

Assessing Hydration Status of Competitive MMA Fighters after a Weight-cut for Competition

Athletes from combat sports perform weight-cutting to make it into the appropriate weight classes for competition. These weight-cutting measures include de-hydration over a period of time and then re-hydration after the weigh-in. De-hydration is detrimental to physical performance and, if the athletes do not re-hydrate sufficiently thereafter, they may not perform to their best during the competitive bout. This project tracks the hydration status of competitive Muay Thai fighters during the weight-cutting phase as well as the re-hydration phase to check whether the fighters' re-hydration strategy works to maximise performance.



Supervisor:
Paul Oh

Team Members:
Tang Jia Hao Hannathon,
Marina Chu Wei-jing, Lim Tien Jie

Process of urine analysis and recording of quantitative data.

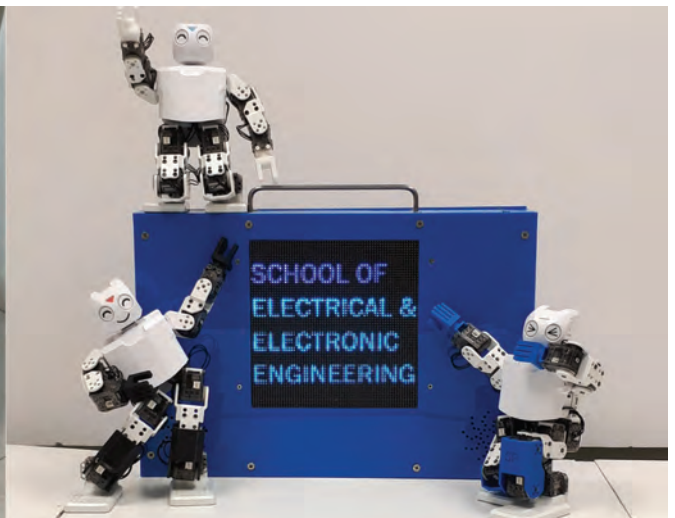
Supervisors:
Lu Hongli, Carlos Acosta

Team Members:
Valent Chia Shu Wei, Zhuang Yaohuang,
Lin Shuai, Li Chen Yuan, Chin Yong Kang,
Denzil Ang Xue Wen

Industry Partner:
Neeuro Pte Ltd

Human-Robot Interaction System

Human-like robots are used in several tasks nowadays. This project presents two applications for humanoid robots. One application is used to provide information and to interact with the users. The second application allows the user to use his mind to control and interact with the robot. Come down, see and interact with these cute robots.

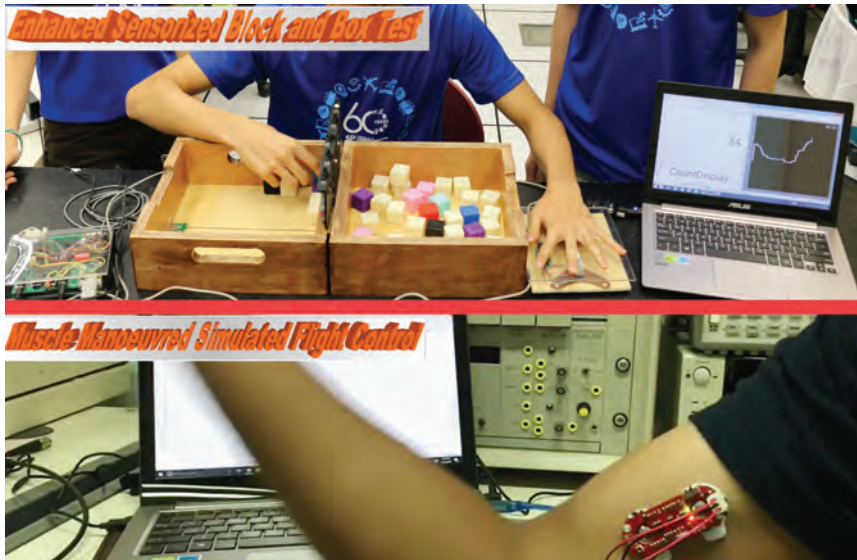


Human-Robot interaction system.



Enhanced Sensorized Block and Box Test/Muscle-Manoeuvred Simulated Flight Control

The Block and Box Test (BBT) is a functional test used for measuring gross manual dexterity in upper limb rehabilitation. This project intends to enhance the usefulness of the BBT by embedding sensors into the objects used in the test. The enhanced system can reduce the manual effort of clinicians in administration and provide better diagnostics to clinicians, helping to improve outcomes. The Muscle-Manoeuvred Simulated Flight Control project aims to develop a simulated flight controller that is based on the changes detected in the muscles of the user.



Enhanced Sensorized Box and Block Test/Muscle Manoeuvred Simulated Flight Control.

Supervisors:

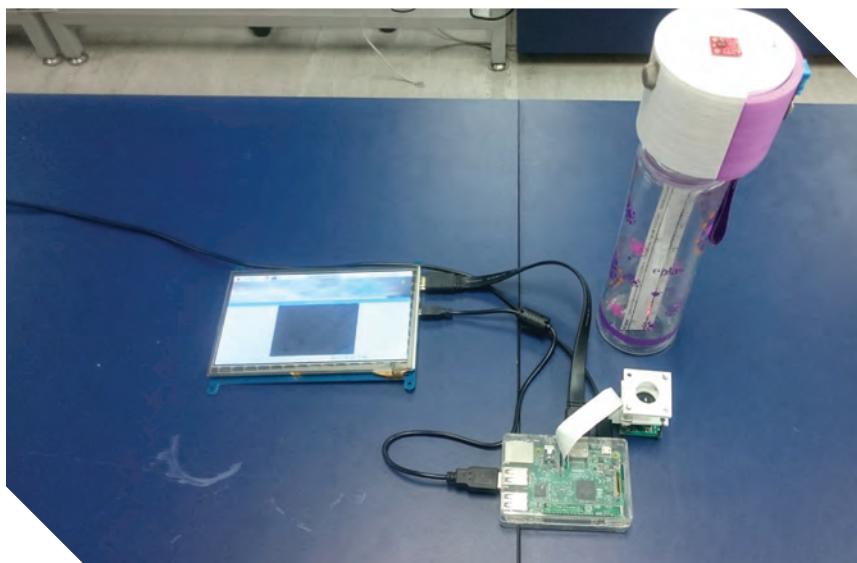
Lee Kah Mein Tracey, Shanker Maniam

Team Members:

Chua Chong Yih, Liyau Kong Liang,
Chang Yun Lin Alicia, S Aloyscieus,
Tang Zhao Xiang Andreas, Pang Yi Wei

Smart Monitoring of Health and Wellness Through Skin and Environmental Monitoring

This Health and Wellness project focuses on two areas - skin and environmental monitoring. Environmental monitoring involves the development of a smart bottle device to monitor environmental conditions and keep track of the user's daily water consumption. In skin analysis, the project focuses on developing a smart device for skin monitoring using a camera. The images are transmitted to a smart phone and server for analysis.



Smart Devices for Health and Wellness through Skin and Environmental Monitoring.

Supervisors:

Ho Soon Seng, Derrick Ting Lee Hou

Team Members:

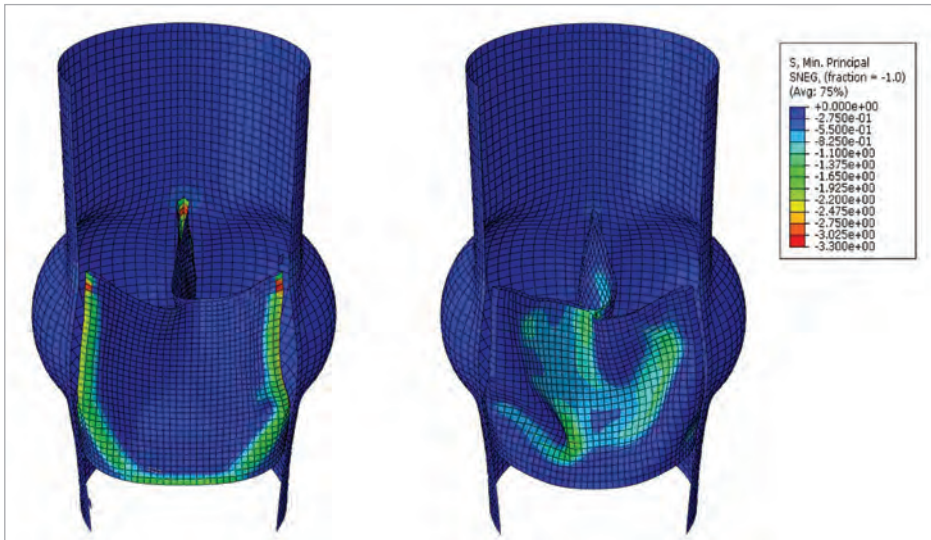
Tan Yin San Nick, Wong Kai Yang Bryan,
Nicholas Woon Le Hao,
Humayra Jeba Binte Mohd Habibur Rah,
Racia Koh Wan Lin, Jeremiah Benjamin Jay

Industry Partner

Happy Beauty Singapore

Computational Simulation of Prosthetic Heart Valves

This project uses the Finite Element Method (FEM) software ABAQUS to simulate the dynamic behavior of prosthetic heart valves, from which important valve indicators such as leaflet stress distribution and leaflet coaptation area can be calculated. The simulation results are then validated with an in vitro flow study using the Vivitro pulse duplicator system.



Supervisor:

Xiong Fangli

Team Members:

Loo Shu Wen Rebecca,
Ong Ai Hua, Ang Soh Ming

Comparison of stress distributions shows a higher maximum stress in the tubular valve (left) than in the molded valve (right).

Design & Development of Motorised Hand-wrist Stretching Mechanism

Spasticity is a common impairment in stroke patients. When a muscle contracts due to spasticity, it tends to remain in the shortened position. Over time, this restriction of range will cause length-related changes in the muscle-tendon complex, the loss of sarcomeres, which causes contracture. The main objective of this project is to design and develop a functional dual action motorized hand-wrist stretching mechanism prototype for diverse physical properties with various medical conditions. The prototype can be used interchangeably on both the left and right hand.



