Yokogawa European Meeting concentrates on wireless systems

The Yokogawa European Users Group conference was held 2-4 July in Berlin, some 20 months after the previous meeting in Nice in November 2012 (See the ***INSIDER*** for that month). With the next such event scheduled for 2016, it seems Yokogawa are leading the biennial trend - also adopted by ABB for the North American market.

However, for Yokogawa this 20 month provided the breathing space to make the business structure changes needed and re-establish the financial health of the group – evidenced by their recent results. In his opening address, Takashi Nishijima, President and COO of Yokogawa Electric, explained that net sales increased 11.6% in the year to March 2014, mainly thanks to some major projects. Quoted elsewhere were projects like Yamal LNG, Ichthys LNG, Sabine Pass LNG and USGC Petrochemicals, with forecast current year sales totalling Y400Bn ($4Bn). Their new business structure concentrates more on industrial automation – now 86% of sales.

CEO Takashi Nishijima

Yokogawa was founded by Dr Tamisuke Yokogawa in 1915, so celebrates 100 years of operations next year. The basis for the company was, and remains, technical excellence, driven by a pioneering spirit. So they were among the first to enter the analyzer market in 1964, had the world's first DCS and Vortex flowmeter in 1975, and (perhaps significantly) Nishijima san added the claim of being the first to offer fully ISA100 certificated wireless systems - last year. It was really appreciated to hear the official company line modified in this way.

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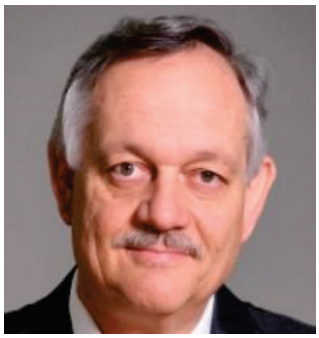
Major markets

Global expansion started in 1957, with entry into the USA markets in 1960: although regions like Asia (at 25% of sales), Middle East (9.6%) and Europe (9.7%) still exceed North American sales volume (6.7%). Revenue from the Japanese market dropped last year, and reduced in significance to 33% of the Group total, down from 38% the year before, possibly mainly attributable to Test & Measurement products. However, it was the pioneering spirit behind the company that led to the conference theme of "The Power of Innovation": Nishijima san mentioned future developments in corrosion detection sensors, micro-magnetic detection, and augmented reality on their DCS - partnered with the need for 'Sustainability' for the next 100 years, in terms of energy saving, safety and the environment; and also 'Best Value' in terms of lifecycle cost, reliability and high quality.

Major end-user markets – upstream oil and gas, chemicals, downstream oil and gas and power – made up the audience assembled in Berlin: many of these were from Southern Europe, Turkey and the Mediterranean area, with only a few from the UK oil industry. More interesting from the UK were the speaker and delegates from Sellafield, identifying a whole new market area for wireless sensors in control systems on decommissioning operations in the nuclear industry.



Herman van den Berg

Yokogawa in Europe

Herman van den Berg, appointed President of Yokogawa in Europe just over a year ago, introduced the press conference and expanded a little on the comments made by Nishijima san on the European operations. Last year European sales totalled Euro347m ($473m), and Yokogawa employed 1650 people in Europe, in 31 separate sales operations, plus operational support centres, production and development sites. Analyzer systems, MID approved custody transfer metering systems, and even portable flowmeter calibrators are produced in Europe: one such calibrator covering flow rates of 20Litres to 32tonnes/hour was installed in the Hotel foyer during the conference, attracting much interest from the elderly tourists from the Viking River Cruise boats who passed through.

The major European activity is with oil and gas related users, and within this there are various joint developments being undertaken with customers, supplier partners, and Universities. An example quoted was a metering system for bunkering ships with fuel oil, which enables accurate delivery metering, without any errors introduced by froth or air entrainment. Local offices have been established over the past year or so to support customers and provide after sales service and solutions, for example in Marl (Germany) in the Czech Republic, in the Port of Rotterdam, in Chemelot (France) and Aberdeen. After

