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## PI News

- P1 MAJOR ENERGY MANAGEMENT INITIATIVE FOR PROFINET
- P1 CONFERENCE SUCCESS
- P2 WIRELESS FOR SENSORS AND ACTUATORS IN FACTORY AUTOMATION
- P2 PROFIBUS/PROFINET NODE GROWTH EXCEEDS EXPECTATIONS
- P2 PROFINET NETWORK TESTING TOO!
- P2 INSTALLATION GUIDELINE IS FIELD-FRIENDLY
- P3 PI CONFERENCE REPORT

## PI World

- P6 BRAZIL
- P6 UK
- P6 INDIA
- P6 NORTH AMERICA

## New Products

- P4 SWITCH
- P4 MASTER FOR CONTROLLogix
- P4 PROFIBUS REPEATER
- P4 PA FLOW
- P4 PROFINET TOOLBOX
- P4 UNIVERSAL GATEWAY

## Member News

- P4 NEW BOOK FOR PA BEGINNERS

## Technology update

- P5 FAST START UP (FSU) FOR PROFINET IO

## PI Network

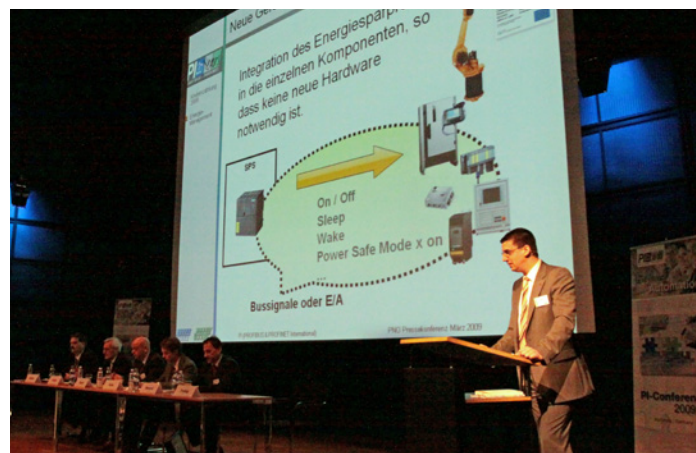
# MAJOR ENERGY MANAGEMENT INITIATIVE FOR PROFINET

PI has begun work on a major energy saving initiative designed to manage the power consumption of high energy devices such as lasers, drives and robots.

The initiative, which will create a manufacturer-independent and standardized profile for PROFINET that helps end users manage their devices more efficiently, has been requested by the AIDA (Automation Initiative of German Automobile Manufacturers)

companies comprising Audi, BMW, Daimler, VW and Porsche. These companies already collaborate on aspects of automation that are of mutual interest and have already committed to PROFINET as their Industrial Ethernet preference. They have now tasked PI with providing functions and mechanisms for PROFINET that support energy-efficient production.

Two factors are driving the initiative - the high cost of energy, and the need to comply with latest environmental regulations. The aim is to develop different energy



PI Chairman Jörg Freitag on stage with AIDA representatives at a press conference held to announce the energy saving initiative at the PI Conference celebrating the 20th anniversary of PROFIBUS in March.

saving modes for high power consumption devices which can be addressed uniformly and easily by a network controller. This will allow the controller to optimize energy consumption during production runs and breaks.

A working group was formed in February and use cases and user requirements have been defined. A specification will be ready by the end of 2009 with first devices appearing around the same time.

## CONFERENCE SUCCESS

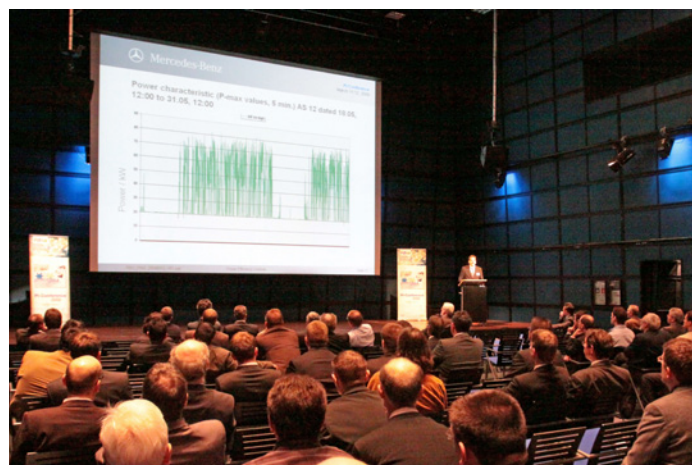
The two-day conference celebrating the 20th anniversary of PROFIBUS saw more than 150 delegates and presenters converge on the prestigious ZKM arts and media center in Karlsruhe, Germany, to hear presentations on many aspects of PROFIBUS and PROFINET.

