

GreenPulse

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ENVIRONMENT

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Placing geospatial solutions at the heart of decision-making

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First launched in 2018, the Mapletree Challenge is a series of programmes that aims to promote entrepreneurship innovation, problem-solving and presentation finesse among SIT undergraduates. By providing a platform for them to present their business ideas, the Challenge hopes to inspire students to become future sustainable innovators.

Mr Edmund Cheng, Mapletree's Chairman said, "The Mapletree Challenge has continued to support SIT students in their entrepreneurial journey for the third year running. We are glad to see SIT students constantly innovating and coming up with new ways to live sustainably. It is our hope that The Mapletree Challenge will inspire them to dream big and make a difference in today's world through their innovations."

SIT President Professor Chua Kee Chaing said, "We are delighted to continue partnering Mapletree to inspire another batch of SITizen thinking tinkerers who will potentially make meaningful contributions to society. The Mapletree Challenge complements the University's pedagogy perfectly in that it enables our students to use their knowledge and skills to innovate and address problems of concern to society."

This year's Challenge with the theme, Improving Our World through Sustainability

and Innovation, saw the participation of 120 SIT students in a series of face-to-face and virtual training and mentorship programmes in the preparation stage of the Challenge. From January to May 2022, these participants attended six masterclasses on personal leadership, value pitching and financial literacy; a forum discussion on entrepreneurship and sustainable innovation by leading young entrepreneurs; as well as small group mentorship from industry experts on their entrepreneurial ideas.

5 May 2022 – Mapletree Investments Pte Ltd ("Mapletree" or "the Group") and Singapore Institute of Technology ("SIT") successfully concluded the third edition of **The Mapletree Challenge Grand Final**. Two teams of SIT students – **RADnovation** and **The Gastronomists** – impressed the judges with their sustainable innovation proposals and emerged joint champions among the five finalist teams from SIT. The two winning teams each walked away with a cash prize of \$5,000 and the winners' trophies.

Ten teams were selected to compete in the semi-finals, with five teams progressing to the Grand Final to vie for the Mapletree Gold, Mapletree Silver and Mapletree Bronze awards, which carry cash prizes of S\$5,000, S\$3,000 and S\$2,000, respectively. Winners may also receive support to prototype their ideas.

PROJECT SYNOPSIS OF FINALIST TEAMS

1. The Gastronomists

Every day, more than 2 billion cups of coffee are consumed across the globe. Most of the coffee grounds used to make those cups are thrown away, with six million tonnes sent to landfill every year. Packed with rich nutrients, spent coffee ground is a natural and sustainable resource that can repurposed and is used for the production of biodiesel. The Gastronomists propose the idea of repurposing spent coffee ground into growth substrate for oyster mushroom. This would be packaged into an oyster mushroom growing kit which typically takes a week to grow the mushroom. The proposed kit aims to help reduce wastage of coffee grounds, educate the public on the importance of growing their own food, and encourage self-sustainability by growing our own food.



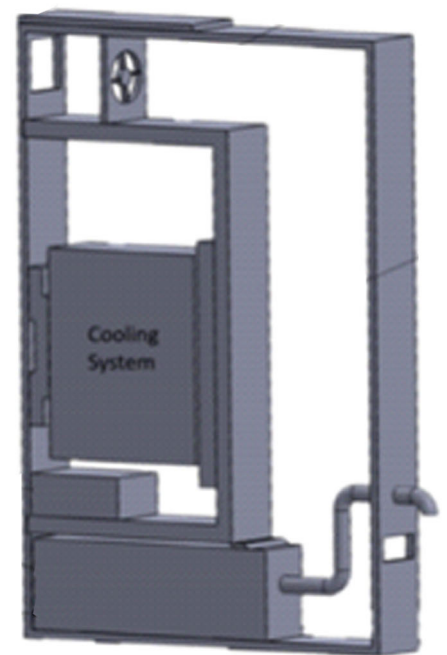
Team members / Degree Programme:

1. Rita Tay Ru En
2. Chua Yuan Shen Raphael
3. Loh Jia Hao Sean
4. Lam Yun Jia Nurice – Team Lead
5. Tan Yi Shan

All the above students are from the Food Technology Degree Programme.

2. SITHinkers

SITHinkers understand the difficulty in finding water-coolers in public places and that a considerable amount of money is spent on plastic bottled water. As the empty plastic bottles are not recycled at desired levels, the team hopes to create a sustainable water generation equipment which converts oxygen into water using solar energy. The creation of this equipment, 'Air Aqua', would facilitate water consumption 'on the go' with the fitting of this equipment on electronic billboard displays at bus stops. Water vapour which flows into the system condenses into water droplets which is accumulated in an internal storage tank (see graphic illustration above). This allows the end users to fill up their bottles via a water discharge outlet connected to the storage tank. The discharged water is safe for consumption. The system taps on the high humidity levels (average: 83.9%) in Singapore and the team is confident of mass producing the equipment with engineering and technological support from industry.



Team members / Degree Programme:

1. Tan Min Er Kelly (Hospitality Business) – Team Lead
2. Tan Yu Ting Grace (Hospitality Business)
3. Tyu Ker Yu (Mechanical Engineering)
4. Davis Zheng Yang (Information Security)
5. Ang Pheng Siang (Computer Science in Interactive Media and Game Development)
6. Unicia Goh Ke Xin (Pharmaceutical Engineering)

3. BikePass

Singapore is promoting public transport, cycling and walking, by expanding the rail transport and cycling path networks. By 2030, Singapore's cycling path network will be expanded to 1,320km providing comprehensive connectivity for all active mobility users. Team BikePass is aligned with the goal of seeing more Singaporeans take up cycling as a main mode of transport for commuting as well as for leisure activity. The team plans to develop a mobile application to promote cycling with a host of functions and services for greater convenience to end users. Some of the unique features of the app would include:

- o Navigation map on comprehensive cycling pathway network
- o Marketplace to buy and sell bicycles
- o Use of machine learning to better understand user needs and set goals for cyclist to meet new performance targets and milestones
- o Ability to locate friends and family who are on the cycling path network while 'on the go'
- o Weekly challenges to earn reward points and redeem vouchers from participating retail merchants

Team members / Degree Programme:

3 member team consisting of Ng Hianhong Aaron, Ong Jun Sheng and Keith Yeo (Team Lead) from the Computer Engineering Degree Programme

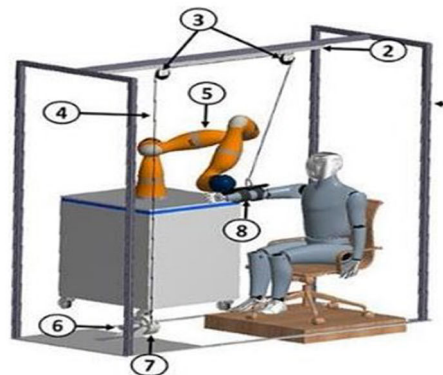
4. RADnovation

Rehabilitation process can be stressful for patients who need to commute to a healthcare facility regularly. Team RADnovation hopes to bring convenience and relief to patients from the comfort of their homes with the creation of a portable rehabilitation device. The device allows patients to perform exercises from home and the performance indicators can be tracked remotely by the physiotherapist or occupational therapist through data transmitted from the device to an online platform. The remote tracking function of the portable device can detect if the patient is doing the physical activity correctly or are skipping their rehabilitation sessions. Team RADnovation hopes to create a prototype of the device and do test trial runs in rehabilitation centres and hospitals.

Team members / Degree Programme:

1. Claire Chia Hui Shi
2. Alexander Quah Zhi Wei – Team Lead
3. Sng Shan You
4. Leow Xue Zi, Junise
5. Ramasamy S/o Subramaniam
6. Willie Goh Jia Wei

All the above students are from the Mechanical Engineering Degree Programme.



5. GoldenBitez

Local food production is important to reduce our reliance on food imports. As a key initiative under the Singapore Green Plan 2030, Singapore hopes to build up our agri-food industry's capability to produce 30% of our nutritional needs locally and sustainably by 2030. Team GoldenBitez sees the potential to work alongside with local farms to sustainably produce tasty and healthy fish fingers with the smallest environmental footprint possible to address food insecurity concerns in the long term. The plan is to rear African Catfishes in a local farm and have it processed and packaged in a food production facility (eg. SIT Foodplant). The product stands out from other frozen food competitors as it is free from added preservatives and artificial flavouring.

Team members / Degree Programme:

1. Aaron Siow (Food Technology) – Team Lead
2. Rachel Loh (Food Technology)
3. Benjamin Tay (Mechanical Design and Manufacturing Engineering)





Face to Face with **DEB NOLLER**

Deb Noller is the dynamic CEO and co-founder of Switch Automation, a smart building software company specializing in building performance optimization. With 20+ years of experience with the built environment, technology and sustainability, she is passionate about helping enterprises leverage digital facilities management technology to execute more efficient business operations.

• *How green certification creates additional portfolio value for hotels and buildings? Does it help in cutting down the operational and maintenance costs?*

As large corporations are moving their focus towards sustainability, they want their buildings to be cleaner and greener because it's part of their outward messaging, branding, and portfolio value. There is an argument for buildings to be more sustainable to get better returns while increasing their value for leases.

As consumers are moving towards net zero or ESG goals, people will seek buildings with those green certifications. Studies have proven that buildings with green credentials have better rates of return and are more likely to be leased. One of the main takeaways from the recently attended CREtech Climate was that the buildings that don't move towards a greener profile would end up being stranded assets. Therefore, there will be much more requirements around green certification than there are currently.

The goal for the green certification is not to just be greenwashing and have a nice plaque on the wall. It is an accreditation on the performance of the buildings, with opportunities to save energy and money, improve equipment performance, maintenance, and ultimately a sustainable building cuts down operational and maintenance costs.

• *What can be the benefits of Understanding the difference between Predictive vs Preventative Maintenance by the building operational managers?*

Preventative maintenance essentially means that you're not sending people out to fix things because the facility equipments are broken. You're moving your posture from waiting for things to break to looking at the data and overseeing tasks altogether. So it's a more efficient use of your operations team, while predictive maintenance looks at degradation and equipment and then actually analyses that a maintenance issue will arise. In other words, maintenance becomes a data-driven process.

• *What is the role of Smart Building Tech in adjusting unoccupied buildings in a crisis?*

If you don't have smart, connected, or digitally-enabled buildings, then the only way to operate those buildings is to physically put people into trucks and send them to inspect them. Through the use of technology in the building, you can remotely monitor them and remotely adjust for real-time conditions.

• *How can hotel or building operators educate the users about energy consumption and its impact on climate change?*

You can have a captive audience in hotels when people check in with the branding and messaging across the lobbies and screens. There's an enormous opportunity there to educate your clientele about reducing the carbon footprint of hotels by showcasing the building performance and improving the tenant experience for the occupants. They could take that a step forward by having complete visibility on the indoor air quality of the building, for instance.

• *How to understand if the buildings are ready for the Smart Building program and data-driven operations?*

There's no distinction between brown or old buildings to be digitally transformed. Old buildings are ready for it. It comes down to whether the owners and operators are ready for it, but essentially, there are no buildings that can't be improved by technology and a digital posture.

• *How does the Smart building platform integrate with innovative building façade technologies achieving energy efficiency?*

Smart building facades are no different from smart energy meters, and are just technologies that allow us to collect data. Therefore, the integration is no different. Integrating to a BMS or a lighting system is based on a specific point of integration, and then it's all about collecting the data and using that data. So smart facades such as the adjustable windows, for example, are all just generations of technology that improve the performance of buildings.

