

2-YEAR DEAL

TPME BAGS SYSTEM INTEGRATION JOB

Company to upgrade KPTEC's precision machining capabilities

KUALA LUMPUR

TPM Engineering Sdn Bhd (TPME) has secured a system integration enhancement contract from Kobe Precision Technology Sdn Bhd (KPTEC).

The system integration enhancement job involves the re-engineering of KPTEC's computer numerical control (CNC) machines by upgrading its precision machining capabilities and additional quality measurement features.

It also involves the application

of new programmable logic controller systems and motion controller, as well as human-machine interface.

TPME president and chief executive officer Datuk Mohd Azman Shahidin said the project was secured following the successful evaluation of its engineering solutions and services capability, based on an initial pilot project delivered in September last year.

"System integration is expected to run over a two-year period and we expected to enhance more than 20 CNC machines and

over 50 micron-level diameter checking machines.

"TPME's expertise and engineering skills in undertaking the system integration project will contribute to substantial cost savings for KPTEC, apart from extending the life span of its existing machines as against the procurement of similar new machines," he said.

KPTEC, a wholly-owned subsidiary of Japan's Kobe Steel Ltd, is the largest independent supplier of aluminium ground substrate in the world, which is used as the primary high-capacity

storage medium for digital data.

Meanwhile, TPME general manager Dr Mohd Zahirain Mohd Rasin said with the rise of the digital economy and the Fourth Industrial Revolution (Industry 4.0), where industrial automation and disruption of technologies offered the opportunity for faster produc-

tion rate and lower costs, it was critical for industries to adopt these technologies to remain competitive and maintain sustainability.

"These industrial and techno-

logical developments had prompted TPME to develop its own Flexible Manufacturing System (FMS), where its technical specifications are compliant to meet Industry 4.0 requirements.

"In our efforts to provide the necessary assistance to relevant stakeholders, TPME has an established a

Centre for Robotics and FMS to encourage and heighten the development of indigenous technology for FMS that includes integration of systems and robots in manufacturing," he said.



Datuk Mohd
Azman Shahidin

RESEARCH

Using plants to produce dengue vaccine

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DENGUE fever, a disease that infects almost 400 million people worldwide every year, is Malaysia's most prevalent infectious disease.

Carried by Aedes mosquitoes, the dengue virus causes severe headaches, muscle and joint pains, swollen lymph nodes, vomiting, fever and rash. In some cases, it can be life threatening.

With no promising treatment so far, a team of scientists from the University of Nottingham Malaysia has started working on a project to create a plant-based vaccine, which, if successful, would provide a safe and cost effective way to prevent this disease.

Research team leader Professor Sandy Loh said the project had produced a vaccine antigen (protein) within a plant that neutralised dengue virus.

She added that vaccines were created from proteins that could be produced in different systems, and research focused on mammalian cell, bacterial cell or fungus.

"Using plants for this process is a new emerging platform that has the potential to provide a vaccine that can be taken orally."

"Other than tobacco plants, we are also working on edible plant species, such as lettuce, which we hope will eventually lead to an oral vaccine in the future."

"This method of using plants to develop vaccines has many advantages, such as higher expression, lower production cost and easier distribution, as there is no need for trained nurses to provide injections. It is also safer as there are no animal or human pathogens which increases the biosafety aspect," she added.

Loh, a virologist and molecular biologist from the university's Faculty of Science, works with plant-based pharmaceuticals focusing on innovative treatments for dengue and avian influenza H5N1, which are diseases that are on the rise in tropical countries, such as Malaysia.

"My current project is to develop an 'edible' plant vaccine, which can be consumed orally by the patient. This is less invasive than using hypodermic needles, and you don't need trained medical staff to administer it."

The uniqueness of the project is the use of a transient expression process called agroinfiltration. During this process, a defective plant virus is combined with Agrobacterium in making an expression vector that delivers the dengue vaccine antigen into the leaf of a tobacco plant.

"It is then incubated and harvested. After a few days, the vaccine antigen can be extracted and purified for use as a vaccine," she said.

Loh said the findings of the project had verified that an immune response was created using the plant-based vaccine in an animal model and the antibodies produced could neutralise the dengue virus.

The next stage of the research, she said, would involve virus challenge studies to determine the protection efficacy of the plant-based vaccine.



Professor Sandy Loh leads ground-breaking research into a plant-based vaccine for dengue fever.

This technique has also been used to investigate plant based vaccine for avian influenza, and has had similar success.

"For developing countries, the development of a cost effective vaccine from plants would have a big impact as it would mean they can develop their own local vaccines to combat endemic diseases."

"Providing vaccines in this way would save many lives. Normally, we freeze-dry the protein, grind it into a fine powder then transfer it into a capsule so it can be taken as a pill, orally."

"The good thing about freeze-drying is you can store the vaccine at room temperature and it maintains its protective efficacy. There is no need for refrigerated storage or cold chain transportation, which is crucial in countries where electricity is scarce or unreliable."

"It has the potential to save many lives. For

diseases like flu, which can mutate quickly, the speed at which we could potentially develop a vaccine is as rapid as one month. This means specific vaccines can be produced and be ready for any potential pandemic outbreaks," Loh said.

Inspired by Professor Charles Arntzen of Arizona State University, who coined the term edible vaccine, she said Arntzen was the pioneer for people working in this field and he had sparked her interest in it many years ago.

"I started my research career by developing a vaccine against poultry viral disease. When I joined University of Nottingham Malaysia, I taught a plant biotechnology course. It changed the course of my research career, encouraging me to investigate plants and their potential as the next-generation vaccine platform," she said.

Loh was the first female academic to be promoted to professor in the university's Faculty of Science in 2015. She obtained a senior fellowship of the Higher Education Academy United Kingdom last year.

"There is still a long way to go. Upscaling will be the next step in our project, along with testing whether the antibodies in the vaccines are protective or not against the intended viruses."

"We need to crack these problems before we can proceed to clinical trial," she said.

She said the project was interdisciplinary in nature.

In addition, the plant biology methods we are using are well-established in the West, but are just emerging in Asia. We are working with colleagues from Nottingham, together with immunologists, virologists and biotechnologists from the John Innes Centre, UK, and the Fraunhofer, the United States Center for Molecular Biotechnology.

"Locally, I have collaborations with Universiti Putra Malaysia and Monash University Malaysia."

CONVERGENCE OF TECHNOLOGY DOMAINS

SECURITY ASPECTS OF FOURTH INDUSTRIAL REVOLUTION

As machines get smarter and smarter, the potential security threats gradually increase, writes
CUNG VU

THE term "Fourth Industrial Revolution" (FIR) is a buzzword introduced by Klaus Schwab during the World Economic Forum in 2016. It is defined as the convergence of technologies to blur the lines between the physical, digital, and biological worlds. It is also used interchangeably with the more popular term "Industry 4.0" coined by the German government in 2011.

In fact, it is the convergence of underlying technology domains of nanotechnology, biotechnology, information and communication technology and cognitive science where the whole is greater than the sum of its parts.

The security implications of the FIR are too complex to fully grasp. These technological waves are coming fast and leaders, whether in the private sector or in public service, need to be prepared. The major concern is what happens to the economy and job distribution. However, there are security implications leaders need to be aware of to develop informed policies and strategies.

Let's peel off each layer of the FIR "onion" one by one. As the security implications are both deep and wide, the following are only highlights of the security aspects of the underlying technology domains.

Nanotechnology: A technology conducted at the nanoscale (one nanometre is equal to one billionth of a metre), materials at these dimensions behave differently from bulk properties. Nanotechnology is used to produce nanomaterials, smart materials, nanoelectronics, nanosensors,



Robot: A one-man bomb detection squad? PIC COURTESY OF PDRM

nanodevices, nanomedicine and so on.

Nanotechnology has numerous homeland security and defence applications. It is used for detecting potentially harmful materials, finding pathogens in water supply systems, or for early warning and detoxification of harmful airborne agents. Nanomaterials are used to build lighter and stronger armour and parts for vehicles, equipment, and aircraft. Nanomaterials also allow building of smaller, more powerful rockets, bombs, and other explosive devices.

Biotechnology: Biotechnology is a broad discipline in which biological processes, organisms and cells are exploited to develop new technologies and products that help improve our lives.

Biotechnology has advanced so much that personalised drugs could be developed based on individual DNA. We are now not only able to sequence and synthesise DNA, but also edit it. This has very grave implications as potential new viruses could be created from the laboratory.

