Combining HART, FOUNDATION Fieldbus, and FDI technologies in a single organization allows suppliers and users to focus on creating value.

INSIDE
FDI TO EASE FIELD DEVICE INTEGRATION WITH HOST SYSTEMS
NUCOR WINS WITH WIRELESS REPORTING SYSTEM
FIELD PREPARES FOR IIOT
The First Redundant Fieldbus Physical Layer

TRUNKSAFE® Fault-Tolerant Fieldbus System

Avoid the number one pitfall of FOUNDATION fieldbus™ networks: All power and communications are vulnerable to a single broken twisted wire pair.

Designed for plant-critical fieldbus segments, TRUNKSAFE maintains all process communications without interruption, even if the network cable is broken or shorted.

With TRUNKSAFE, now you can take full advantage of fieldbus technology without worrying about simple cable failures.

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Welcome to the FieldComm Group

THE FIELDCOMM GROUP combines the resources of the Fieldbus and HART Communication Foundations, and comes just in time to focus on the new era of the Internet of Things (IoT), which has taken the digital revolution to the highest of levels. Rather than a revolution, it seems to me more of an evolution since users have been moving digital information around their plants and to various hosts for about 20 years. I recall the excitement of the first “smart transmitter” and the continual explosion of smart field devices on the market that IoT now refers to as “things.” Although the information available was impressive, the amount of data was quite overwhelming as users were typically ill-equipped to make use of it.

Over the past 20 years, technology has really flip-flopped the situation of “data overload” and created a “hunger” for Big Data to feed the brain of our analytics. Applications now can boil down these masses of data to convert it to “actionable intelligence” and truly help us make better decisions to run the enterprise.

This is exciting, and users in facilities of all types have many stories of how systems filled with data around their assets have enabled their staff to make better decisions. By improving reliability, efficiency, productivity, maintenance costs and safety, and shifting the unplanned to the planned, leveraging digital process data has saved companies millions on millions and raised plant performance to unprecedented levels. These stories show that the IoT era is truly an opportunity to cross that performance threshold that users have bumped up against for years.

It all starts with getting the data in the right places, and that means connecting to the digital data from intelligent devices and assets. We still have much to do in this regard as there are many plants still on analog or with digital data stranded in their devices they are not utilizing in real time. Converting to this digital data and bringing it into use is the first step – there is no analog in the IoT!

Here at FieldComm Group, we understand the issues and are designing specifications for our protocols with connecting to the IIoT in mind, so users purchasing “things” that meet the certification requirements can be assured of a predictable level of performance in their plants. Through working groups, we are addressing users issues such has cyber security and usability, and working on standards for connectivity and integration that will continue to be leading ways to connect and integrate data to hosts across the enterprise in the process automation industry.

It is an exciting time to be a part of this digital transformation, and we hope that this supplement will offer insights into the connectivity and integration standards we see as the future for process automation. We encourage you to discuss their potential with our broad base of more than 350 members worldwide, explore the solutions that will enable you to embrace the vision we all share, and automate to realize the benefits in your operation!

Ted Masters, President and CEO FieldComm Group

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Many Protocols, One Organization

FieldComm Group provides a global one-stop shop for standards, certifications and training.

IT’S BEEN MORE than a decade since advocates of FOUNDATION Fieldbus, HART and PROFIBUS accepted the proposition that, since various protocols would have to coexist, they would cooperate to make them work better together. The latest development in that effort is formation of the FieldComm Group, January 1 of this year.

“The HART Communication Foundation and Fieldbus Foundation have operated similarly in their roles, and their technologies complement each other around the common goal of helping users automate to leverage real-time digital data from field devices in their plants,” says Ted Masters, president and CEO, FieldComm Group. “FieldComm Group was formed by combining these former foundations to create a new entity, which provides a home for their technologies.”

According to FieldComm Group’s mission statement, the new organization was established to “Develop, manage and promote global standards for integrating digital devices into automation system architectures while protecting existing investments in the HART and FOUNDATION Fieldbus communication technologies.”

Masters says, “Although ‘Group’ replaces ‘Foundation’ in the new organization, the HART and FOUNDATION Fieldbus core technologies and branding remain and will be enhanced. All existing registration marks and identifications will also be retained.

“Going forward, we are also now the home of Field Device Integration (FDI) technology and lead its adoption as the integration standard for process automation.”

FDI technology was created by the FDI Cooperation, LLC, which was dissolved at the end of July and responsibility for FDI was handed over to FieldComm Group. “FieldComm Group builds on FDI Cooperation’s work to allow FOUNDATION Fieldbus and WirelessHART to work with PROFIBUS,” says Stephen Mitschke, program director, FieldComm Group.

FDI SIMPLIFIES DEVICE INTEGRATION FDI opens the door for integrating OPC and PROFIBUS PA. “FieldComm Group sets a new collaborative tone for the industry, including Fieldbus Foundation, HART, OPC and PROFIBUS International,” says Mitschke. “We’ve worked together for years, starting more than 10 years ago, since the end of the Fieldbus Wars, on FDI and EDDL [Electronic Device Description Language]. The difference now is we’re being even more collaborative than competitive, more successful working together and combining resources.”

Applications of intelligent field devices predominantly rely on HART, FOUNDATION Fieldbus and PROFIBUS PA communications. “A typical process plant has hundreds or thousands of field devices deployed, often using at least two of these three device
interfaces,” wrote Harry Forbes, senior analyst, ARC Advisory Group, in a recent ARC View. They might use several different device management software applications, each with different technologies for device management.

“We have worked with a number of end users, and when we ask, how well are you doing with device management, they say they have too many technologies that are too different and don’t scale. It takes too much expertise and too much time,” Forbes says. “Managing thousands of devices with multiple interfaces, multiple management technologies, and multiple tools makes device management a frequent pain point for process plants.”

End users may not realize that this same jumble of technology is also very difficult for device suppliers to manage. Each protocol has had its own organization that develops the technology, supports it and certifies compliance. “Device suppliers generally have to support every one of them,” Forbes says. “This is costly, consumes a great deal of scarce human resources, and adds very little incremental value.”

**TECHNOLOGIES WORK TOGETHER**

FieldComm Group was formed to help users and members by combining forces around the common interest of helping them automate. The digital intelligence in field devices is powerful and still underutilized. By integrating this data across the enterprise, it can be used by the many systems and software that can convert it into actionable intelligence and capture value by improved operation.
In the past, end users have had to maintain separate but equal relationships with the foundations. “Today, it’s still mostly the same member companies who have been delivering the technology and writing the specifications for Foundation Fieldbus,” says John Rezabek, process control specialist, Ashland, Inc. “We have the same relationship with the HART people, talking about what could be better.

“We all use HART as well as Foundation Fieldbus, because it works. And if you have a safety system, you use HART because Foundation Fieldbus doesn’t have as large a range of devices, and neither does ProSiSafe. If they did, you might be locked into a single vendor. Then is that an open system?”

To solve the integration problem, “It stands to reason there would be convergence, even at the glacial pace at which it’s come about,” says Forbes.

“Industrial communication and devices is a niche market. This kind of convergence of technologies makes sense, with FieldComm Group managing the technology for HART, FOUNDATION Fieldbus and PROFIBUS International using FDI, a single deliverable that will manage devices on all those networks.”

Bringing HART Communication Foundation and Fieldbus Foundation together streamlines standardization, certification and education for both device manufacturers and users. “Many of the same people were attending multiple meetings,” says Mitschke. “Now these precious resources can work with a single organization to coordinate meetings, schedules and working groups. Where there were three groups devoted to device integration, now there’s one. It’s easier to get the right folks together.”

The PROFIBUS connection

FieldComm Group represents FOUNDATION Fieldbus and HART in all their wired, wireless and Ethernet forms, plus the FDI technology that allows them to share the same software applications with PROFIBUS PA and OPC. “We are co-owners of some tools with Profibus International, and we have specialized agreements to maintain those tools. It’s an environment where they trust us, work with us and can contribute,” says Stephen Mitschke, program director, FieldComm Group.

