Dow and ABB sign global automation systems agreement

What Smart Thinking Can Do

Scott Spencer, Per Fjelldalen

Recently, The Dow Chemical Company, one of the world's largest producers of chemical, plastic and agricultural products, signed a ten-year global agreement with ABB for the supply of Industrial^{IT} systems for its worldwide production facilities. What makes this contract so special is that Dow has traditionally developed, manufactured and supported its own automation technology. Now, Dow has decided on a strategic shift: to use a commercial, off-the-shelf automation solution instead of developing its own proprietary automation.

Dow decided after a lengthy evaluation that ABB's Industrial^{IT} solution best met its business needs. Key requirements for Dow were an automation platform which would support engineering re-use and data consistency. Further, the automation system had to ensure very high availability to support Dow's high asset utilization business model and demanding safety standards.

In the early 1980s Dow began to produce its own automation technology. The company estimates that in the meantime over one million I/Os have been automated with various generations of this technology. Arnold Allemang, Dow executive vice president of operations, explains: "Dow has been a pioneer in the development and application of process automation. Historically, we have produced and supplied our own automation platform because the commercial marketplace did not offer a solution that met our needs."

In recent years, Dow has concluded that current generations of automation, like ABB's Industrial^{IT}, could supply many of the functions previously available only with Dow's proprietary system. If Dow could switch to a more commercially available system, it could eliminate the expense of supporting its own platform. In addition, because systems such as Industrial IT have a much larger sales volume than anything Dow's system could approximate, Dow's

overall 'cost of automation' should be reduced.

These benefits for Dow could only be realized if it could find an automation platform with all the functionality necessary to support its key automation requirements: engineering re-use and consistency, plus high availability. Ultimately, Dow selected Industrial IT from ABB. "Dow must have a system providing high operational reliability and state-of-the-art engineering tools which are not only critical to maintaining the high performance of our production facilities, but also enable us to explore new automation frontiers," continues Allemang. "We believe that Industrial IT is the best solution for our needs. This will allow us to focus our highly skilled process automation employees on innovative, unparalleled automation techniques, creating competitive advantage for our business. Additionally, the connectivity of ABB's system allows us to easily provide the information needed by our business leaders to excel in our dynamic and challenging business environment."

Identifying the key Dow requirements

In June, 2000, Dow inquired into ABB's interest in pursuing Dow's automation needs. Dow had assembled a list of its 30-plus key requirements, and wanted to know if ABB would be available to deliver the key functions.

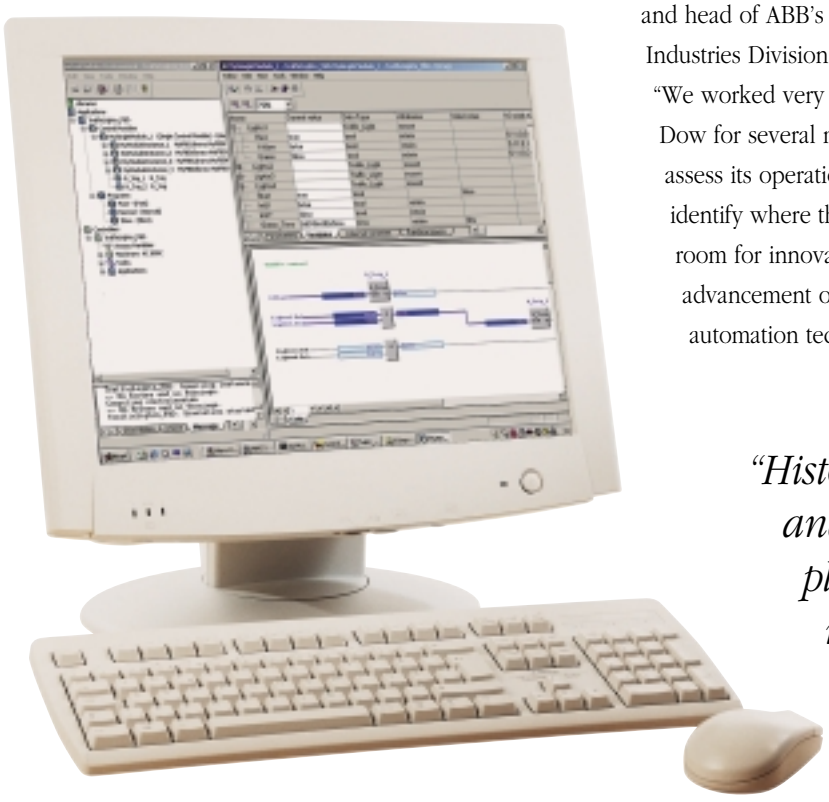
The story is picked up by Dinesh Paliwal, executive vice president and head of ABB's Process Industries Division:

"We worked very closely with Dow for several months to assess its operations and identify where there might be room for innovation and advancement of its process automation technology. We quickly discovered that linking the operations with customized solutions using open architecture software and hardware would result in dramatic productivity and efficiency improvements."

