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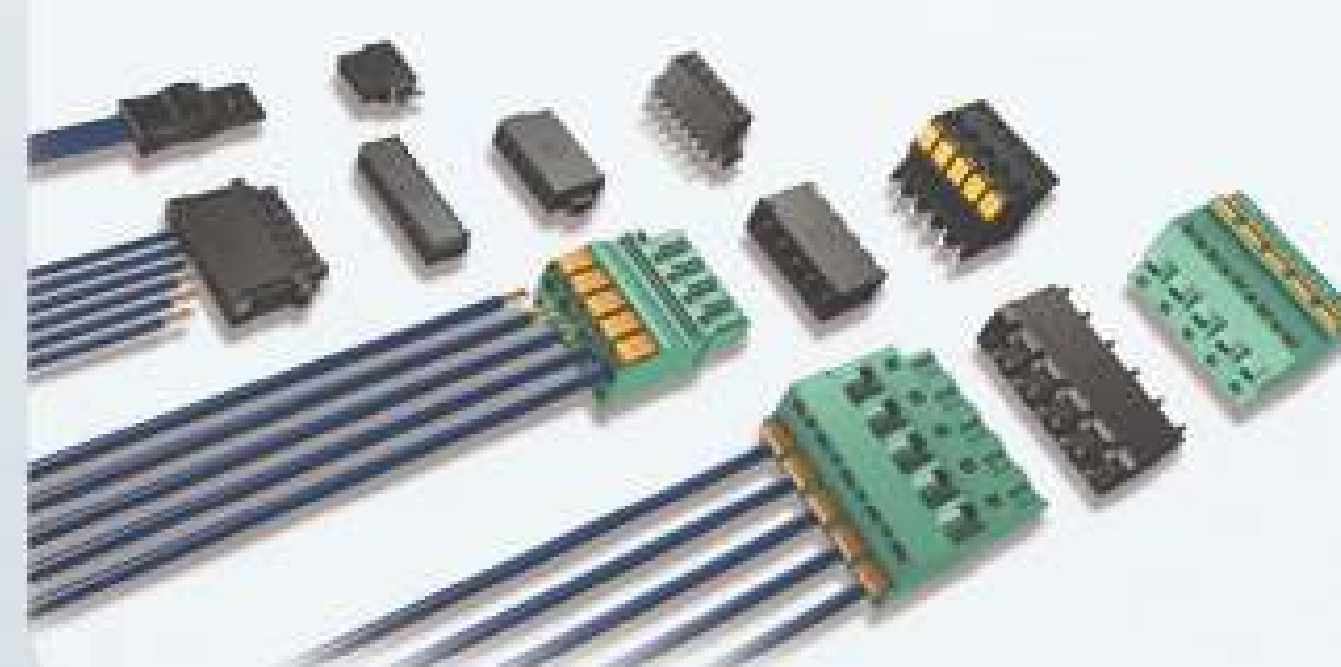
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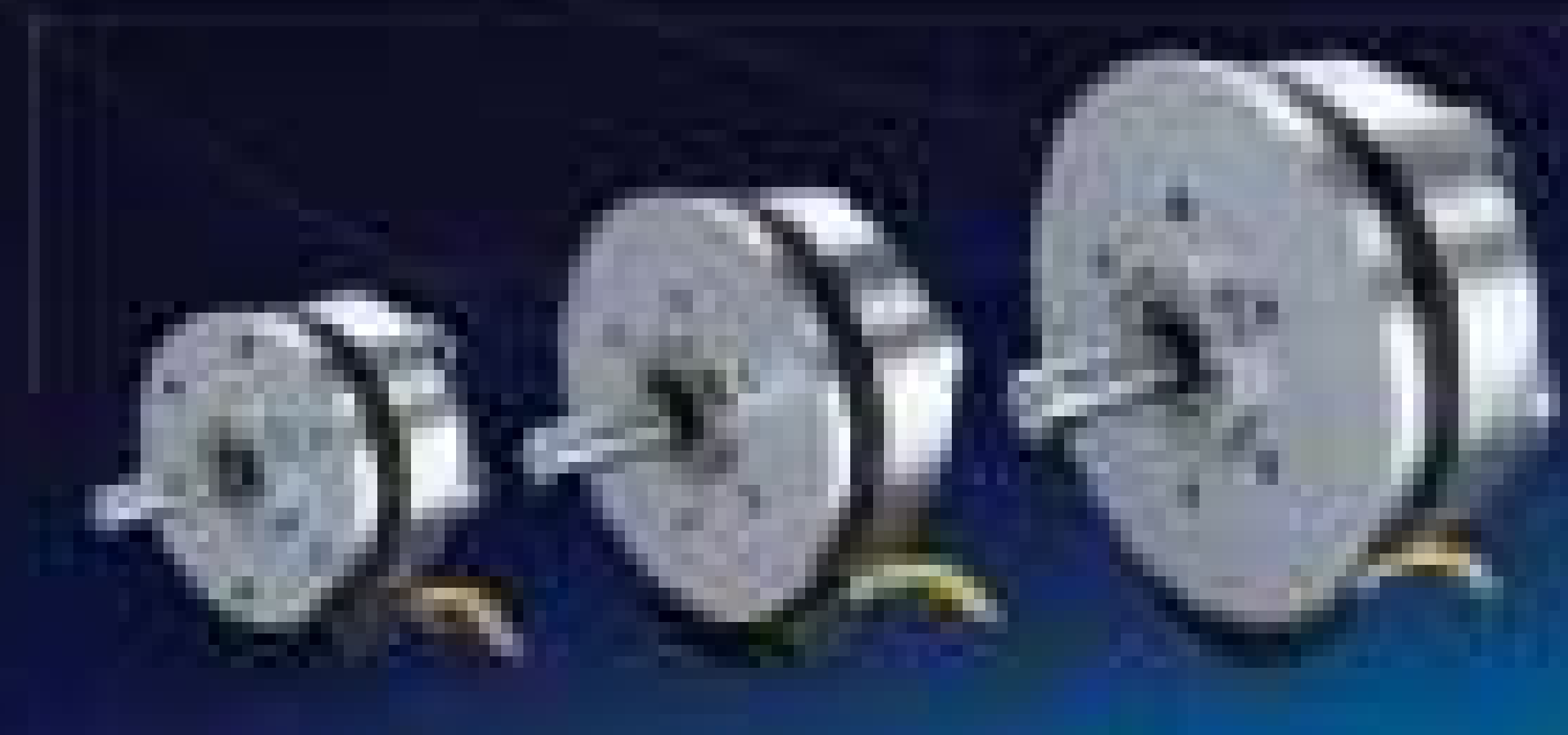
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Singapore Dazzles as A World Leader in Medical Manufacturing



For a medical technology manufacturer, expanding into the Asian market can be decidedly daunting. You need to find R&D resources, build and staff a manufacturing facility, and develop a sales organization. And that doesn't count all of the regulatory red tape you'll have to manage. Typically all of this is done piecemeal, with global firms establishing outposts scattered throughout the continent. Managing all of this can be a logistical nightmare, which is why it can often take years for an Asian expansion to become profitable.

But what if there was one location where you could base all of these functions, thanks to a deep talent pool and a progressive environment designed to support medical technology manufacturing? There is – in Singapore, where manufacturers have those factors and more. For Western medical technology firms looking to grow in Asia, it's the ideal place to be.

Asia-Pacific's medical technology sector is downright monstrous. By 2020, McKinsey expects it to hit US\$133 billion in size, growing from an already massive US\$88 billion in 2015 to become the second-largest medical technology market in the world. Why such breakneck growth? Because of numerous factors the region is now facing: An aging (and massive) population – Asia Pacific is home to more than half the world's population -- with more access to healthcare than ever, combined with a medical industry that's undergoing significant upheaval as it rapidly modernizes.

But there are significant differences between the medical worlds in Asia and the West. Hospitals and doctors, for example, operate differently here than they do in Europe or North America. Even the patients tend to present distinct conditions that require different means of treatment. It can take years for a Western medical technology firm to understand the intricacies of this region well enough to succeed.

It's those differences – and Singapore's talent, infrastructure, and technological advantages – that have led numerous Western firms to establish presences in Singapore, a small country with an outsized influence on the region's medical technology industry.

For decades, Singapore has cultivated an atmosphere that streamlines businesses' access to complex Asian markets. Strong IP protection laws, a business-friendly regulatory climate, and access to a predominantly English-speaking workforce only sweeten the deal. Manufacturers often benefit the most: The Centre of Regulatory Excellence (CoRE), a professional organization that's part of the Duke-NUS Medical School, serves the needs of the biomedical industry by enhancing collaboration between academia, industry, and regulatory agencies. It's among the latest efforts that have helped to make Singapore a world-class location for medical technology businesses.

Says Medtronic's Dr. Lei, *"Singapore is a strategic business hub for the region, and it enables us to fully leverage the developed infrastructure, world-class healthcare systems, technology advancements, open business policies, and skilled workforce to deliver our expertise and innovation -- and scale them to other markets in the region."*

Joy of Motherhood: Having A Baby, Even on Dialysis



Only a few women who receive dialysis treatment can have a baby. Estimates indicate less than a thousand cases in which a dialysis patient has given birth to a child—in the entire world. In B. Braun Renal Care Center in Orenburg, Russia, two patients in one center were able to become mothers while under the care of chief physician Dr. Alexander Seliutin. One of the patients, Olga G., tells us about her life, pregnancy and the birth of her baby.

As a child, I had an inflammation in my renal pelvis that developed into a chronic condition. When I was 17, doctors diagnosed renal cysts and nephrosclerosis. I underwent most of the examinations and treatments that were recommended for me. Otherwise, I tried to let the disease have as little influence on my life as possible. In the end, however, it caught up with me—in the form of chronic renal failure. At that time, I was 25 years old. I can say that the disease influenced me more mentally than physically. Of course, I was busy the whole time with my work and social life, but from time to time I wondered what was waiting for me in the future.

Living with renal failure

However, the diagnosis itself imposed many restrictions in nutrition, rhythm of life and for my future. Although more treatments and hospital stays were inevitable, I tried to go on living as normally as possible. I was involved in my job, which I was successful in and I liked to travel. I especially liked Egypt because it combines everything that I love: a beautiful and very warm sea and ancient and mysterious architecture.

Pregnancy and dialysis

Over the course of my life it worried me when the doctors advised me not to get pregnant. It would be too much of a burden for me, they said—my kidneys were too weak and could stop working altogether. However, I had this wish inside me. One winter I had two severe colds that led to a marked worsening of my hemoglobin and creatinine levels. Then I discovered I was pregnant. I was 36 years old, and I decided to do everything I could to have this baby. Yes, I realized that there was a risk. I took an informed risk. I always compared my condition with the average condition for a pregnant woman. My state at that time was quite satisfactory. In spite of my poor blood test measurements, I felt quite healthy. I was only suffering from nausea a bit, as many women do.

But one day my kidney values got worse. It was time to start dialysis—that day would have come sooner or later, but it would have been later without the pregnancy. Because I was pregnant, I had to undergo dialysis treatment for four hours a day not just three times a week, but six. After a while, I was able to go home between treatments, but only for a short time. Not enough blood was getting to the baby, and I had to be admitted to the hospital again. There was a high probability that I might develop a severe pregnancy disorder, but I was lucky . . . the due date kept getting closer and closer. Fortunately, the baby arrived naturally, although it was a month before the expected due date.





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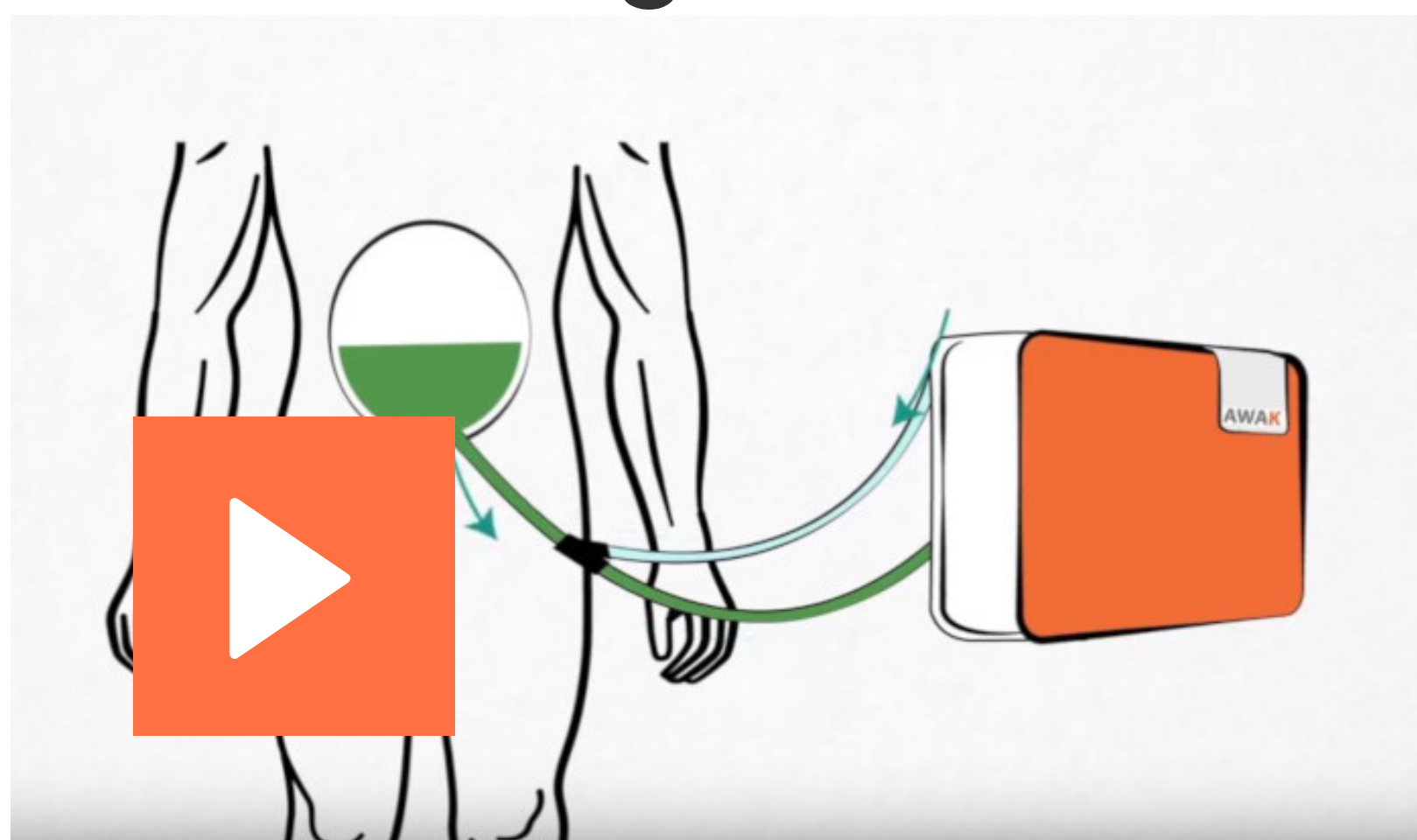
5 New and Emerging Wearable Medical Devices

First AI Medical Monitoring Wearable Approved by FDA for Home Use



Current Health's artificial intelligence (AI) wearable device that measures multiple vital signs has recently received FDA-clearance for patients to use at home. In February, the Edinburgh, Scotland-based company received clearance for the AI-enabled device in monitoring patients while in the hospital, but this recent approval means it can now be used between doctor visits at home too.

World's First Wearable Peritoneal Dialysis Device Receives FDA Breakthrough Status



AWAK Technologies, a Singapore-based medical technology company, recently received FDA Breakthrough Device designation for their wearable and portable dialysis device. Called the AWAK Peritoneal

Dialysis device, or AWAK PD, the technology uses AWAK's patented sorbent technology and offers a convenient means of dialysis for renal disease patients.

Wearable Device Precisely Detects Cancer Cells in Blood



University of Michigan researchers have recently created a wearable device that can continuously collect and examine circulating tumor cells (CTCs) in the blood. These cancer cells are typically obtained via blood samples to provide a biomarker for treatment, but this wrist-worn prototype could potentially screen patients' blood for a few hours to obtain only the CTCs of interest. These findings were published recently in a Nature Communications paper.

Walking Data from Wearables Predicting Alzheimer's Disease

One area of impairment in patients with Alzheimer's disease is walking mechanics, or gait. Gait speed, symmetry, and stride length are typically reduced in patients with the disease, and their walking speed is much more variable. This can be detected via clinical assessment, with the physician observing the patient walking for a certain distance or duration. Alternatively, patients can be monitored through portable equipment. Sensors within smartphones, watches, and other wearables provide accurate data regarding the patient's gait, offering a way to continuously monitor one's walking habits. This information could be enhanced even further with contact sensors in a shoe or sock that provide pressure readings.



Wearable Sweat-Sensor Informs Athletes of Water and Electrolyte Loss

A group of researchers have recently developed a waterproof, bandage-like sweat sensor that tells the wearer when to replenish electrolytes and fluids. This innovative patch collects and analyzes athlete's perspiration as they exercise in any environment – even swimming.



Described in Science Advances, the patch contains tiny pores on its underside that allow the sweat to penetrate the device. Each of these holes contains its own sweat analysis technology, each testing various metrics to analyze if the wearer needs hydration or electrolytes.

3D Printing Injects Future into Medical Industry



Organ transplants, tissue repair, dentistry applications, surgical tools... limitless possibilities herald multibillion-yuan sector

Specialized application of 3D printing is spawning a multibillion-yuan business segment in the medical and healthcare industry, making customized, even personalized, health and wellness solutions possible in China.

From surgical preparation and guides to manufacturing of dental and orthopedic implants, and medical tools and devices ... all are now products of 3D printing, a term for additive printing that applies successive layers of materials to make a three-dimensional object from a digital model.