“As requested by the end users from process industries, the major automation foundations FDT Group, FieldComm Group, PROFIBUS & PROFINET International (PI) and OPC Foundation have developed FDI as a single common integration solution by joining the FDI Cooperation, which meanwhile has been dissolved since the goals have been achieved,” says Dr. Peter Wenzel, Profibus Nutzerorganisation e.V. (PNO). “At the dissolution of the FDI Cooperation, FieldComm Group, FDT, OPC and PI became joint owners of the FDI Specification, and FieldComm Group along with PI became joint owners of the FDI tools and components.”

Tools and components support the controller and device manufacturers in integrating FDI into their products, thus, “FieldComm Group and PI will cooperate through dedicated working groups to maintain and further develop FDI tools and components with a strong end user focus,” Wenzel says. “FieldComm Group will become the ‘home of FDI Technology,’ which means it will provide their working group infrastructure and manage the activities.”

The major goal of the participating foundations is to serve their members and the users, which are customers of the foundation members, by providing FDI as a single integration technology for all supported communication technologies. “This requires a close cooperation,” Wenzel says. “PI’s own experts will therefore be represented in all relevant activities, which guarantees the best results and best benefit to users. PI will actively participate in the further development of FDI and will provide PROFIBUS- and PROFINET-specific parts in developer tools, as well.”
FOUNDATION™ Fieldbus – we put the pieces in place.

The right skills to optimize your projects.

It’s powerful and versatile, but getting the most from your FOUNDATION™ Fieldbus architecture is a major challenge. At Endress+Hauser, we complement our wide product offering with top industry expertise and experience. This enables you to realize your project’s potential and achieve the return on investment you expect. Independent of the DCS we offer you solutions integration for condition monitoring, asset management and control in the field. We deliver improved plant performance and better business results and reduce hassle and risk. Nothing puzzling about that.

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Close collaboration allows a “holistic approach to cyber security” and facilitates advanced applications. “FOUNDATION Fieldbus, HART and PROFIBUS are in a combined group with OPC and FDT,” Mitschke adds. “We can work better together. There’s one place to get the resources, and one place to send the bill.”

FieldComm Group is “a consensus organization that’s bigger than the sum of its parts, where we can come together, share ideas,” says Sean Vincent, director, technical services, registration and training, FieldComm Group. “Whether it’s about cyber security, advanced applications or usability, our focus is on solving problems regardless of the technology. We’re free to make changes unbound by specific domains.”

**SUPPORT, CERTIFICATION AND TRAINING**

The new organization of FieldComm Group remains in Austin, Texas, and combines executive level strategy and direction at the board level with solid and efficient execution and coordination around the globe. The board consists of the combined boards of the legacy foundations and adds a Strategic Technology Committee to provide leadership and strategic direction from a diverse group of technical experts across leading companies (see chart, page S-5).

The new structure offers strategic advantages to automation end users, suppliers and other industry stakeholders working together based on a unified message. Additional benefits will result from leveraging combined resources to improve quality, consistency and efficiency across technologies, while replacing the duality of administrative duties.

FieldComm Group separates the delivery of technical services from the technology direction and program management functions to ensure sound futures for the technology as well as excellent service to its members. “Registration for HART and FOUNDATION Fieldbus products now has a combined lab and resources, with a single point of contact for questions and problems,” says Vincent. “We have combined registrations for products and EDDs—H1, HART, WirelessHART, hosts—streamlined through a single lab.” For a list of components certified this year, see page S-31.

FDI certification testing will be coordinated with PROFIBUS and PROFINET International (PI). “The certification tests of PROFIBUS and PROFINET products with FDI will be performed in accredited vendor-neutral PI Test Labs and the certificates issued by the PI certification body,” says Dr. Peter Wenzel, PROFIBUS Nutzerorganisation e.V. “Users all over the world can be sure that a device that has been tested in PI test labs is tested to the same specifications with the same test procedures.”

FieldComm Group’s training and education program for users and developers encompasses both HART and FOUNDATION Fieldbus technologies, and unifies EDD and FDI across all product types. “The FOUNDATION Certified Training Program (FCTP) is relaunched and rebranded to cover HART, FOUNDATION Fieldbus and FDI,” says Vincent. (See Course Offerings, page S-9.)

Marketing functions are coordinated in each area to promote the message of “automation to connect and integrate digital information” and to drive the adoption of FDI as the new integration standard for process automation.

“In addition to serving as the home for HART, FOUNDATION Fieldbus and FDI solutions, the Group provides a venue for all companies and associations serving the process automation market to share thought leadership,” says Masters. “Culturally, we are receptive to collaborating with leading technologies outside of our organization to find common ground for the betterment of the industry. FDI is a giant step in this effort with international standards organizations such as PROFIBUS International, OPC and FDT Group, already working together. Participation through FieldComm Group Working Groups will also help to standardize the user experience with intelligent device management.

“The message is simple. We want users to gain the value of digital data by leveraging the many member solutions across process automation communication technologies,” Master says. “It is well proven from end users cases time and time again, that users can use real-time data to run their operations and enterprises better to improve performance.”
Calendar

For more information see www.fieldcommgroup.org

Smart Industry Conference and Expo
Chicago, IL, USA
October 5-7, 2015

Emerson Global Users Exchange
Denver, CO, USA
October 12-16, 2015

Distributed Control System (DCS) 20 Congress
Miskolc-Lillafüred, Hungary
October 20-22, 2015

CONTROL Roadshow
Vanderbijlpark, South Africa
November 3, 2015

Free End User FOUNDATION Fieldbus Seminar
Long Beach, CA, USA
Renaissance Long Beach Hotel
November 5, 2015

Rockwell Automation Process Solutions User Group
Chicago, IL, USA
November 16-17, 2015

MCT Petrolchimico Exhibition and conference
Milan, Italy
November 25, 2015

FieldComm Group General Assembly and End User Seminar
Tokyo, Japan
December 2, 2015

Measurement and Control (JEMIMA)
Tokyo, Japan
December 2-4 2015

Power-Gen International
Las Vegas, NV, USA
December 8-10, 2015

FIELDCOMM GROUP
CURRENT COURSE OFFERINGS

Introduction to HART Protocol
This workshop is a two-day introduction course covering the basics of HART communication protocol. The course is designed to provide an overview of the HART market and technology.

HART Fundamentals and QA Testing Workshop
This workshop is an intensive four-day course covering all aspects of HART communication protocol. You will gain the information needed to develop new HART-enabled products, support existing products and design systems that utilize HART technology.

Device Integration - Writing EDD and FDI Package Workshop
An intensive four-day course where developers learn the step-by-step process for building a Device Description for a HART- or FOUNDATION Fieldbus-enabled device based on Electronic Device Description Language (IEC 61804-3, EDDL) that can be used across all DD-enabled host platforms.

Introduction to FOUNDATION Fieldbus
A one-day workshop for developers, end users, marketing professionals and applications engineers, this course assumes little or no prior knowledge of FOUNDATION Fieldbus, but students should be familiar with process control. Students will learn the basic concepts and terminology related to the FOUNDATION Fieldbus integrated architecture and gain a working knowledge of the technical foundation upon which the technology is built.

Advanced Principles of FOUNDATION Fieldbus
This workshop is an intensive three-day course covering all aspects of the FOUNDATION Fieldbus protocol. Students will learn the skills required to develop new FOUNDATION Fieldbus products, support existing products and design systems utilizing FOUNDATION Fieldbus technology.
FDI Empowers Communication

Device packages, development environment and host components ease integration of field devices and host systems.

**WHAT IF YOU** could bring a United Nations translator to any country? You could talk to anyone, communicate exactly what you want, and understand them perfectly, too. Pretty sweet.

Well, that’s what the FieldComm Group’s Field Device Integration (FDI) specification does for field devices, host systems and controllers. FDI takes previously inaccessible data from them that was unusable outside their original protocol, and turns it into commonly reported and displayed information.

FDI combines standard electronic device description language (EDDL) software and elements of field device tool (FDT) software, which are both host-resident technologies. This is a significant development that was a long time coming, and it’s thanks to an epic level of collaboration, years of contributed labor and financial support by former FDI Cooperation LLC and FieldComm member organizations, partners, developers, suppliers and individuals.

“FDI improves interoperability between field devices and host systems through FDI Packages,” says Achim Laubenstein, FDI technology director at the FieldComm Group and manager of fieldbus standardization at ABB. FDI Packages include everything a host system needs for consistent device visualization and parameterization across platforms (Figure 1). “FDI’s big advantage is it replaces platform-dependent integration solutions, and makes device drivers interoperable with host systems because their device descriptions are harmonized across protocols and systems,” Laubenstein says.

