Process Solutions

Honeywell

Experion HS Overview

Experion HS is a powerful software platform that incorporates innovative applications for human machine interface applications (HMI) and supervisory control and data acquisition (SCADA). Built upon the proven technologies of the Experion platform, Experion HS is an integrated and affordable solution for smaller unit operations.

Honeywell delivers automation expertise to process industries. As industry pioneers, we have developed groundbreaking technology that has shaped today's manufacturing processes. Honeywell systems are easier to install and to use and are the industry's most reliable and scalable process control solutions. In addition to delivering innovative products and technologies, Honeywell has the most experienced and dedicated customer and technical support teams.

Since its launch, Honeywell's Experion® Process Knowledge System (PKS) has successfully helped thousands of customers worldwide improve productivity and profitability. The most current release of Experion HS is at R410. Experion HS extends this proven technology to meet the demands of specific industry segments. Experion HS is as robust and powerful as Experion PKS and can efficiently fulfill the requirements of small to medium size applications. It is an easy and intuitive solution that can be used by plant managers, plant maintenance engineers, process engineers and operators in many industries including oil & gas, mining, metals & minerals, chemicals, life sciences, power, cement & glass and food & beverage.

The infrastructure improves operator efficiency and productivity:

- Pre-built standard displays (including process group, point detail, trend, alarm and set point programmer displays) reduce configuration time.

- Intuitive and flexible HMI meets even the most demanding needs for process graphics, display navigation and alarm presentation.

- User-configurable pull-down menus and toolbars promote easier, intuitive navigation to process data.

- Enhanced trending for up to 32 pens simultaneously and event markers provide operators with a comprehensive view of the plant.

- On-board historian collects history and events, enabling instant access to reliable and accurate process data.

- Open architecture based on commonly-used industry standards and the Microsoft Excel add-in provide greater choice in generating reports from process data. (Office 2013 - 32 bit)

- Integrated configuration environment enables offline and online configuration changes and minimizing process disruption.

- Integrated server redundancy without the need for expensive 3rd party fault tolerant computing platforms.

Experion HS R410 Architecture
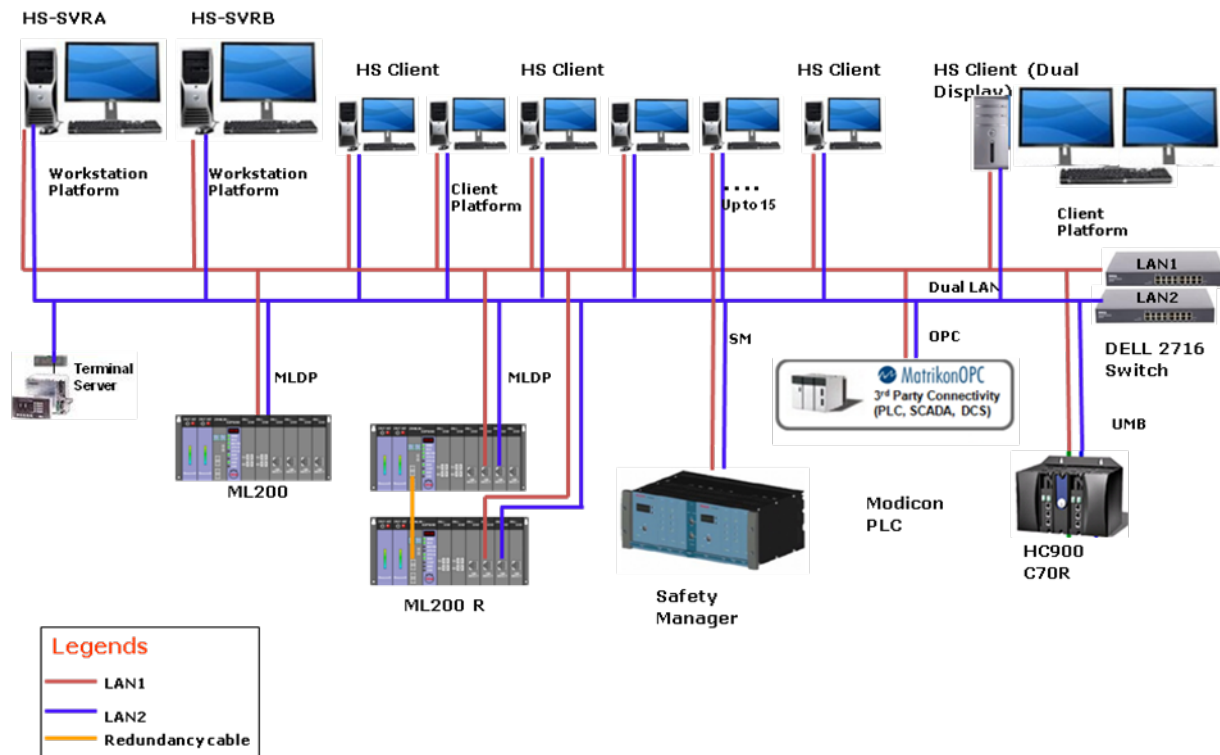
Complete Client/Server System Out-of-the-Box

With out-of-the-box functionality, users simply configure the platform instead of building it from the ground up. Operations can begin soon after point and hardware configuration is complete, using a single computer for the server as well as the client (Station) if desired.