DEB NOLLER

“

Real estate is one of the last industries to be transformed by technology. A myriad of influences are causing a rapid transition of our built environment to digital and low carbon. This is one of the greatest opportunities in our lifetime.

”

• *To what extent tracking the Occupancy Building operations help in optimal energy consumption?*

In relation to smart façade and data integration, if you were going to put building occupancy or a people tracker system, you'd want to understand the performance and the data analytics. You will need the data from your energy usage and your indoor air quality sensors to see if that system is doing according to its operations. So integrating the sensors and the investment into the technology comes down to understanding the outcomes and use cases - in this case, is for assessing optimal energy consumption, before deploying it to other buildings.

• *How does Switch Platform help communicate the health of the building and its occupants?*

This is through collecting and integrating data from various sources and pulling that together to give people a much better understanding of what's going on in their buildings and how it's impacting the occupants and guests in terms of both the experience and their health wellbeing. The Digital Device Discovery or Dx3 is a digital audit and a quick way to assess buildings in being digitally ready and surfacing data.

● SIT HACKATHON 2022: SUSTAINABILITY IN SPACE FINAL



8 June 2022 – The Singapore Institute of Technology (SIT), Science Centre Singapore and NEO Aeronautics Pte Ltd successfully concluded the inaugural edition of ‘The SIT Hackathon 2022: Sustainability in Space’.

Themed ‘How to Live in Space for 365 Days’, the Hackathon saw participating students from SIT proposing innovative solutions related to 3D printing technologies that can be used in space. From January 2022 to June 2022, six teams submitted their product proposals and were given a budget of \$500 to produce their prototype. Four teams progressed to the Grand Final, held at SIT@Dover on 8 June.

Team REPA impressed the judges with their sustainable innovation proposal and clinched the top prize of \$500 cash. The winning team, comprising three Year 3 Mechanical and Aerospace Engineering students from SIT-University of Glasgow joint degree programmes, proposed using recyclable plastic material for 3D-printed repair parts in the International Space Station.

The event was graced by Guest-of-Honour–**NASA Astronaut, Jeffrey N. Williams**, who holds the record for the longest time spent in space by an American Male Astronaut. At the Hackathon, he also shared insights on his space missions in a talk on “What It Takes To Be An Astronaut?” **Professor Ng Siu Choon, Associate Provost (Students & Faculty Development), SIT** said, “We are delighted to organise this SIT Hackathon.

It encourages SIT undergraduates to think of creative ideas on sustainable living in space using additive manufacturing (AM) technology. By affording a platform for them to present their innovative proposals, we hope to spark an interest among SITizens in technology, as well as Singapore’s budding space scene. The strong nexus of applied learning to research encourages our students to go beyond their curriculum and to think out of the box for solutions that can solve real world problems.”

Associate Professor Lim Tit Ming, Chief Executive, Science Centre Singapore said, “Hackathons are a great way to strengthen connections, facilitate fruitful exchanges and stimulate creativity. It’s always inspiring to see the younger generation come together to co-create ideas. In this sense, we see hackathons not just as opportunities to generate solutions but to accelerate innovation.

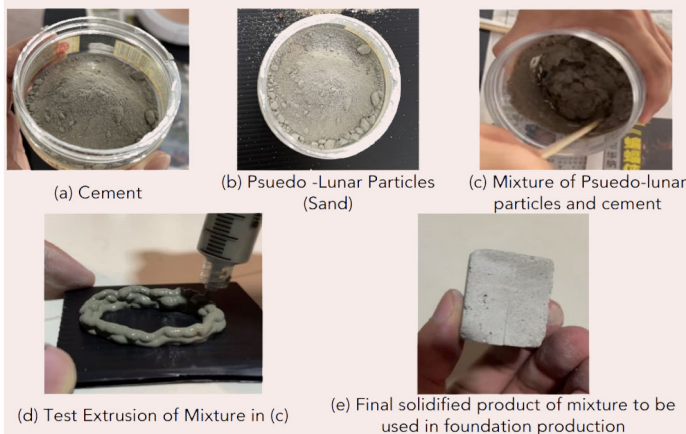
That sense of curiosity, enthusiasm and passion among the teams is what we aim to foster. The hackathon also demonstrates the importance of bringing like-minded partners together to create nurturing spaces. All these small steps can lead to giant leaps in overcoming the complex challenges before us.”

