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Automation Infrastructure: Development Continues

In today’s industrial manufacturing arena, end-user requirements for control and instrumentation technology are always evolving. Plants are faced with a changing kaleidoscope of market trends, customer demands and regulatory restrictions. In order to stay ahead, they must implement automation solutions that keep pace with their business outlook.

The Fieldbus Foundation is committed to serving the control industry through development of its open, non-proprietary FOUNDATION fieldbus technology. FOUNDATION fieldbus is a unified infrastructure managing data, communication, plant assets and plant events, while providing highly distributed control functionality and interoperability between devices and subsystems. This infrastructure is supplier-neutral and standards-based, and provides end users with a common framework to implement and manage strategies for operational excellence and continuous improvement in process manufacturing.

At the forefront of our current developments is FOUNDATION for Safety Instrumented Functions (SIF). This project was initiated in response to process end users, who want to realize the CAPEX and OPEX benefits of open and interoperable fieldbus technology in their plant safety systems. FOUNDATION fieldbus, with its industry-proven distributed function blocks and open communications protocol, is an ideal platform for advancing standards-based solutions for SIFs.

At a recent SIF technology demonstration in Amsterdam, Shell Global Solutions conducted a series of tests proving the robustness of FOUNDATION fieldbus-enabled safety valves with partial stroke testing (PST) capability, as well as various pressure and temperature devices. In addition, Shell evaluated system integration capabilities with asset management and basic process control system (BPCS) platforms.

The Fieldbus Foundation and its members are also working on new initiatives that will enhance the value proposition of High Speed Ethernet (HSE). For example, our HSE Remote I/O (HSE RIO) specification will define the structure for interfacing remote I/O over the HSE control backbone. The addition of remote I/O further tightens the integration of process instrumentation within the FOUNDATION fieldbus architecture. This solution will expand the presence of FOUNDATION technology in hybrid environments such as those found in pharmaceuticals and chemical processing.

At the same time, we are moving forward on a wireless project based on WirelessHART and the emerging ISA SP100.11a standard. Together with the HART Communication Foundation and Profibus Nutzerorganisation e.V. (PNO), we have formed a wireless cooperation team that is developing a specification for a common interface to a wireless gateway. This work will enable wireless communication with intelligent field devices in a wide range of process measurement and control applications.

The Fieldbus Foundation has begun final validation of a FOUNDATION fieldbus diagnostic profiles specification based on guidelines established by the NAMUR Working Group 2.6. The new specification builds upon the robust diagnostic features already provided by FOUNDATION fieldbus devices. At the same time, it allows end users to harness enhanced Electronic Device Description Language (EDDL) technology to achieve true, actionable diagnostics.

By empowering both suppliers and end users, FOUNDATION fieldbus has gained acceptance throughout the global automation market. Our technology is now regarded as a standard in all major process industries, and has a strong foothold in developing regions such as China and India. FOUNDATION-sponsored marketing societies and end-user councils have been established in many of the world’s major industrial centers.

On behalf of the Fieldbus Foundation, I’d like to thank all of you who are helping to advance FOUNDATION technology. We appreciate your support!

All the best,

Richard J. Timoney
President & CEO
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FIELDBUS APPLICATION GUIDES AVAILABLE

The Fieldbus Foundation offers a selection of comprehensive Application Guides that can help end users get on the “Fast Track to Fieldbus.” These documents provide valuable information regarding fieldbus installation procedures, wiring guidelines, network isolation techniques, and more.

To download the Application Guides, visit: www.fieldbus.org/About/FoundationTech/Resources
The Fieldbus Foundation successfully demonstrated its FOUNDATION for Safety Instrumented Functions (SIF) technology on Tuesday, May 20, 2008, at the Shell Global Solutions technology center in Amsterdam, The Netherlands. The SIF demo attracted process automation end users and equipment suppliers from around the world.

Peter Eigenraam, regional manager, instrumentation and plant automation DG, Shell Global Solutions, welcomes the global trade press to the FOUNDATION SIF demonstration in Amsterdam.
Demonstration attendees heard several leading energy companies describe the implementation of FOUNDATION SIF in a wide range of industrial safety system applications. Participants included Shell Global Solutions, Amsterdam, The Netherlands; Saudi Aramco, Dhahran, Saudi Arabia; BP, Gelsenkirchen, Germany; and Chevron, Houston, Texas, USA. The demonstration was intended to promote adoption of FOUNDATION-based safety solutions in the process industries. The project also includes development of SIF best practices and guidelines, training, and interoperability test tools for control system and instrumentation manufacturers and end users.


**Powerful diagnostics improve safety functions**

Fieldbus Foundation President and CEO Rich Timoney discussed the difference between a FOUNDATION SIF system and a conventional emergency shutdown system (ESD), comparing them to doing a forensic analysis on a body versus performing a proactive diagnosis before death. Advanced diagnostics ensure that many issues can be addressed proactively before the ESD needs to activate.

"FOUNDATION SIF provides powerful diagnostic capabilities improving a wide range of safety instrumented functions and streamlining device testing requirements," said Timoney. "This technology offers new opportunities to optimize asset management initiatives and reduce plant operating expenses."

At the Shell Global Solutions technology laboratory, FOUNDATION SIF demonstration working group members constructed a fieldbus-based safety shutdown system demonstration rig, incorporating logic solvers, safety devices, and SIF functions. The live demo was designed to evaluate FOUNDATION fieldbus-enabled safety valves with partial stroke testing (PST) capability, as well as various pressure and temperature devices. It also evaluated system integration capabilities with asset management and basic process control system (BPCS) platforms.

The safety demo system included equipment from a number of leading vendors: HIMA provided the actual safety system, and Yokogawa supplied the BPCS and plant asset management software. Companies such as Endress+Hauser, Magnetrol, Metso Automation, RuggedCom, Siemens, Softing, Smar and Westlock also provided products. Demos running at Saudi Aramco, Chevron, and BP included systems and products from all major process automation suppliers.

ABB Instrumentation participated in the FOUNDATION SIF program by providing three Model 2600T differential pressure transmitters for the field demonstrations. These devices required no special configuration and demonstrated full interoperability with multiple third-party devices and control systems.

Another major controls manufacturer, Emerson Process Management, supplied equipment from its FOUNDATION SIF demonstration versions of the Rosemount® 3051S, DeltaV™ SIS, Fisher® FIELDVUE® DVC6000f SIS, and AMS® Suite: Intelligent Device Manager. Emerson’s FIELDVUE DVC6000f SIS instrument was also utilized in the project.

**Shell Global Solutions conducts live demo**

Audun Gjerde, Shell Global Solutions, conducted the live demo at the Amsterdam event. He demonstrated high- and low-level trips, partial stroke valve testing, and a partial stroke test interrupted by the ESD. The last example showed that, even in the middle of a partial stroke test, the ESD could take over and shut down the system successfully during an abnormal situation. Two-out-of-three (2oo3) voting was demonstrated using various FOUNDATION SIF devices. The system also reacted successfully to a temperature probe loss, a measurement validation alarm, and a diagnostic alarm generated from a dry probe on a level device.

According to Gjerde, the demonstration project sought to have a logic solver fully operable with all available SIF devices, to integrate an asset management system with the SIF devices, and to integrate SIF partial stroke testing/valve stroke testing within a safety system infrastructure.

