

## Boeing Reps from USA and China visit for first time in 3 years

Mr Arnie Lewis, Dr Helen Lee and Mr Luo Wu (pictured) were part of a team that visited the ASRC for one week in early March to reconnect, post pandemic. Other representatives included Mr Ben KY Lee and Mr Colin McNally. Great to have our Boeing partners back in Hong Kong.

During the week long meetings both sides had the opportunity to catch up and to exchange ideas. Several formal meetings were held to update each other on the new directions of both Boeing and the ASRC. On the final day a large Technical Committee meeting was held in person for the first time in three years with staff from HAECO and HAESL joining Boeing at the ASRC.

During the course of the meetings the ASRC outlined the core competencies of the unit and formalised a five year plan with Boeing. We feel it was a very productive week and we look forward to further face to face meetings in the future.



Zhuhai Science and Technology staff visited the centre in February and March to explore opportunities for co-operation.

Zhuhai is not only an active airport for commercial and military aircraft but is set to become the proving ground for UAM technology in the region with start up companies setting up in the area to explore drone and UAM operations.

The visitors were most interested in the activities of the ASRC.



Cathay Pacific Graduate Trainees visited the Centre as part of their exposure to all aspects of the aviation industry. This year the ASRC are hosting three visits from the Cathay Pilot cadet program run jointly by the PolyU and Cathay Pacific Airways.

The students toured the facility and were introduced to the many novel technologies used by the ASRC as well as the traditional inspection techniques.



## VISITS



Mr Richard Sell, the new CEO of HAESL visited the centre in January to familiarise himself with the activities of the ASRC. Mr Sell toured the facilities with Mr Voyle. HAESL are very interested in the work of the centre on BLISK and BLISK repairs in addition to the development of the cold spray cell.



Wuxi city government officials visited the centre in March with Professor MAN to find out how the ASRC contributes to the University research programmes



## New Uniforms for a New Phase

As the ASRC enters a new decade of its partnership with Boeing and the HK aviation industry, a new set of uniforms has been unveiled for staff.

We now have formal white shirt with the blue logo, a semiformal dark shirt with the white logo and a casual polo shirt with the white logo. Thanks to Jeff, Yandy and Shing for modelling, and Daniel for his photography.

## Reverse Engineering and surface reconstruction at the ASRC

In most instances of working on components in the world of MRO, individuals and entities do not have direct access to the original part drawings and 3D models. In some cases, the OEM developed the components without the support of a CAD software, and then the 3D models do not even exist. For this reason the ASRC staff have become very familiar with reconstructing engineering models of components found on airframes and aero engines.

There are a number of systems, commonly referred to as 3D scanners, which can be used to scan surfaces. Because the raw data obtained at

scanning is a cloud of points, dedicated software were also developed, which process the acquired data and render the curved surfaces in the form of adequately-sized triangles and sub-triangles. And this file can then be exported in CAD software, such as SolidWorks or CATIA.

For large components, the tool mastered by the ASRC is the *Creaform MetraSCAN750* with *HandyPROBE* and *Dual C-Track*. It is a stereoscopic imaging camera offering an accuracy up to 22µm for a measurement field of 2.9x3.7m (at 5m distance). A dynamic mode allows to scan while the component moves without losing accuracy.



To be useful, the surface model obtained from the CREAFORM software suite is then reverse engineered to obtain a 3D CAD model which can be imported into a robot programming & simulation environment.

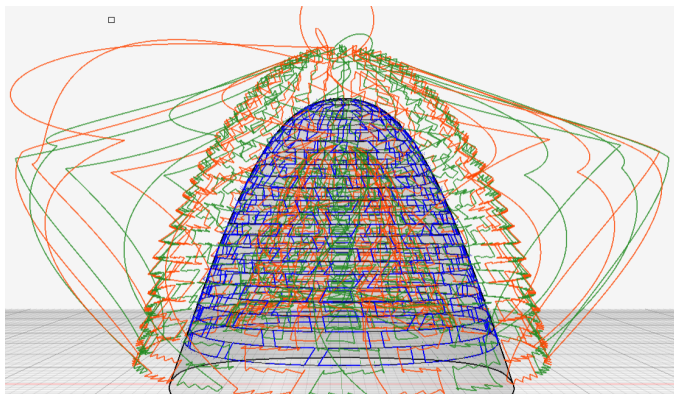
## 2023 Health & Safety Audit

As per the ASRC H&S Policy, every effort is made to ensure H&S of all staff and visitors. To confirm this, the yearly audit took place on March 8th and consisted of both facilities checks and documentation examination. For 2023, the PolyU auditor reported 2 Non-Conformances which were tackled by the ASRC directly afterwards: An area with too low headroom clearance was sealed-off and 4 new hearing protectors were purchased which are approved per HKSAR Labour Department. The audit team praised ASRC's best practices which are consistent with industry standards, such as the available Standard Operation Procedures and the H&S monthly report.

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Quote of the  
Month



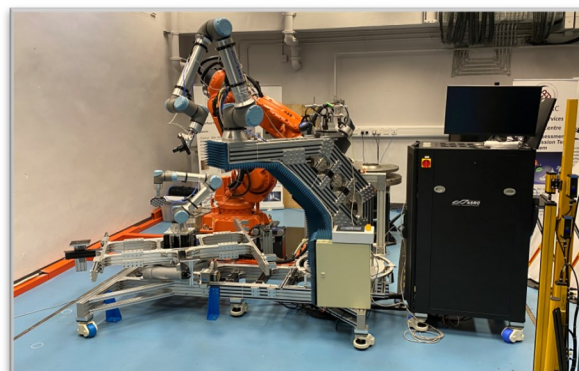




## Robotic Path Definition

Robots are smart equipment and one of the enablers of Industry 4.0. However, thoughtful programming and clever path definition by the development team are required upstream. The robotic path definition is one skillset that the ASRC is very proud of, and which is required for every project involving cobots or industrial robots. It is optimising their movements between all points and orientations that the tool will have to reach during process. The challenge is to make the robot movements as fluid and as short as possible without clashing the environment or the processed component. Although there is software which help in creating the path, the developer must control the definition exercise and consider all additional elements such as joints clashes, transitions between tasks, or cable management. The ASRC masters robotic path definition is various environments to apply on robots of different brands: ABB, Universal Robots, Han's Robot, Techman Robot and consorts.

## Radome Assessment and Transmission Test System (RATTS)



Work continues on the ITC funded RATTS project. Thus far we have produced a test rig that can rotate the radome with two robot arms to translate radar horns across the surface.

Variability and repeatability issues were tracked down one by one with cable lagging, bracing and radar horn coherence issues all contributing. Mechanical errors in the orientation of the radar horns were also chased away after repeatable measurements of the elements of the test jig and point-to-point measurements of the robot tool flanges separation where conducted. These measurements were done using our laser tracker system.

Stray EM signals are reduced to a minimum and the bandwidth allows only desired signal to be recorded.

The system is now almost ready to be declared complete.



## Nansha Government Officials

At the end of March a group of Nansha Government officials accompanied by PolyU and HKUST staff visited the centre to find out more about how ITC funding impacts research in the MRO field. The officials were interested in the symbiotic relationship between the Centre and local MRO industry.

## Wilbur Wright, Aviator

The desire to fly is an idea handed down to us by our ancestors who, in their grueling travels across trackless lands in prehistoric times, looked enviously on the birds soaring freely through space, at full speed, above all obstacles, on the infinite highway of the air.





Some thoughts from the CEO, Robert Voyle

We now have 10 years of research with Boeing behind us, we have moved out of the pandemic, we have a new corporate identity and are in a new phase of project funding submissions with the HK Government through the Innovation and Technology Commission.

We even have a new ASRC work wear!

It seems therefore a good time to change the layout of the Quarterly Newsletter. From here on we will focus on the achievements of the ASRC and stress our core competencies with a view to engaging in new collaborations with those interested in carrying out university level research with a unit who are fully industry focused on delivering impactful solutions.

The ASRC is open for research and open to business! Feel free to get in touch.



## Paint Mixing and Paint Analysis

A group of final year students are, at the moment, helping the ASRC by looking at the science of paint and pigment mixing. The students, under ASRC guidance, have been studying the reflectance of various colours under different light conditions with a view to categorise the reflections. They will then calculate the mixing using the colour parameters developed.

The students had a visit to the Hangars in Check Lap Kok to observe the current process used in HAECO.

## Hyperspectral Imaging

Staff in the ASRC have long been interested in the possibility of using hyperspectral imaging to check for lightning damage on aircraft, especially on fasteners in composite airframes. Recently we had a chance to spend some time on this topic, purchase some new lenses and a snapshot camera to augment our existing camera. Results are being analysed at present along with electron microscope analysis of the stoichiometry of the metals.



## A new Logo

Now that the ASRC has completed 10 years of its life with the Boeing company and our partners in HAECO and HAESL, we felt that it was time to relaunch the centre under its new management structure with a new visual identity to stress the new opportunities for members and others.

The new logo comes in ASRC Blue, Grey and pure white.

It features on documents, workwear and advertising from now on.

For the moment we will include the 10 year tagline celebrating the Boeing partnership.

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