Supervisor:

Lee Kim Kheng

Team Members:

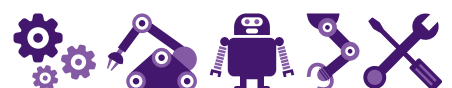
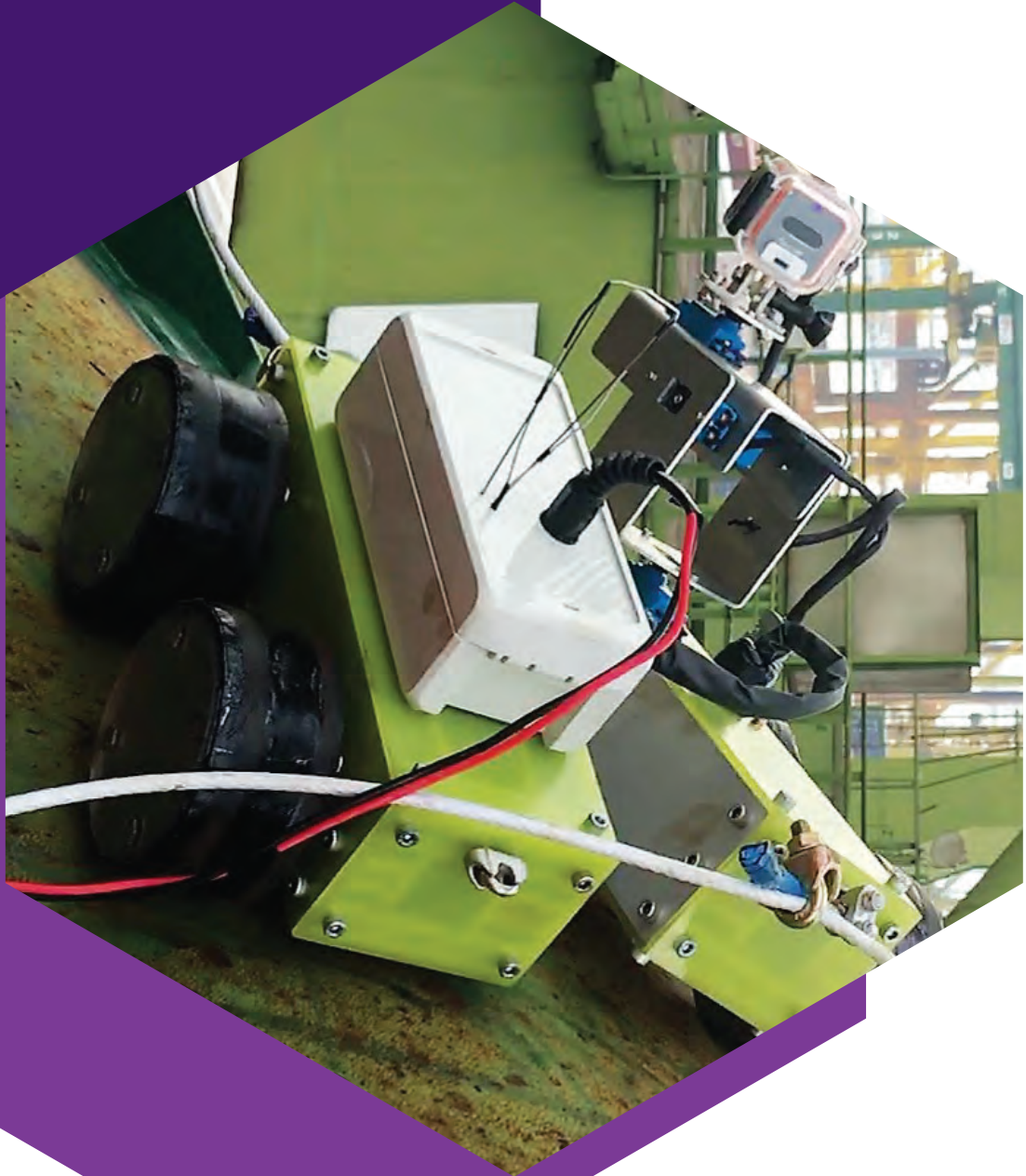
Ling Wei Liang, Tan Shu Xian,
Loh Yong Jie Nicholas

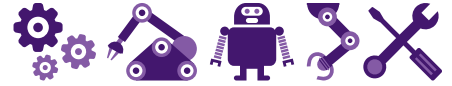
Patient undergoes stretching therapy.



INDUSTRIAL & AUTOMATION

These projects provide control systems with processes that need to interact in real-time with other applications that are significantly superior in precision and speed.





RoboCup@Work

RoboCup@Work is a competition in RoboCup that targets the use of robots in work-related scenarios for industrial environments. The competition enables use of innovative mobile robots equipped with advanced manipulators for current and future industrial applications where robots cooperate with human workers for complex tasks ranging from manufacturing, automation and parts handling, including general logistics. Come to the booth to see our robots in action!



Supervisor:
Asadollah Norouzi

Team Members:
Wendy Heng Wen Yi, Wint Shwe Sin Aung,
Nur Laily Qodariyah Binte Noor Azha,
Sheila Devi D/o Suppiah,
Abdul Hady Bin Zaydie, Jamie Tan Jia Xin

Team SP (Hady, Asad, Wendy, Sin, Jamie, Wen Jing) - RoboCup 2017, Nagoya, Japan.

SP-Iconic Project:- Real-World Test-Bedding of Integrated Smart Green Technologies

Industrial Partner:- Singapore Polytechnic Graduates' Guild



Active Lighting Control based on human, vehicular traffic and ambient lighting conditions



Climate Control System using high resolution environmental sensing
Active control of air-conditioning for energy optimization



Realtime Energy monitoring, visualization and energy analytics




Active Lighting Control, Climate Control System and Realtime Energy Monitoring & Service Alert Features.

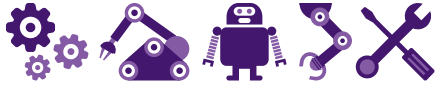
Smart Building Applications

The aim of this project is to create Smart Building applications that include a Personalised Lighting System, a Solar monitoring System, and an alert system to the Maintenance Team, a Climate Control System and a Service Robot. The applications are developed on Android platform and Visual Studio 2017 and allows both Smartphone, tablet and PC operation. The Solar Monitoring System comprises Arduino, sensors, Cloud and 3G communication services.

Supervisors:
Tan-tay Teck Bee, Hui Wing Hong

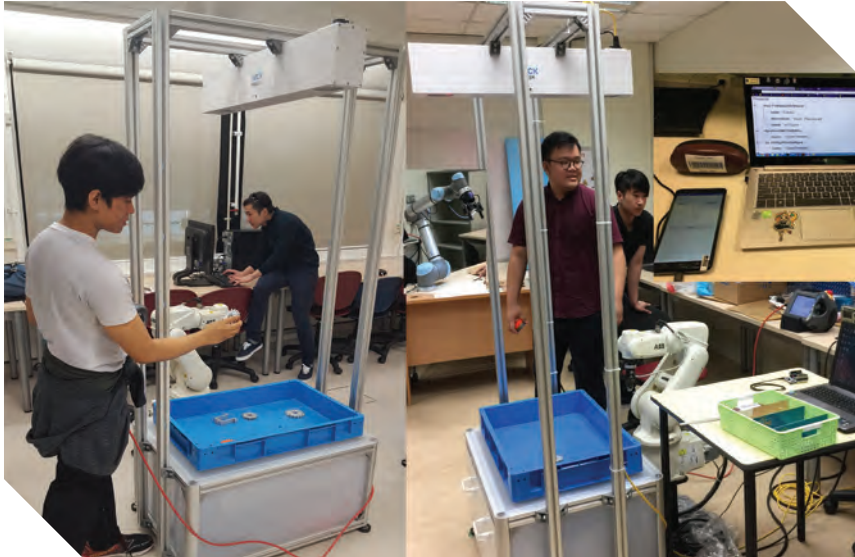
Team Members:
Marcus Xing Koh, Kaung Khant Thein Han,
Tiew Wei Jian, Goh Jie Kang,
Christopher Shan Naidu

Industry Partner:
Singapore Polytechnic Graduates' Guild



Advanced Manufacturing Pursuit

This project aims to involve project students in the various technologies used in Advanced Manufacturing and Industry 4.0. Some of these technologies include Collaborative Robots, Flexible Bin Picking mechanisms, Autonomous Guided Vehicles and Data Capturing for Tracking & Database systems. Visitors can see the applications and interact with a cobot.



Smart Manufacturing Pursuit.

Supervisors:

Lui Siew Kwok, Carlos Acosta,
Asadollah Norouzi

Team Members:

Alaric Tang Ming Kun,
Mohamed Syahiran Bin Mohamed S,
Man Jun Jie, Chia Songcheng,
Muhammad Hanif Bin Abdul Hamid,
Lim Heng Jing Jonathan,
Hariz Ridhwan Bin Mohd Aidit,
Charlotte Lim Wee Teng,
Chua Wen Yang Jeremy,
Timothy Josceff Magbitang Toribio

Low Cost Auquponics Farm Central Monitoring System

This project aims to provide a low cost central monitoring system for auquponics farms. It uses PLC to provide water level control, sensors to monitor temperature and pH, both of which are detrimental to the productivity of an aquaponics farm. The project also provides live video streaming and allows for control over the internet. It also provides alert to the aquaponics farm owner.



Low Cost Auquponics Farm Central Monitoring System.