Other client/server components include:

- **Real-time database** – The server database provides data to a number of client applications including Experion Flex Stations and applications.

- **Open connectivity** – The platform incorporates, as standard, open technologies to simplify integration with business and information systems. These technologies include the ODBC driver, Visual Basic scripting, the OPC Client interface, the OPC Data Display Client and the OPC DA server for read/write access to the database.

- **Advanced system infrastructure –**The platform includes, as standard, a complete infrastructure with an advanced alarm/event management subsystem, built-in system displays, configurable reports, extensive history collection and standard system trends.

- **SCADA interfaces** – An array of standard drivers are provided with the platform including support for the HC900 process controller (using Universal Modbus Interface), Safety Manager and FSC controllers, MasterLogic PLC and the S9000/LCS620 controllers, DPR, UMC, UDC, DR and X-Series recorders. Experion HS also supports Modbus {Serial (RTU) and Ethernet (TCP)} Interface. It also includes the Allen-Bradley Serial Interface, the Allen-Bradley RSLinx interface and Allen-Bradley Integration. When the RSLinx interface is used, RSLinx is required (RSLinx to be supplied by user).

- **Scalability** – As system requirements change over the lifecycle of the system, and as your plant expands, so can the platform. Starting with a standard 50-point database, the platform can expand up to 16050 points, supporting up to fifteen Flex Stations. Because each analog point supports eight parameters, control loops can be defined with a single point (a composite point) to lower the number of points required in control applications.

On-board History Collection

The on-board historian is a fully functional and efficient history engine, providing extended historical data storage that is limited only by storage media size.

Experion history data is seamlessly available for use across every Experion Station for trend displays, reports, custom displays, applications, spreadsheets and ODBC-compliant databases.

Flex Station's Versatile Operator Interface

The client-server relationship that presents process data to the user allows a Flex Station to be applied anywhere as long as it has a connection to the server (either on the same computer as the Experion server or remotely over Ethernet). The Flex Station can be deployed in a number of ways as the operator's view to the process.

When configuring Flex Stations you can choose between two different connection methods:

Static – Provides a permanent, dedicated link to the server. This is the recommended connection type for full-time operations.

Rotary – Provides an as required connection to the server. This is the recommended connection type for staff who do not need full-time access. Rotary connections are advantageous from a licensing point of view because the license only specifies the number of simultaneously connected Flex Stations (concurrent-use licensing). Rotary Flex Stations also provide the option of using the Experion Station interface or Microsoft's Internet Explorer. The Internet Explorer interface is ideal for staff that prefer to use familiar desktop tools to view the process and the same licensing and security mechanisms as used in Station apply.

Powerful Trending Increases Operator Effectiveness

Experion HS trending enables operators to maintain appropriate situational awareness to keep the process within desired limits.

Trends can be preconfigured or configured online as necessary by simply browsing the database and selecting the desired point and parameter (up to 32 pens per trend display). Any of the standard history collection intervals can be used as the basis for the real-time and historical trends.

Trends can display data in the following ways:

- Line graphs
- Bar graphs
- Numerical list of historical data
- X-Y plot of the value of one point against another
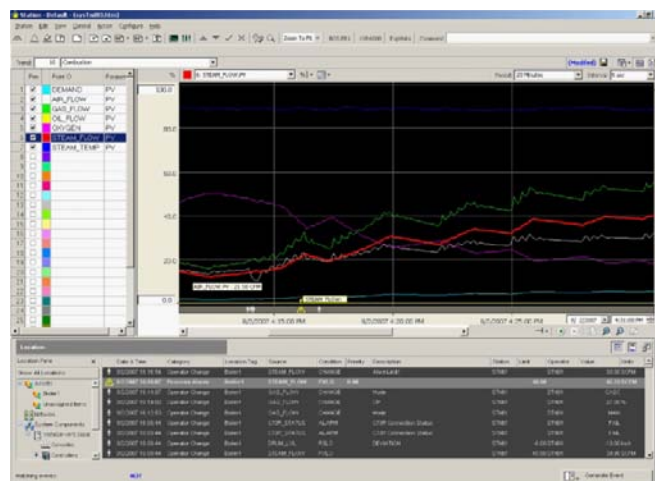
Trend with categorized list of events and associated icon marker on the time axis

Trend functions include:

- View events/alarms in combination with trend data
- Select event and observe marker with description
- Generate operator-entered events/description
- Trend zooming, panning and scrolling
- Hairline readout
- Configurable trend density
- Simple recall of archived history (calendar, time)
- Trend protection
- Smart clipboard support for copy/paste of trend data into Microsoft Excel
- Flexible time period selectors
- Auto-scaling

The declutter feature enables individual traces on multi-type trends to be temporarily disabled for clearer viewing without having to reconfigure the trace. Real-time and historical data are presented together on the same trend. Archived history may be accessed automatically by entering the time period and time and date using a drop-down calendar with the choice of time selector position (at right, left, center or at both ends).

