

AEROSPACE

A regional publication of the Association of Aerospace Industries (Singapore)

SINGAPORE

MCI057/11/2021



PROPELLING WOMEN IN AVIATION

AeroNews

IATA Upgrades
Outlook for 2022

InProfile

Interview with GM of
Bombardier Singapore

AeroCommunity

Dawn of Commercial
Aviation in Singapore

AAIS

Aerospace Leaders'
Dialogue Singapore

Seletar Aerospace Park

Creating Value | Connecting Businesses | Building Communities



Creating Tomorrow's Industry Spaces
www.jtc.gov.sg



Passion
Made
Possible



Scan to find out more

MESSAGE



OPTIMISM DESPITE GATHERING CLOUDS

Aviation continues on its recovery path. The Omicron variant has sparked a wave of infections globally but is proving not to be as deadly as its predecessors. Hence, with the notable exception of China, most travel restrictions in the region have been lifted. Changi Airport is restoring destinations ahead of its Southeast Asian peers, with passenger traffic likely to have crossed the 50% mark versus 2019 levels by the time this gets published. Singapore Airlines has about 80% of its fleet back in service.

There is still the risk of new COVID-19 variants and fresh concerns over a monkey pox epidemic especially in Europe. Global food and fuel shortages, inflation, slowing economic growth and the war in Europe dominate headlines. Climate change continues to be high on the agenda for the industry and is concentrating minds on a new Long-Term Aspirational Goal to be tabled at the 41st ICAO General Assembly.

COVID-19 demonstrated that global crises need international cooperation to solve. The challenges above will likewise call for such cooperation. Let's hope the international community, including the aviation industry, is now in better shape to do so.

SIA KHENG YOK / Chief Executive, AAIS

CONTENTS

VOL 15 / NO.2 / 2022

AERONEWS

04

IATA Upgrades Outlook for Airline Industry's 2022 Performance

AERONEWS SINGAPORE

08

Singapore Aviation Industry Reiterates Commitment to Safety with New Charter

FEATURE

12

**PROPELLING WOMEN
IN AVIATION**

18



08



INPROFILE

18

BIGGER, BETTER, GREENER

An interview with Bombardier Singapore Service Centre General Manager Simon Wayne

INFOCUS

22

SINGAPORE AIRSHOW 2022

Aviation's Finest Meet, Painting Brighter Skies

26



AEROCOMMUNITY

26

Dawn of Commercial Aviation in Singapore

AAIS

32

AEROSPACE LEADERS' DIALOGUE SINGAPORE 2022

34

A roundup of recent happenings at the Association

32



PUBLISHER



Association of Aerospace Industries (Singapore)

Association of Aerospace Industries (Singapore)
www.aais.org.sg

Chief Executive
Sia Kheng Yok
sia_ky@aais.org.sg

Managing Editor, Aerospace Singapore
Ann Majid
ann@aais.org.sg

Director, Sales & Marketing / Head, Publications
Agnes Chua
agneschua@aais.org.sg

CONTRIBUTORS

Goh Yong Kiat
yongkiat.goh@gmail.com

EDITORIAL & DESIGN

Drummond Printing Pte Ltd
sales@drummond.com.sg

Photography
AEROPHOTOWORKS

Cover Photo
Lifestylememory via Freepik



AAIS PUBLICATIONS

AAIS MANAGEMENT COMMITTEE 2021-2023

President
Wong Yue Jeen
SIA Engineering Company Ltd

1st Vice President
Richard Wong
Pratt & Whitney Turbine Overhaul Services Pte Ltd

2nd Vice President
Mads Bondergaard
Airbus

Honorary Secretary
Lim Hee Joo
Wah Son Engineering Pte Ltd

Honorary Treasurer
Desmond Goh
Eaton Industries Pte Ltd

Assistant Honorary Secretary
Ekkehard Pracht
Liebherr-Singapore Pte Ltd

Assistant Honorary Treasurer
Yap Siok Leng
Meggitt Aerospace Asia Pacific Pte Ltd

Committee Members
Rahul Shah
AAR International Inc

Oliver Chamberlain
Rolls-Royce Singapore Pte Ltd

Matthieu Pere
Safran Electronics & Defense Services Asia Pte Ltd

Philip Ang
Singapore Aero Engine Services Pte Ltd

Kevin Chow
Thales in Singapore

Dr Kenneth Low
Singapore Institute of Technology

William See
Temasek Polytechnic

ASSOCIATION OF AEROSPACE INDUSTRIES (SINGAPORE)

690 West Camp Road, #08-08 JTC Aviation Two
Seletar Aerospace Park, Singapore 797523
Tel: 65 6922 1788 • Email: admin@aais.org.sg
www.aais.org.sg • www.aviationdirectory.biz
www.linkedin.com/company/association-of-aerospace-industries-singapore

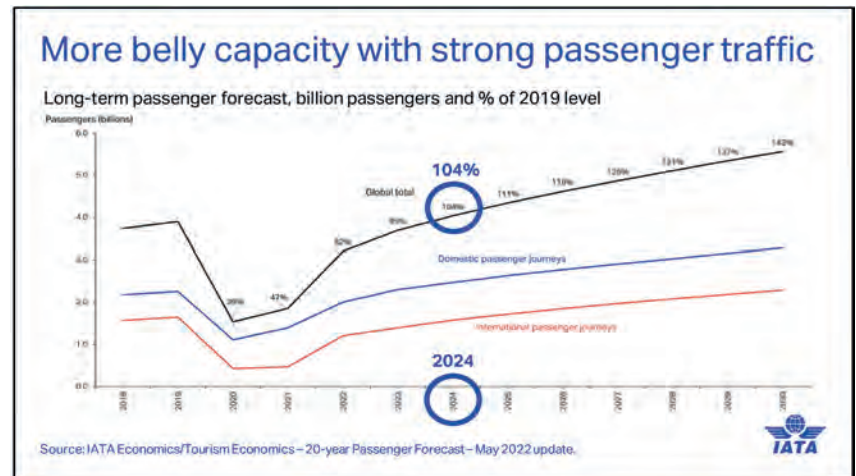
All rights reserved. Copyright 2022. Reproduction in whole or part of the magazine is strictly prohibited without the expressed permission of the publisher. The views of the contributors are entirely their own and do not necessarily represent those of the AAIS or the management committee. AAIS does not endorse any products and services featured in the magazine's advertisements except those in its own advertisements. AEROSPACE Singapore is printed by Drummond Printing Pte Ltd. MCI057/11/2021

IATA UPGRADES OUTLOOK FOR AIRLINE INDUSTRY'S 2022 PERFORMANCE

The International Air Transport Association (IATA) announced an upgrade to its outlook for the airline industry's 2022 financial performance as the pace of recovery from the COVID-19 crisis quickens. IATA's June 2022 projections anticipate industry losses to reduce to US\$9.7 billion, an improvement from their October 2021 forecast for an US\$11.6 billion loss. The projected loss is also a huge improvement from industry losses of US\$137.7 billion in 2020 and US\$42.1 billion in 2021.