Although no reliable reports are available on 3D printing in China's medical industry, Chinese 3D printing companies are making their mark on the medical sector nevertheless. In some areas, they even lead the global pack as the cutting-edge technology is being adopted in China at a rate higher than that in most countries, industry people said.

"Medical 3D printing is developing very fast in China, and in the field of biological 3D printing, our technologies are almost as advanced as international leaders," said Deng Kunxue, director of the company's medical research and development department. *"In the future, organ transplantation may become as easy as changing a component."*

The company, one of the top world players in medical 3D printing, has more than 130 patents granted from regulators in the United States, Russia, Japan and China. And more than 130 patent applications are pending approval at home and abroad.

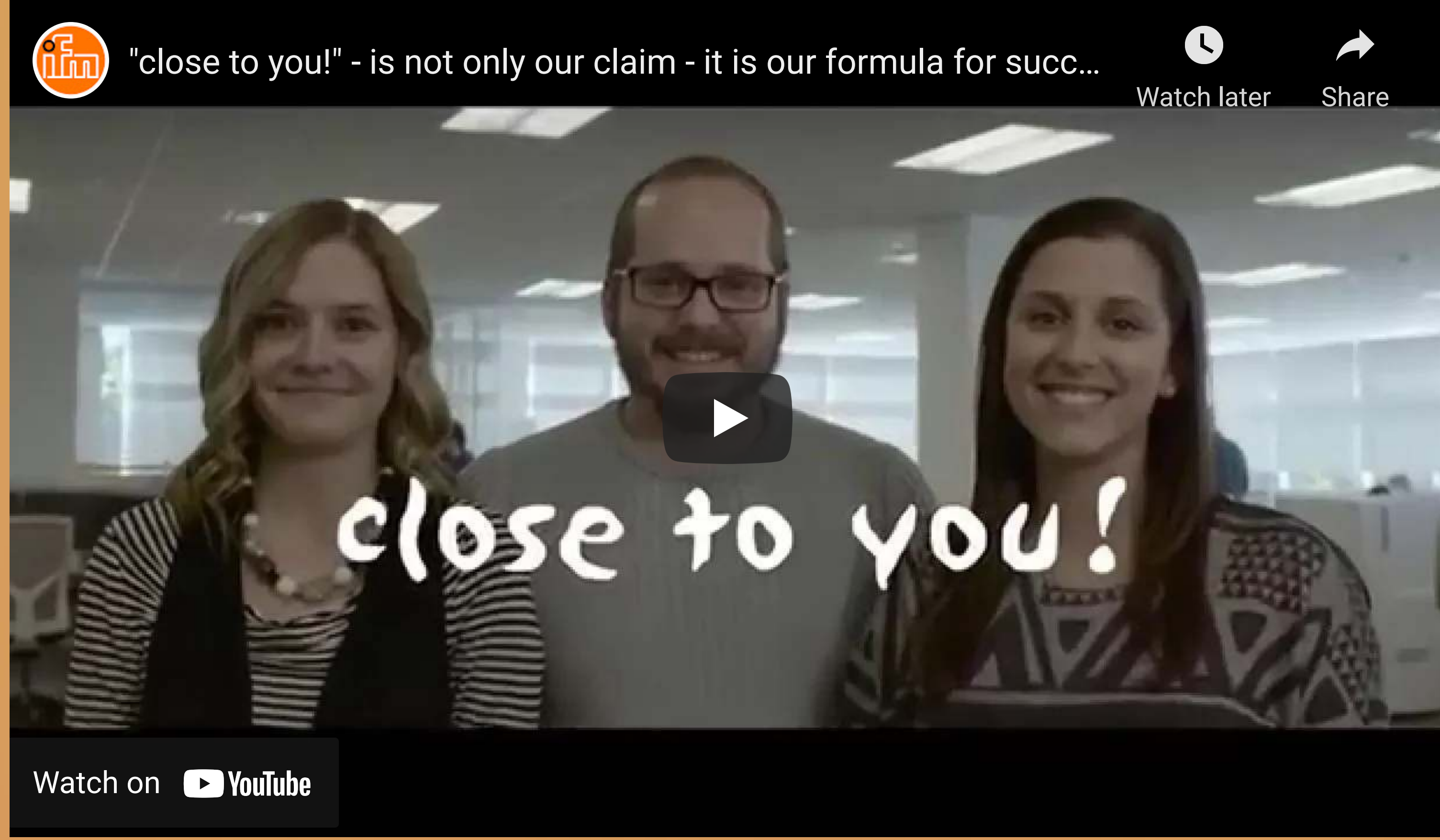
Its flagship 3D-printed biological dura mater (ridge) membrane, called ReDura, a replica of tissue covering the brain, has been used in more than 70 countries and regions benefiting more than 300,000 patients, Medprin said.

Only 0.2 millimeter thick, the membrane has multiple and interweaving pore structures formed by numerous microfibers, which is very conducive to the migration and growth of cells, so that new tissues can grow very fast to repair the defective meninges.

The world's most populous nation, China faces severe shortage of dental professionals, especially in rural areas, and 3D printing can help ease the situation, because it provides more cost-efficient solutions.

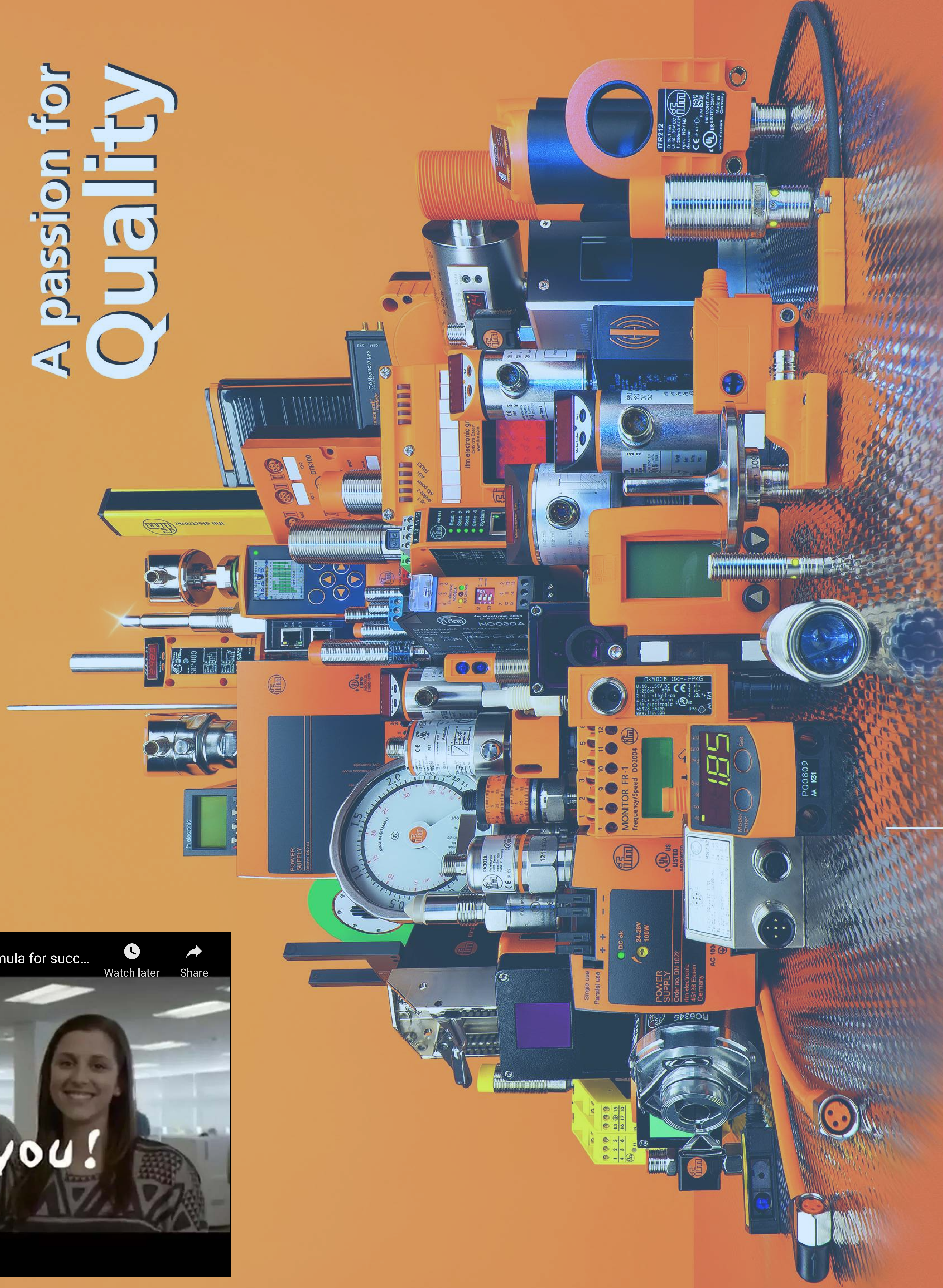
From fabricating customized and accurate dental devices like braces, bridges, and implant guides, helping doctors simulate procedures on special software and 3D-printed models, to training young doctors, 3D printing technology can speed up diagnosis and treatment, minimize risks, and standardize procedures. It can thus help enhance dental care service quality, especially in underprivileged areas.

Although the newly released guidelines on personalized medical devices only ask for registration of some customized products, they still require review and approval of the rest of personalized medical devices. An integrated policy on review and approval of 3D-printed medical devices is expected soon.



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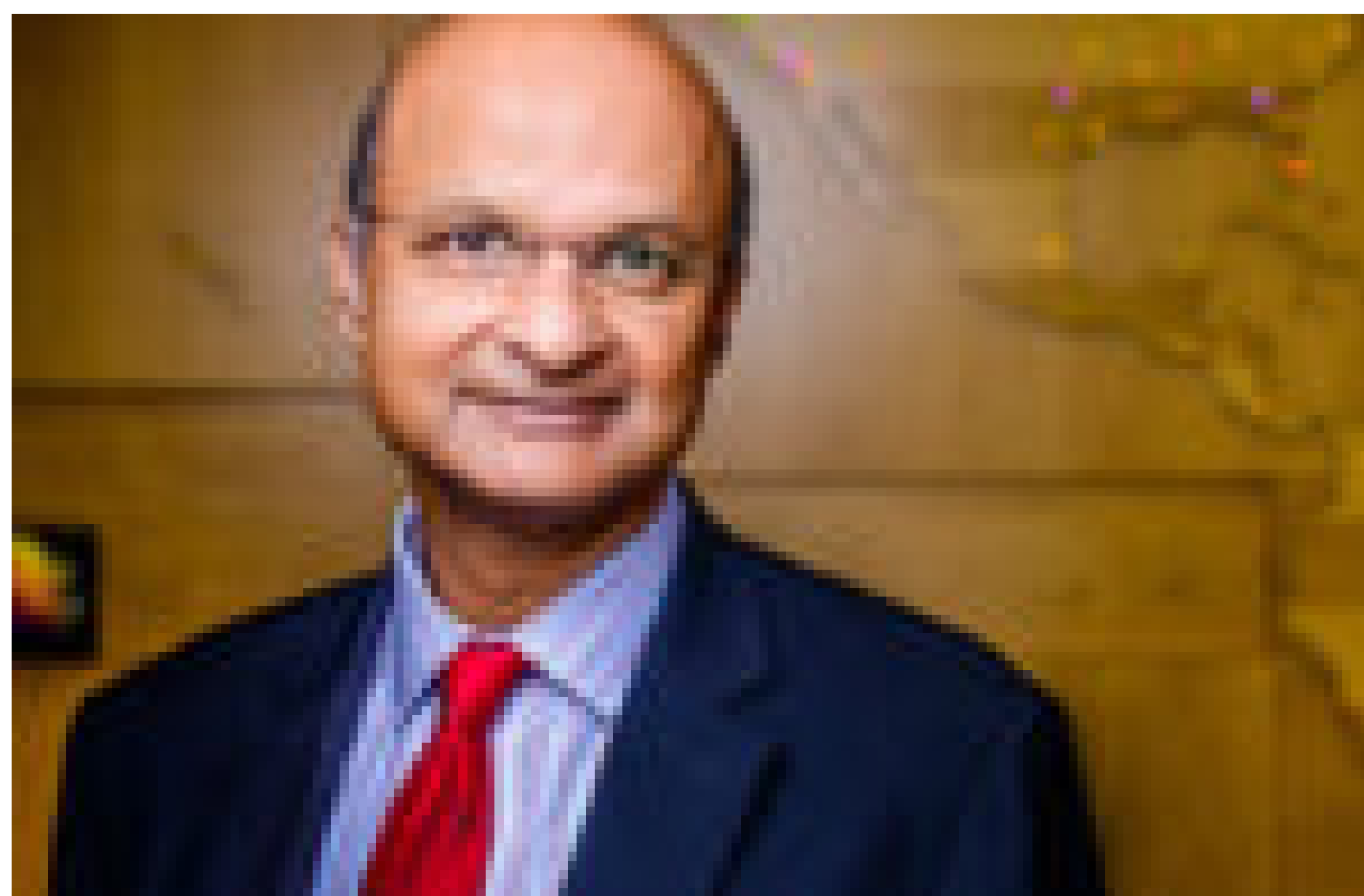
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Here's How Omar Ishrak Transformed Medtronic into The World's Largest Medtech Operation



Omar Ishrak used a series of M&A moves and focus on global markets and value-based care to transform Medtronic into the world's largest medical device business in less than a decade. Ishrak is preparing to retire from the corner office next year ahead of the

medtech giant's mandatory retirement age, to be replaced by longtime lieutenant Geoff Martha. Hired in May 2011, Ishrak doubled annual revenues and added \$100 billion to Medtronic's market cap, according to lead director and Textron CEO Scott Donnelly.

Although early turns toward global markets and value-based healthcare were sustained over the course of his nearly decade-long run, Ishrak will be most widely remembered for the largest-ever medtech merger – the \$50 billion buyout of Covidien in early 2015 – and the raft of other M&A moves that defined his time at Medtronic.

His influence over the company will extend past his last day as CEO on April 26, 2020, when he's due to assume the newly created executive chairmanship the next day. Apart from having a hand-picked successor take over, his new role entails providing *"counsel and guidance to Medtronic's leadership, oversee CEO succession, and drive the ongoing successful execution of Medtronic's long-term strategic plan."*

Report: SEC Probes GE Healthcare, Philips, Siemens in Chinese Bribery Scheme



The U.S. Securities & Exchange Commission is reportedly investigating three of the world's largest medical device makers for their alleged participation in a bribery scheme in China.

The SEC probe involves Siemens, Royal Philips and GE Healthcare, which allegedly used local middlemen to bribe Chinese government and hospital officials to buy their medical equipment, Reuters reported, citing a pair of American sources "with knowledge of the matter."

Federal investigators are already looking into similar charges in Brazil involving those three firms and Johnson & Johnson (NYSE:JNJ). The alleged infractions would violate the Foreign Corrupt Practices Act, which makes it illegal for American citizens and companies to pay foreign officials to win business.

In both China and Brazil, the companies allegedly benefited from the initial sales and from larger profit margins from 10- to 15-year service contracts, software updates, spare parts and materials, according to the sources, "who spoke on condition of anonymity because they were not authorized to discuss the investigation publicly," the wire service reported.

The 2019 Top 30 Global Medical Device Companies



The lack of a significant megamerger in 2018 stood out in an industry that had become accustomed to annual blockbuster deals. There were enough small- to mid-sized deals to keep analysts interested, but the largest deal of last year—Boston Scientific’s \$4.2 billion purchase of U.K.-based BTG plc—doesn’t seem as significant in the wake of several mergers valued in the tens of billions.

A number of the medtech elites did just the opposite, spinning off entire companies or divesting large franchises to refocus their businesses. Pharmaceutical giant Novartis began spinning off its Alcon eye care unit last July, and Alcon took its first steps as a standalone company this past April. Danaher also proclaimed plans to spin off its decaying dental franchise last July. Siemens explored a European IPO for its Healthineers unit last March that valued the company at 28 billion euros. Johnson & Johnson sold its LifeScan glucometer business to Platinum Equity for \$2.1 billion last October and streamlined its portfolio further with the \$2.8 billion sale of its Advanced Sterilization Products business to Fortive Corp. BD handed Thermo Fisher its Advanced Bioprocessing franchise for \$477 million last October. GE teased a spinoff of GE Healthcare last June amid massive restructuring efforts, but decided in the end to shed its biopharmaceutical business to Danaher for \$21.4 billion.

Humanitarian efforts among the Top 30 abounded last year as well. As part of its “Healthy People, sustainable strategy” initiative, Philips proclaimed it would generate 15 percent of revenue from selling refurbished equipment to reduce health systems’ environmental footprint. EssilorLuxottica partnered with Total Group and several Asia-Pacific governments to improve access to vision care services and eyewear through its Eye Mitra program. Zimmer Biomet teamed up with Faith in Practice to deliver knee replacements to Guatemalans in need and hopes to expand the scope to trauma surgeries and hip replacements. Finally, Hillrom began its “Hillrom for Humanity” last year, which facilitates corporate volunteerism through environmental sustainability initiatives, medical equipment donations, disaster relief, and STEM (science, technology, engineering, math) enrichment.

THE TOP 30 MEDICAL DEVICE MANUFACTURERS

1. Medtronic	\$30.56B
2. Johnson & Johnson	\$26.99B
3. GE Healthcare	\$19.78B
4. Abbott	\$18.93B
5. Philips	\$16.09B
6. BD	\$15.98B
7. Cardinal Health	\$15.58B
8. Siemens Healthineers	\$15.58B
9. Stryker	\$13.60B
10. Baxter	\$11.12B
11. Boston Scientific	\$9.82B
12. Danaher	\$9.10B
13. EssilorLuxottica	\$8.53B
14. Zimmer Biomet	\$7.93B
15. B. Braun	\$7.90B
16. Alcon	\$7.15B
17. Fresenius	\$6.06B
18. 3M Health Care	\$6.02B
19. Olympus	\$5.72B
20. Terumo	\$5.41B
21. Smith & Nephew	\$4.90B
22. Dentsply Sirona	\$3.99B
23. Canon Medical Systems	\$3.96B
24. Edwards Lifesciences	\$3.81B
25. Intuitive Surgical	\$3.72B
26. Hoya	\$3.37B
27. Hologic	\$3.22B
28. Varian	\$2.91B
29. Hillrom	\$2.84B
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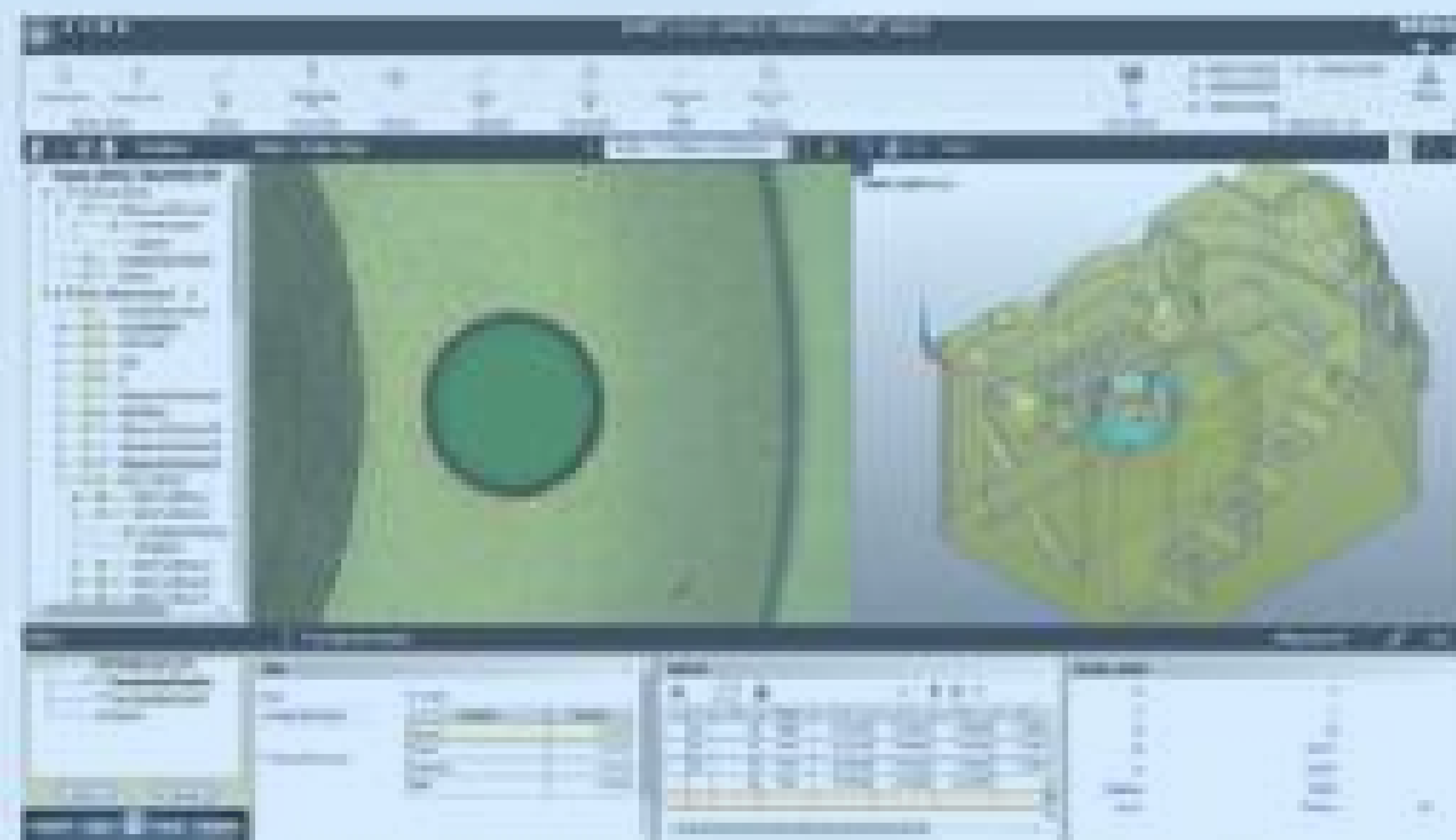
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Only 5% of Mid-Size Manufacturers Are Implementing Industry 4.0

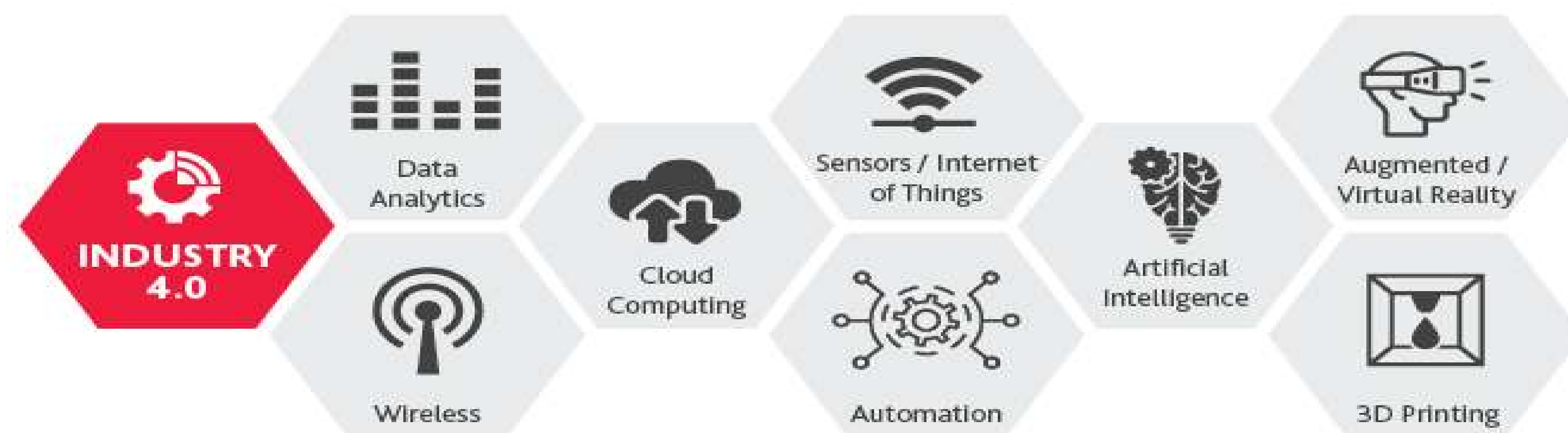
A new survey finds, in spite of competitive pressure, mid-size manufacturers are late in their build-out of smart manufacturing technology.

While major manufacturers have been hip-deep in Industry 4.0 implementation for years, mid-size manufacturers have been slow to invest in smart technology. According to BDO's 2019 Middle Market Industry 4.0 Benchmarking

Survey, 99% of mid-market manufacturing executives are at least moderately familiar with Industry 4.0. Yet despite all its potential to create value, only 5% are currently implementing—or have implemented—an Industry 4.0 strategy.

Industry 4.0 comes with a jumbled mix of lofty concepts and flashy technologies that can confuse rather than illuminate. But underlying the buzzwords are real-world applications that offer significant ROI.

The survey was conducted by Market Measurement, an independent market research consulting firm. Survey respondents included 230 executives at US manufacturing companies with annual revenues between \$200 million and \$3 billion and was conducted in November and December of 2018.



1.) Industry Outsiders Pose the Greatest Threat

Middle-market managers apparently understand that Industry 4.0 technology is crucial. A full 69% of the respondents said that failure to invest in Industry 4.0 will lead to encroachment from non-traditional competitors. *"All you have to do to see the seriousness of digital change is look at what 3D printing is doing to the part manufacturing market,"* Eskander Yavar, co-leader of BDO's Industry 4.0 practice, told Design News. *"It changes traditional logistics. They're taking out a step in the supply chain. That's an enabling technology that wasn't available 10 years ago."*

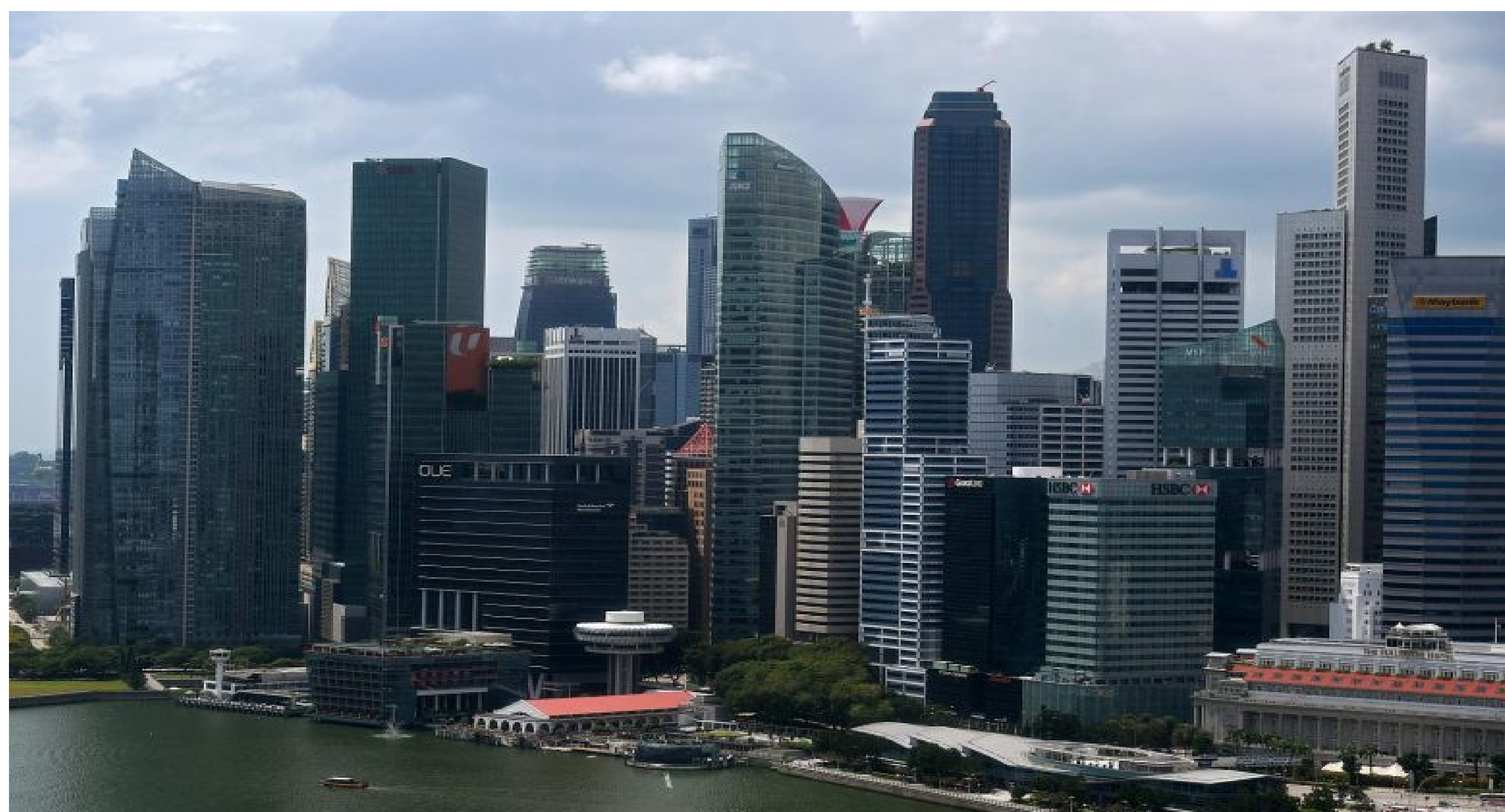
2.) The Biggest Barrier to Implementation is Poor Communication

Two-thirds of the survey's manufacturers view poor communication as the biggest barrier to Industry 4.0 implementation *"That's a great result,"* said Yavar. *"We found there's high expectations from the c-suite about their company's ability to implement 4.0 projects. Middle management, however, is less confident in 4.0 projects. The difference in perceptions is a problem."*

3.) Despite Progress, Silos Remain

Only 6% of manufacturers claim they have transparency across their entire value chain. *"It is a small figure,"* said Yavar. *"They're trying to get the transparency in their own four walls before they extend out to suppliers and customers. This will start to change over the years. This is not a reflection of whether they realize the need. They're just trying to get their own house in order first."*

Growth in Singapore Medical Device Market Cut to 8.4% for 2018-2023: Report



Singapore's medical device market is projected to register a compound annual growth rate (CAGR) of 8.4 per cent from 2018 to 2023, down from a previous estimate of 9.1 per cent, with the industry valued at some \$1.3 billion in 2023, according to a report by Fitch Solutions Macro Research on Thursday (July 25).

This comes amid weaker global economic momentum, and the ongoing US-China trade tensions, though increased government expenditure on the growing healthcare needs of an ageing population will likely cushion the effects of a slowing economy, Fitch Solutions said.

The research house also expects Singapore's medical device market to grow by 6.6 per cent this year, and by 8.4 per cent in 2020.

According to Fitch Solutions, market drivers include a rapidly ageing population with a growing disease burden, high quality healthcare provision financed by a combination of private saving schemes and government subsidies, as well as a well-developed medical tourism industry ranked among the top five worldwide.

Furthermore, strong government financial backing for the healthcare sector, an expanding medical device industry attracting multi-national investment, ongoing regulatory improvements, and new free trade agreements should also drive sector growth, the report stated.

Nonetheless, market barriers include a small population limiting market size, government restrictions and controls that can hinder market development, and high medical device market competition, Fitch Solutions said.

The modest appreciation of the Singapore dollar from 2020 will also benefit import growth over the coming years, said the report. "*The latest monthly trade data show that imports rose by 7.2 per cent year-on-year to US\$1 billion in the three months to April 2019, and increased by 8.8 per cent to US\$4.2 billion for the 12 months ending April 2019,*" it said.

But medical device exports, which primarily consist of re-exported goods, will face mounting headwinds in 2019 due to the global economic slowdown, particularly in the US and China, the country's two most important destinations, Fitch Solutions said.

"That said, the CPTPP (Comprehensive and Progressive Agreement for Trans-Pacific Partnership) trade agreement, which has entered into force for seven countries including Singapore, will support exports to Australia, Canada, Japan, Mexico, New Zealand and Vietnam, while ratification of the EUSFTA (European Union-Singapore Free Trade Agreement) will support further expansion of exports to the EU," it noted.

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Catherine Chen Appointed Executive Vice-President of Bureau Veritas Consumer Products Services

Bureau Veritas, a world leader in testing, inspection, and certification (TIC) services, is pleased to announce the appointment of Catherine Chen, effective January 1, 2020, as Executive Vice-President of its Consumer Products Services division.

Based in Shanghai, China, Catherine Chen will report to Didier Michaud-Daniel, Chief Executive Officer of Bureau Veritas, and join the Group Executive Committee. She will replace Oliver Butler, who has decided to retire from the Group in 2020 after very successful years with Bureau Veritas. Over the next few months, Oliver Butler will continue to work closely with Catherine Chen to ensure a smooth transition.



Didier Michaud-Daniel, Chief Executive Officer of Bureau Veritas, stated:

"I am delighted to soon welcome Catherine Chen to the Group Executive Committee. Catherine has a proven track record at Bureau Veritas, having served in various leadership roles, before eventually becoming COO of our Consumer Products Services division. Catherine will leverage her wealth of experience in the industry, coupled with extensive knowledge of the Asian markets, to develop the division even further. I would also like to thank Oliver Butler for his outstanding contribution to the development of our Consumer Products business over the last 16 years. Oliver has enabled Bureau Veritas to become a global leader in supply chain solutions, sustainability and wireless and automotive connectivity services. I am proud to lead an Executive Committee that brings such a wide array of professional and cultural backgrounds to the table, reflecting the diversity at Bureau Veritas."



Catherine Chen brings more than 20 years of global experience in the Consumer Products industry across Marketing & Sales, and Operational and P&L management. Catherine Chen joined Bureau Veritas in China in 2005 after 7 years with TÜV SÜD. At Bureau Veritas China, she undertook various Sales & Marketing management roles, before being appointed as General Manager of LCIE Shanghai – a subsidiary of Bureau Veritas – in 2009. In 2012, she became Vice President for the Consumer Products Services division (CPS) for North China and, in 2014, was promoted to Senior Vice-President for CPS Greater China. In 2017, she took the reins of CPS for the entire Pan-Asia region, becoming Chief Operating Officer of the division. Catherine Chen holds an International Executive MBA from Rutgers Business School (United States), and a BA in International Business from Western Sydney University (Australia).

HOYA Group PENTAX Medical Cleared CE Mark for DISCOVERY™, an AI Assisted Polyp Detector



PENTAX Medical, a division of the HOYA Group, announced that it has cleared CE mark for DISCOVERY™, an innovative Artificial Intelligence (AI) assisted polyp detector designed to support endoscopists in finding potential polyps during a colorectal examination.

DISCOVERY™ is the outcome of a close cooperation between PENTAX Medical research center located in Augsburg, Germany, and expert clinical partners from six of the leading medical institutions across the world. For this next generation development, a total of more than 120,000 files from approximately 300 clinical cases were used for the software training. By this, DISCOVERY™ is able to assist with the detection of potential polyps in real time.

The system is built in a flat monitor to provide a high usability as it can be used with any of PENTAX Medical video endoscopy systems to highlight potential polyps. The menu is self-explaining and uses an intuitive touchscreen interface.

"The benefits for the customers are outstanding. Our vision was to bring Artificial Intelligence into the operating room in the most user-friendly way. We wanted to give doctors the possibility to use this exciting new technology to strive for a better clinical outcome and maximize the patient care." Mr. Wolfgang Mayer, Managing Director, R & D, PENTAX Medical Augsburg mentioned.

PENTAX Medical is committed to continuously exploit the use of Artificial Intelligence in additional medical fields. By gradually enhancing the product line up, PENTAX Medical has dedicated themselves to leverage AI for the further support of customers and patients.

Prof Timo Rath, Professor of Endoscopy and Molecular Imaging, University of Erlangen, Nuremberg, Germany mentioned, *"As endoscopists one of our major tasks is to reduce the incidence of colorectal cancer. I'm very confident that the DISCOVERY™ will translate into increasing our own Adenoma Detection Rate and therewith will contribute to reduce colorectal cancer mortality"*.



Medical Robots are The Future: 10 European Startups Excelling in This Field in 2019

Several industries have witnessed drastic changes due to robotics and medicine is not an exception. Just like how manufacturers depend on robots to minimise human errors and maintain product quality, even robots are used in the field of medicine to perform surgeries with high levels of precision and help patients live a normal life.

Medical Microinstruments (Italy)



Medical Microinstruments has developed a robotic platform and microinstruments that extend the possibilities of surgical interventions. The company cares about patients and has a meaningful impact on care. As there is an opportunity to advance

microsurgical treatment options with an innovative robotic platform, the company has made it a reality with the new generation of materials and manufacturing processes that make wristed micro-surgical instruments possible.

AOT Swiss (Switzerland)



AOT Swiss has reinvented bone surgery with its CARLO (Cold Ablation Robot-guided Laser Osteotome) system. It works precisely than human beings and paves the way to more gently treatment options. It keeps bone tissue vital and intact at the spot of the laser

incision. It is a custom-designed, small, and lightweight robotic arm with navigation and control software. It lets surgeons perform bone surgeries with unprecedented precision.

Robocath (France)



The French medtech startup Robocath designs, develops, and commercialises robotic solutions to treat cardiovascular diseases. It's first European robotic-assisted

solution for PCI, R-One, obtained the CE-mark in February this year. It is designed to operate with great precision and carry out specific movements for better interventional conditions. Notably, R-One from Robocath is compatible with leading devices and cath labs. The company aims to become a global leader in vascular robotics by developing remote treatment options for emergencies.

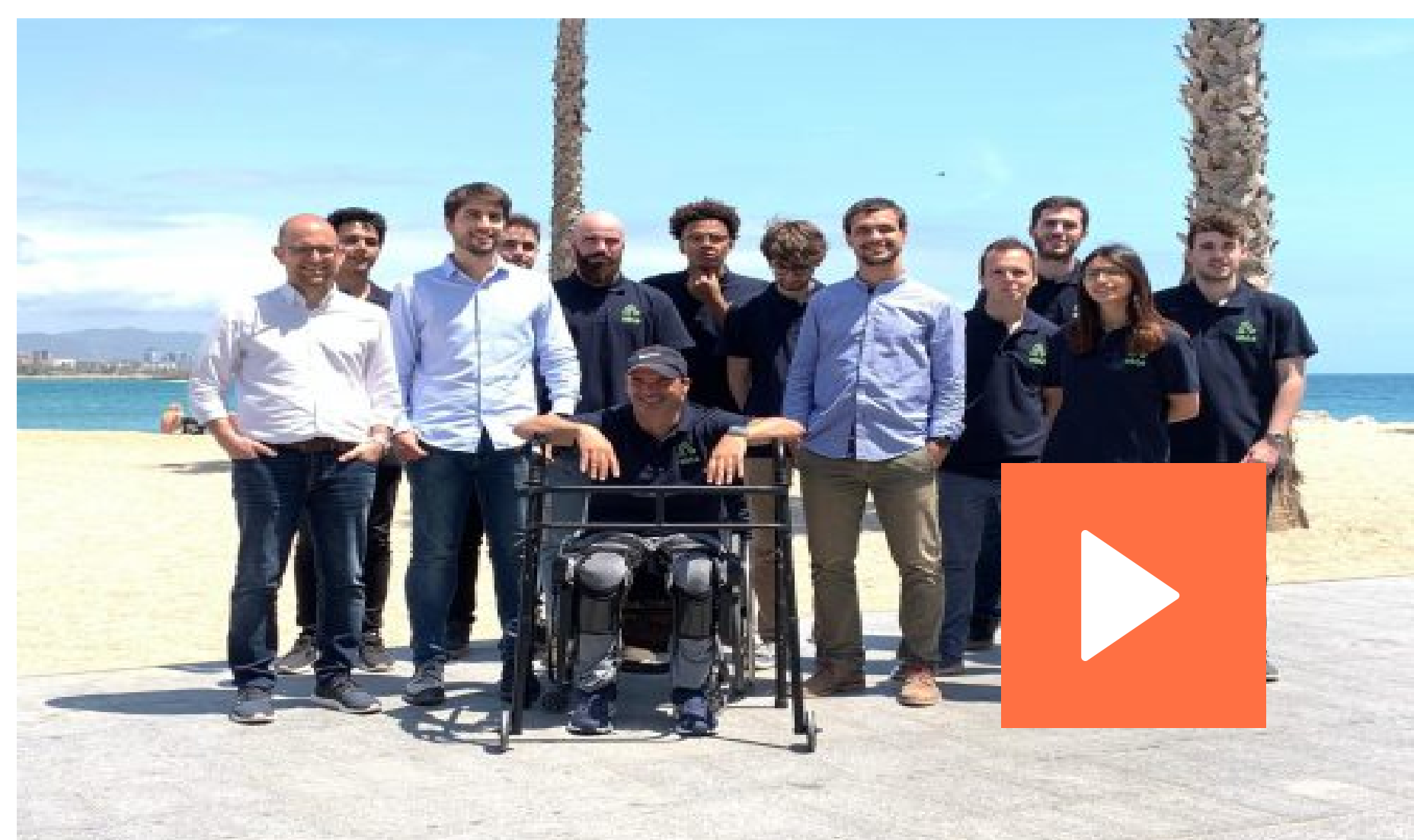
GOGOA Mobility Robots (Spain)



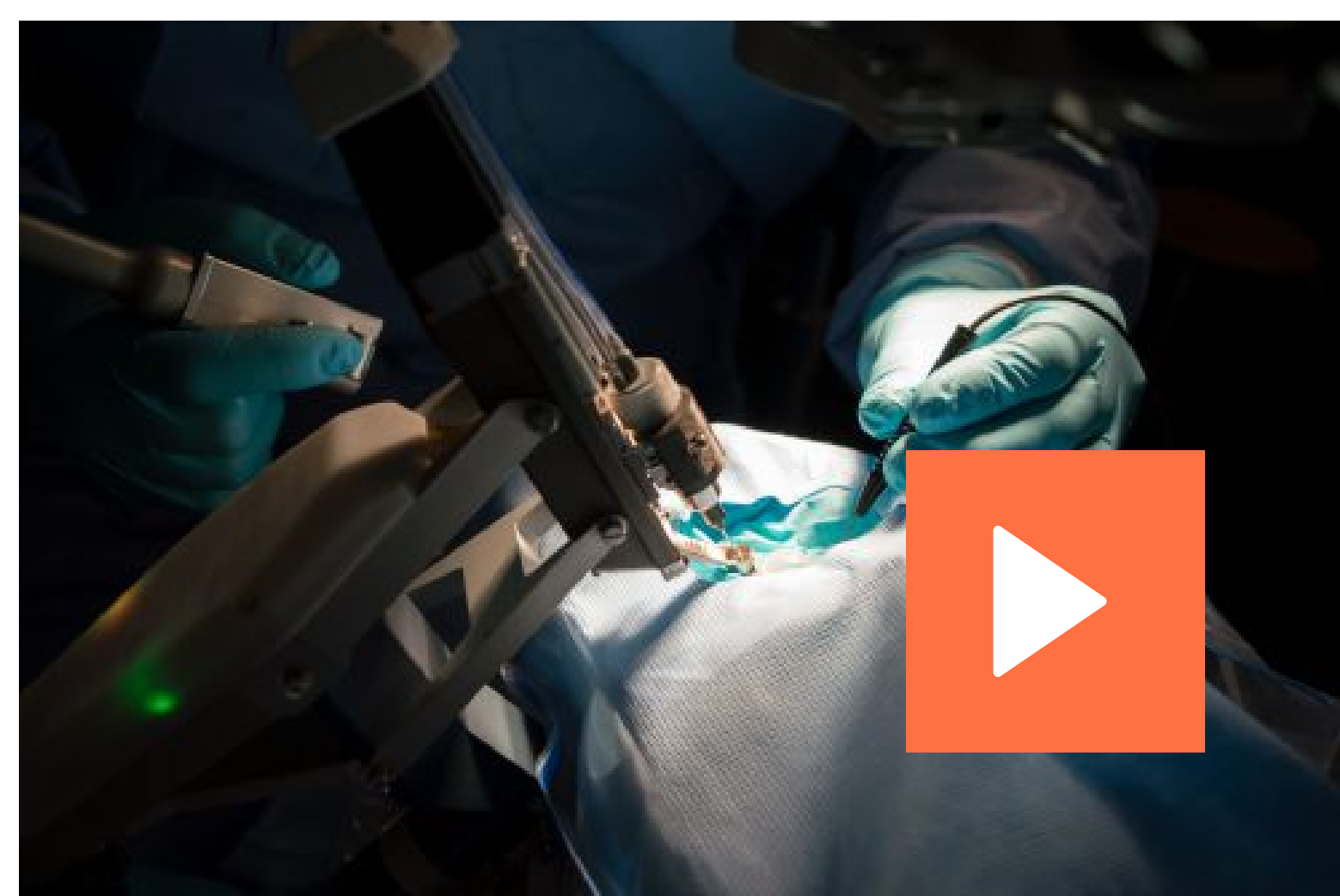
GOGOA Mobility Robots operates with the mission to develop affordable yet effective wearable solutions that help humans increase the capacity for movement. These solutions provide support to the neck, shoulder, and lumbar in various health-related critical challenges. These wearable robotics solutions support human movement.

AcouSort (Sweden)

AcouSort develops continuous flow-based microfluidic systems for particle/cell separation, handling, and enrichment technology. The core technology depends on acoustic standing wave forces integrated within the microfluidic systems. This enables rapid processing and sorting of cell samples. The company develops proprietary bioanalytical and clinical applications depending on acoustophoresis.

ABLE Human Motion (Spain)

Spinal cord injury is a catastrophe and millions of people across the world struggle with it due to disability for a lifetime. With ABLE Human Motion, these people could stand up and walk with the robotic exoskeleton. This Spanish startup is a spin-off from UPC and overcomes limitations with its domestic, lightweight, and affordable exoskeleton. The solution from this company restores the ability to walk naturally in an intuitive way.

Preceyes (Netherlands)

Eindhoven-based medtech startup Preceyes develops innovative robotic solutions to assist eye surgeons to perform the most demanding surgeries including the delivery of advanced therapeutics. The company makes this possible with its latest, high-precision treatments.

Medineering Surgical Robotics

Medineering wants the benefits of robotic assistance available for an increased number of patients undergoing neck and head surgery. The company develops, manufactures, and markets application-specific and convenient robotic solutions including Intelligent Positioning Arm and others that assist surgeons when operating on complex anatomical regions.

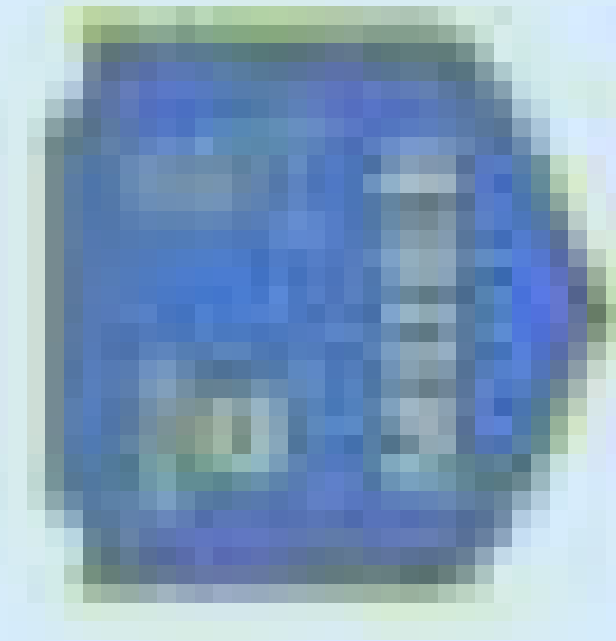
Reboocon Bionics (Netherlands)

Reboocon Bionics deals with the challenges of technology. The company was founded with the determination to advance robotic technology to help disabled people. Based in Delft, it develops lightweight, intelligent, and easy to operate robots. It aims to make those who suffer from mobility impairment to stand up and walk and live a normal life like the others.

Rob Surgical Systems (Spain)

Rob Surgical Systems is committed to developing best-in-class robots for minimally invasive surgery. The company aims to universalise high-precision surgery to address the challenges of the medical community and improve patient care. It offers innovative, efficient, and high-quality robotic systems designed to meet the medical needs.

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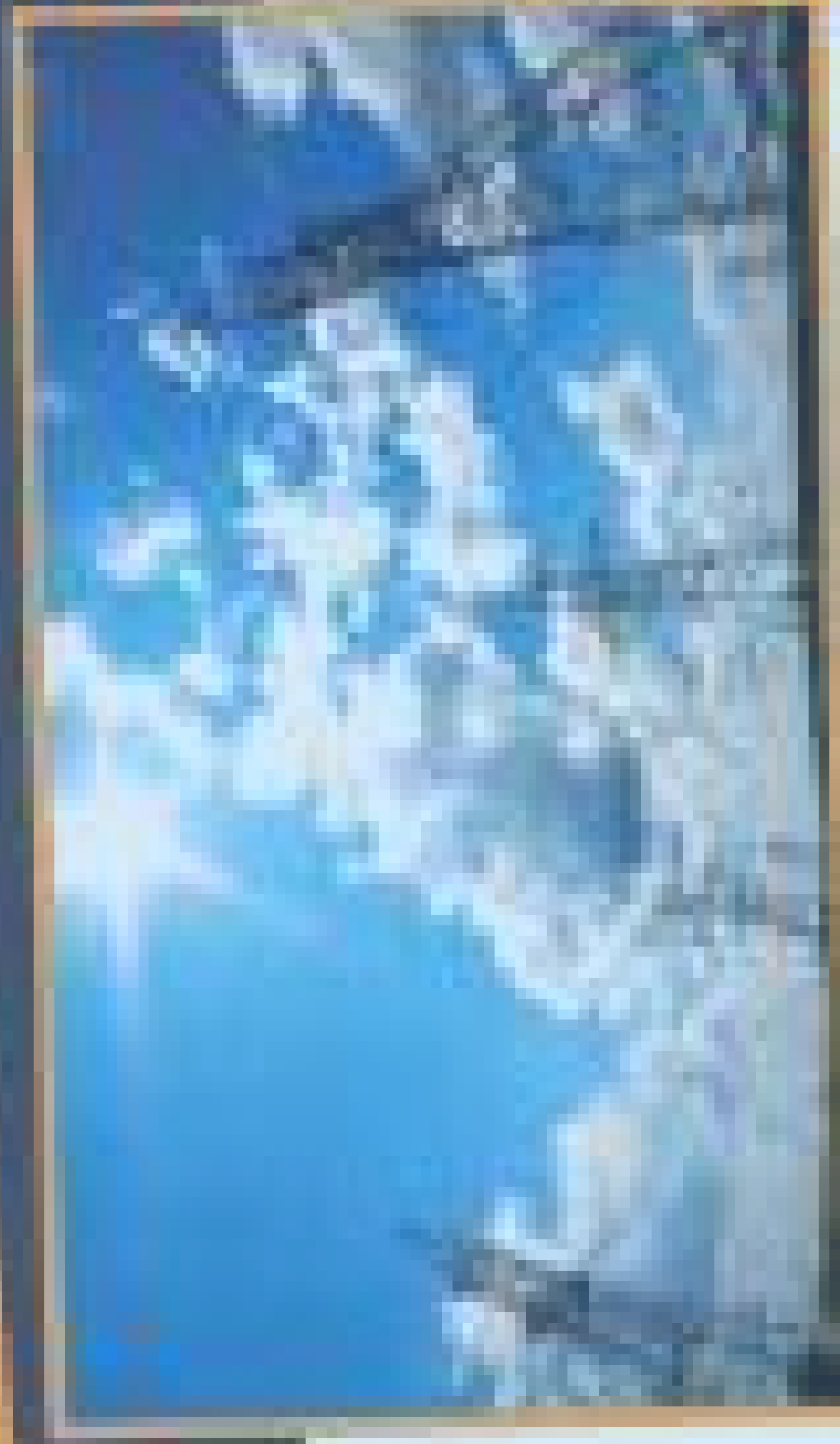


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Fluidda and Materialise Announce Partnership to Develop Personalized Solutions for Lung Patients

Materialise invests €2.5 million in Fluidda as part of a €4 million funding round



Fluidda announces a new phase in its collaboration with Materialise (NASDAQ: MTLIS), to expand personalized treatment options in the respiratory care, building on its image based software. As part of the partnership, Materialise invests €2.5 million in Fluidda and Wilfried Vancraen, founder and CEO of Materialise, will join the board of directors at Fluidda.

The companies want to collaborate more closely to accelerate the development of personalized solutions in pulmonology. Fluidda's proprietary imaging technology, Functional Respiratory Imaging (FRI) based on airflow monitoring, combines CT scan images with computer based flow simulations, allowing for a better visualization of airflows in lung patients. By combining this with the experience of Materialise in medical 3D printing and planning, both companies want to develop more personalized solutions that

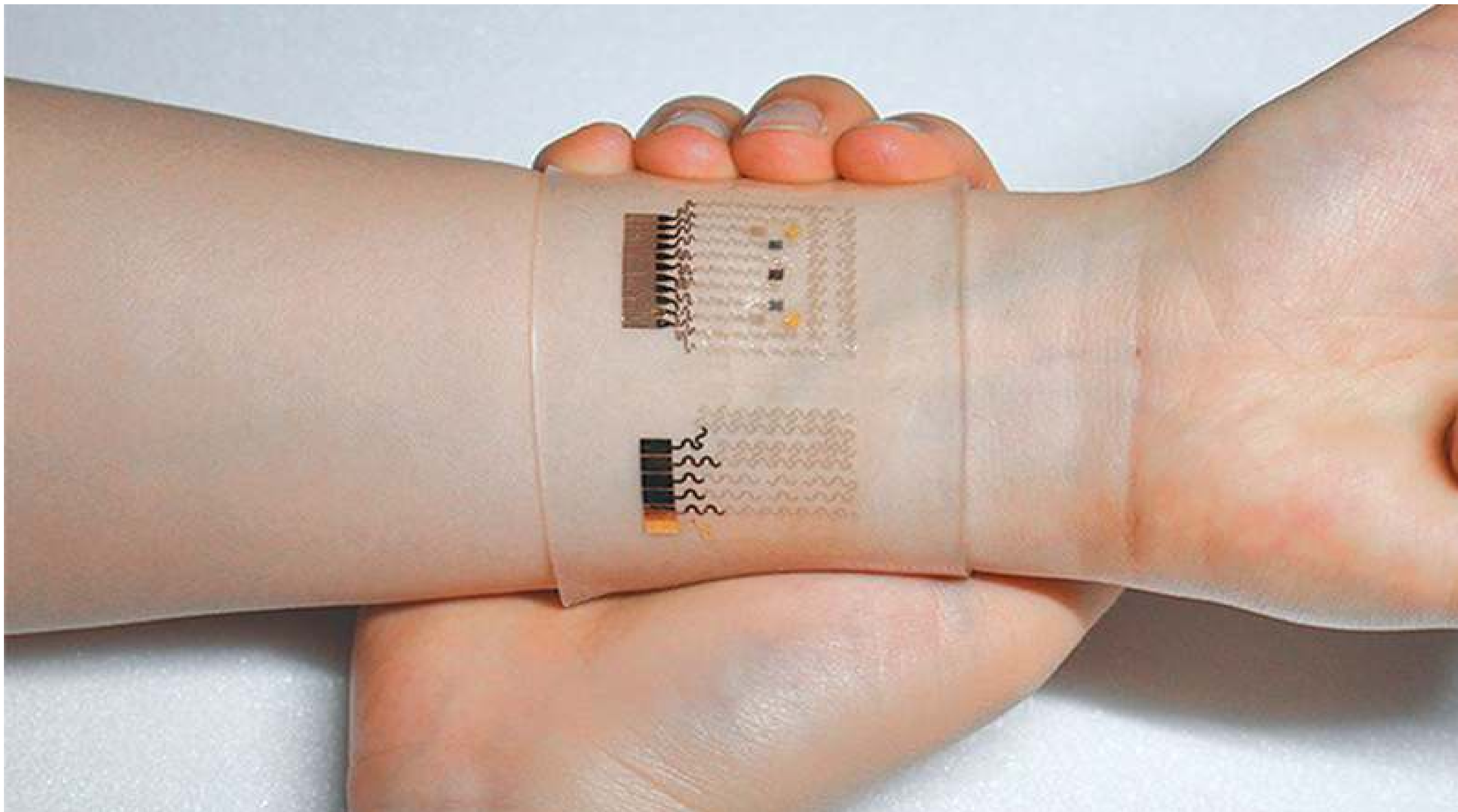
can help the growing number of patients suffering from COPD, asthma, and other respiratory diseases.

As part of the partnership, Materialise led a 4mio EUR funding round with a 2.5mio EUR investment. Fluidda will use part of these resources to accelerate this joint development of a treatment solution that can support clinicians to help patients with a personalized regional treatment, based upon the FRI technology.

Wilfried Vancraen, founder and CEO of Materialise, will join the board of directors at Fluidda. He brings 30 years of experience as entrepreneur in 3D printing and personalized approaches in the medical field.

“We are very excited and proud to enter into this new phase of partnership with Materialise. We share the vision that the medical field, and particularly respiratory healthcare imaging needs to evolve towards personalized, precision medicine through a value-based healthcare approach. We are confident that advanced imaging techniques, such as our Functional Respiratory Imaging methods, can add value in this regard.” - **Jan De Backer, CEO of Fluidda**

How Health Wearables Are Improving Patients' Lives



The proliferation of wearables such as Fitbit to FDA approved medical devices shows that wearable tech is poised to disrupt the healthcare industry.

Estimated worldwide turnover of wearable devices in 2019 was approximately 18 billion euros (\$19.9 billion), according to the German statistics portal Statista.

By the end of this year, more than 300 million users will use one or more wearables to monitor their heart rate, blood pressure or calorie intake. According to estimates by the consulting company Roland Berger, health wearables market will grow by an average rate of 21% per year, at least for the next two years, writes Torsten Maschke, CEO of Datwyler Sealing Solutions.

Medical wearables with artificial intelligence and big data are providing an added value to healthcare with a focus on diagnosis, treatment, patient monitoring and prevention. Wearables can monitor chronic medical conditions, track sleep and fitness routines, and even remind patients to take their medicine, do their exercise, or eat regularly. Wearables help to increase efficiency and reduce time gathering health data, and more.

In 2017, the FDA approved the first pill with a sensor that can track if the patient has swallowed it. The tiny pill has a drug and an ingestible sensor. The sensor gets activated when it comes into contact with stomach fluid to detect when the pill has been taken. The data is then transmitted to a wearable patch that eventually conveys the information to a paired smartphone app. Doctors and caregivers, with the patient's consent, can then access the data via a web portal. This technology can be very useful for treating mental health disorders and chronic diseases like diabetes since medication adherence is a challenge for these populations.



The US Food and Drug Administration (FDA) is exploring the development of digital health applications and wearables. In 2017, the agency selected nine companies to take part in the first-of-its-kind pilot program that will help transform digital health law and allow these firms to create new digital health software.

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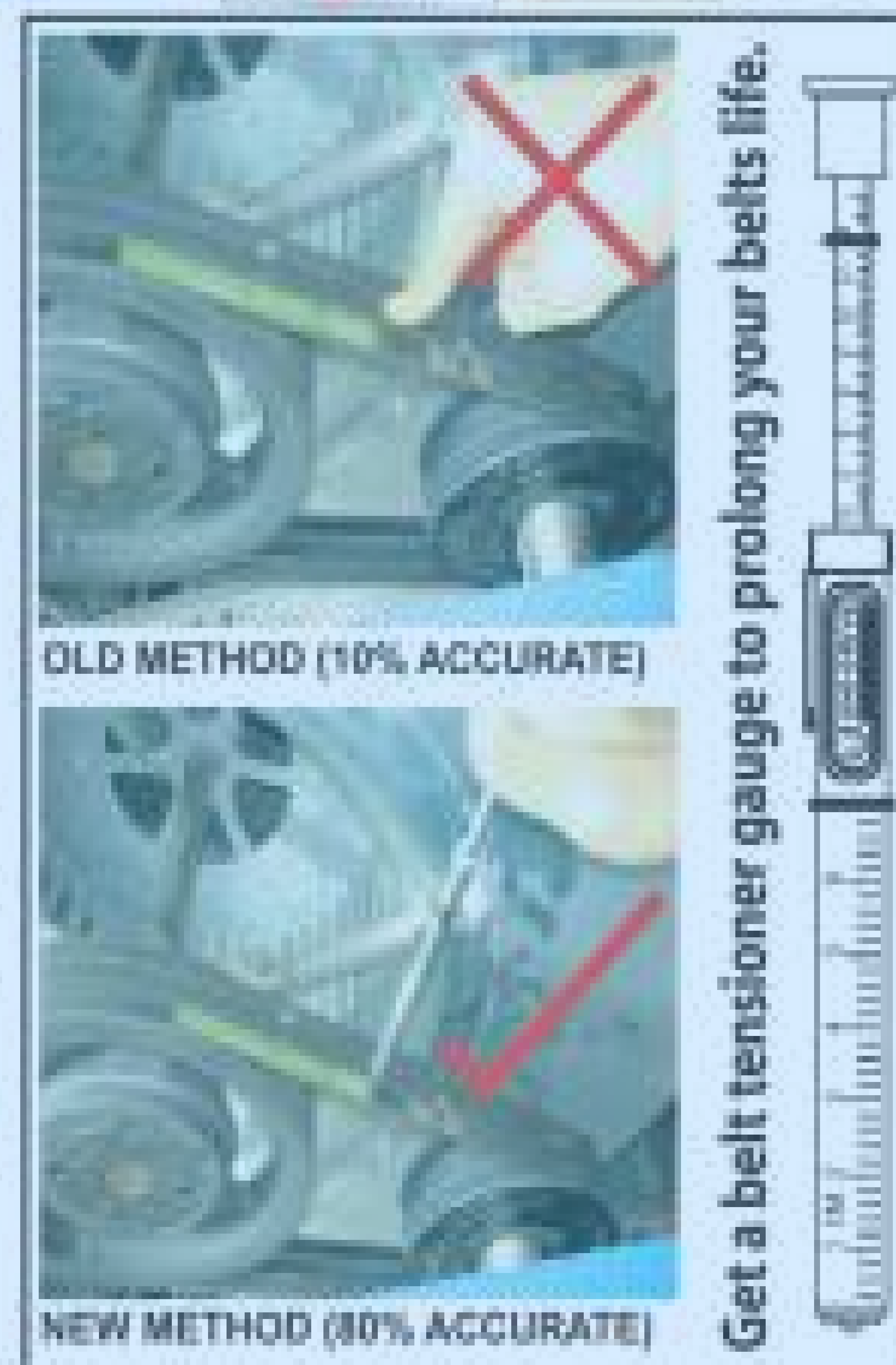
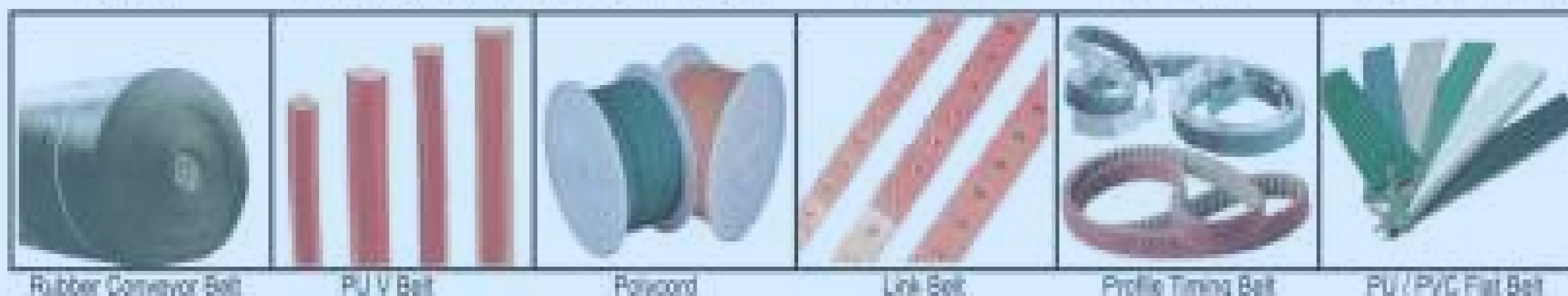
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Fong's Engineering and Manufacturing: Singapore's First SME to Launch A Fully Automated Production Line

From Overseas Design Manufacturer (ODM) to Product Owner

Fong's started out as a manufacturer of metal components, supplying individual parts to sectors such as electronics, defence and oil & gas in 1982.

In less than 40 years, the company has transformed itself into a product owner and now specialises as a manufacturer of high-end medical devices, such as endoscopy and surgical power tools.



"We realised we needed to focus all our resources towards growing and sustaining the company within one industry. We decided on medical devices as we had built strong relationships serving key medical devices companies in the United States for more than a

decade," said Mr Joseph Wong, Project Manager (Technology and Transformation, Smart Manufacturing).

Making Strides towards Industry 4.0

The team at Fong's was also increasingly motivated to review its manufacturing processes. They had initially outsourced production to external vendors in a bid to keep costs low, but this arrangement meant that they did not have full control over the entire manufacturing process.

New technological solutions were thus necessary to re-centralise production in-house and regain management on all aspects of production. *"Technology is rapidly changing. It is inevitable for companies to digitalise and transform in order to sustain growth,"* said Mr Wong.

To solve this, the company carefully charted out their Industry 4.0 (I4.0) journey and adopted an agile approach to project management; they couched the upgrades in a series of stages, in order to avoid delays in delivery and minimise disruptions to day-to-day operations.

According to Mr Wong, productivity on the new smart line has already jumped more than 30 percent. Morale has visibly improved as the work has become less menial, and workers can be redeployed and retrained to take on higher value tasks.

Investing in Talent, Partners and the Future

Mr Fong believes that training his workers are just as important as innovating the company's business model, processes and products. To make sure that no worker was left behind, Singapore Polytechnic was roped in to assess the team's existing competencies and update them according to the necessary I4.0 skills needed.

To fill the necessary gaps, the company also worked with organisations like Employment and Employability Institute (e2i), Skillsfuture Singapore, and Workforce Singapore to help its workforce stay up to date with the new equipment and technology. Some employees even attended part-time diploma courses with Nanyang and Temasek Polytechnic.

Aiming for High Standards

"Without quality, customers will leave and the business will lose out, so people need to put their heart in it," said Mr Fong.

With the help of Enterprise Singapore, Fong's attained ISO 13485:2016, a standard which supports medical device manufacturers in establishing stringent and effective work processes. *"Our clients can rest assured we take quality seriously enough to comply with best practices and regulatory requirements, and that we have better control over our manufacturing processes for constant improvement,"* said Mr Wong.



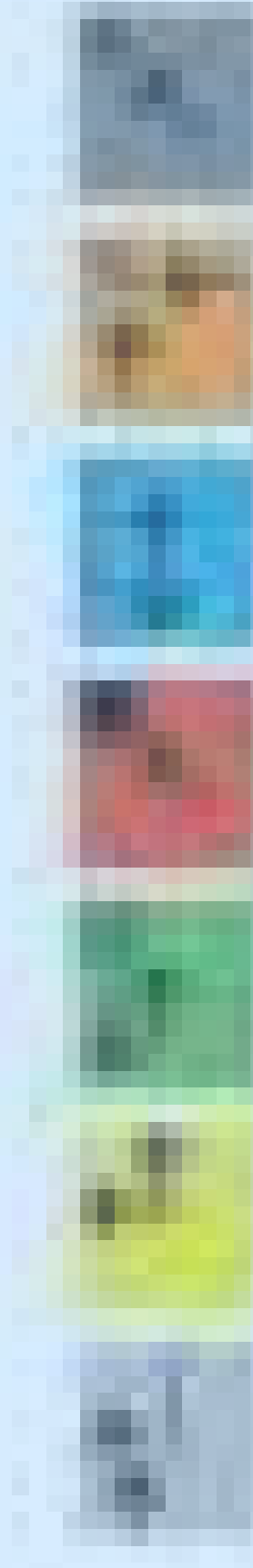
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Globally Recognised Korean Medical Manufacturer Chooses EnvisionTEC for the Production of Precision Dental Appliances



Founded in 2007, Dio Corporation (Dio) is a medical manufacturer based in Busan City in South Korea. The company aims to provide the most advanced dental implant and digital dental solutions to professionals across the world.

Since 2010, Dio has expanded its market share and formed a strategic alliance with Dentsply International, a leading global dental and medical equipment supplier with over a century of experience. This strategic alliance has resulted in Dio products being sold in over 70 countries, with promising continuous sales growth and expansion.

Why 3D printing?

Traditional methods of production, for example dental model manufacture, required many hours of manual hand carving of models. Add this to the molds taken from the patient, the process was messy, slow and even with the most skilled technician resulted in poor accuracy.

When CAD/CAM began to emerge, Dio quickly identified the advantages of the technology. Since these early days the team has witnessed a rise in prominence and the uptake within dental labs and surgeries. They saw dental professionals that still relied on traditional methods starting to lose ground and become less competitive.

The industry was recognising that 3D printing was bringing better results for patients, through better fitting and more effective appliances. CAD/CAM was increasing the speed of production, and that was resulting in reductions in 'time in chair' for dental professionals and reduced patient waiting times.

Why EnvisionTEC?

With a vision to grow and become the leader in the field, Dio understood that they needed to invest in the best equipment to ensure the best quality appliances for its customers.

The team at Dio opted for a number of models to fulfil the different needs of the business. The EnvisionTEC Ultra 3SP Ortho for example, provides a large build area for the mass production of dental models, bite guards, aligners and indirect bonding trays. Printing in different orientations ensures massive numbers can be produced simultaneously. The Micro and Vida desktop models are used in the manufacture of lingual and labial brackets and the direct production of indirect bonding trays. These smaller machines are ideally suited to this task with the production of the tiny appliances being executed with exceptional surface finish and accuracy.

The Future

New applications and improvements are discovered all the time. EnvisionTEC continues to evolve and add the applications to benefit dental, orthodontic and medical professionals. In order to grow, Dio will need to accommodate new applications and the requirements of its customers. Dio can rely on EnvisionTEC to support them, and when further manufacturing capacity is required Dio can simply add EnvisionTEC machines without the need to re-train its team.

