

Next Step in Control System Design Productivity and Quality

Intergraph® and Endress+Hauser

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1. Introduction

Faster ... cheaper ... better. These are the terms increasingly used to describe the goals for project execution and plant operations. In addition, projects continue to grow, both in size and complexity. Given these drivers, larger projects are executed in a global setting with engineering companies and suppliers participating from all over the world.

It is simply impossible to meet these challenges using traditional CAD, older technology, or unproven engineering solutions.

Engineering is teamwork. Likewise, creating solutions involves teamwork. Intergraph® has joined forces with Endress+Hauser (E+H) to provide a state-of-the-art engineering solution. This unique offering combines the market-leading engineering tool Intergraph SmartPlant® Instrumentation and the market-leading instrument supplier E+H. This “1+1=3” solution will benefit both engineering companies and plant owners to meet and exceed their business goals.

One of the most time-consuming tasks during the engineering of a process plant is the specification, selection, and application of field instrumentation. It is not the most expensive component in the plant and is often dealt with as a commodity.

But in a mid-sized refinery, there may be as many as 5,000 devices that need to be specified. At least 10 percent of these devices are installed in critical applications. For example, the devices control plant shutdown when dangerous conditions are detected. Other devices are used for the primary control of the process and the final product quality.

It's absolutely essential to ensure that each device is correctly selected according to its application. For these reasons, the detailed engineering and documentation of instrumentation can sometimes account for as much as 30 percent of plant design time.

In the early design phase of a plant, process engineers specify the need for instrumentation and note the requirements on P&ID drawings. Instruments are assigned to the different tasks required, whether control or simple monitoring. This enables a first estimation of cost. But when detailed engineering takes place, the instrument engineer must document each measuring point on a specification sheet and collate with it the respective documentation and drawings associated with each individual tag.

Initially, the specification sheet has base application information, plus tag and location data attached. The sheet is populated with as much process data as possible at this stage. Completing each specification sheet can typically take one to two hours. This document is the basis for sizing, selection, and pricing of the optimal measurement instrument.

The remainder of the specification document contains device-specific data following the selection of a suitable supplier. This task often adds another hour of the engineer's time, because the respective data must be researched from the manufacturer's datasheets and manually added.

A joint development by Intergraph and E+H now makes it possible for SmartPlant Instrumentation to automate a large part of this process by exchanging the specification sheets electronically. This reduces engineering time because once a device has been selected, the supplier's system automatically populates the specification sheet and attaches all of the respective technical documentation and sizing calculations. This eliminates the need for manual entry, reduces data transfer errors, and can save an estimated more than one hour of engineering time per device. In a plant with 5,000 instruments, this can quickly bring huge savings in engineering time.

2. Partners

2.1. Endress+Hauser

Endress+Hauser is recognized as a leading supplier of industrial measurement and automation equipment, providing services and solutions for industrial processes all over the world. It offers comprehensive process solutions for flow, level, pressure, analysis, temperature, recording and digital communications across a wide range of industries, optimizing processes in regards to economic efficiency, safety and environmental protection.

The Endress+Hauser Group is a globally active, family-owned business. The Group consists of a network of legally independent companies, managed and coordinated by a holding company in Reinach, Switzerland. With over 8,400 employees worldwide, the Group generates annual net sales of approximately US\$1.5 billion. Company-owned sales centers and a network of partners guarantee competent worldwide support. Production centers in eleven countries meet customers' needs and requirements quickly and effectively. For more information, visit www.endress.com.

2.2 Intergraph

Intergraph is the leading global provider of engineering and geospatial software that enables customers to visualize complex data. Businesses and governments in more than 60 countries rely on Intergraph's industry-specific software to organize vast amounts of data to make processes and infrastructure better, safer, and smarter. The company's software and services empower customers to build and operate more efficient plants and ships, create intelligent maps, and protect critical infrastructure and millions of people around the world.

Intergraph operates through two divisions: Process, Power & Marine (PP&M) and Security, Government & Infrastructure (SG&I). Intergraph PP&M provides enterprise engineering software for the design, construction, operation, and data management of plants, ships, and offshore facilities. Intergraph SG&I provides geospatially powered solutions to the public safety and security, defense and intelligence, government, transportation, photogrammetry, and utilities and communications industries. Intergraph Government Solutions (IGS) is an independent subsidiary for SG&I's U.S. federal and classified business.

Intergraph is a wholly owned subsidiary of Hexagon AB, (Nordic exchange: HEXA B) and (Swiss exchange: HEXN). For more information, visit www.intergraph.com and www.hexagon.se.

