

Extreme Performance Through Process Information



Improved Operation Through
Advanced Operator Interfaces

Dal Vernon Reising **Honeywell**

Extreme Performance Through Process Information



The Abnormal Situation Management® (ASM) Consortium



Process Solutions
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Specialty Materials

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Performance Systems, Inc.



Innovating and Fielding ASM® Solution Concepts



ASM Guidelines: Effective Operator Display Design



ASM Consortium Guidelines **Effective Operator Display Design**

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ASM Joint R&D Consortium

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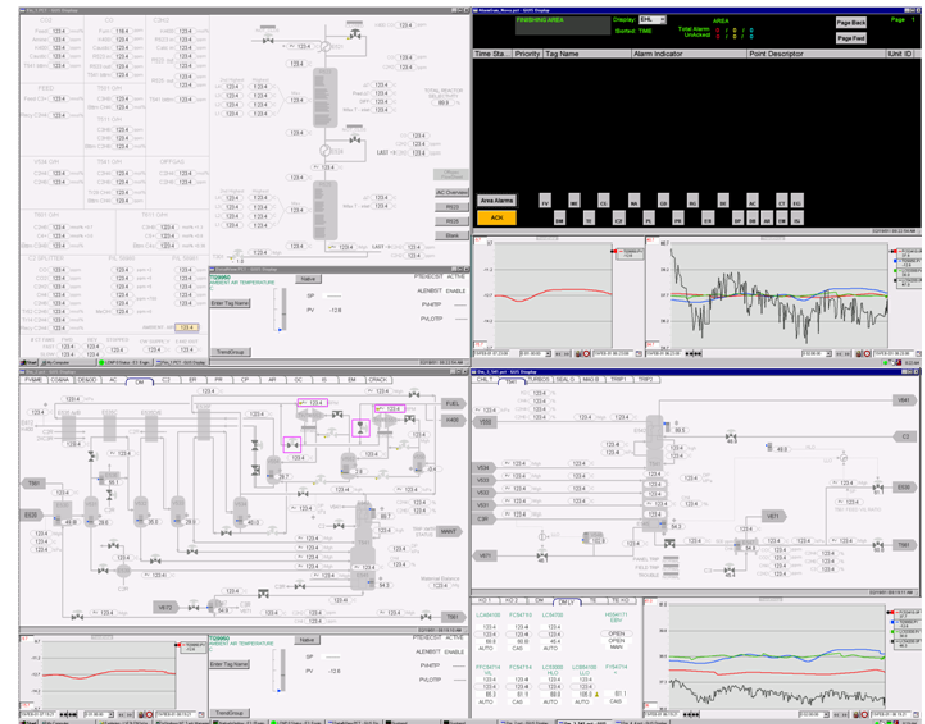
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- Operating Display Content
 - 20 Guidelines on display types, display style, etc.
- Operating Display Features
 - 35 guidelines on display layout, navigation, use of colors, etc.
- Alarm system
 - 14 guidelines on auditory & visual annunciation, etc.
- User Guidance and Training
 - 5 guidelines
- Display Development Process
 - 7 guidelines on human factors and MOC

