



aims to uplift professional recognition, raise technical skills and standards, and recognise contributions of Singapore's public bus technician workforce.

Bus technicians play an integral role in ensuring that different components of public buses perform optimally so that commuters can enjoy safe and reliable journeys.

SINGAPORE BUSACADEMY



Message From
MS GOH PUAY SAN

Dean
Singapore Bus Academy

Last year's inaugural Singapore BusTech Grand Challenge on 15 November 2021 had been a momentous occasion for me and my team. The Challenge had provided an excellent platform for us to recognise our unsung heroes – bus technicians who work tirelessly behind the scenes to ensure our public buses are functioning and in good condition.

To achieve a wider public outreach in recognising our bus technicians' skills excellence and uplifting their professional standing, this year, the bus technician competition would be held at Ngee Ann City, Civic Plaza. Members of the public can get an opportunity to see our bus technicians in action as they compete at the venue for the electrical and mechanical segments.

For this year's Challenge, we have also included a new student category where the students from Institutes of Higher Learning (IHL) work on prototypes to address maintenance-related problem statements faced by our bus operators.

As we transition to cleaner energy buses, we are working closely with industry stakeholders to identify the skillsets needed for our workforce, and the training that they would need to be EV-ready. We are also partnering IHL to develop curriculum, conduct training and assessment of technicians to attain certification in maintenance and servicing of electric and hybrid buses. We hope our bus technicians can strive for continual improvement and pick up new skills to be future-ready.

I would like to extend a special thank you to e2i - our organising partner, our sponsors, our partners - IES, National Transport Workers' Union, our bus operators - SBS Transit, SMRT Buses Ltd, Go-Ahead Singapore and Tower Transit Singapore and supporting IHL - Institute of Technical Education, Ngee Ann Polytechnic, Singapore Polytechnic, Republic Polytechnic, Temasek Polytechnic and Singapore Institute of Technology, for your contributions in making this Challenge a success. I look forward to forging even stronger partnerships in the coming years.

Lastly, I would like to congratulate and thank all participating students and bus technicians for your active participation, good sportsmanship and achievements. Your many months of hard work and preparation have definitely paid off. Kudos to everyone!





Message From MS CARYN LIM Chief Executive Officer Employment and Employability Institute

Into its second year, the BusTech Challenge recognises our bus technicians and promotes a culture of technical excellence. It encourages technicians to acquire new know-how, deepen their skills and push the boundaries of technical engineering. Bringing the challenge to a public venue will allow the technicians to showcase their capabilities to a wider audience. Kudos, and all the best, to our participants!

A new category has been introduced for Institutes of Higher Learning (IHLs) students. This provides opportunities for our youths to show their creativity in developing prototypes to address bus maintenance problems. Through such competitions, we hope to seed greater interest in automotive engineering and cultivate career interest in various roles in the public transport industry.

With Singapore Green Plan 2030, the Land Transport Authority (LTA) is ramping up electrification of our public bus fleet. The exponential growth in electric buses from now till 2030 bring together partners - LTA, e2i, PTOs, and training providers - to prepare our workers. The technological changes on the horizon will require bus professionals to develop future-ready skills in maintenance and service management of electric, hybrid, and even self-driving buses.

The Public Transport Career Fair 2022 onsite will provide opportunities for individuals to join the public transport operators (PTOs), which provide training and an exciting career in this industry.

Working together with LTA and PTOs, e2i will support our bus professionals with continuous learning and better career journeys.





Message From MR DALSON CHUNG

President
The Institute of Engineers Singapore

Singapore's public transport system is known to be amongst the safest, most sustainable and affordable in the world. Our bus transport system is a main contributor to this achievement with its high reliability, efficiency and comfort. With the changing demands and the development of new technologies, our bus system needs to continue to evolve to stay ahead of the game.

Bus technicians play a critical role in making this happen. They are the ones who can ensure that our public buses function optimally so that commuters can experience reliable and safe trips. It is a role requiring high proficiency in routine inspection, maintenance, diagnostics and troubleshooting that can only come about through continuous skills upgrading and knowledge acquisition.

The Singapore BusTech Grand Challenge is a commendable initiative to raise the technical competence of bus technicians across our public bus operators as well as to attract, retain and grow this workforce by recognising their skills and contributions.