Adding related events to a trend further improves process analysis. For example, an operator might want to view the effect of changing a set point, or the start of a batch, or when an alarm occurred. With Experion HS, these events are clearly visible within the trend and filters allow listing only event types of interest.

Group Displays Provide Intuitive Operation

With standard group displays, you can configure panel board-like displays.
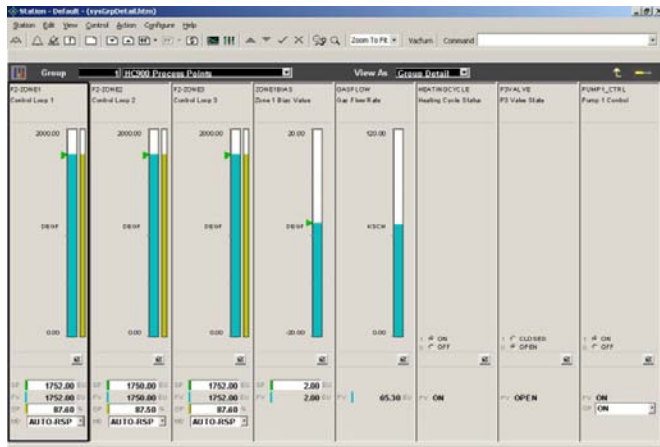
A standard group display enables intuitive control of multiple loops and view of associated points via SCADA faceplates

Each group contains up to eight points using standard faceplates for analog and digital status points. Group faceplates are consistent in design, functionality and appearance with the standard detail displays. Each group has three standard views available including faceplate, group trend (with control parameters accessible) and numeric trend.
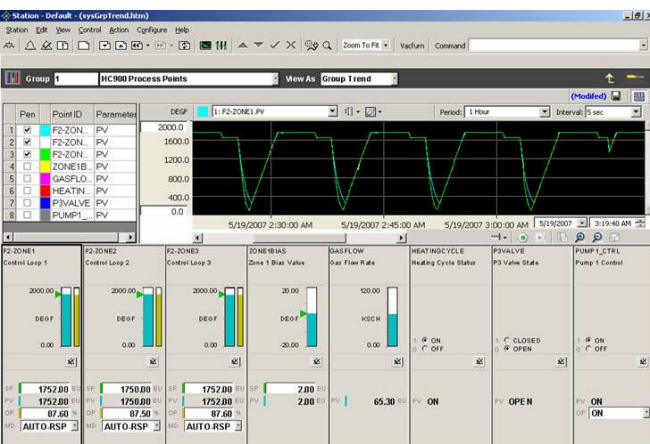

The standard group trend display combines point information with historical trend data

Integrated Alarm and Event Management

The innovative alarm management solutions in Experion HS improve the operator's ability to minimize process interruptions.

Alarm and event analysis feature improvements are based on research relative to technologies for improving the handling of process upset conditions.

The standard Alarm Summary display enables operators to focus more clearly on the problem at hand.
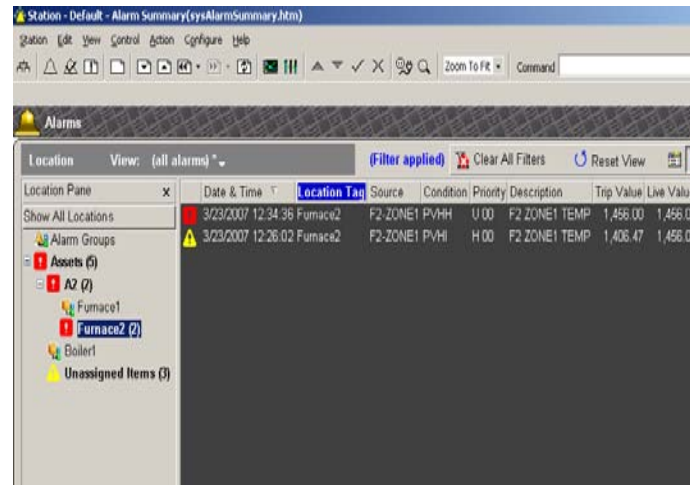

Alarm Summary page showing alarms for a particular asset

Features for alarm and event management

- A selectable Location Pane shows extensive alarm condition details, supports rapid alarm filtering and provides summary alarm count details.

- Alarm summary columns can be customized to suit individual site or operator requirements. Fields can include the actual trip value and current live value along with many other fields.

- A custom alarm summary configuration can be saved and recalled.