IATA's outlook for various regions generally improved, although an uneven recovery was projected. North America is expected to continue to be the strongest performing region and the only region to return to profitability in 2022. Supported by the large US domestic market and the re-opening of international markets, net profit is forecast to be US\$8.8 billion in 2022 with demand (RPKs) expected to reach 95.0%, and capacity 99.5% at 2019 levels. In Asia-Pacific, enduring travel restrictions have seen the region lag in the recovery. However, IATA projects that travel demand will increase quickly as restrictions diminish with RPKs expected to reach 73.7% and capacity at 81.5% of pre-crisis levels.

Overall, strong pent-up demand, the lifting of travel restrictions in most markets, low unemployment in most countries, and expanded personal savings will fuel a resurgence in demand, according to IATA's analyses. Flights operated in 2022 are expected



Source: IATA (June 2022)

to total 33.8 million, which is 86.9% of 2019 levels, and passenger numbers are expected to reach 83% of pre-pandemic levels.

Cargo will remain a bright spot. Cargo volumes are expected to set a record high of 68.4 million tonnes in 2022 with revenues expected to hit US\$191 billion. This is down slightly from the US\$204 billion recorded in 2021, but nearly double the US\$100 billion in 2019.

According to IATA Director General, Willie Walsh, the challenge for 2022 is to keep costs under control. "As the industry returns to more normal levels of production and with high fuel costs likely to stay for a while, profitability will depend on continued cost control. And that encompasses the value chain. Our suppliers, including airports and air navigation service providers, need to be

as focused on controlling costs as their customers to support the industry's recovery," he said.

With the war in Ukraine keeping prices for crude oil high, IATA expects that fuel will account for about a quarter of costs in 2022. Jet fuel prices, in particular remain "well above historical norms", due to capacity constraints at refineries.

Labour is expected to be the second highest operational cost item for airlines. Direct employment in the sector is expected to reach 2.7 million, as the industry rebuilds from the significant decline in activity in 2020. IATA anticipates that in economies where recovery from the pandemic has been swift and the unemployment rate is low, tight labour markets and skill shortages are likely to contribute to upward pressure on wages.

EASA PROPOSES FIRST REGULATORY FRAMEWORK FOR URBAN AIR TAXI OPERATIONS

The proposal is a big step in establishing a regulatory framework for the safe operation and certification of Vertical Take-off and Lift (VTOL) aircraft in cities



The European Union Aviation Safety Agency (EASA) has published draft rules for the operation of air taxis in cities, the first comprehensive proposal for such regulations to be issued world-wide.

The proposed new regulatory framework is open to public consultation until 30 September 2022, and covers the technical domains of airworthiness, air operations, flight crew licensing and rules of the air.

"With this, EASA becomes the first aviation regulator worldwide to release a comprehensive regulatory framework for operations of VTOL aircraft, which will offer air taxi and similar services,"

said EASA Executive Director Patrick Ky. "The publication reinforces the leadership EASA is showing in this area of innovation. At the same time, we have done our best to address general societal concerns and the expectations of EU citizens with respect to safety, security, privacy, environment and noise."

EASA's latest proposals aim to establish a harmonised set of regulations and rules at the EU level for "new mobility by air of people and cargo". The overall objective is to foster the development of a new ecosystem for urban air mobility (UAM), safely integrate certified Unmanned

Aircraft Systems (UAS) and VTOL-capable aircraft operations in the EU, and enable operators to safely operate VTOL-capable aircraft in the single European sky. EASA had also earlier published regulatory material for operations of UAS, an unmanned traffic management system known in Europe as U-space, the certification of VTOL-capable aircraft, as well as EASA guidance on the design of vertiports - the ground infrastructure needed for UAM operations and services.

VTOL manufacturers in Europe have signalled to EASA that they will be ready for aircraft certification in the next few years.

SAFRAN LAUNCHES PROGRAMME TO DEVELOP HYDROGEN-FOCUSED START-UPS

French aerospace OEM, Safran, launched a new programme on 22 June 2022 to identify and develop start-ups for its hydrogen-related Research & Technology (R&T) and innovation projects. Through a programme dubbed "Explore H2", Safran aims to work together with start-ups to mature technologies and turn hydrogen into a viable and technologically feasible solution in the pursuit to decarbonize aviation.

Although Hydrogen is an attractive solution for decarbonising air transportation, operationalising the use

of hydrogen fuel in aviation presents certain technical challenges. Through its Explore H2 programme, developed with French and German partners, Safran's first group of selected start-ups will focus on four areas: hydrogen flow control in propulsion systems, hydrogen state and temperature control, real-time systems monitoring, and aviation fuel cells.

The start-ups will be selected through various challenges run by German start-up accelerator TechFounders by UnternehmerTUM and by the European Commission's European Innovation Council. Successful

start-ups will receive support from the Starburst accelerator programme, along with training from Safran University, as well as assistance in the technical maturation phase from France's Alternative Energies and Atomic Energy Commission (CEA) and CETIM.

"Opening up to outside innovation and the start-up ecosystem is hugely enriching for Safran," said Eric Dalbiès, Safran Senior Executive Vice President, Strategy, R&T and Innovation. "Through the Explore H2 programme, we can turn hydrogen into a bold solution for the aviation industry of the future."

EMBRAER AND PRATT & WHITNEY COMPLETE 100% SAF FLIGHT TEST

Embraer and Pratt & Whitney have successfully tested a GTF-powered E195-E2 aircraft on 100% sustainable aviation fuel (SAF). The test, with one engine running on 100% SAF, validated that Pratt & Whitney's GTF engines and Embraer's E-Jets E2 family can fly safely on both engines with blends of up to 100% SAF.

All Pratt & Whitney engines and Embraer aircraft are currently already certified to operate with SAF blended up to 50% with standard Jet A/A1 kerosene, according to ASTM International specifications. Future specifications will enable blends of up to 100% SAF to maximize the emissions

reduction potential of using fuel derived from sustainable, non-fossil-based feedstocks.

"The E2 is already the most efficient single aisle aircraft flying today, saving up to 25% CO2 emissions compared to previous generation aircraft. This reduction in emissions can be increased up to an impressive 85% with 100% SAF," noted Rodrigo Silva e Souza, vice president strategy and sustainability at Embraer Commercial Aviation.

The SAF used by Embraer and Pratt & Whitney was 100% Hydroprocessed Esters and Fatty Acids Synthetic Paraffinic Kerosine (HEFA-SPK) acquired from World Energy. HEFA-SPK is a



Photo: Embraer

specific type of hydrotreated renewable feedstock fuel used in aviation and is considered a leading alternative replacement for conventional jet fuel due to the sustainability of its feedstock.

"Replacement of older aircraft by new generation products and scaling up SAF production are the two most effective actions commercial aviation can take now to achieve a significant reduction in emissions," continued Souza. "This test demonstrates that the E2 is ready for 100% SAF certification and operation once the industry finalizes standards."

BOEING UNVEILS FIRST T-7A RED HAWK JET FOR THE U.S. AIR FORCE

Boeing has unveiled its first T-7A Red Hawk advanced trainer jet on 28 April 2022, prior to official delivery to the US Air Force. A total order of 351 T-7A advanced trainers has been planned by the US Air Force as part of a US\$9.2 billion contract with Boeing which also includes 46 simulators and support.

"We're excited and honoured to deliver this digitally advanced, next-generation trainer to the US Air Force," said Ted Colbert, President and CEO, Boeing Defense, Space & Security. "This aircraft is a tangible example of how Boeing, its suppliers and partners are leading the digital engineering revolution.