Gjerde said, “By implementing FOUNDATION SIF, Shell expects enhanced diagnostics through a fully integrated asset management system. We also anticipate less testing of final elements thanks to smart testing and diagnostics, as well as online testing and partial stroke testing. This will result in early detection of dangerous device failures — and fewer spurious trips. The added SIF diagnostics will help engineers and maintenance personnel increase the integrity of the plant by ensuring maintenance is performed where and when it is needed. With smart online testing and diagnostics, we will be able to run for longer periods of time without shutting down the plant for testing purposes. We will also save on the cost of adding a second or third device in many cases.”

**FOUNDATION technology advances SIF performance**

With its industry-proven distributed function blocks and open communications protocol, FOUNDATION fieldbus is an ideal infrastructure for advancing standards-based SIFs. Process industry end users requested the FOUNDATION SIF solution in order to realize the CAPEX and
Audun Gjerde, Shell Global Solutions, conducted a live SIF demo at the Amsterdam event. He demonstrated functions such as high- and low-level trips, partial stroke testing of valves, and a partial stroke test interrupted by the ESD.
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Latest Device Description and Specification Releases

Automation industry has access to enhanced development tools

In recent months, the Fieldbus Foundation has released a number of Device Description (DD) enhancements and technology specifications intended to improve the FOUNDATION fieldbus development environment. The new tools will further strengthen the interoperability of fieldbus-based control systems, and provide end users with even greater benefits in terms of automation performance and cost savings.

**DD 5.1 solutions provide rich development environment**

The Fieldbus Foundation’s new releases for DD technology, which is fully compliant with the IEC 61804 and ISA104 Electronic Device Description Language (EDDL) profile, include enhanced versions of DD Services (Version 5.1.0), DD Integrated Development Environment (Version 1.1.0), Device Description Language Interoperability Specification (FF-901), Device Description Language Specification (FF-900), and DD Library (Version 3.2).

The Fieldbus Foundation’s manager – fieldbus products, Stephen Mitschke, commented, “The updated DD solutions build upon the robust functionality of the previous DD 5.0 release, and are intended to help device developers, system suppliers and end users improve the performance of their FOUNDATION fieldbus products.”

Mitschke indicated the latest DD enhancements support Unicode, providing FOUNDATION fieldbus device and system suppliers with an expanded ability to write and visualize DDs using local languages, including Asian languages. The enhancements also allow developers to build device-level menus, thus enabling visualization of multiple blocks and significantly improving the device integration experience. In addition, support for new parameter attributes will ensure an enhanced user interface for accessing devices.

Mitschke added support for device-level menus will become mandatory as part of the Fieldbus Foundation’s host profile test and registration program. Like the current device registration process, host registration will strengthen fieldbus interoperability and system integration. Hosts successfully completing registration testing will be authorized to bear the foundation’s official product registration symbol.

Both of the DD technical documents (FF-900 and FF-901) fully describe the new enhancements, and are included in the FOUNDATION fieldbus technical specification. These documents are available for download on Fieldbus Forums (forums.fieldbus.org) to all foundation members with a specification maintenance agreement.

**Device coupler spec ensures greater robustness**

In addition to new DD solutions, the Fieldbus Foundation has released the final FOUNDATION Device Coupler Test Specification (FF-846 FS 1.0). This specification is designed for coupler manufacturers to perform a standard set of tests against their implementation. The test
cases were developed by a team of volunteers comprised of current members of the foundation who manufacture coupler products, as well as end users interested in the availability of registered couplers.

The Foundation Device Coupler Test Specification includes criteria from IEC 61158-2:2003 and additional functional tests such as input impedance, short-circuit reaction time, and bus voltage consumption. It builds upon the existing power supply specification and registration procedure, and is intended to provide even greater robustness in Foundation fieldbus systems. The resulting registered products will be tested to perform optimally with registered power supplies and conditioners, as well as registered H1 cable.

The scope of the Device Coupler Test Specification includes wiring blocks and couplers that may support short circuit protection. A working group is developing Phase Two of the test specification, to be released during 2009, that supports couplers with electrical isolation.

**Other new specifications benefit automation industry**

The Fieldbus Foundation has also released an additional Foundation fieldbus specification addressing temperature transducer blocks. This new specification includes features enabling automation equipment suppliers to further improve the interoperability and reliability of registered, Foundation-compliant products.

The Temperature Transducer Block Specification (Document FF-904) fully describes the Foundation fieldbus standard temperature and calibration transducer block. Both single and dual temperature sensor implementations fall under the standard temperature block specification. The standard set of parameters and view lists for these two transducer block profiles are included in the specification.

With the introduction of the Standard Temperature Transducer Block Specification, end users will have even greater confidence when implementing Foundation fieldbus systems. The new specification demonstrates the continued commitment of the Fieldbus Foundation to bolster its technology infrastructure for the benefit of the industrial automation market.

Lastly, the foundation has announced the availability of a Foundation fieldbus H1 Cable Test Specification (Document FF-844). The new specification includes test cases providing greater assurance to automation end users that their wiring systems are suitable for fieldbus system operation.

The H1 Cable Test Specification is designed for manufacturers developing cables for Foundation fieldbus H1 (31.25 kbit/s) installations. The specification test cases, based upon the IEC 61158-2:2003 standard, include (but are not limited to) impedance, capacitive unbalance, connector pin-outs, and attenuation. Cable manufacturers can submit their test reports to the Fieldbus Foundation, which will initiate a cable registration process in the near future.

Mitschke concluded, “The foundation is one of the only automation industry organizations with a host and device registration program requiring mandatory testing of critical elements of its technology. This effort now encompasses Foundation fieldbus host systems and field devices, as well as physical layer components such as power supplies and device couplers.”
DART Provides New Solution For Explosion Protection

Technique combines benefits of intrinsic safety with high power levels

By Andreas Hennecke, Product Marketing Manager, Fieldbus Technology Pepperl+Fuchs

According to current automation industry standards, intrinsic safety also means limited power supply. A new technology known as Dynamic Arc Recognition and Termination (DART) promises to eliminate this restricting factor. DART is based upon a revolutionary approach to explosion protection combining all the benefits of intrinsic safety (IS) with high power levels, opening a wealth of new opportunities for process control.
Enabling technology of a new generation

DART represents a simple and cost-effective way to solve the problem of limited power supply associated with intrinsic safety in fieldbus systems. The technology substantially increases the maximum power level, allowing the intrinsically safe connection of devices requiring more power than present technology is able to provide.

According to IEC 60079-11, an electrical circuit is considered intrinsically safe if it can be guaranteed (according to specifically defined criteria) that neither during normal operation, nor in case of a malfunction, a spark or any other thermal effect can lead to the ignition of a potentially explosive atmosphere.

Intrinsically safe system designs (Ex i) primarily rely on the limitation of the available effective power to less than 2 watts in order to prevent the buildup of sparks that might cause an ignition within an explosion hazardous area. This power limitation results in significant restrictions as to the types of devices that may be used in hazardous areas.

DART, however, allows end users to employ field devices with a power rating of up to 50 watts — even within an Ex-rated area. DART makes this possible by detecting failures of the electric system right from the beginning and reacting within only 1.2 µs to shut down the power supply before any critical situation can arise.

The DART technique is based on the fact that any spark produces a sharp voltage and current peak within the respective electric circuit. This phenomenon follows specific characteristics which are known and can be used in order to detect the development of a situation which might cause a problem inside the Ex zone. As soon as the formation of a spark is detected, DART responds immediately and shuts down the electric circuit before the flow of current reaches a level which would allow the spark to develop sufficient heat to cause an ignition.