ABB subsequently assigned a dedicated team of scientists, engineers and sales people to analyze and assess Dow's complex, high-tech operations and key automation requirements. The team worked closely with Dow at locations around the world, eventually proposing an integrated solution with Industrial IT for linking the myriad plants in Dow's portfolio.

Engineering tools

One of the key features of Industrial IT is its ability to support and enforce 'best in class' engineering standards for Dow's global manufacturing facilities. In the past, Dow has maintained a 'library' of pre-configured and validated software applications as a basis for all their worldwide automation needs. This library, called 'Most Effective Technology' by Dow, was key to ensuring that every one of Dow's plants around the world



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The Dow Chemical Co.

was using the same, consistent and field-proven application, regardless of its location. Dow considers this a key factor in ensuring safe, reliable and optimized performance of each of its manufacturing assets.

Industrial IT is able to deliver this key functionality through its Engineer^{IT} application. Engineer^{IT} is a powerful suite of engineering tools that provide major efficiency improvements in project engineering, maintenance and operation of assets and plants.

The Engineer^{IT} suite provides effective tools to transform design specifications automatically into project documentation and executable control code, based on re-usable solutions. Any information pertaining to an individual asset is available from any area in the plant system.

The breakthrough in developing this functionality with Engineer^{IT} is Industrial IT's powerful object-based architecture. An 'object' can represent a physical or logical part of the automation installation, such as a valve, pump or actual batch, and also process units or combinations of hardware units. All information belonging to those 'objects' is structured in functional windows called 'aspects'. Aspect information can be, for example, historical data, process signal data or technical specifications.

With applications supporting these comprehensive information views, the user is free to concentrate on effective engineering instead of spending unnecessary time searching for information. Industrial IT's object-based structure supports two dimensions of information access and views: the asset lifecycle dimension, including design, implementation, commissioning, operation and asset optimization; and the operation dimension, from production to business management. The combination of consistent data, re-used after engineering, and powerful maintenance tools greatly increase overall plant productivity.

Engineer^{IT} provides a tremendously powerful platform on which to build a portfolio of re-usable solutions for engineering. The benefit of this is greater engineering efficiency and better use of the 'knowledge assets' of plant and engineering personnel.

