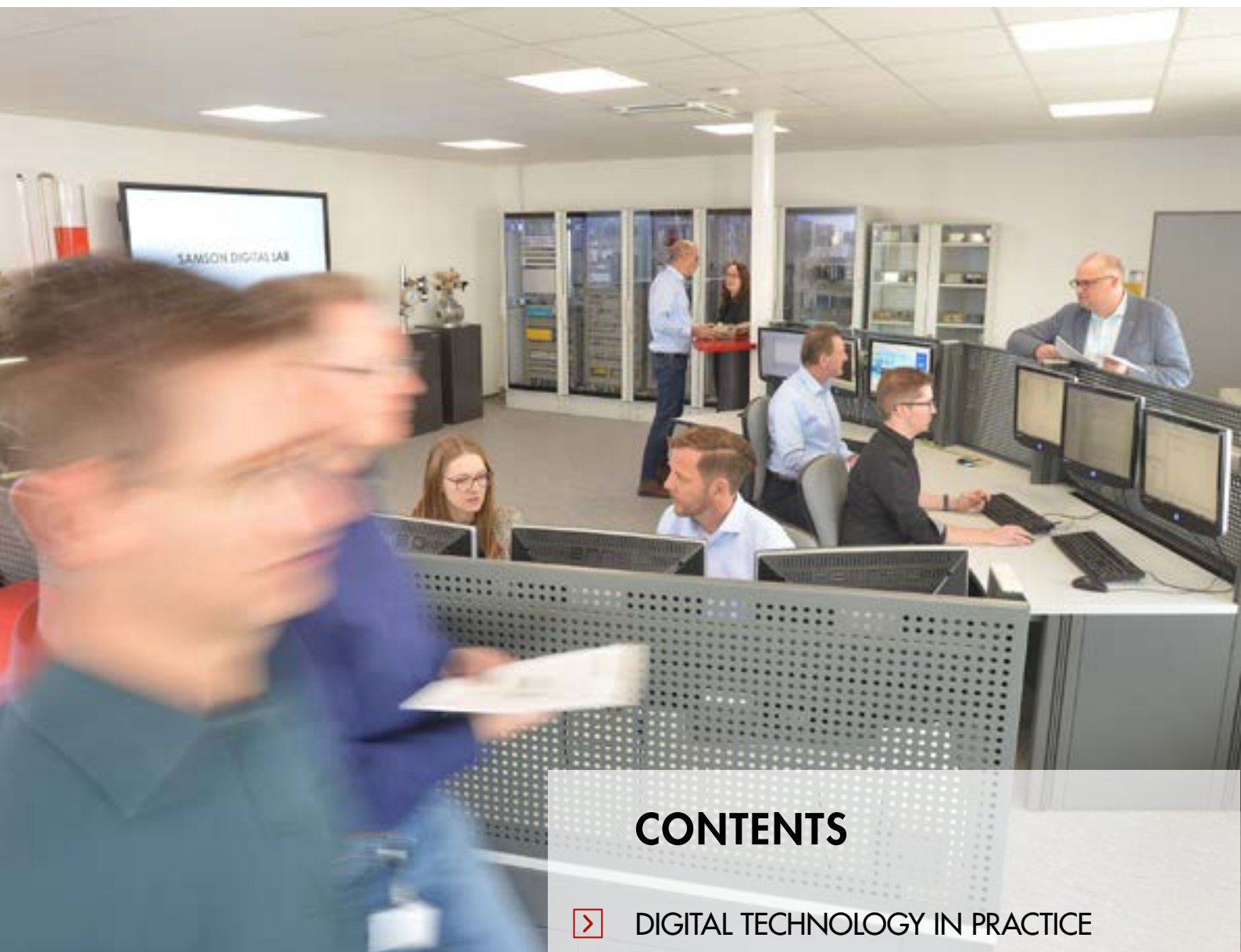




DIGITAL LAB

DIGITAL TECHNOLOGY IN PRACTICE

SMART IN FLOW CONTROL



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-  DIGITAL TECHNOLOGY IN PRACTICE
-  INTEROPERABILITY:
THE KEY TO DIGITALIZATION
-  COMPREHENSIVE NETWORKING TO
EXPAND THE DATA BASE
-  USABILITY AND
USER EXPERIENCE
-  THE FUTURE OF AUTOMATION



"ROLF SANDVOSS INNOVATION CENTER is a place of interaction where business partners and customers from all over the world come together for research, development, trials and testing."





BUILDING

Plot area:	3265 m ²
Floors:	3 (plus basement)
Gross total area:	9050 m ²
Usable area:	7000 m ²
Building volume:	53000 m ³
Max. height:	22.3 m (25 m including silencer)
Steel:	1100 t (76.5 km)

PLANT ENGINEERING

MEP lines:	4000 m
Electric cables:	40 km
Data and ICA cables:	50 km
Water tank:	400 m ³ , 78 t
Pipeline network:	2070 m
Signals used (I/O):	1673
Valves installed:	253
Pumps installed:	8
Total power installed:	5.5 MW

SAMSON offers products and solutions to control the flow of all kinds of process media. When developing new products and services, the focus lies on new technologies as well as current and future trends. The DIGITAL LAB is part of ROLF SANDVOSS INNOVATION CENTER. As a center of competence for the digital transformation in process automation, we are here to get you ready for the Industrial Internet of Things (IIoT) and Industry 4.0 requirements. Our key activities are driven by input from the outside, demands placed on us by our customers, future developments and ideas generated by our staff:



- Positioner communication with common process control systems and cloud-computing platforms
- Development of industry-specific asset management systems
- Integration of machine learning into our products
- Creation of digital twins for our control valves
- Participation in expert organizations and research projects
- Assessment of new technologies
- Cooperations with our customers' innovation teams

SERVICES WE OFFER

Training and knowledge transfer

- Positioner training
- Fieldbus communication
- Theoretical know-how and hands-on training
- Remote access



Application-specific optimization

- Near-plant laboratory facilities
- Optimized equipment
- Application-based training
- Manufacturer-independent installations
- Quick customer support





TRAINING AND KNOWLEDGE TRANSFER

In our DIGITAL LAB Academy, we offer hands-on training courses, for example advanced positioner training. The focus in this course is on adjusting positioner parameters and configurations, positioner diagnostics and status monitoring as well as on servicing, replacing and starting up smart SAMSON field units. In addition, we offer basic training courses dealing with HART®, WirelessHART®, PROFIBUS PA, FOUNDATION™ fieldbus, PROFINET™ and EtherNet/IP™. Thanks to state-of-the-art Internet communication, these training courses can also be completed anywhere across the world.



APPLICATION-SPECIFIC OPTIMIZATION

To track special customer plant conditions, we build and operate near-plant laboratory facilities in our DIGITAL LAB. These facilities include not only SAMSON equipment but also relevant units by other manufacturers. This enables us to optimize our field units and find application-specific solutions based on customized system tests.

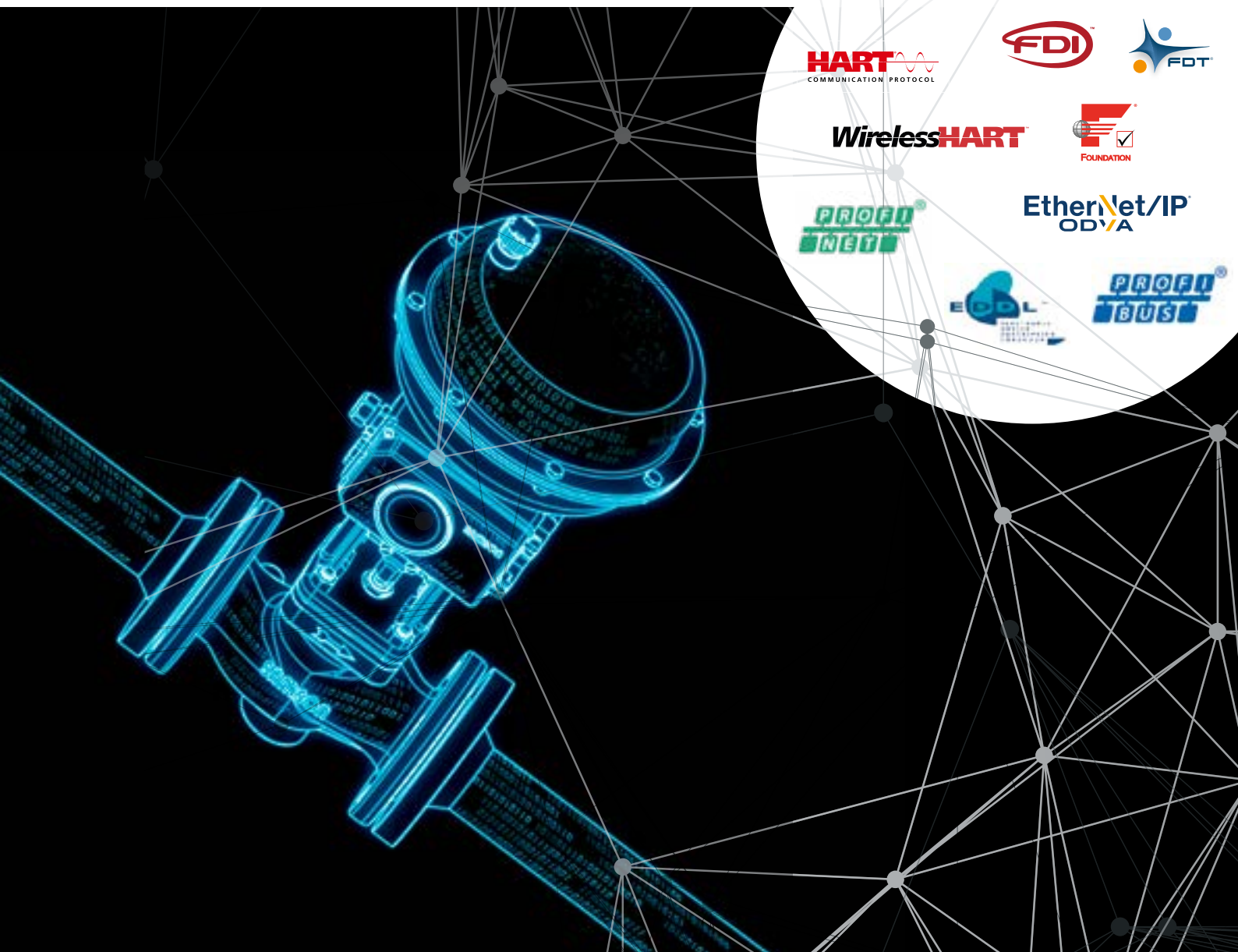
We pass on our expertise and experience in training courses tailored to your specific needs.

INTEROPERABILITY: THE KEY TO DIGITALIZATION



"We subject all SAMSON devices to strict interoperability tests before they are placed on the market. This is how we ensure that our equipment is compatible with your system."