Information and Computing Technology (ICT): It seems that almost all aspects of our life now depend on ICT. The Internet of Things allows endless connectivity to improve how we work and live. Our dependency on the digital world has made us more vulnerable. Cyber attackers could exploit such vulnerability to serve their purposes.

Cognitive Science: This is the interdisciplinary, scientific study

of the mind and its processes. Advances in the development of human-machine interfaces, algorithms, and power sources as well as other components are making robots readily available for personal and industrial use.

Brain stimulation drugs have been used as cognitive enhancement to keep soldiers alert for days without sleep. Amphetamine and fenethylamine are known to be taken by terrorists in suicide bombing missions or to allow them to go into battle not caring if they live or die.

Technology Convergence: The security impacts of technology convergence are virtually limitless.

One of the technology intersections which receives a lot of attention is artificial intelligence (AI) where "intelligent machine" could be created to operate and react like a human being. That means a machine can see, hear, talk, learn and reason.

This leads to the fear that human jobs, both blue and white-collar, would be lost to robots or even the human race could eventually be taken over by robots. Only time will tell. In the near term, as machines get smarter and smarter, the potential threats are also gradually increased.

China is incorporating AI in autonomous unmanned aerial systems. Their drone swarms could utilise neural networks to deny the US the freedom of navigation in the South China Sea. The US also leverages AI to develop cut-

ting-edge technology for military and intelligence purposes.

In the homeland security front, attackers are using AI to study the target, and identify vulnerabilities to generate hacks.

Let's take a look at a few areas of AI:

In speech recognition, a startup company named Lyrebird has developed an algorithm that can mimic anybody's voice after analysing a few pre-recorded audio clips. It can read text with intonation and punctuation.

In visual recognition, computer scientists were able to exploit AI to modify or synthesise images to impersonate people online. When both audio and video technologies combined, they could be used to generate fake news to persuade public opinions or to fabricate terrorist propaganda.

In machine learning, scientists have demonstrated that AI-generated malicious links outperform human competitors in terms of composing phishing tweets, distributing them over cyber space and victimising more users.

In another area of machine learning, researchers have pointed out that many pattern recognition algorithms are easy to manipulate to trick computers, and the implications are scary.

There is a need for the public and private sectors, policy and technical experts to communicate to address the security risks from the current industrial revolution.

Leaders could provide continuous workforce education in multiple disciplines such as data analytics, biotechnologies, automation, computer science, artificial intelligence to enhance societal resilience, to mitigate job risks and to prepare for unknown challenges.

Public awareness is also critical in order to maintain social order in adverse situations.

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LAMPIRAN 4
UTUSAN MALAYSIA (LUAR NEGARA) : MUKA SURAT 12
TARIKH : 13 JUN 2018 (RABU)

Jurutera China memperkenalkan kereta dua roda

BEIJING 12 Jun - Jurutera China tampil memperkenalkan kereta masa depan dua roda atau gyrocar berdasarkan model Ford 1961.

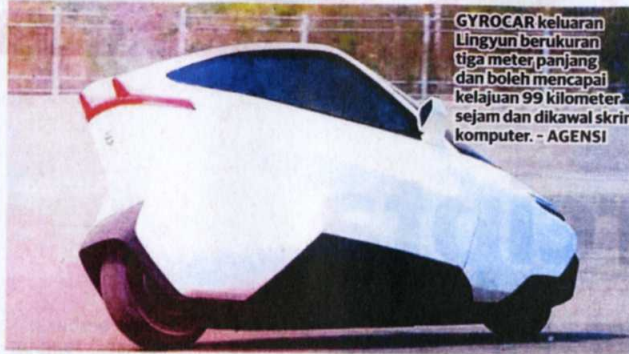
Mail Online melaporkan, kereta dua roda yang dapat mengimbangi sendiri kenderaan itu sudah diperkenalkan kira-kira 100 tahun lalu tetapi gagal mendapat sambutan.

Jurutera itu, Zhu Lingyun berharap perkara itu dapat diubah dengan rekaan kenderaan gyrocar ilhamnya yang mengambil ilham daripada model Ford Gyron 1961.

Namun gyrocar tidak mempunyai roda stereng atau pedal memecut sebaliknya ia dikawal oleh tetikus komputer dan skrin 24 inci.

Kenderaan dua roda itu juga boleh dipandu secara automatik dan akan dijual pada 2020.

