



ASRC Staff at Lufthansa Technic Shenzhen, China

## Visits to the HAECO sites in Xiamen and Jinjiang, China

Staff from the ASRC had the opportunity to visit the various HAECO entities located in Xiamen and Jinjiang in the middle of June. There are altogether 5 separate HAECO sites within the region, where they offer a comprehensive MRO service portfolio comprising airframe services, line services, parts manufacturing, engine services, landing gear service, composite repair services, technical training and private jet solutions, all of which are underpinned by a strong track record for high safety and quality standards with competitive turnaround times and on-time delivery. We were fortunate indeed to have the opportunity to visit all the sites and review the implementation of ASRC projects whilst collecting new problem statements relating to day to day pain points, as well as long term strategic goals and ambitions, for further evaluation enabling R&D project proposals. ASRC staff were also able to share previous and current technology solutions with HAECO staff to help fuel ideas and assist in further collaboration. Over the course of three full days, staff met with senior managers from all of the entities, as well as navigate the facilities hosted by engineers and technicians to help familiarise the ASRC Team with current operations. The scale of the operation and enthusiasm of the workforce is extremely impressive, and set to grow further as part of the new Xiamen Airport Project.



## In this big issue

- HAECO Xiamen site visit **P.1**
- Aero Engines Asia Pacific **P.1**
- Sustainability Corner - ASRC future **P.2**
- Project Descriptions **P.2**
- Membership benefits of the ASRC **P.3**
- ASRC Equipment — DJI Drone **P.3**
- Aviation Classics **P.3**
- Asian Airline Profile **P.3**
- Staff Profile **P.4**
- Activities this period **P.4**
- Social Media Notes **P.4**

## AeroEngines

ASIA-PACIFIC

This event sponsored by our partner HAECO, stands as the sole conference devoted to exploring the trends and challenges within the region's aero engine sector, annually bringing together a diverse group of professional industry representatives from airlines, OEMs, MROs, and suppliers. This year, the conference took place at the Renaissance Harbour View Hotel in Hong Kong, on April 24-25, with an ASRC representative in attendance. This event offers an unparalleled platform for industry leaders and emerging talents to exchange ideas, share insights, and foster potential collaborative opportunities, thereby boost the development of the regional aero engine community. Additionally, it enables ASRC to stay abreast of the latest industry developments, network with partners and potential collaborators, and further equip ourselves to deliver world-class commercial aircraft MRO & Manufacturing solutions across the region.



ASRC Staff won 2nd Runner up in Photo Competition

## Membership Benefits of the ASRC

Organisations that join the ASRC as members have a primary involvement in Aviation MRO or Aerospace Manufacture, or whom could benefit from the application of the technologies developed from fields of research in support of these areas where they may be commonality, such as energy, marine, and other forms of transportation.

If you feel you are in one of these categories and would like more information on the benefits and details on how to join or cooperate with the ASRC, please contact us via Mr Robert Voyle, CEO [robert.voyle@polyu.edu.hk](mailto:robert.voyle@polyu.edu.hk), or take a look at our website [www.asrc.hk](http://www.asrc.hk).

There are different levels of membership and working relationships that have varying levels of access to research at the ASRC. Almost certainly there is a membership level or collaborative opportunity that is a good match for your organisation.

## Aviation Classics - The 'Super Guppy'

An interesting piece of aviation history is the transport aircraft known as the super Guppy. There were five such aircraft produced, with one being called the 'pregnant guppy'. At present three are on display, one is scrapped and one is still in service with NASA and has even been used on the Artemis Programme.



The aircraft is based on a Boeing 377 stratocruiser which itself was based on a WW2 B-29 'Superfortress'. This fascinating and unusual aircraft has been in operation for over 60

years and was the inspiration for the Airbus 'Beluga' transport aircraft which like the Super Guppy ferries aircraft parts around the various sites involved in the construction and assembly of aircraft. The Guppy though has been recently used predominantly by NASA for transport of Rocket parts.



## ASRC Equipment Update - the DJI Drone

ASRC have recently purchased a DJI Matrice 350 RTK 'Small Unmanned Aircraft' or *Drone*. The drone will be equipped with a hyperspectral camera from Specim in order to record images of aircraft fuselage and potential damage. We may convert the drone to carry the Goldeneye 'Bayspec' Hyperspectral camera which uses a 'snapshot' technique via a Fabry-Pérot Étalon to collect a hyperspectral image.