The Institution of Engineers, Singapore is committed to supporting the Challenge to advance bus professionalism. It is congruent with our ongoing efforts to enhance the competence standards of bus technicians with industry best practices through the Certificate of Technical Specialist (Bus) jointly run with the Singapore Bus Academy; and recognise the skills of engineering technologists and technicians in this sector through our Chartered Engineering Technologist and Technician Certification Scheme.

I would like to congratulate this year's competing teams for their accomplishments and the winning teams for their outstanding performance. I wish that this Challenge will motivate all of you to strive for greater excellence and quality in your work to bring our bus transport system to greater heights.





Message From MR MELVIN YONG

Executive Secretary National Transport Workers' Union

The inaugural Singapore BusTech Grand Challenge held in 2021 was a great success!

Participating teams shared with me that they were proud to put their skills to the test and compete with the best in the industry. Even after the event, what happened during the Challenge became the talk of the town in the workshops. Stories of the competition spread within the depots, team members were celebrated, and learning lessons shared. I was heartened to see the public transport operators and their bus technicians started preparing for the 2nd Challenge soon after the first one ended!

Our bus technicians are very skilled in what they do, and this Challenge has inspired them to strive for continual improvement in their work.

Last year, I said our Bus Technicians are the "invisible workforce" keeping our public buses running smoothly every day. This year's Singapore BusTech Grand Challenge is held on a Saturday at the heart of Singapore's shopping district. This brings the "invisible workforce" and their contributions to the fore.

I invite everyone to come witness the Singapore BusTech Grand Challenge and hopefully take back a better appreciation of our "invisible workforce".

On behalf of the National Transport Workers' Union, I want to thank the Singapore Bus Academy and the NTUC Employment and Employability Institute (e2i) for organising this year's Singapore Bus Tech Grand Challenge. I would also like to thank all our bus technicians for your dedication and mastery of skills. Your work has helped keep Singapore and Singaporeans moving every day and every night.



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As a leading technology provider of smart city solutions, ST Engineering offers a full suite of mobility, utilities, infrastructure, security and environment solutions to help cities improve quality of life for citizens. We have deployed over 800 smart city projects in more than 150 cities worldwide, paving the way for a more liveable and sustainable future.



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BUS TECHNICIAN CATEGORY for PUBLIC BUS OPERATORS

Bus Technicians Competition Part 1

OR

Diagnostic Station 1



Voith Transmission on MB Citaro (Single Deck Bus)





Diagnostic Station 2



ZF Transmission on MAN A95 (Double Deck Bus)



Theory Station





Bus Technicians Competition Part 2

Mechanical Station 1



OR

MAN Engine

ST Engineering

Mechanical Station 2



Volvo Engine

VOLVO

Electrical Station 1



OR

MASATS Training Door

masats

Electrical Station 2



Electric Hybrid System Training Bench

Institute of Technical Education

Competition Format

- · 2 stations per practical segment
- Each station is sponsored by an OEM/IHL, who will furnish the assessment setup including the practical task list, theory questions as well as station judge to ensure the consistency and integrity of the competition.

Assessment is based on

- · Fault finding
- Maintenance or repair of components or systems
- Problem Solving
- · Logical order of repair
- Use and interpretation of technical information
- · Precision measurement
- · Appropriate use of tools
- Time Management
- Safety
- Communication of maintenance or repair process



Station Judges



Loy Chee Kiong Senior Lecturer





Axel Habermeyer After Sales Manager





Steven Xu Guo Ming Senior Lecturer



Tan Hwee Hua Assistant Manager

VOITH



Leong Sek Hoe Senior Service Technician

VOLVO



Prince Thomas Technical Service Manager



Sng Beng Huat Assistant Manager



TECHNICIAN TEAMS





Go-Ahead Singapore appreciates being a part of the Singapore BusTech Grand Challenge 2022. We value the opportunity to collaborate with all partners, working towards the common goal of recognising the competencies of our Technical Specialists and elevating their profiles. Their dedicated efforts and tireless contributions behind the scenes are key to ensuring that our buses are in optimal roadworthiness.

We actively engage our colleagues through dialogue and internal communications to drive awareness of the Singapore BusTech Grand Challenge. The objectives of this event are defined to promote better understanding amongst them and serves to encourage our Technical Specialists to demonstrate their skills by participating in the competition.