The Biobeat Patch – Stick It Simple



Biobeat – The medical smart monitor from Biobeat Technologies is ready to take the lead. They are the winner of the GORE Innovation Center Prize in the 10th IOT/WT Innovation World Cup®. Dr. Anik Eisenkraft, the Chief Medical Officer of Biobeat Technologies is here with us to share his team's ambition of enabling innovative healthcare for patients and doctors worldwide:

1. WHAT IS THE TECHNOLOGY BEHIND BIOBEAT?

The patented technology behind Biobeat is based on reflective photoplethysmography (PPG). The use of several LED, wavelengths and our specialized algorithms would allow a full monitor of the blood pressure and the heart rate anytime, anywhere. This smart tool could assist both in-hospital and homestay patients. Accordingly, an alarm could be set against the warning limit. Moreover, it applies a real-time transmission system that information could be uploaded on the Cloud and shared with the medical healthcare center. Doctors can thus constantly check the patients' conditions from afar and provide early treatment.

SOURCE: www.wearable-technologies.com

2. WHAT IS SO SPECIAL ABOUT THIS PRODUCT?

The Biobeat' sensor could be integrated into any wearable devices like watches, wristlets, and patches. For instance, our company introduces a Biobeat' s sensor watch that battery could last up to 3 days. Another version is a single-use patch with a lifespan up to 10 days.

3. HOW LONG DID IT TAKE YOUR COMPANY TO FULLY DEVELOP BIOBEAT?

Biobeat was founded in 2014. We started the patch project in mid-2018. By now, it has been 6 months – a very fast track!

4. WHAT'S COMING IN THE NEAR FUTURE?

We have started selling Biobeat in Israel, USA, and Europe. The next big step would be collaborating with medical centers and research institutes, taking up pilot studies to ensure the device performance in practice and look at numerous use cases. Additionally, we want to focus more on strategic marketing to make our product available to the public.

5. DESCRIBE YOUR EXPERIENCE IN THE IOT/WT INNOVATION WORLD CUP® JOURNEY IN A SHORT SENTENCE

It is a very big and interesting event. Perhaps tech start-up and SMEs should be more aware of it, take part in which to extend the network and to gain deeper insight into the industry.



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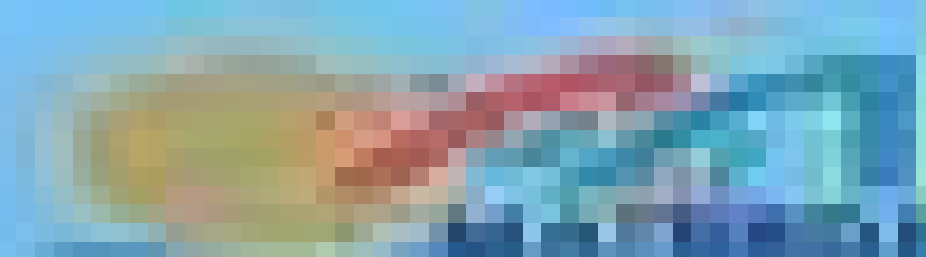
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VSHAPER 270

The flagship product of VSHAPER, dedicated to the production of industrial prints from ABS, ASA, PC-ABS characterized by the high quality of finish.



The printer features a closed chamber with passive heating and heated build platform that guarantees perfect adhesion of the first print layer.

V-PORT extruder, with a port for two V-JET heads, allows printing with nozzles with a diameter of 0.25 to even 1.0 mm.

The stable construction of the printer ensures failure-free and continuous operation of the device in an industrial environment.

Users of the industrial VSHAPER 270 printer emphasize the importance of a closed printing chamber, which ensures equal shrinkage of the material for the entire object, reducing the risk of delamination and deformation of the three dimensional print.



SE/SED-G01-40 Series



We have added the SED series using the DIN connector wiring system to the low power type.

- Realizes maximum working pressure, maximum flow, and allowed back pressure for the 5W class

Maximum pressure: 16MPa

Maximum flow: 40L/min

Permissible back pressure: 16MPa

- CE Approval
- We have prepared a terminal box/DIN connector wiring product and a connector (M12-4 pin connector) wiring product, so selection using the formal auxiliary symbol is possible.
- Surge-less Circuit is standard equipment
- The connector wiring product can be directly connected to a wire-saving system such as Device Net, etc

Makino Introduces U6 H.E.A.T. Extreme Wire EDM Utilizing First-of-its-Kind 0.016" Coated Wire Technology

New machine doubles rough machining rates without increasing manufacturing costs

To be competitive in the marketplace manufacturers must continuously identify opportunities to improve efficiency and increase capacity while maintaining the highest level of quality. Makino, the industry leader in low wire consumption technologies, is introducing a new Wire EDM machine – U6 H.E.A.T. Extreme – that delivers these requirements with increased machining rates while maintaining traditional wire consumption.

The U6 H.E.A.T. Extreme features the industry-first 0.016" coated wire technology that increases rough machining rates up to 300% compared to traditional 0.010" brass wire while maintaining comparable wire consumption rates of 0.6 0.7 lbs./hour. As a result, the new machine is able to significantly improve rough machining speed without increasing manufacturing costs. The U6 H.E.A.T. Extreme machine utilizes a new 0.016" Topas H.E.A.T. coated wire from Bedra, and settings for 2-Pass Machining have been developed to provide optimal productivity.

The U6 H.E.A.T. Extreme also features Makino's HyperDrive Extreme wire control system to improve machine speed and performance. The industry-leading system uses an AC motor tensioning system that expands the range and stability of wire tension creating a reliable threading system for the 0.016" wire. The Wire Threading system provides both Jet and Jet-less threading modes and can rethread the wire in the gap at a break point when operating with traditional wire sizes.

The machine also contains a robust machining conditions library that has been developed to provide an optimal mix of Speed, Accuracy, Surface Finish, and Low Wire Consumption for both sealed and poor flush applications. It utilizes dual digital flushing pumps that harness additional raw horse power to deliver higher pressure and volume of flushing to reduce rough-cut machining cycle time. Additionally, to reduce maintenance intervals and costs the machine features long-life energizers, which dramatically extends the service life of this consumable service item.

To improve ease of use and productivity, the U6 H.E.A.T. Extreme has the intuitive and revolutionary Hyper-i control that delivers a common interface and contains many helpful advanced functions to support every operator need. The machine also comes standard with the HyperConnect IIoT network connectivity function for remote machine monitoring and interconnectivity of all manufacturing information and is equipped with dual 24" Hyper-i screens that allow the operator to display and access any data or program directly at the machine.





Advance Canvas Industries Pte Ltd

Fabric bellows provide maximum protection in rugged industrial environments and prevent foreign particles from entering the hydraulic or pneumatic systems of the precision equipment inside.

Special Advantages:

- Safety
- Flexibility
- Durability
- Dust-proof
- Heat and Cold Resistant
- Oil and Chemical Resistant
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Applications:

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New CombiTac DIN Housings

Stäubli launches new aluminum DIN housings for the modular connector system CombiTac.



The new range includes a complete assortment of coupler hoods in the sizes 2, 3 and 4 with or without protective walls, surface and pedestal housings with or without protective walls and covers, as well as the following accessories: parking stations, interchangeable seals and protective caps for manual applications.

The characteristics of the new DIN housings include 6 marking options, shock and vibration resistance, IP2X during the connection/disconnection process, and an operating temperature range of -40°C to +125°C.

At the same price, we now offer not only more attractive and modern products with faster delivery times, but also a higher IP protection class (IP65 and IP67).

But the housings are not the only novelty: the new CombiTac configurator facilitates uncomplicated, fast customized configuration of modular connectors tailored to your exact requirements. The intuitive tool supports design process optimization by simple integration of step data files and guarantees compatibility and transparency – from planning, inquiries to commissioning and after sales.



Advantages

- Modern and ergonomic: own Stäubli design with robust locking mechanism
- Long life solution: up to 10'000 mating cycles
- Optimum maintenance: quick and easy replacement of sealing
- High operator safety: IP2X with protective wall during mating process, PE module can be added
- Increased Ingress Protection: IP65 and also IP67
- Railway compliance: shock and vibrations according to EN 61373 category 1B

High-Pressure Gauges

T6500 pressure gauges are designed for measuring pressure to 60,000 psi.

T6500 pressure gauges are designed for measuring pressure to 60,000 psi. This gauge's solid-front 304 stainless steel case meets the ingress requirements of IP66 and NEMA 4X standards. Available in either a 100 mm or 160 mm diameter, the T6500 is suitable for water jetting and water blasting applications.



Han® Metal Hoods and Housings Simplify Control Cabinet Assembly



HARTING offers the metal hoods and housings for the Han® B, EMC and M series in versions that allow the rear assembly of contact inserts. The new option simplifies the equipment of electrical cabinets with interfaces. The goal is applications in machinery and automation, robotics and traffic and energy technology.

Han® industrial connectors with a metal hood or housing are especially well suited for environments requiring high levels of component robustness and the simplest possible installation. However, until now, assembly required the cable to first be fed through an opening in the control cabinet so that the inserts could be assembled outside the cabinet and then pulled back into the bulkhead mounted housing. The new Han® solutions are different: They allow for prefabricated inserts to be locked in place directly in the bulkhead mounted housing – from the inside of the control cabinet.

Instead, the inserts are inserted into a plastic frame, which locks in place in the aluminum die-cast hood or housing using latches. The flange gasket of the bulkhead mounted housing is fitted entirely on the inside to ensure a seal with degree of protection IP 65/67 as well as to protect against exposure to UV radiation and ozone emissions.

Rear mounting inserts with a continuous 360° degree shielding will be available by the end of the year: with Han® EMC the shield is always on the metal hood or housing. The hoods also need special EMC cable glands.

The assembly of prefabricated units becomes more efficient thanks to this new option: Control cabinets or machine modules and cable harnesses can largely be pre-assembled separately. The division of work for installations has changed: The amount of pre-assembly work has been increasing and overall the work can now be finished more cost-effectively.

The new Han® connectors with the option of rear assembly are fully compatible with the previous metal housings: All inserts and modules that can be integrated into the existing standards also fit in the new bulkhead mounted housings and hoods. Machine and control cabinet developers as well as production planners can gradually introduce rear assembly into their products or productions.

The PROFINET/PROFIsafe module: MVK Fusion

What makes the MVK Fusion fieldbus module unique is its variety. It combines three basic functions: standard digital sensors and actuators, safety digital sensors and actuators and IO-Link. This combination is new and innovative. It enables unique and groundbreaking automation concepts to be realized. Installation becomes simpler and faster.



The PROFINET/PROFIsafe module unites three basic functions of installation technology:

- Standard digital sensors and actuators
- Safety digital sensors and actuators
- IO-Link

This combination is new and innovative. It enables unique and groundbreaking automation concepts to be realized. Installation becomes simpler and faster.

MVK Fusion makes complex configurations easier because they can be done entirely by the engineering tool in the safety control system. Software developers and electrical engineers no longer need in-depth knowledge of other manufacturers' tools and manuals.

MVK Fusion makes it possible to have fewer fieldbus modules per unit. Some applications might only require a single module. This opens up new opportunities for many automation applications!

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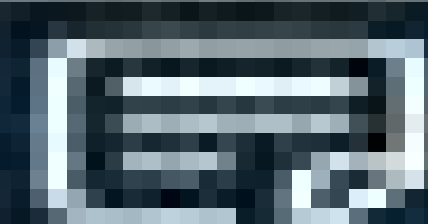
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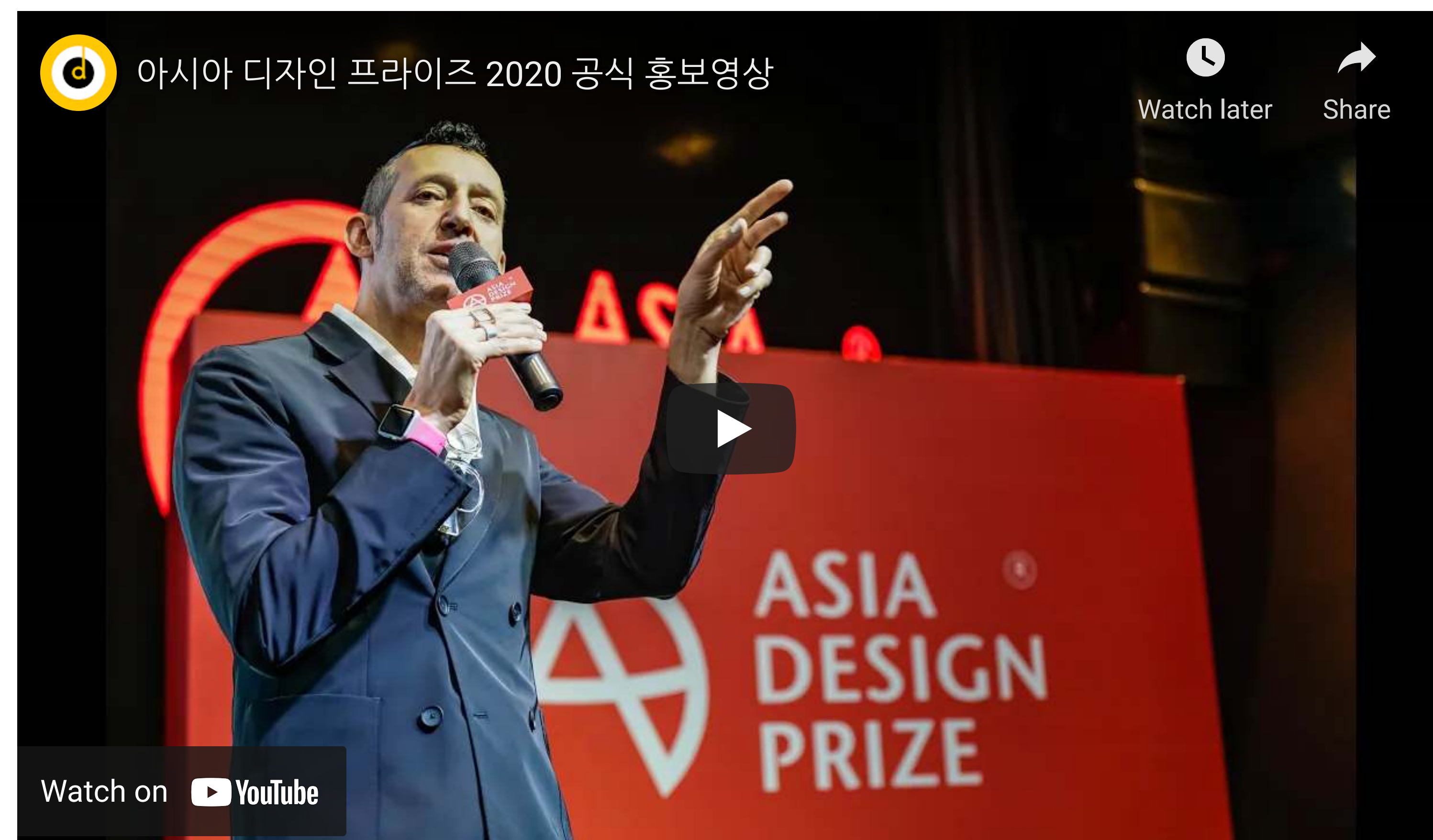
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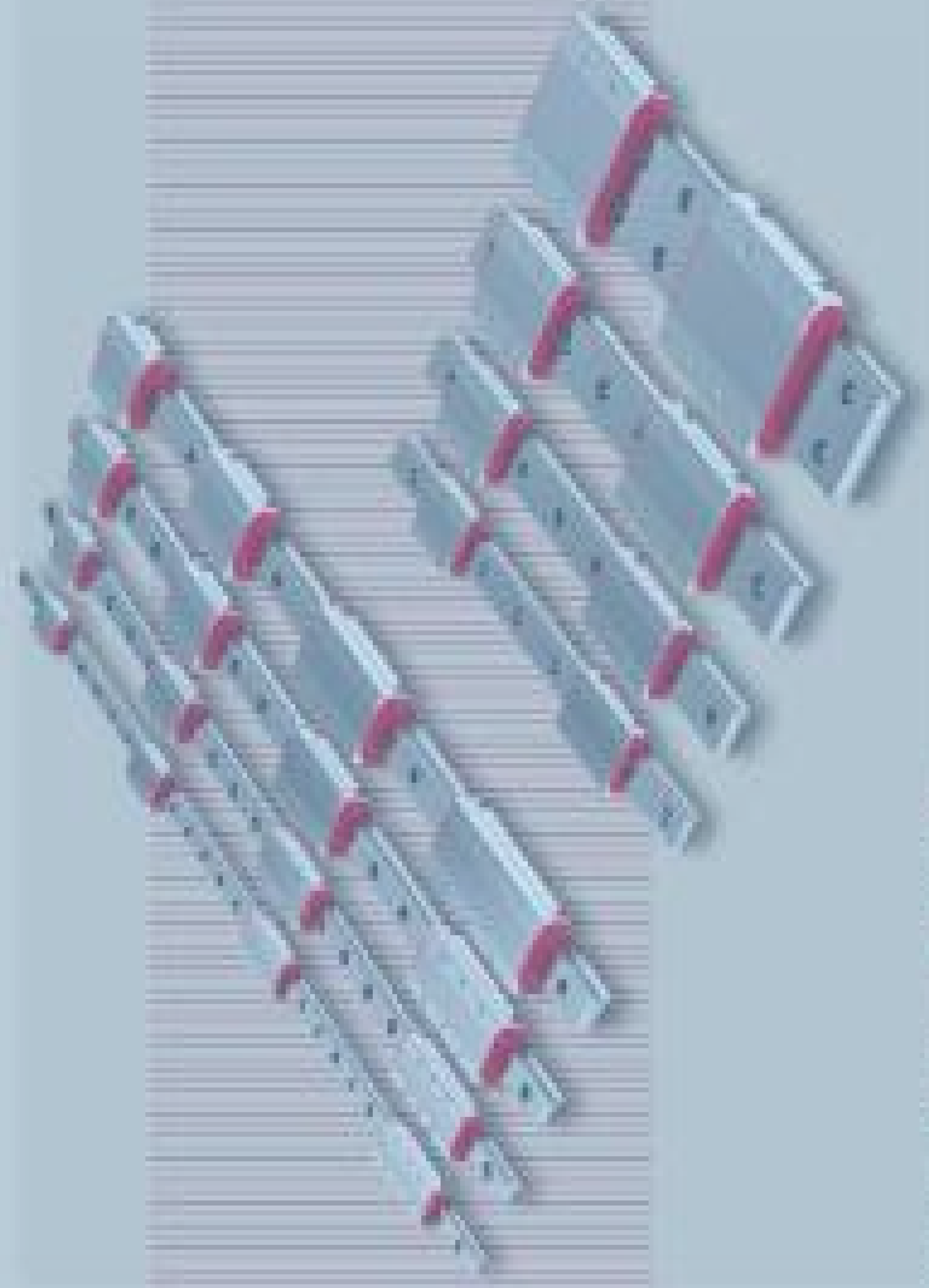
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Siemens and Qualcomm Technologies Set Up The First Private Standalone 5G Network in an Industrial Environment

Siemens and Qualcomm Technologies, Inc. have implemented the first private 5G standalone (SA) network in a real industrial environment using the 3.7-3.8GHz band. Both companies have joined forces in this project: Siemens is providing the actual industrial test conditions and end devices such as Simatic control systems and IO devices and Qualcomm Technologies is supplying the 5G test network and the relevant test equipment. The 5G network was installed in Siemens' Automotive Showroom and Test Center in Nuremberg. Automated guided vehicles are (AGV) displayed here which are primarily used in the automotive industry. New manufacturing options and methods are also developed, tested and presented before they are put into action on customer sites. This allows Siemens' customers, such as automated guided vehicle manufacturers, to see the products interact live.