According to Boeing, the fully digitally designed aircraft was built and tested using advanced manufacturing, agile software development and digital engineering technology. This significantly reduced production time – from concept to first flight in just 36 months.

The aircraft incorporates open architecture software, digital fly-by-wire controls and advanced cockpit technology that provide safety and training flexibility for future fighter pilots. It incorporates a red-tailed livery in honour of the Tuskegee Airmen of World War – the first African American aviation unit to serve in the US military.

The T-7A programme resides at Boeing's St. Louis facility with the aft (rear) section of the trainer built by Saab in Linköping, Sweden. Saab is expected to start producing that section at their new production facility in Indiana in the US soon.



Photo: Boeing

INAUGURAL CHANGI AVIATION SUMMIT GATHERS OVER 300 GLOBAL AVIATION LEADERS IN SINGAPORE

Held at the Marina Bay Sands Expo and Convention Centre, the inaugural Changi Aviation Summit (CAS) was held from 17 to 18 May 2022. The event, jointly organised by the Singapore Ministry of Transport (MOT) and the Civil Aviation Authority of Singapore (CAAS), was one of the first key aviation events held in the region since the onset of COVID-19.

With the theme “Readying for Take-off: A Brighter & Cleaner Tomorrow”, the programme saw keynote addresses by the International Civil Aviation Organisation (ICAO) President of the Council, Mr Salvatore Sciacchitano; International Air Transport Association (IATA) Director General, Mr Willie Walsh; and Airports Council International (ACI) World Director General, Mr Luis Felipe de Oliveira. Hundreds of key representatives and senior executives from aviation policy makers and industry were in attendance, including transport ministers from the ASEAN region and more than 40 Directors-General of civil aviation authorities from various countries.

Singapore’s Minister for Transport Mr S Iswaran delivered the opening address on an optimistic note, highlighting the strengthening recovery of the aviation sector with the easing and reopening of international border measures. He noted that passenger traffic at Singapore’s Changi Airport had “more than doubled to above 40% of pre-COVID levels in May, compared to just under 20% in mid-March”. On the road to recovery, Mr Iswaran also emphasised the need to address pre-COVID capacity challenges and build up capacity in anticipation of demand, “to reduce ground congestion and the consequential delays in the air”.



Aviation leaders from around the world convened at the inaugural Changi Aviation Summit in Singapore

To this end he made several notable announcements during the speech including:

- The recommencement of work on Changi Airport’s Terminal 5, or T5, following a pause announced two years ago amidst pandemic-fuelled uncertainties. During the two-year hiatus the design of T5 was comprehensively reviewed to make it more modular and flexible, and enhance its resilience and sustainability. According to the Minister, the construction of T5 is expected to recommence in about two to three years, to be ready to meet the anticipated demand around the mid-2030s.
- A three-year extension of the Singapore-ICAO Developing Countries Training Programme, which has supported the training of some 1,500 government officials from 130 countries since its establishment in 2001. In this latest extension, the Singapore government will provide US\$1.6 million of training assistance over

three years for aviation professionals in lesser developed countries to support global human capital development.

- The development of a Sustainable Air Hub Blueprint as Singapore sets out its aviation sustainability ambitions and charts specific actions to be taken to decarbonise air travel as an international air hub. An International Advisory Panel has been assembled by CAAS to advise on the Blueprint’s development and propose initiatives and recommendations by July.

The two-day summit featured robust panel discussions with senior public and private sector speakers covering issues on reviving aviation, sustainability and innovation. In conjunction with the event, Minister Iswaran joined ICAO, IATA and ACI to issue a Joint Communique reaffirming the civil aviation industry’s commitment to revive international operations in a sustainable and inclusive manner. The Communique was supported by close to 30 states and civil aviation organisations.

SINGAPORE AVIATION INDUSTRY REITERATES COMMITMENT TO SAFETY WITH NEW CHARTER

80 aviation organisations in Singapore have signed a new Aviation Safety Charter spearheaded by CAAS, pledging to uphold safety as key priority and core value

The first-ever Safety Charter for the Singapore aviation sector was launched on 7 March 2022, signed by some 80 aviation organisations. The “Charter for a Strong and Positive Safety Culture in Singapore” was launched by the Civil Aviation Authority of Singapore (CAAS) at its annual Aviation Safety Forum on 7 March 2022.

Recognising various safety-related challenges posed by the COVID-19 pandemic, the Charter expresses the shared commitment by leaders in the sector to jointly uphold safety standards and strengthen safety culture in their respective organisations as air travel

recovers. Organisations that have signed the Charter includes Singapore-based airlines, aircraft manufacturers, maintenance, repair and overhaul, design and production, and training organisations, airport operator, ground handlers, industry associations and unions.

“Aviation safety must be a non-negotiable and the top priority of the Singapore aviation sector as air travel recovers and we ramp up operations,” said Mr Han Kok Juan, Director-General of CAAS. “The Safety Charter is a statement of shared commitment, by leaders of the Singapore aviation sector, to uphold the highest safety standards as

we work together to rebuild and reclaim Singapore’s position as a global air hub.”

At the Forum, the CAAS also presented findings of the Aviation Safety Culture Survey – Singapore’s first-ever industry-wide survey to understand the impact of the COVID-19 pandemic on aviation safety culture and identify specific areas of improvement. The CAAS is following up with the companies on the areas of improvement as part of its overall effort to strengthen safety culture and improve safety regimes in Singapore.

CAAS also expects that more organisations will be signing the Safety Charter in the coming months.



Signatories’ giving a thumbs up for the launch of the Singapore Aviation Safety Charter. Photo: CAAS

CROWDS THROG AVIATION CAREER FAIR

More than 6,000 jobseekers showed up on the first day of the OneAviation Careers event held on 27 and 28 May 2022, at the Suntec City Convention Centre in Singapore.

Organised by the Civil Aviation Authority of Singapore (CAAS), the National Trades Union Congress (NTUC), e2i (Employment and Employability Institute) and Workforce Singapore (WSG), the two-day OneAviation Careers event was one of its biggest recruitment drives ever held for the aviation sector, as it expects a rebound in air travel.

The job fair aimed to fill some 2,000 vacancies in aviation, ranging from jobs for Professionals, Managers, Executives

and Technicians (PMETs) as well as rank-and-file workers.

Over 20 prominent organisations from the industry participated in the exhibition including Changi Airport Group, Singapore Airlines and SIA Engineering Company, SATS, Pratt & Whitney, Rolls-Royce, Safran and Thales. A large proportion of participating companies also conducted on-site interviews to fill a host of job vacancies in their organisations.

Senior Minister of State for Transport and NTUC Deputy Secretary-General Chee Hong Tat delivered the keynote address at the event. He noted that Changi was “near 50% of pre-COVID passenger volumes” and had arrived at the

milestone “much earlier than originally projected”. He emphasised the need for the sector to “bring in more talent, energy and passion to power it forward”.

Pre-COVID, Changi Airport and its adjacent industries contributed more than 5% of Singapore’s GDP and supported nearly 200,000 jobs across the economy. “We anticipate that the sector could restore close to 85 to 90% of its pre-COVID workforce by end of the year,” added Mr Chee.