The conference featured papers on a wide variety of topics. Journalists attending a press conference held just prior to the event heard news of:

- > a new energy saving initiative (see above).
- > latest node counts.
- > a wireless standard for sensors and actuators.

There's more about these stories on **Page 2** and a full conference report on **Page 3**.

(Left) Mr Jürgen Kübler of Daimler, part of the AIDA group, showing delegates at the main conference how energy demand varies in an active manufacturing line. Even at rest, 20kWh is being consumed!!!



## PI News

### WIRELESS FOR SENSORS AND ACTUATORS IN FACTORY AUTOMATION

PI has begun defining a standard way for using wireless coupling of sensors and actuators in factory automation.

PI has already specified WirelessHART for process automation applications. This uses radio technology compliant with the IEEE 802.15.4 standard. Factory automation requires higher throughputs and faster response times so IEEE 802.15.1 will be used. This is the base transmission standard of Bluetooth. Elements of the WISA solution from ABB will be incorporated and field connections will be enabled via IO-LINK.

Coexistence with WirelessHART, and WLAN - the standard for wireless transmission in PROFINET systems - will be ensured. The target for completion of documentation is end 2009. The use of IEEE 802.15.4 for factory automation is being left open at the moment.

### INSTALLATION GUIDELINE IS FIELD-FRIENDLY

PI has published an installation guideline for PROFINET, aimed at helping ensure that systems are set up properly. It's published as a booklet that can be taken out into the field!

Experience shows that 80% of system failures can be traced back to electromechanical faults (e.g. bad cabling) independent of

the automation system. A majority of these errors can be avoided if installers comply with simple handling rules during system construction.

The new guideline can help increase the quality of an installation. As with the partner guideline for PROFIBUS, great efforts were made to ensure user friendliness.

The easy-to-understand text is limited to only what is essential. Clear instructions are rendered as drawings showing only the elements necessary for understanding. In this way, the reader can see at a glance what is important, preventing misinterpretation.

The guideline was designed for on-site use in A5 format and can be purchased for €18 from the PI Support Center.

### PROFINET NETWORK TESTING

After proper installation, a PROFINET network must be tested. To support this need, PI is creating a commissioning guideline for PROFINET. This contains information on checking existing cabling using simple techniques, and describes a variety of measurement equipment and how to carry out measurements. Templates for creating inspection test reports are included. Commissioning and troubleshooting are described step by step.

#### Planning Guideline too

A planning guideline is also under preparation. This deals with all aspects of planning PROFINET systems and presents the required components. The target date for completion is the end of 2009.

### PROFIBUS/PROFINET NODE GROWTH EXCEEDS EXPECTATIONS

In 2008, PROFINET experienced growth of 40% compared with 2007, with 1.6 million nodes installed by year end. PI believes that the total will rise to 3 million by the end of 2010.

PROFIBUS is also growing fast! In 2008 alone, 5 million PROFIBUS devices were sold - higher even than the previous year's 4.5 million, and representing an increase of 11%. The PROFIBUS total rose to 28.3 million. PI believes that the 50 million node mark will be passed by the end of 2012.

PI Chairman Jörg Freitag (above right) said: "This growth reflects the trust of users, who utilize the advantages of PROFIBUS technology over the entire life cycle of their systems. A decisive factor is full investment protection and compatibility, important due to the long service life of many systems, particularly in process automation."



Process automation use of PROFIBUS also rose. By the end of 2008, 880,000 PROFIBUS PA devices had been installed, a 20% increase over 2007. The total number of PROFIBUS (DP and PA) nodes in the process industry is now 4.8 million.

#### 90% share for PROFIsafe!

Further success was experienced in functional safety. By the end of 2008, the number of PROFIsafe systems reached 66,000 and the number of devices was 630,000. A study by ARC Advisory sees the total market of bus-capable safety devices at 700,000. This means that PROFIsafe has a 90% market share!

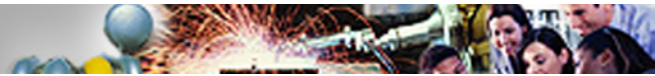
### SOFTWARE FOR EDD ENGINEERING

Two powerful new software components for distributing device descriptions based on EDDL have been announced. These are an EDD import library supporting the development of IEC-compatible EDDs for PROFIBUS PA devices, and an interpreter for use in engineering tools.