3. Solution

Intergraph and E+H have teamed up to provide an innovative offering that offers the best of both market-leading solutions. The graphical workflow (Figure 1) shows the four steps of this process, which are explained further in this section of the white paper. The solution as described is delivered out-of-the-box by both companies. SmartPlant Instrumentation instrument specification forms can be customized to meet your company standards.

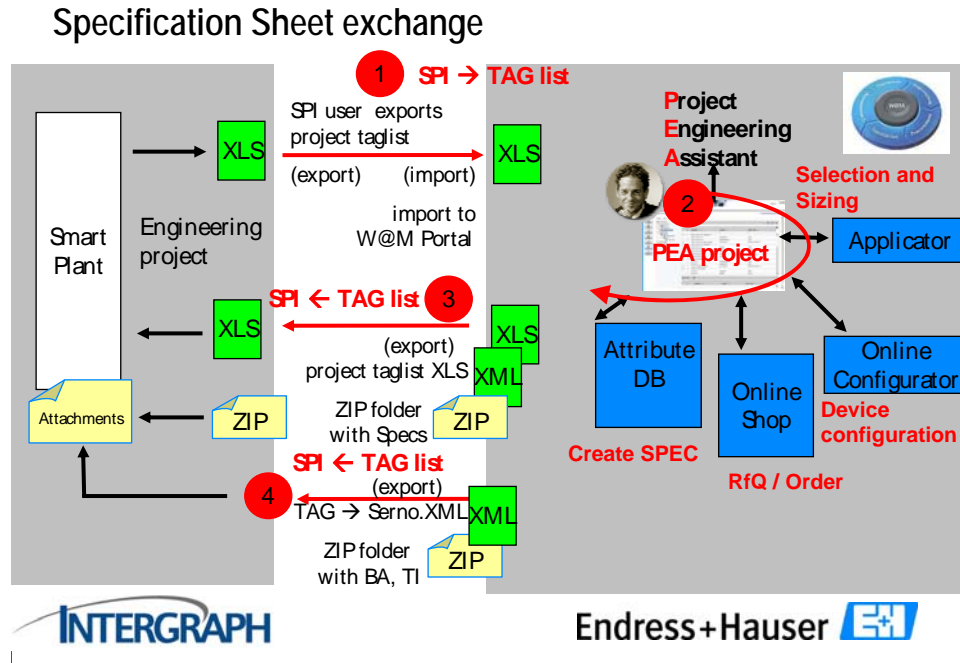


Figure 1: This is an example workflow with four steps showing the Intergraph and E+H solution.

3.1 Example Workflow

3.1.1 Extract XLS-based data from Intergraph SmartPlant Instrumentation and import into E+H W@M Portal

3.1.1.1 Actions in SmartPlant Instrumentation

The SmartPlant Instrumentation user selects the relevant tags and exports the basic specification sheet information such as tag and measuring task to a spreadsheet using the SmartPlant Instrumentation browser module. This spreadsheet is mapped to meet the import structure of E+H Project Engineering Assistant (PEA). When the PEA user imports the tag list, a new project is created within the system.

3.1.2 Detail specification and creation of spec sheet

3.1.2.1 Actions in E+H W@M Portal

The detailed specification of the instruments is derived using specific engineering tools (Applicator and Configurator¹). Next, the tag-related specification sheets are created and stored against the respective project. Three standards are available: E+H format, NE 100, and ISA SP20.

3.1.3 Export XLS-based data and spec sheets from W@M Portal and import into SmartPlant Instrumentation

3.1.3.1 Actions in E+H W@M Portal

The user selects the tags in the project that should be exported. The export creates a spreadsheet and a ZIP file. The spreadsheet is mapped back again to the spreadsheet format of SmartPlant Instrumentation. The ZIP file contains an XML file and the specification sheets, plus associated documents in PDF format. The XML file holds the information surrounding which spec sheet refers to which tag in the tag list spreadsheet.

3.1.4 Export device-related documentation from W@M Portal and import in SmartPlant Instrumentation

3.1.4.1 Actions in SmartPlant Instrumentation

Once the project enters the “as-built” phase, this final step enables the SmartPlant Instrumentation user to import all instrument-related documentation, such as the operating manual and initial calibration certificate, into SmartPlant Instrumentation.

The “as-built” data in the Project Engineering Assistant is updated with the serial number information of the ordered devices and stored in the W@M Life Cycle database. From the Installed Base Assistant, the user exports the data and imports the data, according to the functional possibilities, into SmartPlant Instrumentation.

¹ *W@M is an open web-based solution from E+H that facilitates device-specific life cycle information for the installed instrumentation. All information on the installed device is traceable by tag number, project number, or serial number. Applicator and Configuration are engineering tools that enable the sizing and configuration of the most suitable instrument for the application. These tools provide as output all the engineered parameters, such as accuracy and pressure drop, which are necessary to ensure optimal measurement performance.

3.2. Mechanics

The example workflow outlined in section 3.1 is available today. Solution development was based on requests from several companies in the industry.

Both partners, Intergraph and E+H, are committed to upgrade this mechanism to comply with the PROLIST NE100 standard. This standard was originally developed by a German consortium, but has been adopted by ISA and many others in the industry.

By offering this initial step, Intergraph and E+H provide a workflow that generates value today. In addition, the partners will learn from industry feedback, which will facilitate better and easier implementation of the standards-based solution.

3.3. Benefits and Value Proposition

This simple workflow ensures automatic exchange of specification information and enables direct population of the specification sheet. Plus, it transmits all necessary supporting sizing documentation in PDF format, for example. This makes the workflow paperless, eliminates manual entry errors, and reduces the engineer's work time by a minimum of one hour per datasheet. With the ability to map changes, it also ensures traceability of work across the design to the procurement stages and into the plant operations phase

In the design of a typically sized plant with 5,000 devices, saving one hour per datasheet amounts to two-and-a-half man years of engineering time.

The operational phase is obviously the longest lasting phase in the plant's lifetime. The ability to keep plant data current and the ability to efficiently find device history deliver significant value. SmartPlant Instrumentation offers version tracking. Updated information is marked and can be reported to support the management of change process and ensure that best practices are installed and maintained in the facility to lower operational risks.

4. What's Next

Intergraph and E+H are working to improve the solution over time. Topics in discussion and planning include automatic download of device-specific drawings, electrical design macros, and 3D models.

The E+H W@M environment already offers complete instrumentation traceability. Once the device is produced, then serial number data is created specific to the device. For each instrument, a unique record is created. In addition to holding the as-built specification sheets, it contains all information on the instrument, including hardware, software version, specific spare parts information, and operating manuals. This offers great benefit to an owner operator. Even 10 years after the plant has been in operation, the device data and original engineering datasheets can easily be retrieved.

For SmartPlant Instrumentation users, this traceability can be directly linked and integrated into the owner operator's solution. Information is easily retrievable, 24/7.

Application integration overview with SmartPlant

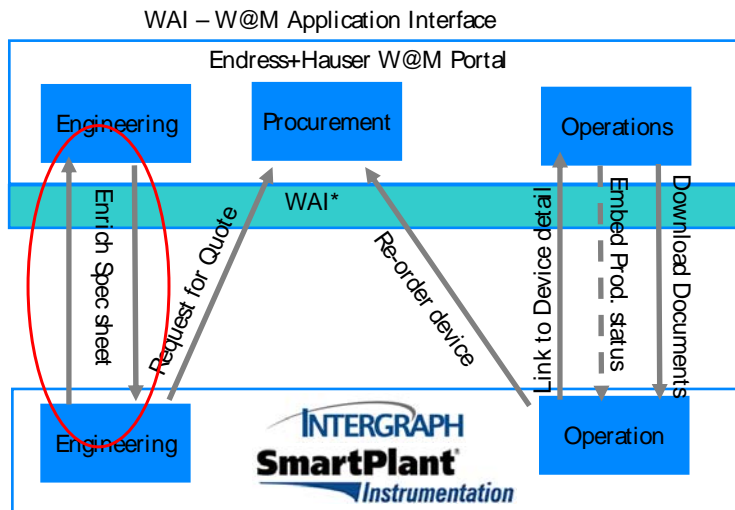


Figure 2: Users can take advantage of a robust application interface with the E+H W@M Portal and SmartPlant Instrumentation.

5. Conclusion

Intergraph has joined forces with Endress+Hauser (E+H) to provide a state-of-the-art engineering solution. This unique offering combines the market-leading engineering tool Intergraph SmartPlant Instrumentation and the market-leading instrument supplier E+H. The solution offers significant value for both engineering companies as well as plant owners.

Intergraph and E+H are dedicated to support industry standards covering this type of work process, making it an open and flexible solution for all parties. Both solution partners are committed to their solutions and have a long track record of successful projects and customer support.

The best offerings are always created by teamwork of three parties: the customer, the solution provider, and the supplier. The Intergraph and E+S solution is built with this principle in mind.

Intergraph and E+H are actively gathering customer inputs to further improve this best-in-class offering to better support the business challenges in the industry. We look forward to hearing from you. To begin the conversation, please e-mail ppm@intergraph.com.

For more information about Intergraph, visit our website at www.intergraph.com.

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