The OneAviation Career fair also featured talks helmed by aviation experts and industry professionals covering diverse career opportunities in service, operations, engineering, sustainability and technology.

SELETAR AEROSPACE PARK TO SUPPORT THE DEVELOPMENT OF ADVANCED AIR MOBILITY ECOSYSTEM

Singapore's Seletar Aerospace Park (SAP) has been identified as a future Advanced Air Mobility (AAM) hub.

With the aim of enabling an ecosystem for the industry, JTC, the masterplanner for SAP, and the Singapore Economic Development Board (EDB) announced the signing of two Memorandums of Understanding (MOU) with Skyports and Volocopter on 15 February 2022 to explore the growth of the emerging AAM sector in Singapore.

Over the past three years, Singapore has been facilitating aviation innovation for the AAM industry by supporting trials for autonomous drones and electric vertical take-off and landing (eVTOL) aircraft. In 2019, Skyports and Volocopter showcased the first full-scale passenger air taxi

vertiport prototype in Singapore, with a view to creating a network of vertiports and an initial commercial air taxi service in the city state by 2024.

"Advanced Air Mobility (AAM) is an emerging area that presents strong growth opportunities for Singapore," said Mr Tan Kong Hwee, Executive Vice President, EDB. "An enabling ecosystem in Seletar Aerospace Park can support a wide range of activities such as manufacturing and R&D", he added, which will in turn "create good business and job opportunities for Singapore and Singaporeans."

The MOU with Volocopter will study the feasibility of developing facilities and resources in SAP to carry out manufacturing and maintenance, repair, and overhaul (MRO) activities for eVTOLs. Meanwhile, the agreement



From left: Representatives from Skyports, JTC, EDB and Volocopter at the MOU signing. Photo: Volocopter

with Skyports will draw on the vertiport developer's experience of building take-off and landing infrastructure for air taxis, to explore ideas for the future development of SAP. This includes facilities like an air taxi vertiport terminal, airside facilities and hangarage, as well as facilities to support R&D and pilot training.

SIAEC SEES STRONG RECOVERY, TO PUSH ON WITH TRANSFORMATION EFFORTS AND INVEST IN NEW CAPABILITIES

SIA Engineering Company (SIAEC) has swung into recovery, bouncing to a full-year net profit for FY2021-22. The maintenance, repair and overhaul service unit of Singapore Airlines reported a net profit of S\$67.6 million for the financial year ended 31 March 2022, reversing a net loss of S\$11.2 million in the previous year, where it took on an impairment provision of \$35 million on its base maintenance unit's assets.

Even as it noted stronger recovery of flights in the second half of its FY, the SIAEC Board warned of risks to its business outlook. In its full-year results released on 5 May 2022, the Group noted that its profit was "lifted by government wage support", without which it would have reported a loss of \$25.9 million. In the face of recovery, the company's

performance was described to be "highly dependent on the degree of our revenue recovery vis-à-vis rising costs and declining government wage support."

To emerge stronger and grow sustainably beyond the pandemic, the company has implemented a series of transformation programmes, accelerating its digitalisation, automation and Lean initiatives. The Group is also focused on expanding its capabilities, services and geographical presence.

SIAEC announced its acquisition of a 75% stake in SR Technics Malaysia in May 2022, to form a component MRO joint venture agreement with SR Technics Switzerland. In April 2022, it also announced the expansion of its regional base maintenance network with

the potential lease of two hangars in Subang, Malaysia.



View of SIAEC's Aircraft Engine Services facility which opened in February 2022.

SKYPORTS AND JURONG PORT INK AGREEMENT TO JOINTLY DEVELOP MARITIME DRONE DELIVERY INFRASTRUCTURE

The agreement represents a significant step in the development of large-scale drone delivery operations in Singapore.

Advanced Air Mobility (AAM) infrastructure developer and drone delivery services operator, Skyport, and Jurong Port, the operator of Singapore's only multi-purpose cargo port, have signed a Memorandum of Understanding (MOU) to explore the development of ship-to-shore infrastructure at Jurong Port.

The MOU is a significant milestone for the development of large-scale drone delivery operations in Singapore. Over the next year, Skyports and Jurong Port will commence joint studies to determine the feasibility and development of plans for cargo drone delivery operations and related infrastructure at Jurong Port.

Ship-to-shore drone delivery trials will be carried out simultaneously with ongoing port operations. At the

same time, Skyports will lead in the engagements with relevant public sector organisations, regulators, and private entities to further the development of critical regulatory frameworks for the deployment of large-scale cargo drone delivery services.

Mr Yun-Yuan Tay, Head of Asia Pacific, Skyports said, "Tremendous progress has been made in the arena of maritime drone delivery services over the past year, and infrastructure development is the next critical step to truly realising the vast opportunities afforded by large-scale drone delivery services. We are honoured to be partnering with an industry stalwart like Jurong Port, as we work closely to take tangible steps towards

designing Singapore's first full-scale infrastructure development project with one of the country's most experienced port operators."

Jurong Port handles bulk, break-bulk and containerised cargo, and manages tens of thousands of vessel-calls annually. Mr Walter Lin, Assistant Vice President, Business Units: Breakbulk & Lighters, Jurong Port said, "As one of the world's busiest anchorages, Jurong Port is constantly looking out for solutions that will benefit the shipping and maritime industry. We believe that drone delivery technology will play an integral role in the evolution of our next-generation port and is thrilled to partner Skyports in a feasibility study for commercial drone deliveries."



Rendering of a cargo vertiport. Image: Skyports

Underwriting OEM quality.

Partnering with OEMs for
repair management and
representative agreements.

Our legacy expertise delivers value-added and fully approved,
specialist component MRO. Niche and cutting-edge.

Avionics | Hydraulics | Fire Extinguishers & Oxygen | Pneumatics | Power | Engines

AMETEK®
SINGAPORE PTE

About AMETEK MRO: Financial stability eliminates risk, protects investment, and underpins innovation. It helps our businesses and people to grow. Compliant, ethical practices, add value to processes where safety and the environment are paramount.

Contact: +65 6505 9047 | SG-MRO.Sales@ametek.com

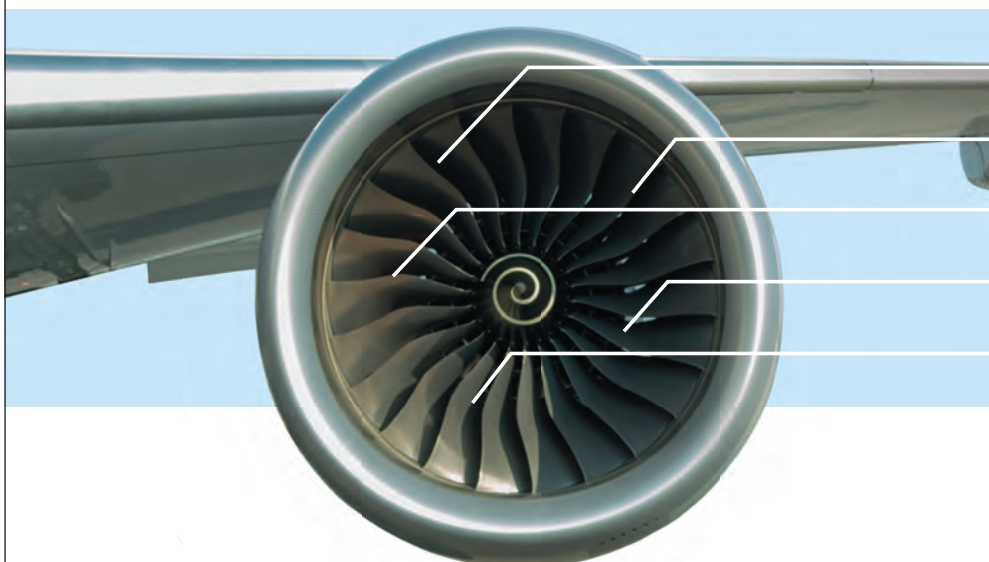
AMETEK® MRO

ametekmro.com



GAIN ACCESS TO

 **Association of
Aerospace Industries
(Singapore)**



EXPERTISE

KNOWLEDGE

MARKETS

NETWORKS

POLICY-MAKERS



Sign Up Today!