Supervisor:

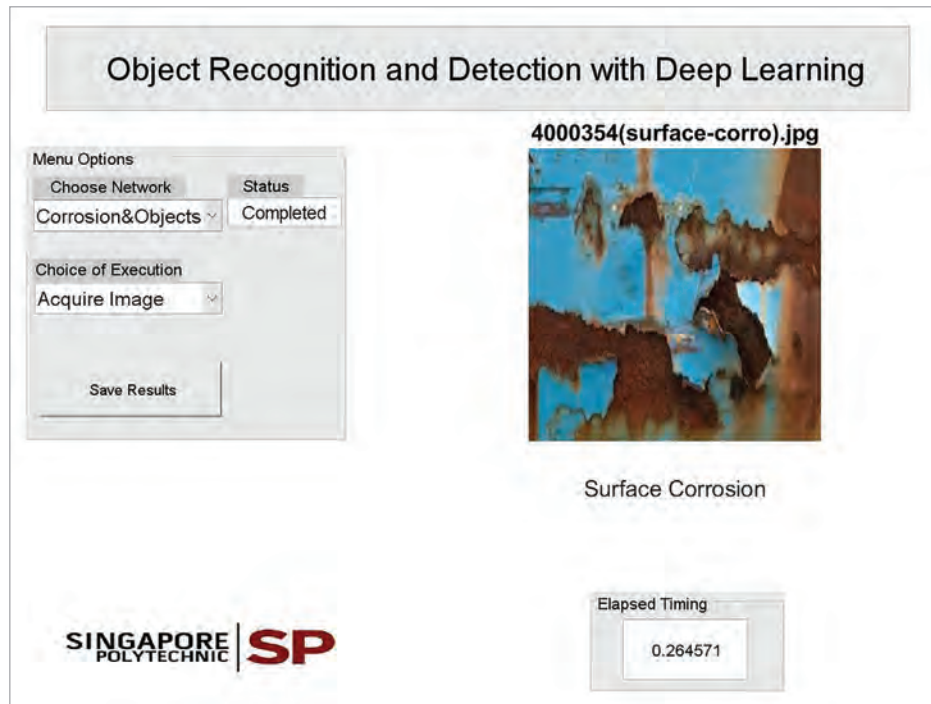
Tony Suah

Team Members:

Tam Chi Yu Dereck, Yau Kah Seng, Koo Zhi Cai

Object Detection And Recognition With Deep Learning

This project aims to develop a vision-based object detection and recognition system using deep learning. Using Convolution Neural Network (Alexnet), the network is re-trained to suit specific requirements to classify types of corrosion and other common objects such as table, door, chair, window, etc. The accuracy of the Network is at 88.5% for testing from datasets.



Surface corrosion failure analysis.

Supervisor:

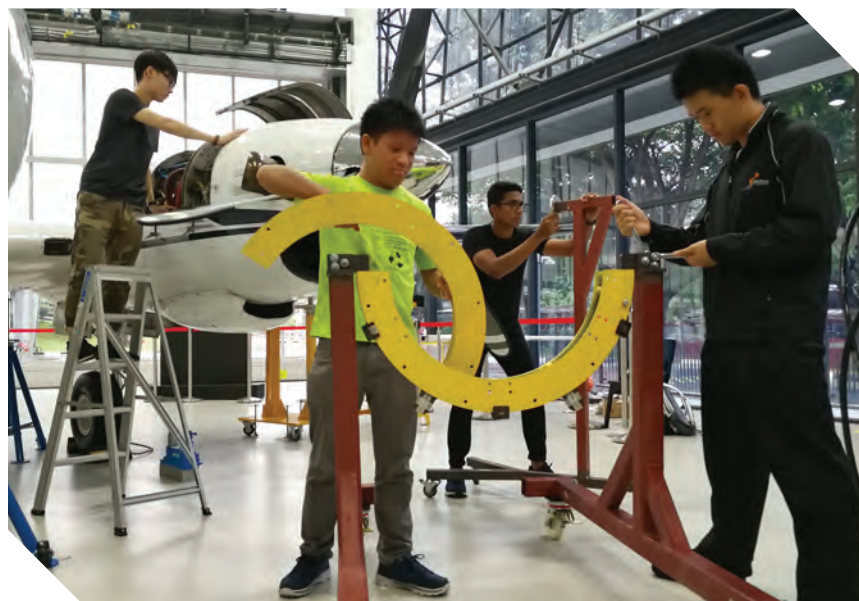
Cai Zhi Qiang

Team Members:

Lee Wei Hao, Lee Xin Lun,
Lee Cheng Hao

Hoisting System for PT 6A Aircraft Engine

The aim of this project is to simulate an engine change on a Beechcraft King Air B90 aircraft. This includes design and fabrication of both the engine and propeller stands. The engine and propeller are hoisted and fitted onto stands. The engine stand is fitted with a rotating mounting ring. This design is for ease of removal and installation of components on the engine. Procedural instructions and risk assessment are also incorporated in this exercise.



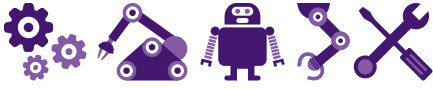
Students working on the engine stand assembly.

Supervisor:

Cheong Choon Kee

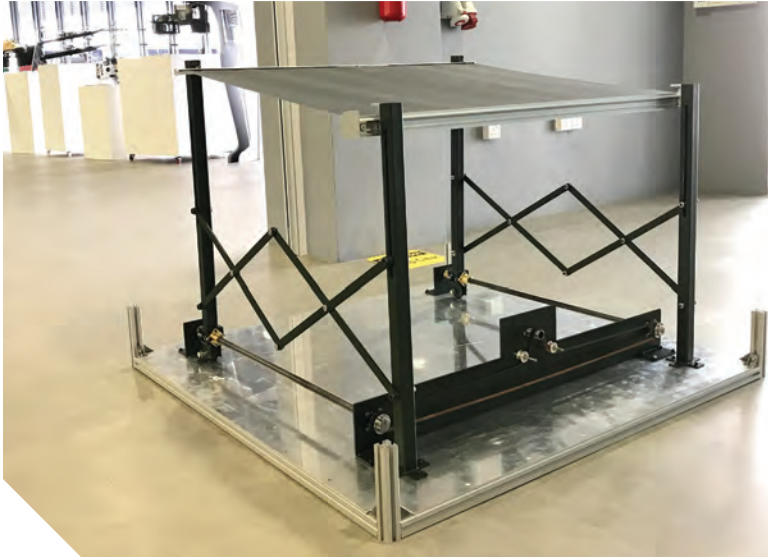
Team Members:

Jeydi Ng Chin Tah,
Thevarajan Vairamoorthy,
Juan Tong Jun, Guo Sheng



New Awning Design @ Boat Quay

The current awning design at Boat Quay restaurant needs enhancement for improved safety and efficiency. It currently requires 3 people to set up the shelter mechanism. It is therefore desirable to develop a new collapsible awning mechanism. The project team has designed and built a scaled down model (1:5) to demonstrate the concept.

**Supervisor:**

Soh Kim Fai

Team Members:

Muhammad Haziq Bin Zulkarnai,
Darius Keenwitt Joseph, Tsen Ya Pei,
Hans Bin Elias, Yansen

New Awning System.



Motorised Trolley

Material transportation is an integral part of a logistics operation where incoming material requests are retrieved by automated or manual storage systems. For warehouses with high storage and narrow aisles, operators need to retrieve material using a trolley and a ladder. Productivity often depends on the material quantity and location. A compact motorised trolley improves productivity in transporting the operator, providing access to high storage areas and collecting materials.

Supervisor:

Tan Tuan Kiat

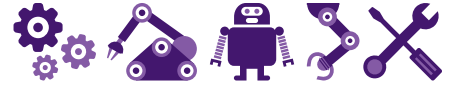
Team Members:

Muhammad Hisyam Bin Mohd Rosli, Poh Jun Wei Melvin,
Wang Zhen Jie, Bay Xin Ru Dion

Industry Partner:

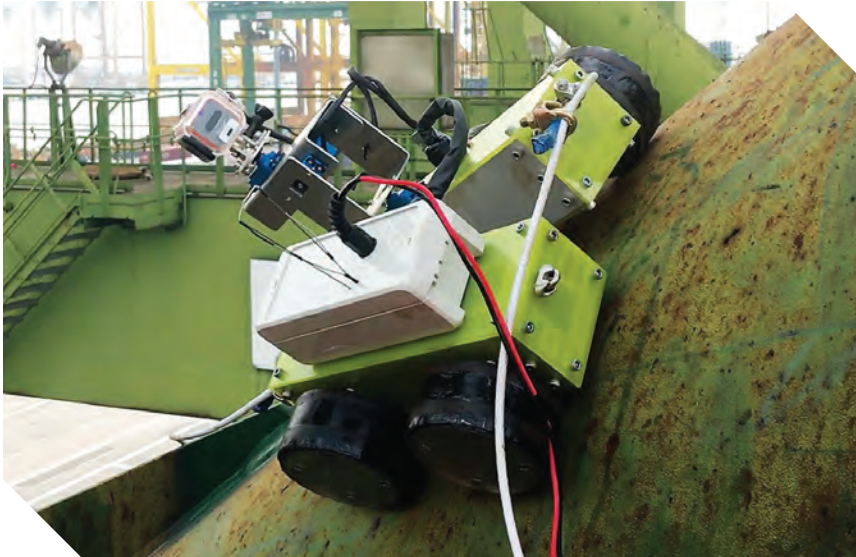
Tractors Singapore Limited

Motorised Trolley.



Pipe Climbing Robot

This Robot is built to traverse along and around a pipe using Magnetic Adhesion. Its unique configuration allows it to rotate about the pipe to align itself in any direction. The Robot comes with a camera system to transmit live videos to the user and is able to take photos of the surface of the pipe.



Robot on the top of the pipe.

Supervisor:

Thevaraja Ramu

Team Members:

Wilson Cheah Chunhoong,
Bjorn Ong Kang Jie, Tan Yaw Liing



Pendulum Impactor.

Design & Development of Pendulum Impactor

The main objective of this project is to design and build a pendulum that determines the reliability of small components under high G-force. This is used for the small receiver that is used in a hearing aid. It is an important test as part of the qualification process to ensure that the receiver in the hearing aid is able to withstand a certain threshold (G-force) so that it continues to function in the event the aid falls to the ground.

