

THE SINGAPORE ENGINEER

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COVER STORY:

First Smart-Enabled HDB Homes
in Punggol Northshore completed



PLUS

SUSTAINABILITY: Keppel Bay Tower certified as Singapore's first Green Mark Platinum (Zero Energy) commercial building

ENERGY ENGINEERING: The energy sector in 2030

DIGITALISATION: Safety and Cybersecurity for Rail Networks in Asia Pacific

Railway & Transport



Infrastructure



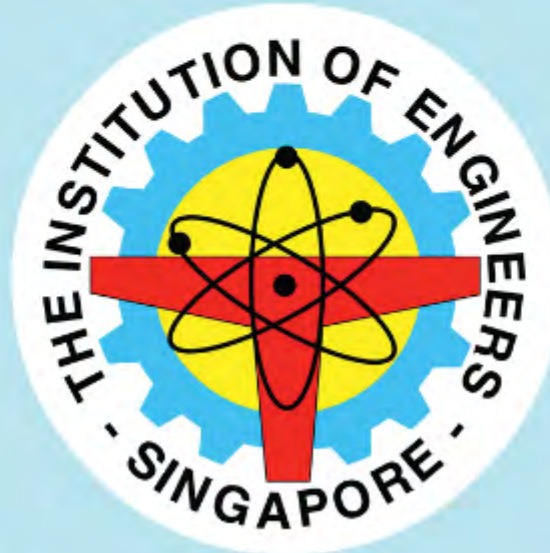
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THE 2021 RANKING OF THE WORLD'S MOST SUSTAINABLE CORPORATIONS ANNOUNCED AT A VIRTUAL EVENT

Corporate Knights 17th annual ranking of the world's 100 most sustainable corporations was released recently at a virtual event. The ranking is based on a rigorous assessment of 8,080 companies with more than USD 1 billion in revenues.

According to the Toronto-based sustainable-business research company's latest analysis, the world's most sustainable corporation in 2021 is Schneider Electric SE, a leader in the digital transformation of energy management and automation, with its headquarters in France.

The 2021 Global 100 rankings include three companies from Singapore - City Developments, ranked 40; CapitaLand, in 58th position; and Starhub which secured the 80th place.

"This year's analysis and results strongly suggest that the world's leading companies learned a lesson from the aftermath of the 2008/09 financial crisis. Rather than de-prioritising sustainability when confronted with a major shock, they have recognised that it will drive the success of recovery strategies", said Mr Toby Heaps, CEO of Corporate Knights.

This year's ranking was based on several new performance indicators that reflect social concerns highlighted by both the pandemic and the Black Lives Matter movement. They include paid sick leave, executive and board racial diversity,

and clean investments (capital expenditures, R&D and acquisitions).

Global 100 companies earn, on average, 41% of their revenues from products or services aligned with the UN Sustainable Development Goals, compared to just 8% for their peers.

Twenty-eight of the Global 100 companies have signed the Business Ambition for 1.5° C commitment, an initiative by a global coalition of UN agencies and business leaders to prevent the worst impacts of climate change.

Corporate Knights Inc includes the sustainable-business magazine Corporate Knights and a research division that produces rankings and financial product ratings based on corporate sustainability performance.

Schneider Electric ranked world's most sustainable corporation

"We are honoured and grateful to be ranked number one by Corporate Knights. It is a major encouragement for our teams and partners, and a great recognition of more than 15 years of engagement to make our company and the world greener and more inclusive. Sustainability is a journey that we accomplish with our people, partners, suppliers, customers and communities where we operate. This recognition goes also to all of them", said



The Schneider Electric Building located in the Kallang industrial belt in Singapore has 5,000 connected Internet of Things points and is 100% solar powered during daytime. It is the regional headquarters of the company. Image: Schneider Electric.

Mr Jean-Pascal Tricoire, Schneider Electric's Chairman and Chief Executive Officer.

The number one position on Corporate Knights' 2021 Global 100 Most Sustainable Corporations ranking marks a big jump from 29th place the previous year and represents a high-profile external acknowledgement of Schneider's long-standing commitment to environmental, social and governance (ESG) issues.

"There are two sides to the sustainability coin. We aim to lead by example within our own operations and ecosystem, and we work to be part of the solution for our customers. Sustainability improves performance, innovation and our attractiveness as a place to work. It creates value", said Mr Gilles Vermot Desroches, Sustainability Senior VP at Schneider Electric.

"In recent decades, Schneider has shifted its focus to data centres; storage and other distributed energy resources; and smart solutions that advance electrification, energy efficiency and renewability. It now earns 70% of its revenue from, and directs 73% of its investments toward, sustainable solutions. Schneider Electric also performs strongly in racial and gender diversity and in resource productivity and safety", said Mr Toby Heaps, CEO of Corporate Knights.

Schneider Electric was an early adopter of ESG considerations and has dialled up its sustainability commitments repeatedly and ambitiously over the past decade and a half. The latest acceleration of its sustainability strategy involves six long-term commitments and 11 concrete targets, deliverable by 2025. Together, these aim to help Schneider, the businesses and communities it serves and interacts with, to address climate change and social inclusion.

CDL ranked Global 100's most sustainable company in real estate and most sustainable company in Singapore

While securing 40th place in the 2021 Global 100 Most Sustainable Corporations in the World ranking, City Developments Limited (CDL) was also ranked the world's top real estate company. This is the second consecutive year CDL is ranked top.

Since 2010, CDL has been the first and only Singapore company to be included in the Global 100 ranking for 12 consecutive years. This year, CDL also remained Singapore's top-ranked sustainable company - a position held for the third consecutive year.

Mr Sherman Kwek, CDL Group Chief Executive Officer, said, "The social and economic challenges posed by COVID-19 have accelerated sustainability and pushed it further into the global spotlight. Our strong foundation in ESG integration, forged over two decades, has been vital in future-proofing our business and preparing us for new challenges and unforeseen changes. We are grateful to be ranked as the world's top real estate company and top Singapore company by Corporate Knights, once again, which

honours our unwavering dedication to scale up in the race to net-zero and low-carbon operations. In spite of a challenging year in 2020, ESG integration has remained a fundamental aspect of our business strategy and we will continue to drive sustainability to build resilience for a greener and healthier recovery".

CapitaLand ranked as one of the world's most sustainable corporations for the ninth time

CapitaLand has been ranked as one of the most sustainable corporations in the 'Global 100 Most Sustainable Corporations in the World' index in 2021, securing the 58th position. This marks the group's ninth inclusion in the prestigious index.

CapitaLand, which has a global presence in more than 220 cities and over 30 countries, is also one of the highest ranked real estate companies in the index.

Ms Lynette Leong, Chief Sustainability Officer for CapitaLand Group said, "CapitaLand is honoured to be consistently recognised as a global sustainability leader on the 'Global 100 Most Sustainable Corporations in the World' index. With the launch of CapitaLand's 2030 Sustainability Master Plan last October, we continue to elevate our environment, social and governance (ESG) efforts with ambitious targets over the next decade. One of our targets is to significantly reduce carbon emissions, and we are the first real estate company in Asia, excluding Japan, to have our carbon emissions reduction targets validated by Science Based Targets initiative for a well-below 2° C scenario".

"To accelerate resource efficiency and shape a more sustainable built environment by developing greener and safer buildings for the communities, we also launched an inaugural CapitaLand Sustainability X Challenge. It is the first global platform by a real estate company to advance innovation and collaboration in sustainability within the built environment. As a responsible real estate company, we place sustainability at the core of what we do so as to future-proof our organisation and deliver long-term value for our stakeholders", added Ms Leong.

StarHub ranked Asia's most sustainable telco

StarHub, a leading homegrown info-communications and entertainment service provider in Singapore, was ranked as Asia's most sustainable telecommunications company and achieved 80th position in the 2021 Global 100 ranking.

"We are both delighted and humbled to be counted among the top 1% globally in what is widely considered as the gold standard in data-driven corporate sustainability analysis. Our unwavering dedication to sustainable practices drives us to formulate strategies and initiatives that maintain a harmonious balance between our economic, social and environmental imperatives. This is truly an honour, and it will encourage us to continue doing what is right for our stakeholders, investors, customers and the community in which we operate", said Ms Veronica Lai, Chief Corporate Officer, StarHub.

CONTACT TRACING DEVICES FOR A

LIVE PROCESS PLANT ENVIRONMENT

D’Crypt, a Temasek-owned security engineering company, recently announced that it has embarked on a pilot project with Shell Singapore, to deploy specially modified BluePass devices for COVID-19 contact tracing for its employees, contractor workers and other visitors, at Pulau Bukom.

As current versions of the contact tracing device are not certified intrinsically safe for use in environments where flammable gases may be present, this is said to be the first time that a modified version will be tested in a live process plant environment. If successful, this pilot could pave the way for the use of the modified devices across the process industry in Singapore and abroad.

A total of 4,000 pieces of these modified devices, named BluePass, will be distributed for this pilot which is expected to run until March. There are 60,300 workers involved in the petroleum, chemical & pharmaceutical products sector in Singapore, as of Q3 2020, according to the Ministry of Manpower’s labour market report.

D’Crypt’s BluePass is a small and light wearable contact tracing device that exchanges proximity information with other BluePasses or interoperable devices via Bluetooth Low Energy technology, and stores that information for a stipulated period, for contact tracing purposes. BluePass safeguards user privacy by not tracking location information.

Shell has evaluated the modified BluePass devices for their safe use in the process areas at the manufacturing site at Pulau Bukom, using IEC (International Electrotechnical Commission) standards commonly referenced by process industry companies worldwide, as well as guidance from EEMUA (Engineering Equipment and Materials Users Association) and EI (Energy Institute).

Shell applies these standards for any equipment used in its facilities since there may potentially be flammable gases present. The evaluations covered factors such as the ruggedness of the body of the modified BluePass device, protection from user tampering or maltreatment, the power source and size of the battery, as well as the energy level transmitted during use.

Mr Hugues Bourgoigne, Shell’s Vice President for Manufacturing in Singapore & Philippines and General Manager of Bukom, said, “Currently the contact tracing of individuals within the process areas can take hours, which slows down the process of identifying and isolating close contacts. The enablement of prompt contact tracing for process industry workers in Singapore will substantially mitigate the risk of a COVID-19 outbreak in the community. Through

this pilot of the modified BluePass devices, we are glad that Shell Singapore can play a role in enabling Singapore’s economic activities to ramp up while keeping our workers safe from COVID-19”.

Dr Antony Ng, CEO of D’Crypt, said, “Shell’s evaluation of BluePass gives us confidence to conduct further pilots of the device for use in real-world production environments. We have full confidence that process industry players will be able to successfully put the BluePass through a similar evaluation for effective contact tracing without endangering lives or compromising operations at their facilities”.

Once the pilot is completed, D’Crypt and Shell will proactively share results - both in terms of effective contact tracing and BluePass’ suitability for use in live process plant environments - with the process industry in Singapore.

“We hope this will contribute to a broad adoption of contact tracing devices in the process sector, dramatically improving Singapore’s and the world’s COVID-19 security”, said Dr Ng.

D’Crypt

D’Crypt is a high-value design and development house that works with customers to deliver cryptographic technology and components which become an integral part of the customers’ information security appliances, systems and applications. With its extensive technology development programme, D’Crypt is able to supply a variety of different technologies in the field of information security, that have immediate practical use and are full system secure.



Shell employees at the Pulau Bukom manufacturing site will be issued D’Crypt’s specially modified BluePass contact tracing device for safe use in the process areas.

SIEMENS DIGITAL INDUSTRIES SOFTWARE ANNOUNCES SENIOR APPOINTMENT

Siemens Digital Industries Software recently announced the appointment of Mr Bas Kuper as Senior Vice President and Managing Director for Asia Pacific. He succeeds Mr Pete Carrier who will be taking over as Senior Vice President of Global Operations and Go-to-market (GTM) Transformation. In this role, Mr Kuper and his team will leverage Siemens's Xcelerator portfolio of software and services to help companies across Asia speed up digital transformation.

"Bas has been instrumental in Siemens's continued global success, and under his leadership in Asia Pacific, Siemens will continue to foster close partnerships with our customers here, helping them pivot to a software-driven approach to manufacturing, and unlocking new efficiencies and opportunities in the global market. The Asia-Pacific region shows strong growth potential for Siemens, even amid a global pandemic, and I

congratulate Bas on this new role", said Mr Bob Jones, Executive Vice President of Global Sales and Service, Siemens Digital Industries Software.

Mr Kuper has held various leadership positions in his tenure with Siemens Digital Industries Software over more than 13 years and is recognised throughout the industry for his experience and thought leadership. Previously, he served as Country Manager for Belgium and Luxembourg and later as Vice President and Managing Director for Benelux and the Middle East/Africa region. He will be based in Hong Kong and will have responsibility for Asia Pacific markets.



Mr Bas Kuper

THE SINGAPORE ENGINEER MAGAZINE GOES FULLY DIGITAL

As part of IES' effort to go green and do its part for environment sustainability, The Singapore Engineer (TSE) magazine is now fully digital! You can browse it on the go through the PDF or ISSUU e-reader included in our emailers, using the ISSUU mobile app, or online at ies.org.sg.

With the digital magazine, you will be able to:

- Keep up with engineering news curated from local and international sources
- Share interesting articles easily on social media (through ISSUU)
- Enjoy an optimised browsing experience for your various devices (e.g. mobile phones, tablets and monitors)
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THE LAUNCH OF SINGAPORE'S FIRST AUTONOMOUS TRANSPORT REVENUE SERVICE

COVID-19 has intensified the need for digital transformation and innovation, and created opportunities for innovative, transformative, and operationally ready solutions for Singapore's economy and businesses. Acting decisively to seize these opportunities, the Alliance for Action (AfA) on Robotics was convened by the Emerging Stronger Taskforce (EST) to promote and accelerate sustainable deployment of robotics in Singapore.

Co-led by Vincent Chong, Group President and CEO of ST Engineering, and Peter Ho, CEO of HOPE Technik, the AfA rallied organisations across the value chain - bus transport operators (SBS Transit, SMRT), and technology providers (ST Engineering, GPS Lands, SWAT Mobility) - to develop and drive sustainable autonomous vehicle (AV) solutions. This collaborative approach allowed the AfA to harness the capabilities across the mobility value chain that each partner brings to the AfA, and collectively test and evaluate the potential for venturing into new businesses for the fast-growing AV space globally.

From 25 January 2021, the AfA, supported by CapitaLand and JTC, will deploy on-demand autonomous bus services at Singapore Science Park 2 and Jurong Island. This marks the first time autonomous buses are operating a revenue service in Singapore, bringing local AV services and solutions one step closer towards commercialisation, domestically and abroad. The pilot is expected to end on 30 April 2021, following which, the AfA will evaluate the findings before ascertaining the next steps.

Through this pilot, the AfA aims to establish a track record which demonstrates services that meet commuters' need for safe, reliable, and efficient modes of transportation. In order to gain more data and insights that will be valuable to the development of future urban mobility services, the two routes differ in physical conditions, commuter and partner mix, service and vehicle type, as well as operation concepts.

Facilitated by the Singapore Economic Development Board (EDB) and the Land Transport Authority (LTA), the pilot will enable the partners to further develop and refine their capabilities, expertise, and service delivery, thus strengthening the local AV ecosystem. This is in line with the AfA's vision of developing global champions in robotics, and to position Singapore as a leading global operator and provider of end-to-end systems for autonomous transport in cities which are looking to implement sustainable, urban transport solutions. The AfA has, in parallel, also been working with the trade unions to create relevant training and upskilling pathways for bus captains who will then be able to take on better jobs, such as managing commuter experience

and overseeing the autonomous bus management system.

"We are happy that Singapore companies across different industries are stepping forward together to deliver an innovative and pioneering pilot in autonomous bus services, one that solves real unmet demand in the piloted locales", said Mr Tan Chong Meng, Co-Chair of the EST, and Chairman, JTC Corporation.

