

Must-reads

**THE BIG STORY**  
Construction under way on sewerage tunnel system

A major project that will free up space on land by moving facilities for treating used water underground is under way, with about a quarter of the 100km conveyance system completed so far. It is scheduled for completion by 2025, and will be one of the nationally significant infrastructure projects eligible for financing through borrowing. **A1**

**THE BIG STORY**  
Global centre for maritime sector to be set up in S'pore

A global centre where those in the maritime industry can coordinate with one another, research and make reducing shipping emissions a reality will be set up in Singapore. The Straits Times understands that there are two possible sites for the project – either the 5.2ha former Pasir Panjang Power Station plot or the 1.55ha Marina South field. **A8**



There were many hugs and enthusiastic welcomes at airports in Australia and New Zealand, such as Auckland International Airport (above), as the travel bubble started yesterday. PHOTO: BLOOMBERG

**WORLD**  
Australia-NZ travel bubble gets off to emotional start

Families reunited in emotional scenes yesterday as Australia and New Zealand launched a quarantine-free travel bubble

that opened the border almost 400 days after its pandemic-enforced closure.

The bubble, which followed months of negotiations, was hailed as a major milestone in restarting a global travel industry that has been crippled by the Covid-19 pandemic. **A10**

**WORLD**  
Nasa's Ingenuity takes off, lands successfully on Mars

Ingenuity (right), the National Aeronautics and Space Administration's (Nasa) miniature robot helicopter, performed a successful take-off and landing on Mars early yesterday, achieving the first powered, controlled flight by an aircraft over the surface of another planet, the United States space agency said. **A14**

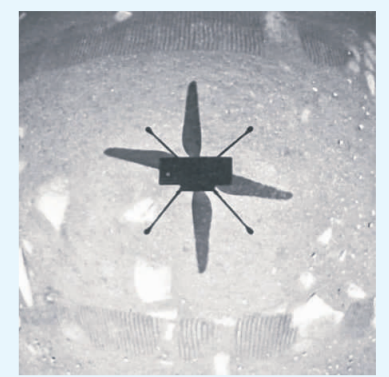


PHOTO: EPA-EFE

**SINGAPORE**  
Mosques, police on alert for threats during Ramadan

As Muslims mark the ongoing fasting month of Ramadan, mosques have increased their focus on detecting potential threats to their buildings and worshippers. The police have also continued patrols at places of worship, which they recently stepped up for the Easter weekend of April 2 to 4. **B4**

**BUSINESS**  
Coupang looking to hire senior execs in Singapore

E-commerce giant Coupang, which has been called South Korea's Amazon, is looking to hire senior executives here, as part of its first foray overseas. The company's LinkedIn page shows recently listed job openings for roles such as head of operations, head of retail and head of logistics in Singapore. **B8**

# Firm aims to ramp up production of breathalysers

FROM A1

which, if proven reliable, will make the airport experience for passengers a smoother one and give reopening efforts a boost," said Changi Airport Group's senior vice-president of passenger experience Albert Lim.

Silver Factory, founded in January last year as a spin-off from Nanyang Technological University, aims to produce at least 200,000 breathalysers a month from June, potentially ramping up production to two million a month. The product's cost price is expected to fall once large-scale production begins.

Sensor chips will be produced in Silver Factory's upcoming 300 sq m pilot plant in Tuas – roughly the size of three five-room Housing Board flats – while home-grown manufacturing company Dou Yee Technologies will assemble the devices.

Further studies are also set to begin soon at Changi Airport, NCID and some hospitals in Malaysia, Silver Factory said.

At least 1,000 participants will be recruited in Singapore in all for both the current and upcoming studies, with this number potentially extending to 2,000, said Dr Shawn Vasoo, head of the Infectious Disease Research Laboratory and clinical director of NCID.

Associate Professor Ling Xing Yi, one of the co-founders of Silver Factory, told ST that trials will be expanded to Malaysia due to the low number of Covid-19 cases here.

Silver Factory aims to apply for regulatory approval from the Health Sciences Authority (HSA) by June.

Once approved, Certis will also use these breathalysers in its current Covid-19 testing operations, Mr Joseph Tan, the security firm's senior managing director and head of technology services, told ST.

The breathalyser "delivers results in just two minutes with a high degree of accuracy and is able to do crowd screening... for aviation and cruise operations, government checkpoints, immigration clearance and at healthcare and medical facilities", Mr Tan added.