Supervisor:

Lee Kim Kheng

Team Members:

Chng Zong Han Joven, Low Qi Wen Keith,
Boh Chang Wei Darren



INFOCOMM & MEDIA

These projects deal with digital technologies in the new era of infocomm-enabled applications and digital media. These projects handle interactive applications involving infocomm technologies.



Project H.O.S.T
Surveying the State of the Internet
 Project members: Ang Wei Xiang Darren, Chua Ming Kiang, Lee Ting Shen Leyond, Chen QiuRong
 Project Supervisors: Mr Emil Tan (External), Mr Ho Chee Meng (Internal)

Background ⓘ
 Vulnerabilities, exploits and malwares are discovered and use out in the Internet every now and then. With various information gathering techniques, how can a researcher quickly identify the state of the Internet and collect preliminary data about an exploit, malware or vulnerability?

Objective ⓘ
 The purpose of the project is to research on methodologies and tools that can be used to survey the state of cybersecurity on the Internet, and build a comprehensive platform that can perform such tasks.

Overview ⓘ
 H.O.S.T is an Internet survey tool that uses information gathering techniques such as deploying honeypots, using of scanners, and device search engine. H.O.S.T also uses Splunk, a log management and visualisation tool, to allow researchers to get a better sense of the data collected from honeypots.

Conclusion ⓘ
 With H.O.S.T, researchers will be able to quickly identify the state of the Internet. Using the various information gathering techniques that are available for use in H.O.S.T

Platform

Honeypots	Scanners	OSINT	Visualisation
Suite of Honeypots provided: <ul style="list-style-type: none"> Dionaea, HoneyPy, Cowrie, Kippo Docker-based Honeypots Features: <ul style="list-style-type: none"> Fast Deployment, Custom docker-based honeypots, Eliminates 'works on my system' problem 	Network Scanners provided: <ul style="list-style-type: none"> Nmap, Masscan  Features: <ul style="list-style-type: none"> Ability to scan the whole Internet, Integration with Shodan, Parsed logs for easy filtering. 	Device Search Engines: <ul style="list-style-type: none"> Shodan Censys  Features: <ul style="list-style-type: none"> 2 Search Engines to choose from, Visualise Shodan search data 	Software used: <ul style="list-style-type: none"> Splunk Google charts  Features: <ul style="list-style-type: none"> Visualise collected data from different Honeypots using Splunk, Google Charts for in-built visualisation of Shodan data

Acknowledgments:
 We would like to thank our supervisors Mr Ho Chee Meng and Mr Emil Tan for their continual support throughout the duration of this project.

 **SINGAPORE POLYTECHNIC** 

Surveying the state of the Internet.

Mimosa

The project aims to enhance the experience of both students and lecturers while using Mimosa, a vulnerable web system for teaching secure coding. Administrative functions such as the management of challenges and user management functions are to be added. In addition, more secure coding challenges of various categories will also be added.

English ▼ Preferences Tools Help

Login

Saved Settings: Generic MySQL ▼

Setting Name: Generic MySQL Save Remove

Driver Class: com.mysql.jdbc.Driver

JDBC URL: jdbc:mysql://localhost:3306/shadow?useSSL=false

User Name: root

Password:

Connect Test Connection

Mimosa screenshot.

State-of-the-Internet Survey Tool

To design and implement a tool that quickly identifies the state of the Internet when a new vulnerability, exploit or malware is discovered. With the use of Honeypots, scanners and Open Source Intelligence Tools (OSINT) information gathering techniques, the team developed a suite of tools which will help to gather information about the state of the Internet quickly.

Supervisor:

Ho Chee Meng

Team Members:

Chua Ming Kiang, Ang Wei Xiang Darren, Lee Ting Shen Leyond, Chen QiuRong

Industry Partner:

The Honeynet Project, Singapore Chapter

Supervisor:

Loh Kwong Khuin

Team Members:

Tay Mei Zheng, Vanessa Teo, Ng Shi Wei, Huan Xiang Deng

MyEZIoT

This IoT gateway called MyEZIoT enables users to connect, collect and send sensor data such as temperature, humidity, GPS, etc., from microcontroller devices (Arduino, Raspberry Pi) to MyEZIoT for data visualization, alerting and analytics in a single platform. It helps to overcome technical difficulties for IoT connectivity and provides a one-stop solution for smart campuses and laboratories. It also allows for home monitoring and the detection of abnormalities.



EZIoT Team Members.

Supervisor:

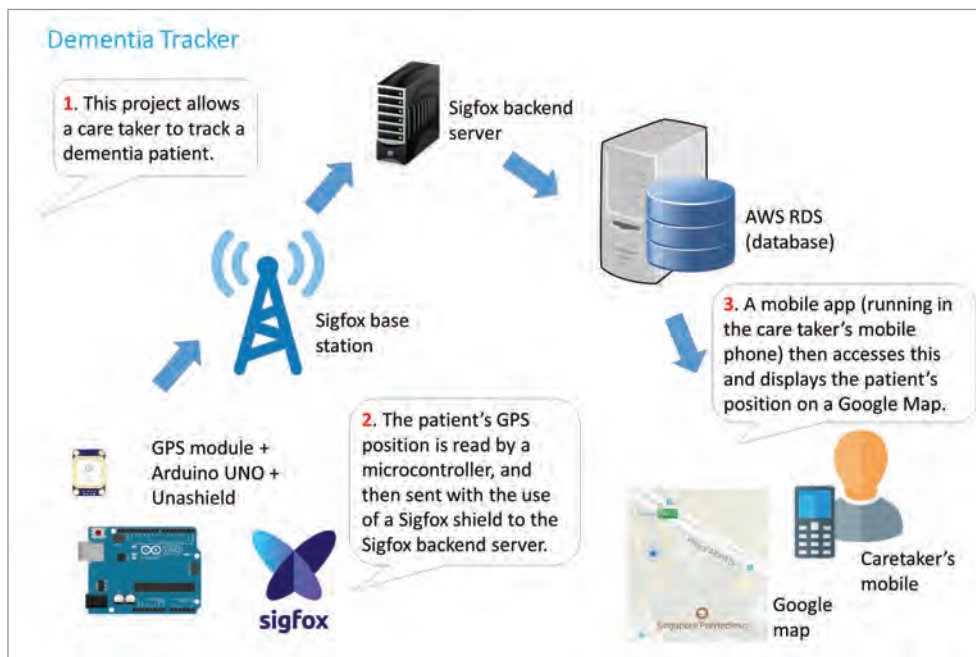
Phyoe Kyaw Kyaw

Team Members:

Chan Chung Loong, Min Hein Aung

Dementia Tracker Using Sigfox

With an aging population, the number of dementia patients is on the rise. Care takers often find it hard to locate dementia patients who have wandered off and lost their way. This project aims to develop a dementia patient tracking system using Sigfox to help locate dementia patients. This cheap, low-powered tracking system will be carried around by the patient. Information from the device will be transmitted to the caretaker who can access the database to obtain the patient's location and display it on a Google map.



Overview of "Dementia Tracker".

Supervisor:

Chong Siew Ping

Team Members:

Chua Chryston, Neo Yizhe

Digitization & Data Analytic - Applications

This project showcases how technology can be deployed to improve and enhance our living through digitization and data analytics. It demonstrates 3 applications as follows: (1) Office - a mobile app to allow for live video streaming of a meeting, (2) Resort - a web-based system to assist the resort housekeeper to inventorize guest room items, (3) Home - machine-learning and data analytics to track the possibility of water leakage or to alert to a possible break-in through utility data collected.



Supervisors:

Wong Chee Yong, Ho Hooi Chee,
Tan Hai Su

Team Members:

Mohamad Shafik Bin Mohamad Adam,
Celeste Loo She Ying,
Tenedero Angelou Mae Pancho,
Chow Keiren, Ang Hao Jun,
Sim Zheng Han Bryan,
Diyana Binte Mohd Aris, Ng Kah Hui,
Khoo Zhi Xuan

Industry Partner:

Kranji Farm Resort

Digitization & Data Analytic - Applications.

Virtual Reality Aircraft Maintenance Training

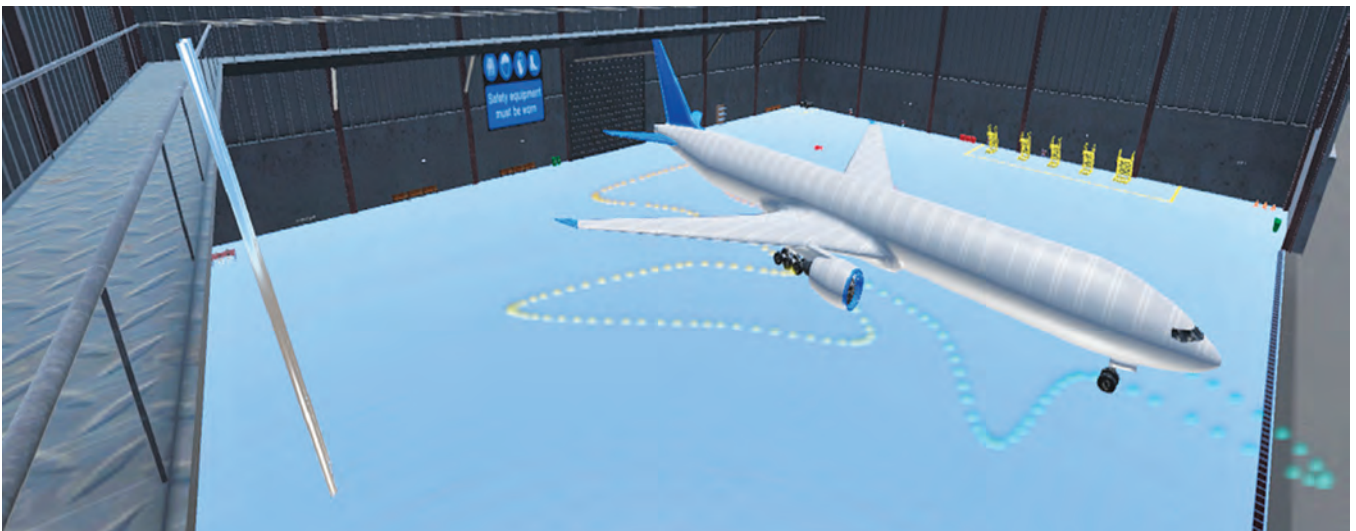
This student-developed project with SIA Engineering Company, simulates aircraft walk-around checks to help trainees identify defects in an aircraft. 3DSmax and Unity are used to create this immersive and interactive VR simulation. HTC vive is used as the output device. This environment provides trainees with practice at their convenience without any negative consequences to the actual aircraft and hangar.

