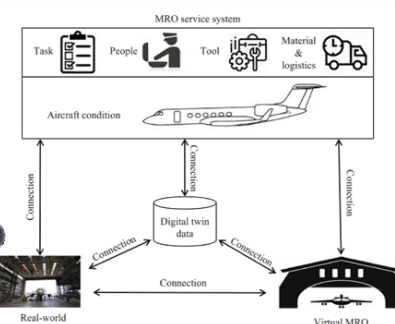
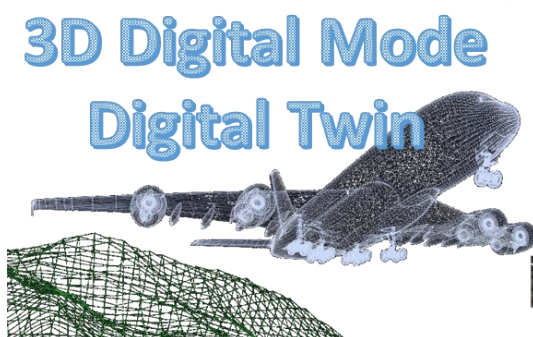




ASRC Staff at the Hong Kong SAR establishment Day Flag Raising 1st July

Projects Old & New

Despite the restrictions of past years the ASRC has been engaged in delivering government funded ITC projects and closed source projects for members. Government-funded projects from the previous round of funding have all been completed. These were the Cold Spraying Material Deposition project, the Machining Distortion Minimisation (MDM) project and the Radome Assessment and Transmission Test System (RATTS) project. The Cold Spray system is now part of a research collaboration with the CEE Dept in the University, and the Radome Testbench is being fine tuned with a view to commercialization. As for new project proposals, these were submitted over the past two years and despite the challenges faced over this time, the ITC were ultimately able to support a number of projects going forward. Thus far, two new projects have started in September; these are the Aerostructure Digital Twin (AeDiT) predominantly for HAECO and the Intelligent Wire Arc-welding Additive Manufacturing (iWA²M) predominantly for HAESL. Both of these projects will be running for two years. More information about the project objectives on Page 2. There are five projects still waiting for confirmed funding within the next quarter from the last round of funding submissions.



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This edition of the ReThink HK exposition took place on September 14-15, and the ASRC attended with one representative. This event held yearly at the Hong Kong Convention and Exhibition Centre is intended for sustainability practitioners, and those responsible for researching and resourcing net-zero and corporate environmental, Social and Governance (ESG) strategies.

The event is to help demonstrate the business case for a just and sustainable transition, supported by real solutions that will accelerate Hong Kong towards a more sustainable and resilient future.

By attending the expo, we are starting our journey in expanding our sustainability profile and ensuring our projects meet our clients goals regarding sustainable growth. To explore further, there will be a need to setup cooperation with other sustainability leaders in our industry.



8th group of Cathay Pacific Pilot Training School Cadets to have visited the ASRC this year

Membership Benefits of the ASRC

Companies who join the ASRC as members should have a primary involvement in Aircraft MRO or aerospace manufacture or should benefit from involvement in technologies which may spin off from these fields of research and development.

If you feel you are in one of these categories and would like more information on benefits and details on how to join, have a look at the website at www.asrc.hk or contact our CEO, Mr Robert Voyle (robert.voyle@polyu.edu.hk).

In principle there are different levels of membership with different levels of access to research in the ASRC. Almost certainly there is a membership level that is a good match for your company.

Aviation Classics, Bristol Britannia



As one of the last turboprop airliners before the kick-off of the jet age, the Bristol Britannia was a spacious and luxurious airliner. It was designed predominantly for transatlantic flights, and was capable of carrying up to 139 passengers in a comfortable and well-appointed cabin. It was renowned for its smooth flight characteristics.

The four turboprop engines allowed for an impressive range and fuel efficiency when it was first delivered to BOAC in 1955. Moreover, the aircraft featured advanced noise reduction technology, making it one of the quietest commercial airliners of its era.