Planning discussions with the LTA, SGBA, and other partners, leading up to the event are especially useful in shaping the competition structure and compiling content for the programme. We are honoured by SGBA's invitation to be in the judging panel for the category of Institutes of Higher Learning.

Go-Ahead Singapore is proud to support this year's Singapore BusTech Grand Challenge. We are confident that participants will benefit from honing their proficiencies as the best in our industry come together. We wish them all an enjoyable event and a rewarding competition.

GAS TEAM 1



Left to Right

- Tay Thian Jun
- Ng Yeow Fong, Jacob

GAS TEAM 2



Left to Right

- Low Kam Yap
- Goh Mao Sheng, Simon



TECHNICIAN TEAMS





SBS Transit is once again excited to be a part of the Singapore BusTech Grand Challenge 2022 which is now into its second year. Having participated in the 2021 Challenge, we have experienced it and are confident that it will serve to raise the skills standards of technicians in our bus industry. As the major public bus operator, the efficient maintenance of our bus fleet is essential in serving our passengers who have come to expect safe and reliable bus rides every time they travel with us. As technology evolves, it has become all the more necessary for our technicians to keep abreast of technology trends such as electric buses and be equipped with the technical skills to constantly keep ahead to stay relevant.

SBS Transit places great importance on our employees' career growth and development, and we continue to invest in their training and upskilling to cultivate a workforce of skilled technicians. This is why we are pleased to sponsor the Singapore BusTech Grand Challenge 2022 as it helps to sharpen our people's technical skills by learning from and competing with the best in the industry. Indeed, iron sharpens iron.

SBST TEAM 1



Left to Right - Loke Sai Kat - Ling Gar Seng

SBST TEAM 2



Left to Right
- Chow Choon Fatt
- Phang Wei Khoon





SMRT Buses is honoured to participate in the annual Singapore BusTech Grand Challenge (SGBTGC) 2022. SGBTGC 2022 shows the continuous support of Land Transport Authority (LTA), Singapore Bus Academy (SGBA) and Public Transport Operators (PTOs) in professionalising the public bus industry.

SMRT Buses is continually adapting, evolving, and embracing technology to improve training, maintenance, and operations. In 2019, we overhauled our training curriculum to be in line with Certification for Technical Specialist (CTS) by SGBA, Skills Framework for Public Transport and Technician Chartership by The Institution of Engineers, Singapore (IES). This ensures our Automotive Technical Officers (ATOs) are equipped with the relevant technical skills and knowledge required to maintain buses of new vehicular technologies. Through the continuous effort of all parties, Bus Technicians now have clear career paths charted out as they go through the curated courses and certifications levels.

With the participation of Institutes of Higher Learning (IHL) at this year's SGBTGC, SMRT Buses is looking forward to engaging students on their insights and proposed solutions for problem statements. SMRT Buses also offers internship opportunities as we work with IHL to boost the local talent pipeline. SMRT Buses is pleased to support this year's SGBTGC 2022 as we believe in the vision of professionalising and recognising our ATOs. The competition allows us to benchmark and validate our ATO's technical competencies with key industry players and sharpen their skills by competing with the best. We hope that this competition will inspire our ATOs to further pursue personal growth and deeper technical knowledge in their field of work. SMRT Buses wishes all participants a fun and fruitful SGBTGC 2022.

SMRT TEAM 1



Left to Right

- Kumaran A/L Renganathan
- Erich Lee Wai Wai

SMRT TEAM 2



Left to Right

- Thoraisingam Kuppusamy
- Marimuthu Senthilkumar





The Singapore BusTech Grand Challenge (SGBTGC) is an excellent platform to put the spotlight on a very important but less visible aspect of public bus operations. The work that our vehicle technicians and engineers do is rarely seen by commuters, yet its impact can be felt so acutely by our passengers, road users and, not to mention, the environment.

A well-maintained bus is seldom noticed. It runs smoothly and safely and doesn't call attention to itself. As passengers, we get to our destinations uneventfully and fail to realise just how much work goes into engineering that perfectly uneventful ride. In fact, the better a job our bus technicians and engineers do, the less their work is noticed by commuters.