- Custom filters can be applied to each column in the alarm display, enabling rapid attention to be focused on problems.

- Alarms can be filtered by priority.

- Single line alarm processing keeps the Alarm Summary display from filling up with a chattering alarm. A single alarm includes details of the time that the alarm originally occurred, the time it last occurred and the total number of times the alarm occurred.

- Operators can easily add comments to alarms and events from the Alarm Summary display either individually or per page.

- Alarms can be acknowledged on an individual or per page basis from the Alarm Summary display or from custom displays.

- Custom alarm priority colors can be configured.

- Archiving can be configured to store events online or to network servers or removable media for accessing later.

- The System Status display provides operators with one place to review the health and status of all components

- The Event Summary display lists system events such as alarms, alarm acknowledgments, return to normal, operator control actions, operator login and security level changes, online database modifications, communications alarms, system restart messages and many other system events.

Tabbed Displays
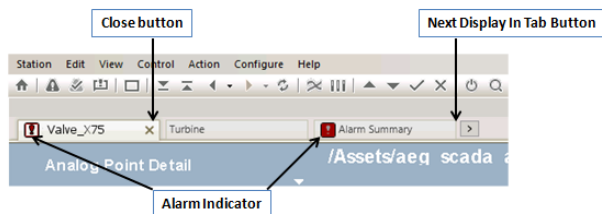
- Provides Tabbed Displays functionality for Station UI
- Tabbed displays are an optional Server-wide setting available for single-window Station as well as multi-window Station (SafeView)
- Operators can call up displays in individual tabs within a Station window, in either an existing tab or in a new tab, and can then quickly move between displays by clicking on the tab of the display they want to view
- The tab of a point detail display and any custom display that is associated with an alarm group, shows an alarm icon representing the "most important" alarm on that display

Integrated SCADA Capabilities

Experion HS offers a rich range of SCADA functionality such as composite point structures, communication redundancy, pre-built detail displays for common SCADA point types and an extensive range of application programming interfaces. Composite point structure represent several field values in a single point. For example, for an analog control loop, the process variable, the setpoint, the output, the mode and all related alarms and other parameters are components of a single SCADA point. These features provide flexible, robust and easy to engineer SCADA capabilities within the Experion system. A range of dedicated communication interfaces utilize a number of intelligent scanning techniques to optimize available controller bandwidth and processing power. Experion performs checks on the integrity of all data received from the controllers and displays communication statistics using a communications barometer. The system recognizes marginal and failure conditions based on user-defined limits to advise the operator of a controller that is in error.

Redundancy

Experion HS provides Integrated server redundancy without the need for expensive 3rd party fault tolerant computing platforms.

Non Redundant to Redundant

- **Experion HS supports conversion of Non Redundant Server to Redundant Server**
- **Pre-requisites**
  - Redundant license available
  - Hardware and Software configuration must be same for redundant pair
  - Non-redundant Server's name must be the base name for the redundant pair
    - For e.g.- If non-redundant server name is "EXPHSR410" then its name should be changed to "EXPHSR410B"and its redundant partner should be named "EXPHSR410A"

In Experion HS user can convert a non Redundant HS server into a Redundant HS server. Following prerequisites must be satisfied before, converting a Non Redundant server into Redundant server. Redundant server license should be available with the user. Hardware and software configuration must be same for the redundant pair. Non-redundant Server□fs name must be used as base name for the redundant pair. For example, if non-redundant server name is "EXPHSR410" then its name should be changed to "EXPHSR410B" and its redundant partner should be named "EXPHSR410A"