For more information, visit www.aaiss.org.sg



PROPELLING WOMEN IN AVIATION

The aviation industry is a major global employer, providing 11.3 million direct jobs worldwide¹. The civil aerospace sector – which manufactures aircraft, systems and engines for business and leisure air travel – employed 1.3 million people in 2018. Airlines, air navigation service providers and airports directly employed a further 4.5 million people (ATAG, 2020).

Where the aviation industry lags behind many others and has seen a problem for years, is in terms of gender diversity. Global statistics on gender equality within aviation remain scarce but it is generally well-observed and acknowledged to be male dominated. With the exception of airline crews and frontline airport staff, a woman would very likely find herself as a minority in other parts of the industry. What is the state of women in aviation and what is it like to be a woman in a male dominated industry? Is there cause to motivate more women to join the industry and what efforts are being made to propel the women in aviation? *Aerospace Singapore* explores.

Gender Disparity in the Industry

There are several theories for the gender disparity in the aviation sector. A common theory is that it is a result of historical legacy, stemming from the Golden Age of Aviation and the standardised roles for men and women back then. By 1936, most flight attendants were women. They were believed to be better able to care for the psychological needs of passengers

but were also selected based on physical characteristics. Most of the other vocations, like pilots, technicians and air traffic controllers were built on engineering and technical disciplines which were traditionally not taken up by women then. Unfortunately, biases and perceptions about women's roles in aviation industry persisted and went unchallenged for decades.

Thankfully, this has changed in more recent times. Aviation companies, international organisations and professional groups are now going the extra mile to encourage more women to enter the aviation world. Over the last few years, greater efforts have also been made to collect and study data and track the representation of women in the aviation industry. The broad aim is to understand the trends and reasons

¹ These would have been the situation under 'normal world' (pre-COVID) assumptions, as per data in the "Aviation: Benefits Beyond Borders" report produced by the Air Transport Action Group (ATAG) in 2020.



behind the dearth of women in aviation, and shape policies to attract and retain more women with sought-after qualifications and experience.

In 2020, six key international aviation and aerospace organisations² partnered with leadership consulting firm Korn Ferry International to produce the first global study on gender diversity in the sector. Data from the “Soaring Through the Glass Ceiling Report” showed large gender gaps in important aviation jobs. The study found, for example, that only 6% of commercial pilots globally were women. In comparison to many other ‘traditional male professions’, such as doctors and surgeons (31.8% female) or police officers (15% female), the closing of the gender gap for pilots had demonstrated slow progress.

Significant gaps were also noted in other aviation line roles with women comprising about 26% of air traffic controllers; 18% of flight dispatchers; and less than 9% of aerospace engineers globally. The gender disparity was even more stark at the higher management level. The report revealed that in 2020, women held only 14% of C-suite roles and accounted for just 3% of CEOs across the top 100 aviation organisations worldwide. This is low compared to global figures which

show that about 32% of senior management worldwide are women, and 24% of CEOs and managing directors across industries are female³.

Even in the Western Europe and North America regions, which were

ranked highest in the World Economic Forum’s 2021 Global Gender Gap Index, gender disparity continues to persist in aviation, especially in more technical areas.

In 2018, the US Congress chartered the formation of the Women in Aviation Advisory Board (WIAAB) to provide recommendations to the Federal Aviation Administration (FAA) on ways to increase female representation in aviation careers. In its report⁴ released in March 2022, WIAAB noted that

women made up less than 20% of the workforce in most aviation occupations in the US. The lowest representations were in maintenance technicians (2.6%), senior leadership positions (3%), and professional pilots (4.6%).

The WIAAB was also tasked to look into the reasons for the low representation of women in the industry and suggest policies in response to the findings. In her statement on the report, WIAAB Chair Dr Heather Wilson remarked “The biggest barrier that discourages women from entering and staying in aviation careers is culture – and it is the hardest to change. Women don’t feel like they belong.” To tackle this issue, the WIAAB proposed 55 recommendations in March 2022, which were unanimously approved by the US Congress, the Department of Transportation, the FAA and industry. The recommendations were grouped in five areas of culture, recruitment, retention, advancement and data.

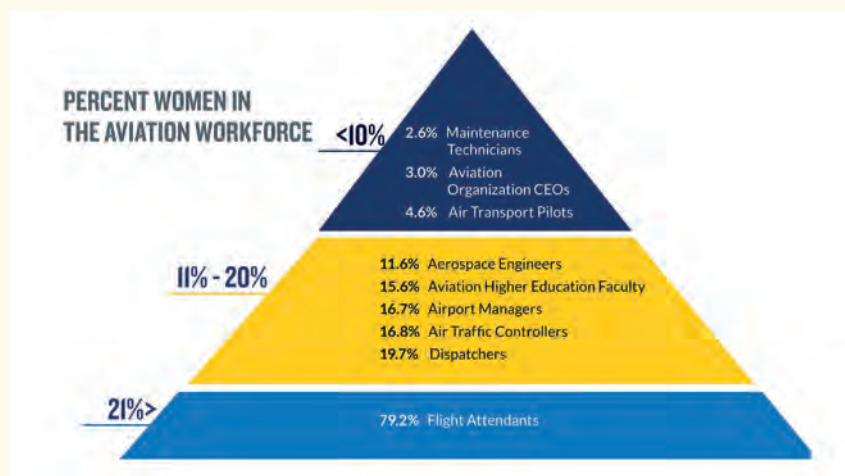


Figure 1 Percentage women in US aviation industry workforce (Source: Rebecca Lutte, “Women in Aviation: A Workforce Report 2021 Edition”, December 2021)

² Aerospace Industries Association (AIA); Airlines for America (A4A); Airports Council International (ACI); Civil Air Navigation Services Organisation (CANSO); International Air Transport Association (IATA); and International Aviation Womens Association (IAWA)

³ Grant Thornton Women in Business report 2022: Opening the door to diverse talent

⁴ Women in Aviation Advisory Board, “Breaking Barriers for Women in Aviation: Flight Plan for the Future”, March 2022

FEATURE

Dr Wilson described the mission of attracting and retaining women as “critical to the future of the industry”. “Especially in a tight post-pandemic labour market,” she noted, “the aviation industry desperately needs women to choose aviation careers”.