The EDD import library is an IEC-compatible library of basic elements which can be used for very efficient development of EDDs. The package

includes source text files and corresponding documentation with implementation instructions. PI member companies can download it free from the PI web site. The interfaces are disclosed and fully documented. The package includes object code, a sample client and documentation. The interpreter is also integrated in a testing system for certification of PROFIBUS products. A use license is granted based on a standard contract. Interested companies are asked to contact the PI Support Center at [info@profibus.com](mailto:info@profibus.com).





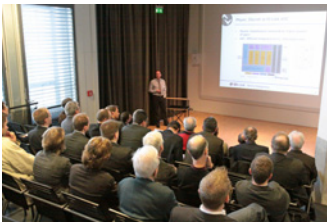
## PI News

### CONFERENCE REPORT

More than 150 delegates and presenters attended the PI International Conference 'Excellence in Automation' in March, held to celebrate the 20th anniversary of PROFIBUS.

The prestigious ZKM Center for Arts and Media was the venue for nearly two days of presentations about PROFIBUS, PROFINET and IO-LINK. Plenty of emphasis was placed on the life cycle advantages of the latest 3.02 profile for PROFIBUS PA, which brings major benefits for process plant operators.

A press conference preceding the main event heard several important announcements, including news of the latest



A parallel conference session was held in a separate lecture theater to allow a range of other topics to be presented. These included IO-LINK, safety, diagnostics and profiles.

node counts, a statement about a new wireless standard for sensors and actuators and an Active Energy Management profile for PROFINET. Fuller details are included elsewhere in this newsletter. It was also announced that Emerson Process Management has joined PNO in Germany.

Professor Klaus Bender of itm, (see above center) one of the godfathers of PROFIBUS, opened formal proceedings with a reprise of progress. He concluded by saying that with 30 million installed devices PROFIBUS had become



Professor Klaus Bender (on stage and inset), one of the creators of PROFIBUS in 1989, described during the opening address his pleasure and pride at how the technology had evolved over the years. "Fieldbus is the enabler for economic production even in high salary countries such as Germany," he told delegates.

the "undisputed" market leader. "If you take an average value of €1000 per device, the total represents a market value of €50 Billion, not counting any services or engineering costs involved," he said.

Only digital fieldbuses can deliver true horizontal integration of components on the factory floor, and vertical integration into MES for example, he continued. "Fieldbus is the enabler for economic production even in high salary countries such as Germany," he concluded.

#### Day 1

The first formal session of Day 1 was dominated by PROFIBUS PA, and life cycle costs and Endress+Hauser, Elcon and Siemens were speakers. After lunch James Powell (pictured above right) kept delegates awake with stories of his cat in a session entitled 'Engineering and Integration'.

Parallel sessions were held in an adjacent hall, and IO-LINK received most attention during the first session. Safety in both Factory and Process environments with PROFIsafe were featured later.

At the end of Day 1, a Podium Discussion took place on Life Cycle Management, featuring



Dr Peter Neumann, who chaired the papers committee, brought the conference to a close with his paper on virtual networks.

Hans-Georg Kumpfmüller and Dr Raimond Sommer from the vendor community, supported by Dr Thomas Hauff, Dr Wolfgang Morr and Dr Thomas Tauchnitz from the user side. A far-ranging

and informative discussion took place.

#### Day 2

Day 2 focused on PROFINET, with TMG TE, Phoenix Contact and Siemens contributing. Wireless dominated the afternoon, while over in the parallel session, topics included diagnostics, trouble-shooting and maintenance.



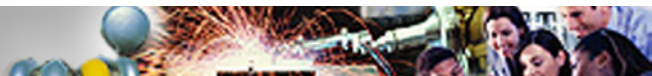
James Powell from Canada used the example of his cat Miss Kitty - who cost only \$5 to acquire but \$800 to 'run' in her first year alone - to illustrate the impact of life cycle costs. James also gave away copies of his new book on PROFIBUS PA

The afternoon began with two end user presentations. First, Michael Pelz of Clariant covered PA topics while Jürgen Kübler representing AIDA (below) described the power management requirement.

Finally, the event was brought to a conclusion by Dr Peter Neumann (left), who chaired the paper selection committee. He gave a detailed explanation of virtual networks in the office and factory.