Martin Zielinski, chairman of the FieldComm Group’s Strategic Technology Committee and director of HART and FOUNDATION Fieldbus technology at Emerson Process Management, adds, “The high-level recognition was that the process industries have multiple protocols that will continue to exist, but now each can deliver data to different host systems in the same way, and transform it into useful information. FDI takes a bucket of bits, transforms it, and puts it on display for users.”

**COLLABORATION AIDS COMBINATION**

To address needs expressed by users and recommendations from user-associations like NAMUR (www.namur.net) and WIB (www.wib.nl), several fieldbus organizations began efforts to overcome the barriers between their protocols by forming the FDI Cooperation LLC about six years ago.

The founding members included the Fieldbus Foundation and HART Communication Foundation, which recently joined forces as the FieldComm Group (fieldcommgroup.com), along with PROFINET International (profinet.com), FDT Group (fdtgroup.org) and OPC Foundation (opcfoundation.org). Suppliers supporting the effort with personnel and funding included ABB, Emerson Process Management, Endress+Hauser, Honeywell Process Solutions, Invensys (now part of Schneider Electric), Siemens and Yokogawa Electric Corp.

**HOW FDI WORKS**

Published as the IEC 62769 standard, the FDI Specification is available from all four owner organizations, including FieldComm Group, PI, FDT Group and the OPC Foundation. “We had cooperation on this six-year project that I think is unprecedented in the process industries,” says Zielinski. “We looked at EDDL and FDT, and came up with a new form that has the best of both.”

Because EDDL is a text-based language that’s independent of the operating system, Zielinski ex-
plains, it’s limited in its ability to display and execute diagnostics, so about 10% of the time, it needs an added software application in the operating system.

“For example, text-based EDDL is used to set up a device to measure multiple physical properties like flow, pressure and process temperature, but to calculate mass flow, its display needs parameters from a database, and this is what the added software application does,” adds Zielinski. “FDI can do both text-based functions, and then display parameters like mass flow because it combines EDDL and the software application that’s a derivative of FDT.”

Laubenstein adds that, “FDI is protocol-independent, in general, but information has to be mapped to protocol-specific syntaxes. This mapping is specified in protocol-specific annexes to the FDI specification. Currently, FDI supports Foundation Fieldbus (FF), HART and WirelessHART, PROFIBUS and PROFINET. ISA100.11a is under preparation, and FDI has also specified mechanisms—so-called gateway packages—that allow data mapping between different communication protocols.

“Consequently, vendors provide a device package, which is a virtual representation of their device, and provide all information needed by a host system. By running the package, a host system provides all the device functionality to the user, such as parameterization, diagnosis and maintenance. FDI Package allows added device data to be accessed through one device package—one set of DDLs for all tools—but run on each host system. With FDI, the end users get access to their valuable device information.”

DO-IT-YOURSELF PACKAGES
To allow device manufacturers to build their own FDI Packages for use on their host systems, the FDI Cooperation team also developed the FDI Package Integrated Development Environment (IDE), which lets suppliers write and test packages for their specific devices, as well as develop common, host-component software (Figure 2). For instance, FDI Common Host Components help system manufacturers implement FDI into their systems, and ensure interoperability among device packages.

“FDI can be viewed as a translator, but so far, it’s only for HART, FF, PROFIBUS or PROFINET. The advantage for end users is that FDI is independent of the physical hardware and software that’s required for each protocol,” adds Zielinski. “Now, users can pick any host and supplier they want, and use any field device they want, as long as they’re FDI-compatible. Users wanted a single integration technology, and that’s what we’re delivering.”

CURRENT, UPCOMING EVENTS
The first release of FDI technology was FDI 1.0 in January 2015, which included its online capability that requires devices to be physically present when setting them up for integration into a system. The second release was FDI 1.1 in July 2015, which included its offline capability that doesn’t require devices to be physically present.
Unidentified condensate in steam systems can result in a range of issues from process inefficiencies to equipment failure and safety issues. If only I had more visibility into the health of my steam traps.

YOU CAN DO THAT

ROSEMOUNT Accurately detect potential safety issues and process inefficiencies with real-time automated steam trap monitoring.

Knowing the status of your steam traps could enable you to prevent serious safety incidents and minimize production losses. With the Rosemount 708 Wireless Acoustic Transmitter, you’ll have instant visibility to all your critical steam traps through a non-intrusive, WirelessHART® monitoring system. Backed by Emerson’s proven experience in Smart Wireless field instrumentation, the Rosemount 708 will enable you to prevent serious safety incidents and minimize production losses without running all over the plant. Talk to Emerson. We’re the experts in wireless so you don’t have to be.

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“The offline capability is key, especially for users on new projects, because it allows them to do configuration without the field devices present,” says Zielinski. “This means they can do different HART, FF, PROFIBUS and PROFINET configurations before they get to the site, and do a bulk download when they get there, which will save a lot of time.”

With its core mission accomplished, FDI Cooperation’s members decided to dissolve it on July 28, and transfer its technology and intellectual property to the FieldComm Group, which will serve as co-owner with PI, FDT Group and the OPC Foundation. As part of this collective ownership, these organizations are contractually required to maintain the FDI specification, including its language and rules. FieldComm Group and PI are assigned to maintain FDI’s tools, including FDI Package IDE and host-component software.

However, even though the cooperation organization is gone, updates to FDI are continuing and further innovations are already underway. For instance, FieldComm Group released on Aug. 19 the first update to its development tools. FDI Package IDE, Version 1.1, and FDI Common Host Components, Version 1.1, consist of new capabilities for FDI product developers, including an automated device package test tool, support for Profinet-based device packages, and support for developing device packages capable of offline configuration, including upload and download features.

In fact, the first two FDI-based solutions have already been released. The first is ABB’s Field Information Manager (FIM), which is a freely downloadable tool for parameterization and visualization. FIM can be used to help configure some of the hundreds of parameters used to assign field devices to do different jobs in their applications.

The second FDI solution is CodeWrights’ iDTM-FDI Manufacturer Edition (ME) for device manufacturers, which combines FDI Common Host Components and FDT2 DTM Common Components to link the two new standards, help users cope with FDI packages in FDT applications, assist device-specific DTM development, and minimize driver development and testing.

In dialog with host systems, the electro-pneumatic positioner SIPART PS2 demonstrates its communicative side. It can be integrated in the communication landscape by means of the PROFIBUS PA, FOUNDATION Fieldbus or HART® protocols based on the newest communication standards.

One that masters everything: SIPART PS2
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Process Instrumentation

In dialog with host systems, the electro-pneumatic positioner SIPART PS2 demonstrates its communicative side. It can be integrated in the communication landscape by means of the PROFIBUS PA, FOUNDATION Fieldbus or HART® protocols based on the newest communication standards.

Get to know our positioner!

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Users Weigh In

Surveys over the past three years indicate that *Control* respondents may represent North America’s leaders in implementing digital communications.

**PROTOCOL POPULARITY**

<table>
<thead>
<tr>
<th>Protocol</th>
<th>2015</th>
<th>2014</th>
<th>Average percent of devices</th>
</tr>
</thead>
<tbody>
<tr>
<td>HART, percent using</td>
<td>83%</td>
<td>71%</td>
<td>51%</td>
</tr>
<tr>
<td>Foundation, percent using</td>
<td>56%</td>
<td>35%</td>
<td>21%</td>
</tr>
<tr>
<td>Profibus PA, percent using</td>
<td>23%</td>
<td>33%</td>
<td>21%</td>
</tr>
<tr>
<td>Other digital, percent using</td>
<td>61%</td>
<td>50%</td>
<td>30%</td>
</tr>
</tbody>
</table>

**WHAT PERCENT OF YOUR HART DEVICES ARE INTEGRATED?**

<table>
<thead>
<tr>
<th>Year</th>
<th>2015</th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>46%</td>
<td>55%</td>
<td>43%</td>
</tr>
</tbody>
</table>

Figure 2: “If permanently integrated HART connectivity is in use at your plant, what percentage of HART-based field devices is permanently integrated?”