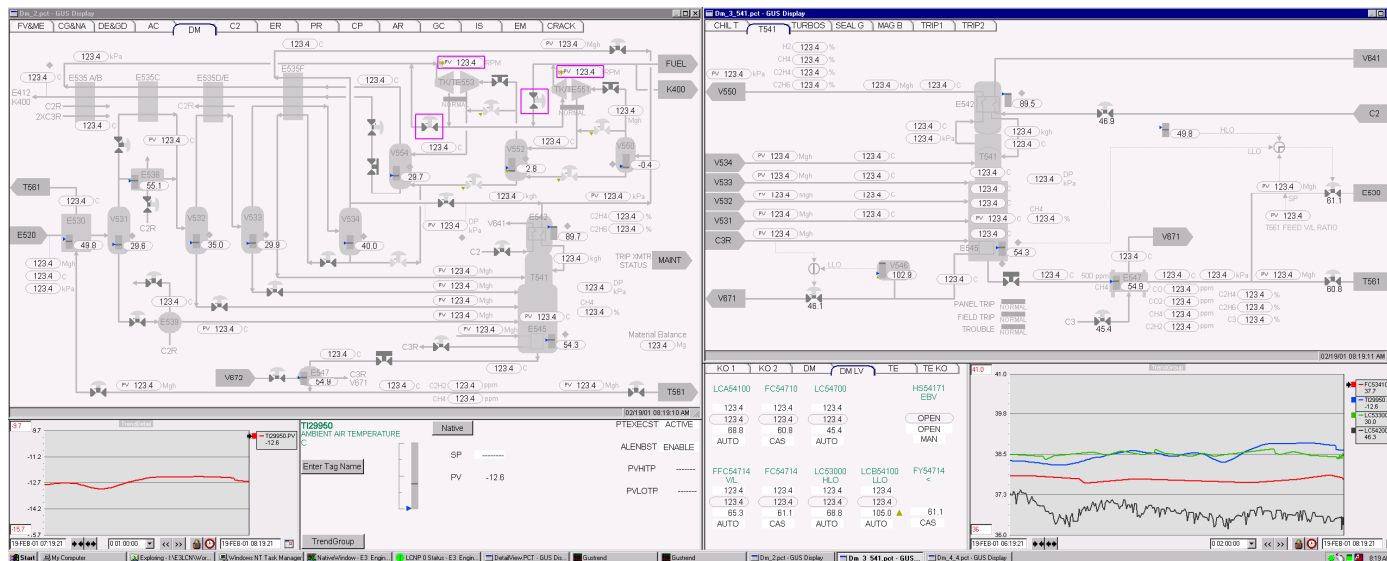
ASM Operator Interface Concepts

- Multi-windowing with controlled window management
- Multi-level, simultaneous views of increasing plant detail
 - Level 1 Area Overview, Level 2 – Unit, Level 3 – Equipment, Level 4 – Group
- Tabbed navigation
- Yoked navigation between levels
 - e.g., between Unit-area summaries and their associated equipment details
- Integrated Trending



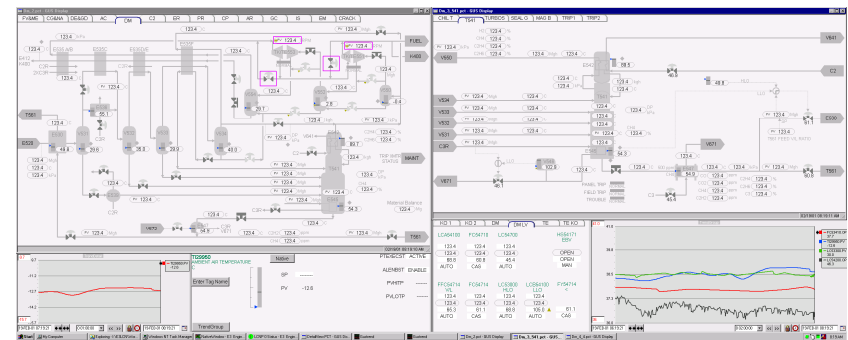
ASM Operator Interface Concepts

- Right-mouse click access to online documentation
 - e.g., Alarm Objective Analysis documents, procedures, etc.
- Integrated alarm management into graphics and navigation tabs
 - e.g., Color-coding only for critical information – like alarms, No 3D graphical objects, etc.