The Automotive Showroom and Test Center enables Siemens and Qualcomm Technologies to test all the different technologies in a standalone 5G network under actual operating conditions and to come up with solutions for the industrial applications of the future. Siemens provided the actual industrial setup including Simatic control systems and IO devices.

"Industrial 5G is the gateway to an all-encompassing, wireless network for production, maintenance, and logistics. High data rates, ultra-reliable transmission, and extremely low latencies will allow significant increases in efficiency and flexibility in industrial added value," says Eckard Eberle, CEO



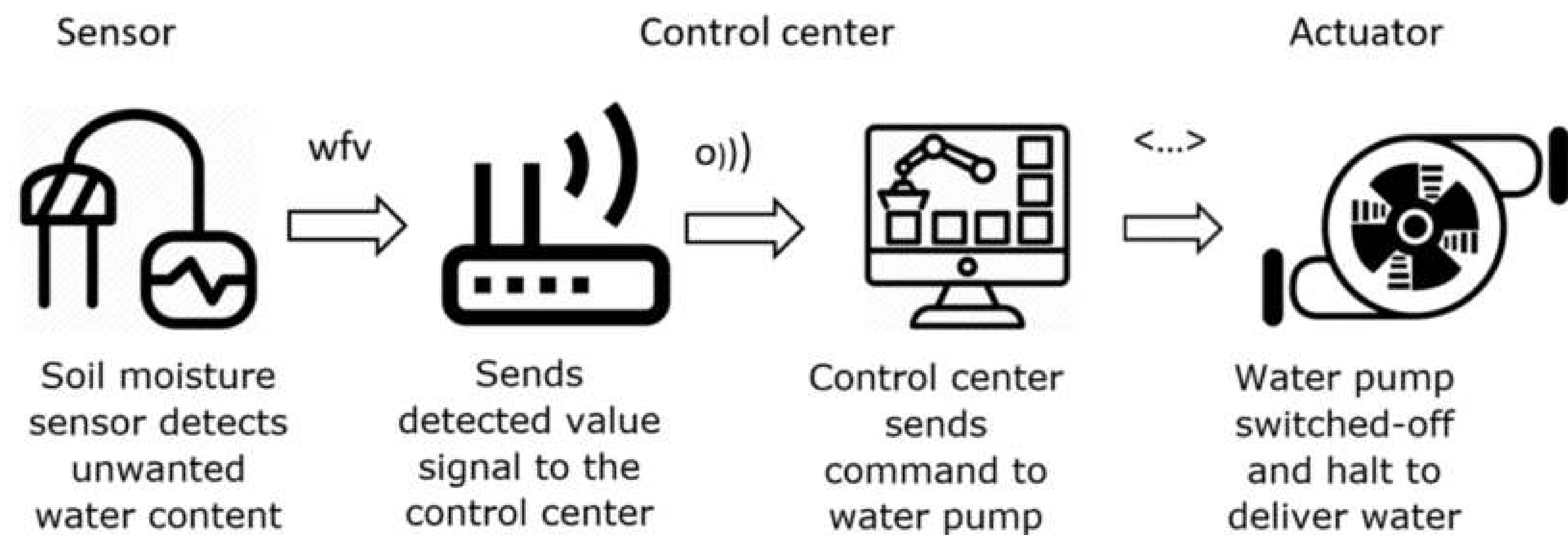
Process Automation at Siemens. "We are therefore extremely pleased to have this collaboration with Qualcomm Technologies so that we can drive forward the development and technical implementation of private 5G networks in the industrial sector. Our decades of experience in industrial communication and our industry expertise combined with Qualcomm Technologies' know-how are paving the way for wireless networks in the factory of the future."

"This project will provide invaluable real-world learnings that both companies can apply to future deployments and marks an important key milestone as 5G moves into industrial automation," said Enrico Salvatori, Senior Vice President & President, Qualcomm Europe Inc. *"Combining our 5G connectivity capabilities with Siemens' deep industry know-how will help us deploy technologies, refine solutions, and work to make the smart industrial future a reality."*

The German Federal Network Agency has reserved a total bandwidth of 100 MHz from 3.7 GHz to 3.8 GHz for use on local industrial sites. German companies are thus able to rent part of this bandwidth on an annual basis and to make exclusive use of it on their own operating sites in a private 5G network whilst also providing optimum data protection. Siemens is using this principle to evaluate and test industrial protocols such as OPC UA and Profinet in its Automotive Showroom and Test Center together with wireless communication via 5G.

Sensors and Actuators of the IoT

Since the data is an indispensable focus of IoT, it is extremely important to ensure its accuracy. This is a brief overview of where data is generated and how sensors and actuators are an important factor in the precision and credibility of IoT data.



Since the data is an indispensable focus of IoT (Internet of Things), it is extremely important to ensure its accuracy. This is a brief overview of where data is generated and how sensors and actuators are an important factor in the precision and credibility of IoT data.

Putting all together

From the aforementioned, these components may be self-contained units or as part of the IoT ecosystem crucial building elements. Taking into account the previous example of irrigation control, an upgraded representation of the IoT ecosystem is shown in the following illustration. Considering the design of the IoT system, taking into account the choice of the system architecture model, it is also necessary to guide the individual sensor and acoustic selection from the very beginning of the project. It is especially important to take into account the accuracy of the sensors that are implemented in the system. We can freely say that in terms of the correct functioning of an IoT system, the sensor accuracy is a critical factor.

Basically, accuracy is a simple description of how much the indicated value is close to, i.e. credibly represents the measured size that is observed in some process. All possible sources of faults that are relevant to the ecosystem, sensor type and type of measurement shall be taken into consideration.

The accuracy of the sensor has to be controlled timely – the process is called calibration. Sensor manufacturers are obliged to provide accurate data on wavelengths, percentages of measuring errors, as well as the sensor calibration procedures. The designers of the IoT system must comply with these manufacturer's notes in order to ensure the proper functionality of the system.

Depending on the nature of the IoT system, the importance of data quality that comes from the layer of things within the system is indispensable. If the endpoint system is for example prediction or real-time analysis, and at the initial stage we have chosen low-accuracy sensors, it is logical that the ultimate product will be evaluated on loss performance.

There are also a number of parameters that affect the correct functioning of an IoT ecosystem and are directly related to sensors and their accuracy or level of error (Linearity, Repeatability, Resolution, Hysteresis ...). Their details will be described in the following articles as parts of the description of specific IoT solutions.

“Our Components Push the Machines to Their Limits”

Össur uses high-performance DMG MORI CNC machines in an efficient complete-machining process to produce complex components for state-of-the-art prostheses.

As one of the world's largest and most innovative manufacturers of prostheses, Össur ensures patients regain maximum mobility following an amputation. From the prosthesis shaft and associated silicon liner, to the smart knee joint, to the carbon foot, the high-tech components contain so much know-how that their development process remains highly confidential. And as they relate to expensive premium products used for medical purposes, the highest quality standards apply right from manufacturing. Össur fulfils these in its machining work by using modern equipment made by DMG MORI. Twentyfive experienced workers create complex aluminium, titanium, stainless-steel and plastic workpieces at eight turning centres, including two CTX beta 1250 TC for turn & mill operations and three DMU 60 linear.



The development work performed by Larus Gunnsteinsson and his colleagues produced an entire range of prosthetic feet for varying degrees of mobility – from occasional use for older patients, to everyday use for active people, to elite sport. Icelandic javelin thrower Helgi Sveinsson, long jumper

Markus Rehm and sprinter and long jumper Vanessa Low are just three of the prominent figures to consistently achieve personal bests with their blades (the name given to the carbon springs) during the Paralympics and world championships. But the main focus is on patients wanting to minimise hassles in their everyday lives. “We’re constantly working on optimising prosthetic feet so that their mobility and rolling characteristics are as similar to real feet as possible”, says Larus Gunnsteinsson, adding that today’s products have already made great progress in this area.

Strong machinery for maximum performance

While the carbon plates in the prosthetic feet help with walking by absorbing and restoring energy, the silicon liners ensure the prosthesis connects firmly to the leg stump, and that the prosthesis is comfortable to wear, by reducing friction between the prosthesis shaft and the skin. The rest of the prosthesis is made from very lightweight but strong aluminium, steel, titanium and plastic components which help with stability and reliability, and thus ultimately guarantee user mobility. Machining, where Gunnar Eiríksson and Hrafn Davíðsson work as supervisors, is thus a top priority at Össur: “Producing complex workpieces requires high performance and strong machines”, - a combination they found many years ago at DMG MORI.



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Strong Connectors for Swissloop

Swissloop once again calls upon Stäubli's performance and know-how

Swissloop's 2019 pod was presented in Zurich: named "Claude Nicollier". In July, the Swiss ETH's young project team members will once again take part in Elon Musk's Hyperloop Competition in California with their transport capsule. Stäubli's extremely high-performance and robust connectors will also participate again.

A new round of Elon Musk's Hyperloop Competition for high-speed transport systems in evacuated tubes will soon take place, following the pre-qualifications that were held in fall last year. The technical concept of the newly formed young Swissloop team from the Zurich ETH proved convincing and in the second examination round at the beginning of the year they got the positive answer for the trip to the SpaceX launch site.



Mastering challenges

The technical specifications for the competition are clear: the transport capsule must ensure maximum speed, self-propulsion and successful deceleration. The benchmark set by last year's winner was 284 mph. The

construction must be light, but robust, in order to withstand the forces. The engineering team for the batteries and power must develop a solution that ensures both high performance and resistance to vacuum conditions. Alongside inventive spirit, creativity, expertise and strength of purpose, the young engineers are also looking for industry partners with know-how and technological solutions. As such, a large number of sponsors are supporting the Swissloop team, not only financially, but also in terms of machine tools, knowledge and materials.

Loss-free power transmission

Stäubli provided the light, compact electrical connectors between the batteries and the power inverters fitted on the linear motor. The modular CombiTac system with its free configuration provides safe electrical power plus monitoring and control signals, reliably and without losses. Stäubli's pluggable connectors enable batteries to be changed quickly and accurately. The MSD solution (manual safety disconnect) is also produced using Stäubli's CombiTac connectors.

An awesome experience for young talent

Miguel Angel Quero Corrales is an electrical engineer and is responsible for development and battery design within the young team. He says "We

needed connectors that could ensure minimal contact resistance and high energy efficiency, without allowing power to be lost. The robustness of the CombiTac systems and the many possible combinations from low voltages to signal transfer for battery management and power contacts for the energy all made CombiTac the perfect solution for us."

For the members of the Swissloop team, the project promises to be a truly unique experience. Tamara Hoffmann (mechanics and construction) says "We are part of a real, comprehensive process, from the first vague ideas, the plan printing and CAD models, to calculations and up to the finished, fully functioning components as part of the whole in a high-power and high-speed competition."



New Study Finds ABBOTT's Blood Test Technology Could Help Detect Brain Injury Quickly, Even If CT Scan is Normal

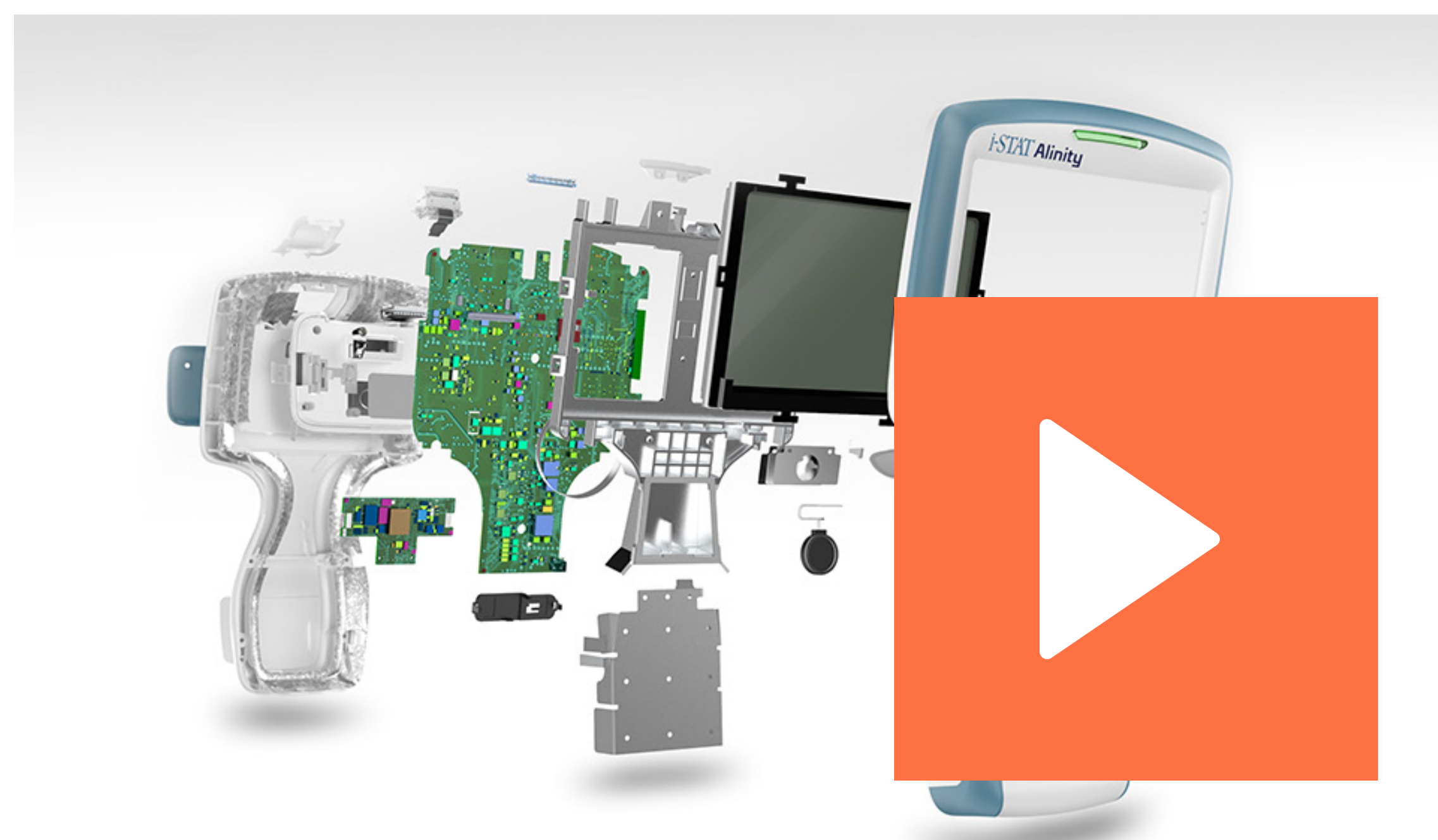
Abbott announced that a new study, published in Lancet Neurology, found that elevated levels of a protein measured with the company's blood test under development could help detect mild traumatic brain injuries (TBIs), even when a CT scan did not detect it.¹ Findings from the Transforming Research and Clinical Knowledge in Traumatic Brain Injury (TRACK-TBI) study – one of the largest TBI efforts of its kind – show this new technology could help fill a gap in emergency rooms today by identifying patients who might otherwise have gone undiagnosed.



"Blood-based biomarkers are emerging as an important tool to detect TBI, and this research opens up the next chapter for how the condition is evaluated," said Geoffrey T. Manley, M.D., Ph.D., principal investigator of TRACK-TBI, neurosurgeon and professor of neurosurgery, University of California, San Francisco (UCSF). "Having these sensitive tools could provide physicians more real-time, objective information and improve the accuracy of detecting TBI. This research shows that blood tests have the potential to help physicians triage patients suspected of brain injury quickly and accurately."