SAMSON equipment must interoperate smoothly with other third-party systems and devices. This is the only way to ensure that communication and data exchange between devices and systems function without any problems. Thanks to close cooperation with our R&D and valve testing departments, the DIGITAL LAB offers the right conditions for the seamless integration of our smart control valves into control, engineering and asset management systems. Device certification can be prepared as well. Comprehensive

integration tests covering all common systems reveal weaknesses and help us prevent problems in real-life operation. This also entails our ambition of keeping start-up and operation of our complex equipment as simple as possible. Near-real-life test installations help us optimize start-up, initialization and diagnostic functions as well as device replacement, alarm management and valve monitoring.





DIGITAL POSITIONERS BY SAMSON ARE COMPATIBLE WITH COMMON PROCESS CONTROL SYSTEMS, SUCH AS:

- EMERSON DeltaV™
- Honeywell Experion® PKS
- Rockwell PlantPAx®
- SIEMENS SIMATIC PCS 7
- YOKOGAWA CENTUM CS 3000 R3
- Schneider Modicon Quantum





Rockwell PlantPAx®



ABB Freelance 800F



SIEMENS SIMATIC PCS 7



Honeywell Experion® PKS



EMERSON DeltaV™



YOKOGAWA
CENTUM CS 3000 R3

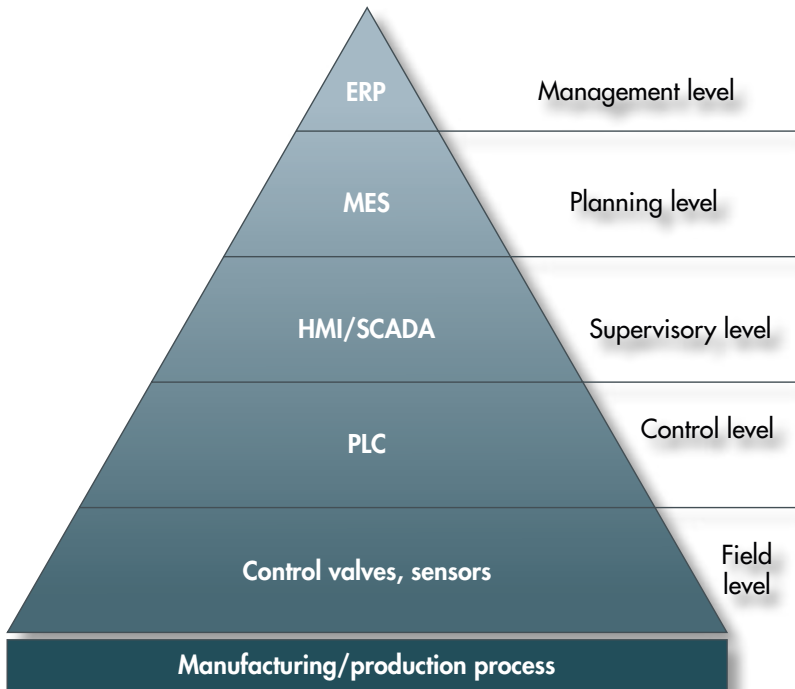


COMPREHENSIVE NETWORKING TO EXPAND THE DATA BASE



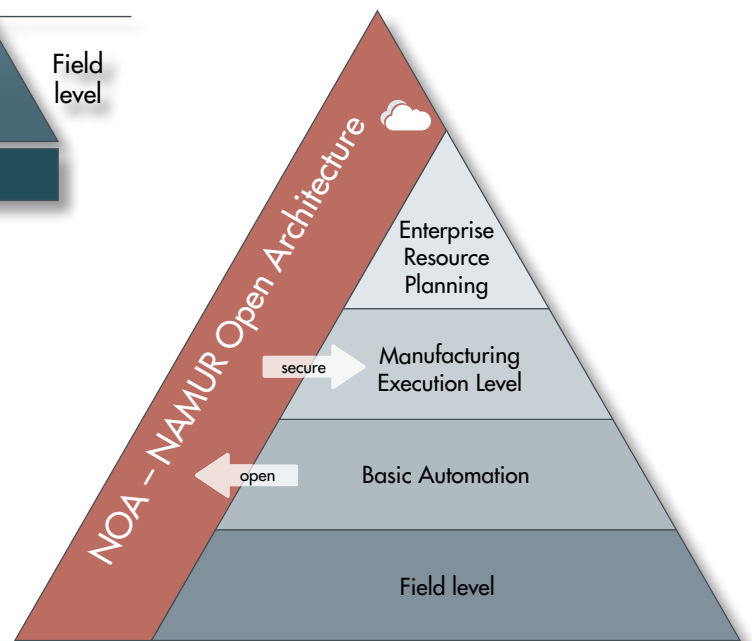
"Web-based asset management systems are rooted in the ideas of the Industrial Internet of Things and Industry 4.0. It is expected that data are available anywhere at any time."





AUTOMATION PYRAMID

NAMUR OPEN ARCHTECTURE (NOA)



In existing process plants, the automation structure is normally a closed system. All systems follow the principle of the automation pyramid. This means that information and data are passed on from field level to management level and vice versa in a hierarchical structure. As a result, the data generated on the field level are more or less incomplete when they reach the management level. Newer approaches try to break through this hierarchy. Whether they can be implemented is tested on digital SAMSON positioners installed in near-real-life installations in the SAMSON DIGITAL LAB. In addition, we are working on

ways of implementation suitable for IIoT and Industry 4.0 environments. FDI, OPC UA and NAMUR Open Architecture are also promising technologies for transmitting the data collected in positioners to higher-level systems. In addition, APL (Advanced Physical Layer) is expected to enable Ethernet-based communication from field level to management level.

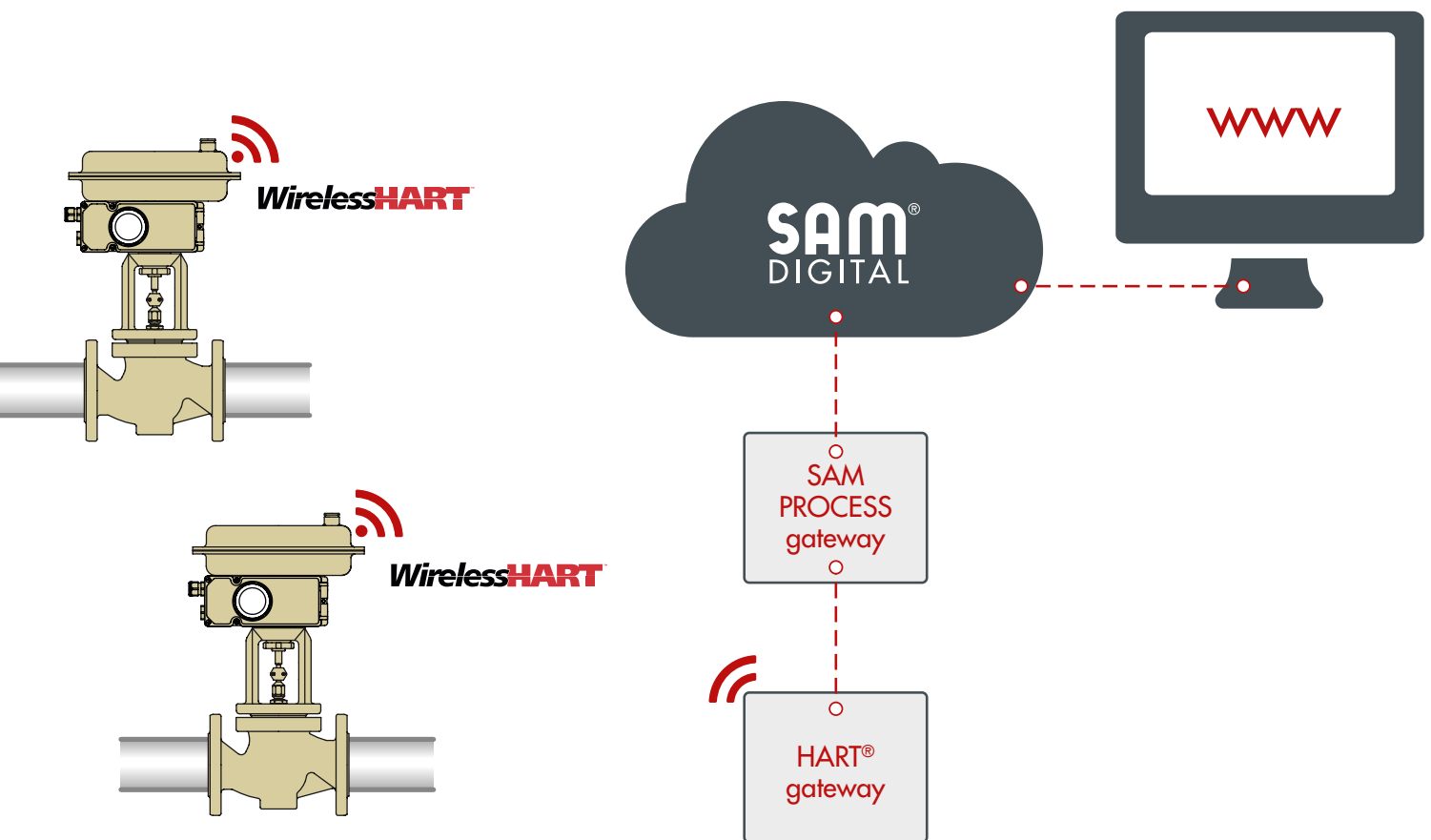
EXAMPLE OF CURRENT TEST INSTALLATION



NAMUR OPEN ARCHITECTURE (NOA):

NOA distinguishes between the core automation and open interfaces for monitoring and optimization tasks. Core automation data are exported to the monitoring and optimization systems over interfaces, such as OPC UA. Additional sensors can be included as required without having to integrate them into the process control system. This reduces the time required for integration and lowers the requirements to be fulfilled by additional sensors.

In the SAMSON test setup, data from installed field units are read using WirelessHART® and forwarded over a SAM process gateway to the cloud-based SAM CHEMICALS asset management platform. This is where the data are clearly visualized and analyzed.



EXAMPLE OF CURRENT TEST INSTALLATION

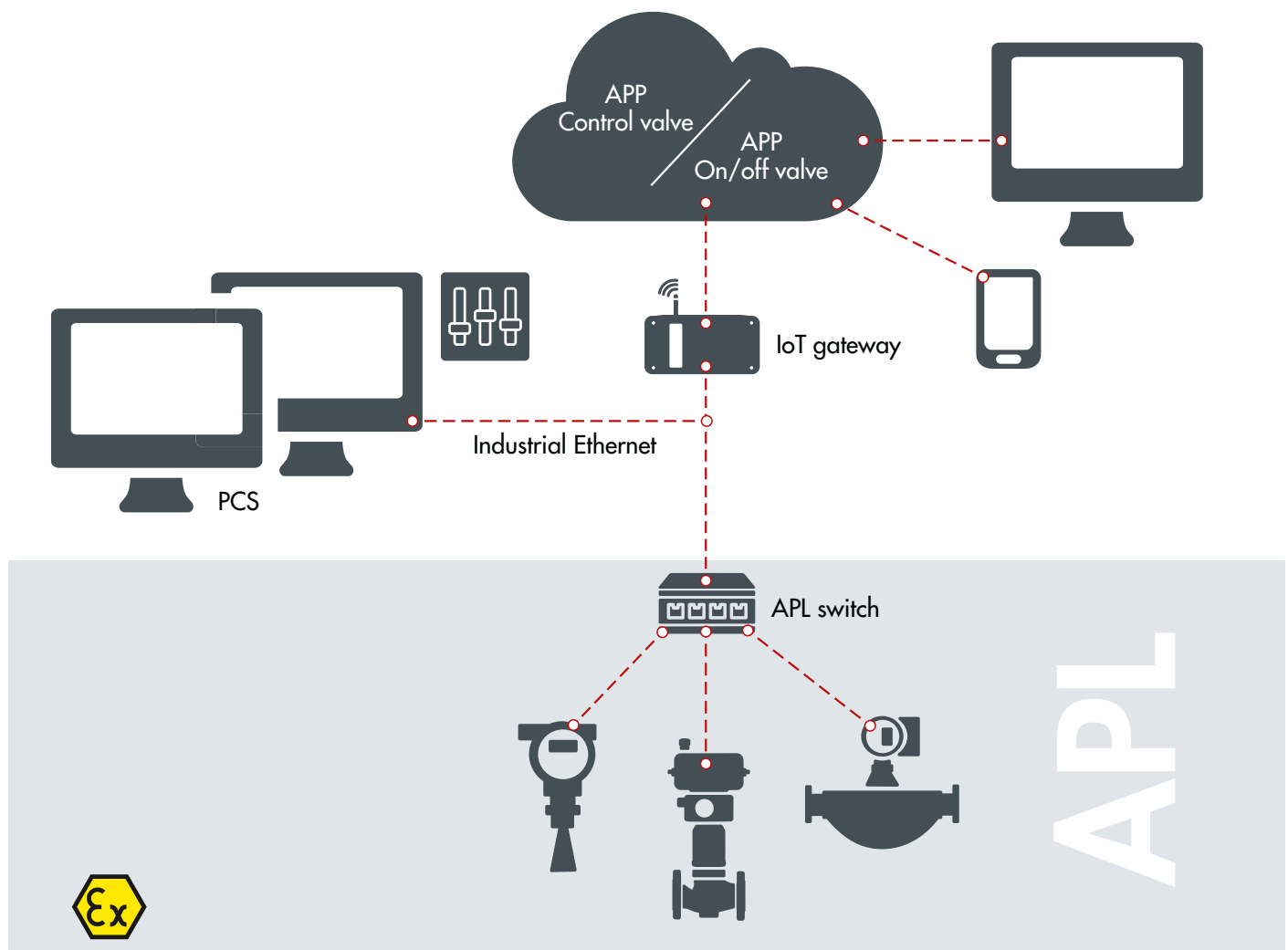


ADVANCED PHYSICAL LAYER (APL):

The use of Ethernet communication down to field level is a vision that originates in new technological developments in IIoT and Industry 4.0 applications. APL makes it possible to transmit process data at high speeds – also in hazardous areas – based on standardized technologies regardless of the communication protocol used. Existing two-wire networks are used for power supply and communication. The APL project is supported by several large suppliers in the process industry including SAMSON. It is conducted in cooperation with leading organizations that develop standards for industrial communication, such as FieldComm

Group™, ODVA as well as PROFIBUS and PROFINET International (PI).

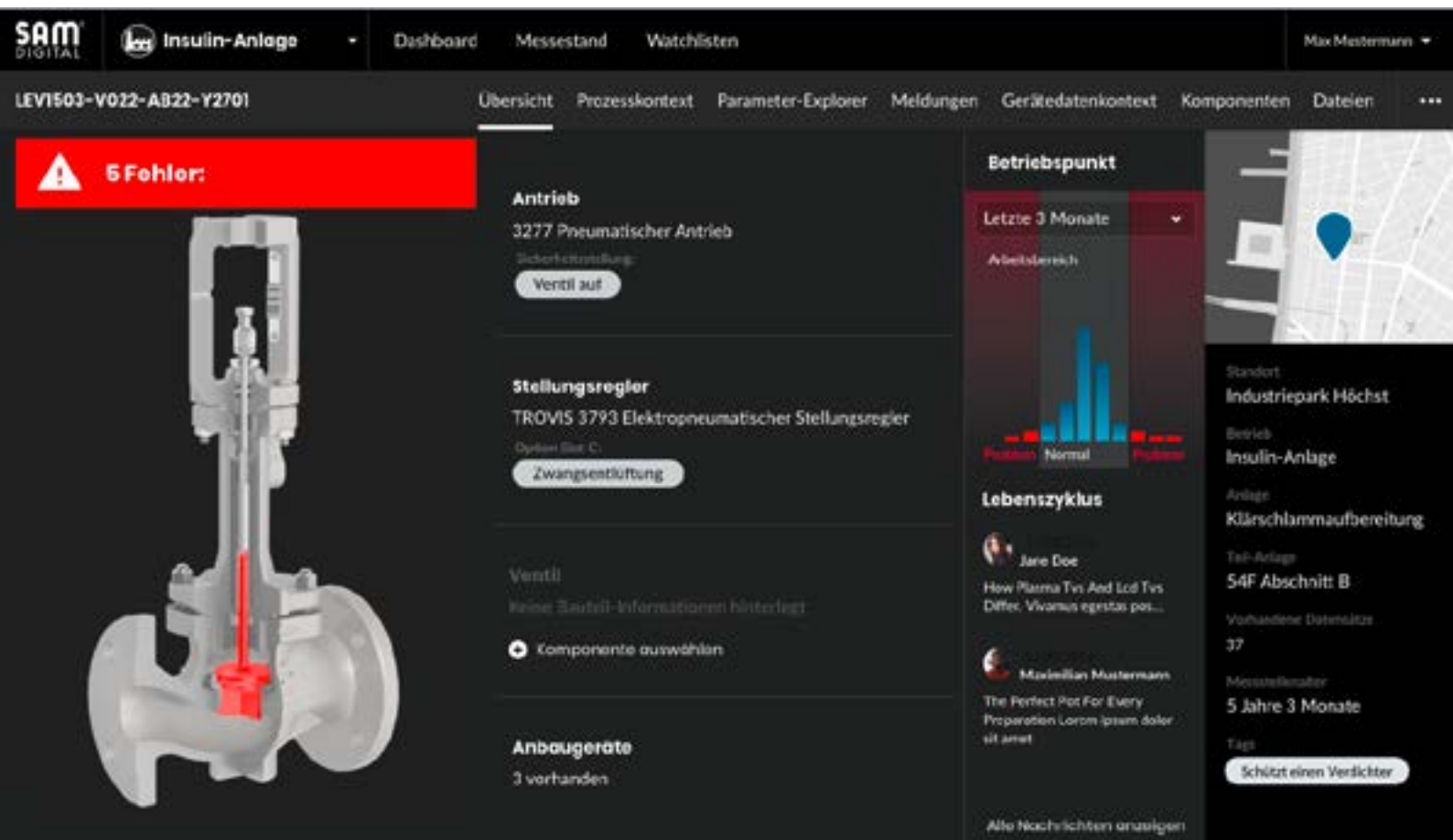
In the Digital Lab test setup, the positioners are connected using the prototype of an APL circuitry and an APL field switch. As IP-based protocols (such as PROFINET™, EtherNet/IP™ and HART-IP™) are used, it is possible to load operating instructions, certificates and integration files from the device web server. Communication is established over a 10BASE-T1L two-wire line following the new 10 Mbit/s Ethernet standard.



"All devices used in industrial processes will soon be expected to have a web interface for operation. This brings cross-media interface design and intuitive human-machine interaction into focus."



In the DIGITAL LAB, SAMSON is driving design processes to create user interfaces that are geared towards user needs and expectations. Meeting customer requirements plays a key role in the design of products for our new digital SAM GUARD and SAM DIGITAL lines. With the large amounts of data saved in the systems, it is essential that the information required at a certain point in time is not only



available but that users can also find and comprehend it. Users and customers help us optimize existing interfaces, improve good interactive features and discard bad ones.





SAM DIGITAL

Based on SAMSON's ultramodern digitization and automation platform, SAM DIGITAL offers solutions that enable you to keep up with the growing level of digitization in process automation applications. By developing the SAM DIGITAL product line, we at SAMSON are transferring our core expertise – quality, reliability and safety – into the digital era. SAM DIGITAL applies the unique know-how accumulated at SAMSON and converts it into an immediate benefit for our customers. SAM DIGITAL upgrades the existing product portfolio while SAMSON makes the transition from a pure manufacturer of valves and controllers to a provider of process intelligence.



▸ **SAM GUARD[®]**

▸ **SAM VALVE MANAGEMENT**

▸ **SAM TANK MANAGEMENT**

▸ **SAM DISTRICT ENERGY**





SAM GUARD

Our predictive monitoring and diagnostics system detects failures days to weeks in advance and provides a few truly actionable alerts.