Certis will have exclusive rights to market this breathalyser in its key markets of Singapore, Australia, Hong Kong, Macau and Qatar.

Another start-up, Breathonix, is running trials of its own breathalyser at three sites – Changi Air-

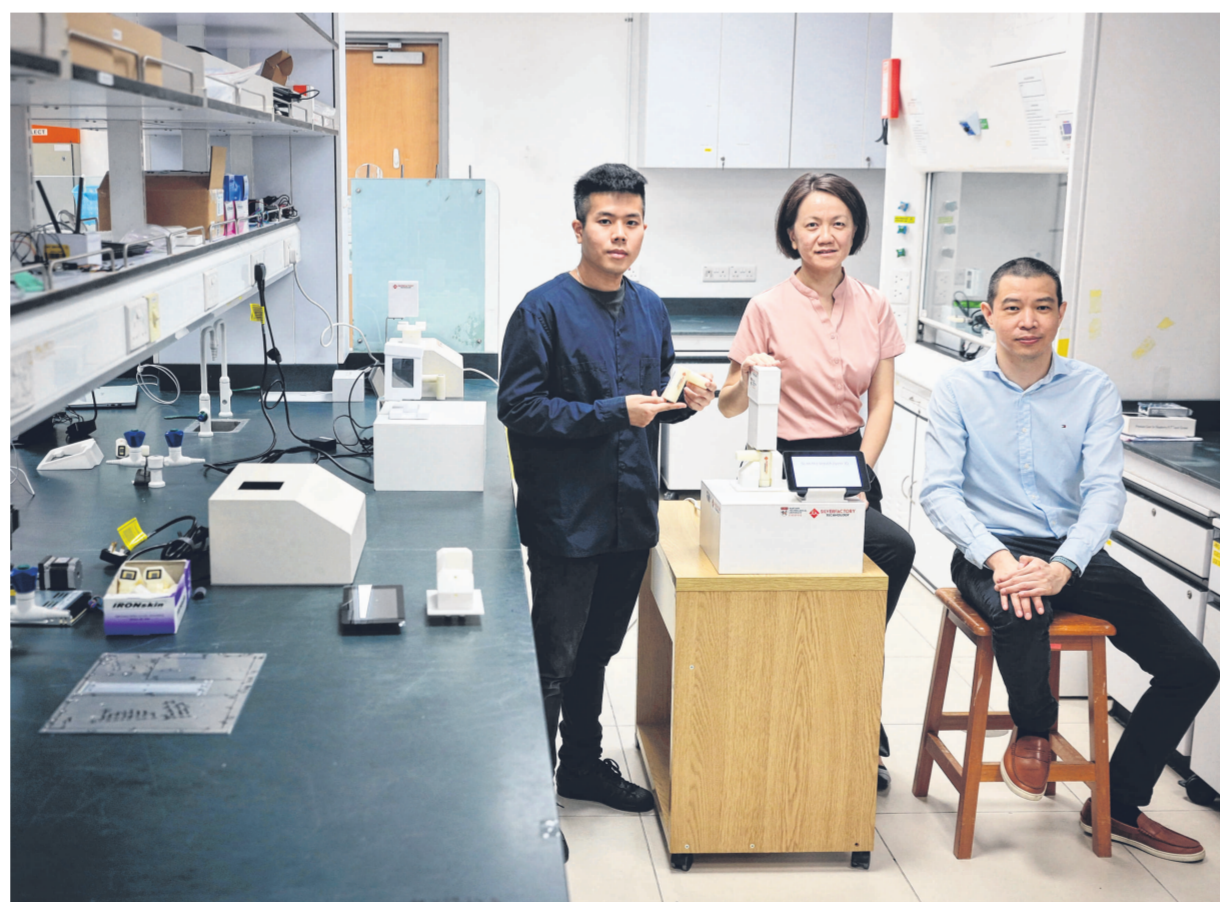
port, NCID and in Dubai – with over 3,000 people tested in total.

It aims to get HSA approval by the first half of this year.

"This trial will help Breathonix better understand and improve the actual deployment workflow for our breath test station," said its chief executive Jia Zhunan.