At present two staff are involved in training for piloting the drone and collecting images with the cameras. The drone is very powerful and great care must be exercised when flying the camera to ensure that all staff in the workshop are aware of what is happening. At present we are restricted to flying inside the Workshop and not outside with GPS support.

## Asian Airline Profile



Asiana Airlines was established in 1988 and became a member of Star Alliance in 2003. Their motto is to provide high quality of service to reach the greatest safety and customer satisfaction. Asiana Airlines has routes for more than hundred destinations, which initiate them to become a global airline.

Asiana Airlines owned several Boeing's aircraft like B777-200ER and B767-300, those aircrafts formed some designated pet seating for pet lovers and priority seating for specific occupation such as firefighter, military and police.

Recently, staff of Asiana Airlines uploaded a dance cover of "Goodnight Ojosama" and attracted numerous audiences' attention. Several airlines followed this trend and uploaded various version of this dance cover to enhance their reputation.

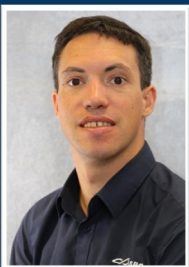


## Sustainability Corner

Charting the path towards a sustainable future at the ASRC

As one of our staff followed a sustainability course, and as our engineers take part in international conferences where this topic becomes pivotal, we can proudly say that the awareness on sustainability requirements is raising within our organisation. Our historical partners put a growing emphasis on it and the Hong Kong Polytechnic University is committed to ambitious yet pragmatic goals. The short-term goal is to achieve 20-25% carbon emission reduction by 2028, followed by long term carbon neutrality by 2045.

We are a relatively small entity within PolyU, however the ASRC is committed to fully contribute. We already consider the ESG goals in our project deliverables. And this quarter, we have started to work on our own journey to sustainability. Like all PolyU departments and SMEs in Hong Kong, we must use resources more efficiently to reduce our energy consumption, and eventually reduce our carbon emissions. In the future, we might have to create our own sustainability report and substantiate all our claims. Therefore, we launched the definition of our ASRC Sustainability Action Plan (ASAP). A brainstorming session involving all staff took place in June and a large number of suggestions were gathered, and added to our existing Ideas to Decarbonize the ASRC List (IDeAL).



Mr Nicolas Detalle is a PRF in the Data, Materials and Instrumentation Stream of the ASRC



## Project Descriptions

### Aerostructure Digital Twin (AeDiT)

Recording and displaying the history of maintenance on an aircraft is presently very much a paper legacy process. However there is a push within the MRO industry to implement a platform based software system to record, display and communicate maintenance activities on the airframe. The ASRC have recently commenced a project to develop a better way to record this data. We will investigate novel methods of damage detection such as terahertz imaging, active thermography, ultrasound, enhanced visual methods and hyperspectral scanning with a drone. The data will be recorded and displayed on a 3D model of the aircraft. Once completed, the CAD model will be used to accurately record a maintenance activity with the option of sharing the data with the OEM should stress analysis be required when considering the repair.

### Aircraft Coating and Paint Analysis

The project will use various sensors to assess the integrity and quality of the paint and coating on the airframe such as multispectral, terahertz and ultrasound imaging in addition to thermal and optical cameras. It will also use machine learning to assess the level of degradation and even the likely cause of the problem. AI will also be used to determine a generic formulation for the mixing of paint for repair of aesthetic damage to the exterior and interior of the aircraft.

For these new government-funded projects, the ASRC is looking to hire Postdoctoral Fellows and Research Assistants. The appointment period is twelve to twenty-four months. A highly competitive remuneration package will be offered.

More information about the duties and qualification on our ASRC Career page: <https://www.asrc.hk/career.html>

### Recycling Metal Chips into AM Feedstock (ReCAM)

During aerostructure and aeroengine manufacture of monolithic parts a large amount of swarf and machined chips are produced, due to as much as 95% of the raw material being removed to create the part. The material removed is typically recycled to produce other components of lower value and specification. The RecAM project aims to test out alternative methods of recycling chips into fine precision powders to be used in additive manufacturing processes such as SLM, DED and Cold Spray. Powder will be produced using conventional methods and material properties compared with standard powders, as well as recycled powders produced from Atomisation and Hydrogenation—Dehydrogenation ball

### ITC-ITF / ASRC Member Funded Open Source Project Dissemination

### Laser Paint Removal

### EcoSocialSustainability (L-PRESS)

This project aims to reduce the burden of gases and smells which are by-products of laser removal of paints. To make this process adapted to an enclosed environment, fumes and gases must be avoided.