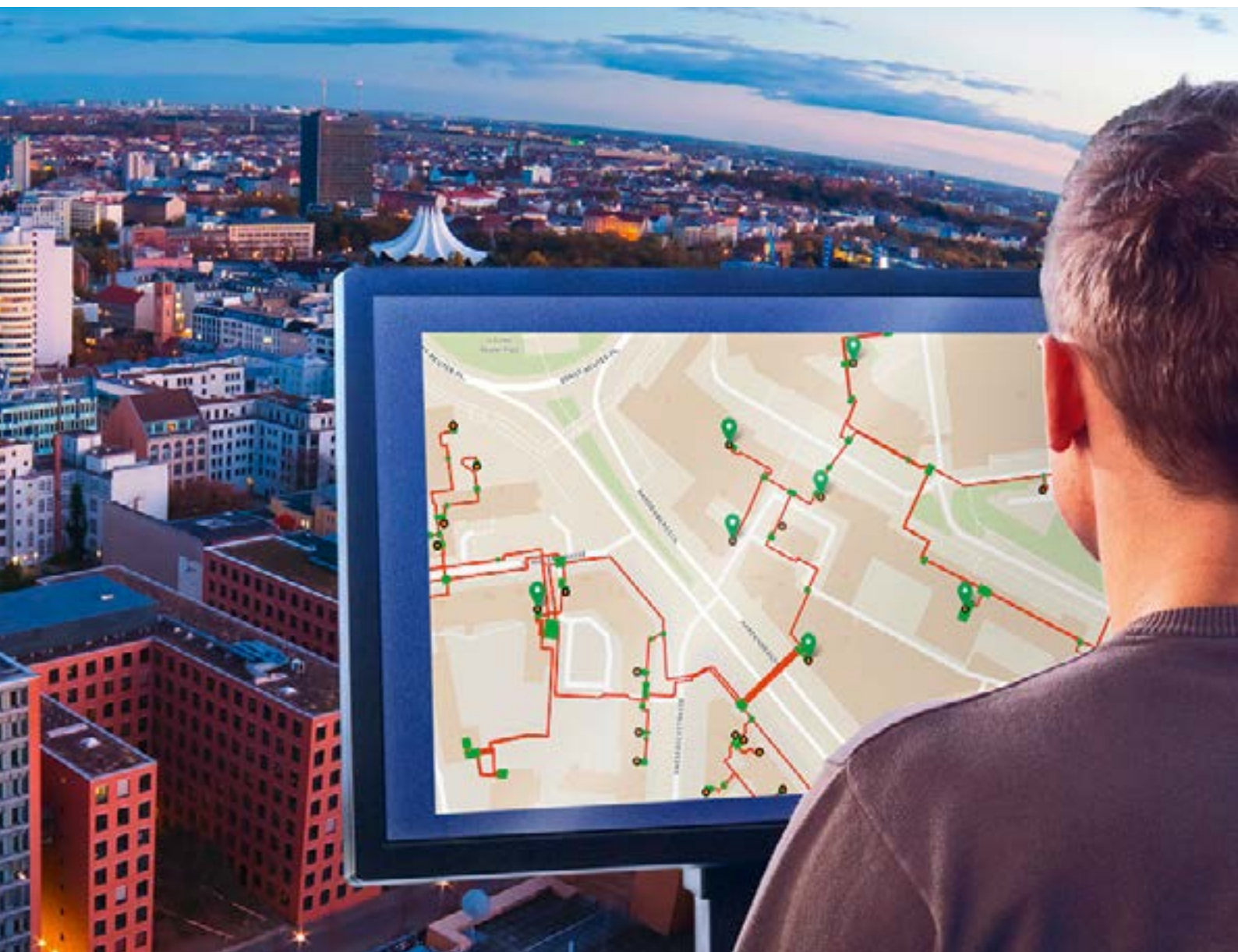
SAM VALVE MANAGEMENT

Our asset management system for the chemical industry lets you keep track of all smart control valves installed in your plant from anywhere in the world. In addition, you can monitor current actual and target values, trends and historical data for every single positioner in a device view.



SAM TANK MANAGEMENT

The industry-specific application was specifically developed for monitoring the filling levels of liquids, gases and vapors stored in stationary or truck-mounted pressure vessels.