Operator Performance Improvements

- In a side-by-side comparison against a “traditional” native windows console, operators using the ASM Operator Interface
 - Responded faster and more consistently to abnormal situations
 - 6.5-9.7 minutes faster
 - a 35%-48% improvement over the traditional console
 - Recognized, before the first alarm, that an abnormal situation was present in 48% of the scenarios
 - 38% improvement over the traditional console

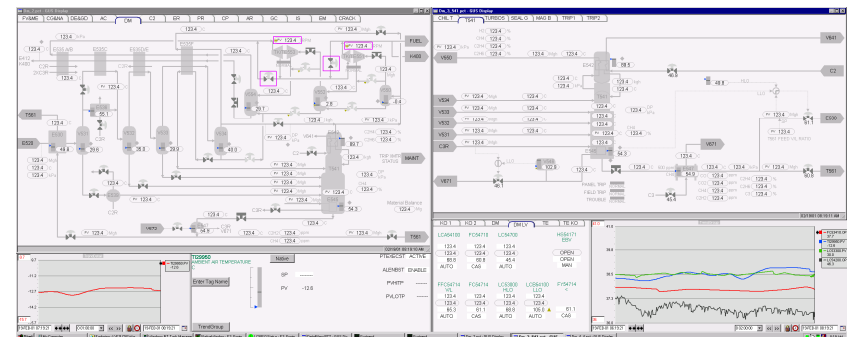


VS.



Operator Performance Improvements

- As a result, they successfully dealt with 96% of the abnormal situations
 - 26% improvement over the traditional console

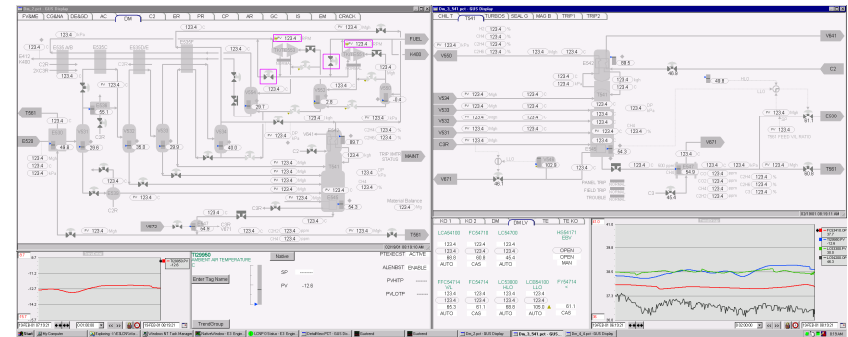


VS.



Economic Impact Assessment

- Conducted a Monte Carlo simulation for the Traditional console
 - Used the operator performance improvement values and ranges as input into this simulation
 - Improved solution times
 - Higher solution success rates
 - Generated an annual baseline from 6 years of incident data from the traditional console unit
 - The “assumed” input ranges for the incident data in the Monte-Carlo analysis were supplied by ASM member site’s process experts



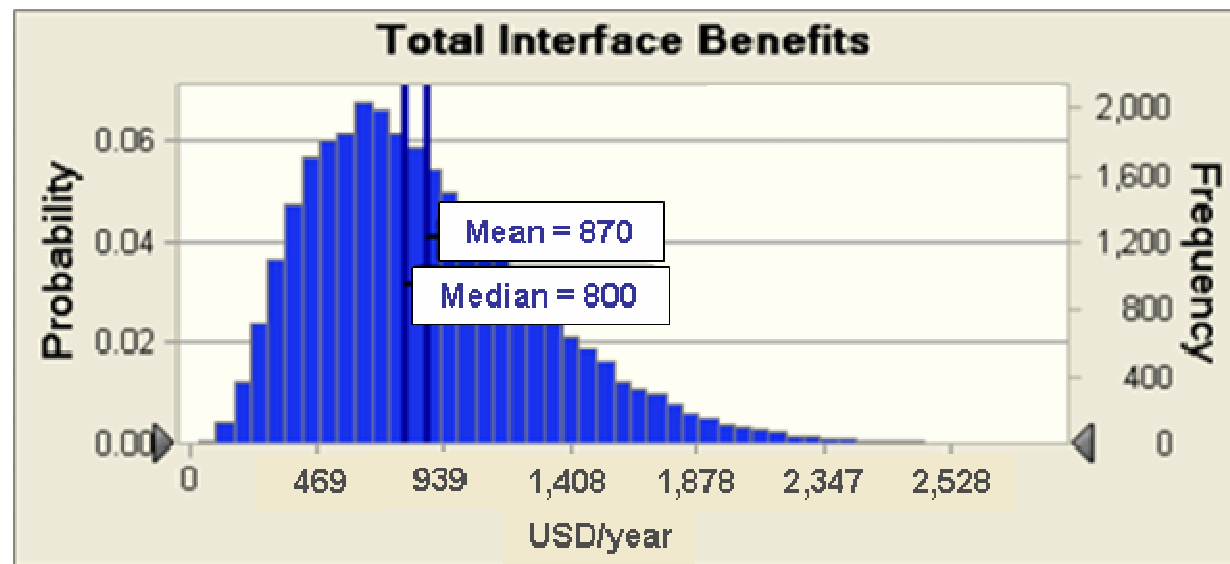
VS.