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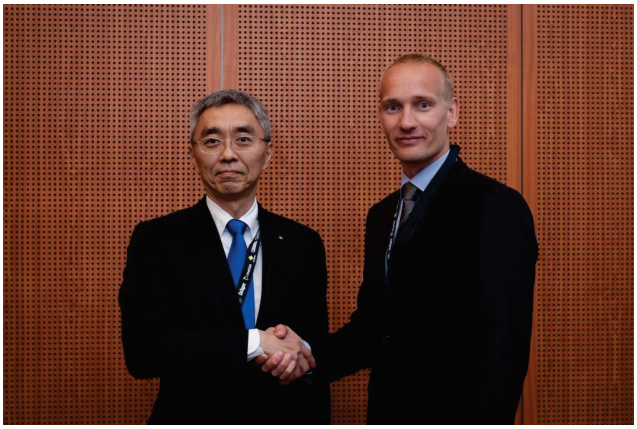
sales support and lifecycle services are seen as offering areas for future business growth in these mature markets. A major order for the Gazprom Yamal peninsula LNG megaproject, situated in Northern Russia is also being engineered by Yokogawa in Europe, on behalf of the Yokogawa sales organization in Russia.

Whilst the overall market share for Yokogawa is relatively low, they have a significant share in chemicals and oil & gas, and are working hard to develop this further. The power industry in Europe has not been significant for Yokogawa recent business, but with the March 2013 acquisition of Soteica VisualMesa of the USA, who have operations in energy monitoring and efficiency projects in Spain, this will be an area for future development.

Yokogawa signs deal with GasSecure over ISA100 gas detectors

The major event at the press conference was the announcement that Yokogawa and GasSecure of Norway have signed a global agreement to promote and sell the GasSecure ISA100 based wireless hydrocarbon gas detectors. This means Yokogawa gains access to the GasSecure sensors, strengthening their line-up of plant field wireless solutions, and enhancing the support of health, safety, security and environmental (HSSE) management applications, an area Yokogawa wishes to develop further. For GasSecure, this deal will provide access to the global Yokogawa sales and service network, and support their sensor offering.

Previously GasSecure sensors or presentations have been seen – and reported on by the ***INSIDER*** - at the Invensys OpsManage User Group meeting in Paris in 2012, on the Yokogawa stand at the Offshore Europe exhibition in Aberdeen in 2013, and at the Honeywell User Group meeting in Nice in 2013. It appears that the Yokogawa wireless offering, with the capability of fully redundant wireless gateway and access points, suited the desire for GasSecure to be able to offer cost effective systems to deliver critical safety data to oil and gas installations. In fact most of their initial installations have been joint projects with Yokogawa.



Nakahara and Sandven celebrate the agreement

Knut Sandven of GasSecure explained how this retrofit application of gas detectors on pump rooms was only viable by using wireless transmission.

GasSecure installations

In co-operation with Satiesh Muniandy, a senior engineer at Petronas in Malaysia, Knut Sandven of GasSecure explained how this retrofit application of gas detectors on pump rooms was only viable by using wireless transmission. In fact this project had arisen from a first meeting with Petronas at the Yokogawa User Group meeting in Southeast Asia, after Petronas had identified some areas needing further gas detector installations, but adding the site cabling made the task impossible. Another retrofit installation with Shell Sabah, offshore in Malaysia, enabled Sandven to discuss how the typical 70% of the total installation cost of a gas detector offshore is in the cabling, which can be reduced to 15% with a wireless sensor. The total cost saving to the operator can be 60% or more, compared to the historic cost. Plus platforms have around 1000 gas detector points typically, so this is a major market potential. His systems offer equivalent sensitivity to wired sensors, and a one second update rate with a 200 sensor system, dropping to 5 seconds for 500 sensors. The sensor uses infra-red absorption measurements, with a different wavelength automatic calibration loop on the same light path to compensate for any dirt on the reflector and windows, and no recalibration of the gas sensitivity needed within its quoted 15 year life.

Other existing GasSecure installations, mainly made in co-operation with Yokogawa, have been made at Gassco BP in the UK, Statoil in the North Sea, BP Alaska, Exxon R+D and CVX R+D in the USA, and in LNG liquefaction projects in Australia, for Woodside R+D and BP Australia. While the slides showed the potential for an operator mounted portable version of the gas detector, this seems to be on hold for the moment while GasSecure sorts out the current interest in static sensors.

The Yokogawa future is in wireless systems

Probably of major interest to everyone in the industry is what Yokogawa will do next in wireless systems. The deal with

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GasSecure is fine, and a good addition to their sensor capability, but that's not what they have been working on for the past two years.

The nearest the User Group meeting moved towards revealing any further steps in the Yokogawa wireless business was to mention corrosion detection as an area of interest. Plus there was the previously launched, earlier this year, a multi-protocol wireless adapter, enabling packets of sensor data to be passed through the ISA100 network, and delivered to an analyzer at the base station. This is excellent for sending the (GE) Bently Nevada vibration waveforms back to the GE condition monitoring unit designed to analyse this sort of 'proprietary' waveform. It seems this relationship is working well, but getting GE to actually provide any sensible answers to the press is always difficult. From the other point of view, obviously GE have worked out that Yokogawa offers the best engineered wireless system, that has been fully tested.

The next area where Yokogawa has pushed wireless system development proving is in big networks, and one of the claims made for their 'WirelessAnywhere' system was that they were first to demonstrate a reliable field wireless system with 500 devices and 20 subnets in July 2012. [OK, so I did not see it, but I believe it].

GX20W SmartDAC Recorder

Wireless touch-screen data recorder

To find the next development, you had to recognize it, sitting there on a display stand, and then wonder whether someone had actually sneaked it in to the exhibition hall without telling Yokogawa. To be fair, Andreas Dobratz, VP of Instrumentation in Europe, did mention it, the GX20W, in his presentation, briefly: the GX20W is a SmartDAC touchscreen data recorder, with an antenna and a wireless gateway incorporated, enabling 50 wireless sensors to transmit data direct to the recorder. The prototype was on display: several of the users present wanted to buy it on the spot. The product is a moulding of technology from one divisional area grafted on to another product area and producing a neat and effective product advance. Plus the operator can write on the touch-screen just as he would have done with a paper chart, and save or send that display to wherever he wants!

One of the enthusiastic customers was a straight-talking guy from Sellafield (previously known as British Nuclear Fuels), working on the decommissioning of some of the oldest nuclear power stations in the world: three different types on one site. Tom Nobes, a Principal Engineer at Sellafield, and their process instruments capability leader, explained that the nuclear industry is classically slow to adopt new technology: it took them 23 years to accept the use of HART systems on site. But in fact they were possibly the first UK user of ISA100 wireless systems, with one installed to control and monitor the steam use from a CHP plant, now providing the steam supplies to the site, replacing steam from all the reactors, after they were shut down at their life-end. On Sellafield laying new cables is not viable, and the use of a wireless link into a gateway and then recorded on a SmartDAC saved them around GBP185k ($320k) and around 16 weeks in time.

Experience leads to future uses for wireless in decommissioning

Nobes explained that the installations placed wireless transmitters inside thick concrete walled rooms, inside buildings that had metal sheeted walls, and worst of all, inside the earthed mild steel casing surrounding an 11KV electric motor used to drive a large compressor. They expected problems getting the signals out. Not only did they not have signal reception problems, they did not see any significant electrical

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noise problems on the wireless link from the sensor near the motor! The next project will involve the transmission of data from 40 legacy level transmitters installed on cooling ponds to a new remote monitoring centre, again through several concrete walls.

Further consideration is now being given to adding wireless adaptors to the air and particulate monitoring and safety alarm systems: where these are typically installed there is no chance of laying new signal cables, they do not wish to disturb any of the dust. The prime safety function here is the audio and visual local alarm beacon, advising all personnel to evacuate immediately. But the remote monitoring of this equipment will improve the efficiency and safety of maintenance, and provide external monitoring after the evacuation in the event of a problem.

Moving on further, as a control room itself becomes the subject of decommissioning work, a second, remote control room will be needed for the remaining monitoring and control functions: this will most easily be provided by fitting legacy sensors with wireless adaptors, or even installing new wireless sensors, which can then be monitored from wherever the replacement control room is situated. A similar portable temporary/emergency capability was quoted in the ***INSIDER*** in May (page 18), built by Thales for use by EDF in the UK in the event of a nuclear power station emergency. This they described as a containerized DCIS (Deployable Communication and Information System) – it might be useful to have such DCIS equipped with similar wireless systems to monitor some of the critical sensors in these power plants!

In the longer term Viswanathan sees ISA100 growing to encapsulate WirelessHART, and to do this ISA100 would need to include some of the WirelessHART functionality

Presentations from external industry bodies

The Yokogawa conference also featured several presentations from industry experts and advisors. Glenn Schulz gave an explanation of how device packages produced according to the new FDI standard, due for release in around a month, will be able to interface into FDT networks, as shown at the Hannover Fair earlier this year. Then from the Frost and Sullivan marketing consultants, Muthukumar Viswanathan, head of their industrial team, reviewed their latest market research report entitled "Global Wireless and Technical Solutions Market Study". They see the market total growing at around 18%pa, worth $1Bn in 2013 and likely to be worth $3.2Bn by 2020. Within this total the current split by technologies was reported by F&S as 35% in WirelessHART, and 24% in ISA100: with Zigbee next at 17% and low power WiFi down at 6%.