**HOW INTEGRATED IS YOUR HART?**

- **Occasional HART device connectivity via handheld communicator/calibrator**
  - 2015: 63%
  - 2014: 61%
  - 2013: 68%

- **Occasional HART device connectivity via portable PC**
  - 2015: 26%
  - 2014: 35%
  - 2013: 32%

- **Permanently integrated HART connectivity, used for offline, user-initiated activities**
  - 2015: 26%
  - 2014: 23%
  - 2013: 22%

- **Permanently integrated HART connectivity, used for real-time alerts and other automated actions**
  - 2015: 43%
  - 2014: 41%
  - 2013: 32%

- **Permanently integrated HART connectivity to enterprise/business systems for real-time alerts and other automated actions**
  - 15: 8%
  - 14: 12%

Figure 3: “If HART is in use at your plant, which of these statements describes your usage. (Please check all that apply.)”

---

Figure 1: “Which of the following field instrument communication protocols are in use in your plant? (Please indicate the approximate percentage of field devices for each protocol.)”
Success in the Field

FieldComm Group technologies continually lower costs, provide new solutions, and prepare users for the Internet of Things.

THE AGE OF always-on, Internet-connected process plant operations, the Industrial Internet of Things (IIoT), Big Data, Industry 4.0 — call it what you want — is taking root. In the process industries, the need for connectivity between field and control room, and from operations to the front office and supply chain, is increasingly evident.

The concept of fully digitizing field instruments and devices has evolved into a small handful of industry standards that have revolutionized how plant automation systems are designed and run. Earlier this year, the FieldComm Group became home for HART, Foundation, and more recently, FDI technologies. These technologies are the keys for unlocking the rich digital data lurking in the world’s process facilities.

WIRELESS EASES DIGITAL TRANSITION

Most plants aren’t new, and infrastructure upgrades are costly. Many continue to shy away from even the most basic digital connectivity. For example, one instrumentation vendor estimates that 85% of process instruments sold today are equipped with 4-20 mA HART capability, but only about 50% of users take advantage of it. For those that do, HART technology, followed by WirelessHART and HART-IP, have proved indispensable to instrumentation professionals seeking to enhance plant uptime and reliability.

WirelessHART lets users “take advantage of what they already know,” says Hoag Ostling, Hoaglund Engineering, St. Petersburg, Fla. “To me, that’s the biggest winner with WirelessHART. Everyone already knows HART. Everyone already knows HART. They can turn on a new device from a new vendor, and they already know how to configure 90% of that device. And in most cases, that 90% is all we really care about.”

Training technicians to implement WirelessHART for the first time in subzero temperatures proved startlingly easy, with training taking just five minutes. (See sidebar, “Staggering ease with WirelessHART on Alaska’s North Slope.”) The same day the technology was installed at a half-dozen well-heads, Ostling says members of his automation group “uploaded a complete new well of approximately eight instruments to the Mod-

ARE YOU USING WIRELESS?

- Already have wireless field instrument networks up and running
  - 2015: 34%
  - 2014: 45%
  - 2013: 27%

- Plan to test or use wireless within 12 months
  - 2015: 27%
  - 2014: 16%
  - 2013: 14%

- Plan to test one more than 12 months from now
  - 5%
  - 4%
  - 7%

- Do not intend to use wireless instrument networks
  - 2015: 19%
  - 2014: 20%
  - 2013: 26%

- Undecided
  - 2015: 14%
  - 2014: 16%
  - 2013: 26%

Responses to “Which best characterizes your current or planned usage of wireless?” Survey details on page 14.
bus map, batteries were installed and now, data is flowing and the SCADA system is trending on a second wellhead.”

At present, an entirely new, full-scale drill site is being fitted with WirelessHART. Ostling says it will be “even easier” than the last job because configuration will be done using a remote PC-based application that connects to the wireless gateway.

Staggering ease with WirelessHART on Alaska’s North Slope

“The most expensive thing we do, second only to running pipe, is running wires,” especially across roads on Alaska’s North Slope, according to Hoag Ostling, Hoaglund Engineering, St. Petersburg, Fla. Ostling was tapped to install WirelessHART for monitoring a cluster of roughly a half-dozen oil wells in a climate where temperatures can stay below -30°F for weeks at a time, wind chills exceed -100°F, and there was no power on-site. A prior solution was to manually monitor gauges, control valves and injection rates, but that proved to be no solution at all.

**BENEFITS:** The successful elimination of wires, lightning-fast training, start-up time savings without spanning and other nuances saved “several hundreds of thousands of dollars,” Ostling reports. Leveraging “what users already know” sped the project along for what he says is “the biggest winner with WirelessHART. Everyone knows HART. They can turn on a new device from a new vendor, and they already know how to configure 90% of that device, which is often all an application needs.” And because the signal is digital, WirelessHART provided “considerable” savings by eliminating the need to check the span of the transmitters: all they had to do was just check the PV, SV, TV and QV (the latter being battery voltage data).

Training was “a complete non-event.” All Ostling had to explain were a few set-up details for PV, SV, TV, and QV that departed from analog connections, and to leave QV as the already-default setting for monitoring and trending battery voltage.

“This training session took about five minutes over a cup of coffee in my office. Except — oops! — we forgot the new issues of join key and network ID. That took 5 more minutes of training, and the coffee was still warm.”

Once instruments and batteries were installed and called in to the remote control room to check, Ostling says data appeared on the wireless gateway — which was configured remotely by the automation engineers. “As fast as they could power them up, field check out was completed without a hitch.” It took only “a minute or two.” The automation engineers used the gateway’s spreadsheet feature to upload a CSV file to create a modified spreadsheet map for the Modbus network map, and “the upload was completed in about two seconds — Bada Bing.”

**HART-IP PAVES THE WAY FOR THE IIOT**

As WirelessHART digitizes wired HART data, HART-IP takes WirelessHART data to a new level by connecting it to plants’ Ethernet IP infrastructure. This is a critical advantage at a time where IIoT and overlapping terms and technologies such as Industry 4.0, Big Data and other high-flying concepts are becoming very real.
“The whole philosophy of the IIoT is about managing a massive increase in data — doubling, tripling or quadrupling the number of sensors. And the only cost-effective way to get there is to not have to wire them,” says Bob Karschnia, vice president, Wireless, Emerson Process Management (www.emersonprocess.com). “It’s not just about wiring more devices, but wiring a massive amount of them in a new way.” Citing the rising complexity of running plants, he says linking HART-IP to WirelessHART addresses the critical need for “an infrastructure that’s common across all platforms.”

One huge benefit of the HART-IP protocol is a vast reduction in manual data mapping chores. Today, a user seeking to map device data from WirelessHART to Modbus must know details of the host’s Modbus settings and registers, map the HART variable you want to that particular register, and separately map the status of each device’s measurement to a different register. Once the data is in Modbus, it then has to be mapped to the host system’s database structure. This might take 30 minutes to an hour per point (including testing and verifying), and the application may have thousands of points to map. In contrast, using HART-IP requires the user to provide an IP address and hit ENTER – the data are auto-populated in the database. “That takes — literally — less than a minute,” Karschnia says, “and everything you can imagine is entered, stored and recorded in the database. That’s the beauty of HART protocol, now the responsibility of FieldComm Group — they’ve done such a phenomenal job of making this so simple that it’s not just easy; it’s hard to get it wrong.”

Researchers have already proven successful in controlling a full distillation column using WirelessHART, “and they’ve proven that for practical purposes, there’s no discernible difference between using wired 4-20 mA control, FOUNDATION Fieldbus control and WirelessHART control,” Karschnia says. The 256 Kb WirelessHART signals, digitized and passed up through HART-IP-equipped wireless access points (multiplexers and gateways), sends data that can be used alongside analog or digital fieldbus data. As HART-IP devices become more widespread in the DCS world, real-time WirelessHART applications will take “a tremendous step forward,” Karschnia says.

HART SMARTS IN THE MOBILE AGE
Handheld HART communicators have made it easier and more cost-effective for technicians to reach hard-to-access devices. Benefits include incalculable cost reductions such as turning hours into minutes for checkout/startup and ongoing maintenance. But in the age of mobile computing, even handheld HART communicators have become less convenient than the iPhones and Google Android-based smartphones in technicians’ pockets.

