Automazione Industriale

COMPONENTI,
SISTEMI E SOFTWARE
PER L'AUTOMAZIONE

ORGANO UFFICIALE DI
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Published in **Automazione Industriale** - September 2010

Protecting knowledge improves processes

Invensys Operations Management standardized its operations with PAS to reduce project risk and increase quality. The starting point is better organization of plant knowledge and data.

di **Roberta Tosi**

As a leading player in the field of automation and information technology decreasing the time to implement automation and information projects while reducing risk are key priorities for Invensys Operations Management. Recently, Invensys has adopted PAS' Integrity Software in order to automate the capture and management of the highly complex configuration of process automation assets, from field devices to advanced applications such as production management systems. It is increasingly understood that the investment in the initial configuration and subsequent evolution of a control system traditionally accounts for many times the cost of the equipment itself, a fact well understood by PAS with its background in system integration and extensive process knowledge. As a direct result of this experience PAS has developed an increasingly acclaimed range of software applications that help both systems integrators and subsequently users to improve system performance and manage information more effectively.

Factory Acceptance Testing (FAT) is a good example of how Invensys has benefited from the use of Integrity software. Neil Holden, vice president of global processes and systems at Invensys Operations Management explains. "Integrity provides us with a 'snapshot' of the system immediately prior to FAT and a detailed record of the changes that are made on the fly during the process. It also provides an orderly means to record any work that has been identified but not implemented and is to be carried out after FAT. Because changes are documented automatically, the risk of missing something is greatly reduced, an enormous quality benefit to our clients giving both time and cost savings." Another important benefit for Invensys and its clients is management of information flow among physically remote engineering sites: "Working as we do with multiple engineering centres and regional offices worldwide, Integrity helps us manage the flow of information and error reporting between sites. This gives us better efficiency and our clients see the results of this both in trouble free acceptance testing and in overall quality," Holden adds.

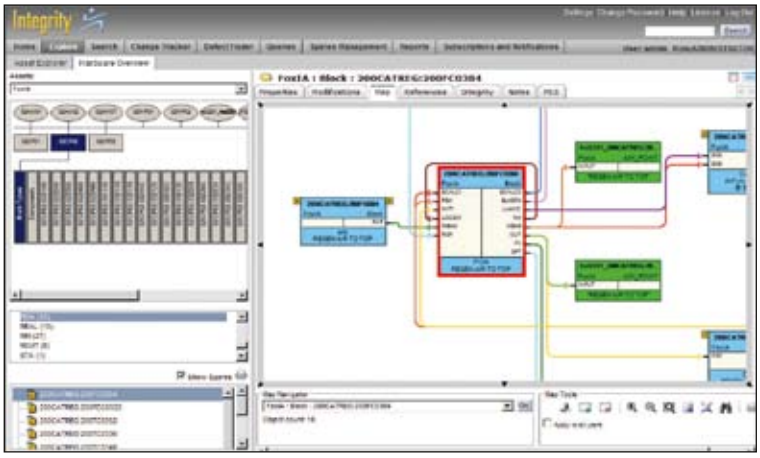
At the Site Acceptance Testing stage (SAT), much the same process is applied, but as a result of the quality of information in the earlier stages, far fewer problems are identified, again reducing cost and risk both for Invensys, and most importantly, for its customers.

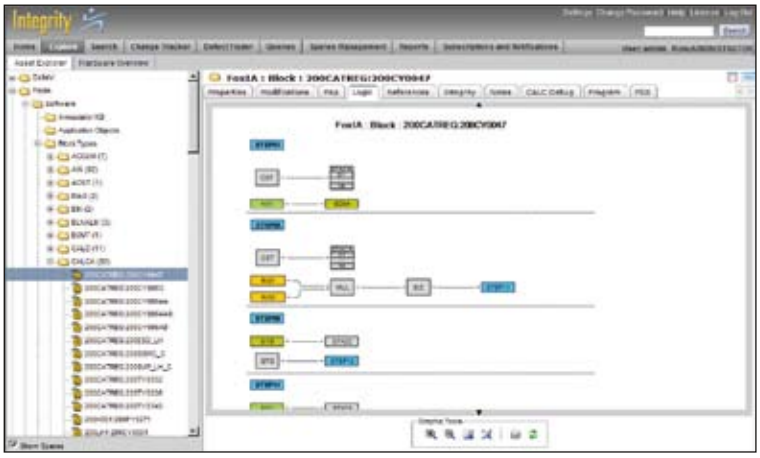
Nick Cappi, Product Manager, at PAS explains. "Integrity Software provides benefits throughout the project lifecycle. As early as the bid and proposal stage, Integrity can be used to map and understand an existing system. It can do this because Integrity has a large and growing family of Asset Models that convert source data into a common data format for storage within the Integrity database. Currently some fifty Asset Models are available, covering most popular DCSs, PLCs, safety systems, HMI/SCADA packages, historians and asset management applications as well as Microsoft Office and SharePoint. The ability to map and contextualize these different hardware and software products and their complex interactions is essential to producing a comprehensive single view of all the systems. This view can then be used to define the scope of work for the purpose of tendering and, of course, eventual implementation."

