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NTU Singapore and Continental launch S\$50 million joint lab to develop next-generation urban mobility solutions

Projects include an autonomous last mile delivery service trial with JTC and LTA

Nanyang Technological University, Singapore (NTU Singapore) and **Continental**, a leading technology company, today launched the new **Continental-NTU Corporate Laboratory** to accelerate innovation in Singapore's automotive industry and translate research outcomes into practical and viable urban mobility solutions for the future.

Researchers in the S\$50 million joint corporate laboratory will apply their expertise in areas such as autonomous robotics, navigation, artificial intelligence (AI), cybersecurity, smart materials, sensing, communication, and cloud technologies to develop real-world applications. This is in line with Singapore's Smart Nation initiatives to leverage data and digital technologies to enhance public and personal transportation, and to use sensors and data to run a smart, green, and liveable city.

Located on the NTU Smart Campus, which aims to develop technologically advanced solutions for a sustainable future, the lab was officially launched today by **Singapore's Minister for Transport Mr Ong Ye Kung**.

Marking the launch is a new collaboration with JTC and the Land Transport Authority to trial autonomous robots for last mile deliveries. These robots have the ability to safely navigate along paths and across designated road crossings, clear building security turnstiles, and even take lifts autonomously.

NTU President Professor Subra Suresh said: "The launch of the Continental-NTU Corporate Lab rides on the digital wave, where data has driven new approaches to transportation, and companies are racing to bring autonomous vehicles and robots to market. The partnership draws on NTU's interdisciplinary strengths and Continental's wealth of industrial experience to generate game-changing solutions. Industry partnerships are a big part of NTU 2025, the University's ambitious five-year strategic plan to tackle humanity's grand challenges. The Corporate Lab's collaboration with government agencies to offer a last mile delivery service is an example of how the

Continental-NTU Corporate Lab can translate inventions and creativity into outcomes that enhance economic benefits and quality of life.”

Chief Technology Officer of Continental Automotive Dr. Dirk Abendroth said:

“The Continental-NTU Corporate Lab presents the ideal platform for students, researchers and engineers alike to come together not only to innovate, but also to collaborate, learn from one another, and create bridges between university and industry. With Continental’s strong expertise in developing scalable mobility solutions in the automotive industry, we want to contribute to an ecosystem for sustainable living and mobility where we focus on new innovative technologies and next generation solutions.”

The corporate lab is supported by the National Research Foundation, Singapore (NRF) under the Industry Alignment Fund-Industry Collaboration Projects (IAF-ICP) scheme, which supports researchers working in strategic R&D projects with industry.

NRF Chief Executive Officer, Professor Low Teck Seng, said, “The launch of the Continental-NTU Corporate Laboratory is testament to the good outcomes produced through academia-industry-government partnerships. We are encouraged that more companies such as Continental, are coming onboard to forge collaborations with our universities on industry-relevant research and to translate research outcomes into innovative products that will serve next-generation urban mobility needs. Such industry-academia partnerships also ensure our innovation ecosystem remains vibrant and robust, and continue to drive Singapore’s long-term competitiveness.”

Multi-disciplinary research-driven mobility solutions

The new Corporate Lab supports NTU’s Smart Campus vision and leverages the University’s emphasis on interdisciplinary collaboration to catalyse high-impact research and take innovative ideas from the lab to the real world. It also builds on Continental’s strong research and manufacturing capabilities.

At launch, 16 industry-focused projects have been identified. They are in the following cross-disciplinary areas of:

- **Smart mobility and delivery:** develop safe, reliable, efficient robotic and navigation technologies to enable delivery robots, autonomous and electric vehicles to operate effectively in both indoor and outdoor environments, including urban settings under different weather conditions;
- **AI and software engineering:** apply AI to automotive software development and solutions, including using AI to find security flaws in the automotive software codes and enable a more human-like conversational platform for man-

machine interface in vehicles; and

- **Smart materials and communication technologies:** develop advanced materials and smart technologies for future mobility applications, such as a wearable skin patch sensor that monitors the driver's health, and cutting-edge 5G+/6G vehicular radar communications.

These projects will draw upon the expertise of NTU scientists in engineering and social sciences. Continental and NTU will also jointly train and upskill full-time Continental employees, NTU research staff, and NTU undergraduates and postgraduates.