"With the support of bus transport operators, transport workers like bus captains have acquired new skills and provided valuable input to the project. As confidence is built, further deployments can be hosted in JTC's estates across Singapore to foster more collaboration opportunities, strengthen the ecosystem, and speed up the move towards autonomous mobility", he added.



AV Deployment at Singapore Science Park 2: The autonomous bus service aims to explore if an on-demand service is better able to meet the transport needs of tenants during the off-peak hours, when frequency of public transport is reduced. The service will provide greater convenience and flexibility for members of the public travelling from Singapore Science Park 2 to the nearest main transport node Haw Par Villa MRT station during off-peak hours. Members of the public can book an autonomous bus on-demand via the mobile app, Zipster, shortening waiting times during off-peak hours.

“The AfA aims to operationalise autonomous transport successfully by creating strong and complementary partnerships that leverage the domain expertise of the partners. It is heartening to see the collaboration of large local enterprises including local bus transport operators, SMEs, and start-ups to form one business ecosystem to develop the autonomous transport industry in Singapore. Collectively, we will offer more sustainable, integrated public transport services, and build a track record that will position us well for overseas markets”, said Mr Vincent Chong.

“The AfA not only supports the Smart Nation initiatives but will also build up Singapore’s reputation as a leading global operator and provider of end-to-end systems for autonomous transport for cities looking to implement sustainable, urban transport solutions. We also fulfill our passion of improving lives through robotics and autonomous technology”, said Mr Peter Ho.

“LTA has been working with our industry partners to deepen Singapore’s expertise in AVs and enable their safe deployment on our public roads. The AfA’s limited deployments of AV bus services with onboard safety drivers at Singapore Science Park 2 and Jurong Island are another key step in building up local capabilities in this emerging field”, said Mr Ng Lang, CEO, LTA.

“Over the last few years, the National Transport Workers’ Union (NTWU) has been working closely with LTA and our industry partners to prepare transport workers for the introduction of AV technology into the transport systems. When AV was first introduced in Singapore, our union leaders and workers were worried about their jobs and livelihoods. Through many visits to trial sites, our union leaders have also seen for themselves how the technology will help uplift the sector as a whole, which will lead to better work prospects for our workers”, said Mr Melvin Yong, Executive Secretary, NTWU.

“To help our transport workers familiarise themselves with AV, the union pushed for experienced bus captains to be deployed as AV operators for the various trials. I am glad that our bus captains have given positive feedback on their AV experiences thus far. The union will continue to work with our tripartite partners to educate our transport workers on AV technology, encourage and facilitate upskilling so as to enable them to take on new roles when we eventually move to an autonomous environment”, he added.

Ongoing efforts for AV development in Singapore

Singapore has been facilitating various on-road AV trials since 2015. This pilot comes after the successful public trial on Sentosa, which ST Engineering conducted in partnership with the Ministry of Transport and Sentosa Development Corporation in 2019. It ran consistently over three months without any incidents and ferried about 6,000 members of the public free-of-charge, nearly all of whom gave high satisfaction scores.

In 2017, the Singapore Autonomous Vehicles Consortium was launched to facilitate and strengthen collaboration

between the AV industry and the Government to further accelerate the development, application and adoption of AV technologies in Singapore. The consortium comprises ST Engineering and educational and research institutes including A*STAR’s Institute for Infocomm Research, National University of Singapore’s (NUS) Faculty of Engineering, Singapore University of Technology and Design (SUTD), and Nanyang Technological University (NTU) through the ST Engineering-NTU Corporate Lab.



At all times, a driver stays at the wheel, in order to respond to emergencies.



AV Deployment at Jurong Island: The autonomous bus service provides Jurong Island employees a fixed schedule transport around Sakra Loop during lunch hours, for them to access the amenity centre Oasis @ SAKRA. It complements the existing on-demand bus service available on Jurong Island during lunch hours.

HELSINKI BUSINESS HUB TO PARTNER

WITH CAPITALAND-LED SMART URBAN CO-INNOVATION LAB

Helsinki Business Hub (HBH), the international trade and investment promotion agency for the capital of Finland, Helsinki, will be partnering with the Smart Urban Co-Innovation Lab led by CapitaLand, one of Asia's largest diversified real estate groups, to connect Finnish companies with industry partners in Singapore to co-develop and pilot smart cities solutions.

The Smart Urban Co-Innovation Lab, said to be Southeast Asia's first industry-led lab for smart cities solutions development, was initiated by CapitaLand and supported by the Infocomm Media Development Authority and Enterprise Singapore. The lab was officially opened by Singapore's Minister for Communications and Information, Mr S Iswaran on 28 October 2020.

The lab brings together leaders in the smart cities space to co-create and test innovations at CapitaLand's 5G-enabled Singapore Science Park.

HBH, with its long-standing history of connecting organisations in Singapore and Finland, will encourage solution providers from both countries to collaborate and come up with innovative technologies for the built environment, smart mobility, and sustainability. HBH will also play a key role in providing relevant expertise to accelerate the development of these technologies.

HBH's Chief Executive Officer, Mr Miska Hakala, said, "Both Singapore and Finland have a wealth of experts and technological advancements in the urban environment sector. By joining hands to bring together our expertise and knowledge to co-create and trial new concepts and solutions in such a vibrant living lab in Singapore, we can enable companies from both countries to tap unique opportunities for collaboration and co-innovation".

"We can also help build an ecosystem of global resources and talent to originate exceptional products and solutions that may be commercially scalable to grow new revenue streams and open up new employment trajectories to boost development of talent and intellectual properties", he added.

Mr Hakala said that HBH is committed to helping Singapore companies and other foreign firms in the lab to set up, grow and develop their business in Helsinki. In addition, HBH will serve as a gateway to enable companies from Singapore and Asia to expand in Europe.

For a start, HBH and the Smart Urban Co-Innovation Lab will arrange at least one event per year in Singapore and one in Finland, to match compatible companies who could collaborate on projects to co-create and test smart cities solutions.

The lab will help HBH-supported companies to set up their business, grow and develop in Singapore as well as serve as a gateway for Finnish companies seeking to enter and expand in Asia.

Mr Aylwin Tan, Chief Customer Solutions Officer of CapitaLand Group said, "I see great potential through this industry-to-industry collaboration platform. It will bring together the industry players of Singapore and Finland, two of the leading drivers and adopters of smart cities solutions, to explore opportunities in our countries and beyond. I hope to see this translate into a strong co-innovation partnership between Singapore and Finland".

This collaboration with the lab is the latest in a string of initiatives by HBH to boost trade and cooperation between Singapore and Finland. HBH has established close working relationships with multiple government agencies in Singapore, such as the Building and Construction Authority; Enterprise Singapore and its subsidiary, IPI Singapore; and Housing & Development Board.

ASIA'S NET ZERO ENERGY TRANSITION WILL CREATE INVESTMENT OPPORTUNITY

Efforts to transition to net zero emissions across Asia would create up to USD 37 trillion up to 2050, in fresh investment opportunities in energy alone.

A new analysis by the Asia Investor Group on Climate Change (AIGCC) finds that a transition consistent with keeping average global warming to 2° C or 1.5° C above pre-industrial levels would create USD 26 trillion and USD 37 trillion in new investment opportunities respectively, representing 1.7% to 2.0% of the continent's Gross Domestic Product.

The brief also shows Asia is well positioned to make this transition with dramatically falling renewable energy costs and governments beginning to implement relevant policies and goals to unlock large-scale clean energy investment.

The proportion of GDP identified for a Paris-aligned transition is similar to current spending on energy and could be partially funded through the reduction of fossil fuel imports and redirection of fossil fuel capital expenditure.

UNIVERSAL ROBOTS REACHES INDUSTRY MILESTONE WITH 50,000 COLLABORATIVE ROBOTS SOLD

Collaborative robots, or cobots, remain the fastest growing segment of industrial automation, and is projected to grow significantly in the Asia Pacific region.

Cobot market pioneer Universal Robots (UR) solidified its frontrunner position recently by selling the 50,000th UR cobot to a German manufacturer who will realise higher productivity and better employee safety.

The 50,000th cobot came as a special delivery with Mr Jürgen von Hollen, the then President of Universal Robots, personally handing over the cobot to VEMA technische Kunststoffteile GmbH and VEMA Werkzeug- und Formenbau GmbH located in Krauchenwies-Göggingen, Germany, at a ceremony held at VEMA.

“We have worked very hard in the past 15 years to develop an entirely new market segment with a mission to enable especially small- and medium-sized companies to automate tasks they thought were too costly or complex. As a pioneer in this market, we put a lot of work into creating awareness, influencing standards, and changing customers’ perceptions influenced by their experience of traditional robots”, said Mr von Hollen, emphasising how UR has created a new global distribution network, a new ecosystem of developers, and ultimately a completely new business model.

Cobots enhance both productivity and quality

VEMA’s new collaborative robot will join a fleet of three other UR cobots already deployed in pick and place tasks in end-of-line applications at the company.

Mr Christian Veser, Managing Director at VEMA GmbH explained how the cobots have enabled the company to add a third shift, thereby enabling it to operate round-the-clock.

“We have enhanced our productivity remarkably and also achieved better quality. Our employees are freed from ergonomically straining work to focus on quality testing. In navigating Covid-19 challenges, it has also been a great advantage that the cobots do not need to keep a safety distance or undergo quarantine. They can always work”, said

Mr Veser, adding that his company appreciates the cobots so much that they gave them names.

“The first three cobots are named Elfriede, Günther and Bruno. We will name our new cobot Jürgen to honour the fact that UR’s President came here in person to deliver it”, he said.

“Fifteen years ago, Universal Robots started with a vision of creating robots that are safe to work alongside human workers, and empowering people to get away from doing mundane, dirty, and dangerous jobs. Today, with the COVID-19 pandemic, collaborative robots have been rapidly adopted by both small and medium enterprises and large corporation around the world. During times that require a high level of flexibility and adaptability, cobots have become a sensible solution to maintaining factory footprint and promoting value creation for organisations like VEMA”, said Mr James McKew, Regional Director of Asia-Pacific at Universal Robots.



Mr Jürgen von Hollen, the then President of Universal Robots, personally handed over the 50,000th cobot to VEMA technische Kunststoffteile GmbH and VEMA Werkzeug- und Formenbau GmbH located in Krauchenwies-Göggingen, Germany, at a ceremony held at VEMA.

ENABLING TEMASEK POLYTECHNIC'S

ENGINEERING STUDENTS TO START CLASSES AT SUTD EARLIER

Temasek Polytechnic (TP) and the Singapore University of Technology and Design (SUTD) have signed a Memorandum of Agreement to launch a new pathway programme that will provide selected TP students from the School of Engineering with early exposure to university-level Engineering modules and a unique university student experience over the course of their polytechnic studies.

Starting from the AY2020 intake, this TP-SUTD Pathway Programme (TPP) will be open to TP students undergoing Electronics, Mechatronics, Biomedical Engineering, and Computer Engineering courses. Students from TP's Common Engineering Programme posted to these four diploma courses are also eligible. The TPP allows selected students to take modules taught by SUTD during the course of their diploma studies, and to earn credits which are counted towards both TP's and SUTD's graduation requirements. Students selected for the TPP will have their polytechnic curriculum adjusted to allow them to complete their TP modules before starting their lessons in SUTD.

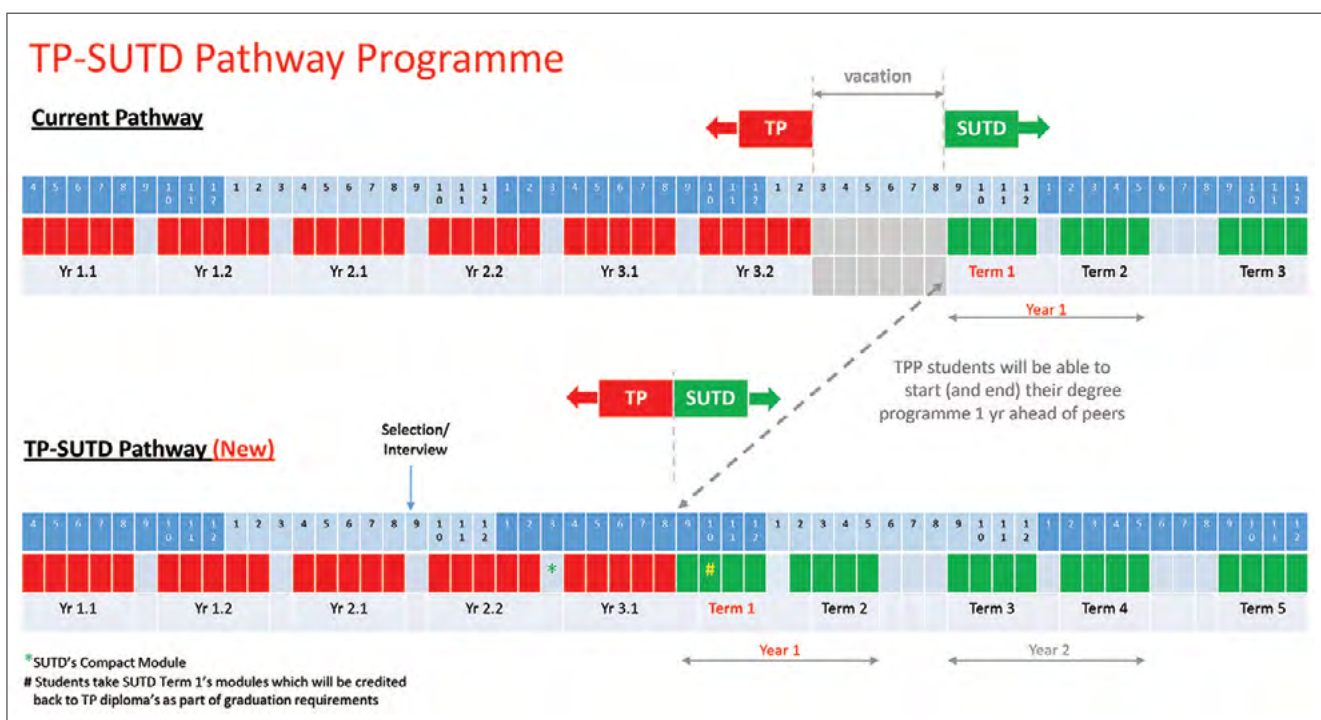
How the TPP works

Eligible TP students can apply for the TPP at the end of Year 2, Semester 1 of their diploma course. They will undergo a merit-based selection jointly administered by TP and SUTD, which will assess them based on academic grades and interview performance. For a start, the programme's inaugural cohort will admit around 20 students.

Selected students will begin the TPP by taking a compact SUTD module during their vacation break at the end of Year 2 Semester 2 in TP. From Year 3 Semester 2, the TPP students will start taking SUTD Term 1 modules alongside SUTD Freshmore (i.e. Year 1) students. These modules taken in SUTD will also be counted towards the students' elective module graduation requirements in their diploma studies. The students can also look forward to a residential experience similar to that of an SUTD Freshmore student.

Professor Pey Kin Leong, SUTD Associate Provost for undergraduate studies said, "SUTD is pleased to work with TP to open multiple avenues for students to pursue higher education. The partnership with TP will give potential students an early taste of the unique SUTD education in engineering and architecture, with a strong focus on human-centred design and innovation. Students under this programme can graduate a year earlier with a diploma and bachelor degree".

Echoing the benefits of the programme, Mr Wong Kia Ngee, Director of TP's School of Engineering said, "By allowing students to start their university modules early while they are in TP, the TP-SUTD Programme has provided an additional pathway for our students to transition to university when they are still in the polytechnic. We will continue to explore collaboration opportunities with institutions of higher learning to ensure that our students get the best possible learning experience while realising their aspiration for further studies".