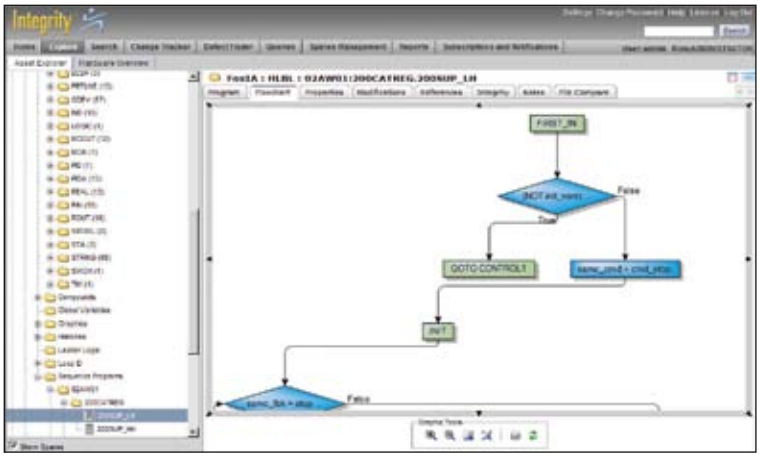
To appreciate the extent to which Integrity simplifies the visualization of related information in context, consider the three screen images showing part of an Invensys Foxboro I/A Series Distributed Control System (DCS) viewed by Integrity. Fig 1 shows signal genealogy and control strategy for a PID block. Fig 2 is interpreting the logic of a Calculation performed in a Foxboro I/A Series DCS and turning that into a simple to understand block drawing. Fig 3 is interpreting the logic from an I/A Series HLBL (High Level Batch Language) program and converting that into a Flow Chart.

The availability of a comprehensive suite of Asset Models was a major factor in the selection of Integrity by Invensys. A significant number of their projects involve migrating legacy systems to newer releases, which often includes integration with multiple third-party systems. Users want the benefits of more powerful and reliable technology, but the changeover process exposes them to risk, not just of downtime, but also the loss of process expertise which is embedded in the configuration of the automation system. Now, by using PAS' Integrity software, Invensys can capture and preserve that valuable knowledge efficiently and reliably.

The Integrity map is then used to ensure that all existing configurations are replicated in the new system. Additionally, the Defect Finder module in Integrity software identifies configuration mismatches and common mistakes long before Factory Acceptance Testing (FAT). This methodology reduces both engineering man-hours and elapsed time for the project and ensures optimal quality for the end user.







The three screens show the elements of a DCS Foxboro I / A Series of Invensys Operations Management. The first shows signal genealogy and control strategy for a PID block. The second is interpreting the logic of a Calculation performed in a Foxboro I/A Series DCS and turning that into a simple to understand block drawing and the third interprets the logic from an I/A Series HLBL (High Level Batch Language) program and converting that into a Flow Chart.

Integrity also enables Invensys to validate the newly configured system against their Best Practice standards and automatically maintains a record of changes made throughout the project.

Adopting Integrity proved to be trouble free. Invensys worked closely with PAS to implement a pilot program at a number of sites across the world in order to gain input from each of their global

delivery teams. Holden again: "We were pleased to find that only a small amount of training was needed. We worked initially from PowerPoint and Web sources, it really was very straightforward. We now use Integrity in each of our five engineering centres around the world, with the largest number of applications being in the USA. We are seeing definite improvements in productivity, as well as improved consistency. However, the biggest benefit is to our customers in the form of assured quality. Using Integrity means that there are very few errors and consequent rework". Invensys now offers Integrity to customers as a built-in configuration management solution on new systems.

The need for comprehensive documentation is just as important once a system has been commissioned. During its life, in fact, users continually add to the knowledge that is embodied within it, often simply in the form of small incremental changes and additions to the configuration. These changes are implemented to overcome a problem or to improve a process and, typically pressed for time, plant operators or engineering staff put off the documentation to another day, a day that sometimes never comes.

People forget or, with the retirement of 'baby boomers' becoming a major factor for many companies, they simply leave the company. One leading US refiner recently reported losing 2500 man-years of operator experience through retirement at a single site in one year.

Vital production knowledge embedded within the automation system may include process chemistry or product recipes critical to the company's competitive position. It may include measures to comply with safety and environmental regulation. Deeply embedded in the detail of the automation system this knowledge may be lost unless it is captured by comprehensive and, above all, up to date documentation. To counteract this, an automatic update of the system documentation is performed by Integrity software. These up-to-date backups that are automatically created by Integrity software also provide a reliable means for recovering from a data disaster. In the event of catastrophic loss of configuration in automation systems, Integrity software provides a simple approach to quickly reconstitute and reload the affected assets with the most recent database.

Those customers who choose Integrity for configuration management also benefit from a number of additional capabilities, such as spares capacity management, workflows for managing changes, and management of automation-related Common Operating Environments.

Integrity also facilitates the transfer of practical knowledge among plant personnel by incorporating the knowledge into its database and making it available at their operator consoles and historian user interfaces. Practical knowledge can be in the form of text, audio, or even video files. To encourage contributions from staff pressed for time, a Notes facility allows messages to be entered and attached to any plant asset or information object in the Integrity database. This information is then presented to users in context regardless of where it originated.

In most plants today, email has become the primary means of communicating process-related information. As a knowledge transfer mechanism, while convenient to use, email is problematic in that it is isolated to only the sender and designated recipients, thus limiting its accessibility on a wider scale. Furthermore, emails are subject to being lost or deleted. Capturing, preserving and providing easy access to practical knowledge within emails is critical to plant safety and operations. Integrity Email Explorer allows users to designate important email messages to be included in the Integrity database where they are made available, in context, to all who need the information they contain.

A final word from Neil Holden at Invensys, "Our clients are already seeing the benefits of Integrity through our use of it during the implementation of projects, and we confidently expect that Integrity will be integral to the future day-to-day management of systems. An automation system is much more than just a tool for operating a plant, it is the repository of priceless proprietary knowledge that deserves to be managed intensively. An Invensys automation system incorporating Integrity is the best means available to capture, organize and leverage that knowledge." ■

For more information

Invensys Operations Management
www.iom.invensys.com
PAS
www.pas.com