It is work that happens around the clock and work that makes our buses safe for both our passengers and our road users. It is work that keeps our vehicles green, efficient and environmentally sustainable. It is also work that's becoming increasingly digital as bus technology advances so rapidly.

The SGBTGC is a timely and important event in light of these changes to both bus technology and the work of our bus technicians and engineers. Through friendly competition, it motivates the participants to hone their skills and spurs the whole public bus sector toward professionalism and excellence in bus maintenance. It is also an opportunity to showcase to the public the technical skills required to deliver smooth, safe and comfortable bus rides.

Tower Transit is proud to participate in and support the SGBTGC 2022. We remain committed to partnering the Singapore Bus Academy to raise the standards of bus maintenance across the public bus sector.

Best of luck to all the participants and may the best teams win!

TTS TEAM 1



Left to Right

- Chua Yong Seong
- Rajendaran Suresh

TTS TEAM 2



Left to Right

- Chee Yun Choy
- Soo Sang Seong



B12A03 - THE FIRST BYD BUS TO BE EQUIPPED WITH BLADE BATTERY



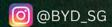
EMISSION

ULTRA SAFE BLADE BATTERY PROVEN WITH NAIL PENETRATION TEST

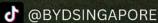
ENHANCED EFFICIENCY
ALL ALUMINUM ALLOY BODY REDUCES WEIGHT BY 10%













BYD'S FULL RANGE OF ELECTRIC VEHICLES WAS ESTABLISHED IN SINGAPORE SINCE 2019

BYD SINGAPORE PROFILE

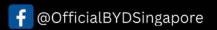
BYD (Build Your Dreams) Singapore Pte Ltd is a subsidiary of BYD Company Limited, with its Headquarters at Shenzhen, China. Its main four clusters of businesses are Auto, IT, New Energy Products and Monorail. BYD is the largest supplier of rechargeable batteries in the world and has the largest market share of Nickel-cadmium batteries, Li-ion batteries and chargers for mobile phones and keypads worldwide.

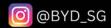
BYD has developed the industry-leading Blade Battery, e-Platform 3.0 and Dual-mode hybrid power technology accelerating the once-in-a-century transition from fossil fuel powered vehicles to electric vehicles. Since it's establishment in 1995, BYD has built its presence internationally over more than 400 cities and 70 countries. In 2021, BYD sold a total of 593,745 New Energy Passenger Vehicles worldwide.

BYD PRODUCTS IN SINGAPORE

In Singapore, BYD is the forerunner in promoting the adoption of electrified vehicles for taxis, private-hire car fleets, bus services, sanitation truck operations, forklifts and commercial vans. Since its inception in 2014, BYD Singapore has delivered more than 30 units of electric buses, 500 units of "T3" electric light cargo vans, 40 units of "T9" electric trucks, and over 700 units of electric passenger cars. According to LTA's report, BYD has successfully became the best in EV car sales with the registration report of 479 units of electric passenger cars from January to August 2022.







The 16 Technicians In Action











BUS TECHNICIAN CATEGORY







CHAMPION TEAM Loke Sai Kat & Ling Gar Seng





We thank SBS Transit for giving us the opportunity to represent the Company at this high-level industry competition. Participating in it gives us the opportunity to observe and learn from our peers, who are among the best in the industry. The extensive training courses and programmes - both internal and external ones - that we have been attending on an on-going basis as part of our job will stand us in good stead for the Competition. The strong support from our supervisors who constantly coached and guided us have also bolstered our confidence.



BUS TECHNICIAN CATEGORY



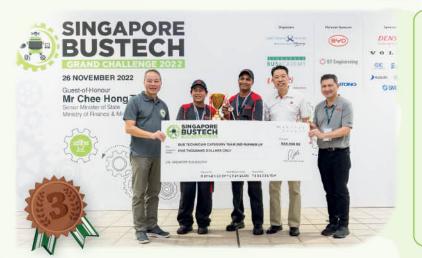




Ist RUNNER-UP TEAM Chow Choon Fatt & Phang Wei Khoon

We are grateful to be selected and given the opportunity to represent SBS Transit at the highest industry level locally. It is a great privilege to be able to compete with the best in the industry and we are excited by the opportunities to do so. The extensive training courses and programmes – both internal and external ones – that we have been attending on an on-going basis as part of our job will stand us in good stead for the Competition. We are also grateful for the help and support from our supervisors who have worked very hard to prepare us well for the competition.





