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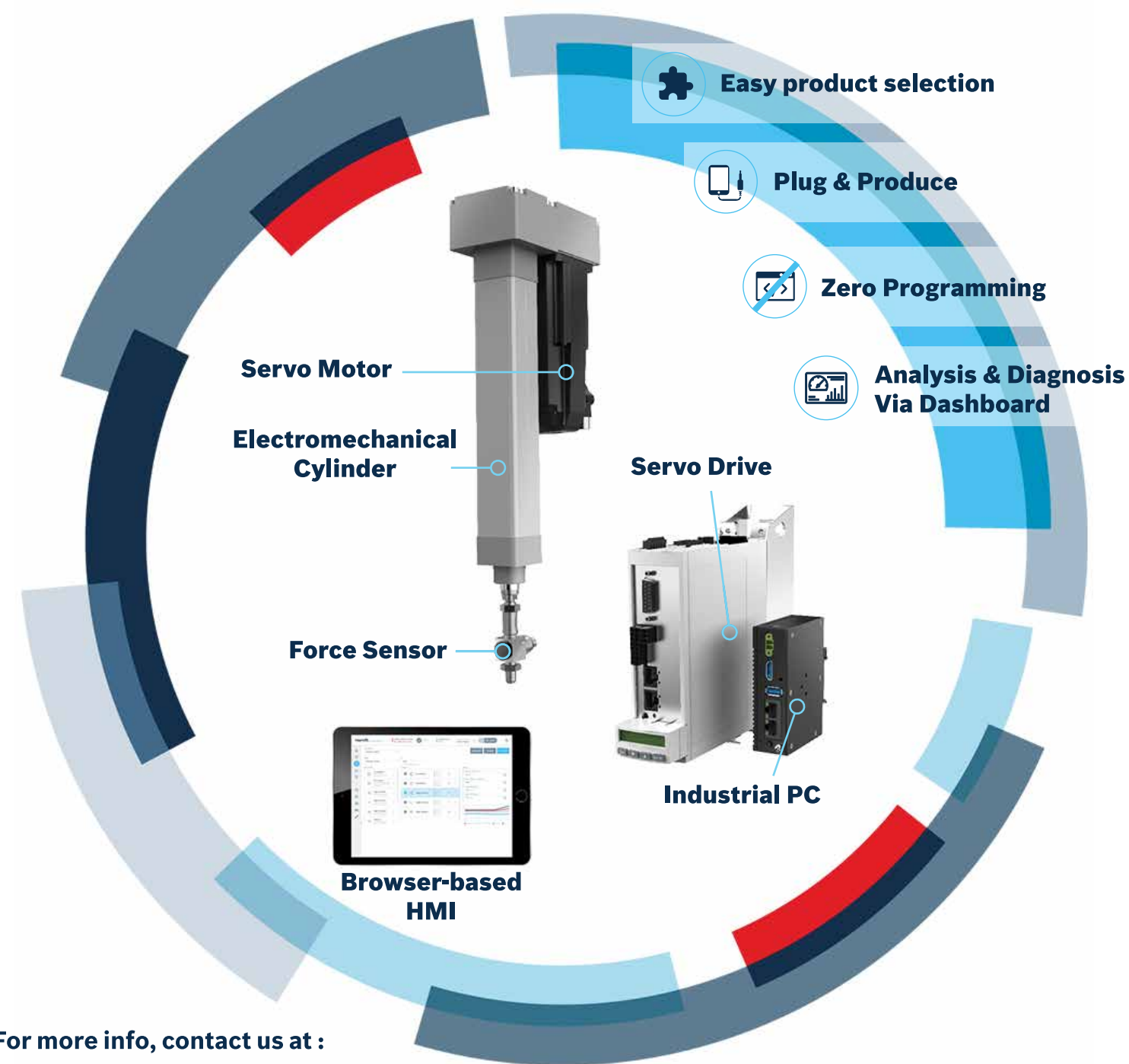
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Publisher's Message

Happy New Year 2020 to the readers of Automate Asia Magazine! Another wonderful year has end, it was the year of the rebirth of this magazine. We received so much love and support from it and we are beyond grateful that we have succeeded in publishing our second issue. With the New Year has started, we hope to bring and create informative and knowledgeable content for our readers out there. We wish to see you in future events.

2019 has seen innovations taking over the country such as 5G, Cybersecurity, Internet of Things, Artificial Intelligence, Wearables and many more. Most companies including SMEs have already taken steps to adopt Industry 4.0. Prime Minister Tun Dr. Mahathir Mohamad stated that the government has planned to develop Malaysia to be a part of the IR 4.0 and utilize modern technology to its best, thus we hope that 2020 will see Malaysian start practicing the Industry 4.0 for our country to evolve according to the demands and supplies of today's needs.

For the highlight of this issue, we have Mr. Terence Tan from the Singapore Industrial Automation Association (SIAA), and Mr. Fankly Christian from Indonesian ICT Businessman Association (APTIKNAS) for interview session upon their Signing of MoU during ITAP 2019 at Singapore. Read on for the full interview.

On behalf of the editorial team, I thank you for your massive support to Automate Asia Magazine. Stay in touch with us on www.asiaautomate.com for more updates.



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International Trade and Industry Minister Datuk Darell Leiking will lead a trade and investment mission to Australia from August 19 - 23. - NSTP/SAIFULLIZAN TAMADI

Leiking to Lead Trade Mission to Australia

International Trade and Industry Minister Datuk Darell Leiking will lead a trade and investment mission to Australia from August 19 - 23.

The mission comprises officials from the Ministry of International Trade and Industry (MITI), Malaysian Investment Development Authority, Malaysia External Trade Development Corporation, Malaysia Automotive, Robotics and IoT Institute (MARii), InvestKL Corporation and EXIM Bank.

In a statement today, MITI said Darell is scheduled to meet with Andrew Barr, Chief Minister of Australian Capital Territory in Canberra. In conjunction with the mission, the 18th Joint Trade Commission (JTC) Meeting will be held on August 20, to be co-chaired by Darell and his counterpart, Simon Birmingham, Australia's Minister of Trade, Tourism and Investment. The meeting will be held to discuss bilateral trade and investment issues and opportunities for further collaborations.

Darell and the delegates will also be visiting the University of South Australia (UniSA), Mawson Lakes Campus to gain an insight on UniSA Industry 4.0 Lab Space and MARii's projects – the Light Weight Plastic Glazing Project and the Hard Coating Project (flow coating).

Additionally, the minister will be visiting the Swinburne University of Technology's Advanced Manufacturing Industry 4.0 Hub, also known as the 'Factory of the Future' for being the first ever fully-immersed Industry 4.0 facility in Australia. He will also be meeting with prominent business groups in sectors such as food and beverages, healthcare, machinery, Halal hub and aged care centre.

During his visit, Darell will connect with strategic partners during a seminar on 'Business & Investment Opportunities in Malaysia as the Gateway to Asean'. In 2018, Australia was Malaysia's 11th largest overall global trading partner, with total trade between both countries recorded at RM55.13 billion (US\$13.11 billion).

Malaysia's exports to Australia stood at RM33.55 billion (US\$7.98 billion) and imports at RM21.58 billion (US\$5.13 billion) last year.

In terms of investments, 350 manufacturing projects were implemented with total investments of RM2.79 billion (US\$660 million). The projects created 22,626 jobs in Malaysia in key manufacturing sectors such as chemical-based products, petroleum-based products and rubber-based products.



Source: www.nst.com.my



Prime Minister Tun Dr Mahathir Mohamad and International Trade and Industry Minister Datuk Darrell Leiking attend the 'Beyond Paradigm Summit 2019' in Kuala Lumpur July 17, 2019. — Picture by Mukhriz Hazim

Malaysia Risks Losing Out with Untapped Talent in Industry 4.0

Malaysia risks losing out on potentially new innovations from the innate, but untapped talent that exists within the country, if local industry, especially small and medium enterprises (SMEs), do not catch up with Industry 4.0 (IR4.0) and its advancements, said Prime Minister Tun Dr Mahathir Mohamad. The prime minister also called out to industry to grow and innovate alongside the needs of IR4.0.

"The Fourth Industrial Revolution will change the kinds of jobs needed in industry. Our strong view is that, as a nation, we must create the jobs of the future.

"Our goal must be to automate work, but humanise jobs. Allow machines to do the dangerous and repetitive, and ensure we humans have the capacity to do the creative, empathetic and interactive," he said in his speech at the Beyond Paradigm Summit 2019. Dr Mahathir said therefore, an urgent response was needed for Malaysia to create, adopt, and integrate distinctive technological solutions to transform the workforce and industries.

In order to fully manifest the technological innovations within Malaysia's economic framework, a symbiotic relationship of sorts must be formed between relevant government agencies and the private sector, that are helping it, he said. "We are happy to see Serba Dinamik IT Solutions taking the lead to initiate these activities to propel and navigate businesses through the digital option," he added.

Dr Mahathir also urged SMEs and local businesses to be at the forefront of digital transformation to stay attractive for investors and competitive on the global scale. He noted that a paradigm shift among SMEs, especially on innovation and creative solutions, was key to propelling the manufacturing industry forward, as it accounted for 98.5 per cent of manufacturing companies and 42 per cent of employment.

"To establish an ecosystem of Industry 4.0, both industry leaders and the talent supply have to fully understand and embrace the disruptive technologies. For now, adapting is a must, but soon, mastering the technology is fundamental," he said.

According to Dr Mahathir, despite all the technological disruptions that are threatening traditional jobs, the government is determined to create the future of Malaysia that was fair and humane, underpinned by shared prosperity.

"Furthermore, it has been projected that 65 per cent of today's children, currently in primary education, will be working in jobs that do not exist today.

"As 70 per cent of our current workforce are SPM graduates, reskilling Malaysians of all ages is imperative to ensure success, within our economic landscape for the years to come," he said. The inaugural Beyond Paradigm Summit 2019 is organised by Serba Dinamik Holdings Bhd.

Themed "Creating Distinctive Digital Solutions", the two-day summit will showcase advanced technologies encapsulating the core ideas of automation and data exchange surrounding IR4.0.

Source: www.malaymail.com



Joachim Horn, chief technology and information advisor at PLDT and Smart Sivasuriyamoorthy Sundara Raja, MIDA Executive Director

NOKIA & SMART SET TO BRING INDUSTRY 4.0 TO SOUTHEAST ASIA

Nokia and Smart, the mobile arm of Philippine telecommunication operator PLDT, are working together to bring Industry 4.0 to Southeast Asia.

This comes in the tail of the recently completed trial of live 5G standalone (5G-SA) video call at the PLDT-Smart 5G Technolab in Makati City. Using Nokia's 5G SA equipment, it was the first trial of its kind to be conducted in Southeast Asia. Standalone refers to systems, such as Nokia's cloud native core solutions, that are entirely 5G-based and do not rely on previous generations' network architecture.

"Southeast Asia is already home to the world's top social media users, and 5G will bring them faster connections, but its true beneficiaries will be industry sectors," said Andrew Cope, country head for the Philippines at Nokia.

"The trial we conducted with Smart shows that Industry 4.0 can become reality for the Southeast Asian region. The opportunities are immense, and we are looking forward to working with Smart to allow the Philippines, and the wider region, to reap the rewards of 5G," he said.

Making The Philippines a Player in the 5G Race

Standalone (SA) systems will become increasingly important as the Philippines and the entire Southeast Asian region moves towards Industry 4.0, in which industry becomes increasingly connected.

According to McKinsey and Company, Industry 4.0 is expected to deliver between US\$216 billion and US\$627 billion in value among the ten-nation members of the Association of Southeast Asian Nations (Asean).

A key component of the Industry 4.0 architecture is network slicing, which allows service providers to partition their networks into discrete "slices" to support specific use cases or sectors. Coupled with ultra-reliable low-latency capability, network slicing will enable the delivery of new use cases, such as real-time remote control of robotics, autonomous transport vehicles and other enterprise-led 5G use cases. 5G-SA has been described as "pure 5G" as it relies solely on 5G for data transmission, and allows the full benefit of 5G capabilities to be tested and demonstrated. In contrast, 5G NSA (non-standalone) combines the use of 5G and existing 4G/LTE resources to transmit data.



Andrew Cope, country head for the Philippines, Nokia

5G-SA technology paves the way for a variety of new industry applications that utilize 5G's full features, such as massive connectivity for thousands of devices, ultra-low latency of under 10ms, ultra-high reliability, distributed cloud computing, unified security, and network slicing, among others. "This is the first 5G implementation which is completely standalone. We don't need LTE for it. Most 5G implementations today actually need LTE—in fact they're actually only fast LTE," said Joachim Horn, chief technology and information advisor at PLDT and Smart, during the 5G-SA video call trial in Makati City more than a month ago.

"What we're seeing here--this is real 5G. For the first time, we are experiencing the true capabilities of 5G. For example, 5G's real low latency can only be achieved in this configuration. This is just the first milestone to show what is possible, and we brought it here to the Technolab," Horn added.

By working with partners like Nokia, Smart hopes to unlock the full potential of 5G for Filipino enterprises and customers.

"We are putting the Philippines at par with the rest of the world in preparing for the deployment and adoption of 5G," Horn said. "It gives us great pleasure to be one of the pioneers of the 5G SA deployment in the region and we are looking forward to moving onto larger scale deployment of 5G to tap into new business and industrial opportunities - to help transform the face of the country's economy."

Smart-Nokia 5G Partnership Journey

In March, Smart and Nokia signed a Memorandum of Understanding (MoU) to deploy 5G-SA solutions in the Philippines, particularly for schools.

Using the combined capabilities of the Smart 5G Technolab and the Nokia Technology Center in Quezon City, the companies are collaborating to identify innovative 5G-SA solutions, such as artificial intelligence, drones, and Internet of Things (IoT) applications.

In April, Smart launched the Ateneo de Manila University as the first "Smart 5G campus". Under the MoU, Smart and Nokia will help set up the Ateneo's Convergent Technologies Center with a 5G lab, enabling Ateneo's students and tech experts to co-develop practical and relevant solutions.

Among the applications being eyed for development are IoT solutions, Augmented and Virtual Reality services, robotics, drones, and analytics. To support these research activities, Smart is also deploying 5G base stations in the Ateneo campus.

Smart and Nokia first explored 5G in 2016, when they achieved speeds of 2.5 Gbps using 100 MHz with latency of just 1 millisecond over a 'live' network—the first in the Philippines.

Source: futureiot.tech



Best Positioned for 5G

Armed with both fixed and wireless infrastructure powered by the country's most extensive fibre network now at over 260,000 kilometres, PLDT and Smart are best positioned to deploy 5G in the country.

To deliver 5G services, Smart is currently upgrading its network's Core and Transport elements, as well as upgrading to fibre the backhaul connecting the network's cell sites nationwide. Smart is also installing 5G-capable equipment in its ongoing LTE and LTE-Advanced roll-out.

Launched in June 2018, the PLDT-Smart 5G Technolab is the company's flagship facility for the research and development, standardization, and testing of 5G, and is designed to be a sustainable environment for innovative services.

In November last year, PLDT and Smart also launched the country's first Smart 5G Cities in Pampanga and Makati. In the same month, they also successfully made the country's first 5G-to-5G NSA video call between the two 5G Smart cities.



Smart and PLDT executives Joachim Horn, Chaye Cabal-Revilla, Ricky Vargas, Mario G. Tamayo with counterparts from Nokia Philippines led by Andrew Cope during the 5G-SA video call trial conducted in Makati City.

Empowering the Singapore Workforce for Industry 4.0

Smart technologies can enable industrial enterprises to streamline energy and resources. Tommy Leong, Zone President of East Asia & Japan at Schneider Electric, shares how industry leaders can prepare their workforce for Industry 4.0

Asia is recognised as the manufacturing hub of the world and is a strong driving force for the Industrial Internet of Things (IIoT) market, which some are calling the Industry 4.0 revolution. In particular, Southeast Asia has the potential to leapfrog ahead of other developing nations as the region is forecast to grow at least five per cent annually until 2020, exceeding the global growth of 3.5 per cent. This can be attributed to strong support from the region's governments to ramp up sustainable manufacturing capabilities in each of the markets, mass digitisation across sectors, increased interconnectivity between numerous technologies and the rise of sustainability movement globally.

Singapore is a prime example. The country's manufacturing industry sits at a very critical time in its advancement. It no longer has the advantage on cost and quality, due to competition from surrounding countries and global trends. However, it can transform itself into a data-driven manufacturing powerhouse. Singapore's developed digital infrastructure, forward-thinking government and government agencies such as Government Technology Agency (GovTech) are important competitive advantages for the state-country to work towards being a leader in IIoT. With this infrastructure, manufacturers can quickly tap on new innovative and provide boosts in productivity, cost reductions and quality improvement.



To survive and to lead in today's business environment, organisations need to innovate and transform how operations are run with smart technologies. PHOTO: SCHNEIDER ELECTRIC

PEOPLE ARE AUGMENTED WITH, AND EMPOWERED BY, TECHNOLOGY

Early adopters of automation are already seeing measurable gains including increased energy efficiency and a better return on capital expenditure. Reports show that manufacturing companies can see a 10 to 20 per cent increase in productivity when they migrate to a digitised lean assembly line that uses sensors, interfaces and basic analytics. Productivity rates can soar by a further 300 per cent with the deployment of Industry 4.0 technologies such as autonomous guided vehicles.

At the same time, industry leaders looking to automate may find that a big challenge they face comes from within, where workers are resistant to change with fears of losing their jobs to automation. Moreover, concerns over costs and the lack of digitisation know-how loom over the case for automation. It is important to understand that while the incorporation of technology or artificial intelligence (AI) will help to drive smart technologies, human input is still essential. While new technologies possess great autonomy, humans must provide direction and control — and apart from overseeing technology, they are needed to gather, compare, analyse and apply data. Technology has a pervasive and growing role, but the key message is that smart factories are empowering the human workforce, not replacing it.

For instance, machines and automation should be seen as an enabler for people to drive new and different procedures in operational efficiency and energy efficiency, breathing new life into traditional workflows and empowering the human workforce. These intelligent new technologies will require organisations to upskill human operators in order to drive the change. Schneider's chief digital officer Hervé Coureil once said that building a digital twin without having a way to respond to the insights is like having a phone that never rings. Likewise, integrating AI technology into the current workflow without knowing how to interpret, manage, and act on the insights leaves any of us with just a shiny object that has no real applicable value. There is a need for organisations to develop talent strategies, as well as build up staffing and training plans to meet the changing needs in terms of skills, job description and organisational models of the companies.

EMPOWERING PEOPLE THROUGH KNOWLEDGE-SHARING

As a global technology company that drives innovation for energy management and industrial automation, Schneider Electric is here to help companies transform digitally by providing them the tools for digital transformation, and the training to help better equip the workers. The French multinational corporation is now part of an elite community of leaders in the Fourth Industrial Revolution who have agreed to open their doors to share their knowledge and best practices with other industries (such as F&B, electronics, etc.) and develop an ecosystem of innovators, which will continue to grow and advance the adoption of smart manufacturing technologies. This is why Schneider Electric has come up with tech solutions such as the open IoT-platform, Ecostruxure Machine Advisor and the Ecostruxure Augmented Operator Advisor, which uses Augmented Reality to help customers manage complex plants and factories.

Examples of such an integration can be seen in Schneider Electric's smart factory in Batam, Indonesia, which not only functions as a factory, but also acts as a showcase for customers and partners to witness how digital transformation can help them make informed, data-driven decisions that bring about improved profitability, asset management performance, operational

efficiency and a smarter productive workforce while keeping operations secure, agile and environmentally sustainable. More than 150 customers and partners from China, Indonesia, Malaysia, Middle East, Myanmar, Singapore

To survive and to lead in today's business environment, organisations need to innovate and transform how operations are run. Savvy use of intelligent automation starts as a competitive advantage and will become, over time, table stakes.

With these solutions, and constant upskilling and empowerment of the human workforce, the assets and operations of plants and factories can be managed remotely and digitally from the smart control centre, and its energy efficiencies can also be better managed through data-informed decisions.

At the Industrial Transformation Asia Pacific (ITAP) conference, Schneider Electric has installed a full-fledged virtual Smart Factory with 7 interactive exhibits and daily live streaming of the Batam Smart Factory to demonstrate how a factory can be transformed through digitisation. The second Asia-Pacific edition of the iconic Hannover Messe industrial technology trade show will bring together the region's leading industry professionals and government agencies to exchange cutting-edge Industry 4.0 concepts and technologies impacting the region.



Tommy Leong, Zone President of East Asia & Japan at Schneider Electric. PHOTO: SCHNEIDER ELECTRIC



This file photo shows Singapore's Prime Minister, Lee Hsien Loong delivering his address at the opening of the World Economic Forum on ASEAN at the National Convention Center in Hanoi on 12 September, 2018. (AFP Photo)

ASEAN's Response to Industry 4.0

As the world moves into the era of the Fourth Industrial Revolution or Industry 4.0, governance at regional and global levels will become a key issue. Effective governance is necessary to adequately manage public issues that cut across national borders such as cybersecurity, cross-border terrorism, international trade and climate change.

In the face of geopolitical threats and pushbacks against globalisation that is increasingly felt in the Southeast Asian region, effective governance is essential in order to secure long-term economic growth as well as a peaceful and prosperous society to undergird it.

For over 50 years, the success stories of ASEAN have centred mainly on the organisation's ability to create a community of nations committed to peace.

The resultant peace in the political domain has allowed the organisation to evolve beyond its mandate of regional security to one of sustained economic growth.

Regional gross domestic product (GDP) has more than doubled from US\$1.3 trillion in 2007 to US\$2.8 trillion in 2017 within the span of a decade.

A dramatic reduction in incidences of poverty has been observed as the regional population with an annual income above US\$5,000 is expected to surge from 300 million in 2015 to 400 million in 2020. The growth of a more affluent ASEAN middle class is set to make the region one of the most important emerging consumer markets globally.

Sharing his views on how ASEAN can better respond to Industry 4.0 at last year's World Economic Forum on ASEAN in Hanoi, Singapore's Prime Minister and then-ASEAN chair, Lee Hsien Loong remarked that the region is in a strategic position to make the best use of opportunities from the Fourth Industrial Revolution.

"The Fourth Industrial Revolution is a dynamic and continuing process," he said. "We cannot predict how exactly it will unfold, but I am optimistic about ASEAN's future because ASEAN has its own competitive strengths, and by pooling our ideas and resources and integrating our economies, we will be in a strong position to ride on this fourth wave to bring tangible benefits to our economies and our peoples."

Room for Improvement

At ASEAN's core is a unique approach to regional governance, called the ASEAN Way – a commitment to the principles of non-interference in domestic affairs of member states, utmost respect for national sovereignty as well as an informal decision-making process between ASEAN leaders. However, the system of "decision by consensus" has increasingly come under scrutiny in the era of Industry 4.0.

On the one hand, the ASEAN Way has managed to keep the association from falling apart because member states cannot be forced to comply with any binding agreements that may be construed as a threat to national sovereignty. On the other, its slow process and the association's strict adherence to the principle of non-interference can relegate it to an ineffectual talk shop with no real capacity for action which could become a hindrance to progress in this new era.

The future holds the promise of accelerated disruption and the birth of new technologies that would revolutionise our daily lives. ASEAN must get ahead of such changes or risk falling behind. On top of that, it is critical for member states to smoothen out their differences and work as a collective in responding to these transformations.

The adage that the whole is greater than the sum of its parts rings especially true here. Technologies of the future like block chain, artificial intelligence (AI) and quantum computing cannot be constrained by borders drawn on a map and it requires a concerted effort by all member states in order to fully capitalise on them.

A People-Centred Solution

To first improve the quality of regional governance, ASEAN must shed its inherent elitist mind-set in order to better serve its constituents – the ASEAN people. One way of doing so is to engage with civil society organisations (CSO) which is currently a dormant and underused cog within the ASEAN machinery. A review of CSO engagement released by the ASEAN People's Forum (APF) in 2017 concluded that "the level of commitment of ASEAN is perceived to be only on the level of rhetoric, and not as intentional, owing to the fact that enabling environments are not present to facilitate people participation."

Thematically, ASEAN values its people's contribution as part of its attempt to be more "people-centric," in line with the aspirations enshrined within the principles of the ASEAN Socio-Cultural Community (ASCC). However, given that the reality is undoubtedly different, the onus falls on ASEAN to be more open and inclusive to the ideas of CSOs when they make regional-level decisions.

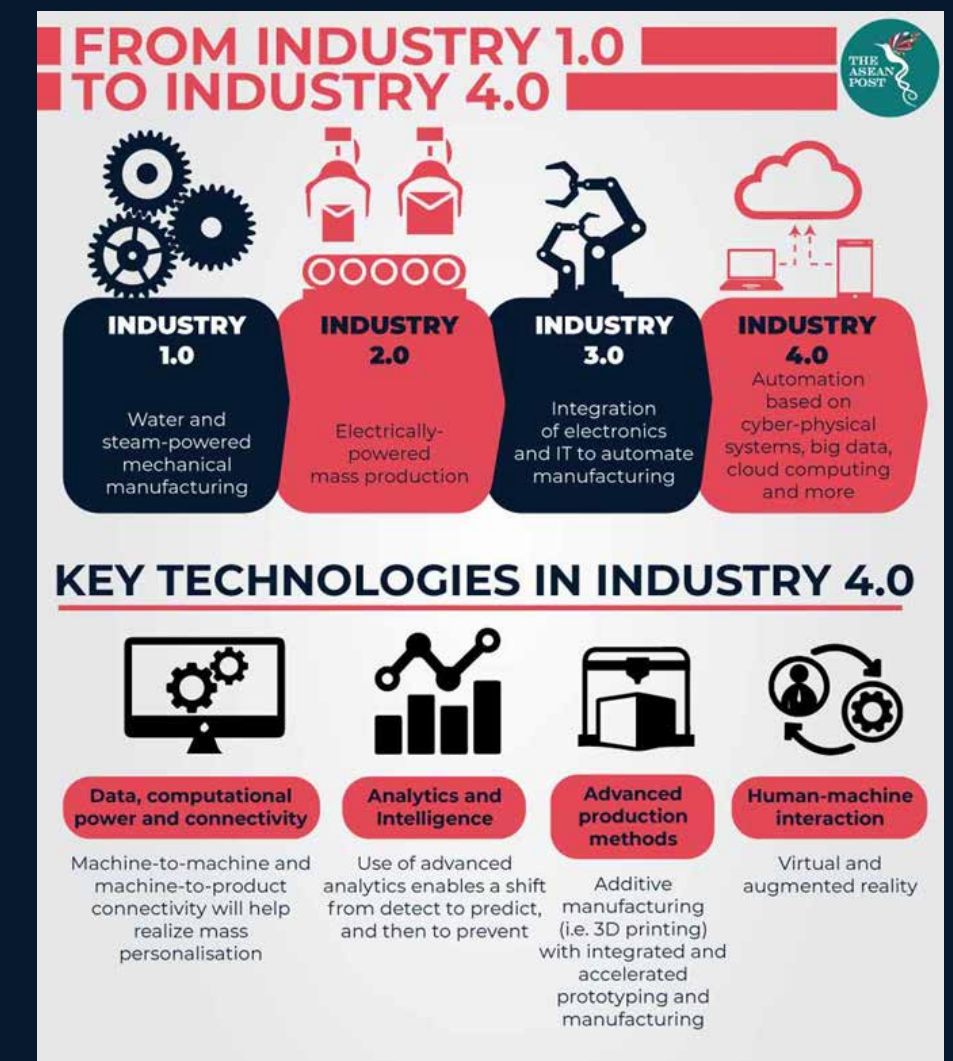
Besides that, it isn't as if ordinary ASEAN citizens aren't interested in regional-level issues. Although there is still plenty of work to be done to improve ASEAN awareness, the younger generation is fast realising the organisation's importance in their daily lives.

A survey of 2,170 respondents from universities around ASEAN found that 76.8 percent felt like they were indeed "ASEAN citizens." 68.8 percent felt that their country's membership in ASEAN has personally benefited them. Besides that, 51.3 percent of respondents felt that the issue of regional identity and solidarity was an important one to the Southeast Asian region.

The numbers – more than anything else – demonstrate potential for a cohesive, cross border ASEAN society. For example, the ASEAN Smart Cities Network (ASCN) is one such initiative in which the human element is indispensable to its success. The ASCN relies heavily on knowledge transfer between partner cities – which in itself is a growing list.

As more of Southeast Asia begins to urbanise, the sharing of data and knowhow between multiple smart cities can only run smoothly when done against a strong backbone of trust.

The Fourth Industrial Revolution is a clarion call for ASEAN to relook its policymaking and regulatory processes. No longer can the old ways of crafting policy be relied upon as they are too rigid, slow and ineffective. Governance of the future in ASEAN must embody a dynamic approach – becoming more agile, iterative and experimental.



Industry 4.0 in Indonesia: Challenges and Opportunities

The roadmap of "Making Indonesia 4.0" has been officially launched by the Indonesian government in order to boost the nation's economy substantially through the implementation of new manufacturing technologies for the most vital sectors in Indonesia that contributed to two-thirds of total manufacturing output in the country in 2017. These sectors included automotive, food and beverage, electronics, textile and chemical. They will be prioritised under the "Making Indonesia 4.0" roadmap.

The government is optimistic that this initiative will lead to a huge transformation including more jobs on the Indonesian market and increase in exports. President Joko Widodo is also positive that this implementation will push Indonesia to become one of the top ten biggest global economies by 2030. This article provides insights into Industry 4.0 in Indonesia, including the challenges and opportunities exist to support this rapidly progressing economy.

WHAT IS INDUSTRY 4.0

Industry 4.0 refers to the fourth industrial revolution in transforming manufacturing by the implementation of new technologies and innovations, particularly in digital technology, cyber-physical systems, and biology and hardware automations.

The vision of Industry 4.0 is to make smart factory a reality and fully utilise the digital manufacturing. It is believed to be an end-to-end digitisation in manufacturing sector and will create an ecosystem across the entire supply chain. Currently, Industry 4.0 is supported by five key technological innovations: artificial intelligence (AI), Internet of things (IOT), robot and sensor technology, human-machine interface and 3D printing.

THE ROLE OF INDUSTRY 4.0 IN INDONESIA

The whole world is now moving towards Industry 4.0 and Indonesia is also getting ready to join the new trend.

As the backbone of the Indonesian economy, the manufacturing sector in Indonesia accounted for 20% of Indonesia's GDP in 2017. Almost one in five of the working population in Indonesia is employed in this sector. Thus, if the Industry 4.0 is successful in Indonesia, the country will see a growth in GDP of at least 7% annually between 2018 and 2030; and the manufacturing industry will contribute to 26% of the nation's by 2030 as well.

THE CHALLENGES

Today, Indonesia faces aggressive competition from other countries such as China, Vietnam and Thailand. Many other challenges still exist but the Indonesian government has already taken a lot of positive strategies in order to fulfil the goal. There are four major challenges present for Industry 4.0 in Indonesia including the capability issues, funding problems, lack of technology/digital infrastructure and system suppliers for Industry 4.0, and the regulation and policy overlaps that require further synchronisation.

For funding and capabilities problems, not only does the manufacturing sector need a large amount of fresh funds, but the implementation of Industry 4.0 also requires foreign talent and technology to help improve the capability and quality of domestic industry.

As for the lack of technology and system suppliers, many manufacturers have been discouraged from migrating to Industry 4.0. Last but not least, harmonisation is needed for rules and policies and this issue has not yet been solved by the Indonesian government.

THE OPPORTUNITIES

The big opportunities for Industry 4.0 in Indonesia are mostly driven by the demographic factor in the country for the next decade. The large population in Indonesia has over 100 million of smartphone users and over 145 million people are connected to the Internet – a huge advantage to the realisation of Industry 4.0.

According to a study conducted by McKinsey in 2018, almost 78% of Indonesian companies had awareness of the Industry 4.0 concept, only behind Vietnam (79%). Surprisingly, countries such as Singapore, Malaysia and Thailand have lower rates of Industry 4.0 awareness as compared to Indonesia.

With proper execution, by 2025, Industry 4.0 is estimated to contribute approximately US\$121 billion to Indonesia's GDP. The speed-up of the digital economy through Industry 4.0 may help Indonesia to earn up to US\$150 billion annually by 2025 as well.



ARE YOU READY TO ENTER THE INDONESIAN MARKET AND TASTE SUCCESS?

With all the data and statistics mentioned above, Indonesia is certainly an alluring market for every foreign entrepreneur. Despite the challenges present as the country is keeping up with Industry 4.0, the opportunities are for you to seize. Get in touch with us now to get important insights into market entry in Indonesia and how Cekindo can assist you with business incorporation in Indonesia.

Source: www.cekindo.com

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3 Automation Trends with a Big Impact on Auto Manufacturing

The automotive industry has been widely automated for decades and has always been one of the first to introduce new, more advanced tools and machinery. Much of the hardware used has been relatively limited, at least when compared to many of the technologies available today.

The equipment tends to be used for one or two duties, and each build is passed along a production line where separate robotics are used at each point. There's nothing inherently wrong with this setup, but it's not as efficient as it could be.

Thanks to a variety of newer solutions — including IIoT, cloud computing, 3D printing and more — the entire manufacturing field is seeing a revolution as it pushes toward full automation. Some of those technologies have made it possible to introduce entirely new strategies. 3D printing, for example, allows for in-house and near-instant development of components, parts and even full builds. As automation becomes more of a focus, several trends are taking shape.



1. Cobots Are on the Rise

While a great deal of automotive manufacturing and development is automated, there is still a significant human component. Conventionally, robots have always been used for repetitive, dangerous jobs that humans shouldn't handle.

Thanks to the advanced technologies of today, robotics are now working alongside their human counterparts in a joint effort. These new types of machines are called collaborative robots, or cobots.

BMW relies on cobots to improve the safety of workers in its plants and the quality of goods and components produced. Other companies doing the same include Nissan, Ford — specifically in their Cologne, Germany, plant — and many more.

2. 3D Printing Speeds up Operations

Additive manufacturing, otherwise known as 3D printing, is becoming increasingly common in the automotive field. What was once primarily relegated to hobbyists and small projects has now been upgraded to create larger parts and components necessary in all forms of manufacturing. The technology is being leveraged to print with a variety of new materials, from concrete and masonry to wood.

The nature of 3D printing, which essentially creates objects layer by layer from the bottom up, will have a huge impact on the way cars are assembled. Advanced forms of welding, such as RF or radiofrequency welding, are often used to merge parts and components more permanently. Welding will always be necessary in one way or another, but 3D printing lessens the need



for it in complex builds. What that means is that the resulting components and parts are just as strong, but made in a shorter span. They can be assembled faster, too.

It's no surprise that the automotive industry has tapped into the technology's potential to help create and develop a variety of components for modern vehicles. This has been ongoing for years now, as the 2015

Wohlers report stated that motor vehicles constituted 16.1% of the 3D printing market for that year. That number has grown considerably since then. Companies like Audi now use additive manufacturing techniques to print metal prototypes and spare parts for their vehicles. Rolls-Royce, Porsche and several others are following suit. As the technology becomes more capable, cost-effective and readily available, additional automotive organisations will incorporate it into their regular manufacturing processes.

3. Vehicle Autonomy Is Coming

Automation is happening at the same rate for consumers, but the difference is that the vehicles themselves are gaining autonomy. Self-driving and fully autonomous cars are expected to be on roadways within the next few years. Some estimates claim 15% of new vehicles sold in 2030 will be fully autonomous.

Of course, the technology has to be optimised and perfected long before that happens. Regulation has to catch up too, not just from a legal standpoint, but also for insurance and user operation.

Electric vehicles are also becoming more prominent as society collectively moves toward more efficient and environmentally sound solutions. With each passing year, they become more capable, viable and cost-effective.

McKinsey also claims that by 2030, the share of electrified vehicles could range anywhere from 10 to 50% of all new-car sales. Adoption rates are expected to be higher in more urban and dense areas. Cities tend to have stricter emissions rulings and more consumer incentives for going green.



The Automotive Industry Continues to Evolve

Automation, in general, is nothing new to the automotive and manufacturing fields. Technologies have been around for decades to help speed up, optimise and handle some of the most difficult and repetitive duties. Just as modern tech has evolved, so too will the automotive industry.

Cobots can help automate and improve many existing processes, particularly those that still require the human touch. They can also make factory plants and facilities safer and more welcoming to their human counterparts. There's much talk of advanced robotics and AI replacing workers in the current landscape, when in reality they're just shifting the way humans do the work.

3D printing can help speed up operations in the same way, allowing for better builds of parts, components and even entire vehicles. As technology becomes more capable, the automotive industry will realise new opportunities.

The entire industry is focusing on driverless technology. Nearly every manufacturer has some form of autonomous driving system, with Tesla being the most obvious. It won't be long before the rest of the manufacturing world follows suit.

Japanese IoT Firms Pour into Aquaculture

Tech companies have been quick to seize the opportunity presented by Japan's recent Fisheries Reform Act, which opened underutilized aquaculture sites to use by companies, rather than reserving them for local fishery cooperatives.

A major impetus behind the legislation was an effort to stimulate a surge of capital investment into aquaculture. At the Japan International Seafood and Technology Show – which took place in Tokyo in August – and the Tokyo Seafood Sustainability Symposium in November, the beginnings of that investment could be seen as several aquaculture-focused tech companies exhibited new products that have the potential of improving the efficiency and yields of aquaculture production in Japan.

At the Japan International Seafood and Technology Show, the 21st annual edition of the expo, Umitron K.K. introduced its Umitron Cell 2, a new model of smart aquaculture feeding system, following the Umitron Cell that was announced on 25 January. The company has dual headquarters in Tokyo and Singapore.

The device is an automatic feed dispenser for aquaculture pens that uses “Internet of Things” (IoT) technology and can be managed remotely via the cloud through a smartphone. These units operate using solar power and satellite signal connectivity, allowing stable data acquisition and remote system updates offshore.

The Umitron Cell 2 has a larger capacity feed container and heavier-duty construction than the original unit. As a result, it can go beyond simply feeding on a timed schedule. When used with Umitron's Fish Appetite Index, which the company claims is the world's first real-time ocean-based fish appetite detection system, timing of feeding and quantity of feed can be optimized to avoid waste. The goal of the product is to reduce feed waste, as feed is one of the biggest expenses for fish farmers. The system uses machine learning and image analysis techniques to extract data from video streams that is then used to measure fish appetite.

At the show, Tomohiro Murota, a software engineer for Umitron, gave a demonstration of the product in which he connected from his smartphone to the feeder with the Umitron application. Through the app, he was able to see underwater video showing fish activity, take remote control of the feeder, and perform data analysis of feeding logs. Murota said that the device eliminates the need to take a boat out to an aquaculture site for daily feedings, though occasional refilling of the feed is needed. Taking a boat out in rough weather or on holidays can be avoided, and fuel and labor can be saved, he said.

At the fifth annual Tokyo Seafood Sustainability Symposium, which took place 7 and 8 November, two cellphone carriers were displaying tech solutions in aquaculture.

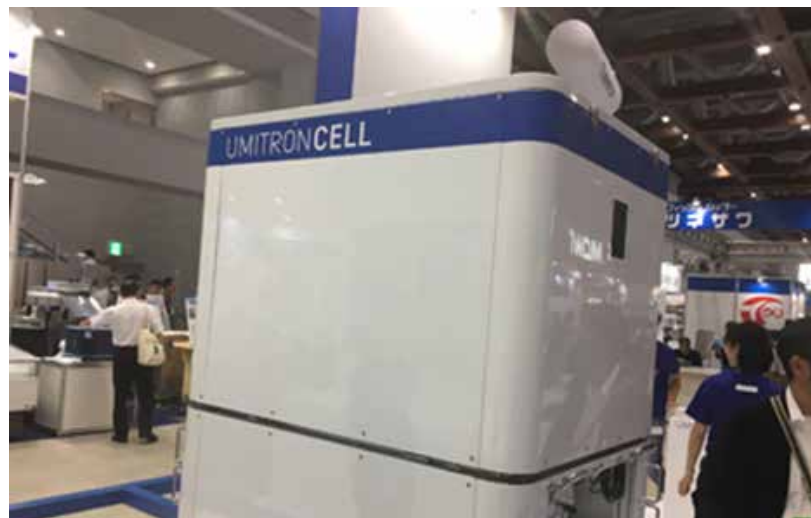
KDDI introduced a drone, dubbed Akabot II, painted a bright red (“aka” or “akai” means red in Japanese). The device flies over the ocean and takes deep-water samples at several locations to detect red tides. It is able to identify harmful plankton using image analysis that implements IoT-based deep learning. As bluefin tuna farming has expanded in Japan, early detection of red tides is becoming more important, as bluefin are more sensitive to red tides than other popular farmed species, such as yellowtail and sea bream. Early detection allows operators time to tow net pens to less

-affected areas. Using this system, the time from seawater sampling to red tide detection and notification to fishermen is shortened to about 15 minutes.

Also at the sustainability show, NTT Docomo displayed an IoT buoy equipped with sensors and communications equipment. The buoy with its sensors was made by Tokyo-based S-Vans. The data is relayed via the Docomo network to a cloud server. It can then be accessed from a smartphone screen. The smartphone app, called “Umimiru” (“See the ocean” in Japan) was made by Sendai software firm An dex. The app can display this data visually in charts, grids or gauges.

The sensors measure water temperature and salinity. This data helps oyster and seaweed farmers track factors relevant to the growth of their stock. The IoT buoy records lowest, highest, and cumulative water temperatures. Cumulative water temperatures are used to estimate the time when oysters spawn.

In the past, the oyster farmers took boats out daily to collect the data and tracked it on paper, making analysis difficult. In future, wind speed and direction and wave height may be added to the data collected.



Source: www.seafoodsource.com

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IoT Trends: What will 2020 Bring?

The year 2019 has witnessed a continued proliferation of the Internet of Things (IoT) software platforms, and no doubt 2020 will see further use cases of the IoT as it cements itself even more deeply within business operations. We'll see further development of the IoT across consumer products and supply chains, too, but some areas to consider in more detail will include:

1. MQTT Will Become the de Facto IoT Messaging Protocol

Fragmentation has been a barrier to progress in the IoT since the very beginning, and messaging protocol is one area in which standardization would be massively beneficial. MQ Telemetry Transport (MQTT) has been around for more than 25 years but has gained momentum recently thanks to the onset of the IoT. Simplicity and low-power efficiency, combined with comprehensive MQTT QoS, make it the ideal standard for the IoT. MQTT-SN will also come to the fore. Extra features added to MQTT to relay data from sensor networks will allow for IoT devices to use even less power to send messages.

2. Industrial IoT Will Overtake Consumer IoT

Is the Fourth Industrial Revolution finally happening? The number of consumer devices has been growing steadily for a few years, but the Industrial Internet of Things (IIoT) has until now been relatively slow on the uptake. The IIoT has been held up by a combination of a lack of suitable technology and trust in the IoT as a whole. Important business processes—such as asset tracking, data gathering, and new business modeling, to name but a few—will see enhancement through the introduction of IoT infrastructure. The past year has seen many advances in IoT technologies, particularly in security and the availability of technology. These advances will be the trigger for many IIoT networks to move from concept to reality.



3. Blockchain Meets IoT

In the IoT world, blockchain has been a buzzword and a “What if?” for some time, but a lack of real-world applications has made it difficult to prove the technology's worth. Next year will see many real-world IoT applications using blockchain to solve some of the trust and security issues inherent in IoT devices. For example, with smart homes using IoT devices, a home security system can be controlled remotely via a smartphone. But IoT sensors use a centralized model for information exchange, which lacks ownership of data and security standards. These security issues could potentially be solved by moving the data gathered from IoT devices to the blockchain.

4. Rise of the Smart Office

You've heard of smart homes; smart offices take the same concepts and apply them to the office environment. As we become comfortable with and accustomed to the smart technology we use at home, we will start to see similar devices and use cases appearing in the office. Smart homes use intelligent devices to save energy and make the homework better for those living in it, and smart offices will achieve the

same at work. Sensors embodied in these smart systems can measure a variety of environmental elements: occupancy, light, air quality, humidity, and even noise. The resulting data gathered from these sensors will help businesses to make important strategic decisions regarding facilities management—everything from costs to operations—with the added option of being able to track business assets.

5. More Networks Means More Fragmentation

The evolution of 5G networks, NB-IoT and a bevy of unlicensed band networks means that there are more ways than ever to get data from the device to the enterprise. While this creates flexibility, thus making the IoT possible just about everywhere on the planet, it also makes things more complicated. For this reason, tried-and-tested connectivity solutions for which the hard work has already been done will win the day. But with more 5G IoT devices connecting directly to the 5G network rather than via a Wi-Fi router, will this make those devices more vulnerable to direct attack? Security will continue to offer up a myriad of challenges.

The Security Challenges of Industrial IoT

The Internet of Things (IoT) is fast turning into an intrinsic part of the digital transformation for industries such as utilities, transportation or manufacturing. The market is expected to reach a value of \$922.62 billion by 2025, becoming one of the biggest catalysts for new emerging technologies.

Although Industrial IoT (IIoT) adoption offers benefits ranging from automating and optimizing the business to eliminating manual processes and improving overall efficiencies, security continues to be an afterthought, one that creates the risk that industrial organizations are ill-equipped to manage.

The Trickle-Down Effect

The lack of mature security frameworks and the breadth of security considerations are big barriers to the improvement of IoT security.

Today, there is no common approach to cybersecurity in IoT, which leaves the door open for device manufacturers to take their approach, resulting in undeveloped or underdeveloped standards to guide the adoption of IoT security measures and best practices.

In many cases, manufacturers designing IIoT devices are challenged to integrate effective security controls into the product design, which results in devices having little to no encryption for securing data at rest or in transit. Because security is not built into the device at the onset, users struggle with securing them after they have been implemented, constantly leaving the door open to potential cyber-attacks, which could lead to operational downtime, loss of customer data and even end-user safety hazards.

This challenge becomes compounded as users come up against other complicating factors, such as:

• Complexity of the ecosystem

– an IIoT ecosystem is an amalgamation of diverse, dynamic, independent, and legacy devices that intertwine communication protocols, interfaces, and people. Such complexity hampers the ability of IT security

professionals to even start with the most basic cyber hygiene, such as changing default passwords, keeping an inventory of hardware and software components on the company network or patching applications regularly.

• Intricate monitoring and management

– the more complex an environment, the more likely it is that IT administrators lack visibility, access, and control over one or more of its components. Moreover, the deployment of IoT devices on legacy infrastructures and non-IP based devices also exacerbates the IT administrators' inability to monitor and control these devices.

• Lack of IoT security awareness and knowledge

– the lack of understanding of connected devices and architecture security poses a significant challenge. Most organizations don't have a full understanding of the risk and exposures they face to protect their devices or the real impact (both positive and negative) those devices have on their security posture.

Thinking of security as an afterthought is one of the most common mistakes when building or adding new connections. IIoT can be effectively disruptive if done properly when done poorly it creates unnecessary risks.

• Industrial IoT Security – Partnering for IIoT Security Success.

Many organizations don't have the skills needed to maintain, let alone build their IIoT security architecture. For that same reason, they should consider partnering with specialists when moving into this space.

Managed security service providers (MSSPs) are adapting offerings to address the needs of complex IIoT environments. As IIoT devices have different application requirements, deployment conditions and networking needs than traditional enterprise environments, MSSPs are investing in specialized capabilities to understand how to configure devices for at-scale operations and to ensure that best practices are followed for both preventative and real-time maintenance.

Businesses considering partnering with an MSSP should take into account the expertise, resources, and services their potential partner will bring to the table. They need to look for a provider that will deliver leading-edge security features such as threat intelligence and monitoring, data correlation and device management and support, while also understanding the differences between monitoring traditional networks with these unique technologies. Leadership will also need to revisit policies and procedures on risk management through an IIoT lens and use audits and assessments as enablers for the application of relevant security controls.

The influx of IoT devices has opened up new entry points into enterprise networks that cybercriminals can exploit. Whether it is in a new connection or an extension of a legacy architecture, cybersecurity must be at the core of the IIoT implementation. Organizations will need to take a defense-in-depth approach to cybersecurity if they are to be better prepared to face the threats targeting IIoT. This starts by identifying the challenges their implementations present, from the increased complexity to awareness and management. The point behind IIoT is to create a seamless connection between people, devices, and networks and drive efficiencies on an industrial scale. If this is to be achieved, cybersecurity is the one guest that cannot be late to the party.

Innovative Automation Solutions: KUKA Wins Major Order from Shaoneng Group in China

KUKA has received a major order in the one-digit million range from the Chinese corporation Shaoneng Group Guangdong Co.

The Shaoneng Group, based in Shaoguan in the southern Chinese province of Guangdong, is active in many segments: from power generation to the manufacturing of sustainable packaging. KUKA is supporting the Shaoneng Group in this order with solutions for automatic loading and unloading of machines. The scope of supply includes around 300 KUKA robots from the KR QUANTEC series.

The delivery follows in cooperation with the Chinese system integrator Foshan Longshen Robotics LTD. With this order, the companies are continuing their cooperation and deepening their partnership.



Source: www.kuka.com

Biometric Security is Coming for You

An effective Industry 4.0 infrastructure requires reliable collection of relevant data from available sources, and that includes human sources

As manufacturers adopt Industry 4.0 standards, biometric security measures are being more commonly applied implemented by smaller and mid-size enterprises — machine shops, for example. Such integrated security measures once were considered more appropriate for hospitals, airports, or other fields where access points had to be controlled constantly, but newer research has shown biometrics can be used to improve industrial processes thanks to its use in collecting worker data.

The core concept of Industry 4.0 is data collection, and effective I4.0 infrastructure is built around properly collected data from millions of sensors. In manufacturing operations, this is the justification for manufacturing execution systems (MES). Data is collected constantly and relevant data is used to revise and improve industrial processes on a sustained basis.

Now, new wearable biometric security devices allow workers to integrate into the MES, as yet another measurable layer of the whole working plant. These devices are typically designed as bands or badges that authenticate the wearers at the beginning of

onto and out of machinery (or, into/out of tool storage cabinets, etc.) without the time, confusion, etc. required for traditional passwords or swipe cards.

This is the technology being integrated into manufacturing now. In fact, Rockwell Automation is gearing up to introduce a wearable device that is synched to an individual's unique cardiac pattern, specifically designed to work with Rockwell industrial management software. It is the next logical step in data acquisition as Industry 4.0 matures. Human-to-machine data collection has been an important portion of the CPS (cyber-physical system) of data collection since the advent of information networks.

But, traditional data entry through a tablet can slow production. Devices that can be synched from a biometric pattern and used automatically create a platform that not only tracks when and where workers interact with machinery, seamlessly, but that also maintain data on how long each employee stays focused on each task.

The data gleaned from these sensors allow managers to measure whether a production unit or facility is working at optimal output, and to consider changes such as:

- Adapting workstation locations. If data shows operation is being slowed by improper workflow, the shop floor can be reconfigured for a more efficient flow. Changes also may be considered for the tool storage, material handling, and other auxiliary service areas.

- Reducing bottlenecks in the production line. If data shows a snag in the production line by highlighting a point of slow throughput, actions can be taken to correct the issue. And while serious bottlenecks in a supply chain are typically easy to spot, even shorter backups can significantly impact overall output across an eight-hour shift. If these continue over every shift, the bottom-line loss can be notable.
- Reassigning tasks. Staffing levels may be appropriate across an operation, but incorrect in specific zones. Because biometric bands keep track of how long each employee is on task, it will help to establish any zones that may currently be under- or over-staffed.

Additionally, biometric devices allow managers to “lock out” employees in a similar way as they’ve been doing with equipment for years. But in this case, the equipment is still available for use by individuals who have been properly trained and who have been cleared to use the equipment, while those who have not met training expectations are unable to power up the machinery.

The core concept of Industry 4.0 is data collection, and an effective I4.0 infrastructure requires reliable collection of relevant data from all available sources, including the human sources.

Source: www.americanmachinist.com

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Farben Technique (M) Sdn Bhd
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Fetta Auto Part Industries (M) Sdn Bhd
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First Engineering Plastics (M) Sdn Bhd
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GI Tech Nano Solution Sdn Bhd
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Technical Data

 Overall stroke	 Gripping force	 Weight	 Workpiece weight for force-fit gripping	 Workpiece weight for form-fit gripping	 Dimensions L x W x H
80 mm	100 N	0.95 kg	0.5 kg	up to 3 kg	114 x 86.5 x 133 mm

Robots or Cobots: Which to Choose?

Today's plant managers are faced with a dearth of automation technologies but it's not always obvious what will work best. There is rarely, if ever, a one-size-fits-all approach. This article discusses what manufacturers should consider when choosing which type of robot to invest in. If it wasn't already clear to manufacturers that the adoption of robots is on the rise, the numbers leave little doubt. The International Federation of Robotics predicts that by 2020, over 1.7 million new industrial robots will be installed in factories worldwide.

Industrial robots have long been used to replace human workers in performing tasks that are dangerous, dirty or repetitive. These robots are often large and bulky, caged machines used to do the heavy lifting in applications such as packaging and palletizing.

Collaborative robots, otherwise known as cobots, have been designed to work safely alongside humans in a shared workspace. These robots, with their increased flexibility and dexterity, can complete more delicate tasks that conventional robots cannot, such as polishing fragile materials in the production process.

Cobots

Cobots were built to be smaller, lighter and safer than conventional industrial robots. Demand for this technology is on the rise, with the global cobot market expected to reach \$9 billion by 2025.

Because of their flexibility, and relative ease of use compared to fully automatic robotic systems, cobots are generally considered to be an affordable and attractive choice for small and medium sized businesses. These manufacturers can benefit from the traditional value proposition of robots — namely that they can carry out repetitive or unsafe tasks, freeing up human workers to add value — but at a much lower cost of entry.

Before investing in cobots, it's important that manufacturers carry out a complete and thorough risk assessment. Risk assessments could call for the addition of extra safety features, low operating speeds or even multiple stops for a cobot. Furthermore, these extra considerations aren't free and add a significant amount to the integration costs.

In fact, according to TM Robotics' Global Robotics Report 2018, 79 per cent of automation distributors don't think that their customers fully understand the safety requirements of installing a cobot, and therefore are unlikely to budget for these additional safety features.

> Safety First

The ISO 10218 guidelines exist to set the safety requirements for industrialized robots. However, for cobots, which will see an increased number of interactions between human and robot, these guidelines alone don't suffice.

First introduced in 2016, the ISO/TS 15066 guidelines supplement the ISO 10218 requirements and ensure that any machines classed as collaborative meet specific safety requirements. This also includes any tools that have been adapted onto the robotic arm to perform tasks as well as any objects handled by it. For the first time, ISO/TS 15066 outlines the maximum allowed power and speed limits for cobots. It also brings increased clarity on what is necessary when carrying out risk assessments on cobot applications.

The risk assessment must consider the entire collaborative workspace and look at how the operator will interact with the robot. Manufacturers must take the time to ensure they properly risk assess all foreseeable contact situations that could arise between the operator and cobot for any job that the robot is expected to complete.

Engineers need to carefully assess every task that the robot will complete in detail — an oversimplified assessment will not accurately represent how safe the robot will be. Here, manufacturers should consider the safety concept of ALARA (as low as reasonably achievable). Manufacturers must consider all the potential risks that could arise in a robot application, not just one or two of them.

Industrial Robots

Manufacturers also need to consider the production speed and volume that they are looking to achieve when deciding between cobots and traditional industrial robots. To run efficiently, an assembly line comprised of both humans and cobots must run at the speed of human operators to avoid bottlenecks on the production line.

Manufacturers in sectors such as bottling or packaging, that need a much higher production speed or volume, can benefit from purchasing conventional robots. The logic is simple. Fewer human operators means there is less chance to slow the system down and production will increase. Multiple industrial robots can be integrated for a fully automated production line.

Industrial robots are automatically controlled and are programmable in three or more axes and they can automate an extremely broad range of processes unattended. Crucially, programming of these machines is easy, so operators don't need to have advanced programming skills to use them. These robots can make use of AI software and machine learning to pick

up processes and improve on them — self-coding their programmes when necessary.

Upgrading a factory to make use of cobots alongside existing legacy equipment and the human workforce is an attractive proposition for many businesses but it is one that requires selective investments and careful obsolescence management.

The widespread growth in the cobot market illustrates the fact that cobots are an ideal first step towards automated manufacturing processes. The initial investment is low in applications that don't require guarding to be installed. However, for large, complex manufacturing setups, full size industrial robots may still offer better economies of scale.



Interview with Mr. Terence Tan from Singapore Industrial Automation Association (SIAA) and Mr. Fanky Christian from Indonesian ICT Businessman Association (APTIKNAS) upon Signing of MoU during ITAP 2019 in Singapore.

1. A brief introduction of yourself and the role you play at Robotics Charter of SIAA and APTIKNAS.

Mr. Terence: For the Robotics Chapter within Singapore Industrial Automation Association (SIAA), we are a team of seven members with various experience in the field of robotics and our task focus on how we could help the adoption of robotics technology within the manufacturing and service industry. Singapore has the potential for the adoption of robotic technology in the automation projects and SIAA is working closely with some of the government agencies to take the lead for some of these demands.

With the focus on robotics technology as one of our key pillars, SIAA will work closely with our members to assist them to take advantage of the opportunities to upscale their domain knowledge in robotics application and to develop product and solutions that can be commercialized and market in the Asia region and beyond.

Mr. Fanky: APTIKNAS (Asosiasi Pengusaha Teknologi Informasi dan Komunikasi Nasional) Indonesian ICT Businessman Association, which has 29 Regional Advisory Council, with a distribution network of 2000 stores throughout Indonesia. APTIKNAS is the transformation of APKOMINDO (the former) and now becomes a new broadened and wider organization. APKOMINDO is 28 years old organization with extensive experiences in the field of ICT and very much well known in Indonesia while APTIKNAS has just been declared in Jakarta on February 24th, 2017.

We are optimistic this organization will become much bigger, stronger and able to contribute to economic growth in Indonesia, especially with the trend of

smart city, IoT and the digital economy. Our members profile from Principal, distributor, dealer, system integrator, software developer, and ICT consultants. We have 3 main focuses in 2019 : (1) Smart City and Industry 4.0, (2) Marketplace and (3) Digital Talents. See the detail in www.aptiknas.id . Currently, I am Chairman of APTIKNAS JAKARTA.

2. How do you foresee the growth of industry 4.0, IoT, Automation, and Robotics in SEA?

Mr. Terence: Industry 4.0 is here to stay and there is no doubt about this, throughout the years of Industrialisation in Singapore, we had experienced the various application of Industrial Automation in terms of the manufacturing industry from the focus of appliance manufacturing 30 years ago to high-end semi-conductor Wafer Fab Manufacturing and Bio-Medical and Pharmaceutical manufacturing within the last 10 years.

Through these years of industrialization, many Singapore based multinational companies and SME companies had built up their competence level in Industrial 4.0 application especially those that are related to line automation, shop floor processes and data acquisition.

For the initial process of the Industrial 4.0 project implementation, companies need to understand the process flow of their manufacturing line and discover the critical data that will be useful for the manufacturing process to be optimized and respond to demand. The key areas in this aspect are the knowledge and experience that automation can be implemented to measure the efficiency of processes, machine efficiency, and reliability.

This led to the implementation of the Overall Equipment Efficiency measurement solution (OEE) within the manufacturing shop floor as part of the initial Industrial 4.0 project implementation. For these implementations of this OEE solution, IoT application in which the deployment of sensors, digital measuring appliances and digitalization will come in a big way to be part of this Industrial 4.0 project. For the reduction of labor to handle repetitive tasks and process that requires consistency, the use of Robotics arm and handlers will be needed to optimize some of this process as part of the automation project implementation.

Within the ASEAN market, some of the countries had emerged to be more attractive for the investment of manufacturing because of the rising cost in China and also the trade conflict that happened between China and the US. We are witnessing a lot of manufacturing facilities shifting to some of the Asian countries where the labor costs and manufacturing costs are much lower than China in some aspect. This is a good opportunity for Singapore companies in the automation industry to offer our solution for adoption to some of this manufacturing company in the Asia market.

Mr. Fanky: Through this year, we had conducted 20 seminars related to industry 4.0, and focus on specific sectors. We had a seminar in manufacturing, hotel, hospital, education, and government sector. We see that most people in Indonesia still lack knowledge related to industry 4.0, automation and robotics. So we run this seminar series and continue in a specific workshop based on customer's requirements.



3. How is the adoption of Robotics going on so far, especially in Singapore and Indonesia?

Mr. Terence: In data-wise, Singapore is on number two after Korea in terms of per headcount for robot adoption. Korea was the world largest adopters of industrial robots in 2018, with 631 robots to 10,000 workers while Singapore was second with 488 robots per 10,000 workers. Singapore had identified advanced manufacturing as one of the key growth areas to maintain the country standing in an increasing competitive landscape.

However, the challenge is how the companies keep up with the volume of production which we are covering in Singapore in the three main verticals with the reduction in workforce allocation; the chemical process, pharmaceutical production, pharma drugs, and semiconductor. These 3 segments affect the GDP growth of the country in terms of the export ratio and hence manufacturing companies in this segment can justify automation solution including implementation of high costs robotics handlers and cobots.

At the same time, the Singapore government is also actively supporting R&D grants and innovative grants to manufacturing companies who took the first steps to get out of the comfort zone and capitalize on new opportunities to adopt robotics in their manufacturing process. Through this initiative, the government aims to spur on factories that are globally competitive, efficient and productive and

to date Singapore had been successful in the adoption of robotics in our manufacturing and service segments.

Mr. Fanky: In Indonesia, the adaption of industrial robotics is still very low. This is because of the high cost and also lack of human resource to support the system. In universities, they already have some projects related to robotic, but still far from implementation. And we are working with many parties now to help people understand and get better access to knowledge of robotics.

4. For the Industry 4.0 Automation in general, do you have any suggestion on what the industry should do?

Mr. Terence: In my opinion, the implementation of the Industry 4.0 Automation is a must for any company to survive and sustain their continuous growth. For the company management, they need to have a full understanding of their manufacturing process and detail planning of their digitalization need and Industrial 4.0 adoption program.

Overall the Industrial 4.0 automation is not only about technology, automation or offering the best product but also on how the companies can acquire the appropriate data and combine it to offer the premium digital services to their customers. The best approach to have a successful implementation of the Industry 4.0 Automation is to learn from successful use case that is implemented by companies of the same industry. With the understanding of the use case that had already being implemented, this allows business owners

to learn and have an understanding of the application of the automation process, robotics application and Industrial 4.0 implementation.

With this domain understanding, the business owner can proceed to customize the Industrial 4.0 automation according to his own companies' platform, product size, machine production volume and capacity, and human resource allocation and tailor it to optimize the best model and the most cost-effective investment for a successful implementation.

In most instances, there is also retrofitting of some of the legacy machines to ensure that data can be collected from this machine for monitoring of their efficiency and production capacity and their downtime and cause of this downtime. With this data, the management will be able to decide if the company can take on a project or justify to scape the old machine and invest on a new machine so that overall it will be a better decision than to keep a poor health legacy machine that drags down the entire production capacity.

By attending conferences and industrial showcases such as ITAP and the Robotics experimental zone within ITAP, this allows business owners and companies management team to understand the various technologies available and how they use common modules such as ROS I programming platform to implement Robotics application for their Industrial 4.0 projects. There are various solutions and integrated applications offer by various solutions providers and integrators for the industrial 4.0 implementation with the exhibition and conference.

Mr. Fanky: In my opinion, Indonesia still needs many stakeholders, including industry and government and university to help people understand better industry 4.0 and automation. This will help to speed up the adaptation of robotics in implementation. Many people are afraid lose their jobs, we need to upgrade their skills (up-skilling) and train new skills (re-skilling).

5. There is a lot of system integration to be involved. How is the situation currently?

Mr. Terence: In a typical industrial 4.0 implementation, it does involve a lot of systems integration as sensors and measuring equipment may need to be implemented and to automate some of the repetitive works, robotics can be used to maximize efficiency and consistency.

In Singapore, we are not lacking in the numbers of system integrators because in the past where we had a lot of appliance manufacturing companies such as hard disks manufacturing, 4 axes to 6 axes Scale Robots had been implemented in production line to improve productivity and consistent quality for the assembled products.

During that time within the production shop floor, our automation companies had implemented a lot of integrated systems in the hard disk drive manufacturing industry. As our industry changes into the semiconductor, pharmaceuticals, and bio-medical manufacturing most of this industry had also similar needs as the appliance manufacturing industry and as such the transition of automation technology is done seamlessly as the technology and skillsets are similar.

Although the wafer fabrication factory may have its own unique needs of robotization and different types of system integration but with the evolution of the technology and the availability of integrated solutions, this led to better and faster implementation as the system integrators upscale themselves in some of this new technology. We are also experiencing an increase in the numbers of initiatives that had people working closely together with robots in the industries and Singapore is one of the key contributors in this area of automation that had deployed quite a several collaborative robots (cobots) in our advanced manufacturing industry.



Mr. Fanky: Number of system integrators as our member is increasing from year to year. Many companies see many opportunities to become one. And this is good for everybody. Because, as system integrator, you need to understand better on system, and prepare the team to handle and support the system.

6. Currently in Singapore and Indonesia, what are the three biggest industries that are picking up on the adoption of Robotics?

Mr. Terence: If you talk about Industry Robotic applications, these will be three main driving industries in Singapore manufacturing landscape which include the semiconductor industries such as the wafer fabrications factories, the BioMedical and pharmaceutical and the Drug and medicines production and packaging industry.

Secondly, we are seeing more applications in the area of service robots. In the Singapore context there is a lot of projects that the agencies, R&D institutions, institute of higher learning are developing service robots for the various service industry such as retail and hospitality, tourism, facility management, hospital, and medical application and also building and construction application.

A service robot is something that the industry is now trying to find the right fit with the correct solution so that it can be commercialized and offered to the market to have a positive business return. It is very important to be business-driven and bottom-line driven.

What we are seeing more are success cases like cleaning robots, such as the locally produce lion bots cleaning robots that is showcase in ITAP that had already been commercially deployed in airports and shopping malls to do the cleaning. We had also seen a hospital in Singapore using robotics technology for medicine dispensing and preparation and for the transport of laboratory test samples and documents.

In areas of hospitality and retail services, we are also witnessing the use of autonomous robots as a concierge in a delivery application, in customer service application and auto and self-help payment applications.

Mr. Fanky: In robotics adaption, in Indonesia, we think the automotive industries is the leader. Then follow by textile industries, and the last one is the food industry.

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Digital Government, Smart Nation: Pursuing Singapore's Tech Imperative

Singapore's ambitious Smart Nation initiative is about harnessing technology to stay ahead as a global city and to improve lives and livelihoods for all.

What Is Smart Nation?

Through the Smart Nation initiative, we aim to make Singapore "an outstanding city in the world...for people to live, work and play in, where the human spirit flourishes". To achieve this, we have to apply technology systematically and extensively, rather than in a piecemeal manner, to improve the lives of our people.

But first, why does Singapore need to be a Smart Nation? Growth in two main factors of production drove Singapore's growth in the first 50 years: our labour force, and capital investment. As our population ages and the inflow of immigrants slows (given our finite physical space), labour as a factor of production will grow more slowly. Consumption as a percentage of GDP will also likely rise relative to investment as Singapore's population ages. The main contribution to growth and prosperity will have to be total factor productivity, which could be achieved through a mix of technology and better business processes.

Besides continuing to build prosperous and flourishing lives for Singaporeans, Smart Nation can be a reason why home-grown talent would want to continue living here, and why foreign talent would want to relocate here. This is the magnetic pull exuded by the world's leading cities, such as New York, London, San Francisco, Shanghai and Tokyo.

Smart Nation is also necessary to accelerate the process of integrating technology into our collective efforts to improve lives, lest Singapore fall behind relative to other global cities. Modern-day classrooms, hospitals and workplaces; the very concepts of retirement and a pension; the city in its horizontal spread (trains and cars) and vertical reach (elevators)—these improvements to human wellbeing were enabled by the first and second Industrial Revolutions. The nature of all these will shift again as the technologies of the fourth Industrial Revolution change our lives. The first two Industrial Revolutions allowed us to automate menial, physical chores. The third and fourth Industrial Revolutions are allowing us to automate even more of such tasks, and to devote a greater proportion of

our lives to meaningful, enriching activities. To give a personal example: it used to be that vacations could be a stressful experience, because of the unfamiliarity with a new environment. These days, with Google Maps and review sites, travelling has become much less anxious and a lot more enjoyable.

Smart Nation: What it Takes

Building a Smart Nation is a whole-of-nation effort which can be thought of in terms of three pillars: Digital Government, Digital Economy, and Digital Society. The first pillar, led by the Smart Nation and Digital Government Group (SNDGG), involves agencies across the Public Service. The Ministry of Communications and Information (MCI) leads work for the other two pillars. Other articles in this issue discuss Digital Economy and Digital Society, so this article will focus on Digital Government.

Unlike in many other countries where innovation and the application of technology are driven by the private sector, in Singapore, the Government has traditionally set the pace. We expect digitalising the Government will set in motion deep changes that will spread to the private and people sectors.

Digital Government: Where Are We Today?

When it comes to Digital Government, Singapore is fortunate to be building on strong previous efforts.

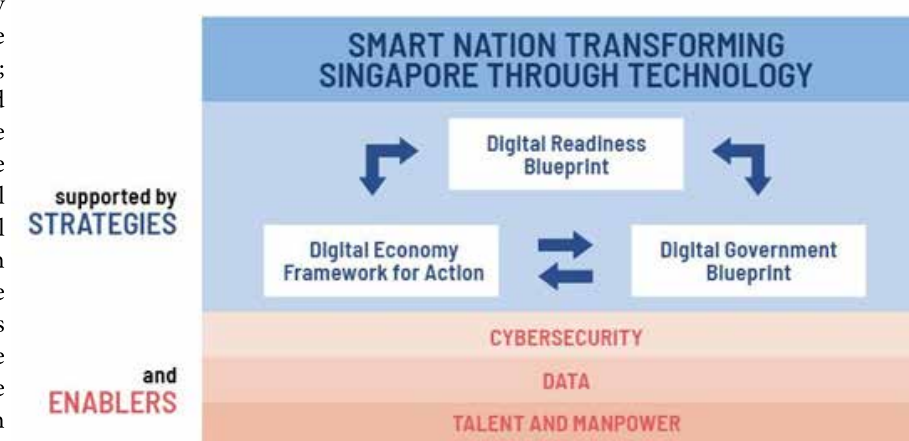
Our digitalisation journey started about three decades back, with the National Computerisation Programme in the 1980s. Led by the National Computer Board (now the Government Technology Agency or GovTech), the Programme focused on automating data, processes and systems.

By the 2000s, we had shifted to providing government services online, first as websites and then as phone applications when mobile phones exploded in popularity. Since the 2010s, we have been focusing on making our services more integrated, and experimenting with different approaches to being citizen-centric.

Heading into the future, we are off to a good start. Most transactions between citizens and the Government today can be done online, and integrated apps that reduce the time taken to fulfil inter-agency requests have been growing in number. But such efforts have been sporadic or agency-led. A central, coordinating entity can accelerate the process, which was why SNDGG was formed in May 2017.

Soon after our formation, we launched five Strategic National Projects: National Digital Identity, E-payments, Moments of Life, Smart Nation Sensor Platform and Smart Urban Mobility. Most of these are digital platforms, upon which more use cases can be explored over time.

SMART NATION FRAMEWORK



In the course of the next two years, we have gone further than just having more projects and systems. We have also put in place policies and strategies, processes and organisational structures; we have also recruited and groomed talent to systematically exploit digital technologies and to sustain the momentum in the longer term. Collectively, these efforts will drive the Government to become digital to the core.

Policies and Strategies: New Way of Working and Thinking

In the past, other than in agencies that have a heavy engineering component, technology did not feature often as an agenda item in policy forums and senior management meetings in the Government. This is shifting. Policymakers are increasingly taking responsibility for technology. For instance, all public agencies now have a role to play in achieving targets set out in the Digital Government Blueprint (DGB). Two such targets aim to achieve 75% to 80% citizen and business satisfaction levels with government digital services. We have made some progress in achieving these goals. Between 2017 and 2018, the score for citizen satisfaction rose from 73% to 78%, while the score for business satisfaction rose from 64% to 69%.

The DGB targets are ambitious but not unrealistic. For this reason, the DGB is a living document, so targets may be revised as we plan further digitalisation initiatives. For example, we will be updating the DGB when the National AI Strategy is ready later this year. SNDGG has also been working with all Ministries to develop comprehensive plans for digitalisation. The first round of plans, completed in June 2018, was useful in quickly identifying “no-regrets” digital initiatives that Ministries felt would be high in impact. Some of the initiatives, such as

the Ministry of Home Affairs’ digitisation of death registration and the Ministry of the Environment and Water Resources’ automated meter reading infrastructure that enables near real-time information on water consumption patterns, will significantly improve service delivery and how agencies operate.

However, the first round of plans was ultimately a list of projects. From 2020,

Ministries will include digitalisation planning in their strategic planning cycle, so the plans are linked to and support the Ministries’ missions. Integrating with the strategic planning cycle also means resourcing, data requirements and capability development will be simultaneously considered.

In addition, Ministries will be encouraged to explore digital technologies beyond application development, such as artificial intelligence (which allows more personalised and anticipatory services), data analytics (which allows more evidence-based and data-driven policy making), and Internet of Things (IoT) or smart systems (which will go much further in creating a good living environment in Singapore). An agency that has made good progress on this front is the Ministry of Manpower, which has deployed cameras and sensors to improve the monitoring and enforcement of workplace safety at construction sites.

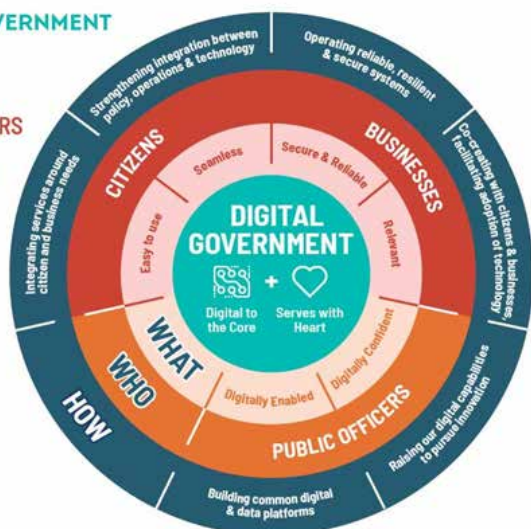
DIGITAL GOVERNMENT BLUEPRINT KPIS

STAKEHOLDER SATISFACTION		Citizen Satisfaction with Digital Services (via survey)	75-80% to rate very satisfied
		Business Satisfaction with Digital Services (via survey)	75-80% to rate very satisfied
END-TO-END DIGITAL OPTIONS		Services that offer e-payment options (inbound and outbound)	100%
		Services that are prefilled with Government-verified data	100%
		Services that offer digital options for wet ink signatures	100%*
		Percentage of transactions completed digitally from end-to-end	80-95%*
END-TO-END DIGITAL TRANSACTIONS		Percentage of payments (inbound and outbound) completed via e-payments	100%*
		Number of public officers trained in data analytics and data science	20,000
DIGITAL CAPABILITIES		Number of public officers with basic digital literacy	All Public Officers
		Number of transformative digital projects	30-50 over a period of 5 years
TRANSFORMATIVE DIGITAL PROJECTS		Percentage of Ministry families that use AI for service delivery or policy making	All Ministry families to have at least one AI project
		Number of high-impact data analytics projects	10 cross-agency projects per year, and 2 projects per Ministry family per year
		Core data fields in machine readable format, and transmittable by APIs	90-100%
		Time required to fuse data for cross-agency projects	Less than 10 days to share data for cross-agency projects
AI, DATA AND DATA ANALYTICS			

* Excludes services or individuals where the KPI cannot be met for valid reasons. These reasons can include legislative reasons, or that certain segments of our population (e.g. the elderly or persons with disabilities) are unable to have access to or use digital tools.

DIGITAL GOVERNMENT BLUEPRINT

2 PRINCIPLES
3 STAKEHOLDERS
6 OUTCOMES
6 STRATEGIES



Processes and Organisational Structures: Starting from the Top

Policies and strategies, however well laid, can only have a chance of success if processes and structures are designed to facilitate the harnessing of technology.

For example, we are witnessing a paradigm shift where agencies are beginning to see technology not just as an expense, but also as an investment in new strategic capability: that it is about how technology can help agencies reach topline growth (faster time-to-market for services, improved service delivery) in achieving mission objectives. This is not to say that we are not striving to be cost-efficient in using technology, but that cost-efficiency should not be the only consideration.

But even if agencies are to treat technology as a strategic capability, conventional approaches to resourcing do not allow projects to be started quickly. The traditional funding cycle takes place only once a year, and if the project proposal is supported, there is still the calling for and then evaluation and awarding of tenders. For in-sourced projects, time is needed to hire developers. To put this in perspective: it can often take longer to obtain the resources for a project than to build a prototype. In addition, the project team has to work out pricing and commit to recovering system costs, before they have even had the chance

We are witnessing a paradigm shift where agencies are starting to see technology as a strategic capability or profit centre.

Over the course of 2018, SNDGG worked with the Ministry of Finance (MOF) to revise this resourcing approach, to facilitate the Government’s exploitation of technology. MOF has now implemented a new resourcing framework to enable more agile digitalisation, allowing for nimble initiation of pilots and proof-of-concepts, to test hypotheses or assumptions before scaling. To date, about 40 projects have received funding through this framework. Some interesting ideas include a computer vision-powered drowning detection system, and speech-to-text software.

If we are to digitalise effectively, the process of integrating policy/ops with technology must also be improved. Good policy/ops-

tech integration happens when the policy/ops communities and technologists know how technology can best be applied to achieve agencies’ missions, and work together to achieve them. The lack of policy/ops-tech integration today is reflected in anecdotes of designers and engineers complaining about “announcement-driven development”, which happens when they are committed to project deliverables—without prior consultation—by their policy counterparts. Business owners often decide on the solution before the technical team of designers and engineers has done its user research.

To improve ops-tech integration at the highest level, we have revised organisational structures. We have appointed a Chief Digital Strategy Officer (CDSO) at the Deputy Secretary level in every Ministry, to oversee delivery on their Ministry’s DGB targets and digitalisation plans. The CDSO is supported by the Ministry’s CIO, to encourage management-level conversations on how technology can support business needs. The CDSO also coordinates and has clear lines of authority over the ICT and Digitalisation Steering Committees within their Ministry, which also involve agencies’ CIOs, Chief Data Officers and Chief Information Security Officers (CISOs).

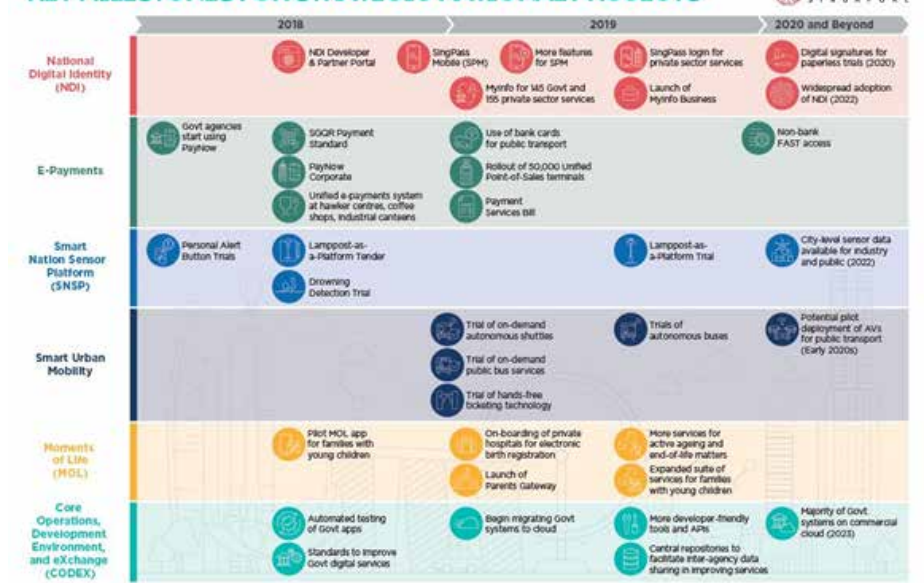
Beyond structures, policy/ops-tech integration can be achieved if policy makers lay down clearly the outcomes they want to achieve or the problems they want to solve, and then give engineers sufficient autonomy to research and come up with technical solutions. We must develop solutions that are evidence-based and driven by user research.

One of the best ways to achieve policy/ops-tech integration is through agile software development, where policy or ops officers work closely with the technical team—and in some cases, are even co-located with them—and constantly iterate their solution through testing with users. This approach to software development is gaining recognition in the public service, and together with the growing awareness that digitalisation is a priority, we are witnessing an unprecedented opportunity to build an engineering culture in the public service.

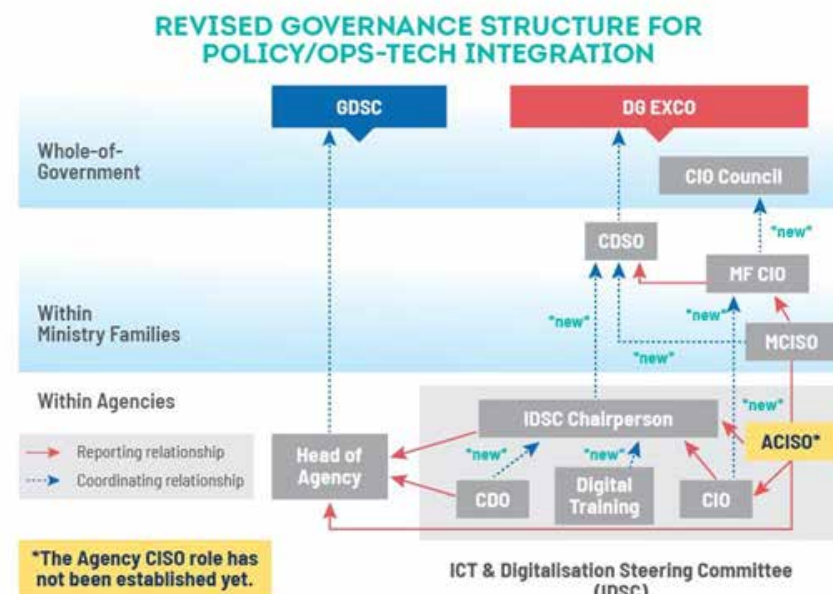
A third example of a process we need more of is giving space to tech-push and whitespace projects. Tech-push goes beyond ops-tech integration and gives engineers freer rein in how to innovate. We have seen the value of tech-push: in fact, many of GovTech’s products and platforms were developed this way, without any business owner. Today, these products and platforms, such as Beeline and Moments of Life are well accepted and considered mainstream.

To structurally enable tech-push and white space innovation, SNDGG is starting a new digital experimentation and implementation unit. The unit will operate in a sandbox environment, where officers not only get to develop new products, but also test future directions for ICT policies, and try out new organisational approaches to building and running tech organisations—including in traditionally non-ICT areas such as HR and procurement. We expect this unit to model itself on how a modern tech organisation should look like, and to have its practices adopted by the rest of government where relevant.

KEY MILESTONES FOR STRATEGIC NATIONAL PROJECTS



Infographic courtesy of the Smart Nation & Digital Government Group



A fourth set of process and structural changes that has been forged is having multi-functional, multi-agency teams to provide integrated services to citizens. The Government had previously experimented with this through the establishment of the Municipal Services Office and its OneService app, and more recently, the Moments of Life project. Unlike most task forces, which disband once they deliver a product, we need such teams to remain: because in the digital age products have to be constantly updated and upgraded beyond their “delivery” date. As a result, civil servants may increasingly find themselves part of matrix organisations, where they have a primary job, but also secondary jobs in such multi-agency task forces.

Civil servants may increasingly find themselves part of matrix organisations, where they have a primary job, but also secondary jobs in multi-agency forces.

The last example of change in SNDGG's organisational construct is the designation of a functional leader or professional head of the Information and Communications Technology and Smart Systems (ICT&SS) community in the Government. This functional leader is the Government Chief Digital Technology Officer (GCDTO). The GCDTO will increase the coherence and lift the standards of the ICT&SS community through the creation of common concepts of operations, common platforms and technical standards, common competency frameworks and training, as well as a common HR scheme.

Projects and Systems: Showing Early Success

For greater coherence across the Government, SNDGG prioritises and brings together engineering resources across Government to work on large, complex but high-impact digital technology projects. These would include the aforementioned Strategic National Projects, though agencies retain the autonomy to commission other high impact projects that are largely within their domains and do not need whole-of-government coordination. SNDGG, working with MOF, evaluates the funding proposals for agencies' projects to avoid duplication and to provide guidance on how to build the projects that do get approved.

For example, we have developed a Singapore Government Technology Stack, and want agencies to use components in the Tech Stack when developing their systems. The Tech Stack comprises various layers of component: the bottom layers are fundamental components such as data and infrastructure, and the upper layers comprise micro-services and applications. Agencies are encouraged to use what is centrally available and customise only at the upper layers.

The Tech Stack signals a departure from the way the Government has traditionally done software development. We are moving from monolithic to modular system architecture, and this saves time and effort in developing and maintaining digital services. It also greatly reduces the time-to-market for digital services since agencies don't have to reinvent the wheel. Examples of projects built using components of the Tech Stack include the Business Grants Portal, MyCareersFuture and Moments of Life.

The Singapore Government officially adopted a commercial cloud-first policy in June 2018. We intend to migrate the majority of Government ICT systems to the commercial cloud over the next five years, as the cloud brings benefits such as access to best-in-class services for our engineers, lower hosting costs, and reduced system downtime.

Collectively, these efforts will achieve greater interoperability between and coherence across Government ICT systems. Standards of use, including cybersecurity, will be uplifted. At the same time, this strikes a balance between commonality of platforms and standards at the infrastructure layer and innovation at the application layer.

People: Building up our Community

To build a Digital Government in support of a Smart Nation, we need a sizeable bench strength of skilled engineers. In particular, we want to hire specialists or peak technical talent, and engineers with experience managing big technology projects. We need to partner the private sector better, and reach out to citizens to make sure the design of our digital products and services are informed by actual experiences and user research. Smart Nation is ultimately a whole-of-nation effort, and we need the private and people sectors to play their part also.

To attract tech talent, GovTech's HR scheme has been revised to match the attractive salaries tech talent would otherwise command in the private sector. We are also stepping up recruitment of overseas Singaporeans who have worked in technology companies, having organised Singapore Tech Forums in the Bay Area for the past two years.

Through the Forum, we share how Singapore's dynamic tech ecosystem can support their ambition, and that there are abundant opportunities whether they join the public or private sector here. We have a Smart Nation Fellowship programme that allows overseas Singaporeans who are working in the private sector to take a three-to six-month stint with us, to collaborate on digital or engineering solutions that will have an impact on people's lives. At the same time, we have to improve the management of tech talent within the Public Service. To this end, we have developed a common HR scheme for digital technologists, so that they can take on ICT&SS roles across different agencies to enhance their exposure and contribution.



The scheme allows them to pursue leadership opportunities, either becoming a specialist or assuming a leadership role in an ICT&SS agency. A Talent Leadership Committee has been established in tandem, to more systematically groom and plan for succession for our talents and key ICT&SS positions. The Administrative Service has also established an engineering track that allows Administrative Officers to spend more time in engineering jobs to deepen their expertise. This is modelled after the Singapore Armed Forces Overseas Scholarship Scheme that allows officers more sustained stints on the ground to build deep expertise.

Our tech talent can join many agencies. SNDGG has established a Centre of Excellence for ICT&SS, comprising the C3 Capability Centre in the Defence Science and Technology Agency, the Geospatial Capability Centre in the Singapore Land Authority, and GovTech's Capability Centres in five areas: Application Design, Development & Deployment, Data Science & Artificial Intelligence, Sensors & IoT, Government Cybersecurity, and Government Infrastructure. These Capability Centres and the talent within them have been crucial in rebuilding engineering capabilities within the government, and have been both the cause and result of the Government being able to in-source ambitious and socially meaningful digital projects.

However, given the finite size of the Government's ICT&SS workforce, we must go beyond the public sector to raise the capabilities of our partners in the private sector. We have been increasingly open to co-sourcing and sharing our approach to software engineering with the private sector,

as well as encouraging them to build applications using components of the Singapore Government Technology Stack.

In October 2018, we hosted our inaugural STACK Developer Conference, which saw 1,200 attendees—more than half of whom were from the industry. The feedback for STACK was positive, with attendees appreciating the Government sharing its technology roadmaps. We are targeting an even bigger Developer Conference in 2020.

We need to partner the private sector better, and reach out to citizens to make sure the design of our digital products and services are informed by actual experiences and user research.

This sharing is not one-way. Leading cloud service providers like Amazon, Google and Microsoft are not just supporting the migration of Government systems, but sharing best practices with our IT teams and helping to train and certify them.

GovTech has also come up with a Digital Technology Attachment Programme, to let our engineers gain industry exposure through a short stint with partnering companies, and a Technical Mentorship Programme which matches our project teams with local or overseas technical mentors. I am glad to report that all mentorship opportunities with Silicon Valley-based mentors have been taken up. Finally, becoming an effective digital government demands that we reach out to our citizens. MCI has programmes to raise the digital readiness of the public, and SNDGG co-creates with the public by involving them in user research for digital products, as well as getting them to test beta applications.

Through a new programme, Smart Nation Co-Creating with People Everywhere (SCOPE), we partner agencies such as the People's Association and the National Trade Union Congress, leveraging their outreach events to garner public feedback on products under development. We believe that this increases the ownership citizens feel towards these products, and makes them more inclined to use the products once they launch.

Conclusion

We are still in the early days of a long journey towards becoming a Digital Government and a Smart Nation. Most of the cutting edge innovations for digital technologies come from technology companies in the private sector. We have to make sure that the Government as a whole, and in particular GovTech, has top talent and is able to exploit technology on the same level as these top tech companies. There is strong political support for our work, and digitalisation is a key component of Singapore's overall Public Sector Transformation. We also have a strong core of strongly committed officers in both SNDGG and across the ICT&SS community in the Government, who are passionate about this mission to make Singapore an outstanding city with the aid of technology.

But there is a lot more work to be done and challenges to be overcome. Although I am optimistic, a lot of hard work and commitment is still needed. On the surface, the public sector is a monopoly. There is no “Netflix” to disrupt us if we continue to operate like “Blockbusters”. But Singapore has no monopoly on the world stage—as a country we can be disrupted and left behind in geo-political and socio-economic terms. So we have to put pressure on ourselves, not by looking at other governments and how digital they are, but by looking at whether Singapore as a whole is economically and technologically competitive relative to other countries.

If we are serious about Digital Government setting the pace for Smart Nation, our agencies and the whole-of-Government must continually look for ways to raise our game, innovate, and use digital technology as a multiplier for our effectiveness. We have collectively created some momentum, delivered some good digital products, and less visibly, gone “under the hood” to change policies, raise capabilities, and modernise infrastructure. Let us build on what has been done, and accelerate the work.

Manufacturer of Nuclear Plants Uses Smartvision™ Success Story

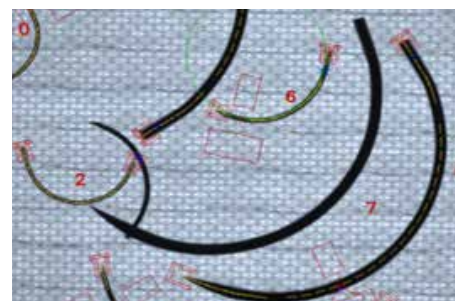
A major manufacturer of atomic power plants required aid with 3D docking of large tools with the face of the reactor.



CHALLENGE

As a part of retrofitting a Nuclear Reactor, a number of very large (10+ ton) specialized tools needed to be mated with the reactor face. Each of these tools completed a specific operation on each pressure tube, and that operation needed to be performed once per tube (by many different operators) over the ~380 tubes per reactor face.

Several vision systems were required to aid the operators in aligning the tool with each tube (or thumbtack or end fitting which cover it at specific times). Over time, the positions (X, Y, and Z) and lengths (along Z) of the tubes changed considerably because of the prolonged exposure within the reactor.



APPROACH

Three different vision systems performed similar docking operations, but with different targets in the field of view of the camera. The cameras were each positioned so that they viewed the target object at an angle. Once the camera was calibrated, feature points of each target were used to reconstruct the 3D pose of the object.

In the case of the thumbtack and end fittings, a triangle comprised of three features was used, while in the case of the tube, the two ellipses were used directly. The X and Y corrections that were reported back on the operator screens were reported in the tool coordinates and could be used by the operator to control the motion stages of the tool.

To complicate matters, the application locating the tube had its camera mounted on a SmartVision controlled goniometer, allowing the camera to tilt. The effect of this tilting had to be considered when computing the X and Y corrections.

TECHNOLOGY

The most exciting technology used in this application was the camera calibration. The full 3D camera calibration consisted of computing the 4 intrinsic camera parameters (focal length, scaling, and the coordinates of the principal point) and 4 distortion coefficients (2 radial and 2 tangential). This calibration allowed the single camera to be used to measure real-world 3D (six degree of freedom) coordinates using single images. The calibration routine used several somewhat arbitrary views of a flat checkerboard-like target.

Analog cameras were used in this application, primarily because of the price as they would be replaced as they degrade due to radiation exposure.



RESULT

Initially, the customer was somewhat skeptical that these applications were possible. Now, the customer is very happy with the system functionality.

Internal testing of the end fitting setup has shown a positional accuracy (3s) in the 0.008" range, and an angular accuracy (3s) in the 0.13-degree range over the relevant work envelope. To put the target size into context, the centers of the white dots on the end fitting are 2.5" apart.

Source: www.automation.com

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Driverless Transport Systems

Automated driving is the future. In addition to self-driving cars, driverless transport systems for people and goods, designed for use on fixed routes, industrial areas and campus sites, are moving into series production. Bosch Research is developing customized solutions for these systems. And one of its vehicles is already in service.



Driverless Cars: Autonomous Campus Shuttle

Our campus shuttle offers a glimpse into the future of mobility. The autonomous, electrically powered transport system has already been used as a research vehicle at several Bosch sites, airports, and industrial areas – without requiring any assistance by drivers. Our next step will be to bring it into regular operation at a Bosch site. For the further advance development, the shuttle will soon be running on a fixed route in semi-public areas.

Our developers had to overcome many challenges to get to this point. This is because people are only willing to accept autonomous transport systems like the campus shuttle if they are both efficient and safe. To achieve this, we connect the driverless, automatic guided vehicles of the future to other elements, such as the infrastructure around them. Traffic lights that exchange information with them via radio communication are one example. In addition, the technology is continuously monitored by a control station to ensure that it is working the way it should. As another precaution, the maximum speed of the vehicles is limited. The goal is to give passengers a positive mobility experience.

Traditional Processes and Machine Learning

Technologies such as robust sensors and fail-safe systems are required to handle the extremely demanding environment encountered in road traffic. Bosch Research is also focusing its research efforts on simultaneous localization and mapping (SLAM) for tracking the location of automatic guided vehicles within their environment, digital maps and motion planning. Within this scope, we use “traditional” processes as well as machine learning methods, which allow our experts in robotics and automotive manufacturing to develop customized and integrated technical solutions.

What is SLAM?

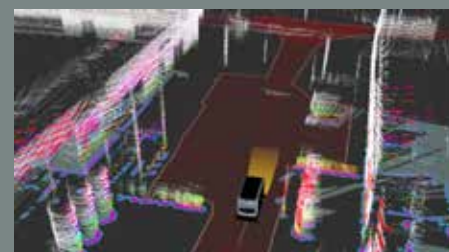
At Bosch Research, we are working on solutions for the multimodal and “on-demand” mobility of the future. Local public transportation will be widely automated, freeing up the downtown areas by reducing traffic zones and parking spaces, for example. People will also benefit from lower emission levels. Autonomous transport systems at industrial sites will bring about greater efficiency and flexibility.

Summary

Bosch is developing the mobility of the future. Our experts use the latest processes, including artificial intelligence, to make autonomous transport systems safe and comfortable. In doing so, we are laying the foundations for a sustainable transport sector.



Traffic in downtown areas is a major challenge for automated driving, due to the high degree of complexity and uncertainty (open world).



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Robotics Re-Shape the Supply Chain

Automated systems are being used more than ever in warehouses, logistics and distribution centers.

WHY?

Because robots give companies a competitive edge by reducing costs and streamlining the supply chain. Historically, robot applications have been limited to the automotive and electronics sectors. But over the past decade, growth in material handling orders indicates that the robotics industry is exploring new avenues, particularly in consumer goods such as food, beverage, and pharmaceuticals.

Demands from Retail Customers

Robotic-based material handling in distribution systems is among the fastest-growing applications in flexible automation, alongside packaging. This is due to manufacturers and distributors responding to the demands of their retail customers – particularly large, influential ones – who require that products come to their facilities palletized in a structure that suits them.

The configuration of each pallet is customized to meet their specific needs, a task that has been difficult to execute in the past. Mixed load pallets are emerging as one of the most efficient technologies currently available for the supply chain process. And robots are the only viable and flexible option for creating mixed load pallets.

The Broad Range of Products

Diversity of products handled by distribution centers and warehouses is expanding at an enormous rate. At the same time, these facilities are under immense pressure to reduce costs. Accommodating the broadest range of products, keeping capital expenditures low, and meeting quick return on investments are tough challenges faced by material handling facilities.

Although packing and palletizing involve a unique set of requirements for every order, managers responsible for warehousing operations are recognizing that an automated solution with rapid changeover capabilities can accommodate a wide diversity of operations and material while maintaining productivity.



Robotics an Alternative

Robotics is becoming a viable alternative to achieve yet a greater degree of flexibility in today's more complex material handling operations. A survey conducted by the United Kingdom's Material Handling Industry Association (MHIA) indicates that automated order picking and palletizing are some of the operations that companies are considering to automate.

As with any other machinery application, end-users need to be able to justify such capital investment. The most obvious benefits of installing robots are reduction in sickness benefits, the overcoming of potential and existing labor shortages, better package quality, and improved working conditions.

Less obvious are savings linked to a reduced headcount such as a reduction in staff recruitment and training costs, tax and health contributions and even the number of parking spaces required. In many cases, a work area reduction alone offers cost savings in real estate. The cost savings above coupled with falling robot prices, increased speeds, and improved accuracies, are imperatives for materials handling facilities and prompt a turn to robotics as the preferred solution.

Axium - Experienced Player

Axium Industrial Automation understands that robotic automation offers a complete solution. Drawing on its 15 years experience in the manufacturing industry, Axium specializes in complex robotic palletizing/depalletizing solutions for warehouses. Working in partnership with ABB Robotics, Axium believes that robots play an important role in the future of warehousing.

Marc Ducharme of Axium says, "We have developed a unique solution for mixed-load palletizing that has received very positive responses when demonstrated to distribution centers. I believe that there is a very strong market for robotics in the future, although it is still in the early stages."

Axium works exclusively with MagicLogic Optimization Inc., which developed Cube-IQ. Cube-IQ is an advanced load planning program, capable of achieving the best possible loads for pallets. It has a complete graphical user interface, with point-and-click and drag-and-drop to build uploading pallets, and with on-screen and printed graphics.

Says Ducharme: "The concept of Cube-IQ is very simple, but the software is very powerful. It uses the same concept as configuring truck combinations, but just builds pallets. We have demonstrated this with potential customers using their real-life scenarios, and results have shown that the cost savings can be substantial, especially when order errors, inaccurate shipment, improper stock rotation, and double deliveries are eliminated."



User-Friendly

The fast handling speeds are due, in part, to the fact that today's generation of robots has high speed, low inertia motors, and fast processors within the controllers. PC-based controller solutions, with their open architecture, have made their mark.

Users are now able to control robots via user-friendly programming interfaces. These have been simplified so that engineers familiar with programmable logic controls are also able to program robots. The user interface for every robot is an intuitive screen. The user can easily implement parameter changes during operation, which significantly increases the quality and efficiency of the system. Simple machine programming can also be used for new product shapes and sizes as well as provides the possibility of viewing production statistics.



Images: New.abb.com

Source: new.abb.com

Partnerships

ABB Robotics believes that the best way to deliver robotic automation within materials handling applications is to establish formal alliances with system designers, builders, and integrators.

This enables information, technology, and experience to be shared in a mutually secure manner to the benefit of the end-user. The ABB Robotics Partner Network allows customized solutions to be developed to maximize economic benefits and ensure efficient robotic configuration for warehouses, logistics and distribution centers.



Images: New.abb.com

Robotics Solutions the Future

Materials handling facilities need to reassess their strategy to identify key opportunities to gain the advantage of integrating robotics into the operation. As the tangible benefits of using robotic solutions are revealed, it is widely expected that robotics will be adopted at a much higher rate in industries outside its strong concentration in the automotive sector.

As robotics makes a stronger appeal to a broad range of industries, the overall life cycle costs will follow a faster decent as initial purchase, integration and maintenance become standardized.

OnRobot Launches VGC10 Compact, a Highly Customisable Electric Vacuum Gripper

THE NEW GRIPPER IS IDEAL FOR SMALL SPACES BUT POWERFUL AND FLEXIBLE ENOUGH FOR NEARLY ANY APPLICATION

OnRobot, a global leader in robotic end-of-arm tooling, announces the VGC10 compact electric vacuum gripper that addresses customer demand for a small but powerful and highly configurable gripper for nearly any application.

Based on the design of the award-winning OnRobot VG10 electric vacuum gripper, the compact VGC10 is smaller and lighter than its larger cousin, so is ideal for constrained environments and smaller robot arms, but offers the same impressive payload of 15 kg (35 lb). The VGC10 provides fast out-of-the-box deployment but also offers unlimited customisation, with easily changeable suction cup options and the ability to add or replace arms to fit highly specific application needs. With this configurability, the VGC10

can grip and move a wide array of small, multi-dimensional, and heavy objects even with a lighter payload robot arm.

The VGC10 features two independently controlled air channels that allow it to act as a dual gripper with pick-up and release in the same action, further increasing efficiency and reducing cycle time. The gripper can also be used with a single air channel for a higher gripping performance. With no compressor or air supply needed—eliminating the cost, noise, space, and maintenance of producing compressed air—this compact electrical gripper is easy to implement and move. Fully integrated software through OnRobot's new One System Solution platform makes it quick to



deploy and redeploy on any major collaborative or light industrial robot arm for greater production flexibility.

“We heard from customers that they loved the features of the VC10 gripper but sometimes needed a more configurable, compact version, so we delivered,” said Enrico Krog Iversen, CEO of OnRobot. “The VGC10 is another great example of OnRobot’s mission to be the one-stop-shop for innovative, collaborative end-of-arm tooling that lets manufacturers focus on their application rather than the complexities of the robot.”

VGC10 Features

- Compact, lightweight, and powerful
- Replaceable, customisable arms
- Configurable suction cups
- 15 kg payload, weight .814 kg (1.79 lb)
- 100mm x 100mm (under 4 ins) footprint
- 2 independent air channels for dual gripping
- Built-in electric vacuum
- No external air supply needed
- Integrated software
- IP54 rated for harsh conditions

Gripper Market to Grow Substantially Across Asia

A study by Future Market Insights predicts that the global robotic gripper market will experience substantial growth over the next 10 years, driven by the use of innovative solutions, the rise in applications as well as the growth in end-use industries. The market, valued at USD 1 billion in 2018, is projected to increase at a CAGR of 10 percent between 2019 and 2029.

The growth is expected to be dominant in the automotive, electronics and semiconductor industries and Asia, specifically East Asia and Southeast Asia, owing to the rapid growth of factory automation.[1]

James Taylor, General Manager, APAC at OnRobot, said: “The roll-out of VGC10 is timely as Southeast Asian countries are embracing robotic automation at an impressive pace. Thailand, Singapore, Vietnam, Malaysia, and Indonesia are ranked among the 30 largest industrial robot markets in 2018 with 87,100 operational robots[2]. The VGC10 continues our commitment to help local manufacturers embrace automation easily and enjoy quicker returns through its flexible and compact nature, speedy deployment process and increased power”.

About OnRobot

Established in 2015, the company merged with Perception Robotics and OptoForce in 2018, followed by an acquisition of Purple Robotics a few months later. In April 2019, OnRobot acquired the intellectual property of Blue Workforce, a Danish company making grippers and a vision system. Now, the OnRobot product range features a wide assortment of end-of-arm tooling, including electric grippers, force/torque sensors, a vacuum gripper, the award-winning Gecko Gripper, and tool changers.

This new combination of offerings from OnRobot makes it quicker and simpler to automate tasks such as packaging, quality control, materials handling, machine tending, packaging, assembly, and surface finishing. The company plans to grow through further acquisitions in the coming years. Headquartered in Odense, Denmark, OnRobot also has offices in Dallas, Soest (Germany), Barcelona, Warsaw, Shanghai, Tokyo, Seoul, Singapore, and Budapest. For more information, visit www.onrobot.com.



Big Data Toolkit to Mine the Dark Genome for Precision Medicine

Traditionally, gene function has been elucidated through experimental approaches, including the evaluation of the phenotypic consequences of gain- or loss-of-function (G/LOF) mutations or by genetic linkage or association studies. In any case, most research endeavours have been given to just a small part of the genes, dismissing the larger “dark genome.” This blocks our comprehension of the underlying mechanisms of complex traits and infections, which is fundamental for the progression of precise medication.

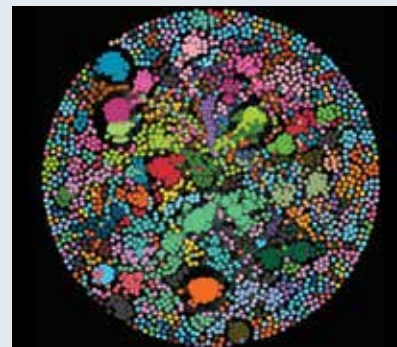
As most of the studies are gene-oriented and primarily influenced by prior knowledge; thus, many potentially important genes are ignored.

In a new study by the EPFL, scientists address the issue of the “dark genome” by developing novel approaches based on systems genetics. Scientists have developed big data tools to identify new gene functions.

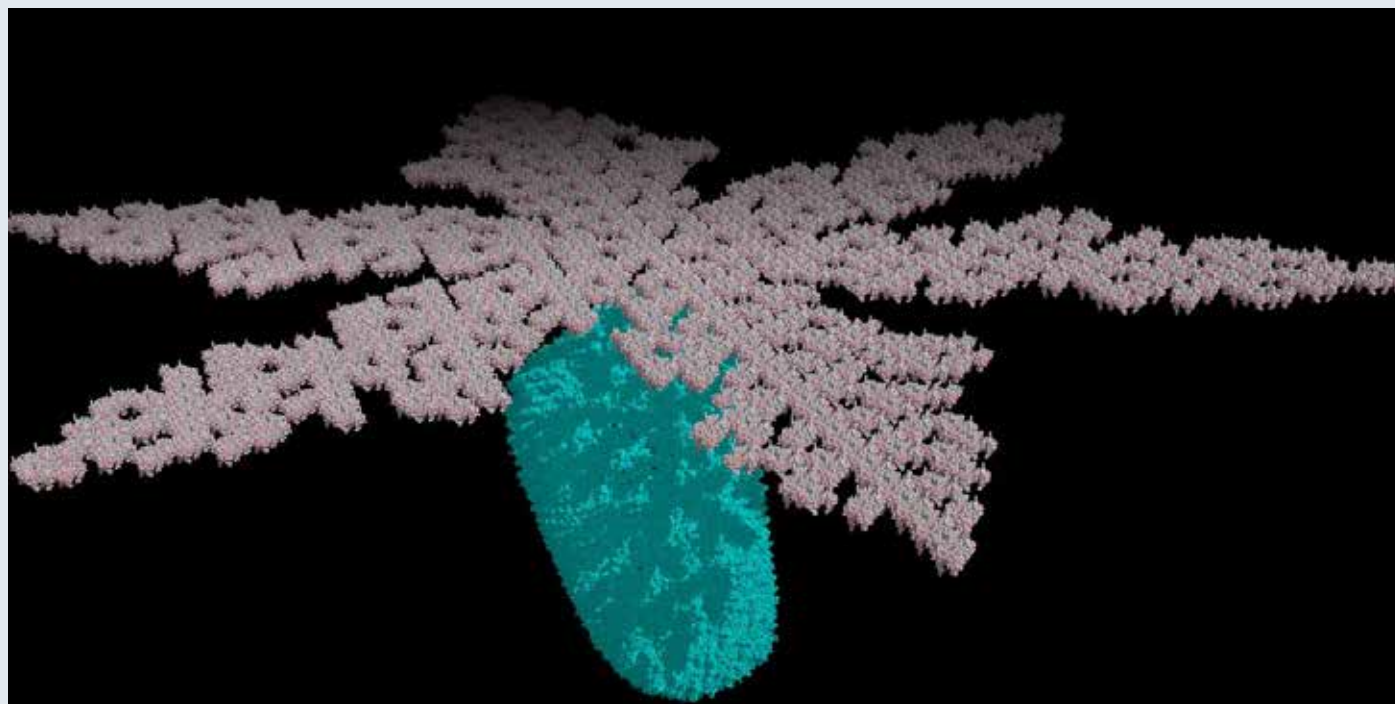
To come up with this new approach, scientists collected large-scale gene-expression datasets containing more than 300,000 samples from six different species. The samples were then used to develop the toolkit dubbed ‘GeneBridge’ to identify potential gene functions.

For testing, scientists used the toolkit to identify hundreds of thousands of novel functions of genes, many of which have been verified by Auwerx’s group as well as by other research groups.

Johan Auwerx, whose lab at EPFL led the study, along with colleagues from the University of Lausanne and University of Tennessee, said, “We have deposited GeneBridge and its seven billion data points on systems-genetics.org along with the already existing 300 million data points. This resource will undoubtedly improve our knowledge of the ‘dark genome’ and promote the development of precision medicine.”



Gene networks. Credit: J. Auwerx, EPFL



Source: www.techexplorist.com

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FLIR has entered into a partnership with Veoneer to supply thermal sensors for upcoming Level 4 autonomous cars. A thermal camera test vehicle from FLIR. FLIR manufactures an automotive development kit (ADK) that can equip vehicles with infrared sensors for capturing thermal imagery. (Image source: FLIR)

FLIR will be adding its thermal cameras to level-4 autonomous cars slated to begin production in 2021. The thermal imaging hardware company has entered into a partnership with Sweden-based automotive electronics supplier Veoneer in which Veoneer will use FLIR's sensors in autonomous vehicles it will be helping to produce.

Last month Veoneer announced that it had entered into a contract with an undisclosed automaker to manufacture and supply thermal cameras for a Level 4 autonomous vehicle. Under the deal with FLIR, the company's Boson model of thermal sensors will be included in the multi-sensor thermal array produced by Veoneer.

FLIR has highly touted the benefits thermal sensors offer to autonomous cars. In 2018 the company released a full open-source library of thermal imaging data to assist engineers of Advanced Driver Assistance Systems (ADAS), and autonomous vehicles in training the neural networks that will be quite literally driving these vehicles. FLIR says that combining thermal imagery along with LiDAR, radar, and visible light cameras can create more robust algorithms capable of more easily identifying objects and people.



Thermal sensors (right side image) are capable of capturing imagery even in total darkness. (Image source: FLIR)

In a previous interview with Design News, Mike Walters, vice president of micro-camera product development at FLIR, said that thermal cameras are able to see in complete darkness as well as other challenge situations. "Thermal cameras can see in absolute darkness and are also able to see in challenging lighting conditions, like driving directly into sun glare that 'blinds' human drivers and visible cameras. Thermal cameras also perform well in most types of fog, where visible cameras and LIDAR can struggle," Walters said.

FLIR's Thermal Sensors are Coming to Self-Driving Cars in 2021



A thermal camera test vehicle from FLIR. FLIR manufactures an automotive development kit (ADK) that can equip vehicles with infrared sensors for capturing thermal imagery. (Image source: FLIR)

According to FLIR, thermal cameras are able to reliably identify humans from up to 200 meters away – four times farther than typical headlights can illuminate – in rural conditions. The cameras can also provide additional information by capturing images from 360 degrees around the vehicle.

Level 4 autonomy requires a vehicle to be able to navigate roads – recognizing other vehicles, traffic signs, and hazards all on its own – but the vehicle must also have a steering wheel and systems for human intervention if necessary. Trucks with Level 4 autonomy are already being tested on public roads in the US and other autonomous car efforts are also rolling out across the country.



FLIR's Boson thermal sensor. (Image source: FLIR)

Beginning in November, Hyundai, for example, will begin a pilot program for a self-driving car ride-hailing service called Botride in Southern California. There is no word on which auto company will be rolling out the vehicles with FLIR's thermal sensors, but one automaker that has been particularly bullish about its self-driving car ambitions is Ford.

Back in 2016, The Big Three automaker said it was aiming to release a fully-autonomous car by 2021 (the year the Veoneer partnership vehicle will go into production). Mounting challenges around achieving full Level 5 autonomy, however, have forced Ford and other automakers to reexamine their timetable for fully-autonomous cars. In the past FLIR has been a key partner with Veoneer to support driver early-warning systems in vehicles from auto companies including GM, Volkswagen, Audi, Peugeot, BMW, and Mercedes-Benz. Perhaps one automaker sees thermal-sensing technology as a key component to keeping its self-driving vehicle ambitions on track.

Fujitsu, Ericsson Accelerate Wireless Connectivity for Industry 4.0

Fujitsu, Ericsson Accelerate Wireless Connectivity for Industry 4.0

News facts:

- New global agreement focuses on driving faster payback from Industry 4.0 projects.
- Co-operation brings together Fujitsu's unrivalled systems integrations know-how with Ericsson's leadership in wireless network solutions.
- Focus on boosting wireless connectivity to enable the full potential of Industry 4.0, accelerating digital transformation.



Fujitsu and Ericsson are joining forces to help realise the full value of Industry 4.0, with a major new initiative to create and accelerate wireless cellular connectivity solutions for the manufacturing sector.

The two companies have signed a global memorandum of understanding (MOU) to leverage Ericsson's wireless connectivity expertise in combination with Fujitsu's expertise in system integration, digitalised services and digitalisation of manufacturing production processes. The co-operation will begin in Scandinavia, Germany and the USA, focusing on Ericsson Industry Connect and Ericsson Private Networks.

The agreement is focused on driving faster payback from Industry 4.0 projects, through creating smart factories with edge devices – of any type and on any scale. The solution combines Fujitsu's unrivalled expertise in integrating complex, diverse infrastructures and Ericsson Industry Connect, a turnkey

solution that provides a dedicated and private wireless cellular network, controlled and managed by enterprise. The system is based on proven 4G cellular technology supported by a large ecosystem of players, and is upgradable to 5G.

Erik Josefsson, Vice-President and Head of Advanced Industries at Ericsson, says: "Only wireless connectivity can help unlock the full potential of industrial digitalisation. By combining our cellular technologies with system integration knowledge from Fujitsu, we can start to cut the cables in factories and realise the full value of Industry 4.0."



Jonas Brandén, Fujitsu Managing Director

Jonas Brandén, Managing Director Fujitsu Sweden, comments: "IOT and 5G are the vital technological underpinnings of hyper-connected factories and supply chains. By linking every aspect of manufacturing to the end-user – and back again – these technologies reveal insights within global ecosystems and provide the ability to act on that intelligence, across entire value chains. This is how Fujitsu believes new value and new market opportunities can be created for manufacturers. Leveraging Ericsson's unparalleled experience in the creation of wireless networks, Fujitsu's unique co-creation methodology will help manufacturing customers to find, scope, plan and implement digital transformation."

1 Ericsson enables communications service providers to capture the full value of connectivity. The company's portfolio spans networks, digital services, managed services and emerging business and is designed to help our customers go digital, increase efficiency and find new revenue streams. Ericsson's investments in innovation have delivered the benefits of telephony and mobile broadband to billions of people around the world. The Ericsson stock is listed on Nasdaq Stockholm and on Nasdaq New York. www.ericsson.com

2 The MOU is the latest development in the strategic partnership agreed in October 2018 between Fujitsu and Ericsson to deliver end-to-end 5G network solutions and related services, extending the geographical focus beyond Japan.

How to Determine the Best Pneumatic Conveying Method for Handling Blended Powders

Pneumatic conveying methods provide sanitary conveying options for sensitive powders and achieve distances mechanical conveying systems cannot. However, homogeneity issues can arise in blended powders that are transported using the wrong pneumatic conveying system. Such issues can be costly endeavours resulting in scrapped product, downtime, and concerns around brand standards and reputation. This column will discuss the two main categories of pneumatic conveying systems: Dense and dilute (also known as lean) phase and highlight dense as the best option for blended powders.

Pneumatic conveying systems work by generating a gas flow (generally air) in a pipe combined with a pressure difference between the pickup and receiving points. Product moves from a point of higher pressure to a point of lower pressure.

Dilute Phase Conveying Methods

In a dilute phase conveying system, product is dropped into a continuous stream of air that is generated either by a blower at the front end (pressure) or back end (vacuum) of the process where typical air velocities can range from 3,000 to 7,000 ft/min. Dilute phase conveying is an excellent way to move robust powders, but not so much for fragile, instantized, or blended powders. With the high conveying velocities, fragile or instantized products are broken down. When dropping a blended product into a fast-moving airstream, the first thing the product does is separate based on particle size, shape, and density. You will lose the homogeneity you worked so hard to achieve.

Dense Phase Conveying Methods

A dense phase system moves slugs of powder through the convey line separated by cushions of air where typical convey velocities will range from 150 to 2,500 ft/min. These slower convey velocities, as well as the higher concentration of powders, makes it less likely for fragile powders to be broken down or blended powders to demix. A dense phase conveying system can be set up to meet almost any production requirement remembering that the goal of this system is to move the product as slowly as possible, without plugging the lines and keeping up with required production. A dense phase system can be set up to run either as a batch system or continuous, depending on the production requirements, and can achieve rates up to 20 tn/hr.



Images: Bulkinside

Dense phase conveying can further be subdivided into a pressure system where compressed air is used to pressurize a transporter vessel to push the powder, or a vacuum system where a vacuum pump is used to draw a vacuum on the receiving vessel and pull the powder. A pressure-dense phase system can move powder up to 325 ft with an elevation increase of over 75 ft, and a vacuum dense phase system can move powder over 160 ft with an elevation increase of 60 ft.

When the production requirements are outside the limitations of a dense phase system, semi-dense phase conveying is a good alternative. By adding a little more air, hence moving the product a bit faster, the overall distance (horizontal and vertical) can be increased without overly affecting the product's integrity or homogeneity.

When developing a powder blending system, it is important to not only spend effort on the design of the blending process, but on the post-blending handling process.



Steven Wicklund, Tetra Pak Inc.

It is advisable for producers to test their chosen solution in a pilot plant to confirm the breakage rate, de-mixing, and other important characteristics. Test centers specialized in powder handling solutions let producers simulate any kind of powder handling process to test the system on sensitive products and validate line performance. This extra effort will go a long way because the wrong powder handling process can easily negate the efforts to develop your blending system.

Source: www.powderbulksolids.com

Huawei to Make Automotive Sensors for Self-Driving

According to reports, Huawei rotating chairman Xu Zhijun announced at a connected vehicle conference in Beijing today that the company would create an ecosystem of sensors for cars, including radars and LIDAR. Few other details were provided, other than that this would derive from Huawei's work in 5G technologies and millimeter wave.

Huawei has a history of producing electronics equipment with good quality at lower costs than many competitors. This may bode a future of lower cost sensors for robocars, which would be good. While today, almost all developers are strongly focused on reaching safety goals rather than reducing costs, in the long run all will want to reduce costs. Cheaper sensors can also mean having more of them for greater safety and performance.

Indeed, over time it is expected that the sensor and computing suite in a robocar will cost less than the components removed from a full robocar (like steering wheels, dashboards, pedals, power seats, single panel windshields, mirrors and countless others) meaning that the total cost of a robotaxi is less than the cost of a similar car today. This will bring down the cost of automotive transportation and make it available to a larger population.

Huawei, however, has recently faced battles with the United States, whose officials have expressed distrust of Chinese made technology in critical systems due to the risk of compromise by the Chinese government, a charge which Xu and others have vigorously denied. If the U.S. government or



Eric Xu (Xu Zhijun), Deputy Chairman of the Board and rotating CEO (Getty Images)

others forbid or pressure against the use of Huawei sensors in cars driven in the USA, this could be problematic. It is less likely a vehicle would be compromised by a radar or LIDAR, but not out of the question.

Radar is an area of strong research today in robocars, because it is low cost and detects things neither cameras or LIDAR can. It is low resolution but improving. While there is no direct connection to 5G efforts in most modern radar efforts, Huawei may simply refer to the value of the expertise they are building up in the high-GHZ bands and extending it to radar.

It is also possible they intend to make use of passive radar, where the signal is transmitted from cell towers, bounces off things in the environment and then is received by a vehicle. This is useful technology, but since it only works in certain special places is not a substitute for standard transmit-and-receive style radar.

Today's automotive radars cost several hundred dollars, but there is no reason that models could not be made costing tens of dollars if made in large quantities.

LIDAR is also an area of hot competition and today, high prices. Several Chinese players are attempting to play strongly in a space previously dominated by U.S. companies. Elon Musk has famously been negative on LIDAR, and cost has been one of those reasons. (Indeed, there is no LIDAR available to put in a currently shipping car like the Teslas.) Other players in the space have presumed that low cost LIDAR will arrive and offer superior sensing ability that wins the race to get to sufficient safety levels first.

Disclosure: The author owns stock in Quanergy, a LIDAR vendor, and has in the past advised Huawei senior management on self-driving cars.

Source: www.forbes.com

OPPO Working on Under-Display Sensors for Supposed Quad-Curve '3D Waterfall' Display

Smartphone innovation has been at an all-time high in the past couple of years with new designs akin to the pop-up camera, under-display fingerprint technology, and waterfall displays we're already seeing. The latest patents filed by Oppo suggest we could see a display that's curved at all edges. This could be possible thanks to another technology that Oppo has also patented: placing sensors under the display.

The patents outline a light sensor and another infrared light sensor, both of which could function from below the display. This would eliminate the need for a bezel to house the sensors, one for adjusting display brightness to the ambient light while the other turns the display off in a call, respectively. This technology could work with either a Micro LED or OLED display.

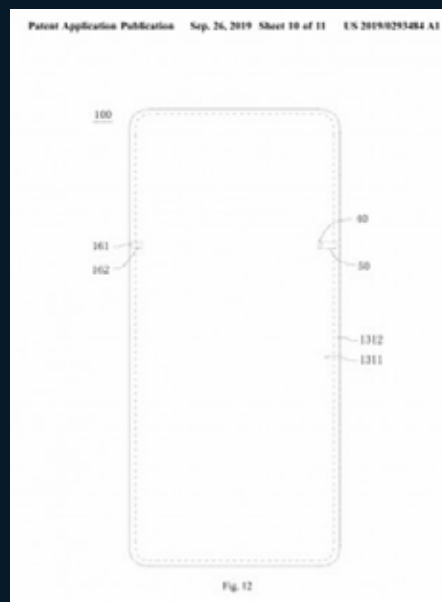
A couple of months ago, Oppo showed off an unreleased device with waterfall display, but the idea of making all four edges swoop towards the frame isn't a new one. Xiaomi has patented a similar device with four curved edges back in February.

Oppo also teased an under-display camera leading up to MWC Shanghai. This shows the company's efforts to eventually create a smartphone with 100% screen-to-body ratio.

We have already seen devices with "waterfall displays" on the two longest edges of the phone: the Huawei Mate 30 Pro and Vivo NEX 3 are two devices already available with waterfall displays.



Mockup render by LetsGoDigital



Patent diagrams



Source: www.gsmarena.com

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Robot Grippers Disconnect from Pneumatic Power

Soft Robotics new coDrive system for robotic grippers doesn't require connection to factory compressed air systems.



The mGrip gripper is designed for collaborative robotic applications such as pick-and-place, packaging, and machine tending.

Use of robots—both collaborative and industrial—has been growing across industry, particularly in industries without a strong history of industrial robot use. As a result, not all of these industries are set up with extensive house supplies of compressed air, which can limit the use of robotic gripping systems that rely on compressed air for motion control. Even in industries with established compressed air outlets, the requirement that robots be located near access to compressed air sources can be limiting factor in the use robotics.



The mGrip P2 robot kit for handling small to medium sized items. Source: Soft Robotics

To address this issue, Soft Robotics has released its coDrive system to “cut the pneumatic cord” and allow the company's mGrip gripper to be deployed where the customer needs it for collaborative robotic applications such as pick-and-place, packaging, and machine tending. Soft Robotics says users of collaborative robots can now bring mGrip adaptive technology to their application with the ease and portability of traditional electrical grippers. This initial release of coDrive is plug-and-play compatible with Universal Robots products.

The controller of the coDrive system fits into the Universal Robots' cabinet and includes URCap software for programming via the teach pendant. To use the coDrive system, Soft Robotics says users simply install the mGrip system, set the grip pressure and release timing, and can then immediately start picking in the manufacturing location of their choice, no longer dictated by the proximity of house air.

Source: www.automationworld.com

Sentons Unveils Sensors That Can Make Any Consumer Device into a Touch Surface



Above: Sentons, Image Credit: Sentons

Sentons has unveiled touch and gesture sensors for use in consumer devices, with new types of user interfaces and controls. The San Jose, California-based company makes Software-Defined Surfaces (SDS), and its latest examples are the new SurfaceWave Processor and Gesture Engine.

Sentons' ultimate goal is to bring SDS technology to every glass, plastic, and metal surface by combining ultrasonic touch and strain-gauge sensors. With Sentons integration, any consumer electronic device — from a smartwatch to a car dashboard — can become interactive and definable by applications.

Starting today, Sentons' technology is available to any mobile manufacturer and can be easily integrated with nearly any form factor or surface material.

The company's ultrasonic touch technology allows users of smart devices, such as mobile phones and wearables, to interact with software beyond buttons and touchscreens. Combined with Sentons' in-processor Gesture Engine, the technology is able to recognize, distinguish, and learn from a significantly larger set of complex gestures than any touch technology previously available.

Like the Marvel superhero Daredevil, Sentons uses enhanced audio acuity to detect not only touch, but force, intent, and subtle nuances that exceed even the capability of capacitive touch sensors. Integrating the updated technology creates new touchscreen capabilities and unlocks interactive experiences for various consumer devices. Asus and Tencent worked

with Sentons on the ROG II, a new gaming phone featuring Air Triggers — software-defined virtual buttons enabling the phone to be used similarly to a video game controller.



Above: Jess Lee is CEO of Sentons
Image Credit: Sentons

and creating ripples back to the sub — you can think of the surface of your phone like that,” said Sentons CEO Jess Lee in a statement.

“Our sensors, arranged along the phone, are constantly ‘painting’ every surface with ultrasonic waves. When your finger comes in contact with those waves, it disrupts them, and our processors can tell if that was a touch, swipe, hard tap, soft tap, or even a squeeze, based on the pattern of that disruption. We can actually do this on any surface of nearly any material, with greater accuracy, lower latency, and a wider dynamic range of understood gestures and interactions than touchscreens or buttons.”

Included in this is the ability to bring richer user experiences to a dozen more phone models through both virtualized buttons and edge-gesture capture. To do this, Sentons created a custom processor that emits constant ultrasonic pings, similar to a sonar array. The chip also houses the firmware stack that comprises the Gesture Engine. An array of sensor modules housed around the perimeter of the device detects any interruption of the audio signal by the touch of a hand or finger.



Above: Sentons, Image Credit: Sentons

The Gesture Engine detects whether a touch is intentional, whether it comprises a light or forceful interaction, and even which hand is holding the device. Those capabilities enable on-demand interaction points around the metal, plastic, or glass surfaces of a mobile phone. In addition to the Gesture Engine's capabilities, the technology is designed to be adaptable and capable of retraining its own algorithms.

In the event that a screen is cracked or an edge is permanently dented or deformed, the software will retrain the processor and sensors to accommodate a changed “landscape” for the ultrasonic pings so that they can accurately detect a swipe, tap, or other gesture despite the crack or deformation. The SurfaceWave Processor works with Sentons' Gesture Engine and sensor modules, which allow the precise identification of squeezes, light taps, swipes, slides, multiple touchpoints, and more — all at different speeds and strengths. Sentons can replace buttons entirely with virtualized buttons, either permanent or on-demand.

Instead of having to tap on a screen and drag an awkward zoom wheel (covering up part of your picture with your finger), imagine being able to zoom in and out on your camera simply by sliding your finger along the top of the device. Software developers could also make the virtual buttons do anything users want — from changing capture modes to recording video on a squeeze. And for gaming, developers could create air triggers, the ability to change weapons with a swipe or reload with a slider. Sentons could also enable a jog wheel anywhere your thumb sits on the device. The company was founded in 2011 and is led by a team of technologists from Apple, Telegent Systems, and LSI.

Source: venturebeat.com

Mitsubishi Launches 'Smallest, Most Compact' Programmable Logic Controller



Mitsubishi Electric has released the company's smallest and most powerful compact programmable logic controller to date – the FX5UC series Premium Micro PLC.

The company says the new PLC's diminutive size is set to help machine builders and manufacturers pack "ever more functionality into a smaller space", while also providing the web access and network connectivity demanded by the latest smart factory applications.

Mitsubishi Electric launched its first range of micro controllers, the FX family of PLCs, over 35 years ago as part of the MELSEC-F series. The high quality, compact size and cost competitiveness of control systems built around them established a precedent for creating new opportunities and revolutionised the industrial automation landscape and this still applies today.

Over the years, the FX product portfolio has expanded to deliver solutions to address different applications and requirements.



Now re-positioned as part of the high functioning MELSEC iQ-F series the new FX5UC model (the 'C' denotes compact) is engineered to handle the increasingly sophisticated data processing and communication tasks demanded by Smart Manufacturing applications. More precisely, this tiny PLC now houses the same performance CPU as Mitsubishi Electric's premium FX5U model in a product as small as a micro FX3S.

Multitasking is the future. This super compact PLC features a program memory of 64,000 steps and a large device memory. In addition, it has an execution speed of 34 ns, resulting in extremely fast machine responses and increased productivity.

Further, the FX5UC PLC can perform positioning and advanced motion control functions for up to four axes, eliminating the need for dedicated controllers that would increase hardware and maintenance costs, programming time and equipment footprint. Additional built-in functions include tools to prevent data theft or tampering such as security key authentication, while allowing

operators to access system status safely via the web and interact with on-board features such as data logging. Very noticeably, the CPU module is a quarter the size of a conventional one, therefore it can fit into smaller spaces, freeing-up valuable on-machine or production floor space usually occupied by larger more conventional control panels. Other features also contribute to the space saving rationale such as incorporating built-in relay and transistor outputs, avoiding the need to install additional, space consuming terminal blocks in many applications.

Automation system engineers and integrators can also benefit. By incorporating flexibility and scalability, the FX5UC designers are looking to deliver an ideal solution for cost sensitive small machines as well as larger, networked multi-PLC systems. Networking capabilities help manufacturers to develop more integrated automated applications, especially when using other Mitsubishi Electric automation solutions. In this scenario complete manufacturing lines can be controlled, offering simpler system architectures and more transparent data management. On the other hand, open connectivity ensures compatibility with a wide choice of network options.

Many small details have been considered in the pursuit of increased user flexibility and ease of installation, the use of spring clamp terminals for example speeds-up wiring activities whilst ensuring reliable and vibration resistant connections. Since modules can be unlocked and moved together with their wires, maintenance and system change tasks are also made far easier. Just when we thought compact PLCs might have reached their zenith in terms of size and performance, Mitsubishi Electric's FX5UC PLC seems to have broken the mould yet again, time to start redesigning those control panels and boxes.

Source: roboticsandautomationnews.com



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2019 Post Show Report Figures:



*Statistic Extracted from 2019 ASEAN Super 8 Post Show Report

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The Signing of the MoU between APTIKNAS - SIAA at Industrial Transformation Asia - Pacific ITAP 2019

APTIKNAS had the opportunity to attend and collaborate with Singapore Industrial

Automation Association (SIAA) during the Asia Pacific Industrial Transformation Exhibition (ITAP) on 22-24 October 2019. SIAA has several similar programmes as APTIKNAS, including Industry 4.0, Internet of Things and Robotic. Therefore it was a mutual agreement between APTIKNAS and SIAA to have a Memorandum of Understanding (MoU).



Objectives of the MoU:

- To encourage and support the formation of an Industry 4.0 centric ecosystem by sharing / leveraging on shared networks and expertise.
- To explore opportunities for collaboration between Indonesian & Singapore companies.
- To engage in developing agreed joint projects / solutions / events in unison



The following are the photos from the MoU activities; With this MoU, members of the two associations can help, communicate and support each other in various activities related to Industry 4.0, Automation, Internet of Things and Robotic.



The MoU was signed by the Chairman of SIAA, Terence Teo and the Chairman of APTIKNAS Soegiharto Santoso was represented by the Chairman of DKI Jakarta APTIKNAS Fanky Christian.



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