Despite its initial success, the Britannia faced increasing competition from jet-powered aircraft such as Douglas DC-8 and the De Havilland Comet 4 and the Boeing 707 and production ceased in 1960.

Today, only a few preserved examples of the Bristol Britannia can be found in museums around the world, serving as a reminder of its contribution to aviation history.



Ongoing maintenance on the large turboprop engine
Photo: Chrissie Eaves-Walton

Asian Airline Profile



Scoot is a low-cost airline based in Singapore, and a subsidiary of Singapore Airlines. Since the start of its operations in 2012 with a fleet of Boeing 777 aircraft, the airline has aimed to provide affordable travel options to passengers in the Asia-Pacific region, primarily from its hub of Singapore Changi Airport. Some popular destinations served by Scoot include Bangkok, Tokyo, Sydney, Athens, and Honolulu, among others.

Scoot prides itself on its unique brand personality, known as 'Scootitude'. It aims to provide a friendly, contemporary, and fun travel experience to its customers. With its purple-themed branding, cheerful crew, and informal atmosphere, Scoot aims to create a relaxed and enjoyable journey for passengers. It is an airline for the young and the young-at-heart.

ASRC Equipment - LiDAR Neuvition Titan M1-A

The ASRC recently took delivery of a light-weight high precision LiDAR from supplier Neuvition. It is a camera used to determine ranges by targeting the objects with a laser. An array of points is created after measuring the time for the reflected light to return to the receiver and this point cloud can be displayed in any 3D environment.



This model has a field of view of 45° horizontally, 25° vertically and a resolution of 1750 x 700 (1.225M pixels) to achieve a precision of ±5mm.

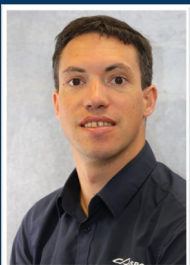
The ASRC will initially use this LiDAR equipment for the Aerostructure Digital Twin (AeDiT) project. Its main application will be to scan aircraft structures to reconstruct the airframe and to rapidly obtain 3D models of the areas of interest. With a weight of only 1.65kg, this LiDAR can be set up inside MRO hangars easily to obtain a 3D view of the maintenance areas, or to record movements around the aircraft so that the floorplan can be organized best. This will be for a future research project that the ASRC has just submitted.



Sustainability Corner

Our continuing look at Sustainable Aviation Fuels Continued from last issue. Now read on...

SAF has properties very close to fossil fuel, and therefore can replace fossil fuel faster than any other technology. And the lawmakers are now pushing for it. End of April this year, the European Union has set binding targets for aircraft operators to use at least 2% of SAF in 2025, rising to 6% in 2030, 20% in 2035 and gradually increasing to 70% in 2050. From 2030, this includes a minimum share of synthetic fuels as well, which will reach 35% in 2050. Incentive programs for production of SAF are now being discussed, and these will be needed, as for the moment SAF is only produced in tiny quantities and its price is far higher than conventional kerosene. But there is no doubt that innovation will be facilitated, resulting into a scale-up in production and ultimately a reduction of the costs. SAF will eventually become more competitive but it is not so easily done and there are technical challenges linked to the implementation of SAF. Although it is true that jet engines can accommodate a small amount of SAF mixed with kerosene, further studies are necessary to ensure full compatibility in the long term. For example, biofuel absorbs moisture more than fossil fuel does, and this can start causing corrosion over time if components are not treated for biofuel usage. Moving towards this objective, BOEING has recently launched the Jet Reference Fluid (JRF) initiative and has held a "100% SAF Compatibility Supplier Symposium" last April. Data and resources are becoming available so that all actors can work on the adoption of SAF. The ASRC is also now studying aviation sustainability and willing to align to the industry's objectives to launch a project proposal on this topic. We are only at the beginning of the journey towards sustainable aerospace industry, and this is a topic in which our research centre wants to contribute.



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

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. Generation of the model will commence by lidar scanning of aircraft and on wing measurements to establish the location of stringers etc. 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.

With a fully populated CAD model, some AI technology can be used to attempt to predict any unscheduled maintenance in the future. This data will be of great use for the MRO and the operator of the aircraft.

Project Descriptions

ITC funded Open source projects underway in the ASRC

Intelligent Wire Arc Welding Additive Manufacture (iWA²M)

Welding is used as additive manufacturing (AM) process in MRO and its subsequent machining process depends on component damage's geometry. This project objective is to design and develop an intelligent arc-welding additive manufacturing system for engine components. AM techniques and advanced automated non-destructive inspection (NDI) techniques will be applied to ensure consistent welding quality, so that components can be rescued and scrap reduced.

Automated WAAM protects operators from hazardous torch light and toxic fumes. The proposed system will speed up and optimize WAAM process and increase the process capacity of local MRO industry. This technique is targeted to critical components in transportation, energy industry and may also be applied to marine propellers and chassis strengthening for automotive.

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>

Visit to Cranfield University in England

The CEO, Robert Voyle, visited the Digital Aviation Research & Technology Centre (DARTeC) of Cranfield University for their Aviation Digital Technology Management Day. The 2022-23 cohort of their MSc in Aviation Digital Technology Management presented their thesis research. With themed presentations in:-

1. Predictive Maintenance Use Case and Data Skills Development Plan.
2. Transfer and Integration of MRO IT Data across Multiple Platforms.
3. MRO Hangar Technology Evaluation and Business Case Process.

There was a review of the state-of-the-art of each area and recommendations for industry adoption. With many of the themes very familiar, and similar to projects we have worked on at the ASRC over the years. We are acutely aware that adoption is the big challenge to achieve the cost benefit required. We look forward to potential future collaborations and some student exchange programs for Digital MRO.





Sonia



Candy

Staff Profiles: Ms Sonia Lee and Ms Candy Ho

The beating heart of the ASRC

Whilst up front in the offices, labs and workshops we find a range of dedicated scientists, engineers and designers, it's a well known fact that in order for any activity to come to realisation, for any project to get started and for any purchase to proceed we rely totally on the administrative skills of our Executive Officer and Assistant Executive Officer.

Sonia and Candy are relatively new additions to the staff with just over a year of service. They have, however, in this short time discovered how to get the job done and how to do it efficiently. They are the tower of strength that the CEO and all staff rely upon on a daily basis.

Sonia joined us direct from the Lingnan University where she was an AO whilst Candy came to us from HKU SPACE as an Executive Assistant.

Their experience in University administration has proven to be a positive advantage as they settle into the administrative system of the PolyU.

Keep up the good work ladies!

Activities/ visits

- 4 JUL China Space Group
- 4 JUL Wuxi District
- 4 JUL Dao Fu Tooling
- 12 JUL HAECO Group I&T
- 20 JUL Air China
- 20 JUL PreCit
- 26 JUL HAECO LGS
- 31 JUL Cranfield University
- 4 AUG HKATG and ALLITE Inc.
- 4 AUG PolyU alumni
- 4 AUG SKLUPM
- 7 AUG Cathay Pacific Cadet Pilots
- 7 AUG Harbin Institute of Technology
- 23 AUG HAECO CRO
- 26 AUG Shandong Officials, China
- 12 SEP Visit to Ningbo
- 14 SEP Guangdong Officials
- 14 SEP ReThink HK Expo
- 15 SEP Nanjing University
- 25 SEP MRO Asia-Pacific Dinner
- 26 SEP MRO ASIA
- 26 SEP BoG and Boeing President visit
- 25 SEP Boeing Technical Visit



ASRC and HAECO Staff at MRO Asia in Singapore



ASRC Staff and Prof MAN in Ningbo



President of Boeing China, (center) and Boeing staff

The ASRC on Social Media

ASRC maintains four active social media accounts, namely 'Facebook', 'LinkedIn', 'YouTube' and 'Instagram'. These are updated from time to time after visits and special events in the centre. As we bounce back from the past couple of years these sites have started to update more often to allow followers to keep up with our activities. Check it out.