We are honored and proud to represent SMRT Buses - Woodlands Depot to participate in this year's BusTech Grand Challenge. The team has worked hard since the start of the year to prepare for this competition through a series of theory and practical training and we are poised to win this year! We do see that the authorities are working toward professionalising the bus industry and recognising technicians as a key pillar.

2nd RUNNER-UP TEAM

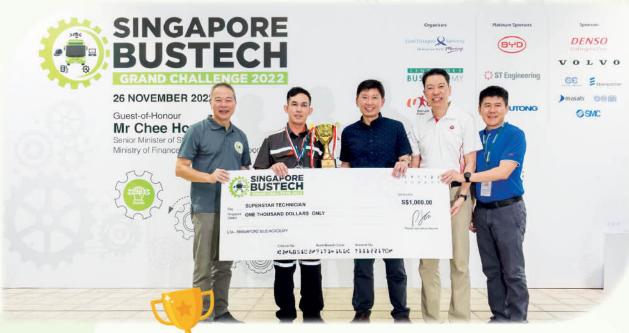
Erich Lee Wai Wai & Kumaran A/L Renganathan



BUS TECHNICIAN CATEGORY











At the age of 19, Choon Fatt discovered that he had a knack for repairing vehicles when he succeeded in getting his motorcycle to work again. Therefore, when he saw a job opening for a bus technician at SBS Transit, he did not hesitate to send in his application. It has been 10 years since and he has progressed to become a Leading Hand where he ensures buses are maintained on time so that they can run smoothly on the roads. To stay relevant in the industry, Choon Fatt continues to upgrade his skills and knowledge to keep up with the evolving technology trends.



suppliers.



Yutong is a commercial vehicle group mainly specialized in the bus & coach, special vehicle, truck, sanitation equipment and construction machinery. Yutong boasts five manufacturing bases for these products and their parts & components. Up to now, Yutong has formed a complete 5m-18m product lineup consisting of buses and coaches and covering various segment markets. In 2021, its sales volume of buses reached 41,828 units, among them 11,420 units are new energy buses. The sales performance takes a lead in the world. Yutong has realized a sizable sales volume in over 40 countries and regions such as France, the UK, Australia, Saudi Arabia, Kazakhstan, Mexico, Qatar, Kuwait, Denmark, Norway and so on, with a market share of over 38% in China and nearly 13% in

the world. In the main target markets, Yutong has become one of the world's major bus and coach





BETTER BUS, BETTER LIFE

Sofia, Bulgaria





In January 2017, Yutong's 12-meter battery electric bus conducted trial operation in Sofia. When the outside temperature is -20~25 °C, the temperature inside the vehicle can be maintained at 19 °C. The power consumption is quite low, and the driving range can reach 300km after being fully charged.





In 2018, Yutong E12 conducted a trial operation in Bulgaria, which was the first batch battery electric bus in the country.

Mexico City, Mexico





In November 2019, Yutong dual-powered trolleybuses began to operate on the Central Avenue of Mexico City, and so far their total mileage has exceeded over 25.000 kilometers.

In 2020, Mexico took the lead in introducing Yutong's 18 meters dual-powered trolleybuses, setting a benchmark for the updating and promotion of dual-powered trolleybuses in Latin America and the world.

Doha, Qatar





741 Yutong battery electric vehicles were delivered to Qatar, accelerating carbon emission reduction & energy conservation and boosting the "innovative, sustainable and low-carbon" World Cup.

Yutong battery electric buses appeared at the UN Climate Change Conference 2015.



Paris, France





In February 2016, Yutong 12-meter battery electric buses conducted trial run on Route 21 and 147 in Paris, France and the average speed is 8km/h on Route 21. The driving range of the bus can meet one-day operation requirement while the air conditioner is turned on and the route is congested.

UK





In 2017, a Yutong 12-meter battery electric bus conducted trial operation in Liverpool, Manchester and Cambridge for one year with a fault-free record, and the total mileage reached more than

Santiago, Chile





In January 2018, Yutong's 12-meter low-floor battery electric buses conducted trial operation on Route 315e in Santiago.

Nur-Sultan, Kazakhstan





In Nur-sultan, the capital of Kazakhstan, the operation of 590 CNG buses greatly improves the local public transport condition. Meanwhile, these clean energy vehicles also effectively reduce air pollution.

Copenhagen, Denmark





E12 has been applied in the Danish market for more than two years. The performance of the vehicle has been fully verified, and the product quality has been highly praised by customers.





STUDENT CATEGORY for INSTITUTES OF HIGHER LEARNING (IHL)

Student Teams were presented with two real-life problems. Each team will choose one problem statement to work on...

Problem Statement 1: Undercarriage Check Device

Audit and inspection for buses involves checking the undercarriage for physical or aesthetics defects. Auditors/inspectors face difficulty to perform the task due to lack of facility to access the undercarriage of buses.

Additional drivers, administrative work and time are needed to arrange the buses to an available pit or lifting equipment to perform the undercarriage inspection task. Auditors/inspectors will also need to go undercarriage with the risk of the heavy bus (> 12 tonnes) from falling from the lifting equipment if used.

Problem Statement 2: Enhancement of current air-con test kits

Current air-con test kit takes a lot of time to set up, especially for to hanging the wirings around the bus interior.

Participants are to design an improved test kit that is hassle-free to set up (e.g. use of wireless probe).

Competition Format

Select ONE Problem Statement



Registration by IHL (up to 2 Teams)



Submit Project Proposal & Budget



Presentation on Event Day



Showcase & Demostrate Prototype (Pre-Event Day)



Design & Create a Feasible Prototype



Judges





Andrew Ng Kok Beng Senior Manager Engineering





Shahri Bin Mohamed Ariff Head, Quality System & Projects





Tan Nai Kwan
Chief Technology Officer
Autonomous Solutions,
ST Engineering.





See Beng Hui Deputy Director Bus Logistic & Maintenance





Fern Meng Jye Senior Manager Bus Assets





Ray Silcox Senior Manager Quality Mangement & Technical Training

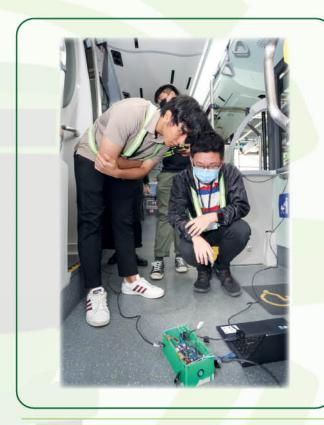


DESM



Left to Right
Gay Dong Bing
Nur Ashiqah Binte Ismadi
I'rfan B Mohamad Aszami
Gemmon Goh Yi Ming
Lecturer, Elven Kee (Not present in the photo)







Concept

The problem inspired us to find a solution to monitor and improve the bus condition monitoring and maintenance operations by adopting IoT technology. We have set up an Arduino system which is compact and able to tackle the problem presented. Our system is not only able to detect the temperature but also the humidity inside the bus. It thus allows the detection of any faults to the air-con systems in a bus. Our system could connect and communicate with Cloud and therefore enable the remote monitoring and control.



FAME



Left to Right

Lecturer, Mr Jervois Wu Davinsubramaniam S/O Vijay Muhammad Ryan Irfan Mohd Jamil Mohammad Rauuf Bin Amir Lecturer, Mr Ivan Gan Ong Sheng Rong (Not present in the photo)





Concept

This project improves the efficiency of bus air-con performance monitoring by greatly reducing the set-up time of the monitoring devices. The kit deploys multiple IoT temperature sensors which offer a wireless solution that removes the need to run a multitude of cables throughout the vehicle. This solution also reduces downtime associated with cabling issues.

The use of fast-deployment clamps further reduces the amount of time taken to position the array of sensors within the narrow confines of the vehicle.



NGEE ANN



Left to Right
Lian Jun Chen
Naila Faiqah Binte Muhammad Azhar
Srinivasan Sanya
Alyssa Chua Sin Ru
Lecturer, Mr Mei Feng Matthew





Concept

Our approach is to use microcontroller ESP32 to replace the existing hard-wire wiring to transmit data from the thermocouples (to Datalogger) via Wi-Fi.