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Below, from left: Silver Factory co-founders Phang-Quang Gia Chuong, Ling Xing Yi and Phang Lin Yee with the company's Covid-19 breathalyser. Silver Factory's breathalyser, TracieX, has been shown to be almost as accurate as polymerase chain reaction tests, while taking a fraction of the time – at two minutes – to turn in results. ST PHOTO: JASON QUAH



## Detecting Covid-19 in a single breath

Breathalysers developed by medtech start-up Silver Factory Technology employ vibrational spectroscopy to identify Covid-19 infections. This technology identifies the molecular fingerprint of volatile organic compounds present in the exhaled breath of individuals who have Covid-19. **Clara Chong** looks at how this works.

Exhaled breath contains thousands of **volatile organic compounds**.

**Different diseases, viruses or bacteria** will alter the composition of these compounds.

Viruses like Sars-CoV-2, which causes the Covid-19 disease, will cause an infected person to exhale a **distinct composition of compounds**. These compounds will be detected by the breathalyser.

### HOW IT WORKS



**1** An individual breathes into a breathalyser, equipped with infection-control features, for **around 10 seconds**.

**2** The breathalyser is disinfected and inserted into a portable reader and the analysis is completed **within two minutes**.



**3** This reader identifies the distinct compounds that are unique to Covid-19.

**4** Statistical analysis is then done by the reader to identify individuals with Covid-19, and a readout is generated.

**5** The breathalyser is disposable and will then be safely discarded.

### ABOUT THE BREATHALYSER

• Benchmarked against polymerase chain reaction tests – considered to be the gold standard for testing – Silver Factory's breathalyser has a...

• **sensitivity of over 95 per cent** • **specificity of over 99 per cent**

• Large-scale manufacturing of the breathalysers will **start in June**.

Source: SILVER FACTORY TECHNOLOGY | ST PHOTOS: JASON QUAH | STRAITS TIMES GRAPHICS

### BOOST REOPENING EFFORTS

**Breathalyser tests are less invasive, more cost-effective and can deliver results in two minutes or less, which, if proven reliable, will make the airport experience for passengers a smoother one and give reopening efforts a boost.**



**MR ALBERT LIM**, senior vice-president of passenger experience at the Changi Airport Group.

### How the device works

Silver Factory Technology's TracieX breathalyser uses a sensor chip to identify the molecular fingerprint of volatile organic compounds present in the exhaled breath of Covid-19 patients.

A disposable breath collection chamber with infection control features securely traps any contagious material within the chamber, thus preventing direct exposure of these materials to others, such as healthcare workers.

#### CURRENT STUDIES

Unblinded studies are ongoing at Changi Airport's Terminal 1 and the National Centre for Infectious Diseases (NCID), where participants have prior knowledge of their Covid-19 status.

Participants who volunteer to be part of the study will take two tests: the breathalyser and polymerase

chain reaction (PCR) tests.

The PCR test result is known before the breathalyser test is taken. The test results are then compared.

Participants first breathe into the breathalyser for around 10 seconds before the device is inserted into a portable reader to obtain a readout. The whole process takes less than two minutes.

#### THE NEXT STEP

In the next stage of trials, blinded studies will be conducted in Changi Airport, NCID and several hospitals in Malaysia.

In blinded studies, those analysing the breathalyser readouts are unaware of the participant's Covid-19 PCR results. This removes the possibility of bias.

Dr Shawn Vasoo, head of the Infectious Disease Research Laboratory and clinical director at NCID, said: "This is an important part of diagnostic trials to make sure that the tests are performing as intended. Participants of the blinded study include NCID patients and travellers on selected flights at Changi Airport."

#### THE FUTURE

Silver Factory is currently working with Enterprise Singapore to take this technology beyond Singapore's shores.

Security firm Certis, one of Silver Factory's partners, will deploy these breathalysers in its Covid-19 testing operations once they have received the necessary approvals.

Certis also plans to deploy blockchain technology

to encrypt test results for confidentiality, Mr Joseph Tan, the firm's senior managing director and head of technology services, told The Straits Times.

Beyond Covid-19, Silver Factory is also working with Temasek Life Sciences Accelerator (TLA) to apply this technology to other areas.

One such example will be to use volatile organic compounds as accurate biomarkers to get a better understanding of infection in humans and other organisms in areas such as healthcare and agriculture.

TLA will also be investing in Silver Factory, together with partners and venture capitalists, with an undisclosed sum, said Mr Peter Chia, chief executive of TLA and Temasek Life Sciences Laboratory.

**Clara Chong**