Women to Bolster Aviation Industry and Businesses

Indeed, the aviation and aerospace industries are no strangers to manpower challenges. As early as 2009, the International Civil Aviation Organisation (ICAO) had foreseen a growing need for qualified and competent aviation professionals to fill future vacancies created by the anticipated retirements of an aging ‘Baby Boomer’ generation. It launched the Next Generation of Aviation Professionals (NGAP) initiative which was later elevated from an initiative status to a full ICAO programme.

In recent months, air travel has been bouncing back with a vengeance as the

impact of COVID-19 lessens. With the resurgence comes a demand for highly trained workers from a larger, and more diverse pool. Meanwhile, global aviation companies had been forced to shed hundreds and thousands of employees to stay afloat when air travel demand plunged for months on end. By the end of 2021, the number of direct aviation jobs globally was estimated to have shrunk by about 21% (ATAG, 2021), equating to the release of 2.3 million employees. As travel restrictions were lifted, pent-up demand for air travel surged and passenger traffic accelerated sharply and suddenly. This left the industry scrambling to beef up their workforce and restore capacity. Major airports in places like US, UK, India, Australia, Germany, and the Netherlands saw record numbers of flight delays and cancellations, mega long lines, and prolonged waiting time for passengers.

Now, more than ever, the aviation industry is facing a pressing need to

secure current and future personnel to ensure a safe, efficient, and sustainable civil aviation sector. There is greater impetus to tap on women who account for close to 40% of the total global labour force (World Bank, 2022).

In addition, aviation organisations stand to benefit from a business perspective, by hiring more women. Research by McKinsey has found that companies in the top quartile of gender diversity were 25% more likely to have better financial performance than their peers. Executive teams with more than 30% women were also more likely to outperform those with fewer or no women by close to 50%. More diverse companies were also found to be better able to win top talent, and improve their customer orientation, employee satisfaction, and decision making, leading to a virtuous cycle of increasing returns.

Worldwide Efforts to Close the Gender Gap

Given the clear benefits of attracting and keeping more women engaged in aviation roles, initiatives are being driven on several fronts with industry associations, progressive global players and passionate leaders leading the way.

In 2019, the International Air Transport Association (IATA) launched its “25by2025” initiative, an industry-wide campaign that focuses on improving female representation in the air transport industry. The campaign targeted not only airlines but also aircraft manufacturers and aviation-services providers. Close to 120 signatories have committed to reaching 25% of leadership positions being held by women in 2025, or to deliver a 25% improvement in such numbers by that year. IATA is also working to improve its internal diversity levels. For example, it plans female representation on all panels at

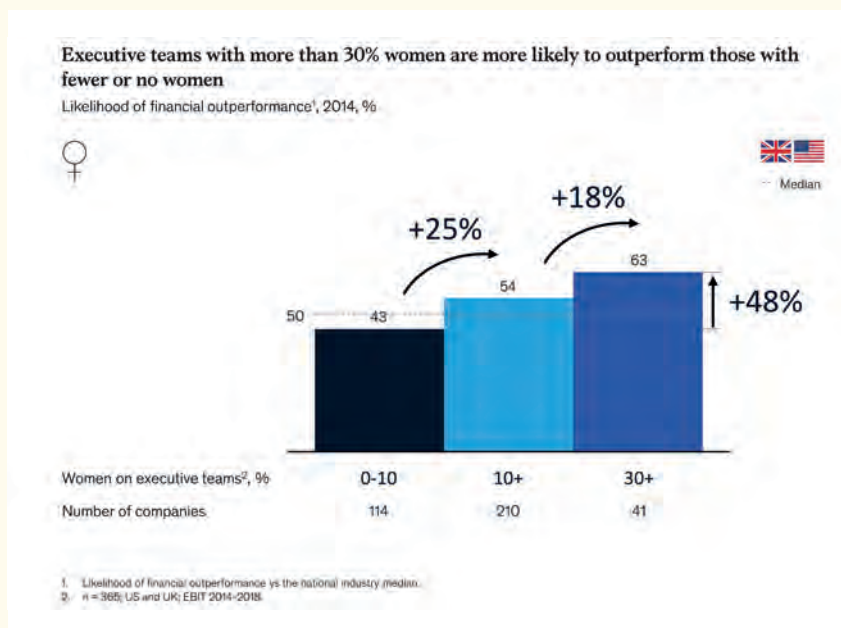


Figure 2 More gender diverse companies have demonstrated better financial performance (Source: McKinsey & Company, “Diversity wins: How inclusion matters”, May 2020)



A strong presence of women at the Boeing Korea Technology & Engineering Center.
Photo: Boeing

conferences, and aims to ensure 25% female representation on its various committees. In just three years, the number of female senior leaders and directors in IATA increased from 16% to 22%.

American jet engine manufacturer, GE Aviation, has also been taking steps to help its workforce become ‘as gender balanced as possible’. In 2016, the company reached a 50:50 gender parity among its Edison Engineering Development Program – a career leadership programme which offers its

engineers deep industry experience, mentorship and opportunities for further education. GE set a goal of hiring 20,000 women in technical roles by 2020, supported by a programme titled ‘Cultivate’, to develop and retain its women engineers. Since 1997, the company has run an internal global women’s network to attract, develop and retain its female professionals. Its chapter in India for example, runs a RESTART programme to assist female professionals who may have taken

a break in their careers for family to restart their aviation careers.

Aircraft manufacturer, Boeing, also has an employee-led business resource group for women – Boeing Women Inspiring Leadership (BWIL), with 33 chapters worldwide. It is one of the few aviation organisations that produces a Diversity and Inclusion report. Apart from data on gender, ethnicity, disability, and sexual orientation of its workforce, the report sets clear and transparent targets to measure D&I progress. The purposeful and deliberate actions undertaken by Boeing are bearing fruit. The Boeing Korea Technology & Engineering Center, for example, boasts an engineering workforce of nearly 45% women, in a society with just 11% of female engineers⁵. In Boeing’s outfit in the UK, 49% of its graduate hires and 34% of its apprentice technicians were women in 2021.

Women in Aviation in Singapore

In Singapore, gender-differentiated data on the aviation industry is not yet available. What is known is, that as a regional hub, the Singapore aviation industry contributes to 131,000 direct jobs (ATAG, 2020), of which 22,000 are aerospace jobs . The country’s female labour participation rate, at 62% (MOM, 2021), is higher than the global average.



Figure 3 Overview of aviation benefits to Singapore (Source: Oxford Economics for ATAG report “Aviation Benefits Beyond Borders”, September 2020)

5 The Boeing Company, “2022 Global Equity, Diversity & Inclusion Report”, 2022

FEATURE

Does Singapore defy convention, and does it see more participation of women in the aviation and aerospace industries?

Limited data and anecdotal suggestions point to a situation that is more consistent with global findings. Female pilots, for example, continue to comprise a minute fraction of the total pilot population in Singapore. National carrier, Singapore Airlines (SIA), hired its first female pilots in August 2015, more than 40 years after its establishment. Its regional arm at the time, SilkAir, fared a little better as it had started hiring its first female pilot in 2001, in the form of Captain Anastasia Gan Kum Yoke. However, the needle hasn't moved much since then. Most recent data shows that there are only 39 women pilots flying for SIA and Scoot⁶ (SilkAir was integrated into SIA in 2021) – which is about 1.4% of the total number of pilots employed by the SIA Group.