Economic Impact Assessment

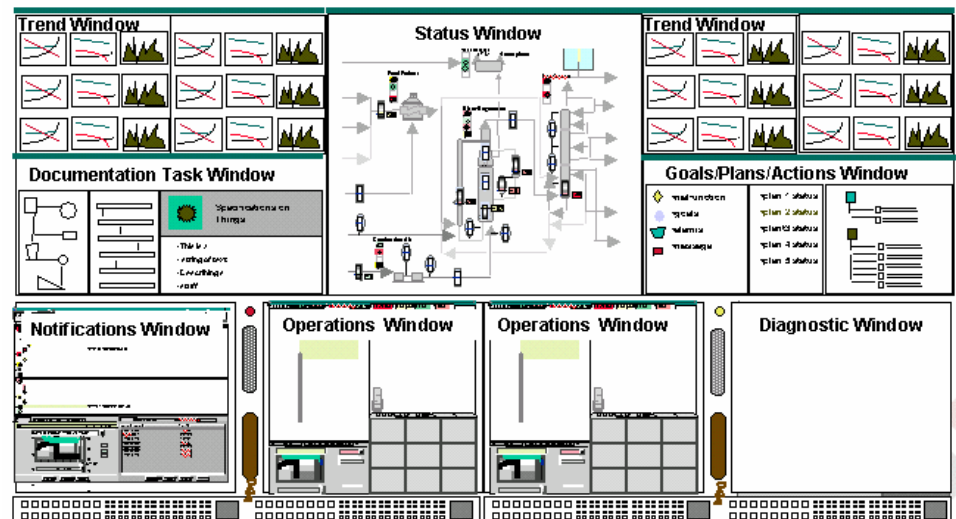
- The total economic impact for the unit with the traditional console (a 1.8 Blb/year ethylene plant) was
 - On average, \$870K USD/year
 - The median (considered most likely) was \$800K USD/year





An “Operator Cockpit” Concept

- Provide Honeywell customers integrated operating environment and tools to help the operator proactively manage the process in order to:
 - Meet your business goals
 - Reduce incidents
 - Improve product quality
 - Reduce operator workload
- Design the console to better support the operators’ work flow and operating tasks
- “Institutionalize” best practices in the console design for...
 - Console operator “rounds”, Shift handover, Routine operations (e.g., furnace swings), & Best response to alarms or events via “recommended actions”, etc.





An “Operator Cockpit” Concept

- Console Organization & Layout
 - Span of control overview
 - Trends for critical variables
 - Operating schematics
 - Diagnostics
 - Documentation & procedures
 - Alarms & notifications
 - Logbook
 - Planning information
 - Alarm help
 - Alarm enforcements
 - Managing tasks (Proc Ops, tasks, etc and other scheduled activities)
- *Information Management for the Console Operator*
 - Task-relevant information when it is needed, where it is needed