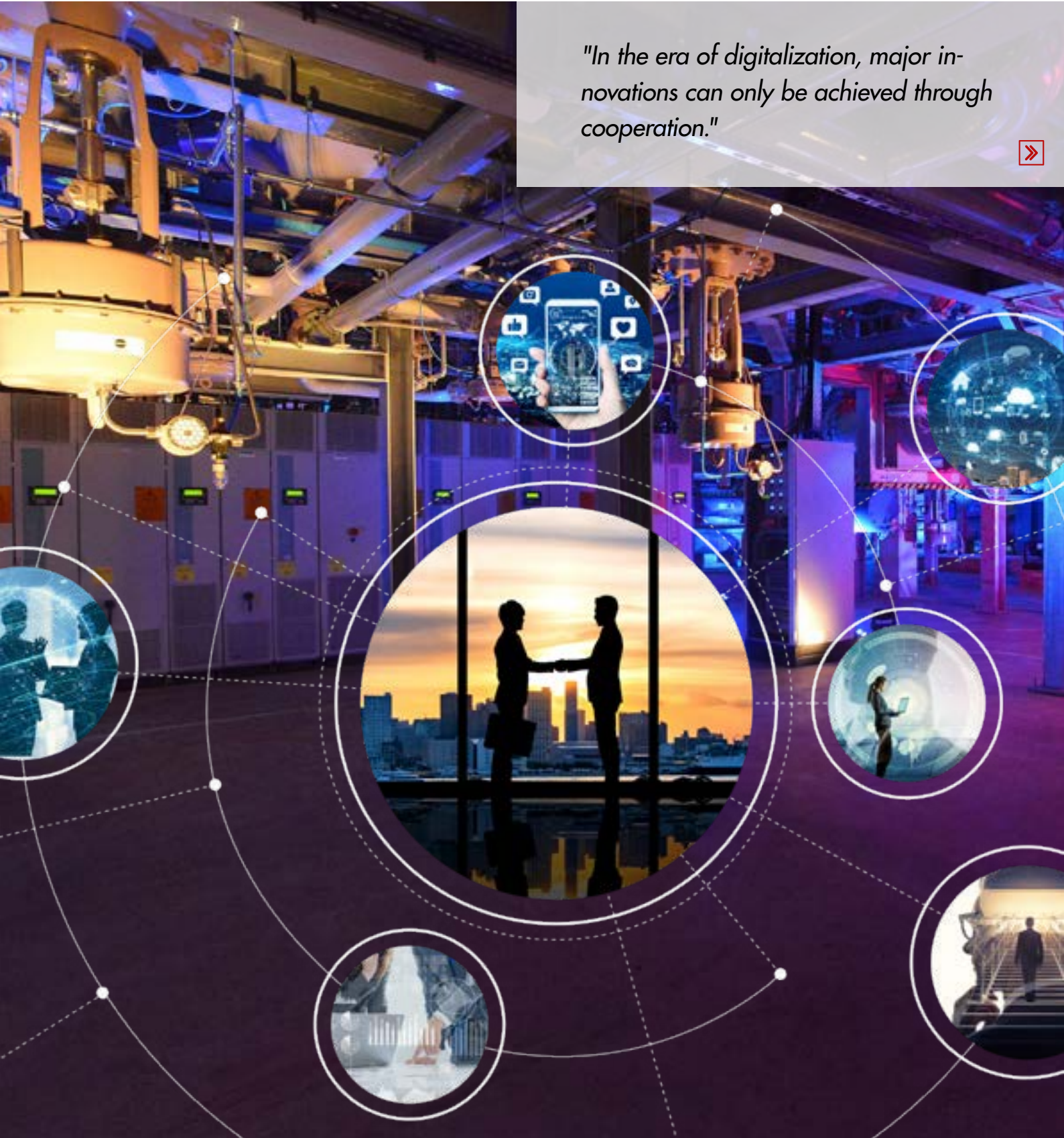
SAM DISTRICT ENERGY

The industry-specific application was specifically developed to manage, control and optimize heating and cooling systems. All key data on connected controllers, utility meters and electric actuators are made available at one central location.

THE FUTURE OF AUTOMATION



"In the era of digitalization, major innovations can only be achieved through cooperation."



To develop system solutions for IIoT and Industry 4.0 environments, SAMSON is currently working together with top innovators and technological leaders on a number of research projects. Here are some examples.

SAMSON

... is a partner in the TAKTILUS (tactile Internet for safe and time-critical applications in industrial and process automation) project. The 5G mobile technology offers simple, high-performance communication solutions suitable for easy retrofitting with low energy consumption and short network delay. With 5G, process industry companies can operate their own local networks.



For further information go to <https://taktilus-projekt.de/>

... cooperates closely with NAMUR and the Process Automation – Device Information Model (PA-DIM) initiative by FieldComm Group™ and the OPC Foundation®. The goal is to develop open, standardized data models for the use of NAMUR Open Architecture. The PA-DIM data model can be an essential part of a field device's description, which means that the device's digital twin can be based on it. PA-DIM is one of the modules used by Open Industry 4.0 Alliance.

For further information go to <https://www.openindustry4.com/>

... takes part in the Modular Automation in the Process Industry initiative by the NAMUR and ZVEI associations alongside other users and manufacturers. The focus lies on creating solutions based on MTPs (Modular Type Packages) to achieve shorter times-to-market, customized products and smaller batches, particularly for fine chemical, biotech and pharmaceutical applications.

For further information go to http://enpro-initiative.de/enpro/en/ENPRO+2_0/ORCA-p-275.html.

... is a member of the Open Process Automation™ Forum, contributing to the process control architecture of the future. This architecture foregoes the classic automation pyramid and forms the basis for the use of state-of-the-art technologies.

For further information go to <https://www.opengroup.org/open-process-automation/forum>

... cooperates with InfraServ Wiesbaden to advance IIoT and Industry 4.0 solutions for medium-sized companies. The key goal of the cooperation is to jointly advance an IIoT platform that digitally supports the optimization of processes and plant control in medium-sized industrial companies inside and outside the industrial park operated by InfraServ in the Rhine-Main metropolitan area.

For further information go to <https://www.samsongroup.com/press-releases/samson-infraserv>

SAMSON AT A GLANCE



STAFF

- Worldwide 4500
- Europe 3700
- Asia 600
- Americas 200
- Frankfurt am Main, Germany 2000

MARKETS

- Chemicals and petrochemicals
- Power and energy
- District heating and cooling, building automation
- General industry
- Industrial gases
- Food and beverages
- Metallurgy and mining
- Oil and gas
- Pharmaceuticals and biotechnology
- Marine equipment
- Water and wastewater
- Pulp and paper

PRODUCTS

- Valves
- Self-operated regulators
- Actuators
- Valve accessories
- Signal converters
- Controllers and automation systems
- Sensors and thermostats
- Digital solutions

SALES SITES

- More than 50 subsidiaries in over 40 countries
- More than 200 representatives

PRODUCTION SITES

- SAMSON Germany, Frankfurt, established 1916
Total plot and production area: 150,000 m²
- SAMSON France, Lyon, established 1962
Total plot and production area: 23,400 m²
- SAMSON Turkey, Istanbul established 1984
Total plot and production area: 11,053 m²
- SAMSON USA, Baytown, TX, established 1992
Total plot and production area: 9,200 m²
- SAMSON China, Beijing, established 1998
Total plot and production area: 10,138 m²
- SAMSON India, Pune district, established 1999
Total plot and production area: 18,000 m²
- SAMSON Russia, Rostov-on-Don, established 2015
Total plot and production area: 5,000 m²
- SAMSON AIR TORQUE, Bergamo, Italy
Total plot and production area: 27,684 m²
- SAMSON CERA SYSTEM, Hermsdorf, Germany
Total plot and production area: 14,700 m²
- SAMSON KT-ELEKTRONIK, Berlin, Germany
Total plot and production area: 1,060 m²
- SAMSON LEUSCH, Neuss, Germany
Total plot and production area: 18,400 m²
- SAMSON PFEIFFER, Kempen, Germany
Total plot and production area: 35,400 m²
- SAMSON RINGO, Zaragoza, Spain
Total plot and production area: 18,270 m²
- SAMSON SED, Bad Rappenau, Germany
Total plot and production area: 10,370 m²
- SAMSON STARLINE, Bergamo, Italy
Total plot and production area: 26,409 m²
- SAMSON VDH PRODUCTS, the Netherlands
- SAMSON VETEC, Speyer, Germany
Total plot and production area: 27,090 m²



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