Supervisor:

Kelvin Ong Chin Peng

Team Members:

Ho Wei Hong Ben, Ng Tian Yun Anna, Maxted Liem Lloyd, Anastasia Tan Ying Jie, Leo Jieli Daryl, Tan Chao Jun Matthew, Michelle Ho Yong Xin, Chua Fu Lin, Shayman Voo Shih Wen



Side View of VR Aircrafts for Training.

ICAN Math Learning Platform

The ICAN Math Learning Platform aims to help secondary school students learn maths more effectively. The client for this project was Bendemeer Secondary School. The ICAN Math Learning platform is developed using real-time multiplayer client-server architecture. The platform contains a database of questions on specific mathematics topics. Students are asked questions in real-time, and compete with up to 3 players in the same virtual room allowing them to engage in a social, fun and game-like learning environment.

Supervisor:

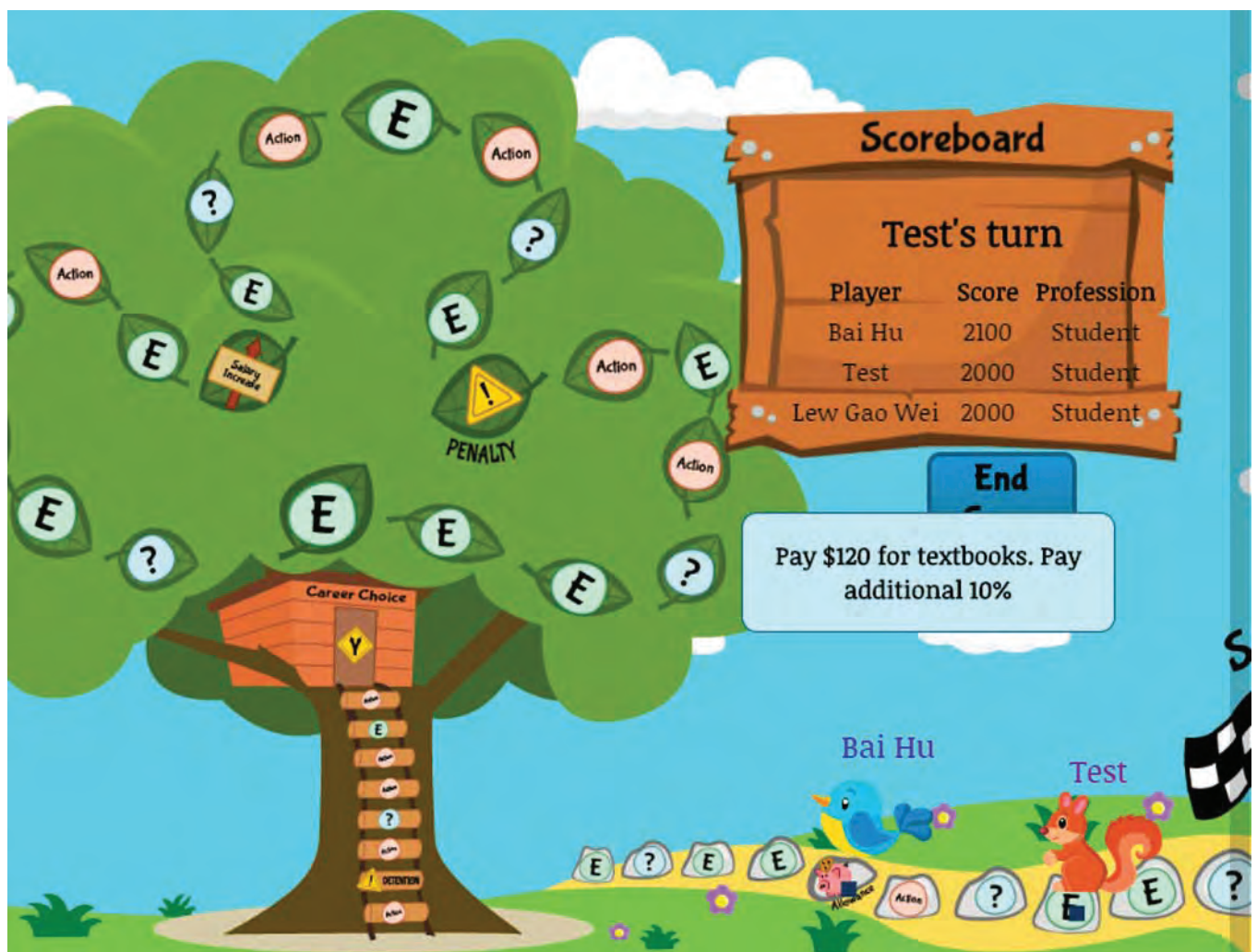
Justin Monreal

Team Members:

Lew Gao Wei, Rogero Paulo Jhimmel Pacia, Sandra Mae Tulio Manese, Quah Kai Yuan

Industry Partner:

Bendemeer Secondary School



ICAN Game Board.



TRANSPORT & MOBILITY

These projects contribute to the creation of integrated transport systems that are resource efficient and which tie in with substantial improvements in the mobility of people and freight.





Autonomous Assistive Robot.

Autonomous Assistive Robot

The Autonomous Assistive Robot (AAR) is designed and built to meet the increasing demand for industry automation and productivity in Singapore. It is built to transport loads from one place to another autonomously and safely in a factory setting without hitting obstacles along its moving path. This assistive robot can also be used in the healthcare, military, warehouses and logistics industry. It offers a flexible, dynamic approach to the required operation, hence increasing productivity.

Supervisor:

Phyoe Kyaw Kyaw

Team Members:

Chan Wei Jie, Lee Jun Hui, Nicholas Soon Hongle, Goh Jian Hui Isaac, Chen Daojie, Kwa Shen Jun Daniel

Virtual SP - UAV 3D Reconstruction for Industrial Applications

The UAV 3D Reconstruction has many applications, including for building and site survey/archival. Previously, the 3D model of a building or site had to be done by skilled workers using 3D Laser Scanners. In this project, students created a 3D Model of the SP campus and the HDB Dover SERS site using a COTS UAV and Bentley Contextcapture. The results clearly demonstrate that this cost effective solution is able to get the job done.



Reconstructed 3D Singapore Polytechnic Model.

Supervisor:

Tan Hwee Siang

Team Members:

Yusuf Bin Mohd Azwan, Wong Jun Ee, Tan Yien Shau, Kayden Peck Weng Hai, Naveen Tamizh Kannan, Goh Jin Wei, Lim Li Ming Derick

Industry Partner:

Bentley Systems Singapore Pte. Ltd.
HDB (Land Clearance Section)

VRATS

This project aims to explore and develop a VR-based (virtual reality-based) aerospace training system. Through this innovative training system that leverages on modern VR technology, current and prospective students can get to experience the fun and exciting world of aircraft and avionics systems training at SP in their very own VR space.



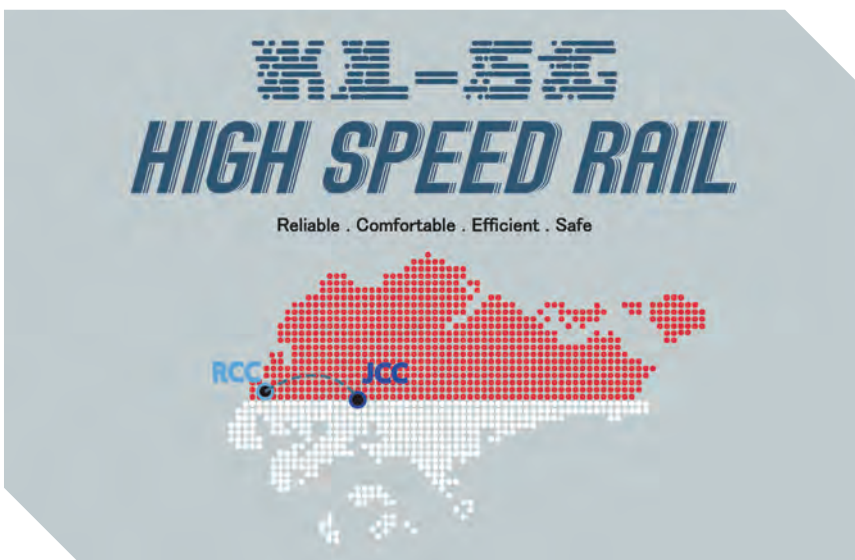
Supervisor:
Shanker Maniam

Team Members:
Muhammad Taufiq Hidayat Bin Safi'ee,
Muhaimin Bin Sadali, James Jonathan Leong

The craftsmen of VRATS, bringing you an immersive aerospace training experience.

Feasibility Study of KL-SG High Speed Rail System - The Singapore Chapter

To make way for the construction of Singapore's terminus and corridor of the 350km long Kuala Lumpur-Singapore (KL-SG) High Speed Rail (HSR) train tracks, both Jurong Country Club (JCC)'s and Raffles Country Club (RCC)'s premises will be acquired. This project aims to showcase the Civil Engineering considerations and technical feasibility of the KL-SG HSR system from JCC to RCC in Singapore.



Supervisor:
Rudy Ang

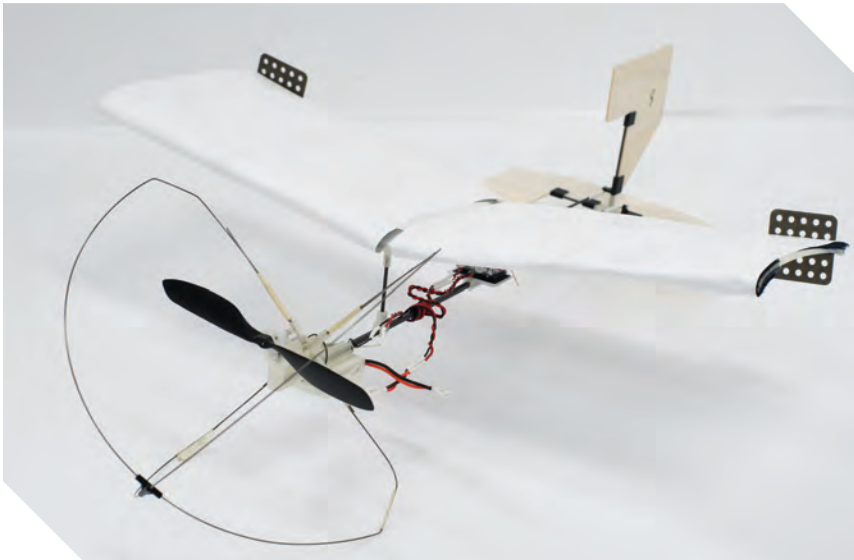
Team Members:
Zeke Sim, Poon Yan Ming Priscilla,
Ho Jun Hui Nevin,
Eldrynn Trishan Tan Swee Yong

Cover image of project.



MOLODAV

The MOLODAV (MODular, LOw DAamage and Velocity) is a mini UAV designed for indoor usage. It has a low speed, low impact damage, with a fixed wing. The MOLODAV was designed for outreach purposes. The mini UAV's low velocity characteristic helps provide better visualisation of the theory of flight when the platform flies through the air. The MOLODAV's modular concept and low impact damage design allows defective parts to be replaced during hands-on assembly and after eventful flights. These features allow students to understand important concepts of "line replacement units" and "designed to fail".



MOLODAV.

Supervisor:

Duncan Sih Wei Cheong

Team Members:

Jasper Chua, Chin Kang Jie, Reza Pahlevi
Bin Abdul Latif, Chng Chi Tze Benjamin,
Reuben Cho Wei Pin

DATUM (Detachable Aviation Transporter Unmanned/Manned Multi-Rotor Vehicle)

With the recent increase in the popularity of drones, various off-the-shelf solutions have become readily available. The advancements of consumer-grade drone components have led to the decrease in cost. However, 3 main issues still exist in the area of UAV development - limited flight time, limited load carrying capability and inflexible design. To overcome these issues, DATUM, a Detachable Aviation Transporter Unmanned/Manned Multi-rotor Vehicle, was developed.



DATUM runs on a Hybrid Engine Fuel Management System with a flight time of up to 30 mins.

Supervisors:

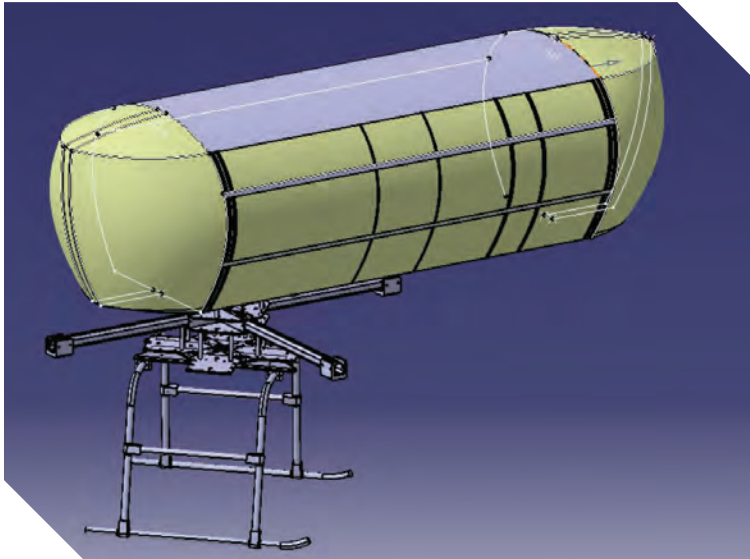
Chua Ming Sing,
Chaganti D V Subrahmanyam,
Chee Choong Yang, Reagan Chionh

Team Members:

Ang Jing Hao, Fabian Tan Yan Zhuang,
Xin Yuelun, Wang Hui, Ye Chao, Li Hui,
Charlene Tan Xin Ting, Yu Xuewen,
Toh Han Yang Kenneth, Lee Qi Rui,
Yang Zhenyong, Jazima Haida Binte Jamal,
Alif Danial Bin Muhammad Ahsiri,
Jackson Loh Xu Tao, Lee Ruey Yee,
Muhammad Izzul Ihsan Bin Zulpakar,
Bahjah Binte Mohamed Yamin,
Samuel Lim Sheng Hian,
Gan Eujun, Jeff Yip Kai Kit,
Harikishen s/o Chandra Kumar

Autonomous Security Surveillance Airship Carrier with Drone

Autonomous security surveillance airship is a multi-disciplinary project between the School of Mechanical & Aeronautical Engineering (MAE) and the School of Electrical & Electronic Engineering (EEE), in partnership with a Singapore-based security surveillance company, TwinRock Global. This project involves an Airship Carrier that is capable of 24/7 surveillance, and has the capability of launching UAVs when key installations have been breached. After a mission, the UAV will either loiter for further surveillance or return to the Airship Carrier to be re-charged and placed on stand-by for its next mission.



Gondola with Chaser Drone.

Supervisors:

Teo Ye Wei, Mike Ong Chin Siang, Liew Hui Sing

Team Members:

Lim Jun Cheng, Arendayen Nathaniel Lorenzo, Muhammad Syahrul Mirza Bin Sulaiman, Kok Zheng Jie Donovan, Ng Yong Ning Luke, Dennis Febrian Kirana, Khairil Amirul Bin Ahmad, Cheung Jun Jie, Thee En Jie, Ruan Zhi, Mohamed Asyraf Bin Mohamed Suhaimi, Lam Shu Xing Charmaine, Dione Goh Wan Yun, Teo Jia Wei, Tan Yi Xi, Ceethirakath Mohamed Rameez, Teng Jun Wen, Ian Tan Guan Ming, Liu Xin Hao, Ray Tan Guan Rui

Industry Partner:

TwinRock Global

X-pod

The usage of personal mobility devices is crucial to Singapore's move towards becoming a car-lite city. This project aims to design and build a velomobile that meets Singapore's regulations. Called the X-POD, the device is a low cost, comfortable and efficient means of transport meant for the general public who would require a more functional vehicle than the recreational bicycle. The X-POD is capable of covering long distances with minimal exertion on the part of the user. It also provides storage and shelter, making it the ideal eco-friendly lifestyle addition for Singaporeans.



Overview of X-POD.

Supervisor:

Chan Kok Yeong

Team Members:

Jonathan Lee Wei Ze, Goh Jun Wei, Muhammad Amir Syafiq Bin S, Philemon Koh Jun Kai, Muhammad Fadhil Bin Jailani

The D3 (Damage Detection Drone)

In the aviation industry, the engineering maintenance crew performs aircraft inspection on a routine basis. Due to the size of the aircraft, platforms and dockings are frequently utilised to facilitate aircraft damage inspection. Thus, a damage detection drone with photogrammetry function can conveniently assist to feedback, to the maintenance crew, any crack or defect sustained by the aircraft.



The Damage Detection Drone (D3).

Supervisor:

Faizal Sain

Team Members:

Ng Boon How Jacob,
Francisco Julian Thomas Pantaleon,
Yeo Fu Xiang, Marcus Wong Zheng Hao



Automated Transporter vehicle.

Automated Transporter

There is an increasing need for personal transportation of users in public places and indoor facilities, such that the vehicle can perform navigation and move to specified destinations. The aim of this project is to design and develop an autonomous transporter that can transport a person with payload in an indoor space. It features both autonomous navigation and manual control, with anti-collision sensors to cater for human traffic.

Supervisor:

Tan Tuan Kiat

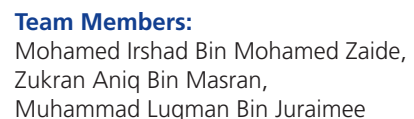
Team Members:

Ng Yu Fan Gerald, Chong Minlon, Dillon Chew Zhi Yuan

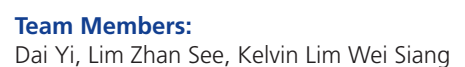
Industry Partner:

SICK Product Center Asia Pte Ltd

The aim of this project is to demonstrate the construction of a Tanker vessel model derived from a statement problem. The group made use of naval architecture software to turn the problem into a constructible model and conducted a load test on it. The project involved three teams working to form one mega vessel. All 3 teams contributed to the development and testing of the constructed model.



The aim of this project is to demonstrate the construction of a modern Tanker vessel derived from a statement problem by making use of Naval Architecture 1 and 2 and including software in NAPA. The project involved three teams working together to form one mega vessel. All teams contributed to the development and testing of the constructed model.



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SP TECH TO MARKET

The Research and Technology Development at SP is application-driven, aligning itself closely with industry needs and the broader national agenda.

These projects showcase our efforts in developing technology that is industry-relevant, with strong potential for market impact.





Robotic Bartender

Bartenders commonly work continuously for 8 to 12 hours, resulting in fatigue which could lead to errors to the orders. This project explores the possibility of using a Robotic Bartender to aid the human one. The Robotic Bartender will never complain of fatigue while ensuring that customers get the correct drinks and be entertained. This frees the human bartender to do more value-added work and focus on improving customer service.