The proportion of women in technical and engineering roles is also generally observed to be quite small. Published data on gender distribution and employment in Singapore MRO organisations is scant. However, SIA's maintenance, repair and overhaul (MRO) arm SIA Engineering Company, has revealed that the proportion of women under its permanent employment is 11%⁷. This is almost a third of the proportion of women permanently employed under its parent company, which is at 33%.

"I can definitely say that there is an underrepresentation of women in the engineering and technical operations sector within aviation, not just in Singapore but internationally", said Joelle Chia, a customer service engineer with Textron Aviation



On the shopfloor at the Rolls-Royce Seletar Assembly and Test Unit. Photo: Rolls-Royce Singapore.

in Singapore. Joelle had studied Aeronautical Engineering Technology at Purdue University in Indiana, US, and noted, that even within aviation courses, the technical or engineering domains were less popular compared to flight (pilot) and management fields. "It's (an issue) everywhere", Joelle said, "I have experienced working both in a Singapore company and a US MNC and I can say that whenever I am in a technical meeting, I am always the only female."

In other aviation roles such as airport services, there is a visibly stronger representation of women. Changi Airport Group⁸, for example, has permanent female employees making up 36% of its workforce while at SATS⁹, the proportion is 29%.

"In general, women are quite visible in the Singapore aviation industry but there is a beer bottle effect. Higher up, it tapers off," said Ms Lou-Ann Seet, vice president for the Women

in Aviation International – Singapore Chapter. "In aviation and aerospace companies here, we can and do see many women, especially in customer service, executive, finance and human resource roles. A smaller number perform technical roles including aerospace engineers, designers and air traffic controllers. At the very senior management level though, it tapers off significantly", she added.

Advocating for the Future of Women in Aviation

Both Joelle and Lou-Ann are passionate about changing this situation. Together with 29 other like-minded women and men from the industry, they became founding members of the Women in Aviation International – Singapore Chapter (WAI-SG). Dr Amy Khor, Senior Minister of State for Sustainability and the Environment was guest-of-honour at the launch of WAI-SG on 21 March

⁶ Singapore Airlines Sustainability Report FY2021/22

⁷ SIAEC Sustainability Report 2020/21: "Engineering a Sustainable Future"

⁸ Changi Airport Group Sustainability Report 2020/21.

⁹ SATS Ltd. Sustainability Report FY2021-22

FEATURE

2021, with Mr Kevin Shum, then-director general of the Civil Aviation Authority of Singapore, also in attendance.

"The launch of WAI-SG was very timely as 2021 was dedicated as the year of 'Celebrating SG Women'," said Lou-Ann, noting the significance of having support from government agencies for the initiative. "Women are included in the Singapore aviation sector, but our numbers are still quite small. When women cannot find the support they need, they end up leaving their jobs and the industry. This is where we find that there is a need to build a connection for women – to link them up to experts and to other women peers at the cross-company level for support", she explained.

WAI-SG's broad aims are to facilitate networks among key aviation stakeholders, increase the visibility of women in aviation, and support student outreach activities. Since its establishment, the unit has been actively growing its networks within and outside the industry. "The network that

organisations like WAI-SG offer play a valuable role in the development of women in the industry," said Joelle. "It creates opportunities for important exchanges between women in aviation, no matter which company they work for. For example, women leaders can engage with female engineers or managers to provide guidance on their career development and give advice on the skills needed to ascend to leadership roles."

Towards this end, WAI SG launched the 'Women in Aviation Mentorship Programme' in collaboration Korn Ferry International and the Association of Aerospace Industries (Singapore) in February 2022. With the aim of advancing women in aviation, the programme targets the involvement of 100 women mentees from the aviation industry who will be mentored by top industry professionals.

"This is one of the ways for us to build up critical mass and legitimacy so that we can influence policies and forge a way forward for more women

to create an impact in the industry," said Lou Ann. "I am very heartened that there has been growing support in this important endeavour of closing the gender gap in aviation. In just a year after the establishment of WAI SG, our membership has increased to 100 individuals and 10 corporate members," she added, pointing out that "very supportive" male advocates make up about 10% of WAI-SG.

Stronger, Together

The initiatives being driven by WAI-SG complement others that are being taken by government, NGOs and institutions in Singapore. Aviation and aerospace players are also actively pushing the gender diversity agenda. The SIA Group, for example, has reported that it is on track to meet two key gender targets: first, to have at least 25% female employees in senior positions (VPs and above) by 2026, and second, to increase in the number of female pilots by at least 25% from 2021 levels.

These positive changes are taking place across the aviation industry. While encouraging, the road to achieving gender diversity can, nonetheless, be expected to be a long one. Meaningful, systemic changes in an industry with a long history, large organisations, deep-rooted and traditional stereotypes will take great effort to achieve. Yet, hope remains as the global aviation industry pledges to put sustainability and sustainable practices at the heart of the restart post COVID-19.

In anticipation of heightened competition, aviation companies have become more purpose led to attract and retain talent and customers for the next chapter of recovery and growth. With wind beneath their wings, more women can be lifted and propelled to advance in the industry and have the same opportunities to savour the triumphs of a high-flying career.



Breaking the bias with the voices of female aviation professionals, male advocates and future talent. Photo: WAI-SG.

BIGGER, BETTER, GREENER

Aerospace Singapore speaks to Bombardier Singapore Service Centre's General Manager Simon Wayne on the inauguration of its new expanded facility

Canadian aerospace giant, Bombardier, celebrated the grand opening of its newly transformed Singapore Service Centre on 30 June 2022 in the company of industry partners and clients. Located at Seletar Aerospace Park, the Singapore Service Centre, which opened in 2014, has more than quadrupled its footprint from 70,000 sq. ft. (6,500 m²) to approximately 290,000 sq. ft. (27,000 m²). *Aerospace Singapore* speaks to Mr. Simon Wayne, General Manager of Bombardier Singapore Service Centre to find out more about the massive expansion and Bombardier's operations in Singapore.

Hi Simon, congratulations! Tell us about your background and how you came to become the Singapore Service Centre's General Manager?

Thank you! I started my career back in Australia as an engineer whilst gaining my pilot licence. Over the

past 30 years, I have worked regionally and internationally in a wide range of aerospace-related roles, with the last 17 years based in Asia Pacific. In previous organisations, I was responsible for MRO and FBO operations as well as business planning, new facilities design development, construction planning, and business development.

In 2013, I was given the privilege to establish the first Bombardier Business Aircraft Service Centre in Asia — here in Singapore. We started with an empty field, in the heart of Seletar Aerospace Park (SAP), and today, we are thrilled to have grown over four times of our original size and enhanced our presence in tandem with the development of SAP and the Singapore aerospace sector!

Can you tell us more about the decision to expand the Bombardier service facility in Singapore?

At Bombardier, providing service excellence on every level is our ongoing commitment to every customer, and I know that the outstanding engineers and technicians based at our enhanced,

award-winning facility consistently deliver the service experience our customers have come to expect.

Bombardier recognises that Singapore, and Seletar, is the gateway to Asia-Pacific with a growing aviation footprint that will greatly enhance passenger traffic in the region. With business aviation rapidly starting to open, the Singapore Service Centre will provide infinite benefits, including quicker aircraft turnarounds, greater convenience, and peace of mind to Bombardier's growing customer base in Asia. Customers can also enjoy access to the complete range of OEM customer service and support at their doorstep.