NEW CERTIFICATION SCHEME

TO RECOGNISE ENGINEERING TECHNOLOGISTS AND TECHNICIANS

As part of IES' efforts to uplift professional recognition of engineering technicians and technologists, the Chartered Engineering Technologist (CETg) and Technician (CETn) Certification Scheme was unveiled during a hybrid ceremony held at the Singapore Polytechnic Auditorium on 22 January 2021.

The event, which was graced by Minister of State for Education and Manpower Gan Siow Huang, saw the recognition of the inaugural batch of 84 technologists and 46 technicians from the Built Environment, Land Transport and Water & Environment sectors.

Many of the qualified CETg will also be appointed as the first batch of independent assessors for CETn.

The scheme will open up a non-academic route for engineering technicians and technologists to move towards Chartered Engineer accreditation, based on their technical skills, competencies and work experience.

Besides enhancing career opportunities, it will also build a pool of engineering professionals with complementary skillsets to contribute to the growth of Singapore's industries.

Additionally, it is a step towards IES' vision of forging an inclusive engineering community in support of Singapore's increasingly innovation-driven economic growth, and has been developed in alignment with the SkillsFuture Skills Framework to boost skills-based career development and foster a culture of lifelong learning.

The official installation of the Chartered Engineering Technologist and Technician Accreditation Board (CETTAB) members also took place at the event. CETTAB, a multi-organisational body set up to operationalise the scheme, will serve in the areas of registration, accreditation and quality assurance.

In addition, IES signed an MoU with the Singapore Bus Academy to recognise their on-going collaboration in setting standards and quality assurance under the Land Transport - Automotive (Bus) sector.

"This scheme brings us a step closer to our vision ... where all practitioners have the opportunity to learn, earn professional recognition and contribute to their organisations and industries, regardless of their level of academic qualifications," said IES President Dr Richard Kwok.

The scheme is the fruit of development by more than 40 partners from the public and private sectors, professional associations, and institutes of higher learning. It follows the MoU signing for the National Engineering Career Progression Pathway for Technologists and Technicians in July 2019.

"With the support of several sector-based Work Groups, we have set up a rigorous competency-based framework, clear assessment criteria and a proficient accreditation board.

"Our aim is to recognise the technical competency level of Chartered Engineering Technicians and Technologists nationally and internationally," said CETTAB Chairman Er. Tan Seng Chuan.

Er. Tan also encouraged all technicians and technologists to apply for the scheme, as it would open up new possibilities for their careers and enable them to make even greater contributions to society.

For more information on the scheme and CETTAB, visit www.cettab.com.sg.





GEARING UP FOR THE ERA OF ROBOTS

The automation era is upon us, where robots are no longer just science fiction but an integral part of our daily lives. As robotic applications move from manufacturing into the service sector, and from factory floors to public spaces, the Singapore Institute of Technology (SIT) is also gearing up its students and the industry for the robotics revolution.

Robots have come a long way from confined roles of performing hazardous tasks in place of humans, to key enablers of advanced manufacturing, to ‘cobots’ – collaborative robots that work with and for humans in people-centric environments.

In Singapore, robotics and automation have been identified as key focus areas for creating new growth opportunities and enabling industry transformation.

In 2017, more than 4,400 industrial robots were installed, an increase of 72 per cent from 2016, according to figures from the Ministry of Trade and Industry Singapore.

Besides industrial robots, the adoption of service and field robots is also on the rise. Singapore’s robotics ecosystem of automation companies, systems integrators and research institutions has been growing steadily to support the design, development and deployment of robotics solutions in various sectors.

A New Programme to Support Career Aspirations in Robotics

As opportunities in robotics continue to bloom, many are eager to pursue a career in the field.

But robotics is a complex, interdisciplinary field that involves much more than building robots. A robotics or automation engineer requires knowledge and skills across diverse areas, including mechanical and mechatronics, electrical and electronics, computers and networking, sensors and digital signal processing, navigation and control, as well as cognitive science and systems engineering.

To prepare students to excel in this field, SIT launched the Bachelor of Engineering in Robotics Systems in January 2021, as part of its suite of specialised degree programmes.

Designed in consultation with key partners such as the National Robotics Programme (NRP) and the Economic Development Board (EDB), the four-year programme focuses on the design and development of service and field robotics systems.

It will cover the deployment of integrative elements including software engineering and artificial intelligence (AI) to link various mechatronics elements together to create a complete robotics system.



Upon graduation, students will be equipped with competencies to solve intricate problems in multiple domains and tackle the evolving demands of Singapore's service robot industry.

Applied learning is a core component of SIT's approach to education for all of its programmes, and robotics is no exception. Students in the degree programme will be given opportunities to contextualise theories into real-world industrial applications.

Besides projects, they will also participate in the Integrated Work Study Programme (IWSP), a 12-month work attachment to develop specialist skills in robotics and learn from industry experts.

Driving Applied Research in Robotics

As Singapore's University of Applied Learning, SIT pursues applied research across its programmes, including robotics systems.

Its work in robotics is closely aligned with NRP, set up by the government to harness robotics technologies and capabilities to address challenges to Singapore's ageing population and enhance industrial productivity.

SIT's faculty members actively participate in NRP's Deep Dive discussion series to investigate applications, technology transition and new initiatives for research and technology development in robotics. This adds to its efforts in partnering with local industries to drive industry innovation and transformation.

A prime example is SIT's collaboration with local SME, Solustar, to develop and test solutions for autonomous navigation and path planning for their disinfectant robots. Its Engineering, Infocomm Technology and Health and Social Sciences clusters have also worked together to bring about cross-fertilisation of ideas for solutions in assisted healthcare, teleconsultation, as well as robotics and automation solutions.

Joint Laboratory to Collaborate on Robotics

To spur robotics development, SIT has set up a joint laboratory with strategic partners.

In December 2020, SIT signed a Memorandum of Understanding with the DSO National Laboratories (DSO) to establish the DSO-SIT joint laboratory. It is aimed at developing robotics and cybersecurity projects with an emphasis on dual-use technologies to benefit the commercial sector and the defence community. The laboratory will be sited at SIT@Dover to facilitate collaboration between researchers from DSO and SIT.

The laboratory's inaugural project is a development of advanced robotics transporter drone technologies. Besides integrating design of key power and propulsion technologies, aerodynamics and control systems, the project will also develop an innovative Virtual Flight Tests approach.

Taking this initiative further, SIT is exploring another project with DSO to design a Digital Twin for experimenting with advanced sensor design and predictive maintenance concepts to enhance the safety of robotics systems.

Moving forward, SIT plans to introduce corporate laboratories for joint work in robotics and emerging technologies in the near future to further boost the capabilities for robotics systems development. ■



Signatories of the MOU (from left): Mr Cheong Chee Hoo, Chief Executive Officer, DSO; and Prof Chua Kee Chaing, Deputy President (Academic) & Provost, SIT. (Image credit: DSO)

This sponsored feature on engineering education was brought to you by SIT.

FIRST SMART-ENABLED HDB HOMES

IN PUNGGOL NORTHSHORE COMPLETED

A range of technologies have been used.



Northshore Residences I & II - the first two smart-enabled housing precincts in Punggol Northshore, Singapore's first smart and sustainable district.

Smart living in residential estates developed by the Housing & Development Board (HDB) has come to fruition, with the completion of Northshore Residences I and II - the first two smart-enabled housing precincts in Punggol Northshore. In line with Singapore's vision of a Smart Nation, Punggol Northshore is the first public housing district to testbed smart technologies right from the design stage, to enhance the planning, design and maintenance of HDB estates, in order to bring about a more liveable, efficient, sustainable and safe living environment.

As of 14 December 2020, about 85% (1,192 out of 1,402) of home owners from Northshore Residences I and II have collected their keys. These flats are equipped with smart distribution boards and smart sockets to help residents monitor their energy consumption. They also support the adoption of smart home solutions and applications developed by commercial companies, more easily, within their homes. The smart distribution board replaces the conventional distribution board in HDB flats, enabling residents to monitor electricity usage across household appliances. In addition, smart sockets are provided in every bedroom, living room and kitchen within the flat. Similarly, residents can track the energy usage of a home appliance, such as a television set, when it is plugged into the smart socket. In turn, residents will

be able to effectively moderate the use of their home appliances, enabling them to save electricity and reduce their utility bills.

“The completion of the first smart precincts in Punggol Northshore is a major milestone in HDB's smart journey which started in 2014. The delivery of these smart homes also caps off Year 2020, where HDB marks 60 years of transforming Singapore's public housing landscape, with significant shifts towards well-designed, smart, sustainable and community-centric towns in the last 10 years. As HDB enters its seventh decade, it will continue to tap on smart solutions and adopt bold ideas to create the best possible homes for Singaporeans.”

- Dr Cheong Koon Hean, Chief Executive Officer, HDB



Environmental modelling helps to inform the design of open spaces, placement of amenities like playgrounds, as well as optimise the building layouts and orientation to capture wind flow and promote natural ventilation.

SMART LIVING AT PUNGGOL NORTHSORE

Beyond the improvements in the flats, HDB has also implemented other smart initiatives in Punggol Northshore to make daily living more convenient and comfortable for residents. For example, in the planning and design of the district, HDB carried out environmental modelling, to simulate the interaction of environmental factors such as wind flow, the amount of sunlight falling on a surface, and the casting of shadows. As a result, more greenery has been planted in potential hotspots to lower the ambient temperature, while outdoor amenities such as playgrounds are sited in well-shaded locations, thereby creating a more pleasant living environment.

Residents can also look forward to more reliable estate services, with sensors to monitor and issue alerts when maintenance of common amenities, such as lights or lifts, is required. These facilities or fittings can then be checked and any issue identified can be resolved promptly, with minimal disruption to services. In addition, estate management will be more efficient, with the introduction of new technologies, such as smart lighting at common areas, that adjusts illumination levels, based on human traffic patterns, thus reducing energy consumption.

SMART TECHNOLOGIES IMPLEMENTED IN PUNGGOL NORTHSORE

In September 2014, HDB announced the 'Smart HDB Town Framework', which mapped out how HDB intends to harness Information and Communication Technology

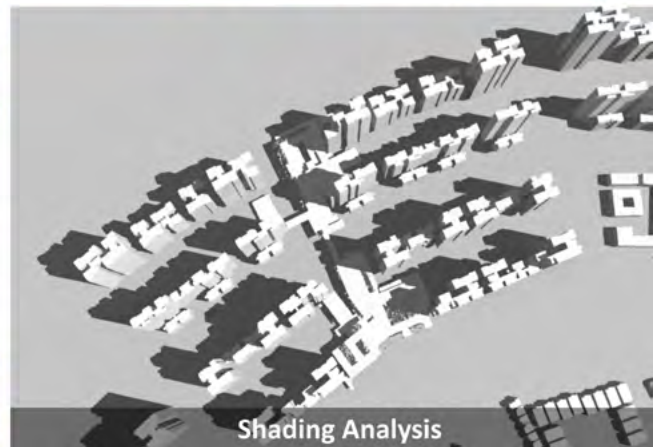
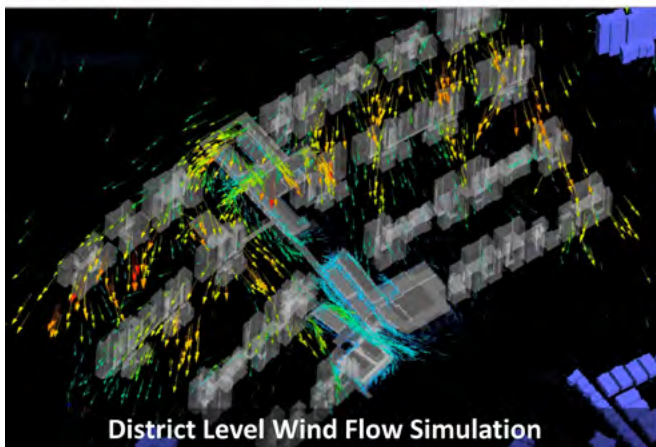
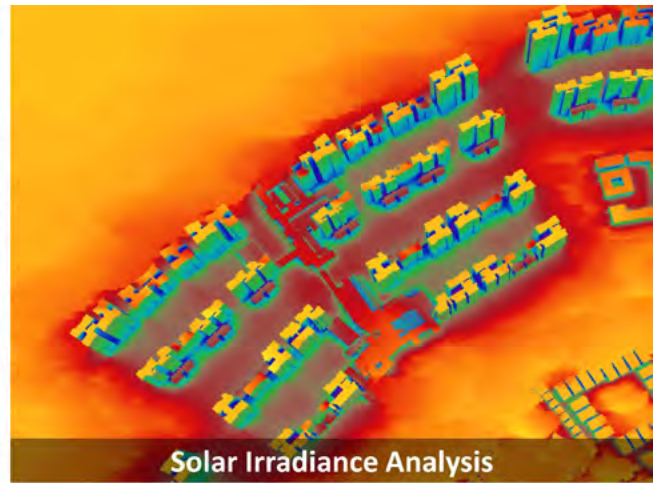
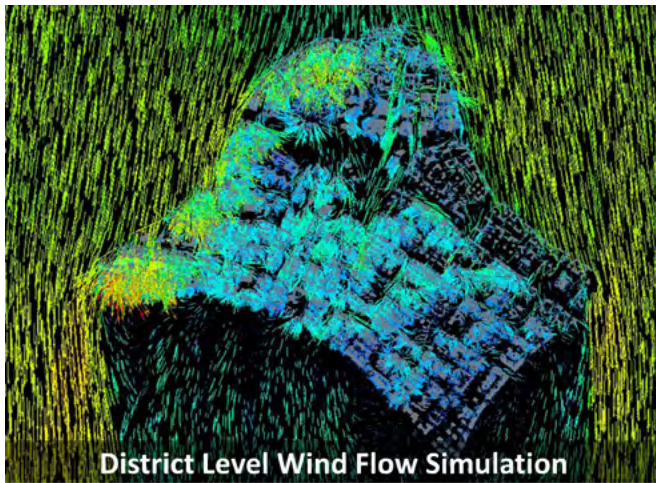
(ICT) to introduce the 'Smart' element in public housing, to achieve a more liveable, efficient, sustainable, and safe living environment. The framework covers five key domains - Smart Planning; Smart Environment; Smart Estate; Smart Living; Smart Community.

Punggol Northshore, one of seven waterfront housing districts in Punggol town, will be the first district to incorporate smart features across the whole district. Envisioned to be 'A Smart and Sustainable District', it is Punggol's first district to test-bed smart technologies in public housing, right from the design stage, to enhance the planning, design and maintenance of HDB estates.

The smart technologies implemented in Punggol Northshore under the five key domains are as follows:

Smart Planning

- The use of computer simulation and data analytics will enable HDB to improve the way it plans and designs its towns, precincts and buildings, and also derive optimal and cost-effective solutions to achieve sustainability goals. Real-time data is integrated into simulation models to derive the optimal and most cost-effective solutions for urban design technologies in HDB towns.
- For example, environmental modelling of microclimatic conditions facilitates the urban planning and design process to create a green and comfortable living environment. Studies on wind flow, temperature, the amount of sunlight falling on a surface, and the casting of shadows were carried out at Punggol Northshore District to aid decision-making during the planning and



Environmental modelling aided decision-making during the planning and design of Punggol Northshore District.

design process. Through environmental modelling, potential hotspots were identified, where greenery could be introduced to bring down ambient temperature; well-shaded locations were identified, to place outdoor amenities such as playgrounds and fitness corners; and optimal locations were identified, for future installation of solar panels.

The Integrated Environmental Modeler (IEM) builds on the design technology that HDB has been developing through the years. Treelodge@Punggol was the first HDB project to be planned using simulation tools that optimise environmental factors. The IEM was previously trialled on a small scale in Punggol and later used in enhancing the planning of Bidadari.

Smart Environment

- Smart initiatives have been deployed in Punggol to improve estate maintenance. For example, through the implementation of a network of sensors, a 'Smart Environment' can be created. The sensors will capture real-time information on factors such as resource utilisation (energy & water), waste generation and the environment, providing insights that can help improve estate services by integrating, managing, and analysing data from various sources.

Smart Estate

- To improve estate services, HDB will leverage Smart technologies to collect and analyse data that helps to optimise maintenance cycles and preempt potential problems.
- A central data repository for the collection, integration, management, processing and analysis of data collected from a network of estate sensors in products performing key functions, e.g. lighting, water pumps, lifts and solar panels, is being developed. This will enable HDB to monitor the health of estate services in real-time, allowing for quick detection of issues, optimised maintenance cycles, proactive upgrading and replacement of systems, and identifying opportunities where resources could be saved. This could, in turn, help to minimise disruption of services and reduce inconvenience for residents.
- Smart Lighting in common areas will be sensor-controlled and equipped with predictive data analytics tools to understand human traffic patterns. Lighting in common areas, with little or no human traffic detected, could be reduced to 30%, potentially saving as much as 60% on energy usage.
- Smart Irrigation uses moisture sensors and considers the various factors that may affect the amount of



Sensors have been deployed in Punggol to improve estate maintenance.

water retained in the soil (e.g. rainfall and exposure to sunlight) to optimise plant watering schedules and usage. This is a water-efficient and less labour-intensive approach to maintain greenery and landscaping.

- Smart Parking uses automation and real-time technological capabilities to provide for seamless entry and exit of vehicles, dynamic allocation of available lots, and in-app alerts for ease of payments, as well as reminders if users have parked in unauthorised lots.

Smart Living

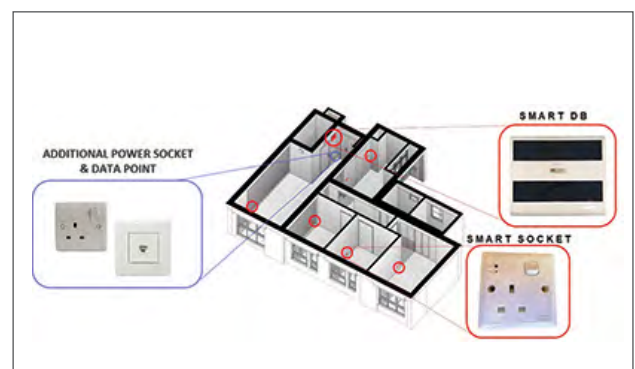
- Smart-Enabled Homes will be equipped with additional infrastructure, such as additional power and data points at strategic locations, as well as smart sockets and a smart distribution board in Northshore Residences. The smart distribution board replaces the conventional distribution board in HDB flats, enabling residents to monitor electricity usage across household appliances. Similarly, smart sockets are provided in every bedroom, living room and kitchen within the flat for residents to track the energy usage of home appliances when they are plugged into the smart socket. With the appropriate ICT infrastructure in place, residents will be able to enjoy more convenience and energy savings, when they adopt compatible smart home solutions and applications developed by commercial companies.

Smart Community

- HDB also leverages data analytics and ICT to better understand and engage residents, based on their demographics, social trends and lifestyle preferences. This



The Smart Hub, akin to a 'brain' of estate operations, enables HDB to monitor estate services in real-time.



Smart-enabled flats are equipped with the necessary infrastructure to support residents' adoption of smart devices and applications.



Barrier-free car park entrance and exit at the smart HDB car park in Northshore Residences.

can enhance community-building efforts and empower communities to co-create their living environments with HDB.

- HDB launched the Pulse of the Heartlands initiative, in collaboration with tech companies, to develop an ecosystem of applications and services that will be useful to residents. The development of such an ecosystem will leverage the digital capabilities of a new Artificial Intelligence (AI) and data platform, which comprises information on HDB towns, such as on shops in the neighbourhood. Over time, the platform will be enriched with more datasets, as other public agencies and private companies come on board to offer more types of data, such as location and availability of transport and car park facilities. App developers can tap on the platform's data to build more applications, and as users interact with these applications over time, the data platform will collect more insights on residents' interests, which could inform future planning and management of community facilities.
- HDB also embarked on the 'New Urban Kampung' research programme, a study on social behaviour, undertaken together with Singapore University of Technology and Design (SUTD), in 2017. This in-depth, multi-disciplinary study combines the fields of behavioural studies, Computational Social Science and Urban Informatics, to predict how the demographics in HDB towns are likely to evolve. It also attempts to forecast residents' behaviour and responses to initiatives introduced in their living environment so as to help HDB improve the design of the towns.

Tapping on data from traditional surveys and sensor networks around the estate, and through engaging the

community, HDB believes it can better understand residents' preferences and create new housing solutions in tandem with their evolving needs and aspirations.

A MORE CONVENIENT AND SEAMLESS PARKING EXPERIENCE

From January 2021, residents living in Northshore Residences I and II, and their visitors, are expected to benefit from a new generation parking system which offers a seamless and more convenient parking experience. The Smart Parking system, Parking@HDB, is the latest addition to the suite of smart features in the district.

Parking@HDB includes various features aimed at improving the parking experience for residents and motorists:

Seamless entry and exit for motorists

Motorists can seamlessly enter and exit the car park. Gantry barriers will no longer be put up at the car park entrance and exit, as vehicle plates are registered via cameras.

More payment options for short-term parking charges

Motorists parking for a short period are encouraged to download the Parking@HDB app at Apple App Store or Google Play Store, so that they have the additional option of paying their parking charges via credit or debit card, through the app. The smart parking system detects their vehicles when they enter the car park and automatically activates the parking session through the app. Parking charges will be automatically deducted when they exit the car park, without the need for motorists to manually activate the app. With this, motorists need not insert their cash cards into the In-vehicle Unit (IU), nor worry about insufficient funds.



Lot availability is signalled by the overhead light indicators, enabling motorists to locate available lots quickly.

For motorists who do not have the Parking@HDB app, the parking charges will continue to be deducted from their cash card in their IU.

Efficient parking experience

To provide greater convenience to motorists when searching for available lots, colour-coded LED overhead guidance indicators have been installed above every parking lot to signal lot availability. A green colour means the lots are available for short term parking, while an amber colour means the lots are reserved for season parking. The light indicator will be switched off for occupied lots.

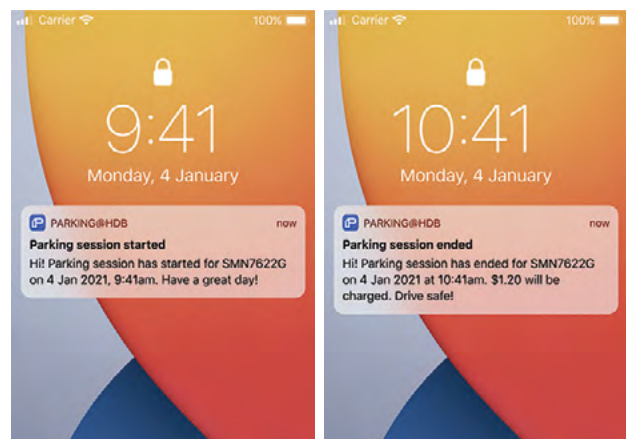
In-app alerts for motorists

Motorists who park short term will receive in-app notifications in real-time, at the start and at the end of their parking sessions, and will also be notified of the incurred charges.

Smart cameras are installed in the car park to detect motorists who park illegally. Motorists who park in an unauthorised lot will receive an automated alert informing them to shift their vehicles, if they have downloaded the app. Those who do not remove their vehicle will face a fine. Motorists without the app will not receive such a notification. Instead, the system will alert HDB to administer the enforcement, backend. This will allow for automated enforcement round-the-clock, to ensure more orderly parking for the benefit of both motorists and residents.

Flexible allocation of parking lots

HDB will be able to better cater to the parking needs of season parking ticket holders and visitors, more flexibly and effectively. Based on the data collected on car park usage, the system will automatically allocate parking lots to



Motorists will be notified at the start and at the end of their parking sessions, and will also be notified of the parking charges.

meet varying demands on a real-time basis. For example, during the day when demand for short-term parking is high and season parking lots are not fully occupied, the system will increase the lots for short-term parking, by adjusting the light indicators from amber (indicating a season parking lot) to green (indicating availability for short-term parking). Conversely, the number of available lots for short-term parking will be reduced in the evening to ensure sufficient lots for season parking, when residents return home. This will allow an efficient and dynamic allocation of parking lots to meet motorists' needs throughout the day.

All images by HDB

KEPPEL BAY TOWER CERTIFIED AS SINGAPORE'S FIRST GREEN MARK PLATINUM (ZERO ENERGY) COMMERCIAL BUILDING

The original target of creating Singapore's first super low energy high-rise existing commercial building has been surpassed.



Keppel Bay Tower is the first Green Mark Platinum (Zero Energy) commercial building in Singapore.

The Building and Construction Authority (BCA) has certified Keppel Bay Tower, owned and operated by Keppel Land Limited (Keppel Land), as a Green Mark Platinum (Zero Energy) building. It is the first commercial building in Singapore to achieve this accolade.

A Green Mark Platinum (Zero Energy) building must, in addition to achieving a low energy use index (EUI) of less than 115 kWh/m² per year, also have all of its energy consumption, including plug load, supplied from both on-site and off-site renewable sources.

Mr Tan Swee Yiow, CEO of Keppel Land, said, "In line with Keppel's Vision 2030, Keppel Land places sustainability at the heart of our strategy and operations. We are committed to doing our part in greening the built environment and are delighted by BCA's recognition of Keppel Bay Tower as the first Green Mark Platinum (Zero Energy) commercial building in Singapore, which is an important affirmation of our efforts to leverage

technological innovations to enhance the environmental performance of our buildings. We hope that this will pave the way for more zero energy commercial buildings in the years to come, and look forward to further pushing the envelope of environmental sustainability in Singapore and beyond".

Commenting on the achievement, Mr Kelvin Wong, CEO of BCA, said, "This is a significant milestone in our green building journey and I applaud Keppel Land's commitment and efforts in this outstanding accomplishment. It also demonstrates how research and innovation can make zero energy, high rise commercial buildings a reality. I believe this is just the first of many more to come and I look forward to upcoming contributions from across the Built Environment value chain to realise our collective goal of a greener and more sustainable Singapore".

In 2018, BCA awarded Keppel Land a grant of up to SGD 1.28 million, under the Green Buildings Innovation

Cluster (GBIC) programme, to implement new and emerging energy-efficient technologies at Keppel Bay Tower. The aim of this programme is to experiment with energy-efficient solutions, as well as exhibit them to, and exchange knowledge on these solutions with, stakeholders.

The energy-efficient technologies that were piloted at Keppel Bay Tower include a high-efficiency air distribution system, an innovative cooling tower water management system, integrated sensor technology to optimise fresh air intake, smart LED lighting solutions, and an intelligent building control system.

By February 2020, Keppel Land had achieved a reduction of 22.3% in annualised energy consumption of the building, exceeding its initial target of 20%. Following the successful pilot, some of these technologies, such as the high-efficiency air distribution system, are currently being replicated in the rest of the building.

In addition, an assembly of photovoltaic (PV) panels spanning over 400 m² will be installed on the roof of the 18-storey Keppel Bay Tower as well as its six-storey podium block. The installation of the PV panel system will generate an energy yield of about 100,000 kWh per annum.

Upon completion of these initiatives, Keppel Bay Tower's annualised energy consumption, or energy use intensity (EUI), will be less than 115 kWh/m² per year, which is a reduction of over 30% from its 2017 Green Mark Platinum level and almost 50% less compared to typical office buildings in Singapore [1].

This translates to energy savings of over 2.2 million kWh a year from its 2017 baseline, which is equivalent to the amount of energy required to power more than 400 homes in Singapore for one year [2].

This also translates to cost savings of approximately SGD 400,000 annually. The remaining energy use will be offset through the purchase of Renewable Energy Certificates (RECs) through Keppel Land's electricity retailer, Keppel Electric, which are generated from PV panels installed at Keppel Offshore & Marine's yards in Singapore.

Earlier in January 2020, Keppel Bay Tower became the first commercial development in Singapore to utilise renewable energy to power all its operations, including the offices of tenants in the building. The purchase of RECs, together with the installation of onsite PV panels at Keppel Bay Tower, will result in a reduction of over 2,400 tonnes of carbon emissions per annum.

Throughout this journey, Keppel Land collaborated with different stakeholders, including business partners and tenants. For example, the company collaborated with Envision, a global leading smart energy management company and tenant in Keppel Bay Tower, to introduce a smart building control system to further improve the energy efficiency of the building.

It also partnered Signify Singapore (formerly known as Philips Lighting) to roll out a scheme for Keppel Bay Tower's tenants to replace their existing office lamps



The energy-efficient technologies that were piloted at Keppel Bay Tower include a high-efficiency air distribution system, an innovative cooling tower water management system, integrated sensor technology to optimise fresh air intake, smart LED lighting solutions, and an intelligent building control system.

with energy-efficient LED lighting with no upfront capital investment required. This initiative helps tenants enjoy about 30% savings on their utility bills and reduces the total building energy consumption by about 5%.

As a sustainable landlord, Keppel Land encourages its tenants to adopt green practices.

In 2019, Keppel Land achieved 100% participation from all its office tenants at Keppel Bay Tower in signing green leases, which is a demonstration of the company's commitment to working with its tenants to provide energy-efficient, resource-efficient and healthier interior spaces for building occupants.

The green leases have incorporated the requirements of the BCA-HPB Green Mark (for Healthier Workplaces) Certified Standard which focuses on the health and well-being of building occupants in green offices.

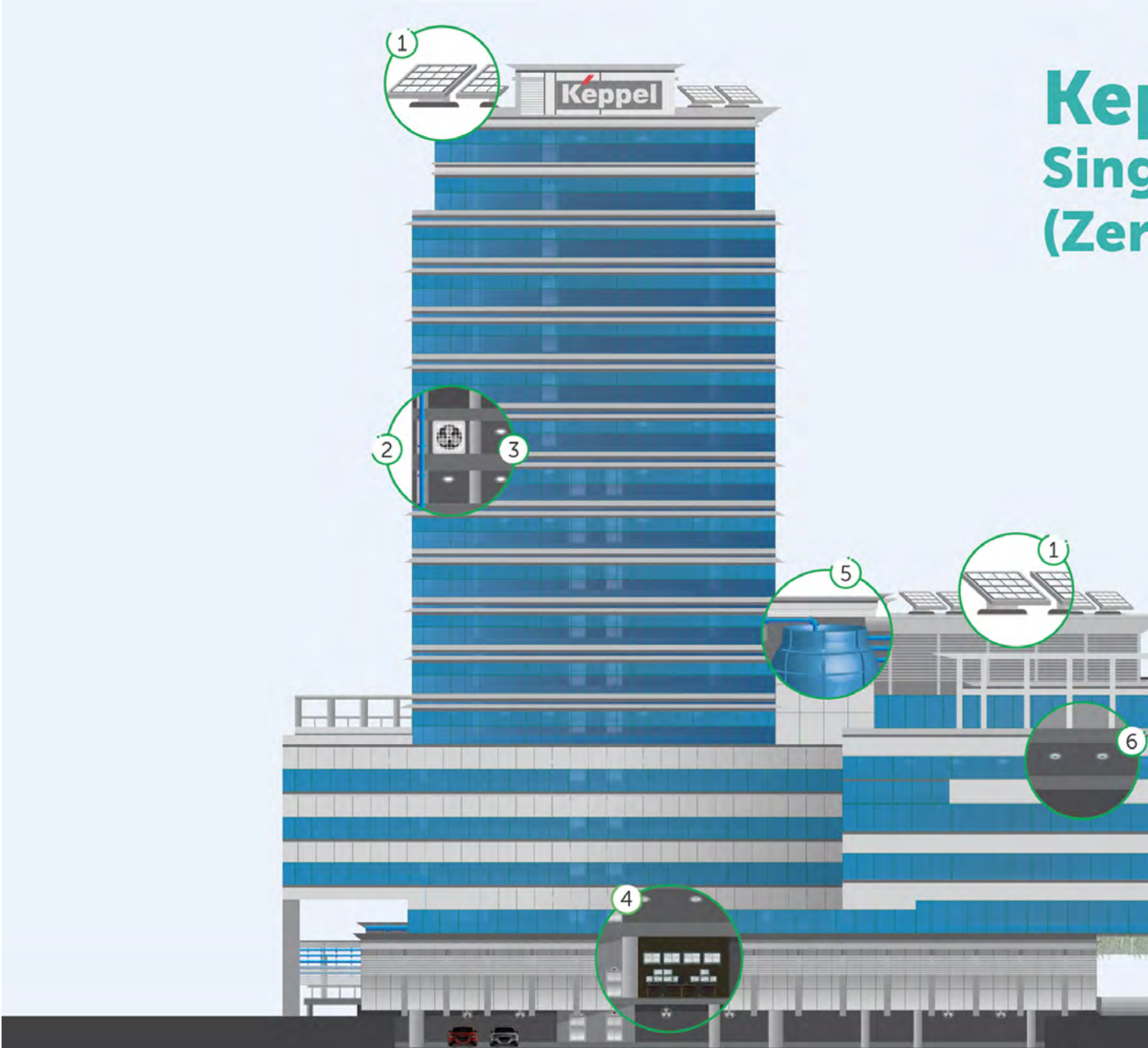
References

[1] Average EUI of large office buildings (>15,000 m² GFA) in 2018 was 219 kWh/m² per year. Source: BCA Building Energy Benchmarking Report (Statistics and Figures) 2019.

[2] Based on average energy consumption of a five-room Housing & Development Board flat, which is 418 kWh/month. Source: SP Services.

All images by Keppel Corporation Limited

Keppel
Singapore
(Zero Carbon)



Smart, eco-features of Keppel Bay Tower

- 1 PV Panel System**
allows the harvesting of about 100,000 kWh of energy per annum
- 2 Energy-Efficient Air Distribution System**
features air handling unit fans which are about 45% more energy-efficient than other best-in-class technologies
- 3 Demand Control Intake System**
utilises intelligent sensors to regulate airflow according to occupancy, optimising energy use and better thermal indoor environment

Smart and sustainable features of Keppel Bay Tower will result in a significant reduction in the building's carbon footprint.

Keppel Bay Tower - Singapore's first Green Mark Platinum (Low Energy) commercial building



Energy Use Index (EUI) of <115 kWh/m² per year

Almost 50% more energy-efficient compared to typical office buildings in Singapore



Reduction of over 2,400 tonnes of carbon emissions per annum

Purchase of Renewable Energy Certificates generated from PV panels installed in Keppel Offshore & Marine's yards in Singapore. Together with the installation of onsite PV panels at Keppel Bay Tower, these initiatives will result in a reduction of over 2,400 tonnes of carbon emissions per annum



Overall energy savings of over 30% or 2.2 million kWh/year

Equivalent to the amount of energy required to power more than 400 five-room HDB flats in Singapore for a year

Control Fresh Air System

Integrated sensors monitor fresh air intake to indoor activities, energy usage for thermal comfort and environmental quality

4

Intelligent Building Control System

employs a high-precision physics-based simulation engine to improve data analytics and control

5

Cooling Tower Water Management System

utilises a patented solution that reduces cooling tower water usage and eliminates the need for chemical water treatment

6

Smart Lighting System

utilises occupancy sensors which allow seamless transition in lighting levels according to building occupancy

THE ENERGY SECTOR

IN 2030

by Jackson Seng, Energy & Sustainability Services Leader,
East Asia & Japan, Schneider Electric



Mr Jackson Seng

It will look dramatically different.

The energy and sustainability sectors have experienced more rapid changes from 2010 to 2020, than they went through in the previous 50 years. As we enter the new decade, this global transformation is showing no signs of slowing - despite the COVID-19 crisis. Companies are moving faster and in more innovative ways than ever before, to address their own emissions and those of their entire value chains.

To many, 2020 was a tipping point for climate action. Strategies that were once considered cutting-edge are becoming foundational. If 2020 was a milestone, what can we expect to see in 2021? What progress, disruptions and opportunities can companies expect this year and beyond?

At Schneider Electric, we envision many changes in the energy and sustainability sectors this year and in the coming decade.

Consumers care about sustainable brand association

Incoming generations of consumers and employees increasingly place value on how their associations with a company's brand impact their identity. To highlight just a few examples, leading companies globally entice high calibre talent with their commitments to the environment while others market products to consumers by emphasising fair trade practices, use of repurposed fabrics, compostable packaging, or other similar attributes.

While there are many reasons to pursue such strategies and messaging, individuals primarily want to interface with organisations that share their ethos and strengthen their personal brand or identity. They are influenced by, buy from, and align with, brands not only based on the goods and services those brands represent, but also on the producing companies' legacy of good.

Sustainability is one of the disruptive features, if not the most important one, that will define this coming decade. In the identity economy, energy and sustainability initiatives will contribute to and accelerate business profitability, strategic direction, risk and financial management, and continuity. With COVID-19 causing a downturn in the 'gig economy', there is a gap that will be filled, coming out of this disruption, by the consumption patterns of young consumers.

Already now, companies are required to take decisive actions that deliver upon the market-disrupting



Megatrends are reshaping the business world, breaking down walls and powering convergence and collaboration.

sustainability demands of their shareholders, customers, boards, C-suites, and employees, among others, and seize the opportunities presented by this ever-changing world. The call to make these decisions will only grow louder over the next decade.

Reimagining the energy grid for a sustainable future

The grid is transforming in ways that will challenge conventional energy management. In particular, renewable energy generation and the use of distributed energy resources (DERs) are growing. They are expected to soon overtake traditional fossil-fired generation. In most global markets, renewable energy is already beginning to rival, or has surpassed, even the cheapest fossil fuel-generated sources on price competitiveness.

As the price continues to drop, cheap renewable energy will fundamentally reshape the electricity system. Bloomberg New Energy Finance believes that wind and solar will supply 50% of the world's electricity by 2050. And once battery storage becomes more cost-effective, it will revolutionise the potential of these renewable sources, helping wind and solar reach 80% penetration in some markets.

Although most large-scale energy storage options are not yet commercially viable, it would be short-sighted to assume commercial viability will not improve dramatically by 2030, whether as a result of breakthrough innovations or implied learning rates. By mitigating the intermittency and baseload issues that renewable power sources face, storage will help remove the barriers that have historically prevented greater adoption of energy from wind and solar resources.

Microgrids show great promise in this new ecosystem and are a perfect example of a fringe technology that may easily become a foundational tool for building resilient operations in the next decade. By connecting a combination of clean technologies, microgrids help organisations operate autonomously, away from the traditional grid, and integrate renewable sources on an even greater scale. One of the great advantages of microgrid technologies is that they can allow organisations to operate independently of the electricity grid - a future-proofing strategy to manage disruptions in energy supply caused by extreme weather events or pandemics, such as the one that we are currently living through.

Autonomous resources will drive the growth of a microgrid ecosystem

The way energy is managed and monitored, and the way it flows, is also changing. The grid is moving away from the historical linear system of generation-to-transmission-to-distribution-to-end use, to a more clustered and decentralised system, often described as peer-to-peer. The proliferation of renewables and other DERs has begun to test many of the long-standing assumptions underpinning today's power systems and is driving innovation, as prosumers (producing-consumers) seek to monetise the flexibility of their DERs, using bi-directional power flows.

In the future, countless DERs of all sizes and varieties will create new market opportunities for prosumers to optimise their energy resources. As an example, the electric car sitting in your garage can act as a DER - downloading energy when there is a grid surplus or uploading spare electricity back to the grid when there is a shortage - and in the process, potentially reducing charging costs.

Today, the term 'microgrid' typically applies to a specific set of onsite DERs that can be orchestrated in a unified fashion and islanded from the broader grid. In theory, any electrically connected asset with onboard communications

and computational capability could respond to a command signal in a way that could support the overall operation, balance, and cost equation of the grid ecosystem.

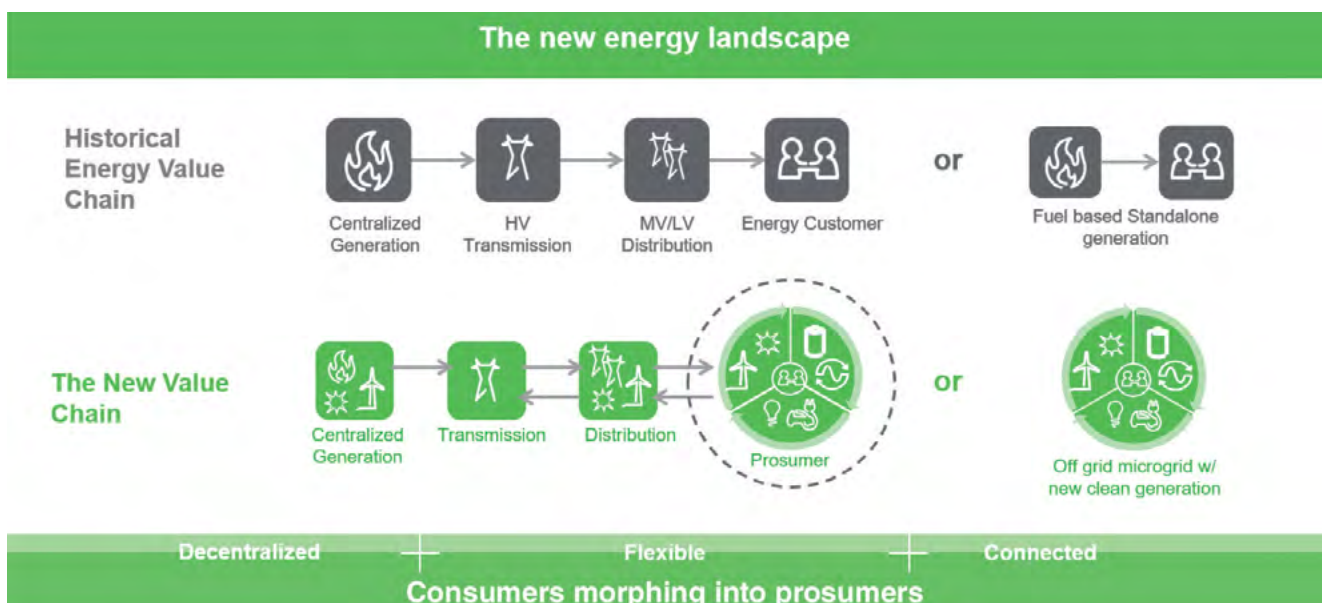
This level of interconnection may sound futuristic, but it is at the very heart of the IoT revolution that is driving innovation in virtually every global industry. Thanks to low-cost, communications-enabled microchips embedded in everything from home appliances to electric vehicles to smart light bulbs, the ability to create a response in any number of highly-distributed assets exists today. With grid operators already offering incentives to control smart thermostats, how much harder is it to imagine a grid control signal being sent to a smart lightbulb in a home?

In times of uncertainty, looking to the future of energy and sustainability instils a sense of hope and purpose to do better. This can revolutionise the way business operates today, and in a manner that benefits both the environment and the bottom line.

As organisations reassess their strategies, coming out of the COVID-19 pandemic, they should recognise the pending recovery for what it is - a unique opportunity to thrive in the identity economy, by assessing what future generations value, and operating in a way that enables a sustainable future, in every sense of the term.



The costs of renewable energy have dropped significantly.



The energy internet is already generating new opportunities, and because energy generation is increasingly decentralised rather than reliant on a central source, a single node going down no longer causes a major interruption.

SAFETY AND CYBERSECURITY

FOR RAIL NETWORKS IN ASIA PACIFIC

by Mr Friedhelm Best, Vice President Asia Pacific, HIMA

With nations now much more prepared in dealing with the pandemic, Asia Pacific is slowly getting its economy back to speed, which means having to move large numbers of people, once again, safely and expeditiously.



Mr Friedhelm Best

Moving masses through the veins of the cities

In many of the Asia Pacific nations, public transportation is the crux of their economies, since the populace depends on an affordable and dependable infrastructure for work and leisure, especially in highly congested metropolitan cities around the region. Domestic air travel, whilst perhaps contributing to a faster journey, from point to point, may not be as affordable as rail or bus networks, especially when rail systems become fast and are meticulously engineered into urban planning. Domestic high-speed rail for larger nations in this region has become more important, especially as they have begun to link up provinces.

The region boasts some of the most advanced mass transit rail networks in the world, including in Singapore, Hong Kong SAR, Taiwan, Japan, South Korea, and China.

A McKinsey report accorded Singapore the top spot for public transport affordability, efficiency and safety. Hong Kong SAR has an extensive mesh network of heavy and light rail, with its more tenured and dependable MTR (mass transit rail) system put through a five-stage assurance process for safety-related and safety-critical systems.

A large continent like Australia has begun to see pockets of successful rail networks, such as the Newcastle Light Rail with six stops connecting the waterfront and the key parts of the city, as part of the Newcastle Urban Transformation and Transport Program (NUTTP). The Great Southern Rail is a 400 km railway corridor that now serves mostly freight, but promises to revitalise passenger mobility from Adelaide to Melbourne. This will increasingly become a great enabler for tourism and hospitality, and business travel as well.

Looking at smart safety and cybersecurity for rail

Rail safety as well as cybersecurity are mission-critical. For example, there must be safety controls to enable early braking and stopping of a speeding train, if it is coming towards a person who has fallen onto the rail track. Likewise, there must be early warning controllers linked to a control panel, that will enable operators to intervene early, should there be electrical failures affecting parts of the train or rail controls. And in the modern era of incessant hacking, any system, including rail and transportation systems, that has computers and networks involved, is subject to potential intrusions.



Rail reliability and safety are critical requirements. Image: Timothy Brandt.

Standards are everything in safety and cybersecurity. For rail systems, we need to comply with IEC 61508, the basic functional safety standard, and IEC 61511 for process-control and safety systems, IEC 62443 for IT security, as well as rail-specific safety standards such as IEC 62278 for RAMS (Reliability, Availability, Maintainability, and Safety), IEC 62279 for rail software, and IEC 62425 for rail system safety.

When looking at the safety aspects for rail systems, companies can consider either proprietary safety solutions or commercial off-the-shelf (COTS) solutions. Proprietary safety solutions may accord certain unique functionalities and controls that some companies may prefer, but a great majority of rail networks, built for longevity, cost-effectiveness, and ease of maintenance, may prefer, instead, to look at COTS solutions for functional safety, such as the HIMA SIL4 technology.

The Australian Rail Track Corporation (ARTC) is one such adopter of the HIMA COTS solutions, for its rail safety, achieving success and relatively lower costs.

The functional safety of rail networks is mandatory, as such transportation moves large numbers of people from different points, at high speeds and with zero tolerance for errors or failures.

With the COVID-19 pandemic raging through every inch of the world, the demand for functional safety of rail systems is compounded with new requirements such as increased hygiene and safe distancing between passengers, whilst still conforming to consumer demands for a dependable and fast transportation system that never fails. In the pre-COVID-19 world, regular or daily general cleaning of the cabins and floors would have sufficed.

Surmounting safety and cybersecurity challenges

Cybersecurity threats are ever present and escalating, just as we deal with the pandemic, daily, as individuals and as institutions. Therefore, the global protocols will continue to change our lives even as economies slowly unravel the damage already done.