Non Redundant to Redundant
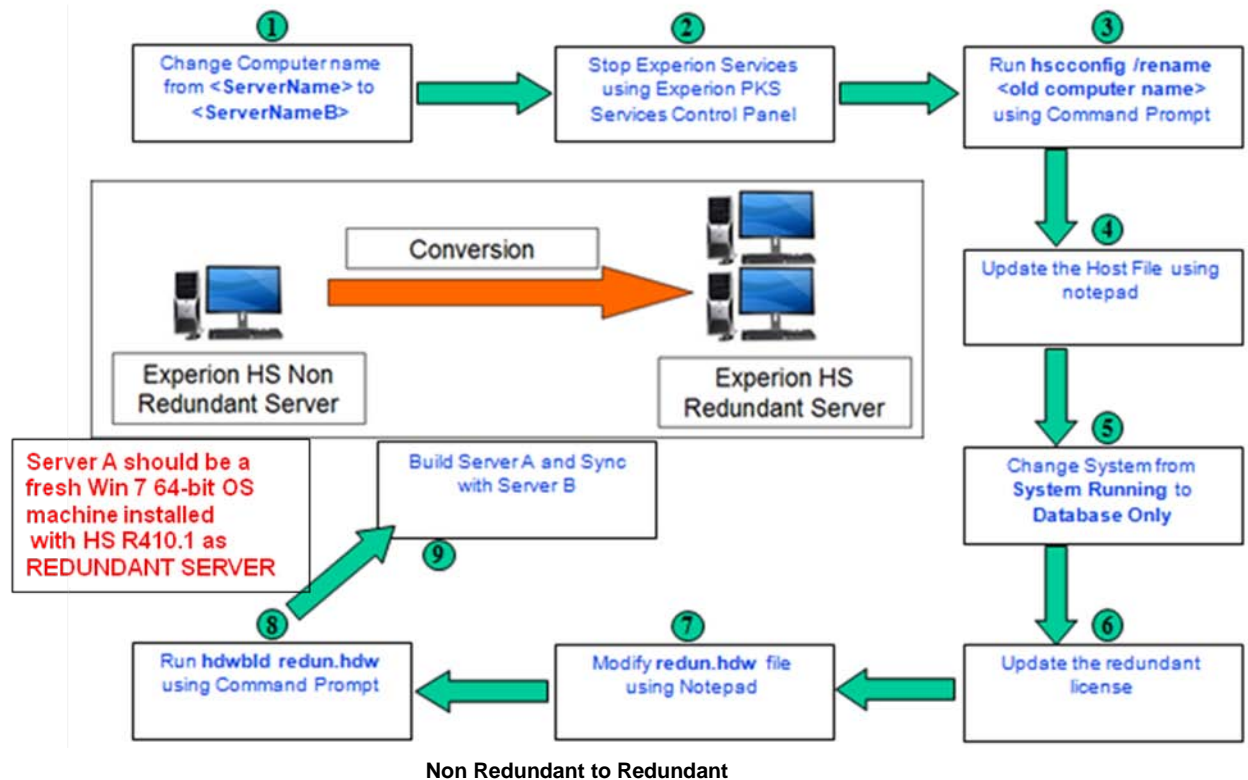
Safety Manager Integration

The Honeywell Safety Manager and FSC interface centralizes process safety information and data from multiple locations within a plant.

Increased operator effectiveness – Integrated sequence of event (SOE), alarming and diagnostic data provides easy access and interpretation of the process and equipment under control. It enhances operator response and provides readily available information and data for operator effectiveness.

Improved process safety management – Extensive system diagnostics down to the field sensors extends the reliability of the safety solution. It improves process safety management of critical processes and the equipment under control.

Improved maintenance – Productivity tools in Experion HS enable faster and more accurate engineering with automatic documentation, improved online modifications and validation, resulting in better engineering and maintenance efficiency.

MasterLogic Integration

Experion HS includes, as standard, Honeywell MasterLogic controller integration, providing considerable engineering savings, integrated system diagnostics and clock synchronization with the MasterLogic controller.

Master Logic 200 Series integration also supports **DISOE** (DI Sequence of Events), **8050 PLC points and 64-bit OS platform**.

HC900 Integration

The platform provides, as standard, integration for the HC900 controller set point programmer and recipe/profile management using the Honeywell Universal Modbus driver. A programmer trend display and a tabular segment display allow easy program supervision by operators.
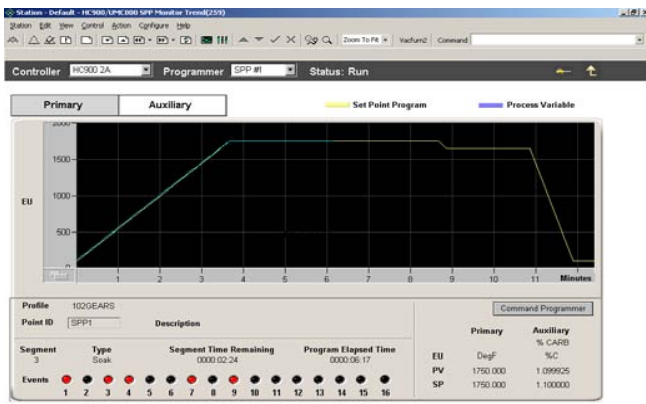
HC900 SP programmer trend display with a pre-plotted profile

HC900 SP profiles can be defined and stored on the server and then directed to a specific HC900 controller. Recipes involving up to 50 HC900 variables can also be defined, stored and then directed to a controller.

Experion HS R410 now allows **access to 32k addresses within HC900 using a single virtual controller**.

HC900 History Backfill

- New licensed option that enables upload of plant history data from HC900 into Experion HS
- Benefit:- **Critical Data Protection and Compliance**
  - Target:- customers with critical data needs; aerospace manufacturing for complete records of the complete manufacturing process, food & beverage where accurate data on manufacturing and warehousing is required, pilot plants for accurate data retention of processes for new product documentation, data centres.
- Secures critical customers from:
  - Network outage
  - EBI server failure / offline
  - Other breakdowns
- At all other times, the Experion HS history database remains the master
- Backfills ONLY occur when plant data is missing

Experion DNP3 Interface

Distributed Network Protocol (DNP3) is an open, standards-based protocol for communication between devices such as remote terminal units and master stations such as Experion HS, used mainly in electric utility, oil & gas, water/waste water industries. The Experion DNP3 Interface supports redundant and non-redundant topologies and offers easy configuration through Experion Quick Builder.

Experion supports StandAlone Redirection Manager

Redirection Manager (RDM) provides high availability and reliability of OPC client connections to OPC servers."

Built-in Reporting

Experion HS provides many built-in reporting functions to help document or analyze process and system events. Standard report descriptions include:

Alarm/Event Report – Reports all alarms and events in a specified period. By using filters, this report provides operators or engineers with a point trace facility.

Alarm Duration Report – Reports the time of occurrence and elapsed time before return-to-normal for specific alarms in a specified period.

Integrated Excel Report – Provides the ability to launch a report built with Microsoft Excel.

Free Format Report Writer – Generates reports in flexible formats, which may include mathematical and statistical functions such as maximum/minimum and standard deviation.

Point Attribute Report – Reports on points displaying specific attributes, such as off-scan, bad data and alarm inhibit.

Point Cross-Reference – Determines database references for specified points to enable easier system maintenance when points are decommissioned or renamed.

Batch Reporting – Enables integrated reporting of batches or lots of a production process run (typically thermal in nature) to be compiled and archived automatically. This feature enables batch history for a set of points (up to 50) and events to be output either as a CSV file or directly into Microsoft Excel. Static batch data can also be added to the report such as batch number, customer name, lot size and so on. Multiple reports may be active, each event-activated.

Reports can be generated periodically or on an event-driven or on-demand basis and can be configured online. Report output can be directed to a screen, a printer, a file or directly to another computer for analysis or electronic viewing.

Scripting

The platform makes extensive use of the VBScript scripting language throughout the supervisory system. Users can create a script that will run when a display is active or scripts can also be attached to server objects like point parameters, alarm events, report completion and other events.

Display Scripting

Users can extend the functionality of graphic displays by writing event-based scripts for display objects. Scripts are typically used to create animation that is not possible with standard functionality.

Server Scripting

The server scripting support allows the behavior of the server and its runtime objects to be extended. Examples of server objects are:

- Server
- Points and parameters
- Reports
- Areas
- Tasks

The user can configure scripts to be run by the server either periodically or when a specified event occurs. In addition, standard displays are supplied to allow users to monitor the status of running scripts.

Recipe Management

With recipe management, you can create recipes and download them to nominated process units. Each recipe can have up to 30 items (database points with parameter selection) with recipes chained together to form larger recipes if required. Recipe items can be used to set ingredient targets, set alarm limits, set timers and place equipment into correct operating state. Items can be individually enabled for scaling. Alternatively, HC900 recipes (with up to 50 HC900 variables, not counted as points) can be created for HC900 controllers.

Virtualization

Fully supported and documented in Experion HS R400. It allows for Experion Stations to be deployed on thin clients. Offers faster deployment of multi-node systems. Provides excellent remote troubleshooting support.

Virtualization Deployment is achieved in this HS R410.1 release using VMware vSphere 5.0 Update 1. For management nodes vCenter Server 5.0 is required.

Flexible Access to Data

ODBC Driver

With the ODBC driver, you can query the server database using SQL commands from ODBC client applications such as Microsoft Access. Experion HS R410 uses Microsoft SQL Server 2008 R2. The server database is exposed as a number of read-only ODBC tables that include points, event history and process history. Driver features include:

- Open read-only access to real-time and historical data
- Throttling to prevent performance impact
- Fully functional examples for productivity improvements

Microsoft Excel Data Exchange

With Microsoft Excel Data Exchange, users can capture real-time point value and history information from Experion HS for display in an Excel spreadsheet using an integrated add-in. Data can be retrieved by using either the Microsoft Excel Data Exchange Wizard or through cell formulas. The captured data can be static or dynamically updating, and can consist of either point parameter or historical data from the server. With the Microsoft Excel's toolset, you can create charts to display and analyze data and you can link values into other OLE-enabled applications.

OPC Server

The OPC DA server allows a third-party OPC client application to browse the server database to establish links for read/write of server point parameters. The OPC server is included with all systems.

Efficient Engineering Environment

HMIWeb Display Builder

Experion HMIWeb technology supports innovative object-based graphics for implementing custom displays online.

This technology is based upon Web standards using HTML as the native display format and provides process graphics within a secure Station environment or from Microsoft's Internet Explorer.