(Main picture) Representatives of AIDA supporting the press conference held prior to the main event. They commented about the significance of PROFINET to their manufacturing lines and explained the importance of the new Active Energy Management profile to future cost savings and regulatory compliance. Jürgen Kübler of Daimler (sitting left, and inset) of Daimler later explained during the Conference proper the need for such a profile.



## Product News

### SWITCH

The Scalance XF204IRT is the optimal managed switch for PROFINET IRT field level applications. It combines a very flat housing (ET 200S design) and four downward sloping RJ45 jacks for easy installation with high performance Isochronous Realtime performance. So even in small and cramped control cabinets, PROFINET IRT segments like line, star or redundant ring structures can be established. For high availability even standby connections to other network segments are possible. In addition the rugged RJ45 jacks optimized for FastConnect RJ45 plugs secure reliable connectivity.



### MASTER FOR CONTROLLogix

This PROFIBUS Master for the ControlLogix chassis (MVI56-PDPMV1) is the first module to be enabled with CIPconnect, a feature that allows a PC to connect to the MVI56-PDPMV1 module over Ethernet via the 1756-ENBT EtherNet/IP module. This allows the user to configure the PROFIBUS master and network, upload, download files, and view network and module diagnostics from a PC using the ProSoft Configuration Builder. RSLinx is not required and the user only requires one IP address and slot number. PROFIBUS comDTM (PSW-cDTM-PDPM) support is included to allow FDT or Asset Management software connectivity.



### PROFIBUS REPEATER

PROCENTEC's new compact PROFIBUS repeater offers an economical alternative and fulfils the requirements of the demanding modern industry.



The advanced 12 Mbps core of the repeater is identical to the ProfiHub; it can be cascaded without limit and is equipped with the latest isolated RS 485 interface. The data is constantly monitored for glitches which are digitally filtered out. Every channel has on-board switchable termination and can drive 31 devices. A DB9 connector is provided for ProfiTrace or other maintenance/engineering tools.

### PA FLOW

The Yokogawa ADMAG AXF magnetic flowmeter is now available with PROFIBUS PA communications, allowing its easy integration into process environments. The ADMAG AXF flowmeter is ideally suited to use in demanding applications: in particular, for making reliable measurements



in difficult media such as those with a large proportion of solids or with low conductivity. Operation only requires 1.0  $\mu$ S/cm media conductivity. The standard accuracy is 0.35% of reading, but a high-grade option with an accuracy of 0.2% of reading is available.

### PROFINET TOOLBOX

NetSpector is a toolbox for PROFINET analysis. The Sniffer observes the network traffic, records data packages using filters and triggers, and decodes them. It has 3 components: the display unit (network viewer), the recording unit (echorecord) and echoTAP for recording telegrams in full-duplex operation. echoTAP is a USB 2.0 solution that uses Wirespeed. The Permanent Network link feature avoids packet loss even when power fails or the USB port is disconnected. With the diagnosis-view, there is a simplified



presentation of PROFINET information. A browser recognizes PROFINET devices and provides information about system status, connection issues, network utilization, etc.

### UNIVERSAL GATEWAY

netTAP 100 is a gateway designed to bridge the gaps between fieldbus, Real-Time Ethernet systems and serial protocols. Based on Hilscher's netX chip, the netTAP 100 is capable of linking any of the major fieldbuses, real time Industrial Ethernet and serial protocols. netTAP 100 can be configured to be a master or slave. The configuration software for the master is an FDT/DTM based tool. A USB port is used for configuration and diagnostics. Development tools are available that allow third parties to develop custom protocol gateways utilizing any stacks and gateway applications.



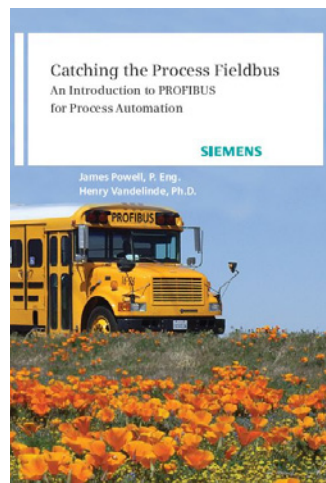
## Member News

### NEW BOOK FOR PA BEGINNERS

Siemens Milltronics has published a new book entitled 'Catching the Process Fieldbus: An Introduction to PROFIBUS for Process Automation'. It's written by James Powell and Henry Vandelinde and brings the world of industrial communications to the beginner.

The authors take the occasionally confusing mixture of fieldbuses, software packages and media that defines industrial communications and make it accessible.