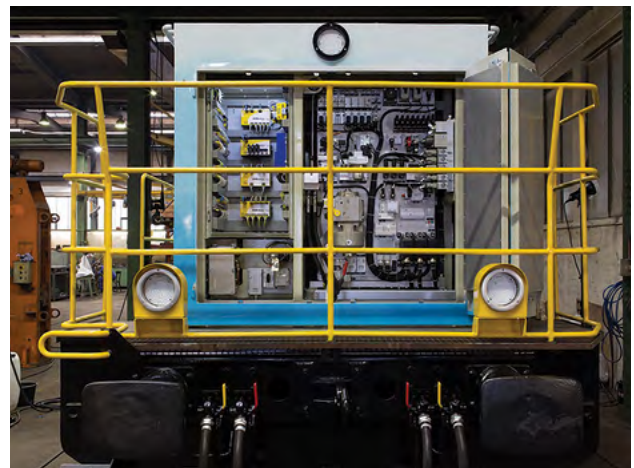
Moving large populations between homes and workplaces efficiently, whilst ensuring functional safety, cybersecurity, and medical hygiene, will become the thrust of all rail network operators and government officials, alike.

The current and emerging technologies are rising to these challenges and we are surmounting them. After all, we have all braved economic crises and pandemics before, and emerged victorious.

All images by HIMA Paul Hildebrandt GmbH, unless otherwise stated



HIMax Uninterrupted Safety Control from HIMA.



HIMA COTS (commercial off-the-shelf solutions) contribute to rail safety.



HIMA Smart Safety at work.

IS YOUR TEST BENCH

STILL ON MUTE?

by Wayne Mackey, Global Marketing Leader, New Product Introduction Launch Programs, Keysight Technologies



Mr Wayne Mackey

No engineer wants test equipment.

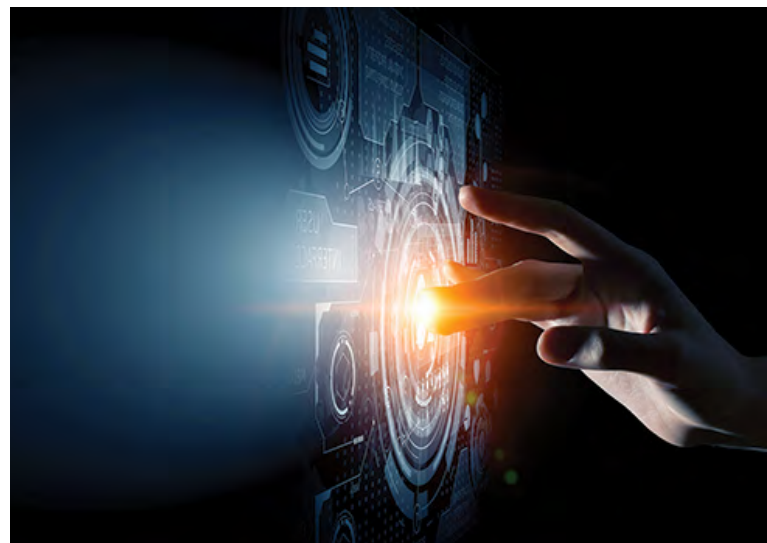
An oft-quoted speech by a machine tool executive began with “Last year my company sold over 2 million quarter-inch drill bits. None of my customers wanted them. They wanted quarter-inch holes”. Likewise, test engineers need to know if their device is doing exactly what it should be doing. Test equipment is just the tool to get that job done. But like a dull drill bit, each piece of test equipment on the bench, isolated on ‘mute’, obstructs engineers from getting their job done right. Sharpen your test bench by intelligently sharing across equipment boundaries, automatically recording and analysing test data, and providing quick and easy Q&A support.

The essential test bench is a power supply and function generator, as sources, coupled with a DVM (Digital Volt Meter) and an oscilloscope as receivers. They are the foundation of electrical engineering education and measurement, but are not ‘smart’ on their own. On a smart bench, each piece of test equipment hardware connects seamlessly with other test equipment, and uses smart bench instrument, laboratory, and remote learning software, to communicate, eliminate mundane tasks, simplify complex settings, and facilitate remote collaboration.

An engineer must manually set up, measure, record, and analyse stand-alone test equipment results. In each of these essential processes, mis-steps and inconsistencies can and do occur. But many parts of these processes do not add any discovery value to the job that an engineer needs to do. They are predictable, rote, or recurring.

Smart power supplies and function generators communicate their status and settings to smart DVMs and oscilloscopes without compromising any creative or innovative elements of test. Smart DVMs and oscilloscopes interleave their data, providing composite on-screen numerical and visual insights. Smart bench instrument software snapshots every setting and piece of data from every piece of equipment, with the push of a button.

No smart test bench should be an island and no team member should have to work alone. The test group needs to see every setting, screen, and measurement - whether the members are present at the bench or are working from their homes or dorm rooms. ‘Hands-on’ becomes ‘sign-in’ with smart bench remote learning software. Institutions and companies need to optimise equipment allocation and maximise up-time.



Intelligently sharing across equipment boundaries.

Smart bench equipment, communicating its status automatically and integrating it lab-wide with smart bench laboratory software for quick and accurate decisions, eliminates laboratory leaders’ guesswork.

Connecting and sharing, in real-time, is not enough. A smart test bench automatically stores, analyses, and synthesises test equipment data and transforms it for use in getting the test engineer’s and the test laboratory leader’s jobs done.

The engineer’s job is to know that the device under test is doing exactly what it should. That applies equally to students, hobbyists, and professionals. Data from early tests or courses feed into later ones. But data that early tests do not capture and store is useless later. Every test bench comprises sources and receivers. Smart bench instrument software enables smart DVM and oscilloscope receiver devices to automatically send all their data alongside their smart source device’s settings into the cloud. The software analyses bench-wide data history resident in the cloud automatically against known standard tests, customised sequences, and prior measurements.

The laboratory leader’s job is different, but equally supported by smart bench laboratory software. Detailed lab-wide equipment history, from last year or last semester, provides insights into allocations, utilisation, and uptime, to achieve better performance. Out-of-date

or out-of-calibration equipment obscures results and confuses learning. The big-picture view of the status of all equipment in the lab enables the leader to predict updating and calibration issues, instead of reacting to them. The laboratory leader uses smart bench laboratory software history data to justify new equipment purchases when it is time to expand.

Documentation is a necessary evil for engineers and laboratory leaders. Smart bench instrument software and smart bench laboratory software take that pain away, by providing repeatable and professional composite overviews, charts, and tables. Reusable lesson plans correlate directly to specific test setups. Standard output report formats enhance consistent analyses and simplify grading or data review.

A smart test bench is only as smart as its user's ability to access its power. Intuitive interfaces and well-thought-out software go a long way in harnessing the power of a smart bench. But no artificial intelligence anticipates every issue. The solution is committed support from experts to answer questions from students, engineers and lab leaders, independent of their experience level.

Paraphrasing an old quip, "If you think support is expensive, try ignorance".

Support as an option results in too many users without the answers they need when they need them. Expert support leverages decades of experience and taps into the best source of information for a smart test bench - the people who designed the equipment and wrote the software. If your test bench equipment is on 'mute', it is time for a new smart bench.

If your 'job to be done' is to cut down a mighty forest, when should you pause to sharpen your axe? You cannot afford to ignore a bench full of old, disconnected test equipment that is perpetually on 'mute'. Competent test engineers and students may find a way to get the job or assignment done manually. But the price paid is in wasted time, error escapes, and higher total costs. Test equipment on 'mute' cannot keep up with better universities, competitors or with the longer-term demands of your students or customers.

All images by Keysight Technologies Inc



Industry 4.0-ready In-Circuit Test (ICT) Suite.



Measurement of engineering parameters.

TURNING

THE TIDE

Trend Micro Incorporated, a global leader in cybersecurity solutions, presents its recently released security predictions for 2021.

The coronavirus (Covid-19) pandemic has changed the way many organisations operate, as remote work has become the norm. However, moving from a customary office to a home-based workstation - potentially as a long-term arrangement - poses new security risks for businesses as more threat actors attempt to capitalise on Covid-19-related unease.

We affirmed in our security predictions for 2020 that the old paradigm, where networks are traditionally isolated behind a corporate firewall, would be behind us. Traditional setups and protections would no longer be adequate in an ecosystem that demands a wide range of services and platforms.

When the Covid-19 pandemic hit, organisations quickly had to reckon with this reality. It has put to the fore sobering reminders of perennial issues and neglected warnings that have beset cybersecurity for years. It also presented how organisations worldwide are at a significant risk of disruption by cyberattacks, global crises, and other eventual tipping points. While the risk has always been there, the pandemic only underlined the gravity of the issue: How are sectors equipped or prepared for such scenarios?

In 2021, organisations will scramble to deal with the far-reaching effects, while striving to stay secure, as online dependency grows. We discuss the developments that are not only plausible but ones that should also be anticipated. We look into the drivers of cybersecurity's near future and how organisations will have to adapt as threats and technologies exert their influence. Our report aims to empower organisations and decision-makers to frame a proper, strategic response that can withstand change and disruption.

THREAT ACTORS WILL TURN HOME OFFICES INTO THEIR NEW CRIMINAL HUBS

The ongoing pandemic and resulting lockdowns in many parts of the world have forced an influx of employees into unfamiliar territory - remote work, and in many cases, working from home full-time. As a result, many employees and companies are starting to realise the viability of working from home, moving forward. In these circumstances, users and enterprises will have to protect work-from-home setups from threats - not only for IT teams who suddenly need to secure entire remote workforces but also for individual users who need to take precautions.

The boundaries between work and private lives have broken down as work is done over home internet service providers (ISPs), with possibly unpatched routers and machines, other connected devices in the background, and family members sharing computers while working for different organisations. While virtual private networks (VPNs) can secure connections with workplaces, housebound users will have to be wary of VPN vulnerabilities that could drive remote attacks.

Home networks will also become launch points for threat actors looking to hijack machines and jump to other devices in the same network, aiming to gain a corporate foothold. Malicious actors will either take advantage of installed software or 'wormable' unpatched vulnerabilities - hopping from one remote worker's machine to another until it finds a suitable target. This supply chain attack will spread to other users downstream. Employees who remotely access confidential and critical information (e.g. in human resources, sales, and tech support) will also be actively targeted by data-stealing attacks in 2021. A lack of an intrusion detection system or a firewall in place, coupled with high-speed internet bandwidth, will make it especially easy for threat actors to move from one corporate network to the next.

Routers have always been viewed as sitting ducks for remote attacks on connected devices. Cybercriminals will offer hacked routers as a new service where they sell access to home networks. Access-as-a-service will emerge as a lucrative business model for criminals, who could establish persistent footprints and offer access to high-value home networks (such as those of executives or IT admins) to other threat actors. Organisations with converged networks will be prime targets for this - they will find themselves in the crosshairs of cybercriminals looking to profit by selling access to operational technology (OT) networks. An exploited weak point in the information technology (IT) space can become profitable for threat actors planning to cash in on OT network access in 2021.

Having detailed company security policies will help organisations ensure that the exchange of data between offices and employees working from home is protected adequately, and home office setups do not become a gateway for various forms of cybercrime. An incident response plan will have to outline how an organisation would deal with security in a network with discrete machines. Companies should advise work-from-home employees on home router and internet of things (IoT)

CYBERSECURITY CHALLENGES IN 2021 AND SOLUTIONS

Nilesh Jain, VP, SEA and India, Trend Micro, provides a summary of the predictions.

When the COVID-19 pandemic hit, organisations had to reckon with this reality - and fast. It has brought to the fore sobering reminders of perennial issues and neglected warnings that have beset cybersecurity for years. How are sectors equipped or prepared for such scenarios? Here are some of our predictions:

- **Threat actors will turn home offices into their new criminal hubs**

Home networks will also become launch points for threat actors looking to hijack machines and jump to other devices in the same network, aiming to gain a corporate foothold. Malicious actors will either take advantage of installed software or unpatched vulnerabilities - hopping from one remote worker's machine to another until it finds a suitable target. This chain attack will spread to other users downstream.

Employees who remotely access confidential and critical information (e.g. in human resources, sales, and tech support) will also be actively targeted by data-stealing attacks in 2021.

- **Contact tracing will have malicious actors directing their attention to users' gathered data**

Rapid access to data could be crucial in fighting the outbreak but easing data privacy measures leads to problems of its own. Big databases, along with hasty implementations, are rich targets for malicious actors looking to compromise collected and possibly retained data. Cybercrime groups can

abuse this in different ways, including extracting identity information and selling it in the underground.

- **Critical class bugs enter the scene**

Critical class bugs can render a platform or site unusable. Vulnerabilities related to Microsoft Teams, as well as SharePoint, Office 365, and Exchange, will be sought after in 2021. Processing potentially sensitive information in these collaboration software platforms will be a major concern for organisations with increased remote workforces, particularly in regulated industries such as financial services and healthcare.



Mr Nilesh Jain

WHERE DOES THIS LEAVE US?

Organisations should focus on creating security-based company policies and an incident response plan that covers the perimeter of their operations. This will harden services, workstations, and corporate data while empowering businesses to work remotely. Refrain from putting implicit trust in assets or user accounts regardless of the location.

An incident response plan will have to outline how an organisation would deal with security in a network with discrete machines. Companies should advise work-from-home employees on home router and internet of things (IoT) security, as well as the use of a virtual private network (VPN).

security, as well as the use of a virtual private network (VPN). This would include a briefing on the risks of password reuse and the use of default router and IoT passwords. We also recommend segmenting home networks to isolate company computers (i.e. using a virtual local area network [VLAN] and dedicating it for office work only).

THE COVID-19 PANDEMIC WILL UPEND CYBERSECURITY PRIORITIES AS IT PROVES TO BE FERTILE GROUND FOR MALICIOUS CAMPAIGNS

Threat actors see any major event as an opportunity for manipulation or sabotage, and it is no different for the coronavirus pandemic - they are shifting tactics and exploiting collective Covid-19-related fears. In our mid-year security roundup for 2020, we noted a dramatic increase in Covid-19-related fraudulent emails, spam,

and phishing attempts since the beginning of the public health crisis. Cybercriminals will continue to bank on social engineering opportunities and remain active with campaigns using coronavirus-themed lures.

Covid-19 will continue to present global businesses with cybersecurity challenges. E-commerce, for instance, has seen sustained growth in recent years, and the pandemic has reinforced it. Organised crime will attempt to break into logistics as online shopping further increases and more parcels get delivered. Crimes such as production sabotage, trafficking, and transporting counterfeit goods will emerge as their *modi operandi* amid the pandemic.

The healthcare sector, in particular, will be thrust under the spotlight. As many physicians have since moved to telemedicine and the provision of medical services has become even more critical, the IT security of healthcare

systems will be put to the test. Security teams will not only need to address security risks that are associated with patient data and malware attacks, but also the possibility of medical espionage.

Threat groups will reconnoiter coronavirus vaccine laboratories, particularly targeting those institutions that have publicly identified themselves as working on Covid-19-related research. Malicious actors will attempt to gain intelligence on response efforts and steal ongoing research on vaccines and related remedies. This potential medical information theft can slow down their research efforts and jeopardise the delivery and supply of treatment options.

Misinformation campaigns will also make it difficult for users to cut through the murk of the pandemic's many uncertainties. Threat actors will pivot to using misinformation to lure users into clicking on malicious attachments and links in fraudulent transactions. These scams will be sent through emails, fake apps, malicious domains, and social media, purporting to provide health information, supposed vaccines, and corresponding waitlists. Conversely, the topic of vaccines will be used as a phishing lure when they become available.

TELEWORKING SETUPS WILL FORCE ORGANISATIONS TO CONFRONT HYBRID ENVIRONMENTS AND UNSUSTAINABLE SECURITY ARCHITECTURES

As telecommuting further takes hold in 2021, hybrid environments - where work and personal data commingle in a single machine - will pose a significant challenge to organisations having less control over employee use. Mixing personal and work-related tasks (i.e. using one machine to do various online activities) blurs the lines concerning where the data is stored and where it is processed. If a work device is infected, how will personal data be considered in the cleanup? Is there a way to track printed or exported data? This decreased visibility of enterprises into what is happening on devices is exacerbated when employees access personal apps from the devices.