Features include:

- Shape library for plant equipment static objects and the use of shape sequences, dynamic shapes and pop-ups including standard SCADA faceplates
- Advanced custom trend object enabling visualization of real-time and historical process information
- Point browser window allowing drag and drop assignment to objects, filterable by asset
- Visual Basic display scripting for advanced animation
- Extensive toolkit for drawing, alignment and rotation plus standard bar chart, button, combo-box and ActiveX import support selections

- Alarm, event, user-defined tables and alarm state insertion

The OPC Display Data Client allows the display designer to insert OPC data into a display without the need to purchase and build points. This is ideal for data that only needs to be visualized by the operator and does not need to be alarmed or historized. OPC data acquired in this way supports both read and write access to the data.
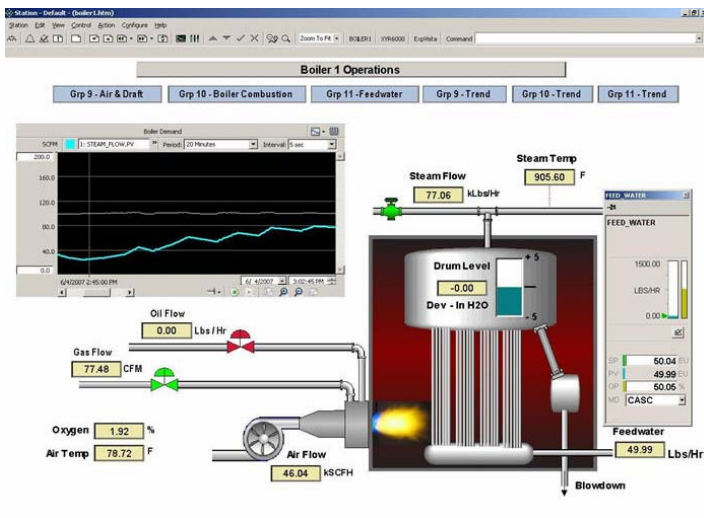
HMIWeb custom display with embedded trend object and interactive faceplate pop-up

Quick Builder Database Tool

Quick Builder allows users to configure points, controllers, Flex Stations and printers for the SCADA application while the system is online. Quick Builder leverages a relational database engine to provide greater productivity through capabilities such as filtering user views and an intuitive Windows interface.
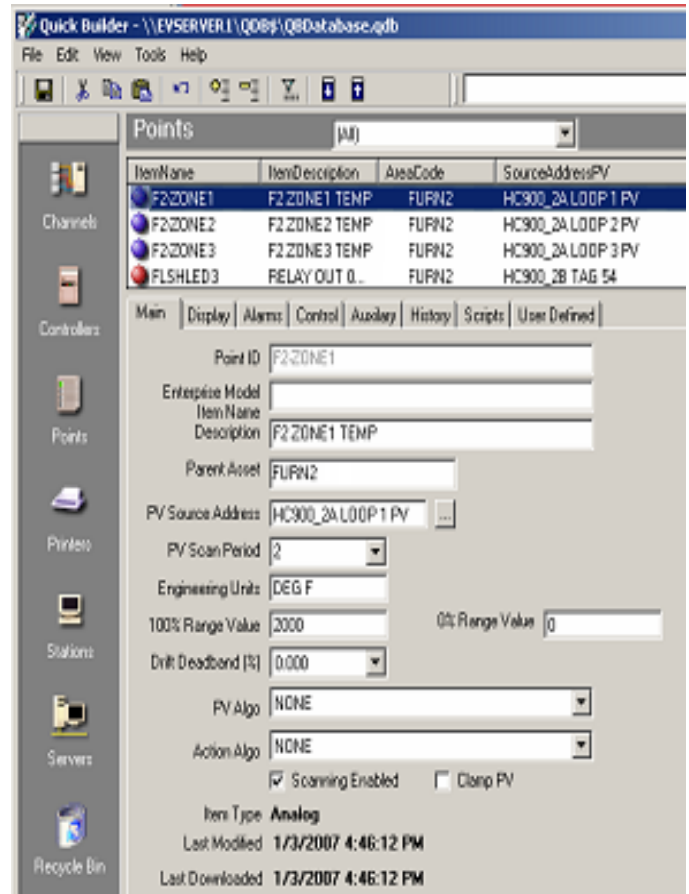
Quick Builder database

HMIWeb Display Builder Enhancements

- **HMIWeb Display Builder Validation**
  - Validates the User's displays and reports the error information to the user
  - Can be used in 2 Modes:
    - **Validate offline** (without connecting to Experion Server)
      - Verify file references in the display are correct
      - Verify display meets the performance guidelines
      - Display error information to the user and highlight the source to facilitate quick correction

- **Validate online** (connected to an Experion Server)
  - Validate offline + Verify data references in scripts and objects

- **HMIWeb Bulk Analysis Tool**
  - Permits the user to select a list of HMIWeb displays and then validates / analyzes the performance for all
  - Excel or CSV Performance analysis report is generated

User Documentation

Comprehensive documentation is available through help menus and a PDF data management tool which provides access and desired information quickly to complete documentation set for Experion HS.