In the longer term Viswanathan sees ISA100 growing to encapsulate WirelessHART, and to do this ISA100 would need to include some of the WirelessHART functionality. There was then the inevitable F&S award made to Masatoshi Nakahara, Head of the Yokogawa Industrial Automation business, in recognition of the "Global Enabling Technology Leadership" shown by Yokogawa, in developing their plant wireless solutions.

Whose market estimates are believable?

So what did Yokogawa think of the F&S market analysis? There was no comment on that. In a later presentation by Andreas Dobratz, already mentioned above, which discussed the Yokogawa new developments over the past few years, the number of Yokogawa wireless system installations made - up to December 2013 - was quoted as 750, which involved the supply of 4177 wireless transmitters. Emerson Process Management is undoubtedly the market leader in the supply of WirelessHART sensors, and from there Bob Karschnia quotes that the total installed base of their WirelessHART networks to date totals around 18,000 worldwide. When you work out that these are working systems, not evaluation installations, the average sensor number on each network must lie between 8 and 20: using a mid figure of 12 sensors per network, this would imply over 200,000 Emerson WirelessHART sensors installed.

Such numbers as those above would tend to make an 18% market growth rate since 2013 (as suggested by F&S) unlikely, when the business maybe really started in earnest only in 2010. Plus the F&S market share figures imply that Honeywell would have to have produced maybe 125,000 ISA100 sensors, just to balance the Emerson figure in the proportions F&S suggest. Even counting back 15 years, to include their OneWireless systems installed before ISA100.11a was conceived, this is difficult to believe. Then they would need to have produced a lot more to balance off the WirelessHART sensors produced by ABB, E+H, and many other manufacturers. Market estimates are maths: just units sold, numbers, growth rates and orders of magnitude. There seems to be an order of magnitude error in their result, or some wishful thinking for the benefit of clients.

The ***INSIDER*** would love to hear other views!

Yokogawa weathers the storm OR Yokogawa re-emerges as a major player, both are true

Yokogawa is back to full health, so the major players will need to move over. The group has had a hard time over the last five years, following the world-wide recession and then their poor financial results in 2009. Then Japanese factors affected the Group badly, with the rise of the Japanese Yen reducing the competitive position - because of local production and group HQ costs – and the country then faced the impact and aftermath of the Fukushima disaster. Some of the Test and Measurement Division businesses were sold off, realizing some capital, and the company structure has been rearranged: jobs and resources were re-allocated. Wound around this, the wireless standards 'war' between ISA100 and WirelessHART, where Yokogawa for a long time took the brunt of the problems, and presumably had to help in the process of finalizing the ISA100 standard into a workable form: at least this is now completed, and consequently Yokogawa is the leader in the ISA100 field.

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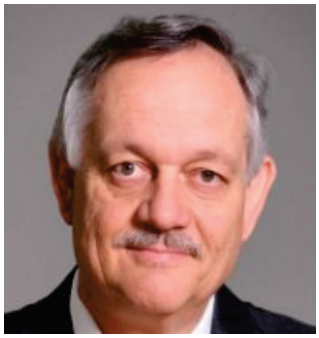
Perhaps the major market factor that aided the Yokogawa recovery was the growth of the LNG liquefaction and shipping activity around the world, since is this an area where they have significant expertise and have a large market share compared to the other majors. Currently there are continuing LNG projects, the Japanese Yen has returned to the historic level of ¥100=$1, and over some years the production facilities have been diversified. While the flow company, Rota, has always been headquartered in Europe, and the special custom assemblies of complete analyzer houses are now also built in Europe and the USA, plus the latest LNG project on the Yamal peninsula in Russia will be engineered from Europe. In a discussion at their Berlin conference, Yokogawa president and COO Nishijima-san reminded me that they have two established manufacturing joint venture companies in China, manufacturing transmitters and flowmeters, and the DCS systems plus other measuring instruments are built in Indonesia, with general pcboard manufacturing in Singapore. Nishijima san also commented on the need for local manufacture in the USA to provide the fast lead times required in that market, so we might see investment in a new venture there.

Chairman Shuzo Kaihori and New President and COO Takashi Nishijima

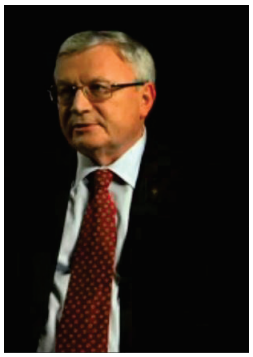
The current conference shows Yokogawa is building on their ISA100 position, and is seeking other add on wireless sensor technologies to increase their 'in-house' capability. This might be by using their add-on wireless adaptor/interface, to existing mains powered sensors. It looks like a good relationship has developed with GE Bently Nevada, and corrosion and intrusion detection sensors might be next, with maybe fire detection sensors to go alongside the Gas-



Herman van den Berg

Simon Rogers

Secure flammable gas detectors on offshore platforms. Dräger, the specialists in oil and gas safety technology, were one of the major sponsoring partners of the Berlin conference, and also presented a talk discussing fire detection, using visual flame detection systems.



Chet Mroz

Nishijima was appointed President in February 2013: in April 2013 Herman van den Berg was appointed European President, and in December 2013 Simon Rogers was recruited as the head of the UK operation. Van

Yokogawa weathers the storm OR
Yokogawa re-emerges as a major player, both are true (continued)

den Berg, probably in common with Chet Mroz, CEO of Yokogawa USA, and others in the USA, has been burning up the air miles to Japan over the past 18 months, as a part of planning the recovery of the business. In fact there was an acquisition in March 2013 of Soteica Visual Mesa, marking an entry for Yokogawa into energy management IT services. Nishijima-san sees further alliances and even acquisitions as an important route for Yokogawa to consider to achieve the future growth his shareholders expect to see, and the current improvement in debt/equity ratio and normalization of the company share status makes this much more possible.

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The major existing DCS developments have involved cyber-security improvements, probably in conjunction with McAfee after the February 2013 announcement, and ***ISAsecure*** certification for ProSafe RS. Additions to expect in this area are augmented reality added onto the displays, and compatibility with virtual servers. Yokogawa sees major business expansion potential in providing IT techniques and services for their IA customers, as a continuing service activity. Examples quoted were CMMS in the cloud, which is already being offered as a service in Japan, and a software service called iMaintain, jointly developed and installed with Akzo Nobel in Germany: plus there is also their RigRider drilling procedure software, as reported from the Offshore Europe Expo last September. iMaintain enables client engineers to access device live data and history via a tablet on site, after reading the device ID locally using OCR. The iMaintain server accesses the DCS via an OPC link, to get current data, but can also call up device notes previously recorded, and also the instruction manual. A similar service offering is the Sotieca VisualMesa energy management system, which can suggest fuel and operational changes that will run plants such as refineries at minimal cost. An example of this is a recent project for the BP Lingen refinery in Germany: the system is in use in around 70 sites in refineries and petrochemical plants in the EU and North America.

Continuing R+D activity

In the area of field instrumentation, continuing development will be seen following their strategy of having a two tier offering, featuring a top of the range unit backed up with a lower cost unit aimed at lower specification requirements. This has been seen with the EJX and EJA-E pressure transmitter, and the Admag AXF flowmeter, with the RXF unit typically for water industry applications. A new version of the TDLS combustion gas analyzer will also be launched soon. The activity level in this area of R+D is significant, with typically 400 to 500 new patents generated in a year.

Some *INSIDER* Commentary

Yokogawa continues to face significant issues as it attempts to become a global player, instead of a Japanese company that markets outside of Japan. There is no doubt that they are superb engineers, scientists, and technologists. The list of Yokogawa "firsts" now is close to 100 years long.

Yokogawa has historically had a strong "not invented here" issue. They've also had real difficulty working with partners who are not Japanese, and integrating acquisitions of companies from outside Japan.

Yokogawa, like other companies from Japan, also does a strange thing— typically, they deliberately de-rate their performance specifications on field devices like flow meters, pressure transmitters, temperature transmitters, and the like. While this is seen in Japan as politeness and customer oriented ("We do not want a customer to use the product at the extreme edge of performance.") in the rest of the world, it simply loses orders because other companies' specifications are not so de-rated.

What this boils down to, is that Yokogawa is, in its soul, a Japanese company. That is emphatically not a bad thing, but it does limit them. It doesn't need to, and in the past it has not. They need to remember what they did when they first came into the US market with the vortex shedding flow meter. They bought understanding of the local market, and whether they believed it or not, they followed that advice and were wildly successful.

More Research and Development, especially product development, needs to be done outside of Japan, because the products will be different and more universal. More customer research needs to be done outside of Japan, so they understand what their wider customer base wants and will buy. They can do this, and the ***INSIDER*** doesn't doubt they will.