James Powell said: "My intent was not to write the definitive and comprehensive handbook on PROFIBUS. I wanted to show that when industrial communications is understood and then installed with forethought and care, network operation can be both beneficial and painless."



The book is designed to speak to the beginner. It lays the groundwork for communication design, providing information for the curious to explore and motivation for the dedicated to go further. Jörg Freitag, Chairman of PI said: "The book is an excellent appetizer - a great introduction to the world of PROFIBUS."

Ron Mitchell, author of 'PROFIBUS - a pocket guide', recommends it as a "Very good

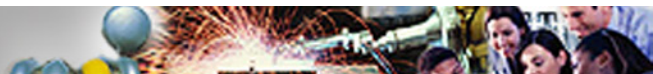
book! I particularly like your examples from site visits." (a reference to the many simple installation mistakes James mentions throughout the book.) Order from **learningcenter**. [smpi@siemens.com](mailto:smpi@siemens.com).

### INCREASING SUCCESS RATES

PROCENTEC, from the Netherlands, which has been offering 'Installation Certification' for some years, reports that more and more certifications are passed in the 'first-round'. Dennis van Booma said: "It is clear that training and support are available everywhere now and that the users have learned from thousands of successful projects. Certification is a quality assurance for plant-owners and integrators to emphasize that the PROFIBUS installation complies with standards and is working properly before it is being put into commission".

**PROCENTEC**





## Tech Update

### FAST START UP (FSU) FOR PROFINET IO

by: Kostyantyn Shcherbina of Hilscher and Jens Bürger of Murrelektronik

Fast Start Up (FSU) was specified for PROFINET IO to make it possible for an IO Device on the network to go instantly into a 'power on' state following cyclic data exchange with an IO controller. Such functionality is a high priority requirement for some important applications in factory automation.

#### Problem and Solution

Industrial robots have become very important for efficient factory automation. Modern robots and their ability to change tools automatically increase the flexibility of production lines as well as reduce the number of robots per cell. This leads to a reduction of costs and floor space.

With good planning, tool changing may also shorten the production cycle and increase productivity. The fact that a production cycle of a typical line can be lower than one minute results in the requirement for the tool changing time to be as short as possible. Every delays while uncoupling one tool and coupling another should be minimized. A tool, and thus the whole robot, is only ready for operation if all corresponding IO peripherals are in cyclic data exchange with the PLC. This means that the time required for the establishment of the communication between the IO Device of the tool and a PLC can negatively impact productivity.

In 2004, AIDA (the automation initiative of German automobile manufacturers) made a decision to use PROFINET IO as the basic

communication standard for their factory automation. At that time Industrial Ethernet suffered from the handicap of very slow start up time compared to traditional fieldbuses. Typically, start up times were in the range of seconds. This disadvantage prevented the use of Industrial Ethernet systems with robots with automatic tool changing (ATC).

#### Technology

FSU is described in the latest specification of PROFINET IO. The basic rule defines that the time between the 'power on' and receipt of the first cyclic input data should not exceed 500 ms.

Because during the first start up the IO Device is parameterized and configured the benefits of FSU may be used only from the second start up.

The protocol optimizations are standardized in the following ways:

- > use of fixed transmission parameters (only for copper wires), instead of automatic detection, which reduces the start up time by up to three seconds.
- > the network address is not passed to the IO device on each cycle, but only at first start up. The parameters are saved within the permanent memory of the IO device. On every following start up the parameters are retrieved from the permanent memory and reused. This optimization may save several seconds.
- > IO Devices announce their readiness to establish communication instead of waiting for the IO Controller to search. It is possible to save up to one second this way.

These enhancements remove any protocol-specific delays. Furthermore the start up of a

device can be optimized through the use of suitable hardware. Full details of FSU can be found in the corresponding standards or case literature.

#### Comparison with alternative solutions

The transmission of signals in present-day ATCs is mostly based on approved fieldbuses like PROFIBUS, DeviceNet and INTERBUS. The typical start up time for conventional fieldbus systems lies in the region of a few 100 ms.

For a long time Industrial Ethernet communication systems were not able to keep up with the conventional fieldbuses in terms of start up time. The market did set new performance requirements which resulted in the development of compromise solutions. The most noticeable among them are gateways and wireless.

For some time PROFINET IO - in contrast to the other common Industrial Ethernet systems - has standardized the way IO Devices can reach start up times of less than 500 ms. Devices on the market guarantee times of approximately 400 ms. However, considerably lower times can be easily reached.