Dr Neo Kok Beng, Founder of NEO Aeronautics said, “I would like to encourage students to apply their scientific knowledge and imagination to explore opportunities in the space industry.”

PROJECT SYNOPSIS OF FINALIST TEAMS

1. Legstronk

A rocket launch and its colossal payload currently emit tonnes of harmful gases into the atmosphere. In addition, astronomical costs are associated with each launch, making sustainable living in space difficult. To that end, Team Legstronk proposes the reduction of payload by using material found on the lunar surface to produce building foundations by adopting the 3D printing layering concept. This is opposed to carrying large masses of man-made material on-board the rocket for foundation production. In this way, the weight of payloads entering space and hence, the volume of emissions will be reduced. The proposed idea aims to allow sustainable living within space, educate the public on existing building technology, and support future space ventures.



Team Members / Degree Programme:

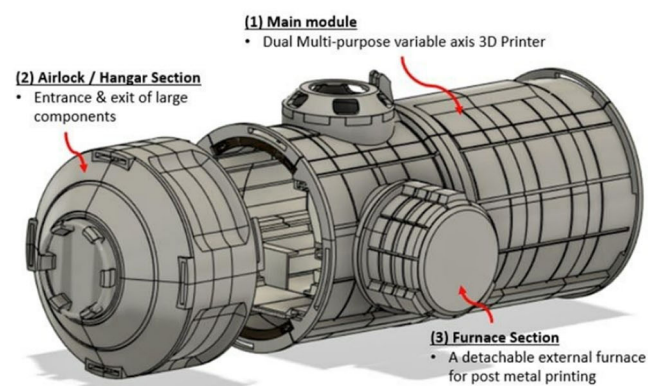
1. Sim Xuan Le – Team Lead
2. Darryl Chan Jun Hao
3. Goh Kuok How

All the above are Year 3 students from the Aircraft Systems Engineering Degree Programme.

2. AMICA

In 2021, The National Aeronautics and Space Administration (NASA) had finalised plans to decommission the International Space Station (ISS) after operating for more than two decades since its launch on 20 November 1998.

With the decommissioning of the ISS approaching, there is a need to re-establish a space station in outer space. However, building another space station through conventional means is costly and risky. Parts of the space station are limited by the payload size, while multiple launches increase costs and risks.



Team AMICA proposes the development of an Advanced Manufacturing and Innovation Capsule (AMICA). AMICA will be equipped with 3D printing technology, consisting of an in-built, dual bed 3D printer system with three axes of maneuverability, a multi-nozzle print head capable of printing objects in various materials, a segregated control room for monitoring and controlling purposes, an attached furnace for metal post-processing work and lastly, remotely controlled robotic arms situated outside the capsule.

AMICA will be able to expand the space station by printing modular sections of the outer frame internally and assembling them through internally controlled robotic arms, paving the way for the modular expansion of the space station. Spare parts and tools can be printed on-demand, saving costs and precious cargo space during resupply missions.

In the future, a space debris recovery capsule can be attached to promote self-sufficiency. This allows for the capturing of space debris to be broken down and recycled to produce powder bases or filaments to print other 3D objects,

saving costs and space in resupplying missions. Moreover, this would also address the growing concern of orbital debris, tapping into tons of valuable resources that would otherwise be disintegrated or lost.