Effective approach for fieldbus installations

DART represents an ideal solution to provide considerably more power via a FOUNDATION fieldbus installation without being restricted by the limitations imposed by the Ex e requirements for increased safety.

Practically all field devices with intrinsically safe power supplies fulfill the requirements of either FISCO or Entity. DART supplies power to a field device at 24 volts, which is the maximum value according to Entity. In this way, compatibility with almost all field devices on the market is guaranteed. Provided the cable length does not exceed 1,000 meters, it is possible to supply up to 24 field devices with a total power rating of 8 watts per segment.

Elimination of distortions

A DART system consists of three primary components: energy supply, wiring and field device. In such a configuration, the length of the cable and the corresponding signal delay has a significant influence on the response time for recognizing a spark. The characteristics of the device itself can also lead to signals that cannot be interpreted dependably.

DART deals with the power level issue by connecting devices via a decoupling module to the energy supply. This module needs to be integrated into the device itself. It ensures a clearly defined electrical response pattern and results in a soft start of the device with limited current increase. In this way, the DART system is provided with a signal that allows the dependable detection of critical situations requiring immediate shutdown of the circuit.

Conclusion

DART promises to usher in a totally new era in process automation. The high-power trunk, which requires increased safety measures, can now be realized as an intrinsically safe solution without having to deal with the restrictions imposed by limited power supply. In addition, DART opens the way to numerous additional applications in the process industries, such as valve control, scales or emergency lighting.
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High Speed Ethernet Remote I/O Update

Working group is currently completing HSE RIO specification

The Fieldbus Foundation has reported its High Speed Ethernet Remote I/O (HSE RIO) initiative remains on schedule. A multi-vendor working group is completing specifications for prototype development. Currently, four host system and four gateway suppliers are developing prototype products.

The HSE RIO project will standardize the interface of remote I/O into the open, integrated Foundation automation infrastructure. The new HSE RIO specification defines the structure for interfacing remote I/O over the HSE control network. The addition of remote I/O further tightens the integration of process instrumentation within the Foundation fieldbus architecture.

The initial HSE RIO work includes H1 linking device functionality, discrete inputs and outputs, analog inputs and outputs, and HART support. Future phases will include gateways to other protocols.

The HSE RIO team is directed by program manager Ian Verhappen, MTL, and technical leader Detlef Arndt, Pepperl+Fuchs. The group is working to ensure the new functionality required to support HSE RIO is compatible with that for wireless communications. It is also coordinating its efforts with the Fieldbus Foundation’s wireless project team in preparation for a combined technology demonstration within the next two years.

R. STAHL hosted the HSE RIO kick-off meeting in January 2007 at its facility in Germany. Based on the latest Ethernet system, it is donating one of the prototypes for the planned HSE RIO technical specification validation in 2009. Besides this, the company’s future HSE RIO strategy is mainly based on use of the Foundation high-speed control network.

MTL, a leading physical layer supplier, will be developing one of the HSE RIO gateways to validate the new specification. MTL is leveraging its knowledge of fault-tolerant Ethernet, along with other advanced Ethernet and wireless technologies, to provide a fully compatible product meeting its customers’ needs.

According to Fieldbus Foundation President and CEO Rich Timoney, HSE RIO will benefit end users seeking a true, integrated control system environment. He said, “The ability to incorporate remote I/O in the Foundation infrastructure ensures that plants can leverage their existing automation investments, and at the same time, realize the advantages of a digital fieldbus control platform. I commend the foundation employees and all of our volunteers and supporters, who have helped to make this important technology development possible.”


HSE RIO defines the structure for interfacing remote I/O over the Fieldbus Foundation’s High Speed Ethernet (HSE) control network.
A wireless technology cooperation project spearheaded by the Fieldbus Foundation, HART Communication Foundation and Profibus Nutzerorganisation e.V. (PNO) recently held its kick-off meeting. A technical group comprised of representatives of the three industry organizations gathered at Honeywell's facility in Fort Washington, Pennsylvania, to launch its wireless specification development process.

The wireless cooperation project, headed by technical team leader Marcos Peluso, Emerson Process Management, and End User Advisory Council (EUAC) advisor Herman Storey, Shell Global Solutions, is an extension of the successful collaboration on Electronic Device Description Language (EDDL). The industry groups are developing a specification for a common interface to a wireless gateway. This work is based on WirelessHART and the emerging ISA SP100.11a standard.

The wireless project includes development of use cases, requirements, and specifications for wireless communication with intelligent field devices in process measurement and control applications. As with the EDDL cooperative effort, the Fieldbus Foundation, HART, and PNO groups are developing a common set of compliance guidelines for incorporation into their respective product registration processes.

The introduction of wireless technology into the manufacturing and process industries requires suppliers, end users, and international standards bodies to address technical issues related to wireless applications. The Fieldbus Foundation, HART, and PNO are working together to establish a common, open standard that also ensures complete compatibility with the existing wired versions of each participant’s technology. The intent of the collaboration is to facilitate the acceptance of wireless technology in industrial automation.

The Fieldbus Foundation is focusing its efforts on developing a gateway at the High Speed Ethernet (HSE) level to ensure an open and fully functional point of integration for all wireless devices built upon emerging standards.

Marketing Committees Encourage Fieldbus Adoption

Fieldbus Foundation supporters promote technology worldwide

Around the world, proponents of Fieldbus are joining together to form regional marketing committees promoting the benefits of Fieldbus-based control solutions to both automation suppliers and end users. From Asia to South America, these groups are helping to ensure the technology remains strong.

In Europe and the Middle East, for example, the growing list of regional marketing committees is a significant step forward for the Fieldbus Foundation’s EMEA Steering Committee. New committees have been established in the Commonwealth of Independent States & Baltic States (CIS&B), Norway, Southern Africa, Sweden, and Central & Eastern Europe (CEE). These groups join seven other marketing committees already active in Germany, France, UK, Italy, Belgium, The Netherlands and the Middle East. The former Hungarian committee has been incorporated into the new CEE committee.

Marketing activities focus on end user education

Each marketing committee is committed to promoting Fieldbus in their area through local activities, including end user seminars, supplier training, trade shows, and technology demonstrations. Committee members are suppliers of Fieldbus devices, host systems, tools and services, and represent many of the world’s leading automation equipment suppliers.

Among the most active marketing committee participants, R. STAHL is a founding member of committees in Brazil, Norway, Sweden, Russia, India and Thailand. As one of its corporate policies, R. STAHL supports all Fieldbus regional marketing activities with fieldbus specialists from company headquarters.

The Fieldbus Foundation’s new Swedish Marketing Committee (FF-SWMC) got off to a successful start with a well-attended end user training event. Some 22 delegates from the Stockholm region attended the committee’s first Fieldbus training seminar on February 5, 2008. The day featured an introduction to Fieldbus and terminology, followed by a series of hands-on training sessions.

In Scandinavia, the recently formed Fieldbus Norwegian Marketing Committee (FF-NOMC) is focused on serving the North Sea oil & gas industry, which includes large-scale implementations of Fieldbus by major end users such as BP and Shell.

Marc Van Pelt, vice president of Fieldbus Foundation EMEA Operations, welcomed the formation of the Norwegian committee. “The demand for Fieldbus technology within the oil & gas and hydrocarbon processing industries is well established, but there is a particularly dynamic and strong market for new automation technology in the North Sea offshore region and Norway,” said Van Pelt. “The Norwegian committee will play an important role in promoting the primary value propositions of Fieldbus technology, which include process integrity, business intelligence, and open and scalable integration of information across process manufacturing plants.”