This project will help identify, in real time, the nature of the volatile elements. For this, equipment is currently on order, namely a LIBS (Laser Induced Breakdown Spectroscopy) handheld device and a multi-gas monitor with switchable sensors. This is the first step to allow one second measurements.

The second step is to capture the volatile elements efficiently so that they can be brought to a treatment area fitted with appropriate charcoal filters and absorption equipment.

### Intelligent Wire Arc Welding Additive Manufacture (iWAAM)

Welding is used as additive manufacturing (AM) process in MRO and its subsequent machining process depends on component damage's geometry. This project's objective is to design and develop an intelligent arc-welding additive manufacturing system for engine components. AM techniques and advanced automated nondestructive inspection (NDI) techniques will be applied to ensure consistent welding quality, so that components can be rescued and scrap reduced. Advanced thermal imaging will give real time pictures of the weld pool. The advantages of the Wire Arc Additive Manufacturing (WAAM) processes include high material utilization and deposition efficiency, low production cost, and versatile equipment.





Shing Lam



WW Ng

## Staff Profiles:

### Mr Shing Lam and Mr WW Ng

Each department and all the included equipment needs to be “serviced” with electricity, such as computers, printers, electronic devices etc. Should electricity issues occur, the productivity and efficiency of staff will be reduced.

The electrical maintenance of our project and office equipment is supported by Mr Shing Lam and Mr WW Ng. WW joined Vocational Training Council (VTC) as a senior technician in lab development with a degree in Electronics, he then took a Master of Education and became a lecturer prior to joining the ASRC. Shing joined Calbee Four Seas Company Limited as a Senior Technical Officer, he read a degree in Applied Science (Aviation) in 2018 while working in ASRC.

Shing and WW are invaluable team members of the Robotics and Automation stream, who utilize their professional knowledge and experience in our day to day project activities. Currently they are contributing on several government funded and closed-source direct funded projects with industrial clients.

# Activities/ Visits

## APR

- Xuzhou Municipal Government
- HAESL Annual Dinner
- Aero Engines Asia Pacific
- Cathay Pacific Pilot Cadets
- Shaw Foundation
- HAECO Group Safety and Environment

## MAY

- Lufthansa Technik Shenzhen
- MTR Corporation
- CNERC-Rail
- Liechti GF+ Machining Solutions
- HKPC International Conference
- Charting the Path ESG Policies & SMEs in Hong Kong's Green Finance Journey

## JUN

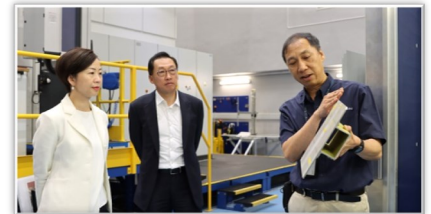
- CAS Space
- COMAC
- HAECO Xiamen and Jinjiang
- Xiaoqing Government Delegation
- Guangzhou Innovation Enterprises
- Hangzhou Government Officials
- EEE Lab Opening Mainland Visitors
- Jiangsu Province Government Officials



GF+ Machining Solutions



HAESL Annual Dinner



Shaw Foundation



CAS Space



HAECO Xiamen visit

ASRC News Issue #21 April 2024 — June 2024

Aviation Services Research Centre  
Block X  
Hong Kong Polytechnic University  
11 Yuk Choi Rd, Hung Hom  
Kowloon, Hong Kong  
T: (852) 2766 7599  
F: (852) 3011 3348

[www.asrc.hk](http://www.asrc.hk)



### The ASRC on Social Media

ASRC maintains six active social media accounts, namely 'Facebook', 'LinkedIn', 'Website', 'WeChat', 'YouTube' and 'Instagram'. These are updated regularly with project status, visits to the centre, as well as special events. These sites enable increased engagement with our clients, industry and our local community, and allow followers to keep up with our activities.

Check it out!