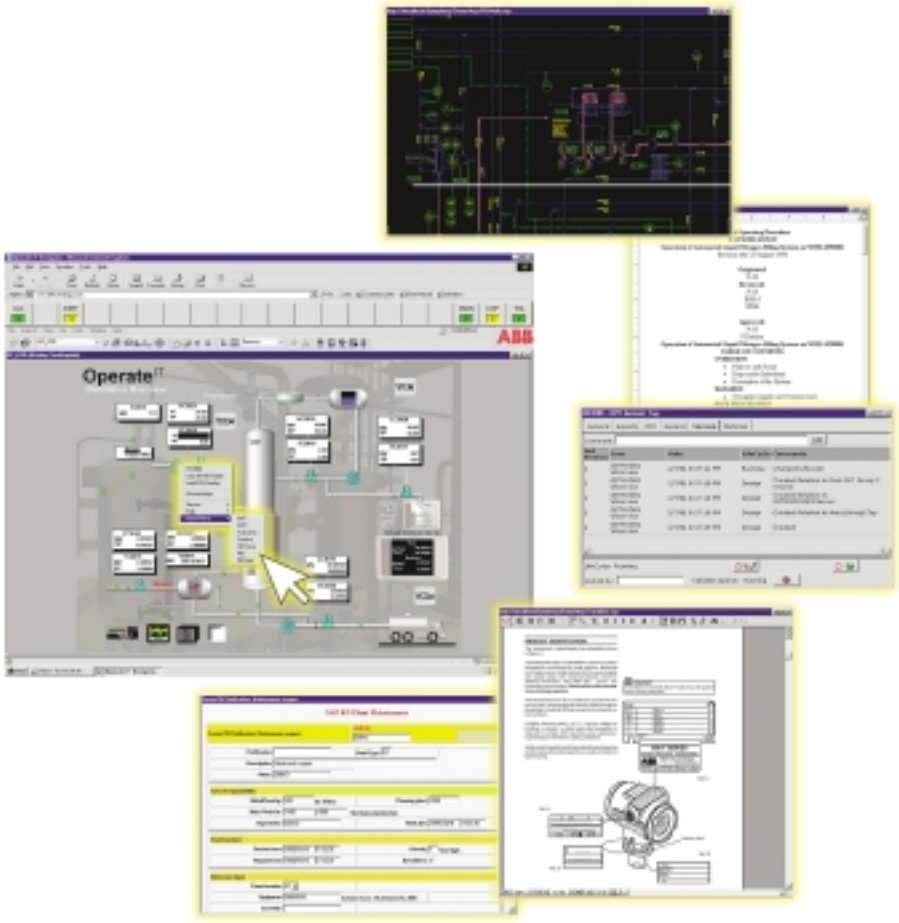


ABB Object and Aspect systems, providing direct access to all relevant information about plant entities, in all contexts

Industrial^{IT} supports high availability with a common control and safety platform

As reported recently by the Automation Research Corporation [1], "Dow's business principles are guided by three things: safety, minimizing impact on people, and minimizing impact on industry and the community. These principles have led them to create a highly secure control system architecture. The system is unlike most

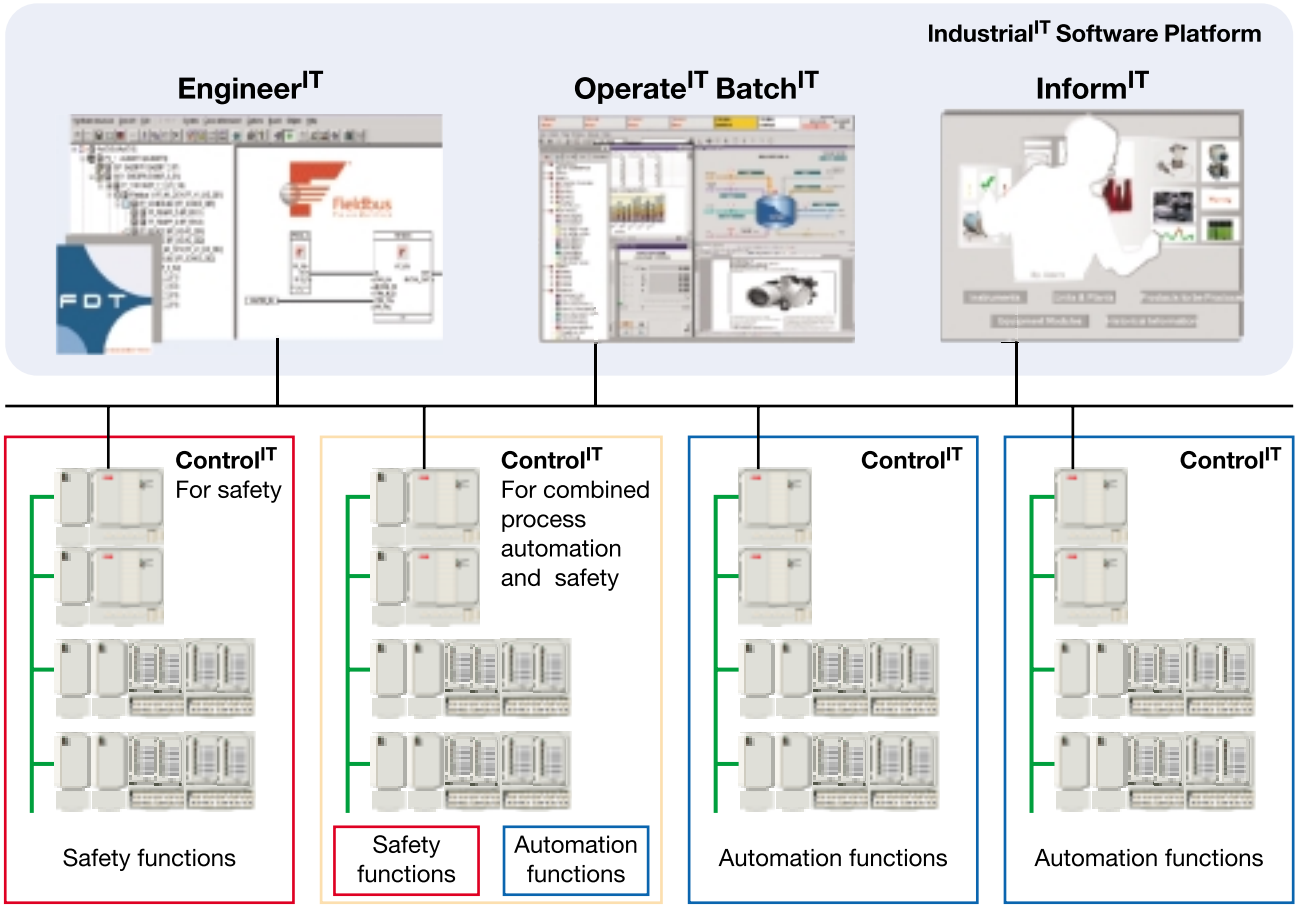
systems deployed in industry today. It was designed to be as bulletproof as it could be made, while at the same time allowing Dow's automation experts to continue to advance their application know-how." Having automation technology which could support Dow's requirements for high operational reliability was critical.

Within the automation industry, 'system availability' is a way of measuring the continuity of system operation with respect to different reliability aspects of process control, ie general process automation, business critical control and safety control. Reliability performance can be verified by several third-party agencies. To adequately support the replacement of its proprietary system, Dow required a process control system or an integrated process control and safety shutdown system[1] in which system reliability and diagnostic coverage are expressed in terms corresponding to published standards such as IEC 61508.

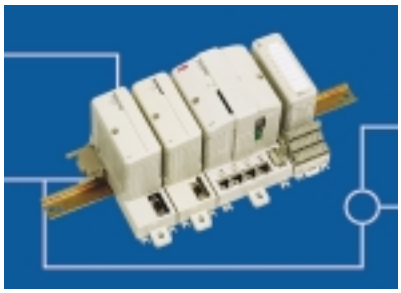
Of those systems available in the automation marketplace, the ones dedicated for use as 'safety systems' are generally the only ones capable of providing the level of availability required by Dow. However, safety systems are generally optimized to support the 'safe control' of a plant, and are not commonly used for 'process automation' purposes. Dow wanted the highly optimized

[1] The term 'integrated process control and safety shutdown system' refers to a system in which the control software and the safety shutdown software execute on the same controller.

Industrial^{IT} integrated control and safety system



ABB's Industrial^{IT} modular controller assigned to supporting both 'control' and 'safety' solutions



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'availability/reliability tradeoff' of a safety system, but with the functionality of a 'process automation' system. Safety is best accomplished through stable, well-controlled and uninterrupted processing.

Industrial IT is able to deliver the high-availability 'integrated control' solution required by Dow due to its architecture, which makes use of a high-integrity, common hardware and software platform for both control and safety, and which maintains the required safety integrity regardless of the system configuration. Thus, instead of using two different systems (with two different engineering tools, hardware platforms, maintenance tools, etc) for control and safety, Dow can use one with Industrial IT. Using one set of application software (ie, Operate^{IT}, Engineer^{IT}, Produce^{IT}), with one set of control and I/O platforms (Control^{IT}), Dow can develop either applications for general process control, or applications capable of satisfying the requirements for Safety Integrity Levels 2 or 3. Ultimately, this Industrial IT flexibility allows Dow to focus on application development and engineering re-use, instead of worrying unnecessarily about certain aspects of system configuration, multiple engineering tools or platform maintenance.

The way forward

Dow began purchasing Industrial IT systems in the second half of 2001, and will use them to support pilot plants in the USA and the Netherlands. The remainder of 2001 and early 2002 will be used by Dow to develop its 'Most Effective Technology Library' for Industrial IT. Dow expects to be buying Industrial IT systems in significant volumes by late 2002 or early 2003.

Dow's confidence in Industrial IT

Dow wants to use a standard commercial system, not a customized proprietary product. Dow is proud of the fact that with each incremental release of its own proprietary system, the functional capabilities increased. This is a trend it needs to continue, only with Industrial IT as a replacement. With ABB's Industrial IT, Dow is confident it can continue to improve its performance in areas which give it competitive advantage through:

- Support of chemical industry Responsible Care Programs
- Increased asset utilization
- Reduced process downtime
- Highly efficient engineering supporting lower project and maintenance costs.

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Reference

[1] **Dick Hill**: The Dow-ABB Agreement Could Be a Win-Win-Win. ARC Insights 2001-027MH&MP. ARC Advisory Group, June 2001.