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The road to silence and boredom

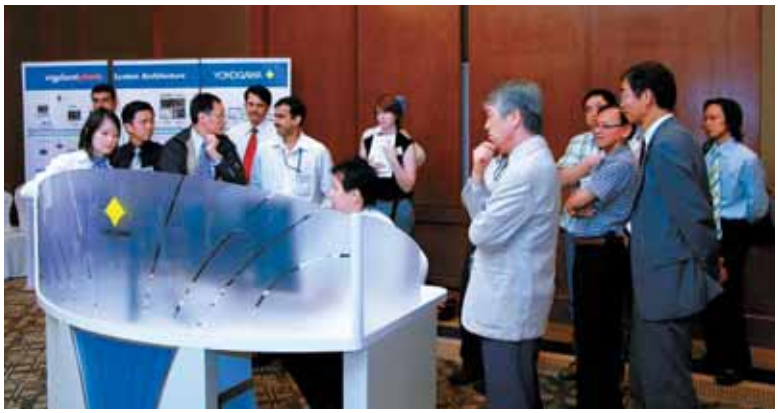
Yokogawa reaches another stage in its VigilantPlant automation concept

MIGUEL GONZALEZ

SINGAPORE. Yokogawa has taken a vital step in their plan to make the world's plants 'silent and boring', and therefore, well-managed, with the release of their new integrated production control system CENTUM VP last month. But what does VP stand for?

"Very precise, very potent, very punctual, they're all correct," joked Kersi Aspar, Executive Vice President of Yokowaga Engineering Asia. In fact, VP comes from VigilantPlant, the automation concept conceived by the Japanese company that aims to create safe, reliable and profitable plant operations. CENTUM VP follows the release of the VigilantPlant solutions for Safety Excellence (ProSafe-RS) in 2005, Asset Excellence (FieldMate) in 2006, and Production Excellence (InsightSuite AE) in 2007. The launch of the CENTUM VP takes the VigilantPlant initiative to its next evolutionary step, integrating the three solutions into one Operational Excellence platform.

"This is another significant milestone in Yokogawa's history of technology innovation. Over our 93-year history, Yokogawa has gained global recognition as a leading player in the fields of automation and control and introduced numerous world's-first innovations that have contributed significantly to the industrial world," said Dr. Tony Lee, Managing Director of Yokogawa Engineering Asia.



The first crowd to explore CENTUM VP's capabilities

"Yokogawa introduced the world's-first Distributed Control System, named CENTUM in 1975, revolutionising the automation of the process control world. We introduced the first single-crystal silicon resonant sensor technology and pioneered the vortex flowmeter technology. And once again, to continue this proven track record of innovation, we now have the next generation DCS."

The Managing Director and CEO of Yokogawa Electric International, Teruyoshi Minaki, explained that one of the main objectives of Vigilant Plant is to increase the growth potential of each customer. "Automation is a journey that we take with our customers. Run the plan safely, satisfy a customer and make money, and we are helping them do that. Integration itself makes the plant safer," said Minaki-san.

The 'silent and boring plant' that Yokogawa wants to help create is a reference to the late management guru Peter F. Drucker, who used those adjectives to describe a well-managed plant where all crises have been anticipated and converted into routine. But achieving this 'industrial boredom' is not easy, because there are still blind spots, gaps in information and 'knowledge silos' and as a result, a considerable amount of energy and resources are lost in correcting problems. The situation is only aggravated by the short supply of skilled people.

That is why VigilantPlant aims to enable an ongoing state of Operational Excellence where plant personnel are watchful and attentive, well-informed, and ready to take actions that optimise plant and business performance. This initiative eliminates unplanned downtime, improves asset utilisation, and allows businesses to adapt to shifting market conditions quickly and efficiently.

CENTUM VP is the eight generation member of the CENTUM series; it integrates plant information management, asset management, and operation support functions, achieving a unified operating environment.

The next step will be achieving horizontal integration between operating units, with the Real-time Production Organiser in 2009.

You can find our full interview with Messrs. Teruyoshi Minaki and Masatoshi Nakahara – the Vice President of the Industrial Automation Systems division – on page 16. For more about CENTUM VP, go to page 39.

One is the *only* number

PACE celebrated both the Lunar New Year and the release of Yokogawa's CENTUM VP in Singapore. Miguel Gonzalez sat down with Teruyoshi Minaki and Masatoshi Nakahara to discuss the Japanese giant's future on the way to its 2010 world domination target.

First we had Minaki-san, and we were lucky that his trip to Russia was cancelled and he had some time for us.

In 2005, Yokogawa's President and CEO Isao Uchida announced that the company had set a target for 2010: to become the global leader in industrial automation. We are only two years away from that date and this is not yet the case. Is this still a corporate goal and if so, how will it be achieved in the time that is left?

It's always good to reach a target. We have a long-term plan called VISION-21 and ACTION-21, and the target for our Second Milestone is 2010. By then, Yokogawa will become number one in the industrial automation business.

We have already moved closer to this target, and now that we're launching our new DCS CENTUM VP, we will surely reach the top spot. We rank at number two in transmitters, but we're catching up in territories like China, where we're already in a leading position. We're also leading in vortex meters, pH and conductivity transmitters. At the moment, we are concentrating on process plants.

What happens after CENTUM VP?

Our CENTUM VP is very strong, which means that we will provide the VigilantPlant concept to our customers; accelerating Operational Excellence and using Yokogawa's cutting-edge technology. From all the different data sources that come together in VP, customers can use the right informationat the right time.

But it doesn't stop there. After that, we need to work on further optimisation of production and business with our customers, who require high level customisation that has to be developed according to their requests and needs. We can provide that with VigilantPlant, and we'll continue its development.

We also have a target at Yokogawa; we would like to become a service company which, after installation, can also provide more value-added services throughout customer plant lifecycle.Because each customer has a different know-how, it's about providing that service and working with them.

Do you have the human resources required to provide such services?

Yokogawa's business is expanding, even in Japan. We need skilled people, and fortunately, we can still select good people, the best, in Japan and overseas. However, we always need more skilled staff.

COMPANY PROFILE

Yokogawa's global network of 18 manufacturing facilities, 84 companies, and over 650 sales and engineering offices spans 33 countries. Since its founding in 1915, the US$4 billion company has been engaged in cutting-edge research and innovation, securing more than 7,000 patents and registrations, including the world's first digital sensors for flow and pressure measurement. Industrial automation and control, test and measurement, information systems and industry support are the core businesses of Yokogawa.

You're leaders in the Japanese market. What are the main challenges for overseas growth?

We offer the latest technology and we keep the highest quality standards and people. Our promise is to finish what we start, that's our culture. In the Asian market, including Japan, we have a predominant share of the market, but in North America and Europe our company does not have the same level of recognition yet, so we need to let people know who we are. But many customers are discovering Yokogawa and they are coming to us; we are working with Shell Norco Chemical, Chevron Oil refineries and BP-Sonatrach. North America is growing at a very high speed; we have dispatched almost 20 of our Japanese staff, and we're targeting new customers. Once our customers use our products and services, they will surely continue to use Yokogawa. This expansion has been successful, and now roughly half of our automation business comes from outside Japan.

PERSONAL PROFILE

Born in the Yamaguchi Prefecture of Japan, Teruyoshi Minaki graduated from the Faculty of Engineering at Waseda University in 1971. He then joined Yokogawa Electric and has been with the company ever since, in a variety of roles such as Vice President of the Field Instruments Division or Vice President of Corporate Marketing. He currently holds the positions of Director and Executive Vice President of Yokogawa Electric Corporation, and Managing Director and CEO of Yokogawa Electric International.

If I were a big client who has never heard of Yokogawa, how would you introduce me to it? Pretend I represent a big contract, worth millions of dollars…

We have something prepared for those occasions (*Minaki produces a bilingual plastic card – Japanese and English – from one of his pockets*). We aim for a healthy and profitable operation to uphold our responsibilities to our customers, colleagues, shareholders and society.

We will achieve this target through three initiatives: One Global Yokogawa, customer centric solutions, and leading-edge technology. (*the card's last line reads 'Be prudent, the sun is watching us!'*).

Can you elaborate on this 'One Global Yokogawa' initiative?

That is very important within our Second Milestone, because it gives us unity. There are many Yokogawa companies operating outside Japan, but for the customer there should be only one global Yokogawa. We can share information, and all 19,286 employees work for one global Yokogawa.

And since we aim to become a global service company, it is important for the customer to know that 10, 15, or 20 years after we've installed our products, we'll be there to provide the support they require.

Do you find that being a Japanese

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company works as an advantage when targeting new markets?

Japan's image is about high quality, and that's always a good help. We pride ourselves on the quality of the seven 9s (99.99999%) reliability of our control systems, and that of our people too.

It is also about Japanese culture; we promise and we finish and deliver!

What role does Australia play in your plans?

We are very strong in power (*Eraring and Loy Yang A power stations were two of their major global projects*) and mining. We decided that our Australian subsidiary would be our global power and mining centre.

We have a very positive market share in Australia, and we are also using Australian people overseas. The know-how belongs to the people who develop it, so there is a lot of expertise in Australia. Not only is that expertise documented, but people have been dispatched to support other regions. We've had Australian Yokogawa staff working in China, Mongolia, Taiwan, Vietnam and Chile, among other countries.

What are the most exciting things about your job?

Today – the launch of CENTUM VP – is an exciting day, as is whenever I meet a top executive from a company to discuss business possibilities. Also when I think that under me, under Yokogawa International, there are good results with a significant growth. I'm usually in Japan for one week and then the rest of the month I'm travelling; that is exciting because it means that the business is growing.

We also had the opportunity to talk to one of the minds behind the CENTUM series , Masatoshi Nakahara.

What does the launch of CENTUM VP represent?

VP changes the definition of DCS from just a control system to a total information system based on a real time plant database. The database is not an add-on station, but a native feature of CENTUM itself. Process and asset data and operation history are integrated for a more reliable and cost-effective operation.

When planning this new system, we consulted our customers and shared the concept with them. Their main requirements were safety and reliability. A long time ago we chose Windows as the operative system, with CENTUM CS 1000, because it is fast and can integrate the data more suitably. VP is the first control system to be based on Windows Vista.

How do you see CENTUM VP evolving in the future?

Two main things: a digital field network, and an integrated database. As the core of a total information system, the new definition of a DCS will have a real time plant database, which will be filled with rich database contents including plant data from process units, diagnostic information from plant equipment, and future process data estimations. It will empower people in a plant as knowledge workers.

The operator requires the data from many sources to make decisions. Before you had individual operators working independently in various areas of the plant, but now we can combine the production database so it becomes a team of operators working and sharing the information.

What does the recent acceptance of the Vnet/IP protocol standard by the IEC mean to Yokogawa?

A control system is built with equipment from many vendors, but for the customer, every element should be integrated into one system. The communication between these components – HMI, electrical control, safety and so on – is essential. We need a robust common language, a control network protocol, so we made a big effort to achieve this standardisation. The acceptance is the result.

PRODUCT PROFILE

In Australia, Yokogawa provides industrial automation products including process measuring instruments, single station controllers and recorders, analysers and analyser systems, distributed control systems, safety instrumented systems, network control systems, programmable controllers, advanced operation and control applications, test and measuring instruments, and industrial closed circuit television systems. A complete range of project implementation and lifecycle support services are offered in Australia for all of the automation products and systems.

Why should companies adopt VP?

It is the latest and most advanced control system available today with a clear direction/road map for the future, and full backward-compatibility into the past generations of control systems. It is the latest evolutionary step in the control system journey which started in 1975 with the release of the first CENTUM system. We have the development capability and the determination to continue to evolve the CENTUM system into the future, thereby providing users with peace of mind that their investment will continue to be state-of-the-art throughout the life of their plant.

The lifecycle of our product is very long; many of our customers use it for 20 years or more. We have to keep the same functionality for all that time, even though devices change every day. We can't tell the customer that we can't! We need to retain our customers and protect their investment.

PERSONAL PROFILE

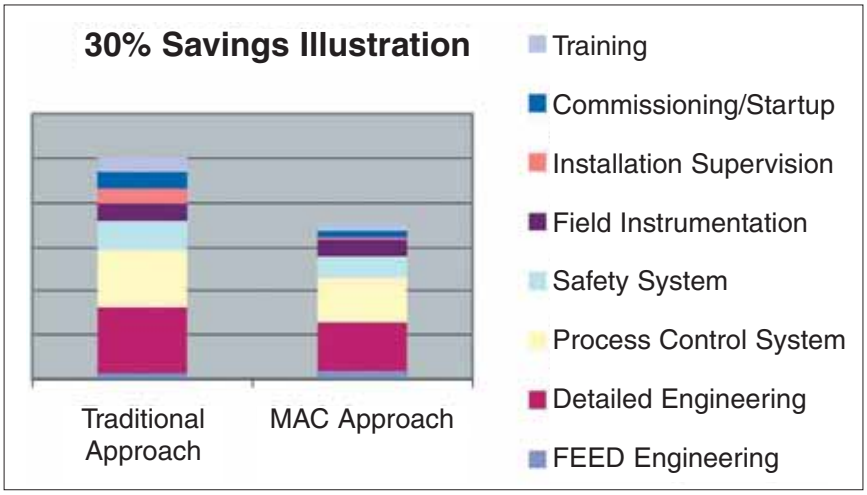
Based in the Yokogawa Corporate Headquarters in Japan, Masatoshi Nakahara is responsible for the Industrial Automation Systems Business. A graduate from Keio University, Mr. Nakahara joined Yokogawa in 1981. Since then, he has been deeply involved in the development of CENTUM series DCS and the STARDOM network control system. Over the past twenty years, his development philosophy has been to incorporate leading-edge information technologies into Yokogawa control systems while vigilantly upholding the security and reliability required in real-time production. CENTUM VP is a culmination of that effort.

What is your biggest challenge in terms of keeping up with trends?

In just ten years we changed the HMI platform from being Unix-based to Windows-based. At the time, many people said that it was crazy; they were afraid. We now have 6,000 HMI packages worldwide, and only 20 out of those licences are Unix-based. Technological changes happen very fast, and we not only have to catch up with trends, but to create new trends ourselves, for the future.

What is your greatest contribution to Yokogawa so far?

In 1999 I was assigned the development of a new type of control system and after three years we released STARDOM. While CENTUM is DCS, concentrated control, STARDOM is a network-based control system (NCS) more suited to wide, separated areas. Yokogawa is leader in DCS, so to develop something that is different within that culture, when the whole organisation is in the DCS mindset, it takes vision to create a new type of system and make it success. We had many challenges, but it was a big success especially in the USA. I was very pleased. Big companies like BP accepted STARDOM. It is my baby.



The following is an extract from the ARC Advisory Group's white paper *Yokogawa matures a best practice culture for successful project execution*, February 2008. Analyst: Larry O'Brien.

Large grassroots projects and upgrade projects are ubiquitous in the developing economies of the world, and there is an unprecedented demand for system integration and project management services. End-users are increasingly constrained by personnel issues, shrinking capital budgets and shrinking timetables. Aside from grassroots construction activity in emerging markets, end-users are also faced with the task of executing multiple projects simultaneously in disparate geographic regions. With many of the world's large engineering and construction firms paring down on their automation departments, end-users are increasingly looking to suppliers to take on the role of a main automation contractor (MAC), which assumes responsibility over all automation related aspects of a project.

Many of the world's leading end-users, particularly in the process industries, are applying the MAC concept to all of their capital projects. End-users have reported up to 30% savings on projects versus the traditional approach. Costs are reduced in nearly all areas of the project, from training to commissioning and installation. Automation suppliers need to combine their expertise with industries and application with their ability to execute projects in a consistent manner. This means developing practices and procedures that are standard and can be reused across multiple projects to reduce cost. Yokogawa is one supplier that has evolved its project execution capabilities to provide a superior value proposition to the end-user.

End-users are under more pressure than ever to do more with less. Project execution requirements are more important than ever not only for automation end-users but also for Engineering and Procurement Firms (EPCs). The automation market is undergoing a boom cycle that has not been seen in decades. End-users in the chemical, oil and gas, refining and other industries are pushed to the limit when it comes to executing new projects around the globe.

Over the past several years, the knowledge base of the automation and controls marketplace has greatly increased among automation suppliers. While EPCs still have a good knowledge base for generic automation and controls, the expertise in specific supplier offerings has shifted in favour of the automation suppliers. In the wave of downsizing that occurred in the 80s and 90s, many leading end-users in the process industries either eliminated their internal automation and control engineering departments, or radically reduced them in size, many by 50% or more. With the imminent wave of retiring baby boomer employees, end-users are faced with even more of a challenge around executing projects and conducting day-to-day operations. EPCs have undergone a similar transformation, and view automation as less of a core competency than before. Most of the big EPCs used to have large automation and control departments with running versions of all the major suppliers' DCSs and instruments. This is no longer the case.

Automation suppliers have stepped in to fill these requirements. Many of the key personnel with expertise in automation that are retiring from the end-user companies are finding new careers as consultants and engineers at supplier companies. Suppliers as a whole have greatly increased their application expertise and project execution capabilities to fill the void left at the end-users and EPCs. Yokogawa-s project execution services business, for example, has grown at double-digit rates over the past several years as it meets the increasing project execution needs of its end-user and EPC clients.

Reducing the 'Four Cs'

There are four key areas where taking the MAC approach provides an economic advantage to the end user. These include reduced coordination effort, commissioning time and customisation, all of which accumulate into reduced installed cost and cost of ownership. As a single source of responsibility, the MAC removes the associated effort and cost of juggling several different suppliers and/or systems integrators from the end-user. Single point of ownership for the design effort results in lower engineering costs and helps to eliminate another enormous source of cost: customisation. ARC believes that custom integration of disparate applications results in significant added cost where it is required.

With better engineering and a reduced need for custom integration, commissioning and startup are achieved much faster, with a seamless handover from the project phase to operations. The resulting operational strategy of the plant is ultimately driven by the accrued knowledge achieved in design and installation. When a MAC transitions to a collaborative lifecycle partner, it can bring all the knowledge it has captured during the project to bear in supporting the customer, as well as sharing this knowledge with the customer to help them achieve operational excellence (OpX).

Redefining DCS

CENTUM VP is the successor of CENTUM CS 1000/CENTUM CS 3000. While securing clear backward compatibility and consistency with previous systems, VP redefines the role of a production control system, commonly known as a DCS. It integrates plant information management, asset management and operation support functions, delivering information in context and allowing easy role-based access to all key information. VP is suitable for process control and monitoring of plants in industries such as oil and gas, petrochemicals, chemicals, power, pulp and paper, pharmaceuticals, food, iron and steel, waste, and water and sewage treatment

Unified architecture based on a single real-time plant database

Plant operations require various functional components such as production control and monitoring, plant information management, asset management, and operation support. Usually these functions are handled by a variety of products from different suppliers. The plant is operated by a patchwork of disparate systems, leaving gaps and barriers that constrain smooth and integrated operations. In contrast, CENTUM VP establishes a single real-time plant database that serves all of these key functions in real time, setting the foundation for a unified operating environment. This unified architecture improves information efficiency and enhances the safety and agility of plant operations.

VP enables single-source seamless integration of advanced applications that manage plant information, stabilise processes, and improve operational efficiency. Quick and flexible deployment of these applications enables the user to improve the safety, availability, and profitability of a plant on an ongoing basis. This simplifies change management, minimising the life-cycle ownership cost.

Continued high reliability and compatibility

CENTUM VP utilises Yokogawa's Pair & Spare reliability technology that leaves no single point of failure and maintains an industry-leading seven 9s (99.99999%) system availability. It is fully backward compatible with the CENTUM CS 1000/CS 3000 systems and secures a smooth and flexible migration path to all previous CENTUM series DCSs, allowing customers to maintain existing systems while expanding their plant or systems with a new DCS.

Intuitive HMI

VP introduces a unified and intuitive operating environment. The new screens are ergonomically designed and arranged to reduce operator fatigue and discomfort. The HMI also facilitates easy access to the right information. Another key element is the visualisation of operational know-how and consideration of information users' mental models, enabling everyone to work smarter. This unified and intuitive HMI is essential for harnessing the power of the integrated production control system. Information users get prioritised, actionable information instead of a flooding of data.

Ultra fast SOE modules

Rockwell Automation's new SOEs feature sub-millisecond resolution for first-event detection and sequence of event data capture for event cascades. ControlLogix SOE modules is ideal for substation automation and emergency shutdown systems, and any application for which change-of-state data improves capability to view, diagnose and optimise process sequence and effectiveness. The modules fit into a ControlLogix rack, expanding the input time-stamping capability of standard input modules, from per-module to per-channel, across 16 channels. Combined with a 1756HP GPS card from Rockwell Automation Encompass partner, HiProm, this brings a coordinated, real-time time-stamping capability to geographically distributed systems.