The recently-established Gateway concept enables fast ATC for fieldbuses. The Industrial Ethernet systems handle vertical communications while the fieldbus handles horizontal. The crucial drawback is increased complexity due to the utilization of two technologies, which has a noticeable, negative, effect on maintenance and service.

Wireless solves the problem of a fast start up either through keeping the communication up all the time or utilizing the technique

of communication establishment shortly before the tool is coupled.

The advantage of wireless is the absence of idle time during start up or cable induced problems (for instance, line disruption or short circuits). This may help to save costs. However, the disadvantages are increased safety risks and interferences, which lead to higher jitters, cycle times, additional planning effort and limited amount of transmitting devices in the local area. Therefore, wireless should be used only where:

- > cable usage is uneconomical or impossible;
- > the disadvantages are negligible.

#### User opinion

One of the leading German car manufacturers is currently planning its future production line and has to choose the communication peripherals for his robots with ATC. Typical operations are welding and gripping. Car body production for a robot cell is as low as 45 seconds, including the delay for tool change. That emphasizes the crucial role of the communication components. This manufacturer has clear views:

- > FSU devices with a start up time less than 500 ms are required.
- > gateway concepts will not be used.
- > the use of wireless components will be limited because the cycle times are usually not satisfactory.

#### Conclusions

With start up times lower than 500 ms nothing stands in the way of PROFINET IO utilization on robots with ATC. Based on AIDA's choice and the advantages in comparison to other solutions PROFINET IO will soon become an approved standard for ATC systems.

## PI World

## BRAZIL

During February, Andy Verwer from Manchester Metropolitan University in UK accredited the first PI Competency Center (PICC) in Brazil.

During recent training visits Andy had carried out an in-depth accreditation inspection of the PICC in foundation at the FIPAI-University of Sao Paulo-USP in Sao Carlos City. The accreditation and inspection procedure included a full audit of available equipment, demonstration and development equipment as well as an in-depth technical examination of the knowledge of the Center's staff. Cesar Cassiolato, Director of Smar and also the RPA Brazil Latin America President and Prof. Dr. Dennis Brandao from USP (pictured above right with Andy center) are the internal experts of the PICC Brazil Latin America. Another external expert will need to evaluate the center and then full PICC status will be gained.

The PICC in foundation is also undergoing accreditation as a PROFIBUS International Training Center (PITC) ready to deliver Certified PROFIBUS Installer and Engineer training. The Brazilian Latin America PICC has been working closely with the Brazilian Latin America RPA for some time running PROFIBUS application workshops, attending exhibitions and producing publications and technical presentations. The PICC also offers PROFIBUS industrial consultancy and a technical hotline.

An extensive demonstration wall is available with a mixture of PROFIBUS DP and PA active devices and controllers from multiple manufacturers. "Establishing a PICC in Brazil is a landmark in the history of PROFIBUS in Latin America," said Cesar Cassiolato. "We have in Brazil one of the biggest PROFIBUS installed bases in the industry and, now, users, manufacturers, members and students at University of Sao Paulo will be able to count on a center of excellence in services, training, certifications of professionals and much more."

Details of the PROFIBUS Product Wall, plus the PROFIBUS workshops and training events run by Brazilian Latin America PICC can be **found here**. For further information about the range of



PROFIBUS services offered contact: [cesarcass@smar.com.br](mailto:cesarcass@smar.com.br) or [dennis@sel.eesc.usp.br](mailto:dennis@sel.eesc.usp.br)

The Brazil Latin America PROFIBUS Association recently hosted the first certified PROFIBUS training courses in Sao Paulo. Two internationally recognized PROFIBUS courses – the Certified PROFIBUS Installer course and the Certified PROFIBUS Engineer Course were held, conducted by Andy Verwer, of Manchester Metropolitan University in UK, in co-operation with the Brazil Latin America PICC.

These courses are internationally-accredited and several professionals were certified during the courses. The one-day Installer course covers the layout, installation and testing of PROFIBUS DP and PA networks. The 3.5 day in-depth Engineer course covers PROFIBUS network design, commissioning and live fault-finding.

Andy Verwer commented: "This was my first visit to Latin America and was a welcome break from the snow of Manchester. I have lots of experience in training around the world and the level of knowledge and ability of the Brazilian Engineers on these training



courses was excellent. The good sense of humor of the Brazilian people (very similar to the British) made the trip and the training very enjoyable."