The proof of concept prototype includes one Master ESP32-C3 and 10 to 20 Slave ESP32-C3s. The Master ESP32 will first send a message to every Slave ESP32 to start transmitting the data. After the Slave ESP32s have acquired the data, they will then begin the sending process back to the Master ESP32, which will subsequently transfer the data over to the MySQL database in real-time. This can then be imported to Excel.



SWACT

Singapore Polytechnic Left to Right
Lecturer, Mr Niu TianFang
Soh Yu Xuan
Neo Wei Le
Chai Jia Zhi
Lecturer, How Seo Tin







Concept

We present a smart wireless low-power hassle-free air conditioner test kit for buses. This system offers significant enhancements to the current methodology. By using Internet-of-Things technologies and analog/digital electronic designs, we developed a smart (IoT) system with low-power rechargeable wireless temperature sensor modules, a wireless door sensor device, and a portable and configurable hand-held data logger. This solution allows ultra-low setup time of 5 minutes, provides instant temperature display, and supports quick data analysis with auto-generated door closing/opening timelines.



Team Polaris



Left to Right

Lecturer, Mr Cha Cher Liang Jaicharan Gopinath Goh Rui Xin, Richie Narengautham Govindaraj Ng Hsu Xien Teo Qing Yang





Concept

The current procedure to measure the cooling performance air-conditioning inside a bus requires two or more technicians enduring a hot and humid 40C environment for over an hour to set up the probes. Our solution, using MQTT, Wi-Fi, and an interactive dashboard manages to shorten the setup time to 15 minutes or less whilst maintaining the completeness of the current testing procedure, and requiring training to implement. Furthermore, testing becomes physically safer and more comfortable because of the convenience of remote controlling and monitoring.



AUTOMEC



Left to Right

Lecturer, Ms Yvonne Chen Dannis Pee Lek Hao Wong Man Kit Soh Kai Zhe Danish Bin Mohamad Noor Jayan Low Cheng Kiat Lecturer, Mr Jervois Wu







Concept

This project deploys mobile robotics running on Internet of Things (IoT) applications to capture real-time images and transmitting the data wirelessly to a workstation or mobile device. Powered by a programmable controller, the robotic device can perform various undercarriage inspection tasks which are now performed manually.

The portable nature of the device allows a single operator to set up and operate. It is equipped with various customizable solutions to increase productivity and reduce the risk of workplace incidents or even fatalities.



SP Debussy



Left to Right

Lecturer, Ms Zhang Qi Tiamzon Joseph Martin Cristobal Benjamin Thomas Komatt Vicky Liu Deslaena







Concept

The goal of this project is to develop an undercarriage check system to allow bus inspectors to perform bus undercarriage audits and inspections safely and efficiently. The system consists of a remotely-controlled vehicle with a camera, and a base station with user-friendly interface. This system allows inspectors to control the compact vehicle remotely, stream live videos, zoom in/out camera view, capture and save images on a thumb drive, etc.



thesoloengineer



Left to Right
Lecturer, Mr Peter Wazecki
Tang Jing Herng





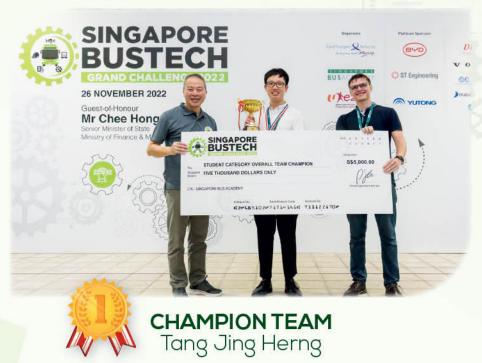
Concept

The proposed prototype for improved and enhanced bus undercarriage inspection consists of a wirelessly controlled robotic car with a movable camera and lighting system. The car moves in all directions and rotates on the spot to eliminate the turning radius. The camera has pan, tilt, and zoom capabilities to replicate a technician's manual scanning of the undercarriage. Both, camera and car are controlled wirelessly via a mobile app. The prototype replicates current inspection techniques, thus providing effectiveness, safety, and efficiency.





thesoloengineer



SP Singapore Polytechnic

SWACT



Team Polaris





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ALL OUR SPONSORS AND PARTNERS



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The eCitaro is not a prototype. It is a fully developed all-electric bus that has been put through tough city traffic conditions to test its electrohydraulic steering and drive axle, and forced to negotiate the steep ascents and descents in the Sierra Nevada.