Firma Beijing Lingyun Intelligent



GYROCAR keluaran Lingyun berukuran tiga meter panjang dan boleh mencapai kelajuan 99 kilometer sejam dan dikawal skrin komputer. - AGENSI

Technology Co merancang mengeluarkan kereta untuk kegunaan umum dan kenderaan itu sedang menjalani ujian di China.

"Saya diberitahu seorang pelabur

bahawa saya mempunyai peluang sifar untuk menjadikannya kenyataan, kata Zhu, 40 kepada Bloomberg selepas memandu uji prototaip kenderaan itu dikenali sebagai 1703.

"Saya yakin ini (gyrocar) adalah masa depan pengangkutan bandar kerana ia sangat indah, jimat tenaga dan mudah dikendalikan," kata Lingyun.

Lingyun pertama kali melihat model Gyron keluaran Ford di Internet lima tahun lalu dan terus bingkas mencipta versi kenderaannya sendiri.

Kereta itu pernah menjadi muka depan majalah *Car Life* bagi edisi Mei 1961 dan dipamerkan di *Detroit Motor Show*.

Lingyun memulakan syarikatnya pada 2014 dan mencipta kereta dua roda versinya sendiri.

Gyrocar keluaran Lingyun berukuran tiga meter panjang dan boleh mencapai kelajuan 99 kilometer sejam dan dikawal skrin komputer.

Jurutera itu berharap kereta berkenaan boleh dipasarkan dua tahun lagi.

LAMPIRAN 5
KOSMO (DUNIA) : MUKA SURAT 47
TARIKH : 13 JUN 2018 (RABU)

SEJUMLAH zarah
dipercayai mengeluarkan
cahaya gelombang mikro
yang menyerupai awan
berlian di angkasa lepas.



Saintis temui 'awan berlian' di angkasa lepas

WASHINGTON – Sekumpulan saintis menemui gelombang mikro misteri menyerupai awan yang berkilauan seperti berlian di angkasa lepas ketika menjalankan satu penyelidikan baru-baru ini.

Cahaya gelombang mikro yang dikenali sebagai pelepasan gelombang mikro anomali (AME) itu telah diketahui sejak bertahun-tahun lalu tetapi sehingga kini kekal menjadi misteri.

Berikutan itu, sekumpulan saintis dari Universiti Cardiff menjalankan penyelidikan dan mendapati gelombang



Ragam
global

mikro itu sebenarnya berasal daripada kristal karbon iaitu dikenali sebagai berlian nano.

Dr. Jane Greaves yang mengetuai kajian itu mendapati bahawa terdapat beberapa zarah yang mengeluarkan cahaya mikro berhampiran bintang pada kedudukan yang amat jauh.

Menurutnya, pihaknya tidak menolak kemungkinan bahawa cahaya gelombang mikro itu berlaku akibat kehadiran berlian nano di sekitar bintang-bintang yang baru terbentuk.

– Agensi

LAMPIRAN 6
HARIAN METRO (GLOBAL) : MUKA SURAT 77
TARIKH : 13 JUN 2018 (RABU)

IAEA sedia periksa nuklear Korea Utara

Vienna: Pemerhati nuklear Pertubuhan Bangsa-bangsa Bersatu (PBB) yang mengalu-alukan kenyataan bersama Presiden Amerika Syarikat Donald Trump dan pemimpin Korea Utara, Kim Jong-un, bersedia melakukan pemeriksaan pengesahan.

Trump dan Jong-un berikrar bekerjasama ke arah gencatan penuh senjata nuklear sepenuhnya di Semenanjung Korea dan Washington komited menyediakan jaminan keselamatan.

"Agensi Tenaga Atom Antarabangsa (IAEA) bersedia menjalankan sebarang ak-

tiviti pengesahan di Korea Utara yang mungkin diminta untuk dijalankan oleh negara berkaitan, bergantung kepada kelulusan Lembaga Kawal Selia IAEA," kata Ketua Pengarahnya, Yukiya Amano dalam kenyataan.

Sementara itu, Russia menyambut baik perjanjian Trump dengan Jong-un namun memberi amaran mungkin ada 'agenda tersembunyi.

Agensi berita TASS metik Menteri Luar, Sergei Ryabkov, sebagai berkata Russia bersedia memastikan perjanjian berkenaan dicapai. - Reuters