## INDIA

A kick-off meeting took place in April between Joerg Freitag, Chairman of PI and representatives of 14 Indian companies concerning the formation of an Indian Regional PI Association. Currently, Indian companies interested in PROFIBUS or PROFINET are members of PI South East Asia. Clarification is being sought concerning how an RPA should be

registered under Indian law and a draft constitution is being derived from the SEA model. A program of Technical and Marketing Activities for PROFIBUS and PROFINET has begun. These included a PROFIBUS Developer Workshop in March. A PROFIBUS Certified Engineer/Installer class in June 2009 is planned, ([profibus@ulepl.com](http://profibus@ulepl.com)) and a PROFIBUS/PROFINET Talk / Seminar will be organized. Other planned activities include participation in the ELECRAMA Fair. A Foundation Meeting is targeted for June/July 2009.

## UK

Following the success of the first two Certified PROFINET Engineer Courses in the UK, The PROFIBUS Group in conjunction with the PI Competence Center at Manchester Metropolitan University (MMU) and PROCENTEC of the Netherlands has organized a third Certified PROFINET Engineer Course to be held in Manchester on 20 - 22 May. Priced at £1400 for members and £1500 for non-members of The PROFIBUS Group, this 3-day training course provides a detailed technical knowledge of PROFINET. Participants who pass the exam gain the title 'Certified PROFINET Engineer' More information can be **found here** and a registration form and course description can be **downloaded here**.

## NORTH AMERICA

A PROFINET one day training class held in Detroit March 11th attracted 160 registrations, an all time record for a PROFINET class in North America. Carl Henning, Deputy Director of PTO, reported that 135 people turned up and that the event was an outstanding success. **Read Carl's PROFIBlog**. He told us: "My favorite feedback on the Detroit class: 'Professionally done; thankfully pleasant.' The day after, we had an additional half day for PROFINET developers. This was also well-attended showing the increasing penetration of PROFINET in the Industrial Ethernet market. We offered developers the chance to interview six suppliers of development tools to determine who is best positioned to help them add PROFINET to their automation products. This was our last PROFINET Developer Workshop for the year, so if you need help making a similar match for your company please call us so we can introduce you to those tool providers by phone or email."

## PI Network

Australia - Mr. John Immelman  
Tel: +61 3 9761 5599; Fax: +61 3 9761 5525  
Email: [australia@profibus.com](mailto:australia@profibus.com)  
[www.aus.profibus.com](http://www.aus.profibus.com)

Belgium - Mr. Herman Looghe  
Tel: +32 2 706 80 00; Fax: +32 2 706 80 09  
Email: [belgium@profibus.com](mailto:belgium@profibus.com)  
[www.be.profibus.com](http://www.be.profibus.com)

Brazil - Mr. Cesar Cassiolato  
Tel: +55 16 3946 3519; Fax: +55 16 3946 3595  
Email: [brazil@profibus.com](mailto:brazil@profibus.com)  
[www.br.profibus.com](http://www.br.profibus.com)

China - Mr. Tang Jiyang  
Tel: +86 10 62 02 92 18; Fax: +86 10 62 01 78 73  
Email: [china@profibus.com](mailto:china@profibus.com)  
[www.cn.profibus.com](http://www.cn.profibus.com)

Czech Republic - Mr. Zdenek Hanzalek  
Tel: +420 2 2435 7610; Fax: +420 2 2435 7610  
Email: [czechrepublic@profibus.com](mailto:czechrepublic@profibus.com)  
[www.cz.profibus.com](http://www.cz.profibus.com)

Denmark - Mr. Jacob Hagen  
Tel: +45 4453 1293;  
Email: [denmark@profibus.com](mailto:denmark@profibus.com)  
[www.dk.profibus.com](http://www.dk.profibus.com)

Finland - Mr. Taisto Kajaniemi  
Tel: +35 8 9 5307259; Fax: +35 8 9 5307360  
Email: [finland@profibus.com](mailto:finland@profibus.com)  
[www.sf.profibus.com](http://www.sf.profibus.com)

France - Mr. Eric Lobet  
Tel: +33 1 48 58 30 24; Fax: +33 1 48 58 50 53  
Email: [france@profibus.com](mailto:france@profibus.com)  
[www.fr.profibus.com](http://www.fr.profibus.com)

Germany - Mr. Jörg Freitag  
Tel: +49 721 96 58590; Fax: +49 721 96 58589  
Email: [germany@profibus.com](mailto:germany@profibus.com)  
[www.de.profibus.com](http://www.de.profibus.com)