Supervisor:

Steven Tan Yih Min

Team Members:

Ding Jishen, Benjamin Chew Xue Min, Tan Yong Bin, Maisurah Binte Mohammed Ali

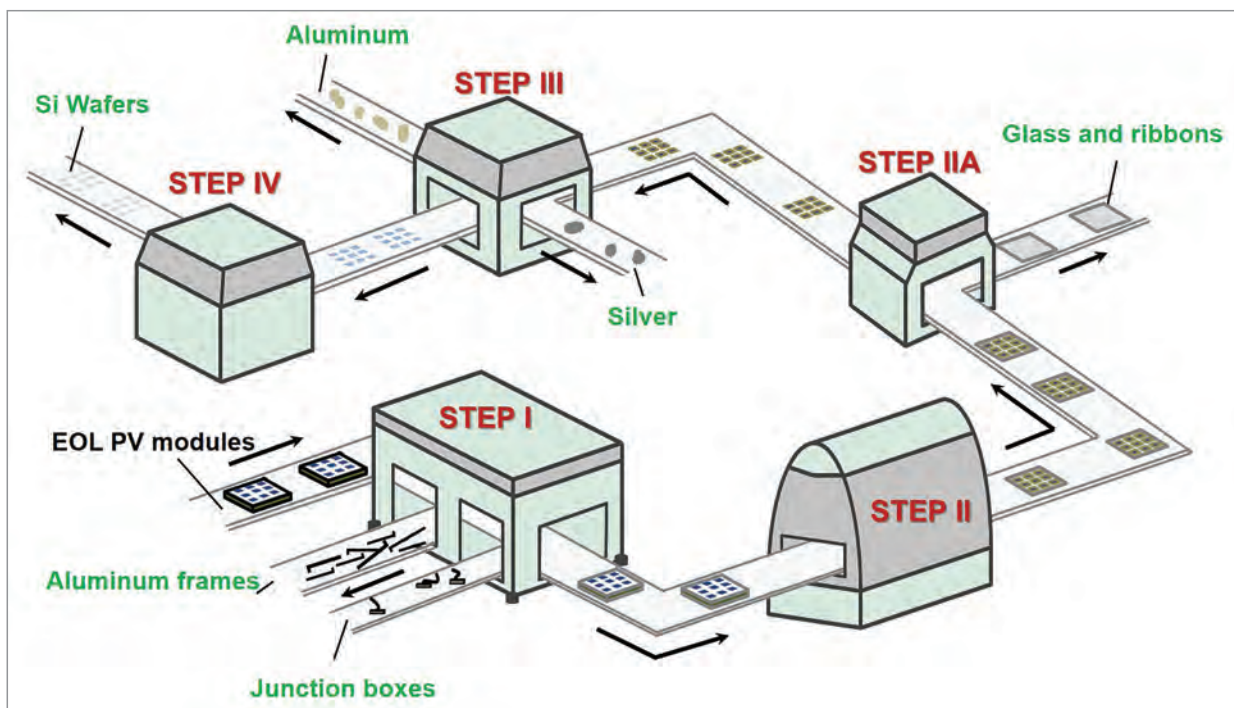
The Robotic Bartender entertains and make no mistakes in serving your drinks.

PV Module Recycling

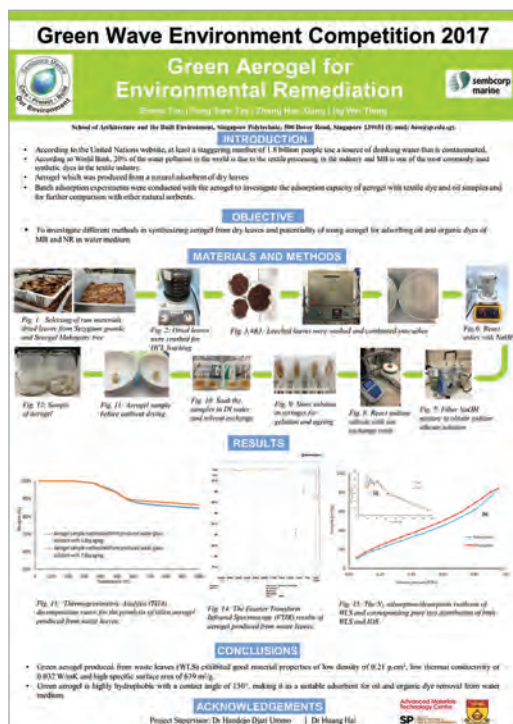
Global green initiatives see an exponential increase in the number of solar panel installations around the world. However, most end-of-life or defective panels end up in landfills, posing potential danger to the environment due to the leaching of toxic materials (such as lead) into ground water. Hence, SP has developed a one-stop solution for recycling crystalline silicon photovoltaics (PV) with an over 90% reclaim rate from entire modules, down to their individual components, through green chemistry.

Supervisor:

Li Xiaodong



Automated Sequential PV Recycling Process.



Green Aerogel Project.

Green Aerogel for Hydrocarbon Clean-up

Many organic pollutant-clearing techniques for the water bodies either are very costly, require many tools or have limitations. Hydrophobic aerogels are excellent candidates for efficient oil absorbers from aqueous solutions because of their high porosity and specific surface areas. The objective of the current study is to investigate different methods in synthesizing aerogel from dry leaves and to study the potentiality of using aerogel for adsorbing oil and organic dyes of Methylene Blue and Neutral Red in water medium.

Supervisors:

Handojo Djati Utomo, Huang Hai

Team Members:

Zhang Han Xiang, Fong Siew Tzy,
Ng Wei Tiong, Tan Xin Rong Emma



Case of Ra - Rapid Water Detection Kit.

Rapid Detection of Microbial Bacteria in Recreational Aquatic Facilities

The rapid increase of recreational aquatic facilities in Singapore makes it more important to ensure safe water for users, protect public health and prevent the spread of waterborne diseases. However, currently there is a lack of rapid on-site bacteria detection specific to water in aquatic recreational facilities, e.g. pseudomonas and legionella bacteria.

Supervisors:

Liu Qishan, Ken Lee, Joel Chia

Team Members:

Dhiyaul Asyraf Bin Rahmat,
Sherwin Chua Xiang Wei, Loh Wenyu,
Lim Kai Teng Eunice



Fast Inspection of Structure Defects by Active Thermography

Active Infrared Thermography (IRT) is fast and more suitable for inspecting large areas for structural defects. Active IRT can be used as an auxiliary tool to complement the ultrasonic detection method for precise defect measurement and evaluation. This project aims to develop a non-destructive technology, Active IRT, for inspection of structural defects.



IRT setup for detection of structure defect.

Supervisors:

Zhen Yongda, Cai Zhi Qiang, Tao Nengfu,
Estee Tan, Liu Lili

Team Members:

Ng Joo En

Easy Authoring System for Education (EASIE)

Companies need trained candidates to operate but training them is costly in terms of time and money, and could sometimes involve safety risks. There is, therefore, a need for situational training that requires the use of specialised environments and equipment. This project aims to design a software system that provides realistic 3D virtual training environments to meet the training needs of industry.



EASIE.

Supervisor:

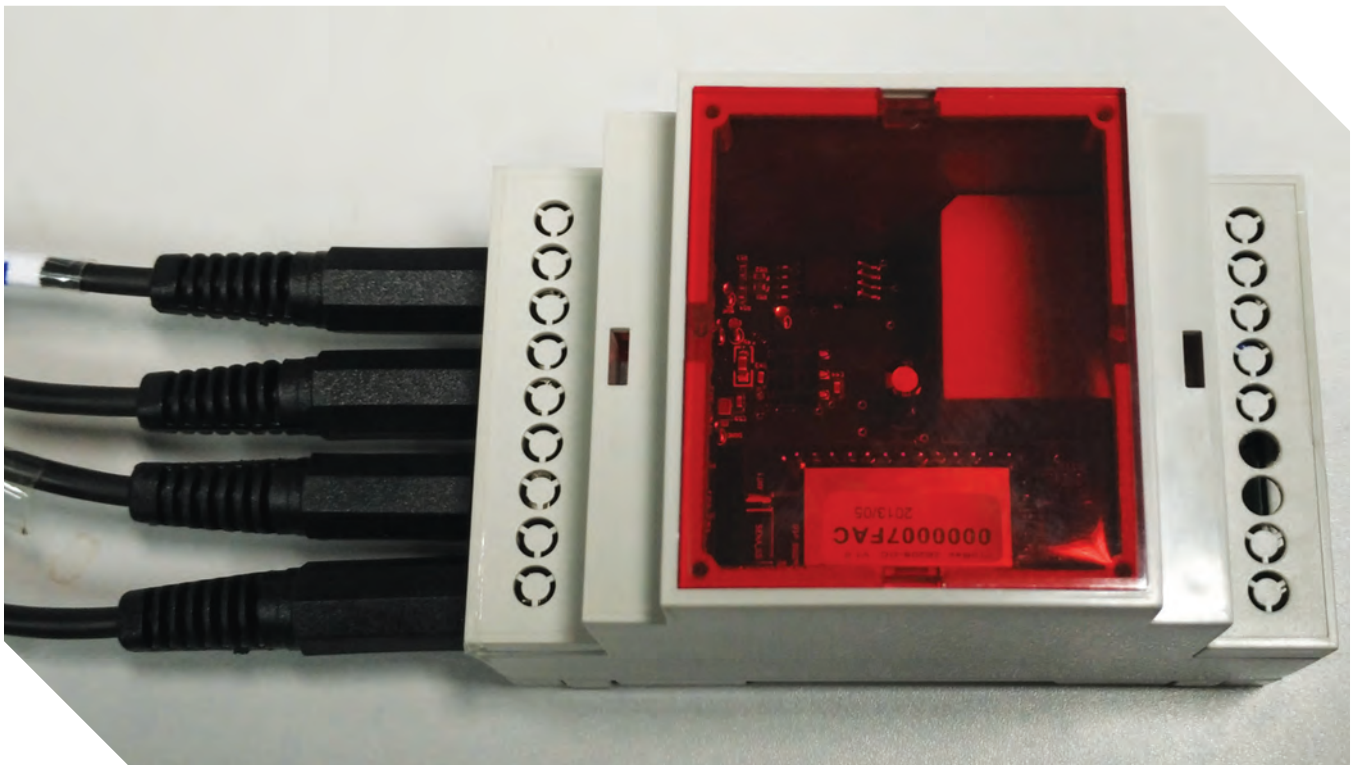
Dorothy Tan

Miniature Smart Gauge For AC Distribution Board

Singapore's electrical power system is moving towards a new smart grid system concept for a smart nation. This SP developed Miniature Smart Gauge (MSG) has a miniature size and din rail mounting case. It can measure up to four current channels with non-intruding current transducers (CT) and report data wirelessly.