As various technologies used in remote work made the headlines for security issues, zero trust models will gain momentum in 2021 as an effective approach for empowering distributed workforces. By eliminating implicit trust on anything inside or outside the network, everything is verified. Through micro-segmentation, a zero-trust architecture gives users access to only specific resources needed within certain perimeters. Such enforcement will ensure a robust security posture by making it more difficult for threat actors to penetrate the network. The zero-trust approach easily integrates with the cloud-backed secure access service edge (SASE), giving security teams critical visibility on all inbound and outbound traffic.

In the wake of the pandemic, organisations have modified their IT infrastructure and fast-tracked their move to the cloud. Infrastructures that would normally stumble over upgrading technologies are accelerating transformation programs. Those who rely on traditional

on-premise solutions will not be able to keep up with the current demands that secure cloud-based software and applications can undertake. It will be organisations' goal, regardless of sector or industry, to ensure that they are versatile and agile enough to meet the challenges ahead.

From virtual travel to remote entertainment, there will be a continued emergence of new business models as various entities break new ground on digital platforms. Emerging technology solutions will help with daily routine work in home offices through AI-enabled apps. Before inevitably facing forms of digital criminal schemes, these apps will first find it tricky to get off the ground and market.

In response to the ongoing pandemic, organisations have grasped the need to reorient their security and cover remote workers for business continuity. IT teams will have to overhaul security approaches to accommodate remote-working setups for the long-term. Organisations would be wise to outline work-from-home policies (including coordinating with managed service providers), data handling, and, to every extent possible, enforce the line between personal and business use of devices.

THE UNPRECEDENTED NEED FOR CONTACT TRACING WILL HAVE MALICIOUS ACTORS DIRECTING THEIR ATTENTION TO USERS' GATHERED DATA

Unprecedented levels of data gathering in efforts to monitor individuals' health statuses will attract criminals and political activists attempting to obtain that data. The rush to implement these measures will increase the risk of exposing or leaking user data.

Rapid access to data could be crucial in fighting the outbreak, but easing data privacy measures leads to problems of its own. Big databases, along with hasty implementations, are rich targets for malicious actors looking to compromise collected and possibly retained data. Cybercrime groups can abuse this in different ways, including extracting identity information and selling it in the underground.

A lack of strict protocols and protections leaves servers or databases vulnerable to exploitation. Governments will have to prepare and take appropriate steps to secure the data from hackers.

Efforts to slow the spread of the disease could also include lockdowns, which will have economic implications on several supply chains. The economic and operational impact will create budgetary constraints in organisations' security operations, challenging security teams to maintain (or increase) coverage under tighter financial allocations.

ATTACKERS WILL QUICKLY WEAPONISE NEWLY DISCLOSED VULNERABILITIES, LEAVING USERS WITH A NARROW WINDOW FOR PATCHING

While zero-day vulnerabilities tend to steal the limelight when it comes to attacks, known or n-day vulnerabilities will raise significant concerns in 2021. Whereas zero-day vulnerabilities refer to flaws or bugs that have just been

disclosed but remain unpatched, n-day vulnerabilities are those that have been publicly known and may have patches rolled out. There are innumerable known vulnerabilities today, and many organisations will find that they have considerable exposure in their respective digital footprints.

In 2021, there will be a quick adoption of n-day vulnerabilities and exploits released by the research community. Attackers will actively weaponise newly disclosed flaws in their attack frameworks. In Operation Poisoned News, the threat actors lifted code from an n-day proof of concept (POC) and took advantage of several privilege escalation bugs released by Google's Project Zero. Earth Kitsune actors had a similar modus: They modified exploits released by Project Zero and Trend Micro's Zero Day Initiative (ZDI).

N-day vulnerabilities will prove to be a goldmine for threat actors seeking weaknesses that are readily available for their use. Exploits reported in attacks may also have public disclosure documents for perusal, as opposed to zero-days that are time-consuming and arduous to find and exploit.

We predict n-day vulnerability marketplaces will also spring up for trading or selling exploitable known bugs - where vulnerability findings are modified accordingly to the threat actor's needs. It is not far-fetched to conjecture that sellers will also offer exploit customisation depending on the attack. While this will enable relatively inexperienced actors to craft attacks, it will be particularly appealing to threat actor groups that are known for taking advantage of existing zero-day and n-day flaws in high-value targets. Sophisticated attacker groups, moreover, will ramp up their use of penetration testing tools, including the widely used Cobalt Strike which had its source code allegedly leaked in November 2020.

EXPOSED APIS WILL BE THE NEXT FAVOURED ATTACK VECTOR FOR ENTERPRISE BREACHES

An application programming interface (API) is a software intermediary that allows communication between any application - from data sharing and functionality delivery to streamlining operations and system connectivity, providing protocols, routines, and tools for deploying services and software in devices, including the IoT. Many businesses rely on APIs to provide access to internal systems and interact with customers via apps.

The caveat is they are also ripe for the picking for threat actors looking for an entry point into an organisation's networks. As APIs become more prominent in the enterprise space, so will their attack surface. APIs will become a preferred target as they also act as conduits for third-party integration, and we predict that API security will be a new focus area for adversaries in 2021.

APIs, while already ubiquitous, have security that is still nascent. They introduce several weaknesses that could be vectors for data breaches in enterprise applications.

Some recent cases have reported gaining access to users' personal information and finding exposed source code and access to backend services.

APIs also are relatively easy to discover, have many parameters open for compromise, and are inherently unsecure. Traditional defence mechanisms involving Captchas, JavaScript, or mobile SDK instrumentation cannot be effectively used to prevent an automated attack, which means APIs are only partially protected, if at all. We recommend configuring access control and authentication mechanisms with a defence-in-depth approach and regularly monitoring access logs.

ENTERPRISE SOFTWARE AND CLOUD APPLICATIONS USED FOR REMOTE WORK WILL BE HOUNDED BY CRITICAL CLASS BUGS

We expect top software and services used in distributed work will run into more publicly disclosed vulnerabilities due to increased research. Using publicly available vulnerability details, users can check their systems for security problems while allowing researchers and threat actors to look into similar holes in systems - especially if the discovered flaws are relatively new. Researchers will be particularly on the lookout for critical class bugs and similar variants in enterprise software and other remote-working technologies. Both cybercriminals and threat actor groups will favour weaknesses in popular software as part of their campaigns.

Vulnerabilities related to Microsoft Teams, as well as SharePoint, Office 365, and Exchange, will be sought-after in 2021. Processing potentially sensitive information in these collaboration software platforms will be a major concern for organisations with increased remote workforces, particularly in regulated industries such as financial services and healthcare.

With a renewed push to move to cloud environments and use collaboration tools, cloud security is talked about more than ever. To gain system visibility and meet scaling needs, organisations gather and store massive data across multiple sources and environments. These clouds of logs, however, will be central to modern, high-profile cybercrimes. Cloud environments often keep troves of valuable and sensitive data that criminals can use to find initial access points into networks.

The uptake of cloud technology use in 2020 will press on in 2021 to address the pandemic's effect on operations. We expect this trend to continue to grow even when the pandemic recedes. Toward the end of 2021, the majority of workloads will be running in the cloud. Organisations that moved quickly and haphazardly will grapple with the security implications. We predict that data breaches and exponential compromise in cloud infrastructures will be caused not by cloud providers but by misconfigurations and missteps of unwitting users.

Other concerns for cloud adopters are hackers attempting to take over cloud servers and deploy malicious container images. We expect a sprawl of vulnerable images running

in various architectures as users put unfettered trust in container services and depositories. These images will be aimed at hijacking repositories and poisoning resources. Exposed data will be a common pitfall that leads to cloud-based breaches and attacks in organisations.

FORGING AHEAD WITH CYBERSECURITY

Trend Micro's security predictions for 2021 reflect our security experts' research and insights on emerging technologies and security issues. Stay ahead of the threats we outlined with these security recommendations for proactive global threat intelligence and response:

Foster user education and training. Threat actors will continue to capitalise on the fear surrounding Covid-19, and users must be informed of the tactics and possible attack vectors. Organisations should reinforce knowledge on threats and extend corporate best practices into the home. Directly share the do's and don'ts of telecommuting and advise against using personal devices.

Maintain strict access control on the corporate network and home office. Organisations should focus on creating security-based company policies and an incident response plan that covers the perimeter of their operations. This will harden services, workstations, and corporate data while empowering businesses to work remotely. Refrain from putting implicit trust in assets or user accounts regardless of the location.

Reiterate basic security measures and patch management programs. Weak points will only crop up throughout the next several months of remote-working arrangements. It will be imperative to regularly update and patch applications and systems that are more vulnerable than ever.

Augment threat detection with security expertise. Ensure advanced, round-the-clock threat detection and incident handling in cloud workloads, emails, endpoints, networks, and servers, with the help of dedicated security analysts. Gain better insights into attacks and prioritise security alerts through comprehensive threat intelligence and industry-leading solutions.

TREND MICRO RESEARCH

Trend Micro, a global leader in cybersecurity, helps to make the world safe for exchanging digital information. Trend Micro Research is powered by experts who are passionate about discovering new threats, sharing key insights, and supporting efforts to stop cybercriminals. Trend Micro's global team helps to identify millions of threats daily, leads the industry in vulnerability disclosures, and publishes innovative research on new threats techniques. Trend Micro continually works to anticipate new threats and deliver thought-provoking research.

FOUR CHALLENGES OF CLOUD MIGRATION FOR HEALTHCARE ORGANISATIONS IN SINGAPORE

Trend Micro commissioned Sapio Research to survey more than 2,500 IT decision-makers in 28 countries across several industry sectors, including healthcare.

In Singapore, the results show that nearly all (96%) of Healthcare Organisations (HCOs) have accelerated their cloud adoption because of the pandemic. Remote working, cost savings and improved IT agility were three main reasons for the switch to cloud-based infrastructure.

Rapid shifts to the cloud may leave organisations at higher risk of cyber threats. Here are four challenges Singapore's HCOs reportedly faced when moving to cloud-based environments:

- **Skills shortages:** 38% revealed that skills gaps are a persistent barrier to migrating to cloud security solutions.
- **Day-to-day operations:** Setting and maintaining policies (41%), misconfigurations (36%), and patching and vulnerability management (30%) were challenges of protecting cloud workloads.
- **Increased costs:** 41% have spent more on capital expenses, while nearly half (49%) of respondents have spent more on operational costs since migrating. 47% have also seen an increase in their training expenses.
- **Security responsibility:** Just 42% are confident they secure their part of the Shared Responsibility Model.

While cloud migration is not simple, it can be enabled and improved using the right security tools.

The healthcare sector has been on the frontline in the struggle against COVID-19, and digital transformation can make a positive impact on productivity and patient care during this time of critical need. However, it is essential that the broader attack surface of an expanded digital infrastructure is given due consideration.

With the right cloud-ready solutions in place, HCOs can maximise cloud benefits without putting mission-critical systems or patient data at risk. Such tools can also minimise skills challenges by spotting misconfigurations, automating patching and policy management, and integrating security into DevOps, across both cloud and on-premise environments.

AUSTRIAN COMPANY UNVEILS

PROPRIETARY CALOTTE LOADER

Austria-based mechatronic systemtechnik, a leading global supplier of automation equipment for semiconductor wafer handling, recently announced the availability of the mWL.cs mechatronic calotte loader.

A fully automated stand-alone system for transferring wafers between cassettes and calottes, the mWL.cs provides integrated device manufacturers (IDMs) an opportunity to increase yield and improve process traceability at a high throughput.

Evaporation process tools often utilise spherical carriers and rings to meet uniformity and defectivity targets. However, the design of these tools has made it challenging to introduce automated wafer handling in this step of the manufacturing process.

IDMs invariably default to manual wafer loading, which has resulted in yield degradation and an increased risk for misprocessing.

According to mechatronic systemtechnik, automating the wafer loading and unloading system for evaporation type metal deposition is a step that has much potential. By eliminating human error from the equation, the system offered by the company enables manufacturers to achieve higher yield and reduce damage to wafers. Enhanced process traceability also supports quality

improvement measures to meet the conformity requirements of critical customer industries.

Key features of the mWL.cs mechatronic calotte loader include the following:

- Superior handling accuracy and repeatability - hands-off position measurement and auto-teaching capabilities (<50 µm).
- Improved process traceability - host notification of Wafer ID, Cassette ID, Segment ID, and position in the segment.
- Redundancy - 2 loading areas for continuous processing.
- Impressive transfer times - high throughput of up to 240 wph that enables ROI within two years.
- Dual size handling - customisable to handle 4", 6", 8", or 6" & 8" (dual size)
- Small footprint - less than 7 m².

A specialist in fully automated handling systems for non-standard substrates and handling requirements, mechatronic recognises and addresses the semiconductor industry's need for the handling of ultra-sensitive substrates used in modern new wafer fabrication technologies. The company's deep expertise and proprietary technologies provide manufacturers with safe, reliable systems that handle non-standard substrates with ease.



Austria-based mechatronic systemtechnik, a leading global supplier of automation equipment for semiconductor wafer handling, recently announced the availability of the mWL.cs mechatronic calotte loader.

SAMSUNG ANNOUNCES THE EXPANSION

OF ITS BUSINESS RUGGED DEVICE RANGE

Samsung Electronics Singapore has announced that the Galaxy Tab Active3 is now available and that the Galaxy XCover Pro will be available in March this year. Knox Capture, a new enterprise-grade scanning solution will also be supported by both devices, by March. The new business rugged devices feature sleek, durable and compact designs that enable frontline workers to be more secure, collaborative and productive in the field.

Today's businesses are looking for multi-functional devices that are easy to use. Samsung's research found that 68% of those surveyed agree that devices supporting point-of-sale (mPOS), push-to-talk (PTT) and mobile scanning functions need to be performing more than one dedicated role. In addition, enterprise customers with frontline employees, in the construction, healthcare and last-mile delivery sectors, require durable, portable and easy-to-use, rugged devices to complete their tasks confidently.

"When designing the Galaxy Tab Active3 and Galaxy XCover Pro, we have incorporated new features, based on feedback from our customers, on functions that would benefit their everyday operations. The Galaxy Tab Active3 is a multi-functional tablet that supports not only the latest applications for field work, but also the no-battery mode for those who require devices at a fixed kiosk or mounted on vehicles. Meanwhile, the Galaxy XCover Pro can seamlessly transform into a mobile device scanner or a walkie-talkie - perfect for field workers in logistics and supply chain sectors. With a strong line-up of rugged devices, we are paving the way for continuous innovation to create products that allow customers to do business with peace of mind, while keeping their frontline workers productive and safe", said Ms Sarah Chua, Vice President of IT and Mobile, Samsung Electronics Singapore.

Samsung's commitment in developing ruggedised devices has also been recognised in the industry, when the company was named as a Leader in the IDC MarketScape for Worldwide rugged mobile devices in 2020.

THE GALAXY TAB ACTIVE3

The Galaxy Tab Active3 is MIL-STD-810H and IP68-certified to handle the toughest jobs in extreme environments. Its shock absorption capability, enhanced with an in-box protective cover, enables it to withstand drops of up to 1.5 m.

The long-lasting, replaceable 5050 mAh battery supports fast charging through USB and POGO pins. For businesses that use tablets in a fixed location like a kiosk, Galaxy Tab Active3 now supports the no-battery mode for power without a battery.



Samsung Galaxy Tab Active3 is a business ruggedised tablet designed to withstand the harshest of work conditions.

Providing a PC-like experience with Samsung DeX, the Galaxy Tab Active3 is equipped with dual-screen functionality, so that tasks can be picked up from anywhere - be it in the office or in the field.

Local private transport operator, Woodlands Transport, saw productivity improvements with the implementation of Samsung's business rugged tablets in their buses and for backend administrative processes.

