the on-site workshop itself. Typically, the workshop will require two weeks of dedicated work by Honeywell and the customer's representatives. Honeywell engineers facilitate the meeting using Honeywell User Experience (HUE) tools such as affinity diagramming, rapid prototyping and role-play simulation. Before the team leaves the site, a debrief summary is reviewed with the site or project leader.
3. After the on-site workshop has been conducted, Honeywell's graphics team will complete the deliverables.

Operator Empowerment in Process Display Design

Operators are experts in how the end-user process runs. You want them to adopt new tools, but how do you engage them and make sure they're comfortable with the technology?

The IRA process ensures all members of end-user operating staff are involved. By simulating start-up, shutdown, normal operation and anticipatable upsets, Honeywell can help operators design a display hierarchy to enable the very best performance and reduce future support costs.

During the IRA process, Honeywell introduces the concept and advantages of standard builds and involves the customer team in choosing the best style guide for their operation.

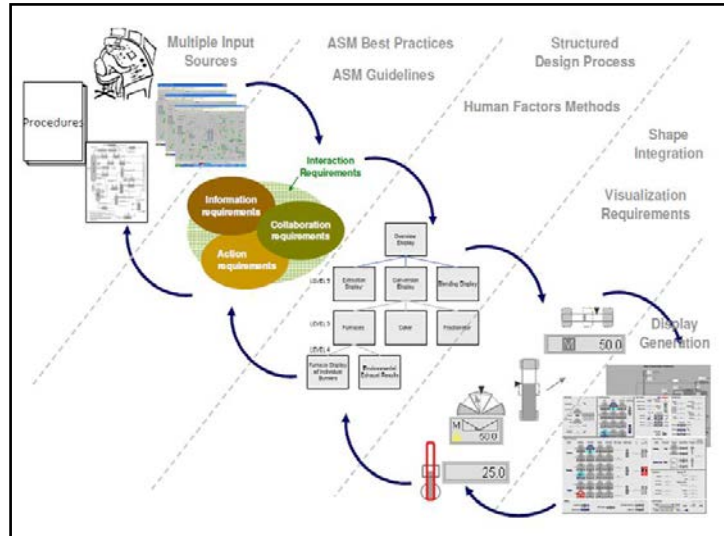
Gray Scale is Only Part of an Effective Display

ASM-compliant displays are much more than gray scale, or more correctly, monochromatic display backgrounds and process descriptions. The goal of graphical displays is to ensure operators are aware of any exceptions and that exceptions stand out. Alternate colors can also boldly to alert the operator to the severity of the problem.

It is crucial that operators be able to scan the entire process at a glance. If something occurs while an operator is engrossed in a detailed graphic, will he or she be aware of any other changes taking place?

Graphical Hierarchy Improves Performance

The ASM Consortium has conducted very detailed eye-tracking experiments at universities to examine how operators can best solve process problems. They've mapped the mental processes of operators during high-fidelity simulations and measured how their eyes use the display hierarchy to gather required information. A graphical hierarchy from Overview (L1) to Unit Operation (L2) to Detailed Displays (L3 and L4) provides the best support.



IRA Process Chart

What are the benefits?

The benefits of an HMI developed from the IRA process include:

1. 1 percent or more improvement in operating performance
2. Substantial risk reduction from better situational awareness.
3. Reduction in operator fatigue and eye strain using new console technology
4. Reduction in operator entry errors using touch panel.
5. Conformity with ISA-101, EEMUA and ASM Guidelines.
6. Substantial control system lifecycle support and maintenance cost savings.

What are the Deliverables and Lead Time?

The deliverables from the IRA process include:

1. Functional Design Specification (FDS)
2. Detailed Design Specification (DDS) with style guide, safe view configuration, shape library, and specific customer standards
3. Level 1 graphics (L1 + KPIs)
4. Level 2 graphics
5. Sample Level 3 and/or Level 4 graphic to illustrate the chosen features
6. Final report document summarizing the work and any assumptions

When properly planned, the typical IRA activities for 100-120 L2/L4 graphics will require 6-8 calendar weeks to perform.

Summary

Honeywell's effective IRA process can be used to develop display graphics based on the experience of end-user operating staff and design teams. These graphics provide a comprehensive environment to improve operator performance. Because operators are fully engaged in the IRA process, new graphics and new ways of running plant processes are readily accepted.

For More Information

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