Team Members / Degree Programme:

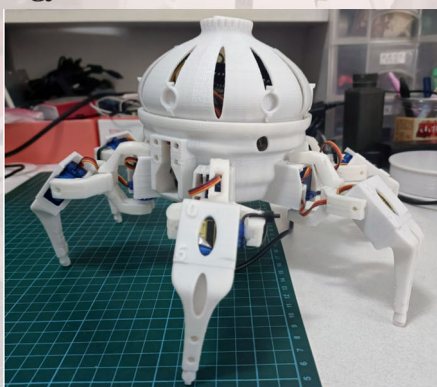
1. Fermi Toh Zheng Jie - Team Lead
2. Lim Puay Keat
3. Lee Xiang Wei
4. Axal Ang Yong Sheng
5. Gan Li Cin

All the above are Year 2 students from the Sustainable Infrastructure Engineering (Land) Degree Programme.

3. Space Construction Vehicle (SCV)

To enable astronauts to survive in space for more than 365 days without resupplies, one approach is to convert space waste into new usable 3D-printed structures that can be connected to a space station.

If space stations can fully utilise 3D technology, crucial needs and equipment can be efficiently produced. Ideally, the earth control centre can design the 3D model file of the required equipment or materials and upload them to the space station to allow astronauts to print out the objects when required. This project proposes a Space Construction Vehicle (SCV) that would recycle space waste into reusable materials and perform construction of infrastructure in the space using 3D printing technology.



Team Members / Degree Programme:

1. Du Yufei - Team Lead
2. Muhammad Nur Aslam Bin Sanosi
3. Clarence Hoon Tien Yu
4. Phatchararuangkij Natsinee
5. Lucas Lim Yong Keat

All the above are Year 2 students from the Mechatronics Systems Degree Programme

4. REPA

Cooked food is sent up to the International Space Station (ISS) via a spacecraft every 90 days. This is because cooked food does not have a long shelf life. Along with food, the spacecraft might carry additional items required for logistics or repair work. These items being sent to the ISS require proper packaging to ensure that they are kept safe during the journey. However, should an emergency happen in the ISS where repair parts are needed before the next scheduled spacecraft flight, one will have to be launched immediately. REPA is proposing to 3D print repair parts/components in the ISS, where the filament needed for printing is made from the plastic packaging used to store the items brought from earth. The objective is to reduce the number of spacecraft trips to the ISS or allow spacecraft with smaller payload to be sent instead of the larger one, hence trimming the operational cost. This idea would require two machines to be sent into the ISS, one to shred the plastic packaging and one to produce the components/parts.



Team Members / Degree Programme:

1. Tan Lek An Louis – Mechanical Engineering – Team Lead
2. Yeo Jen Yong Bryce – Mechanical Engineering
3. Heng Hoong Yeow Wesley – Aerospace Engineering

All the above are Year 3 students from SIT-UofG joint degree programmes in Mechanical and Aerospace Engineering



GetGo Technologies ("GetGo"), the fastest growing and largest Point A to A Carsharing platform in Singapore signed MoUs with the Hyundai Motor Group Innovation Centre in Singapore ("HMGICS") and ComfortDelgro ENGIE ("CDG ENGIE") on 26th May 2022, to accelerate electric vehicle (EV) carsharing adoption in Singapore. GetGo's long term vision is to operate a fully electric and hybrid fleet of 10,000 vehicles in Singapore by 2030 in line with the Singapore Green Plan 2030. The event also saw the debut of "IONIQ 5", Hyundai Motor Group's state-of-the-art EV, on the GetGo platform.

Founded in 2020, GetGo currently has over 1300 cars across 1200 locations available 24/7. From launching the service in February 2021 with 10,000 users, GetGo now serves 200,000 users with thousands of bookings each day.

The aim of GetGo is to promote shared and sustainable mobility in Singapore over the next 10 years, thereby reducing the demand for private vehicles in line with the Government of Singapore's Car-Lite Master Plan. For users, GetGo offers the option to enjoy the freedom and flexibility of driving, without the financial burden and inefficiencies associated with car ownership.

GetGo and HMGICS will collaborate on innovative mobility technologies in relation to EVs and carsharing, with the aim of promoting the adoption of Hyundai EVs in Singapore through carsharing. CDG ENGIE will be GetGo's EV charging partner in its electrification journey, supporting the deployment of EVs on its platform.