Alarm Pager Option

When important information needs to reach people outside the control room or site, the Alarm Pager uses paging, SMS, e-mail or SNMP traps to escalate operational and system alarms. Alarms can be forwarded to one or multiple recipients, and can be further escalated to another recipient if an alarm remains unacknowledged. Asset and time profiles determine which points should be monitored at a given time and the locations that notifications should be sent. Alarm pagers can be configured to use a service provider or a local base station for the broadcast of pages or SMS messages. The forwarded information can be custom designed to include values such as time, date, point ID, alarm, priority, description and value.

Electronic Signatures Option

Experion HS provides enhanced capabilities to support the pharmaceutical industry and other U.S. Food and Drug Administration (FDA) regulated industries and their unique requirements related to regulations such as 21 CFR Part 11. These features such as electronic signatures are specifically designed to meet the guidelines of 21 CFR Part 11. However, they are also useful to any user with a desire to improve the traceability of actions within their plant. Experion HS R410 with Electronic Signatures and trend backfill together provide a very strong and powerful tool for applications that require Critical data and compliance (for example - aerospace, food and beverage etc.).

Point Control Scheduler Option

The Point Control Scheduler tool allows the user to schedule supervisory control actions at specified times.

This feature schedules the control of analog or status points on both a one-time only and periodic basis, such as daily, on a workday, on a weekend, or on a specific day of the week. For example, a pump could be scheduled to turn on at 4 pm and off at 6 pm each day, or a controller set point could be set to a lower value over the weekend.

Automated scheduling of points

OPC History Data Access Option

The optional OPC History data access client further complements the open connectivity portfolio of Experion HS. OPC HDA can be used to retrieve historical process data into other databases.

Experion IEC-870 Communication Driver

The IEC-870 communication driver provides SCADA communication and data exchange between RTUs using standard IEC protocols such as 60870-5-101 and 60870-5-104. The driver supports redundant and non-redundant topologies and is configured using Quick Builder.

Honeywell Digital Video Manager

Honeywell Digital Video manager (DVM) is a scalable, digital closed-circuit television (CCTV) video solution that sets new standards in cost-effectiveness, flexibility and performance. Combined with Experion HS, operators can view and control video as well as monitor and control the plant or mill from a single user interface, greatly improving productivity. Experion HS R410 currently provides support up to DVM R400.

Experion HS alarms and events can automatically trigger a camera to move to a predefined position and trigger video recordings to start. This enables quick access to recent events by operators and remote personnel.

All DVM alarms and events, including events detected using video analytics, appear within the Experion HS alarm summary display. The alarm summary display includes a DVM icon that displays a pop-up with the recording control embedded, removing the need for the operator to search for video information.
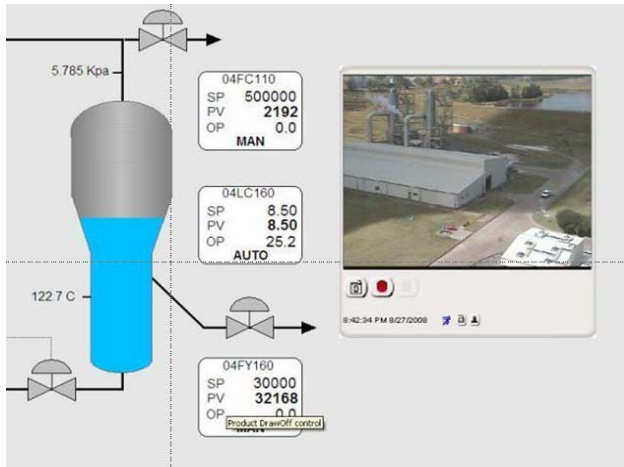
Integrated video with Honeywell Digital Video Manager

Experion eServer

Experion eServer enables users from any location on the business network to view Experion HS custom process graphics securely, from their web browser. Experion eServer is an integrated, view-only solution in a single, scalable package that offers secure access to multiple casual users. Experion eServer standard access is included with the Experion eServer base software and delivers a zero footprint solution for an unlimited number of users. Experion eServer Premium Access is an option that is licensed per concurrent user, providing live updating Experion HS custom displays and trends to casual users. To ensure security, eServer users do not have the ability to control the plant, view system displays or view and acknowledge alarms.

Information Management

Experion HS supports collaboration across the entire business enterprise with Honeywell's information management products. Honeywell's Uniformance PHD consolidates data sources from small to medium sized systems located throughout 'islands of automation'. A PHD database may be centrally configured and managed, gathering data from many systems including Experion HS servers, OPC Servers and other third-party sources. This data is "shadowed" into a single centralized database, allowing engineers and plant management to analyze performance of the entire operation from a single location.

Leveraging Experion PKS Architecture

Using Distributed System Architecture (DSA), Experion PKS systems can access Experion HS data, history and alarms. This provides simple operational oversight from an Experion PKS system while still enabling an Experion HS system to have local autonomy.

Experion$^®$ is a registered trademark of Honeywell International Inc.

For More Information
To learn more about how Honeywell's Experion HS can improve plant performance, visit our website www.honeywellprocess.com or contact your Honeywell account manager.

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