"Partnering with Samsung has helped our organisation to streamline and digitalise operations. What used to be traditional pen and paper processes is now done on a Samsung rugged tablet which provides us real-time information on our drivers and passengers. In addition, the multifunctional tablets allow us to seamlessly coordinate and manage our fleet vehicles on the roads daily, all from the same device. With improved operational efficiencies, our on-ground employees are able to focus on the task at hand - operating the vehicles - thereby delivering an optimal travel experience and improving customer satisfaction", said Mr Albert Lim, Managing Director, Woodlands Transport.

Additional Galaxy Tab Active3 features include the following:

- **Capture Everything:** A 13 MP rear camera provides clarity for both taking pictures or scanning detailed documents and the 5 MP front camera is suited for video or conference calls.
- **Augmented Reality:** Google ARCore is now supported and enables new augmented reality services, such as remote training.
- **Quick Access:** The Active Key on the side of the device allows instant access to the apps or programmes used most often and grants easy access for emergency calls, scanning or push-to-talk functions.

- **Retail Ready:** Galaxy Tab Active3 is optimised for camera-based barcode scanning to help retailers easily manage inventory and scan products for purchase. The Galaxy Tab Active3 also supports NFC with EMV Level 1 for payment.
- **Touch Sensitivity:** When activated, Touch Sensitivity allows professionals to continue using the Galaxy Tab Active3 while wearing gloves, so that employees can stay protected while operating the device.
- **IP68-certified S Pen:** Good for signature capture and managing complex documents in gloved environments, the S-Pen is also water- and dust-resistant.

THE GALAXY XCOVER PRO

With its thin and light form factor, the Galaxy XCover Pro offers much more than a traditional enterprise device. According to Samsung, it is the most stylish and sleekest rugged all-in-one mobile device on the market.

Like the Galaxy Tab Active3, the Galaxy XCover Pro is IP68-certified for water- and dust-resistance. It is also capable of withstanding drops of up to 1.5 m, even without a case, and is MIL-STD 810G-certified for reliable protection against extreme altitude, humidity, and other severe environmental conditions. Pogo pin charging support and compatibility with third-party charging docks ensure the phone is powered as soon as the workday begins, and a 4,050 mAh battery lasts long after the day is done. For times when even more power is needed, the battery is replaceable.

The Galaxy XCover Pro allows users to tailor their experience with two programmable keys to create custom actions with one click. This functionality makes complicated workflows simple, letting users open the scanner, turn on the flashlight or launch a CRM app, all without swiping through apps, scrolling through menus, or even looking at the screen.

The Galaxy XCover Pro offers a clear, edge-to-edge 6.3" FHD+ Infinity Display with an enhanced touchscreen able to work in any condition, including in the rain. For users in the field, the glove mode allows for gloves-on use and the new 'voice to text message' feature provides real-time dictation and messaging for simple, convenient communication.

Full-field solution powered by Samsung's partner ecosystem

The Galaxy XCover Pro meets the needs of the mobile enterprise and features all the things customers have come to expect from Samsung. Professionals and field workers can enjoy their favourite mobile solutions from Samsung's broad partner ecosystem, making it easier to manage inventory, and process payments immediately and communicate on-the-go.

The Galaxy XCover Pro can be easily transformed into a walkie talkie. Samsung has partnered Microsoft to introduce Microsoft Teams to the Galaxy XCover Pro's push-to-talk feature. By doing so, users can stay connected to their teams throughout their day, with the simple push of a button.



Samsung Galaxy XCover Pro offers the power and versatility of a smartphone, plus the durability and one-button access to key features, for example, easy access to Microsoft Teams.

Collaboration with software and hardware from KOAMTAC and Scandit also enables users such as retailers to conduct inventory tracking with barcode scanning.

DEFENCE-GRADE SECURITY MEETS ENTERPRISE MANAGEMENT

The Galaxy Tab Active3 is said to be the first business rugged tablet to be Enterprise Edition-ready, out of the box. The Enterprise Edition includes a set of mobile services that provide administrators with the ability to easily and quickly secure, deploy and manage mobile devices across a distributed workforce. It includes one year of Knox Suite, three years of market availability, and up to five years of security updates for the Galaxy Tab Active3 and up to two years of security updates for the Galaxy XCover Pro.

The devices are also protected by Samsung Knox, Samsung's security platform, as well as regular Android security updates. Samsung Knox can also be customised by IT administrators to manage the programmes and apps used across the business, giving complete control over the mobile fleet.

In addition, the Galaxy Tab Active3 and Galaxy XCover Pro will support up to three generations of Android OS upgrades, ensuring enterprises are protected from evolving security threats.

KNOX CAPTURE

A new solution available for Samsung's ruggedised line-up is Knox Capture which will be available from March 2021. Powered by Scandit's industry-leading capture engine, Knox Capture readily turns the device's camera into a barcode scanner, with no additional accessories and add-ons required.

This is especially helpful for enterprises that rely on barcode technology for tracking, especially in the last-mile delivery and healthcare sectors.

NEW CO₂ SNOW-JET BOOTHS

IN CLEANROOM COMPATIBLE DESIGN

Whether in medical engineering, the semiconductor industry, in laboratory and development environments or in other areas - parts produced in small quantities often have to meet the highest cleanliness requirements. For such cases, acp systems AG has developed two new CO₂ (carbon dioxide) snow-jet booths suitable for cleanroom use. These enable high-purity workpieces to be cleaned in a manual or semi-automated process with the quattroClean technology.

Components for high-purity applications, for example, in medical engineering, laser technology, semiconductor supply industry, precision optics and metrology, could hardly be more varied. And yet they share common features such as low production volumes, high workpiece diversity and, above all, extremely high demands on surface cleanliness. This involves the removal of particulate and filmic contamination and, depending on the industry, possibly biological and ionic contaminants as well as organic and inorganic residues. Research and development departments are also confronted with these requirements.

Conventional parts cleaning solutions are usually designed for much larger quantities and in some cases - such as with wet-chemical cleaning - may reach their limits as far as process capability is concerned.

Compact CO₂ snow-jet booths suitable for cleanroom use

With the new manual and automated JetStation-HP booths, acp systems supplies compact cleaning solutions for these use cases with quattroClean technology. The closed, sound-proofed stand-alone units are made entirely of stainless steel. They are equipped with only components and materials used in cleanroom applications. When designing the process chamber, attention was paid to ensuring that detached contaminants and CO₂ are removed quickly and effectively by the integrated extraction system and that no dirt pockets can form. This prevents the cleaned parts from becoming re-contaminated.

For both booth models, a system for monitoring the CO₂ concentration in the working area comes as standard. If the set limit value is exceeded, the CO₂ supply is automatically switched off and an error message is displayed.

The manual JetStation-HP is loaded and unloaded via the front flap with hand access and is suitable for both seated and standing workstations. The cleaning process, in which the part is guided to the nozzle by the operator, can be started conveniently via a foot pedal.

If higher requirements in terms of process reliability and/or part geometry must be met, the automated JetStation-



The compact, cleanroom-suitable JetStation-HP is designed for cleaning tasks involving small quantities of parts that have to meet the highest cleanliness standards. With the manual cleaning booth, parts are loaded and unloaded via a front flap with hand access.



With this automated, stand-alone system made entirely from stainless steel, the part to be cleaned is placed in a receiver mounted on an x/y-axis, rotary table, or combination of both, located in the process chamber.

HP is used. With this model, the part to be cleaned is advanced through a door which can be automated and placed in a receiver mounted on an x/y-axis system, rotary table, or combination of both, in the process chamber. The part-specific cleaning program stored in the system control unit is started at the push of a button.

The process then runs fully automatically, with all parameters such as movements of the receiver, speed, force and duration of the jet, distance between nozzle and workpiece, kept constant as specified in the parts program. In addition, the automated JetStation-HP model has a sensor system for monitoring the cleaning process, which continuously measures the density of the snow jet.

Plug & play concept for rapid deployment

The plug & play concept makes the JetStation-HP cleaning booths quick and easy to put into operation. All the technology for the snow-jet process and media preparation is integrated in the system housing, meaning that only the CO₂ and compressed air supply need to be connected up.

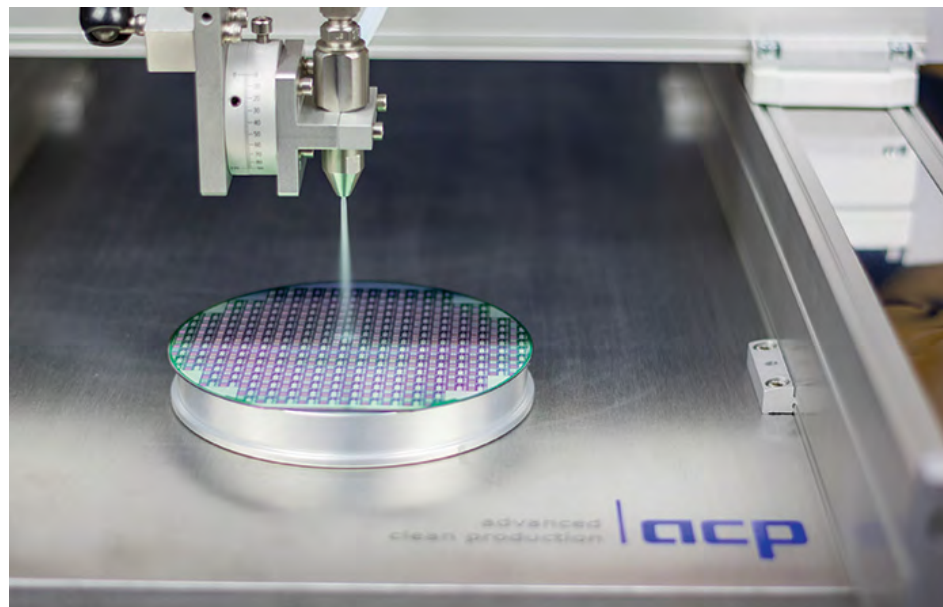
The quattroClean technology - four effects for clean surfaces

The cleaning medium used in the QuattroClean process developed by acp systems is liquid CO₂, a by-product of industrial processes and thus climate-neutral. It is guided through a wear-free two-component ring nozzle and expands on exiting to form fine CO₂ snow. This core jet is then bundled by a separate jacketed jet of compressed air and accelerated to supersonic speed.

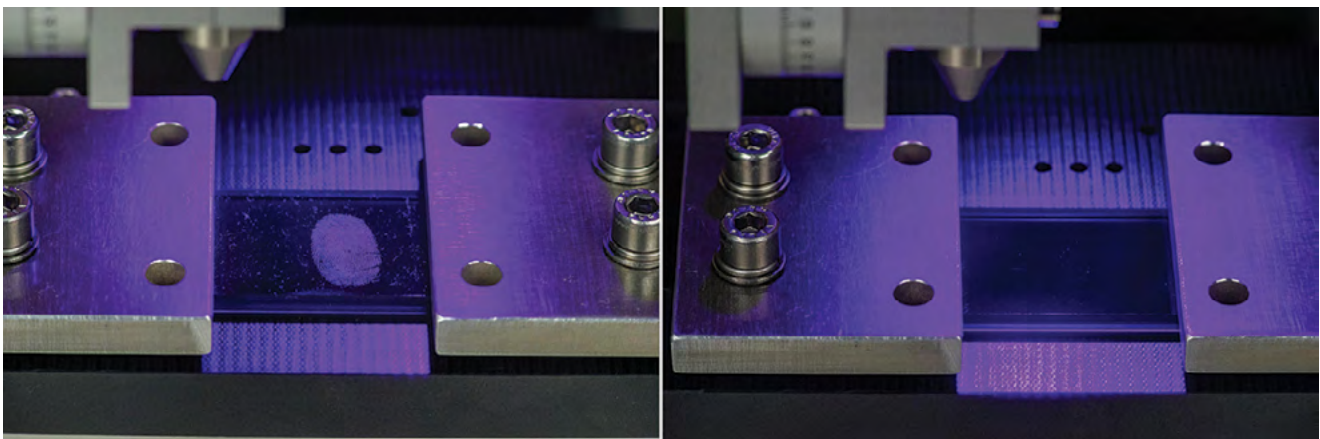
When the easily focused jet of snow and compressed air impacts the surface to be cleaned, a combination of thermal, mechanical, sublimation and solvent effects occur. The interaction of these four mechanisms of action removes particulate and filmic contamination in a reliable and reproducible process. During the cleaning step, the crystalline CO₂ is completely transformed from a solid to a gas, meaning that parts are instantly dry.

The cleaning process is gentle on materials, so it can even be used to clean delicate and finely structured surfaces. The dry quattroClean technology is suitable for parts made from practically any technical material and combination of materials.

All images by acp systems AG



For reproducible cleaning results, all process parameters such as the force and duration of the jet are kept constant in a program-specific manner. In addition, a sensor system for monitoring the cleaning process, which continuously measures the density of the snow jet, comes as standard.



The before-after image, made under UV light, shows that particulates and contaminations on components made of all technical materials are removed in a process reliable manner.

VAISALA LAUNCHES NEW HUMIDITY AND TEMPERATURE TRANSMITTER SERIES

Finland-headquartered Vaisala, a global leader in weather, environmental and industrial measurements, has launched its next-generation humidity and temperature transmitter series to take advantage of advancements in technology and to meet and exceed current hazardous area regulations.

The new Vaisala HMT370EX humidity and temperature transmitter series builds on over 20 years of experience with the Vaisala HMT360 series, with an even more robust and easy-to-use design.

The HMT370EX series is said to offer improved user experience, better corrosion resistance, and the latest Vaisala humidity measurement performance. As the successor to the company's HMT360 product series, it can be effortlessly installed into existing systems.

Measuring humidity in hazardous environments

The HMT370EX series is designed specifically for hazardous and explosive environments. The entire transmitter can be installed directly in explosive areas, up to zone 0 and zone 20.

According to the Vaisala, the HMT370EX operates safely and reliably even in the most hazardous environments, with no need for additional protective enclosures. Thanks to its rugged display, the transmitter can withstand continuous exposure to potentially explosive areas that contain flammable gases or dust.

Typical applications for HMT370EX include the performance of measurements in paint booths in the automotive industry, hydrogen-cooled generators in electricity generation, chemical plants and processes, the baking industry, pharmaceuticals manufacturing, oil and gas drilling platforms, as well as fuel tanks and storage.

Probe options for different applications

The HMT370EX series consists of the transmitter and a wide selection of probes. The transmitter is equipped with an intuitive graphical display for improved ease of use. Hand-detachable measurement probes and easy

product configuration and calibration with Vaisala Insight PC Software enable smooth maintenance, minimising any downtime in the measurement.

HMT370EX offers several probe options for different applications:

- HMP371 for wall mounting
- HMP373 for confined spaces
- HMP374 for pressurised spaces
- HMP375 for high temperature
- HMP377 for high humidity
- HMP378 for pressurised pipelines

In addition to measuring relative humidity and temperature, the new transmitter outputs also dew point temperature, wet-bulb temperature, absolute humidity, mixing ratio, water concentration, water mass fraction, water vapour pressure and enthalpy.

Available in early 2021

HMT370EX can replace the HMT360 series in all the applications where the HMT360 has been employed.

The new HMT370EX series is expected to be available in the first quarter of 2021 with European ATEX and Global IECEx certificates. Ex certification for other regions is expected to be available later during 2021.



The new Vaisala HMT370EX humidity and temperature transmitter.

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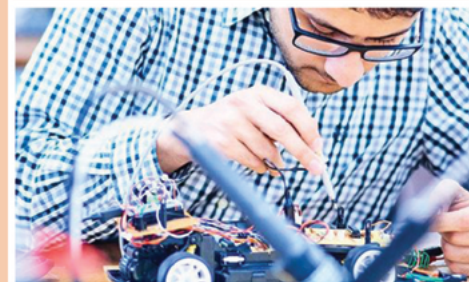


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