GEO CONNECT

Asia 2022

Live & Virtual Show

Wednesday 1st - Thursday 2nd June

NEW DATES

Sands Expo & Convention Centre,
Marina Bay Sands, Singapore



Geospatial & Location Intelligence Solutions for Asia - Underground, Land & Sea to Sky

Featuring Industry Profiles



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Delivering Solutions to the Built Environment



UAV
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Geo Connect Asia 2022 hosts close to 2,000 professionals from 36 countries, strengthening its reputation as the region's flagship geospatial and location intelligence meeting point 1st & 2nd June 2022

The GCA 2022 exhibition and conference:

This year's edition of Geo Connect Asia (GCA), the region's flagship geospatial and location intelligence trade event, came to a successful close after a two-day run at Marina Bay Sands Exhibition & Convention Centre on 1 & 2 June 2022. Close to 2,000 geospatial professionals from a record 36 countries; over 40 exhibitors from 14 countries; and more than 60 prominent speakers and moderators, gathered at GCA 2022 to showcase the latest technology and exchange ideas and solutions.

The GCA 2022 exhibition and conference centred around geospatial data and technologies for multiple industry verticals, including building & construction; PropTech & real estate; and smart city infrastructure, among others.

The third edition of GCA is scheduled for 15 & 16 March 2023, set to feature more hands-on opportunities for visitors to experience different elements, modules and applications of geospatial data. GCA 2023 will also see the launch of a dedicated drones show – Drones Asia.





The geospatial community can look forward to the next edition of Geo Connect Asia on 15th & 16th March 2023, set to include a dedicated drone-technology show Drones Asia

Singapore, 6th June 2022 – Geo Connect Asia, the second edition of Southeast Asia’s flagship geospatial and location intelligence technology trade event, came to a successful close after a fruitful two-day run at Marina Bay Sands Expo & Convention Centre in Singapore on 1st and 2nd June 2022. Organised by Montgomery Asia, GCA 2022 was a highlight of the recent resumption of large face-to-face business events and met the sourcing and networking needs of close to 2,000 geospatial professionals from a record 36 countries. Over 40 exhibitors from 14 countries showcased their latest technology at the exhibition, and 79 prominent speakers and moderators spurred robust discussions on the application of geospatial technology across multiple industry verticals.

The event was graced by Guest-of-Honour Mr Edwin Tong SC, Minister for Culture, Community and Youth and Second Minister for Law, who delivered the opening address at the opening ceremony. Minister Tong also toured the exhibition showground, including the 12 companies comprising the Singapore Pavilion, led by SGTech. In his speech, Minister Tong said: “Geospatial development is an important dimension of our Smart Nation initiative, and we have developed a Geospatial Master plan to guide the development and adoption of geospatial solutions. In the public sector, we have been using geospatial solutions to make better decisions, helping to create impact not just in the commercial world, but also making a visible difference on the social sector and making a visible impact on social value.”

A key highlight of the opening ceremony was the signing of a Memorandum of Understanding (MoU) between the Singapore Land Authority (SLA) and the Real Estate Developers’ Association of Singapore (REDAS). Signed by Mr Colin Low, Chief Executive of SLA, and Mr Chia Ngiang Hong, President of REDAS, and witnessed by Minister Tong, the MoU aims to fortify collaboration between the two organisations to promote awareness of geospatial technologies and organise joint events and capability-development programmes to address challenges faced by the real estate and related industries.

GCA 2022 was organised alongside its two complementary industry events – Digital Construction Asia (DCA) and Unmanned Aerial Vehicle (UAV) Asia, and was well-supported by over 60 trade organisations, associations and government agencies, including the Construction Industry Joint Committee (CIJC), GovTech Singapore (GovTech), Economic Development Board (EDB), Infocomm Media Development Authority (IMDA), National Parks Board (NParks) and Singapore Tourism Board (STB). Strategic Partners of GCA 2022 included the SLA, SLA’s Geospatial Industry Centre, GeoWorks, and SGTech.