Developing regions reflect demand for technology

In Africa — another promising market for Fieldbus technology — the Fieldbus Foundation Southern Africa Marketing Committee (FF-SAMC) was recently established to promote an increased awareness and adoption of Fieldbus technology throughout the region.

The FF-SAMC was formally launched at an inaugural meeting held in Johannesburg, South Africa, which was attended by representatives from many different automation companies. At the gathering, Van Pelt thanked participants for their support. “I am delighted that such an enthusiastic committee has been established in the Southern Africa region,” he said. “The automation market here is in need of a broad range of local support — from basic introductory training in the benefits of a fieldbus system through to advanced implementation assistance.”

Van Pelt added, “Training and technical support will be the committee’s primary focus. One key initiative will be the establishment of a registered training institution to meet the region’s need for comprehensive technology instruction.”

Across the globe, in Latin America, the Fieldbus Foundation has formed a Mexican Marketing Committee (FF-MXMC) to encourage implementation of Fieldbus technology in the Mexican market through trade show participation, end user seminars, and other promotional activities. This group was formed at a meeting held in Mexico City, Mexico.

Regional marketing committees, such as the new group in Southern Africa, are committed to promoting Fieldbus through end user seminars, supplier training, trade shows, and technology demonstrations.
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Fieldbus Foundation Marketing Effort Goes Global

An interview with the Fieldbus Foundation’s marketing director, Bill Tatum

Fieldbus Report asked the Fieldbus Foundation’s marketing director, Bill Tatum, about his plans for 2008/2009 promotional activities supporting the adoption of FOUNDATION fieldbus throughout the industrial end-user community. Here is the interview:

Fieldbus Report: Over the past few years, the Fieldbus Foundation has expanded its marketing program addressing industrial automation suppliers and end users. The organization has also established regional marketing committees in key areas around the world. How has this effort evolved?

Bill Tatum: The demand for FOUNDATION fieldbus is global in scale. We are seeing an impressive rate of adoption throughout the world’s developing industrial regions. This includes areas such as Eastern Europe, Latin America, Asia/Pacific and the Middle East. In response, the foundation has broadened its marketing program to help manufacturers around the world get started with the technology.

FR: What is the main objective of your marketing program?

Tatum: Technology education is a very important requirement for us. End users want to know more about the advantages of FOUNDATION fieldbus, and they’re seeking help in putting fieldbus to work in their plants and factories.

FR: The Fieldbus Foundation offers a wide range of training courses for end users and suppliers of all skills levels. Why is training so important to the implementation of an advanced technology like FOUNDATION fieldbus?

Tatum: The key to successful fieldbus operation is the ability to effectively design, install, service, and operate a new breed of process automation system. Fieldbus is not more difficult than traditional automation technologies, but it is different, affecting the planning, implementation, and operational aspects of a project. Once learned, fieldbus is actually simpler than conventional control strategies in many respects.

FR: You conduct fieldbus seminars at various locations around the globe. Can you describe the format of these seminars?

Tatum: Our one-day seminars are oriented towards end users and engineering firms. They cover all aspects of FOUNDATION automation infrastructure management. Each of the core technology areas — Process Integrity, Business Intelligence and Open Scalable Integration — is discussed in detail, followed by a hands-on demonstration to reinforce the subject matter. Local end users also present case studies about their fieldbus applications.

FR: Does the Fieldbus Foundation support independent, vendor-neutral training centers providing instruction in your technology?

Tatum: Yes. Early on, for example, we formed a partnership with the Southern Alberta Institute of Technology (SAIT) to establish a FOUNDATION fieldbus training facility on the SAIT campus in Calgary, Alberta, Canada. This agreement was threefold as it mandated SAIT to develop certified fieldbus training curriculum, to deliver this curriculum to end users in Western Canada, and to establish a demonstration site for FOUNDATION technology.

More recently, we established the FOUNDATION Certified Training Program (FCTP) defining uniform standards for fieldbus training curriculum at certified training sites around the world, and identifying acceptable levels of learning for students of the technology.

FR: Besides seminars, training courses, trade show exhibits and other events, how do you convey the benefits of FOUNDATION fieldbus to the global automation market?

Tatum: The Fieldbus Foundation conducts an aggressive promotional campaign utilizing the resources of Control Engineering magazine and its sister publications in Europe and Asia/Pacific. This program includes a monthly e-newsletter, Fieldbus Facts, as well as a multi-page print publication, Fieldbus Report, providing in-depth coverage of fieldbus technology. Plus, we recently launched a new website located at www.fieldbus.org that serves as a comprehensive online resource for our organization and its members worldwide.

FR: How do your members support this effort?

Tatum: Aside from their contributions to our newsletters, supplements and other promotions, and their participation in our regional training seminars, many members promote FOUNDATION fieldbus at their own events. For example, our technology will be a key topic at Rockwell Automation’s annual Process Solutions User Group (PSUG), to be held November 17-20, 2008, in Nashville, Tennessee. Like other supplier user groups, this event will facilitate peer-to-peer exchange and provide an environment where users can hear innovative ideas, learn best practices and seek solutions.
From batch to bottle to packaging to sipping. We make sure it’s a totally fluid plant-wide process.

If it sounds simple, it is. One solution, from one company, that uses a single control platform to connect production end-to-end. With one configuration environment for maximum reuse. Link your automation, batching, packaging, and business-level systems. It’s simple. RockwellAutomation.com/think/process.
Increasingly, industrial end users are moving beyond traditional analog control systems and embracing the advantages offered by the latest digital automation solutions. The migration to digital technology requires careful planning, as well as an awareness of important considerations involving network design, installation, commissioning and training.

Continued on next page
Q: How can the many end users with existing, legacy hardwired networks learn about and begin to migrate to digital networks such as fieldbus, Ethernet and wireless?

A: FOUNDATION fieldbus provides a modular, scalable automation infrastructure that makes migration to a modern digital control network both easy and cost-effective. The technology allows end users to migrate their existing hardwired systems at their own pace. Implementation of FOUNDATION fieldbus does not require a wholesale change to a plant’s existing control data infrastructure. Rather, users have the flexibility to utilize existing plant wiring for new fieldbus installations, cutting over their legacy system one loop or process unit at a time.

Any user considering the adoption of FOUNDATION fieldbus should first gain a complete understanding of the technology by attending instructional courses at professional training sites around the world. A complete list of Fieldbus Foundation-certified training providers is available at www.fieldbus.org. Visitors to the foundation’s website can also download free technical guides.

In addition, companies installing FOUNDATION technology can learn from the experiences of other end users by attending Fieldbus Foundation-sponsored training seminars conducted around the globe. This peer-to-peer interaction will help users take full advantage of all the CAPEX and OPEX benefits FOUNDATION fieldbus has to offer, while also learning how to justify future fieldbus projects.

Q: How should end users evaluate the needs of their applications to determine their networking requirements?

A: End users preparing for a FOUNDATION fieldbus project should carefully evaluate their network loading requirements. This, in turn, will help in determining the number of interfaces needed for a given application.

Fieldbus users must also decide whether to locate control functionality in the host system or in field devices. For control in the field on critical applications, the Fieldbus Foundation generally recommends one control loop per segment. For non-critical applications, two or three control loops can be implemented per segment while still providing reasonable update times.

To determine a suitable fieldbus networking solution, end users are encouraged to download the Fieldbus Foundation’s System Engineering Guidelines at www.fieldbus.org. A variety of tools are also available to assist the user in making appropriate design choices.

Users who approach fieldbus as nothing more than a digital replacement for hardwired analog technology do not realize the full return on their control system investment.

Q: How much more thorough do end users need to be ahead of time in designing and planning their first digital network than they used to be with hardwiring?

A: For traditional control systems, there are rules that must be followed to ensure a successful installation. The same is true for a fieldbus network. In this case, however, the rules are different. For example, fieldbus installations require segment drawings rather than loop drawings — but the concepts are not foreign to most users.

When it comes to adopting new technology, there is no substitute for education. End users and integrators who get the most out of FOUNDATION fieldbus do their homework in advance. They establish their control infrastructure in the early stages of a project, and then train their personnel to utilize all fieldbus technology benefits. This includes: reduced wiring, multi-variables from a single multi-channel field instrument, simpler integration and easier maintenance.

Ultimately, FOUNDATION technology is the key to greater manufacturing flexibility and productivity, higher quality products, and improved regulatory compliance. This can be achieved by predictive maintenance scheduling and better upkeep enabled by the diagnostics, performance analysis data, and operational statistics. Better-adjusted and properly calibrated devices ensure lower process variability.

Q: How can end users make their first fieldbus network simpler and easier to install, while still meeting their needs?

A: Many plants choose to install their first fieldbus network on a pilot plant or non-critical control loops. This approach allows operators and engineers to gain familiarity with the technology before applying it in larger, more critical applications. For some end users, it may be beneficial to enlist the help of an EPC firm with proven fieldbus experience. Also, most of the major DCS suppliers can assist their customers in getting started with fieldbus technology.

Fieldbus physical layer suppliers have developed special connector designs that make fieldbus device installations truly “plug and play.”

Q: Is it a good idea to test possible network solutions before implementation?

A: End users should always plan for a Factory Acceptance Test (FAT) when undertaking a fieldbus project. The FAT procedure typically involves simulation and validation of the control system before it is installed at the site. It can also provide an opportunity to do some preliminary operator training and “fine-tuning” prior to system delivery.

For a fieldbus installation, the FAT procedure should include as many field devices as possible to verify the user’s network loading capabilities.

The Fieldbus Foundation’s System Engineering Guidelines, available for download at www.fieldbus.org, provides some recommendations for FAT. The document calls for strategically testing different configurations, but not the complete network. All FOUNDATION
Reliability + Maintainability = Availability

The Yokogawa FieldMate Versatile Device Management System is a new PC-based integrated software tool that handles parameter setting for intelligent field devices, regardless of their make or field communication protocol. FieldMate speeds up device configuration and problem solving, and automatically stores a work log for a traceable field maintenance database that consolidates the maintenance work flow and facilitates the sharing of maintenance know-how.

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For more information and free trial software, visit promo.us.yokogawa.com and enter key code AD7716.
devices provide simulation, which can be used during such FAT testing.

Q: How can plants implementing fieldbus address safety and security issues?

A: It should be noted this question does not address "availability," which is an important fieldbus benefit related to OPEX. Data quality, diagnostics, and control in the field are key enablers. When the subjects of "safety" and "security" are mentioned in regards to fieldbus, the discussion really should address "availability."

Individual DCS suppliers address security considerations with fieldbus-based control systems. FOUNDATION technology, as it exists today, does not provide a dedicated security layer. As a wired communications bus, however, FOUNDATION fieldbus provides a robust and secure solution interconnecting the DCS to field instruments.

For security, end users should consult publications such as ISA 99 (Industrial Automation and Control System Security). Security is a complex topic — most DCSs implement a role-based authentication system that provides operators, maintenance and engineering personnel with appropriate access levels. Plant procedures are also very important.

As for safety, we are talking about specialized systems that perform safety functions. The Fieldbus Foundation does have a new FOUNDATION SIL protocol, which will bring more diagnostics to safety systems, but its H1 and HSE developments are not designed for safety applications. The foundation is responding to the issue of safety through its ongoing High Speed Ethernet (HSE) Remote I/O and Wireless development teams.
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Economic Case For Using Foundation Technology

Innovative segment design approach ensures greater ROI

By Mike O’Neill, Director
MooreHawke Division of Moore Industries-International, Inc.

Modern DCS systems are major distributed networks with multiple data transmission paths, which, in the interests of security and the highest plant availability, are almost always duplicated and made redundant. This article describes how Foundation fieldbus systems can now incorporate redundancy and fault-tolerance right down to the H1 field layer. The major impact is on project ROI and plant revenues, and only Foundation technology can offer this level of security and benefit to the plant operator.
It’s almost ironic: network cables in the benign, well-managed control room environment are almost always made redundant, whereas field cables exposed to the harsh and sometimes corrosive environment of the modern industrial plant have to fend for themselves. Of course, while the field cables carried simple point-to-point communications as 4–20mA, then redundancy wasn’t really a concern in general, and specific devices could be duplicated as required. However, now that the lowest fieldbus physical layer carries data from up to 32 devices, the vulnerability of that cable can constitute a reliability issue, particularly if those devices are safety-related or process-critical.

Conventional fieldbus segment design does not lend itself to any version of fault-tolerance except through complete and wholesale duplication, and in a systems context, that duplication brings with it a requirement for “special” software to implement 1oo2/2oo3 voting schemes and special measures for safe maintenance, device replacement, etc.

In 2007, a new fault-tolerant segment design was released that permits a far higher segment MTBF than conventional designs without any special software in the DCS and for only the additional cost of an extra trunk cable. Working with a leading DCS supplier and a major oil & gas company, this package was installed on a set of platforms in the South China Sea simply to mitigate the huge financial risk associated with loss of control. The question is, does this increase in availability really make any significant difference to the economics of the general fieldbus installation?

The answer is not a simple yes or no, because a fault-tolerant system allows a user to make permutations that match the desire for high plant availability against a budget for the systems hardware. These permutations (simplex vs. duplex vs. fault-tolerant) were simply not possible in previous fieldbus physical layer products.

The standard segment design process takes two controllers (H1 cards) and two power conditioners and connects to the field using a single cable. This can be called a duplex segment design. Based on conventional MTBF data books and data from other sources (Reliability, Maintainability and Risk, 7th Edition, by Dr. David J. Smith), we can evaluate the MTBF of such a segment. Figure 1 below shows such a segment and the physical layer components in that configuration give a calculated MTBF of some 50 years.

Some users also admit to the possibility that some FOUNDATION fieldbus devices are not that critical to plant operation, and that these devices can be connected via a single controller. If this were to be allowed, a new segment design could be used.
called a simplex segment as indicated in Figure 2 above. The physical layer components in that configuration give a calculated MTBF of some 30 years. Regrettably, very few project specifications allow for simplex segments, which may be because most vendors only offer duplex segments.

The fault-tolerant design utilizes a unique power conditioner that can detect open-circuit and short-circuit conditions in the field at up to 1,000 meters of standard cable. It is matched to a field wiring hub that can react to the loss of a trunk cable (out of an active pair) by automatically terminating the segment via the remaining cable. (It may be a surprise to many, but standard power conditioners do not effectively detect field short-circuits over a couple of hundred meters and, when faced with a remote short-circuit, the standard power conditioner simply tries to drive into what it thinks is a high load, getting progressively hotter and hotter until premature failure).

The fault-tolerant segment design takes two controllers, two advanced power conditioners and a high-integrity wiring hub, but connects to the field with two trunk cables, one per power conditioner. The segment layout is as indicated in Figure 3 on page 29, and the calculated MTBF is around 350 years. This is a factor of 10x the simplex segment, and 7x the duplex segment, for the cost of an extra cable.

Significantly, this version of fault-tolerance does not depend upon monitoring and switching mechanisms. Both trunks are continuously active as opposed to the alternative “one active, one hot spare” configuration. Designing systems for redundancy using watchdogs and switches is inherently complex and rarely results in improvements in MTBF, since the failure rate of the switch acts against the parallel failure rate of the “spare” trunk. This version of fault-tolerance meets the requirements of FOUNDATION fieldbus Safety Instrumented Functions (SIF) since there are very few unrevealed faults, and the highly critical “Probability of Failure on Demand” factor is kept low by continuous diagnostics and simple non-destructive testing — unplugging one of the trunk cables annually demonstrates the safety functionality in a similar fashion to partial stroke testing of shutdown/isolation valves.

Segment design costs

For example, let’s base this discussion on a plant with 120 segments, or about 1,440 fieldbus instruments, such as flow transmitters, valve controllers, etc. This plant can be described in terms of how many segments are related to control of the plant, and how many are related to simple monitoring. Let’s say that 80 segments are monitoring-only and 40 segments have control. Of the 40 control segments, let’s say that 12 segments have loops which are process-critical: failure in any of those segments would cause immediate plant shutdown or product that was out of specification and hence non-saleable).

<table>
<thead>
<tr>
<th>Segment Types</th>
<th>Number of Segments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitoring</td>
<td>80</td>
</tr>
<tr>
<td>Control-Related</td>
<td>28</td>
</tr>
<tr>
<td>Process-Critical</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td>120</td>
</tr>
</tbody>
</table>

Let’s assume the following prices for fieldbus equipment, which are typical across the industry from physical layer vendors.

- $390 Power Conditioner
- $240 Carrier, 4-segment, Simplex
- $320 Carrier, 4-segment, Duplex
- $280 Carrier, 4-segment, Fault-Tolerant
- $450 Diagnostics Module, Standard
- $350 Standard Coupler, 12-spur
- $700 High-Integrity Coupler, 12-spur
- $500 Trunk Cable

We can now start to compare costs between the conventional design and the new approach.

Conventional Segments:

- 30 x $320 Carriers, 4-segment, Duplex (1 per 4 segments)
- 240 x $390 Power Conditioners (2 per segment)
- 30 x $450 Diagnostics Module, Standard (1 per 4 segments)
- 120 x $350 Standard Coupler, 12-spur (1 per segment)
- 120 x $500 Trunk Cable (1 per segment)

Total (Conventional) = $218,700

Simplex Segments:

- 20 x $240 Carrier, 4-segment, Simplex (1 per 4 segments)
- 80 x $390 Power Conditioner (1 per segment)
- 20 x $450 Diagnostics Module, Standard (1 per 4 segments)
- 80 x $350 Standard Coupler, 12-spur (1 per segment)
- 80 x $500 Trunk Cable (1 per segment)

Total (New Approach) = $198,170

The conventional approach for 120 segments takes 240 power conditioners.

The new approach allows savings for the 80 monitoring-only (simplex) segments as these have only one power conditioner. (Of course, the conventional system could also fit single power conditioners, but since they still have duplex carriers, two power conditioners are fitted by everyone as a matter of routine.) The duplex segments have dual power conditioners as is common practice, and the fault-tolerant segments also have two power conditioners, but they are physically separated onto different carriers and connected to the field through two cables. In total, the new approach has 160 power conditioners.

The net result is that this new approach leads to somewhat lower costs, even when allowing for the additional trunk cable used in the fault-tolerant segment layouts. The savings may be greater still; many end user specifications restrict process-critical segments (commonly defined as “Level 1” criticality) to having just one valve and one transmitter in that segment. It seems ridiculous to install a fieldbus segment with just two devices, but in the conventional single-trunk...
configuration, that is deemed necessary to minimize the risk of accidental plant shutdown.

**Failure analysis**

Since we are comparing a conventional fieldbus physical layer with a fault-tolerant physical layer, we can effectively ignore all other sources of plant stoppage (blocked lines, primary power outage, pump seal failure, etc.) in this analysis. We are concerned only with the cost incurred if a fieldbus power conditioner or segment cable fails.

Let's assume that the cost of a spurious trip in a plant of this size is $250,000. The spurious trip rate due to the standard fieldbus system is estimated as once every five years, and the spurious trip rate resulting from a failure in the fault-tolerant fieldbus system is estimated once every 25 years (we can demonstrate that the fault-tolerant design generates a ten-fold improvement in segment MTBF, so assuming only a five-fold improvement is conservative).

The annual cost of spurious trips for the conventional plant is $250,000 divided by 5 years, or $50,000 per year. The annual cost of spurious trips for a fault-tolerant plant is $250,000 divided by 25 years, or $10,000 per year. The potential benefit is therefore $40,000 per year (50,000 minus $10,000).

Another analysis concerns the cost benefit over the investment lifecycle of any plant, which modern technology has reduced to something like ten years. In this case, the fault-tolerant system represents a CAPEX saving ($218,700 minus $198,170, or $20,530) which generates $33,441 at, say, 5% for ten years.

Therefore, selecting a fault-tolerant system generates:

- **CAPEX Return:** $33,441 (savings in capital expense)
- **OPEX Return:** $400,000 (savings in spurious trips)
- **Total:** $433,441 (**“free” additional income over ten years**)

This is, of course, a very simplified argument made by a systems engineer and not an accountant, and all the assumptions are open to re-interpretation by appropriate financial experts and operations managers. For example, there is no separate accounting of systems design time, maintenance costs, repair times, spares stock holding, etc. Current suppliers of power conditioners frequently sell at massive discounts in order to win market share over their rivals. However, the fault-tolerant design, as depicted in Figure 3, offers long-term savings and reliability benefits.

**Figure 3 — Fault-tolerant segment design.**

Continued on page 31
Unleash the power of your FOUNDATION Fieldbus devices.

Asset Optimization & Device Management Application

ABB's Asset Vision Professional supports devices from a wide range of suppliers and enables a predictive maintenance strategy that reduces cost. With condition based performance monitoring capabilities, CMMS connectivity and calibration management, Asset Vision Professional is a true productivity enhancement tool. To download the FREE Fieldbus terminology guide “Jargon Buster”, go to http://instrumentation.request-center.com/8
Economic Case For Using FOUNDATION Technology

Continued from page 29

From oil and gas facilities on the Persian Gulf, to refineries in Kuwait and Saudi Arabia, FOUNDATION technology is improving the business results of industrial end users throughout the Middle East and Africa — and around the world.

This issue of Fieldbus Report includes a roundup of FOUNDATION fieldbus installation activity in the fast growing Middle East region.

ACBC To Expand Carbon Black Processing Unit
Alexandria Carbon Black Company (ACBC) of Aditya Birla Group, a carbon black producer, recently issued a letter of intent to Emerson Process Management to supply a PlantWeb digital architecture scope with FOUNDATION fieldbus technology to automate their expansion project in Egypt. This new project, which follows the earlier successful installation of a DeltaV automation system, will use FOUNDATION technology to communicate with intelligent field devices from Emerson, including Rosemount® 3051 and 848T transmitters, Micro Motion® Coriolis flowmeters along with AMS® Suite to upgrade performance with improved product quality.

For their expansion project, ACBC insisted on an automation technology that could deliver important benefits like reduced process variability, lower engineering and installation costs, and decreased maintenance costs.

Scarab Saffron Gas Fields Reduce Operating Costs
The Scarab Saffron gas fields represent the first deepwater development to be undertaken in the eastern Mediterranean. The fields lie in the West Delta Deep Marine concession near Alexandria, Egypt, and are the largest natural gas development in that country.

The latest FOUNDATION fieldbus technology provided by Yokogawa was chosen to reduce operating costs at the new on-shore facilities. Design, engineering, procurement, supply, testing and commissioning were completed smoothly and on schedule, ensuring the benefits of FOUNDATION fieldbus were quickly realized.

Qatar Shell Improves Efficiency of GTL Plant
Honeywell was selected by Qatar Shell GTL Ltd. to design and implement the integrated process automation system for the Pearl Gas to Liquids (GTL) plant. This includes installation of the Experion Process Knowledge System (PKS) Release 300, with FOUNDATION fieldbus communication, to tie together all critical subsystems in the plant.

With the integrated automation platform, Qatar Shell GTL Ltd. will be able to efficiently control GTL operations from production at the platforms, to processing at the onshore plant, to shipping of the finished product. Data from equipment such as process controls, field devices and safety systems will be sent to the control room, enabling operators to make better decisions faster.

Shell Ensures Safety of Oil Storage Terminal
The Bonny Island Terminal Project in Nigeria comprises 24 oil storage tanks for Shell Petroleum Development Corporation. The main engineering contractor for the project chose the Korean subsidiary of Yokogawa to provide the CENTUM CS3000 control system with FOUNDATION fieldbus capability for the site.

The fieldbus network at Bonny Island includes a total of 6,000 devices, of which 1,600 are located in Zone 1 hazardous areas. Intrinsic safety was selected as the preferred protection method for the hazardous sector, with fieldbus power provided by MTL’s FISCO power supplies. These devices are used in conjunction with two- and four-way, intrinsically safe Megablock and FB1-I-S terminators to create fieldbus segments that may be “live-worked” throughout without gas clearance procedures.

PDO Integrates Technology For Wellhead Control
Petroleum Development Oman (PDO), a Shell operating company, selected Yokogawa to implement its STARDOM solution for wellhead control. The automation system, utilizing FOUNDATION fieldbus, provides transparent information technology from field devices to SCADA and management tools.

PDO has benefited from flexible configuration supporting redundancy and hot swapping of I/O, as well as seamless connections to secure Intranet/Internet and FOUNDATION fieldbus H1 networks. The system enables reporting and securing of valuable data under extreme ambient conditions, and also provides remote programming, diagnostics, maintenance and management functions.
Emerson Introduces DeltaV™ InSight
Next-Generation Control Performance Application

Emerson Process Management has announced the availability of the DeltaV™ InSight integrated control performance software. DeltaV InSight utilizes FOUNDATION fieldbus device diagnostics to monitor, analyze, diagnose, and improve control loop performance. The InSight application includes all the basic monitoring and tuning capability of its predecessor products, DeltaV Tune and DeltaV Inspect, plus advanced diagnostics and adaptive tuning capabilities made possible with embedded learning algorithms.

DeltaV InSight makes it easy to improve process control by monitoring control performance; identifying and diagnosing problem loops; recommending tuning and maintenance improvements; and continuously adapting to changing process conditions. DeltaV InSight automatically learns users’ processes with embedded learning algorithms running at the controller level and develops process models based on day-to-day operations. These models allow users to identify operational benchmarks, diagnose problems and calculate optimum loop tuning across the entire control system.

Emerson Process Management • www.emersonprocess.com

FREE Fieldbus Jargon Buster

If you mix up HIST and host, can’t tell a chicken foot from a backbone, or wonder what Kermit has to do with fieldbus technology, then the ABB Fieldbus Jargon Buster is the publication for you. It contains a clear explanation of dozens of fieldbus technical terms and can be downloaded from http://instrumentation.request-center.com/8.

ABB • http://instrumentation.request-center.com/8

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For more information, go to www.products.endress.com/TMT85 and www.fieldbus.org.

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Invensys’ InFusion Field Device Manager Supports Both FDT and Enhanced EDDL

A key component of the new InFusion Enterprise Control System from Invensys is the Field Device Manager — an open toolset to configure, commission, maintain and diagnose FOUNDATION fieldbus devices throughout their lifecycle.

Field Device Manager provides a comprehensive, fully integrated engineering and maintenance environment and is the first to offer support for both FDT and Enhanced EDDL technologies.

Invensys • www.foxboro.com

New MTL Fieldbus Components

Whether you are planning your first fieldbus project or your twentieth, it pays to know what is available. And MTL knows a thing or two about fieldbus networks, having been involved in defining the early standards right up to supplying the power supplies, wiring hubs and components for the world’s largest fieldbus projects. So before you commit your hard-won budget check out what’s available from the leading source of:

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- Surge protection devices
- Process junction boxes
- Wiring hubs and components
- Integrated fieldbus diagnostics
- FISCO and FNICO supplies
- Fieldbus Barriers

For more information, request a copy of the latest product overview by e-mailing fieldbus.info@mtl-inst.com and read up on application stories that outline why MTL is the world’s leading supplier of fieldbus components.

MTL • www.mtl-fieldbus.com
1757-FFLD FOUNDATION Fieldbus Linking Device from Rockwell Automation

The FOUNDATION fieldbus standard provides you the ability to distribute architecture throughout a plant. This enables integrated, seamless distribution of data and the execution of process functions with multi-vendor devices. Rockwell Automation takes full advantage of the FOUNDATION fieldbus standard with the combination of the linking device and RSFieldbus Software to bring fieldbus devices into the Integrated Architecture™. Control Loops can be run in a Logix Controller or in the FOUNDATION fieldbus devices. This device fully supports all FOUNDATION fieldbus control capabilities through HSE & EtherNet/IP.

The linking device offers you the most flexible FOUNDATION fieldbus device interface available and when used with Integrated Architecture, you can greatly increase the efficiency of your manufacturing. With the 1757 FFLD, you have the flexibility to do process control with any Logix controller while you are using the advanced capabilities of network based process instrumentation. The device also includes the unique ability to bridge both FOUNDATION fieldbus HSE & EtherNet/IP networks to FOUNDATION fieldbus H1 device networks.


Yokogawa’s digitalYEWFLO Vortex Flow Meter Available with a Multi-Variable Option

The digitalYEWFLO Multi-Variable Mass Vortex Flow Meter is based on the field-proven sensor technology of the digitalYEWFLO series of vortex flow meters, which features a unique signal processing technique that extends the features of DSP. The advanced processing algorithms are known as Spectral Signal Processing (SSP). SSP analyzes the vortex waveform into its spectral components to filter noise from the signal for the most stable measurement possible. The meter will provide stable, accurate measurements at low flows, even in noisy environments, without any need for start-up tuning. The user benefits through greater reliability, reduced maintenance and a lower total cost of ownership.

Now, in addition to the benefits of no start-up tuning and low flow stability, the addition of an integral temperature sensor extends the application of digitalYEWFLO to include the mass flow measurement of saturated steam based on steam tables embedded in the software and the mass flow measurement of liquids based on programmed fluid temperature coefficients. The measured temperature can be displayed on the two-line LCD indicator and is also available through fieldbus for process temperature management. Additionally, mass flow rate, total and diagnostic information is also available.

Yokogawa • www.yokogawa.com/ fld/FLOW/DYF/fld-dyf-ff-01en.htm

Save Project Time and Expense with Honeywell’s Patented Link Schedule Optimization

Projects utilizing FOUNDATION fieldbus technology have reached tens of thousands of devices, creating the need to improve performance. One method is to optimize the fieldbus link schedules to deliver better control, more devices per link, and less work for the project engineers. Honeywell’s unique time-saving algorithm optimizes the link function block publication schedule. This prioritizes and optimizes the link by maximizing parallel execution, minimizing loop latency, and maximizing available communications bandwidth, resulting in significant savings.

Honeywell • hpsweb.honeywell.com/Cultures/en-US/Products/ Systems/ExperionPKS/FoundationFieldbusIntegration/default.htm

New White Paper Gives Fieldbus Basics

MooreHawke, a division of Moore Industries-International, Inc., has released a new white paper called “Introduction to Fieldbus.” This concise 8-page bulletin explains, in terms any engineer, technician or operator can understand, how fieldbus works. It explains: the advantages of using fieldbus networks; the elements of fieldbus (H1 cards, power conditioners, segments, spurs, device couplers and segment terminators); and much more. To get your copy, go to www.miinet.com/moorehawke.

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Northwire • www.northwire.com/buscable
Pepperl+Fuchs’ Award Winning Advanced Diagnostics Module Now Available in Mobile Configuration for Maximum Flexibility

The Mobile Advanced Diagnostic Module from Pepperl+Fuchs is a comprehensive physical layer measurement tool for FOUNDATION fieldbus H1 and Profinet-PA installations that can be used in Zone 2/Class I, Div. 2 areas. The Mobile ADM creates a visual picture of the fieldbus communication signal to facilitate faster commissioning work and easy, efficient troubleshooting. Diagnostic data is easily integrated directly into DCS/PLC device configuration and asset management tools.

For more information, call (330) 486-0002 or e-mail sales@us.pepperl-fuchs.com.

Pepperl+Fuchs • www.fieldconnex.info

1 x 8 Instead of 2 x 4: More Compact, Cost-Efficient Couplers

Introducing a new Ex i coupler which connects eight instead of the usual four intrinsically safe FISCO devices to a fieldbus, R. STAHL has extended its ISbus product range which consists of FOUNDATION fieldbus H1 and Profinet-PA components and systems. The new 8-spur variants of the 9411 type couplers have the same size as previously available models. Two 8-spur couplers are sufficient to connect typical fieldbus segments with up to twelve devices. Compared with three conventional 4-spur couplers, this requires 1/3 less space and saves approximately 10 to 20% of expenses. With a total of 16 connections, this compact and cost-efficient solution also provides four spare spurs.

The new coupler models retain all proven functions and features of R. STAHL’s couplers. They allow users to choose between different grounding and shielding concepts, such as Single Point, Multi Point and capacitive grounding. The units feature an integrated, switchable terminator. They come with a power management which is unique on the market, reducing starting currents in the trunk and, in case of short-circuits in several spurs, minimizing fault currents in the bus. Signal and error status are signalized via clearly laid-out, multi-colored LEDs.

The 9411 couplers are suitable for use in Zone 1, Zone 2 and US Division 2. They are available with plastic or stainless steel housings which can be tailored to customer requirements.

R. STAHL • www.stahl.de

Smar’s SYSTEM302 Remote Controllers Connect to High Speed Ethernet (HSE)

Smar offers a series of advanced remote I/O and controllers that are all connected to FOUNDATION High Speed Ethernet (HSE). Unique to SYSTEM302 are the gateway connections of your choice (FOUNDATION fieldbus, Profinet, DeviceNet, and AS-i). All remote I/O can access conventional signals from a variety of discrete and analog I/O cards, also having a Modbus connection for legacy equipment integration. Other capabilities include Function Block Programming and Ladder Logic via FFB (Flexible Function Block) and EDDL.

SYSTEM302 is the “all-in-one” structure that supports the use of many different technologies in a single, integrated and transparent environment for engineering, operation and maintenance of your plant.

Smar • www.smar.com

Softing’s FG-100 FF/M — New Features for a Field-Proven Product

Softing has updated its field-proven FOUNDATION fieldbus to Modbus/TCP gateway FG-100 FF/M with its new field-device stack to enhance the product with the latest technology FOUNDATION fieldbus has to offer. The Modbus/TCP gateway represents an efficient, yet economical solution for control system manufacturers that want to avoid developing a dedicated H1 interface for their control devices.

The certified FG-100 FF/M offers one Modbus/TCP port that is connected to the control or visualization device (e.g., PLC or HMI) and four H1 ports that connect to H1 field devices. The gateway is configured like any other H1 field device by using a standard configuration tool and transparently maps the process data to standard Modbus holding registers (4x Registers). A PLC controls H1 devices simply by accessing the holding registers in the FG-100 FF/M.

For more information, please visit us online or call (978) 499-9650.


TURCK’s New Diagnostic Power Conditioner for FOUNDATION Fieldbus H1

TURCK introduces a revolutionary new Diagnostic Power Conditioner system (DPC) for FOUNDATION fieldbus. The power conditioning system features an integrated diagnostics module that provides the end user with vital statistics that ease the task of diagnosing any problems associated with the FOUNDATION fieldbus physical layer.

Yamatake Delivers Hybrid Smart Positioner, SVP3000 Alphaplus

Yamatake’s SVP3000 Alphaplus Model AVP304/204 (Model 204: remote type positioner) obtains a unique function that is realized by hybrid technology. The Model AVP304/204 adopts two signals — analog and FOUNDATION fieldbus. Users need not worry about positioner selection, since the Model AVP304/204 can control a valve both by analog signal and FOUNDATION fieldbus signal. The FOUNDATION fieldbus signal is for diagnostic purposes. The SVP3000 Alphaplus and control valve maintenance support system “Valstaff” provide Stick Slip detection which is a dynamic diagnostic.

Yamatake • www.azbil.com
Buy a FOUNDATION fieldbus system with proprietary snap-on device diagnostics and get a free matching bracelet.

Break free. Push performance without constraints. Get open, advanced diagnostics with FDT plug-ins. Plus basic and enhanced DD.

There are those who promise advanced diagnostics for their fieldbus systems. Problem is, you have to use their devices—and only their devices to get any benefit. Well forget it. Push performance past the usual threshold with the I/A Series® system. This Foxboro system offers the first and only management application that combines the open, advanced diagnostics of FDT technology with commissioning via today's Device Descriptors. Plus the simple diagnostics offered by enhanced DD that device vendors will bring to market. Providing truly open, advanced diagnostics for any device, from any vendor.

Combined with ease of engineering and maintenance, plus the industry's best fault tolerance—you get the most advanced, open solution available. More importantly, you get a control system with FF that delivers real lifetime economic benefits. More performance. More uptime. Less cost. There's a reason Foxboro FDT technology is the leader. It's called Know-How. To learn more visit ips.invensys.com.
Automation Infrastructure For Operational Excellence.

The Fieldbus Foundation is "Changing the Playing Field" in industrial automation. The scope of FOUNDATION technology makes it a process automation infrastructure — one of the most advanced and scalable solutions available.

This infrastructure is supplier-neutral and standards-based, providing end users with a common framework to implement and manage strategies for operational excellence and continuous improvement in process manufacturing.

Today, FOUNDATION fieldbus dominates the worldwide process automation market — and is a growing solution for the hybrid industries. It's the "technology of choice" for both early adopters and new end users around the globe, especially in developing markets such as Asia-Pacific, Latin America and Eastern Europe.

Find out more.