Mobile apps, used in conjunction with a compact Bluetooth modem and HART-enabled PC-based software, is cost-effective upfront because it can eliminate the purchase of traditional HART communicators. Additionally, plants that can’t equip every qualified technician with a communicator can now deploy phone-based calibrators in the field, reducing future budget deliberations and significantly enhancing maintenance productivity. Plus, phones tend to have larger screens, free-up space in the technician’s tool bag — and can do double and triple duty when instruction manuals, engineering catalogs, calculators and more can fit in the same, pocket-sized device.

“Most of our people have Android phones, so it makes sense to run the DevComDroid software...
in our own devices rather than more cumbersome handheld devices,” says Andrew McIntosh, instrumentation lead with Fonterra Co-operative Group, a New Zealand Dairy (www.fonterra.com). On his use of DevComDroid from ProComSol (procomsol.com), he adds, “Bluetooth capability lets us remotely control the connected device, so it reduces the need for two people doing an end-to-end loop check. It’s dependable and efficient technology, and has saved us time and money.”

MORE USER-FRIENDLY FOUNDATION

Foundation Fieldbus digital technology provides much greater bandwidth for moving large volumes of data. But the shock of going all-digital for some users has been a barrier to implementation. To
address this issue, the specification continues to evolve for greater user-friendliness.

John Rezabek, process control specialist for ISP Corp., a Lima, Ohio, specialty chemical unit of Ashland Chemical, notes how FOUNDATION Fieldbus has roots in a specification written for “extraordinary reliability,” which came with a level of complexity that is difficult to maintain in today’s climate.

The good news is that as human and budgetary capital have tightened, FOUNDATION Fieldbus has responded with usability improvements that ease the instrument professional’s job. These include making the spec’s existing “Compatibility_rev” parameter a “mandatory” part of the protocol’s interoperability test kit (ITK) and other details that Rezabek says move tasks such as device replacement and commissioning closer to a “screwdriver-only” scenario that bypasses the need for involvement by control system specialists.

New products on the market continue to enhance FOUNDATION Fieldbus utility, including vari-

**FOUNDATION Fieldbus at new Novartis plant in Singapore**

Pharmaceutical leader and global processor Novartis broke ground on a new, multi-billion dollar biologics production site in Singapore in 2013. Set to open in 2016, this latest site in the country is shaping up to be a flagship for the company’s technological competence in biotechnology and pharmaceutical manufacturing — with help from FOUNDATION Fieldbus.

The company’s automation infrastructure includes instrumentation from Endress+Hauser, which reports that a new concept for the management of field diagnostics has taken root, employing FOUNDATION Fieldbus field devices.

**BENEFIT:** Operators will be able to identify, remedy and document current or potential faults much quicker. In addition, major workflow simplifications were achieved during parameterization, commissioning and calibration.

---

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- Support standard DD file
- Support function blocks: AI, AO, DI, DO, PID, etc.
- G0313 supports multiple Modbus devices

**Modbus to HART Gateway/Module—G0310/M0310**
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- Comply with HART protocol specification V7.0
- Support Modbus communication parameter configuration
- Support 375/475 handheld device
- G0310 supports multiple Modbus devices

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ous remote diagnostics solutions for plants where Foundation Fieldbus components have been running for years. “Segments may be approaching the threshold of failing, terminals may have corroded, extra de-vice may have been added or replaced, and there may be varying installation practices,” explains Jason Norris, process automation manager, Phoenix Contact (www.phoenixcontact.com). He cites a need for solutions to troubleshoot aging network segments as well as device issues, for example, improperly fit device caps on transmitters, which Norris says recently caused a shutdown at a power generation customer site.

To address the issue, a Field Diagnostics Module, to be installed in the junction box, is being readied by Phoenix Contact for market introduction. It monitors voltage between power supplies and junction boxes to detect issues such as voltage drops, and sends alarms back to the control room. “Maintenance crews no longer need to do a two-step maintenance cycle where they go out to the field to first check to see what kind of problem there is — they get that information immediately,” says Arnold Offner, strategic marketing manager, Phoenix Contact.

Additional Foundation-compliant diagnostic products include surge protectors from Pepperl+Fuchs (www.pepperl-fuchs.com) that also provide Foundation-compliant diagnostics to protect control components, device couplers and field devices with self-monitoring and alarm messaging back to control room operators. By detecting
depleted surge protectors early, the vendor reports, this product replaces costly and repetitive manual checks and prevents unscheduled downtime through the replacement of modules — without need for an intermediate level of wiring, because modules are simply plugged into the device coupler. Related Pepperl+Fuchs Foundation products include a device coupler that monitors networks to prevent segment failures in process plants where aggressive gases can compromise wiring, and in foods and pharmaceutical plants using high-pressure sprays. Additionally, Foundation-compliant control enclosures, I/O modules and gateways provide early-warning diagnostics to boost the reliability and availability of control as well as process equipment.

**PERFECT COMPLEMENTS**

Monsanto, at its Muscatine, Iowa agricultural products processing facility, first applied Foundation Fieldbus in 2004 at a waste treatment plant and soon after, a coal-fired boiler unit. The initial driver was to physically circumvent the cost and physical barriers of cable-tray and wiring capacity constraints.

Beyond trouble-free performance, the all-digital field “has given us a huge advantage in our ability to diagnose and predictively determine issues with our instruments,” says Joel Holmes, site electrical reliability engineer and enterprise lead for Emerson’s asset-managing AMS system. He says the network infrastructure has taken on an increasingly relevant role for its ability to “absorb the massive amount of information” coming as the IIoT takes root.
Monsanto achieves years of reliability

Monsanto is a pioneer of FOUNDATION Fieldbus, and uses it throughout its widespread network of plants, including applications at Muscatine Iowa. But this facility, winner of 2013 HART Plant of the Year honors, is also a leading user of HART and WirelessHART in tandem with Emerson’s asset-managing AMS Suite. Upgrades a few years ago added predictive and condition-based maintenance and reliability benefits that included preventing a shutdown whose cost was estimated at $100,000 per hour; saving as much as $25,000 per hour by identifying plugged sensor tubing on a critical mass flow meter measuring catalyst slurry; and identifying “bad actor” devices to save the plant between 800,000 and $1.6 million per year in cost avoidance. But what happens years down the road following the big “low-hanging fruit” gains of those first improvements over legacy analog systems?

BENEFITS: WirelessHART networks have proliferated at the site, connecting more than 1,500 HART-smart devices at two of the site’s eight process units. Cost avoidance, beyond the of initial installations, still “ranges anywhere from $800 to $1,800 per work order” due to the use of “predictive technology versus just doing stuff reactively when something breaks,” says Joel Holmes, site electrical reliability engineer and enterprise lead for Emerson’s asset-managing AMS system.

Today, the site’s operating units are running at efficiency levels as high as 99.8% with more than 90% of field devices connected to HART and WirelessHART networks, or FOUNDATION Fieldbus technology. Over the next two years, multiple new DeltaV-based control systems will connect the bulk of “stranded diagnostics” that lack the required smart I/O, being under the purview of legacy Provox control systems. This will significantly increase the number of devices connected to WirelessHART and other FieldComm Group technologies.
Connecting more than 90% of the facility’s field devices “allows us to identify issues before they occur so that you can predictively, proactively plan, schedule and execute those repairs before they have a negative impact on your units.” (See sidebar, “Monsanto achieves years of reliability.”)

Under the umbrella of the FieldComm Group, Foundation Fieldbus and HART protocols will integrate with hosts via FDI technology. FDI rationalizes the device-describing protocols of FDT and EDDL, allowing a single software solution to work in plants with disparate network protocols, says Edmond Toutoungi, product manager, Wireless and HART, Endress+Hauser Process Solutions (www.endress.com). For instance, FDI’s efforts will ease interoperability between FOUNDATION Fieldbus H1 and PROFIBUS DP/PA/PROFINET at the instrument level, as well as a merging of control networks via industrial Ethernet. Furthermore, communication will also be more open to discrete networks.

“A lot of the same things we’ve been talking about for more than 10 years are even more true today with the advent of the IIoT,” says Laura Briggs, marketing manager, Plant Asset Management, Emerson Process Management. Easier integration of devices, networks and hosts; easier connection to host systems; and a more open attitude toward sharing data between process control and maintenance have been the goal of technology developers for decades. But under the FieldComm Group, the industry is poised to realize a new level of cost avoidance, efficiency, profitability and reliability.
Plant of the Year Wins with Wireless Reporting System

Nucor Steel Tuscaloosa gained reliability, eased maintenance and avoids incidents with WirelessHART.