New autonomous last mile delivery service trial

Tapping on the interdisciplinary strengths of the Continental-NTU Corporate Lab is a **new autonomous last mile delivery service trial** for those working at the JTC Summit.

Working with **JTC** and the **Land Transport Authority (LTA)**, robots developed by the Continental-NTU Corporate Lab will run on fixed routes, subject to site-specific safety considerations, under a pilot to deliver food from food and beverage outlets in Jurong East and the JTC Summit.

This four-way partnership was inked in a Memorandum of Understanding at the launch of the Continental-NTU Corporate Lab.

NTU will work with autonomous outdoor navigation technologies and develop sustainable business models for the autonomous delivery robot platform.

JTC will allow Corriere, Continental's scalable and modular autonomous delivery robot platform, to access its Open Digital Platform (ODP), enabling the robots to "communicate" with different technology systems to complete the food delivery. For example, with JTC's building management systems integrated into the ODP, the robots will be able to clear security turnstiles and service lifts seamlessly. Communications between the robots and the ODP will be enabled by Singtel's standalone 5G network in the second half of 2021.

LTA will administer safety assessments and provide regulatory advice to support the safe deployment of the autonomous robots along the designated route for the trial.

Robust safeguards will be put in place during the trial. LTA will require trial autonomous vehicles (AVs) to undergo rigorous safety testing at the Centre of Excellence for Testing & Research of AVs – NTU (CETRAN) test circuit in the Jurong Innovation

District, before they can be trialled on public paths and roads.

JTC's Assistant Chief Executive Officer of Development Group, Mr David Tan, said:, "This is a good example of how public-private partnership will advance Singapore's Smart Nation ambition for last mile B2C delivery service. It gives us the opportunity to strengthen the robustness of the Open Digital Platform and be better prepared for more complex district-level systems integration when deployed in Punggol Digital District and beyond. We look forward to our partnership with Continental, NTU and LTA, and welcome more players to partner us in developing smart city solutions."

LTA's Chief Innovation & Transport Technology Officer Mr Lam Wee Shann, said: "Ensuring public safety is a top priority in the conduct of autonomous vehicle trials. LTA will work closely with NTU, JTC and Continental to carry out comprehensive safety assessments and put in place the necessary safeguards to support the trial."

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About Nanyang Technological University, Singapore

A research-intensive public university, Nanyang Technological University, Singapore (NTU Singapore) has 33,000 undergraduate and postgraduate students in the Engineering, Business, Science, Humanities, Arts, & Social Sciences, and Graduate colleges. It also has a medical school, the Lee Kong Chian School of Medicine, established jointly with Imperial College London.

NTU is also home to world-class autonomous institutes – the National Institute of Education, S Rajaratnam School of International Studies, Earth Observatory of Singapore, and Singapore Centre for Environmental Life Sciences Engineering – and various leading research centres such as the Nanyang Environment & Water Research Institute (NEWRI) and Energy Research Institute @ NTU (ERI@N).

Ranked amongst the world's top universities by QS, NTU has also been named the world's top young university for the past seven years. The University's main campus is frequently listed among the Top 15 most beautiful university campuses in the world and has 57 Green Mark-certified (equivalent to LEED-certified) buildings, of which 95% are certified Green Mark Platinum. Apart from its main campus, NTU also has a campus in Novena, Singapore's healthcare district.

Under the NTU Smart Campus vision, the University harnesses the power of digital technology and tech-enabled solutions to support better learning and living experiences, the discovery of new knowledge, and the sustainability of resources.

For more information, visit www.ntu.edu.sg.

About Continental

Continental develops pioneering technologies and services for sustainable and connected mobility of people and their goods. Founded in 1871, the technology company offers safe, efficient, intelligent, and affordable solutions for vehicles, machines, traffic and transportation. Continental generated preliminary sales of €37.7 billion in 2020 and currently employs more than 235,000 people in 58 countries and markets. In 2021, the company celebrates its 150th anniversary.

About National Research Foundation, Singapore

The National Research Foundation (NRF) is a department within the Prime Minister's Office. NRF sets the national direction for research and development (R&D) by developing policies, plans and strategies for research, innovation and enterprise. It also funds strategic initiatives and builds up R&D capabilities by nurturing research talent. The NRF aims to transform Singapore into a vibrant R&D hub that contributes towards a knowledge-intensive, innovative and entrepreneurial economy; and make Singapore a magnet for excellence in science and innovation.

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