The need for fast, accurate, objective testing of TBI

More than 4.8 million people in the U.S. visit the emergency room each year to be evaluated for brain injury. An accurate diagnosis is critical to making sure the patient's care is managed appropriately. To currently detect a brain injury, doctors use a physical examination, a series of screening questions for cognitive and neurological symptoms and often order a CT scan to confirm the diagnosis of TBI. CT scans have become the standard of care to acutely look for bleeding or swelling in the brain. Yet, in this study, nearly 30% of patients with a normal CT scan showed signs of TBI when doctors used an imaging technology that is more sensitive: an MRI scan. However, MRIs are not available at all hospitals, are considerably slower to produce results, and are generally more expensive than CT scans and blood tests.

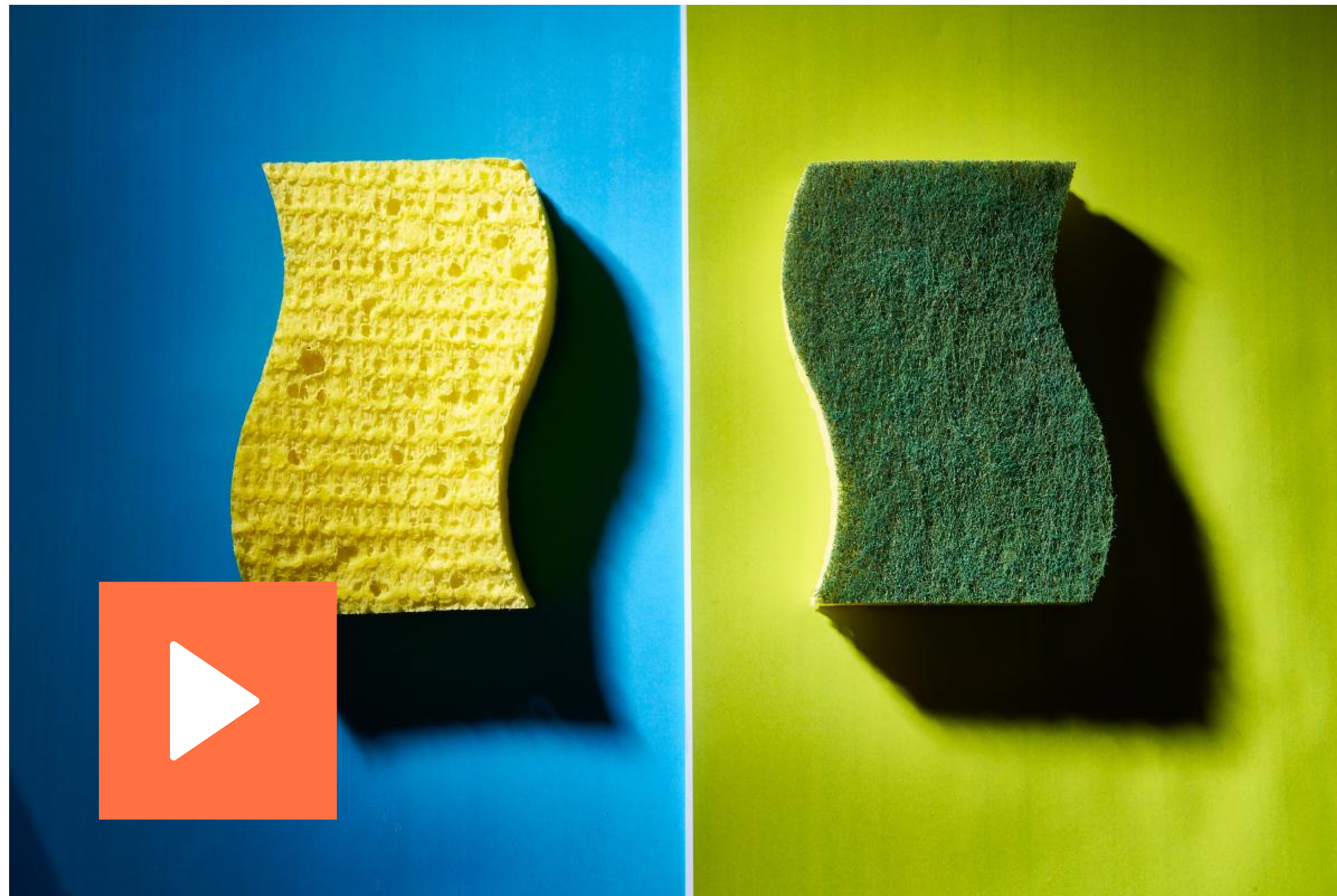


Developing a blood test to evaluate brain injuries

As the global leader in diagnostic point-of-care testing, Abbott has more than 120 scientists and engineers who are researching and developing Abbott's concussion assessment test. The test in development by Abbott measures specific proteins, such as GFAP, that are released from the brain when it's been injured – serving as a warning bell that further evaluation is needed.

"Healthcare providers rely on blood tests for a variety of conditions because of their accuracy and speed, yet we haven't had a blood test for the brain as part of the standard of care," said Beth McQuiston, M.D., R.D., neurologist and medical director, Diagnostics, Abbott. "Abbott's i-STAT device has become a trusted brand in hospitals globally today. In the future, our TBI test and next generation device could also be added to the standard of care, working together with CT scans and other diagnostic tools to provide doctors with a more complete understanding of a patient's condition."

How Two Engineers Made Scotch-Brite® Heavy Duty Scrub Sponges Sustainable and Effective



Going from zero to 100% recycled scrubbing fibers didn't happen overnight for Scotch-Brite® Heavy Duty Scrub Sponges.

"It took years of formulation work to find a total construction that worked," said Kaylee Schmall, a product developer in the Home Care Division (HCD) Lab.

Scotch-Brite Heavy Duty Scrub Sponges are the iconic yellow sponges with a green scrubbing layer. As consumers seek more sustainable options, Scotch-Brite has paired the use of recycled content with superior scrubbing technology.

"Sustainability is very important to 3M and our customers," said Alex Toupal, product developer, HCD Lab. "We've developed a product that uses recycled fiber that doesn't compromise performance."

Switching to recycled fibers wasn't easy, though. Changing one component affected how the whole product held together and performed, said Kaylee.

That's why the two engineers were excited when, after a significant amount of lab work, they were able to reformulate the green scrubbing fibers from 100% recycled plastic so they still matched the performance of traditional scrubbing fibers.

"This allows us to have a sustainable product that still works the same," Kaylee said. "We wanted to make sure the product we created met the needs of our customers."

With the change, 100% recycled scrubbing fibers will not only be incorporated into Scotch-Brite Heavy Duty Scrub Sponges, but also in U.S. versions of the following 3M products:

- *Scotch-Brite® Non-Scratch Scrub Sponges (blue)*
- *Scotch-Brite® Gentle Clean Scrub Sponges (pink)*
- *Select Scotch-Brite® Dishwand Refills*
- *Scotch-Brite® Non-Scratch and Heavy Duty Scour Pads*

That means the sponges will still remove tough, baked-on messes, which makes them ideal for kitchen, garage and even outdoor use. Just as important, when U.S. customers use their favorite scrubbing sponge now, their ability to clean won't be their only advantage.

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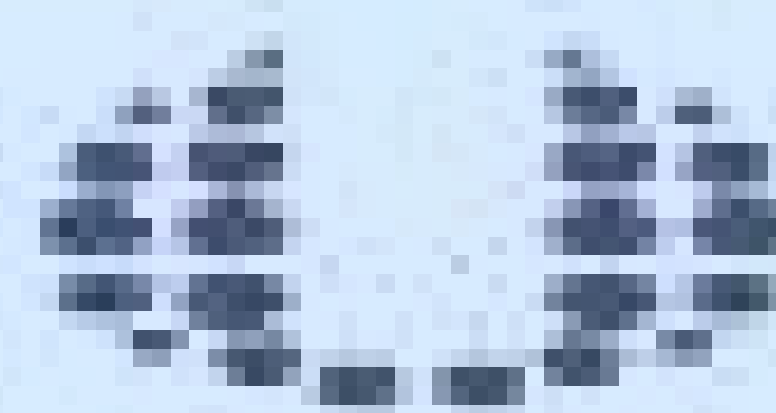
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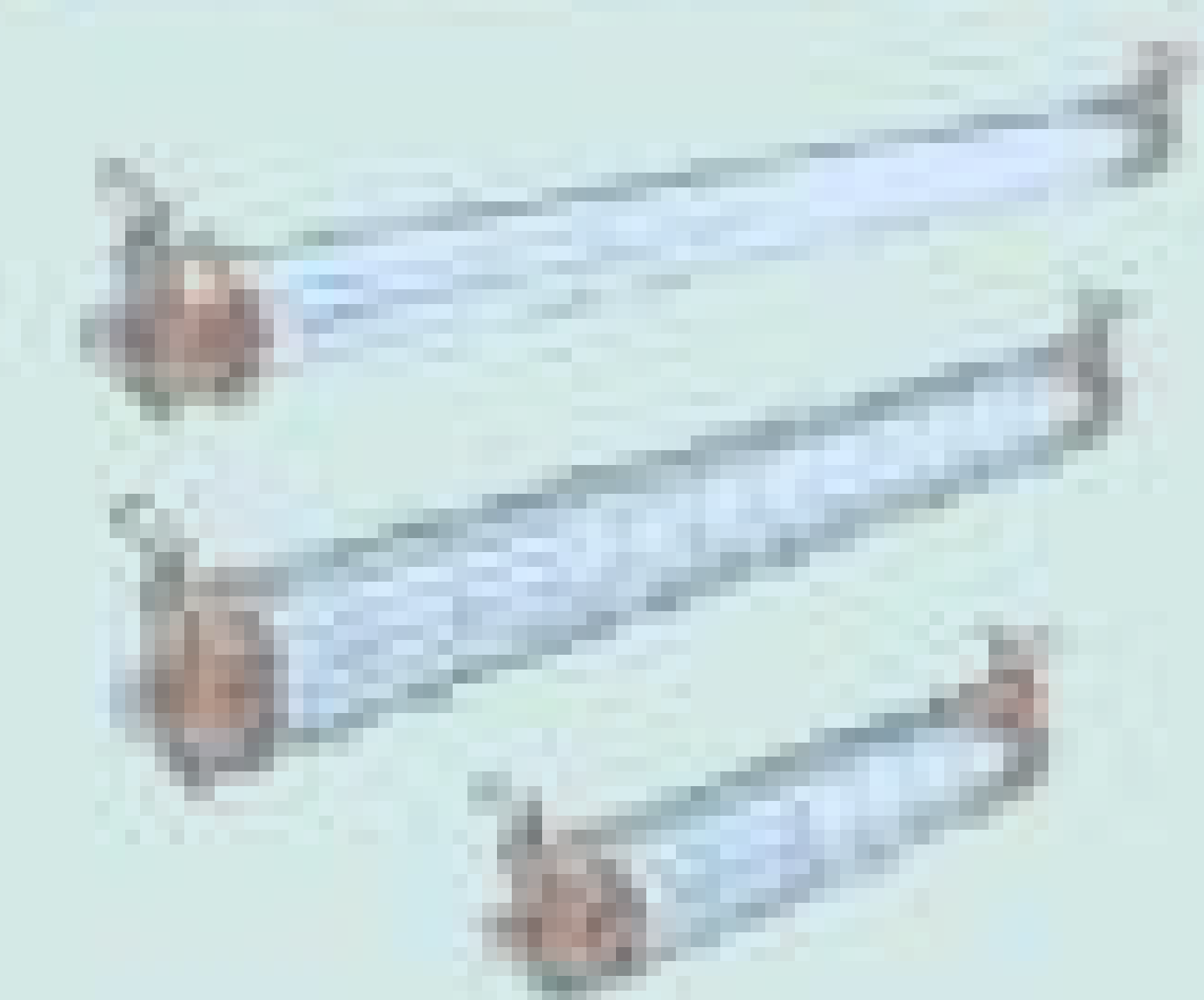
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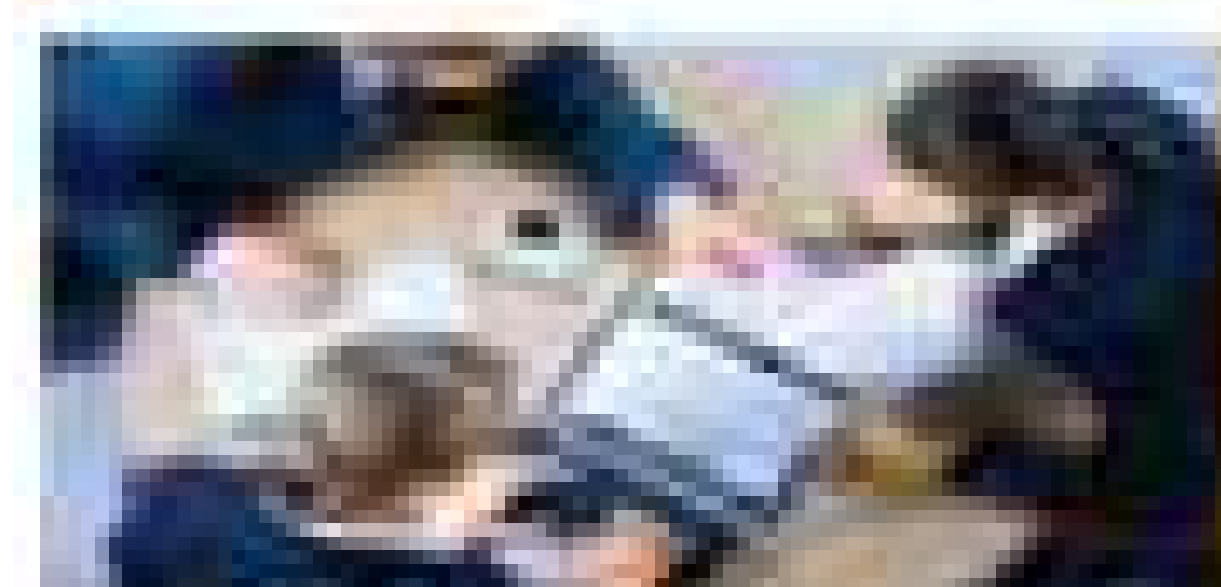
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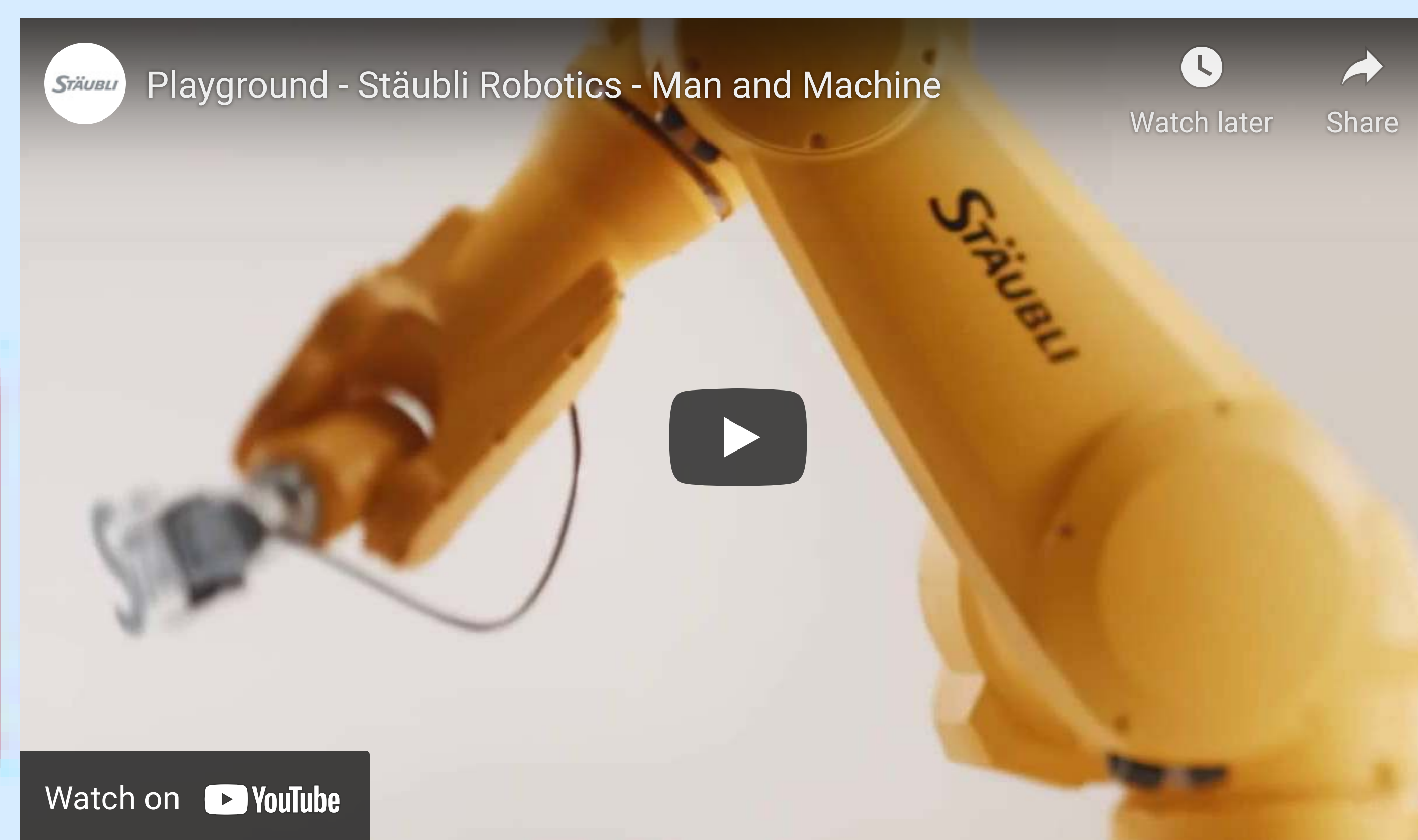
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