Supervisors:

Wang Huaqian, Cai Zhi Qiang



Miniature Smart Gauge.



SP FABLAB

FabLab@SP began in 2011 and is the result of collaboration among School of Electrical and Electronic Engineering (EEE), School of Mechanical and Aeronautical Engineering (MAE), and Singapore Maritime Academy (SMA). It was conceived to allow staff and students to make "almost anything"



Personal Mobility Transporter

This project intends to develop a personal mobility transporter that can be deployed in applications with great distance between locations, and where the location itself might not be easy to find. The proposed system will be able to autonomously take the user safely between locations. The project is developed using ROS, which it is an open source library for the development of the robot control. The work here is to create the interface between the hardware and the planner of the task in ROS.



The students involved in the project and their vehicle.

Supervisor:
Carlos Acosta

Team Members:
Ho Ming Zhen, Ong Jian Wei,
Loke Zhao Fook

Electro-mechanical Shadow Puppet Show : Shades Of Change

SP's second year Engineering Academy students were tasked to design, build and present an Electro-mechanical Automatic Shadow Puppet show. The operations and sequencing of the motions of the puppets are controlled by micro-controllers. The group has chosen the storyline of climate change and the complacency that is fuelling it. The story begins with a lush, green landscape and, during the play, it is continually degraded to the point of becoming a landfill. The play is intended to be a cautionary tale, to warn viewers to respect nature and to act now when possible.



Electro-Mechanical Shadow Puppet Show.

Supervisor:

David Tan Soon Ling

Team Members:

Faruq Khan Bin Hayat Khan,
Lim Eun Gyu, Sng Kok Hng,
Lusung John Matthew Sicat,
Kenny Voo Tze Rung,
Manishpal Singh Dhadli



Portable Desktop Vacuum Former.

DIY Vacuum Former

This low cost DIY vacuum former can heat up plastic sheet and shape it into a mould. It is fitted with an electric ceramic heater controlled by a microchip ATmega 328. The machine was designed with the intent of using materials which are cheap and easily available. Design softwares used include Fusion 360, Corel draw and Eagle.

Supervisor:

Louis Goh



CLEANTECH & BUILT ENVIRONMENT

- Design and Fabricate a Seeding Device for Hydroponic Planting
- GreenTech SRV
- Operation and Maintenance of Hawker 700 APU (Aux Power Unit)
- Quantum Train



HEALTHCARE & WELLNESS

- LECA Automatic Dispenser
- QuicStepz
- T.E.G



INDUSTRIAL & AUTOMATION

- Electric Skateboard
- Fabrication, Characterization and Analysis of Sandwich Panel
- Fire Rescue Surveillance Drone
- Heavy Instrument Transfer Device
- NDT of Aircraft Composite Components
- On-machine Non-contact Dimension Measurement System
- SEW Wireless Charging AGV
- S-trolley with Inserts through Tailed Fibre Placement



INFOCOMM & MEDIA

- Aero Educatrix
- Design and Fabrication of a Small Wind Tunnel for Flow Visualization
- Engineering Escape Room - Mobile Game Kit
- VR Classroom for Gas Turbine Engine



TRANSPORT & MOBILITY

- Aircraft Landing Gear Simulator
- Composite Component for an Aircraft Seat Structure
- Design and Analysis of UAV Wing
- Flight Simulator System
- Mini-drone design
- Project Recovery
- Project Whisper
- Reconfigurable Tube Transport System
- SICK Autonomous Transporter
- Structural Analysis and Testing of the Volocopter Structure

OTHER EEE PROJECTS



CLEANTECH & BUILT ENVIRONMENT

- A Smart “Grid” system
- Contactless Charging for Electric Vehicle
- Curved Treadmill With Additional Sustainable Energy Features
- Cyclight
- Eco Friendly Mobile Toilet
- ECO Power Bank
- Efficient Solar Powered Plant Watering System
- G-Cycle
- Irrigation System Using Solar PV
- Portable Battery Powered Fridge (Camper Cool)
- Power Generation from Incinerator Plant
- Project Sundisk
- Ready Set Glow
- Rear View Camera & Telemetry System for Electric Vehicles
- Smart Electrochromic Window
- Solaquarium
- Solar Powered Aquaponic System
- Solar Powered Garden
- Solar Powered Laser Harp
- Solar Powered Lighting and Charger
- Solar Powered Transfer System (Electric Vehicles)
- Solar-Powered Mug With Auto Stirrer
- Study on Performance of Small Grid-Tied PV System
- Water-Based Paper Shredder
- Wireless Data Report for Miniature Smart Gauge



HEALTHCARE & WELLNESS

- A smart Healthcare Alert system
- Aim to Recover
- Ambisonic Microphone for Sound Localization
- An Internet based remote health care monitoring device for elderly at home
- An Wireless Wearable (Flexible Circuit) EMG Device for Rehabilitation
- Electronic Gadgets (FPGA Based) to Promote Healthy Living
- Image Processing Tools 3D Wound Analysis
- IoT in Healthcare
- Musical Therapy Glove
- RILEE Therapeutic Pet Robot
- Smart Rehabilitation Device
- Voice Controlled Household Robot
- Wearable Technology for Health Care
- Wetness Alarm for Patient Care



INDUSTRIAL & AUTOMATION

- A Demo System for Engineering Promotion
- Aerial Surveillance for Electrical Installations
- Automated Solar Irrigation System
- Automatic Hydroponic Aquarium
- Autonomous Underwater Robot
- Climate Control System
- Control System of Fish Farm
- Demo-System for Engineering Promotion
- E-Piggy Bank
- Easy Eyes
- EZseats
- Flexible Sensors
- FPGA Interface with Camera for Colour Detection
- FridgeBud
- Guitarduino!
- Health Alert System for Singapore Lifestyle
- Hit Sensor cum Heat Signatory
- i4.0 -- Mobile Manipulator
- i4.0 Handy Web
- Industry 4.0 Port Automation
- Intelligence Monitoring System for Bicycle Parking
- Intelligent Traffic Light
- Localising 3D Printing Pancake Machine
- MEM-Based Laboratory Experiment
- Portable IC Tester
- Remote Monitoring and Control in Smart Home
- RoboCup CoSpace Logistics
- RoboCup CoSpace Rescue
- SAW Filter Wafer Through Silicon Via
- Smart Automated Watering System
- Smart Campus (SPBites)
- Smart Electronic Controller
- Smart Sensor for Predictive Monitoring
- Smart Service AGV - Master PLC SCADA System
- Smart Storage System
- Social Receptionist Robot
- UAV Battery Swapping Station
- Uniform Smart Sensor Disc for Any Fixed Deployment such as Carpark Tracking System
- Vision Enhancement for Underwater Imaging

OTHER EEE PROJECTS



INFOCOMM & MEDIA

- A Web-Based Market Data Distribution System
- Attendance Marking with Beacon
- Automated Housekeeping Solution(2) for D’Kranji Farm Resort
- Bus Stop!
- Cloud-Based Tracking Application
- Crowd Monitoring in SP Food Courts with Video Analytics
- Cut Queue
- Embedded Network for Rehab
- Environment Monitoring with IoT
- Equipment Retrieval and Return System for Fast Response Car (FRC)
- ezlife at Home
- Fit Buddy
- Food Waste Management Apps
- HomeSafe
- Hospital Patient Tracking
- Identification of Fibre Routing Single-Point of Failure (SPOF) in IP network (Part 2)
- Intelligent Home System
- Intelligent Monitoring and Communications Assets for Data Centers
- Intelligent Sensor Network
- IoT Enabled Security System
- MA Apps
- Machine Monitoring
- Mobile Application for Coaching Purposes
- Mobile Car Companion
- Rainbow Wristband
- Rat Trap
- Reach Out!
- Safety Gadget for E-Scooter
- SCS App
- Sensor Network Powered from Harvested Energy
- Smart Locker
- Smart Office
- Smart Parcel Kiosk
- Smart Safety Cone for Work Site Deployment
- Smart Sensor Network
- Smart Storage & Charging System for PMD (Personal Mobility Device)
- SP EEE Student Help Page
- SP-App
- Support Centre Situation Awareness
- Table Management System
- Tag Your Tutor
- Virtual Assistant
- Wheelchair Tracking System III
- Wireless Network Site Survey Application



TRANSPORT & MOBILITY

- Aerial Saver
- Aircraft Fuel Quantity Measurement System
- An UAV with Video Surveillance of Mosquito Breeding Ground
- Autonomous Aerial Vehicle Challenge (AAVC) Multicopter for 3D Reconstruction and Target Localization
- Autonomous Carrier
- Autonomous Security Surveillance Airship Carrier Phase
- Autonomous Transporter
- Divinus-2 UAV for AAVC 2017
- Drone for 3D Reconstruction
- Drone with Leds
- Drones for Cluttered Pipelines Inspection and Land Precisely on Target
- Flying Fish
- Indoor Aerial Drone Show Using Precise UWB Positioning System
- Indoor Fully Autonomous Flying Machine for Singapore Amazing Flying Machine Competition (SAFMC) 2018
- Indoor Precise Landing Air Drone
- Outdoor Drone
- Singapore Amazing Flying Machine Competition Cat E
- Swarm Aerial Performance with Multiple Land-Air Drones by an Indoor Positioning System (using UWB)
- Target Drone
- Terrain Mapping Drone
- UAV Inspection of LRT Tracks



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For more information, please visit <https://industry.sp.edu.sg/contact-us/>