SOMETIMES MAKING ONE improvement leads to a jackpot of others.

For instance, Nucor Steel’s plate mill in Tuscaloosa, Ala., recently needed a more reliable recording and reporting system to accurately monitor water resources used at the mill, but the existing reporting system wasn’t reliable, its network connectivity was poor, and technical support was lacking.

As a result, Nucor Steel Tuscaloosa Inc. (www.nucortusk.com) replaced its old, point-to-point wireless system in operation during 2009-13 with a new, mesh-based wireless solution. Also, rather than hiring an outside engineer or contractor, the plant’s engineers and technicians found they could do almost all of the design and installation of their wireless replacement project on their own.

Well, the new mesh and WirelessHART solution not only provided more reliable reporting about the plant’s water system, but it also delivered a cornucopia of other benefits to Nucor’s operations. In fact, the new wireless system achieved so many gains that the Tuscaloosa mill has won the FieldComm Group 2014 Plant of the Year Award.

PLANT PROVENANCE

The present Tuscaloosa facility was built in 1985 on the site of what was once a paper mill. In 2004, Nucor Steel bought the mill and all of its assets from Corus, formerly British Steel.

The Tuscaloosa mill presently has about 430 employees, which Nucor calls “teammates,” and operates 365 days a year. They convert scrap metal into 5.25-in. slab steel, which is then rolled out into 1/8-in. to 2-in. thick temper plate steel. They can also coil steel up to 1 in. thick. Steel from the mill is used for pipelines, building plate, tug boats, barges, and pressure vessels.

Ben Springer, environmental technician at Nucor Steel Tuscaloosa, reports the mill can produce more than 1.2 million tons of steel per year, so it also

Figure 1: Output from 57 different transmitters at the Tuscaloosa mill goes through four WirelessHART gateways, and their output is connected to seven radios from ProSoft Technology, which creates an IEEE 802.11 (WiFi) wireless backhaul network. The radios create their backhaul network to the PLCs, and the data can be accessed by using an OPC server application.
annually consumes a lot of industrial, non-potable water, which it gets at low pressure from Lake Tuscaloosa via the municipality. The mill sprays this water on its steel strand as it moves through the machines in its production line, both to help form the steel and to cool its equipment. This distribution system’s water meters are monitored by transmitters that send back 4-20 mA signals via wireless to indicate flow rates and other parameters.

“The monitoring system is needed to see how much water is being used and where,” says Springer. “By knowing this we can look for ways to conserve water and manage how we use the water in our process. We can also use the monitoring system as a troubleshooting aid if a failure of equipment or piping infrastructure occurred.”

MIGRATING TO MESH

To improve its water monitoring system, the Tuscaloosa team initially had to weigh several options, including continuing to invest in current wireless infrastructure, investigating alternate solutions such as manual collection of data, implementing a wired solution, or investigating an alternative wireless solution that better met their needs. A wired system wasn’t an option because the location of the water meters would have require miles of excavation and new cables, a restricted number of analog cards in their PLCs, and limited flexibility for future applications.

However, the team’s research found that WirelessHART was an open protocol, and they eventually selected it because it didn’t require a radio frequency (RF) survey, it cost less than other options, and its devices offered a self-organizing mesh network, secure communications, easier deployment, simple system integration, multiple vendor options and total digital communications.

“The main goal was to monitor our water usage, and be able to troubleshoot it,” says Springer. “We didn’t have leaks yet, but if we did have an issue, we wanted to catch it quickly. This wouldn’t be possible with the old wireless system because it was only about 60% reliable based on the many times it lost and dropped communications, the number of transient errors we were getting, and how often we had to work on it. We were dealing with wireless transmitter issues for several hours every week.”

DESIGN, INSTALL, SUCCEED

Following some basic training on the wireless gateways, transmitters and support devices they planned to install, the Tuscaloosa team found they could do their wireless upgrade almost entirely in-house with some help from local sales representative Russell Poor. They deployed several wireless tools from Emerson Process Management, including Smart Wireless gateways/servers and Asset Management Suite (AMS) Wireless Snap-On planning software, which works with Google Maps (Figure 1).
These components use WirelessHART to communicate to four gateways, and their output is connected to seven radios from ProSoft Technology, which creates an IEEE 802.11 (WiFi) wireless backhaul network for communications from the gateways. The radios create their backhaul network to the PLCs, and the data can be access by using an OPC server application (Figure 2). This network receives input from 34 WirelessHART temperature transmitters, two WirelessHART temperature transmitters with extended range antennas, 19 WirelessHART dP transmitters, and one WirelessHART adapter connected to a wired HART device.

The four gateways presently cover 90% of the Tuscaloosa mill, and can easily go to 100% coverage if needed. The Prosoft radios are mounted 80-90 ft. up on the bag house, so no added towers were required.

RESULTS ATTRACT CRANES

Springer reports that the mill’s new WirelessHART network achieved 100% data reliability that was on-time and validated. “It was much better than we expected,” he says. “It’s easy to get data out of the system. The WirelessHART signals go through buildings without any problems, and its meshing provides for a strong network with only a few routers needed, which help make the network even stronger. Depending on the application, we also saved 50-80% with WirelessHART compared to the costs of a wired system.”

Beyond checking water use at the mill, the Tuscaloosa team discovered they could also use WirelessHART to monitor 19 dP transmitters in the plant’s bag house and water filtration system. “When you melt steel, one of the byproducts is dust, and so the bag house is basically a large dust-collection system with big filter bags,” explains Springer. “Measuring pressure drops in the bag house helps us determine when the bags need to be cleaned.”

Next, these results began to draw interest from the mill’s overhead crane maintenance team, who realized they could use WirelessHART to monitor bearing temperature and vibration. The crane moves steel in and out of the mill’s production process, and also transports its ladle for casting and forming products.

Consequently, sensors and transmitters on the crane were added to the mill’s WirelessHART-based network, where they deliver updates every 2-4 seconds. In the crane’s gearbox/bearing monitoring application, savings were estimated at $150,000-$250,000 per event because now they can monitor the bearings, and take action before a major problem disables the crane.

“Because of WirelessHART’s reliable and automated monitoring, we can now plan maintenance to our processes and equipment, rather than having unplanned shutdowns due to equipment failure,” adds Springer. “We’re now able to provide accurate and reliable data for the process points measured. WirelessHART is helping us reduce cost and prevent costly downtime.”

Figure 2: To build their WirelessHART network, the Tuscaloosa mill’s team used AMS Wireless Snap-On planning software, which works with Google Maps. It made sure each transmitter and gateway had enough coverage, and showed how they would form and maintain their wireless mesh network.
WHICH WIRELESS PROTOCOLS WILL YOU USE?

Use/will use IEC 625910-compliant Wireless HART solution

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Plan to wait until a single wireless instrument network standard emerges

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Do not intend to use wireless instrument networks

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Responses to “Which of the following statements best characterizes your current or planned usage of wireless instrument networks?” Survey details on page 14.
A Robust Foundation for the Industrial IoT

Easier integration will empower transformative applications.

**IT’S REALLY TOO BAD** that the Industrial Internet of Things (IIoT) includes the word “Internet.” For process industry practitioners tasked with keeping industrial processes running safely and securely, the word sometimes conjures images of process-critical systems connected directly to the public cloud—and the cyber nightmares that come with such scenarios.

“Every day we hear of another high profile hack,” notes Scott Saunders, president and CEO of Moore Industries-International, a specialist in process instrumentation interface solutions. For the process industries, cyber security is a critical and growing concern, Saunders says. “It’s not like a home automation system where cyber concerns are real but limited. Plants can have ‘kaboom’ situations that threaten entire communities.”

**AN INTRANET OF THINGS**

The process industries, in particular, embarked on their own IIoT journey to realize the power of networked digital systems long before the advent of the consumer and commercial Internet. Today, increasingly capable networked devices and sensors, together with powerful software applications, continue a slow but inexorable transformation of process operations begun decades ago.

Some progressive industrial enterprises already have begun to realize the IIoT’s promise of data-driven decision-making to optimize processes and predictive diagnostics. And, more often than not, they rely on a robust, reliable and secure infrastructure of communication technologies developed over the years to meet the specific needs of process auto-

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S-28 Advertising Supplement to CONTROL
mation, notably the HART protocol, FOUNDATION fieldbus and FDI—all of which are now managed on behalf of industry by the FieldComm Group.

Despite rapidly advancing network technology and growing attention to the IIoT’s promise, the needs of the process industries continue to resist the application of commercial networking technologies at the field level, notes Peter Zornio, chief strategic officer, Emerson Process Management. “While Ethernet has reached further down the automation hierarchy in discrete manufacturing applications, issues such as distance, intrinsic safety and loop power have limited our ability to use off-the-shelf network technologies,” Zornio says.

“More sophisticated devices such as gas chromatographs and Coriolis flowmeters have started to go to Ethernet connectivity,” continues Zornio. “But if you need intrinsic safety and it’s a relatively simple pressure or temperature transmitter, an IP [Internet protocol] network connection will add some complexity and likely some cost.”

Ethernet technology all the way to the field instrument level is seen by some as an inevitable next step. But for others, the business and use case for developing a new physical layer “just for us” isn’t at all clear. “We’re talking about putting a lot of effort into new wired protocols when the world is increasingly going wireless,” Zornio adds, “and if we want battery-powered devices, the power and data efficiencies of IP protocols really come into play.”

Cyber security is a persistent concern, as is the ability of technicians to cope with IP-addressable field devices. “If we can make what we already have easier to use and to integrate into IP networks, do we really need new physical layer protocols?” Zornio asks.

Indeed, industrial facilities that have built a communications foundation based on FieldComm Group technologies already are in a position to leverage the power of this secure “intranet” of process automation things in order to gain many of the promised benefits of the IIoT—without incurring the IIoT’s perceived security risks. “It’s an industrial intranet of things in the sense that it’s firewalled and sometimes physically segregated from the outside world,” says Moore Industries’ Saunders.

### USING DIGITAL FOR MORE THAN CONFIGURATION?

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Responses to “If you have digital instruments, are you using the digital information for more than configuration, i.e. integrating it for condition monitoring, transmitter internal temperature, etc.? “ Survey details on page 14.

### DATA AND PROTOCOLS ALREADY HERE

Modern process automation systems, for example, now include built-in multiplexers for seamlessly extracting digital HART information from analog transmitter signals. Leveraging these capabilities, together with full digital FOUNDATION fieldbus and WirelessHART networks, industrial facilities have never been better equipped to extract from their field assets a wealth of digital information related to instrument and equipment health as well as safety and energy efficiency performance.

Ted Masters, president and CEO, FieldComm Group, believes that the process industries can draw inspiration from the IIoT’s momentum to capture the value of the digital information that’s already available in the millions of smart instruments installed worldwide. The vast majority of those smarts are used only during calibration and commissioning, Masters notes. “Now is the time to go get that digital data and use it to improve process performance.

“The value of digital data accessed through various hosts and systems is exciting, and is transforming our everyday lives. Nearly all devices are becoming connected and accessed for various types of new use cases. But as the IIoT becomes more complicated, users will have many more requirements to keep their plants safe and mission-critical processes reliable. The protocols of FieldComm Group understand the critical needs of process automation users and build robust standards around these special requirements.”
EASIER INTEGRATION IS NEXT FRONTIER

As the FieldComm Group’s protocols have demonstrated their utility and robustness through billions of instrument hours, the primary goals of the organization have shifted from advancing the protocols themselves to making it easier for users to integrate and extract value from their installed base.

“One thing we’ve recognized, with the FDI effort in particular, is that it’s not so much the protocols but the integration of data that is meaningful—and most difficult,” says Emerson’s Zornio. Early on, integration issues were exacerbated by multiple host implementations that often didn’t interoperate in a multi-vendor environment. Users also have had to use multiple data formatting and presentation standards such as EDDL and DTM. “We learned that if it’s not easily integratable, it’s no good,” Zornio says.

FDI set a new bar for cooperation and communication among industry standards organizations. “Now, the FieldComm Group is acknowledging that these other standards exist and is working with them to provide value for end users,” Zornio says.

Meanwhile, the FieldComm Group’s organizational structure, notably its strategic technology committee and working groups, provide for the continued development of new technologies, notes FieldComm Group’s Masters. “We now have a home for those collaborative efforts, a model for continuing to bring technologies forward. We want people to feel safe about coming together here, to work together to advance the practice of process automation.”

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GE
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high availability solutions for today’s connected infrastructure
# Recently Registered Technology

These products have been registered since January 1, 2015.

## New Registered Host Systems

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<td>Honeywell Industrial Automation &amp; Control</td>
<td>EIB Integrated Host (H1)</td>
<td>Honeywell PlantCruise</td>
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<td>FOUNDATION Fieldbus</td>
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<td>EIB Integrated Host (H1)</td>
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## New Registered Devices

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<thead>
<tr>
<th>PROTOCOL</th>
<th>MANUFACTURER</th>
<th>TYPE</th>
<th>MODEL / DEVICE NAME</th>
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<tr>
<td>HART</td>
<td>A&amp;H Enterprises</td>
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<td>AMINATECH Corporation</td>
<td>Wireless Repeater</td>
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<td>FOUNDATION Fieldbus</td>
<td>Azbil (formerly Yamatake Corporation)</td>
<td>Pressure Transmitter</td>
<td>AT9000 Model GTX</td>
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<td>AVP700 STS</td>
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<td>LB480 Density</td>
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<td>Flow</td>
<td>GV7-100</td>
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<td>Promag 200</td>
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<td>Analytical</td>
<td>DAK</td>
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<td>GO-CE9900</td>
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<td>Measurement Of Dissolved Oxygen And Temperature</td>
<td>sc200 Amperometric Module – Configured for O2 SCAVENGER</td>
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<td>sc200 Conductivity Module – Configured for CO</td>
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<td>sc200 Conductivity Module – Configured for ICO</td>
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<td>Measurement Of Ph Value And Temperature</td>
<td>sc200 pH Module</td>
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<td>SmartLine RM76</td>
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<td>SmartLine RM77</td>
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<td>Yokogawa Electric Corporation</td>
<td>Gas Detector</td>
<td>TDLS8000</td>
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Visit www.fieldbus.org to view FOUNDATION Fieldbus registered products and www.hartcomm.org to view HART registered products.
# Updated Registered Devices

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<tr>
<th>PROTOCOL MANUFACTURER</th>
<th>TYPE</th>
<th>MODEL / DEVICE NAME</th>
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<tbody>
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<td>FOUNDATION Fieldbus AUMA</td>
<td>Electric Valve Actuator</td>
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<td>Ultrasonic Gas Flow Meter</td>
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<tr>
<td>HART</td>
<td>Daniel Measurement and Control Inc.</td>
<td>Ultrasonic Gas Flow Meter</td>
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<td>FOUNDATION Fieldbus DREHMÖ GmbH</td>
<td>Electric Actuator</td>
<td>DREMÖ-matic</td>
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<td>FOUNDATION Fieldbus Emerson Process Management</td>
<td>Discrete Valve Controller</td>
<td>Q Series QCS4</td>
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<td>pH/ORP Transmitter</td>
<td>Liquiline pH/ORP</td>
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<td>Guided Radar Level Measurement Device</td>
<td>LevelEx FPM5x</td>
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<td>FOUNDATION Fieldbus VEGA Grieshaber KG</td>
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# Updated Electronic Device Description (EDD)

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<tr>
<td>FOUNDATION Fieldbus Emerson Process Management</td>
<td>Guided Wave Radar Level Transmitter</td>
<td>Rosemount 5300 Series</td>
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<td>Radar Level Transmitter</td>
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<td>Flowserv</td>
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<td>FOUNDATION Fieldbus Honeywell Industrial Automation &amp; Control</td>
<td>Temperature Transmitter</td>
<td>SmartLine/ST8850</td>
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<td>FOUNDATION Fieldbus KROHNE Messtechnik</td>
<td>Ultrasonic Flowmeter</td>
<td>OPTISONIC UFC400</td>
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<td>FOUNDATION Fieldbus Magnotel</td>
<td>Magnetoresistive Level Transmitter</td>
<td>Orion Jupiter JM4</td>
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<td>Micro Motion</td>
<td>Coriolis Mass Flow Meter</td>
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# New Physical Layer Components

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<th>TYPE</th>
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<tbody>
<tr>
<td>FOUNDATION Fieldbus Phoenix Contact</td>
<td>Four Channel Redundant Power Supply</td>
<td>FB-PS-PLUG-24DC/28DC/0,5/EX (Module) with FB-PS-MB-7/EX (Base)</td>
</tr>
</tbody>
</table>
**TEMPERATURE TRANSMITTER WITH ADVANCED DIAGNOSTICS**

Endress+Hauser’s iTEMP TMT162 is a temperature transmitter that is designed to meet the highest demands in ruggedness, accuracy and diagnostic capabilities.

Available with aluminium or stainless steel housing, it has separate electronic and connection compartments for safe and quick installation. RTD, thermocouple, Ω and mV sensors can be connected. A large backlit display provides measurement, bargraph and diagnostic information. Certified transmitter versions are available with various types of Ex protection. The transmitter supports two-channel operation with monitoring of redundancy and temperature drift as well as calculation of differential and average temperature. Sensor matching ensures the highest accuracy in critical applications.

iTEMP TMT162 is available with an ITK6-compliant FOUNDATION Fieldbus interface, thus supporting field diagnostics. Error messages are sorted into four categories, each carrying additional information on cause and remedies. Sensor short-circuit, lead breakage and RTD/TC corrosion are all recognized. With this information, users can quickly identify and rectify faults, thus increasing plant availability.

Endress+Hauser [www.endress.com/TMT162](http://www.endress.com/TMT162)

---

**PROTECT SEGMENTS FROM SPUR AND TERMINATION FAULTS**

MooreHawke TRUNKGUARD Device Couplers provide the most advanced electronic, fully auto-resetting spur short-circuit protection and auto-termination that prevents segment failure caused by single device faults. Designed for General Purpose, Non-Incendive and Zone 1/2 applications, TRUNKGUARD Series 200 & 300 Device Couplers enable fast and easy implementation of fieldbus systems by connecting multiple devices to a main fieldbus trunk in FOUNDATION fieldbus™ H1 and PROFIBUS PA networks. Available models handle four to 12 fieldbus devices.

MooreHawke [www.miinet.com/moorehawke](http://www.miinet.com/moorehawke)

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**EASILY CONNECT WIRED DEVICES TO WIRELESS SYSTEMS**

WirelessHART is used as an economical alternative to complex and costly cable installations. The impressive technology offers simple upgrading of existing field devices and uses new intelligent WirelessHART field devices. If you need flexibility, mobility, and efficiency, WirelessHART networks are the ideal solution.

Pepperl+Fuchs offers a new and expanded portfolio of products with the introduction of the newly acquired Mactek Bullet. This loop-powered WirelessHART adapter enables new and existing wired 4-20mA and HART field devices to communicate measurement, diagnostics and parameterization data wirelessly. The BULLET can be permanently installed by attaching it directly into a field device or anywhere on its current loop. It can harvest the necessary energy from a 4-20mA loop with very low voltage drop through a patented method. In addition, it has an encased antenna, which is a real benefit in rough areas.

The Bullet comes as a General Purpose version without any Ex certification, or as an Ex version with explosion-proof enclosure and IS circuits.


---

**DEADLINES COMING FOR FOUNDATION Fieldbus AND HART TRAINING**

Whether writing DDs, developing device or protocol-specific features or just needing an introduction to digital device development for FDI, FOUNDATION Fieldbus or HART, one of these upcoming courses should fulfill your requirements.

For more: [www.fieldcommgroup.org](http://www.fieldcommgroup.org)

- **Introduction to HART Protocol**
  - Sept. 14-15, Austin, TX, USA
  - Oct. 5-6, Düsseldorf, Germany

- **HART Fundamentals**
  - Sept. 14-17, Austin, TX, USA
  - Oct. 5-8, Düsseldorf, Germany

- **Intro to FOUNDATION Fieldbus**
  - Oct. 6, Austin, TX, USA
  - Dec. 8, Frankfurt, Germany

- **Advanced Principles of FOUNDATION Fieldbus**
  - Oct. 7-9, Austin, TX, USA
  - Dec. 8-11, Frankfurt, Germany

- **Device Integration - Writing DD and FDI Package**
  - Sept. 21-24, Austin, TX, USA
  - Oct. 19-22, Düsseldorf, Germany
PRODUCT SOLUTIONS

FDI-BASED DEVICE MANAGEMENT SOFTWARE - FREE TRIAL

ABB’s Field Information Manager (FIM) is the first FDI-based software for device management. Equipped with a high-performance and innovative graphical user interface, the software makes the configuration, commissioning, diagnostics and maintenance of fieldbus instruments easier and quicker than ever before. For a limited time, ABB is offering a free trial.

To learn more and get your free trial download, visit www.abb.com/fieldinfo

FOUNDATION Fieldbus AND HART TRAINING - DEVELOPER COURSE

Introduction to FOUNDATION
December 8, Frankfurt, Germany

Advanced Principles of FOUNDATION Fieldbus
December 8-11, Frankfurt, Germany

Device Integration - Writing DD and FDI Package
October 19-22, Düsseldorf, Germany

For more information, visit www.fieldcommgroup.org

HIGH PERFORMANCE SMART VALVE POSITIONER

The Smart Valve Positioner 700 Series ensures safe plant operations by providing early detection of control valve abnormalities, allowing optimum valve maintenance scheduling. It detects abnormalities in shut-off, the actuator spring and the gland packing friction by measuring output pressure with a dedicated pressure sensor.

Azbil

SIMPLIFY WIDE AREA NETWORKS WITH A SINGLE ACCESS POINT

The Smart Wireless Gateway 1552WU Wi-Fi access point connects WirelessHART sensors to the control network. Jointly developed with Cisco, the gateway is a mesh access point that simplifies Wi-Fi and WirelessHART installations, lowers costs and reduces deployment time. Users no longer have to run fiber optic cables for Ethernet communication to every WirelessHART Gateway.

Emerson Process Management www.emersonprocess.com

NEXT-GENERATION MASS FLOWMETER WITH FIELDCOMM PROTOCOLS

The next-gen ST100 Series Flow Meter for air/gas flow measurement and plant communication features both FOUNDATION Fieldbus and HART. The triple-variable instrument measures mass flow, temperature, and pressure. Totalized flow and pressure measurement up to 1000 psi (70 bar) is available. Its logger stores 21 million readings on a removable card.

Fluid Components International
www.fluidcomponents.com

GATEWAY INTEGRATES HART AND FOUNDATION DEVICES

Gateway G1013 is a gateway device for HART and FOUNDATION Fieldbus protocols. As HART master, HART to FOUNDATION Fieldbus Gateway G1013 communicates with a HART slave via HART interface, and it can convert dynamic variables in the device into FOUNDATION Fieldbus device variables output.

Microcyber Corp.

EXTREMELY COMMUNICATIVE VALVE POSITIONER

SIPART PS2 can be integrated with PROFIBUS PA, FOUNDATION Fieldbus or HART protocols. It supports both EDD and DTM, and interoperates with the Siemens process control system SIMATIC PCS 7 and SIMATIC PDM, as well as other process control and asset management systems. Plant operators therefore benefit from the complete diagnostics range of the positioner.

Siemens www.siemens.com

HART MULTIPLEXER EASES ETHERNET INTEGRATION

GW PL ETH/-… Ethernet HART multiplexer is an up-to-date replacement for RS-485 HART multiplexers. A variety of expansion modules allow up to 40 HART devices to be connected to a single head station. It supports HART-IP, MODBUS TCP, and PROFINET mapping for easy HART device management using Ethernet.

Phoenix Contact
www.phoenixcontact.com

S-34 Advertising Supplement to CONTROL
Simplifying commissioning. Trusting expert knowledge. Rediscovering fieldbus.

Fieldbus Diagnostic Handheld FDH-1

- Easy and intuitive handling with multilingual, well-structured menu
- Embedded expert system for quick fault detection and correction
- Portable, wireless device for flexible connection anywhere at the infrastructure

www.pepperl-fuchs.com/fieldbus-handheld
CONNECT + INTEGRATE = VALUE

Enable the Industrial IoT with tools, standards and training from the FieldComm Group

Learn more at go.fieldcommgroup.org/control

The FieldComm Group is a global member organization with a mission to develop, manage and promote process automation standards