The newly expanded Singapore Service Centre is a key pillar in the major investments of our growing worldwide customer service footprint, and is today, the largest, most comprehensive OEM business aviation maintenance facility in Asia Pacific. Having a service centre of this calibre makes a strong statement about our commitment to this region, and we are immensely proud to be an integral part of the community in Singapore.



The newly expanded Bombardier Singapore Service Centre in Seletar Aerospace Park.
Photo: Bombardier

INPROFILE

Please tell us more about the new and enhanced services being offered at the expanded facility.

The massive expansion at the Singapore Service Centre introduces new services and a complete suite of maintenance and modification capabilities for Bombardier's clients. This includes a brand-new business jet paint facility – a first in the Asia-Pacific region – with a dedicated preparation and a dedicated temperature and humidity-controlled painting bay. Our parts depot has doubled in size, and we have added over US\$15 million in parts inventory. This integrated parts depot is equipped with the latest technology and will serve the site and the region 24/7. Bombardier's Global aircraft customers can also choose to lease BR710 engines from Rolls-Royce stored on site, significantly reducing downtime and costs.

The expanded facility also enhances amenities for our customers, offering exceptional office and lounge facilities, as well as ground handling in collaboration with Jetex. We have also been able to add sought-after new heavy structural and composite repair capabilities in addition to enhanced full-service interior finishing capacity. With the expansion, we have essentially doubled our maintenance capacity, and the Singapore Service Centre is expected to support more than 2,000 business jet visits annually.

What are some of the unique features at the newly expanded building?

We created this US\$85-million investment with sustainability at its core and took an environmentally respectful approach to its design and project development. We installed solar panels on the facility's roofs as well as carpark structures to reduce energy consumption, which translates to 15% of the site's annual electricity demand.

Other important green initiatives include the use of building

management systems, insulation, LED lighting, low flow plumbing fixtures and automated water reticulation for improved water conservation and enhanced energy efficiency. With these in place, the facility achieved Singapore's Green Mark Gold by the Building & Construction Authority and the U.S. Green Building Council (USGBC) Silver LEED Green Building certifications.

We are leading the sustainability push by uploading the first ever batch of Sustainable Aviation Fuel (SAF) at Seletar at the Singapore Service Centre in collaboration with Shell Aviation. Bombardier is committed to reduce the environmental footprint of business aviation worldwide, hence we are offering business aviation operators this environmentally friendly fuel option at Seletar Airport.

Being in Seletar also means being surrounded by rich heritage and Singapore's history, and we are pleased to pay homage to this in the design of the spaces within our facility. This is reflected, for example, in the Peranakan touches throughout the lounge spaces, art and photography celebrating the local landscape and vertical green walls mirroring this garden city. We have strived to optimise the environmental quality for the health and well-being of customers and employees while delivering highly efficient, environmentally responsible operations.

Given the scale of the expansion, were there any challenges faced, and how were they overcome?

The ground-breaking for this expansion was held in February 2019, and while the project was expected to be completed in 2020, we inevitably faced delays and disruptions due to the COVID pandemic, lockdowns etc. With travel restrictions, we also had to wait for the right time to be able to give the



Simon Wayne, General Manager of Bombardier Service Centre since 2013.
Photo: Bombardier

facility the inauguration and celebration it deserves, in the company of our partners and clients from all over the globe.

This project was certainly a labour of love with years of planning and support from many key parties. It could not have been possible without the outstanding support by the Singapore Government, especially EDB and JTC, and their hard-working account managers, and CAAS and CAG, who have provided the regulatory support and guidance that has been instrumental for our facility and team to grow. We are also thankful for the strong support from the High Commission of Canada in Singapore, the team from Boustead Projects Limited, and so many others.

Of course, exceptional service cannot happen without the commitment and expertise of outstanding and passionate talent. I am immensely proud of my incredible team

INPROFILE

at the Singapore Service Centre. They have demonstrated amazing flexibility and resilience in providing customers with an outstanding service experience the past two years – and pushed on tirelessly since we set foot onsite back in 2013 through the expansion of the site. I applaud everyone on my team for their resiliency, creativity, and flexibility throughout these challenging times.

Will Bombardier be looking to augment its workforce to augment the new capabilities and services?

The Singapore Service Centre currently employs more than 200 staff, including more than 160 licensed engineers and technicians. Our original commitment in setting up this facility was to hire 230, but we believe we will surpass that number. In fact, we are already in the process of adding more than 50 additional staff.

To ensure we continue to provide our customers with outstanding service for years to come, we are always planning for the future. Earlier this year, we instituted and launched a comprehensive apprenticeship programme to train the engineering professionals of tomorrow and create a strong talent pipeline for years to come. The 45-month Licensed Aircraft

Maintenance Engineer training programme is conducted in conjunction with Temasek Polytechnic (TP), with support from the government. Trainees receive comprehensive theoretical classroom training for 1.5 years at TP followed by two (2) years of on-the-job training at Bombardier Singapore Service Centre, where they will be offered a wide range of learning opportunities, including detailed hands-on mechanical engineering work on Bombardier aircraft. The trainees get an opportunity to earn a CAAS license to qualify as certified Licensed Aircraft Maintenance Engineers.

Thank you, Simon, for an inspiring conversation. Finally, can you share with us what you are looking forward to next?

I am looking forward to welcoming more customers to our amazing new home! Keeping our jets flying and providing unsurpassed turn-key service solutions for our customers is precisely what they demand and deserve, and




View of the expansive new hangar on opening day.

our enhanced Singapore Service Centre will provide them all aspects of service excellence.

As a company, Bombardier is expanding our worldwide service footprint by one (1) million square feet as part of our mission to provide the best support to our customers. At the same time, we're evolving our portfolio – our new Global 8000 business jet, the industry flagship, will have an unmatched range of 8,000 nautical miles, which is ideal for customers in this region. This will be the fastest, most luxurious aircraft ever built, and we are looking forward to introduce it to customers here in Asia-Pacific when it enters into service in 2025.



Simon Wayne (second from right), at the ribbon cutting with senior Singapore and Canada government officials and senior executives from Bombardier.



Corporate Industrial Photography Videography For The Aerospace Industry

On location shoots (facility, aircraft, people, operations)
Helicopter & plane based aerial photography
High quality UAV aerial photography & filming
Live video streaming of events
Corporate video production
Aerial stock image library
Engineering background
Familiar with MRO



AEROPHOTOWORKS

www.aerophotoworks.com richard@aerophotoworks.com

aerospace - aviation industrial - destination promotional - aerial photography

Since 2008

AVIATION'S FINEST MEET, PAINTING BRIGHTER SKIES

Singapore Airshow 2022 manifested the strong optimism of the aviation and aerospace industries towards recovery of air travel and a focus on sustainability. The biennial event saw aviation's finest gather from all around the world at the Changi Exhibition Centre from 15 to 18 February.

Despite the ongoing COVID-19 situation and a smaller participation, Singapore Airshow 2022 proceeded with various health and safety measures in place. Show organisers, Experia, underscored the importance of holding the biennial event as a platform for industry players to discuss ways out of COVID-19 pandemic.

Mr Leck Chet Lam, Experia's Managing Director, said, "We are starting to see green shoots in the industry.. