

Fieldbus Integrates Digital Control

"FREEDOM TO CHOOSE" AND "POWER TO INTEGRATE" ARE THE BUZZWORD PHRASES FOR FOUNDATION FIELDBUS. But what do these words really mean? FOUNDATION fieldbus is a networking standard supported by 200 of the world's leading suppliers and end users of process control and manufacturing automation products. Hence, end users have the freedom to choose from a long list of interoperable products, each of which has passed a rigorous device registration process to ensure compliance with the networking standard. And, FOUNDATION fieldbus enables the integration of a manufacturer's plant and global enterprise through the High Speed Ethernet (HSE) backbone. Businesses can optimize enterprise performance by distributing control functions, and the accompanying risk, to enable higher, more secure up-time.

How did this networking standard gain such large-scale support? A history lesson puts it into perspective.

With the introduction of distributed control system (DCS) technology in the 1970s, processing plants were able to distribute intelligent control throughout the facility. These large, expensive DCSs did their jobs very well—controlling complex processes by monitoring sensor data, correcting for process variable setpoints and executing a control decision, such as closing a valve or turning on a pump. The field devices—sensors, transmitters, valves, pumps, for example—had little, if any, communication with each other and sent minimal data to the DCS. Typically, field devices communicated to controllers using pneumatic or 4-20 mA analog signals.

In the 1980s, much effort was expended trying to develop a digital communication standard for field devices. Credit is due those members of the Instrumentation, Systems and Automation (ISA) Society's SP50 committee who spent years defining technical requirements and building consensus for a digital fieldbus. In the interim, several process control suppliers started work on their own proprietary digital communication standards.

These multiple efforts resulted in several competing protocols, none of which could work together. Many years and committee meetings later, members of industry groups for two of these standards pooled efforts. On September 23, 1994, World Factory Instrumentation Protocol (WorldFIP) North America and the Interoperable Systems Project (ISP) Foundation members voted to form the Fieldbus Foundation.

SHARED STANDARD

No individual company, nation, or regulatory body "owns" FOUNDATION fieldbus. Rather, it is an interoperable digital network based on the International Standards Organization's Open System Interconnect (OSI/ISO) seven-layer communications model. The specification complies with the ISA SP50

digital fieldbus protocol to meet mission-critical demands for intrinsic safety and use in hazardous areas, volatile processes and difficult regulatory environments.

The Fieldbus Foundation (www.fieldbus.org) was established to develop the FOUNDATION fieldbus (FF) standard in an environment that promoted cooperation and interoperability. At the

FF architecture flattens network and gateway hierarchy.

Foundation's February, 2003, board meeting in Singapore, John Berra, president of Emerson Process Management and chairman of the


Fieldbus Foundation, reviewed past goals and present successes. "Openness, innovation and control-in-the-field were the design objectives of FOUNDATION fieldbus development. We have delivered. Suppliers offer a breadth of products rich with diagnostics and information about the process." Berra cites the worldwide installation of over 200,000 FF-compatible devices in almost 4,000 systems.

Rich Timoney, president and chief executive officer of the Fieldbus Foundation, discusses additional benefits.



Rich Timoney, president and CEO of Fieldbus Foundation

"With FOUNDATION fieldbus, end users can implement tightly integrated digital control based on a unified system architecture and a high-speed backbone for plant operations. This, in turn, removes the constraints on device and subsystem interoperability. The FF architecture enables a flatter hierarchy of networks, gateways and systems, simplifying the enterprise structure.

"Perhaps most importantly, the technology provides 'sensors to the boardroom' information integration. By giving companies access to more information, easily integrated into their enterprise software management tools, plant personnel are able to make better decisions and respond faster to changing market demands." 

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APPLICATION SUCCESS IN CHINA

With its many performance and business benefits, FOUNDATION fieldbus is rapidly gaining user acceptance around the world. This fact is evidenced by two milestone projects recently announced in China. SECCO Petrochemicals Company Ltd. is constructing a new 10-plant petrochemical complex near Shanghai that will include more than 25,000 fieldbus devices. A second large installation will connect more than 12,000 fieldbus devices at a new petrochemical facility under construction northeast of Hong Kong. The project is a joint venture between leading Chinese industrial and business interests, including Shell Nanhai BV and China National Offshore Oil Corporation (CNOOC) Petrochemicals Investment Ltd. (CPIL).