Safety as standard.

Pursuing Mercedes-Benz's vision of accident-free driving, the eCitaro integrates all the safety considerations for drivers and passengers in challenging urban traffic conditions.

Mercedes-Benz The standard for buses.







Providing Quality & Reliability with Our Vision for the Future and Pioneering Spirit

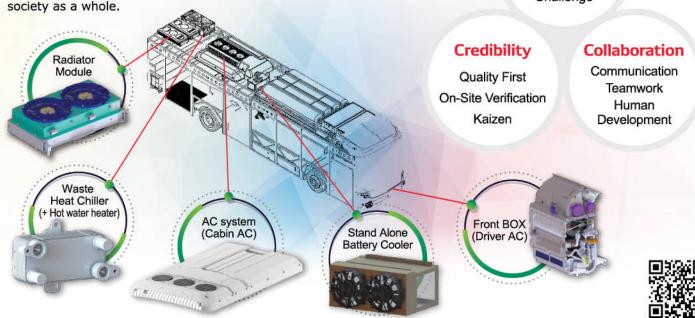
The DENSO Spirit expresses values and beliefs shared by all employees around the world that have driven us to contribute to the automotive industry and society as a whole.

Foresight

Vision

Creativity

Challenge





Smart climate control solutions for comfort and safety

Driving e-mobility climate control solution of tomorrow





Why Eberspächer?



German-based Technology & Products innovated for Singapore Climate & City Bus Application



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We keep ready stock of fast moving items to serve our customers in a timely fashion. We know the cost of downtime to your business and work to minimize it.



Knowledge

Over 2 decades in the business has helped us accumulate a wealth of knowledge to cater to our customers' unique requests and varied projects.



We understand the core of any business is to provide good service to customers. Be assured your needs will always be our top priority.

Our Partners





















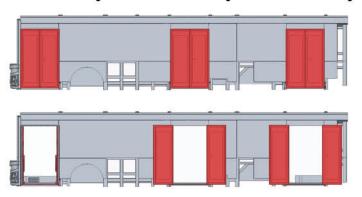




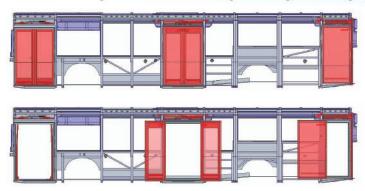
SMC®

3 DOORS SYSTEM

Front Inward Gliding + Centre Double-leaf Sliding + Rear Double-leaf Sliding



Front Inward Gliding + Centre Double-leaf Sliding + Rear Single-leaf Sliding



WHY SMC?



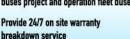
Simplified innovative design
- easy to troubleshoot and rectify fault

Customize flexible control system to

meet technical requirements



Provide full technical support on both new buses project and operation fleet buses





Provide professional training according to depot requirement



Comprehensive and sufficient inventory on door kits and parts



+65 6861 0888



Sustainability Beyond Emission

- Energy efficiency
- Manufacturing methods
- Responsible sourcing of materials
- 90% recyclable

Safety Beyond The Bus

- Superior safety standards
- Impressive torque and driveability
- Outstanding flexibility for safe and efficient body building
- Connectivity for uptime and safety

Reliability Beyond Delivery

- Dedicated market teams and technical expertise
- Flexible charging and energy storage
- Global service network
- Swift parts supply

Technician Category























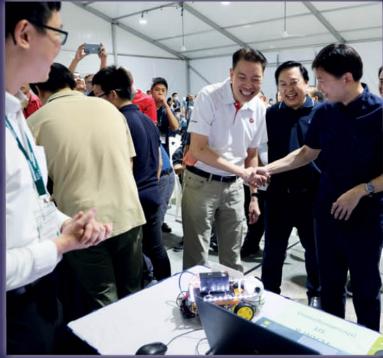
Student Category





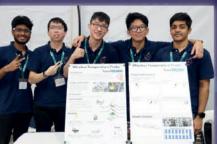




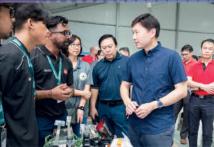












Public Showcase & Activities























Partners























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