Ireland - Mr. Hassan Kaghazchi  
Tel: +353 61 202 107; Fax: +353 61 202 582  
Email: [ireland@profibus.com](mailto:ireland@profibus.com)  
[www.ir.profibus.com](http://www.ir.profibus.com)

Italy - Mr. Maurizio Ghizzoni  
Tel: +39 030 3384030; Fax: +39 030 396999  
Email: [debonbonde@libero.it](mailto:debonbonde@libero.it)  
[www.it.profibus.com](http://www.it.profibus.com)

Japan - Mr. Shinichi Motoyoshi  
Tel: +81 3 54 23 86 28; Fax: +81 3 54 23 87 34  
Email: [japan@profibus.com](mailto:japan@profibus.com)  
[www.jp.profibus.com](http://www.jp.profibus.com)

Korea - Mr. Cha Young Sik  
Tel: +82 2 523 5143; Fax: +82 2 523 5149  
Email: [korea@profibus.com](mailto:korea@profibus.com)  
[www.rk.profibus.com](http://www.rk.profibus.com)

Middle East - Mr. S C Sanu  
Tel: +971 4 398 2760; Fax: +971 4 398 2761  
Email: [middle.east@profibus.com](mailto:middle.east@profibus.com)  
[www.proftime.com](http://www.proftime.com)

Netherlands - Mr. Dolf van Eendenburg  
Tel: +31 33 469 0507; Fax: +31 33 461 6638  
Email: [netherlands@profibus.com](mailto:netherlands@profibus.com)  
[www.nl.profibus.com](http://www.nl.profibus.com)

Norway - Mr. Ivar Sorlie  
Tel: +47 2272 8972; Fax: +47 904 05509  
Email: [norway@profibus.com](mailto:norway@profibus.com)  
[www.no.profibus.com](http://www.no.profibus.com)

Poland - Mr. Dariusz Germanek  
Tel: +48 32 208 41 36; Fax: +48 32 208 41 39  
Email: [poland@profibus.com](mailto:poland@profibus.com)  
[www.profibus.com](http://www.profibus.com)

Russia - Mrs. Olga Sinenko  
Tel: +7 095 742 68 28; Fax: +7 095 742 68 29  
Email: [russia@profibus.com](mailto:russia@profibus.com)  
[www.rus.profibus.com](http://www.rus.profibus.com)

Slovakia - Mr. Richard Balogh  
Tel: +421 7 6029 1411; Fax: +421 2 6542 9051  
Email: [slovakia@profibus.com](mailto:slovakia@profibus.com)  
[www.sk.profibus.com](http://www.sk.profibus.com)

South-East Asia - Mr. Volker Schulz  
Tel: +65 6490 6464; Fax: +65 6490 6465  
Email: [southeastasia@profibus.com](mailto:southeastasia@profibus.com)  
[www.sea.profibus.com](http://www.sea.profibus.com)

Southern Africa - Mr. Edwin Bauer  
Tel: +27 11 617 2045;  
Email: [southernafrica@profibus.com](mailto:southernafrica@profibus.com)  
[www.rsa.profibus.com](http://www.rsa.profibus.com)

Sweden - Mr. Peter Bengtsson  
Tel: +46 4 51 49 460; Fax: +46 4 51 89 833  
Email: [sweden@profibus.com](mailto:sweden@profibus.com)  
[www.se.profibus.com](http://www.se.profibus.com)

Switzerland - Ms. Karin Beyeler  
Tel: +41 32 672 03 25; Fax: +41 32 672 03 26  
Email: [switzerland@profibus.com](mailto:switzerland@profibus.com)  
[www.ch.profibus.com](http://www.ch.profibus.com)

UK - Mr. Bob Squirrel  
Tel: +44 20 8144 9597; Fax: +44 870 141 7378  
Email: [uk@profibus.com](mailto:uk@profibus.com)  
[www.uk.profibus.com](http://www.uk.profibus.com)

USA & CANADA - Mr. Michael Bryant  
Tel: +1 480 483 2456; Fax: +1 480 483 7202  
Email: [usa@profibus.com](mailto:usa@profibus.com)  
[www.us.profibus.com](http://www.us.profibus.com)

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Editor: Geoff Hodgkinson  
St Johns Park, Exbourne, Devon, EX20 3RD  
Tel: +44 (0) 1837 851253 or +44 (0)7831 138 318  
[geoff@ggh.co.uk](mailto:geoff@ggh.co.uk)

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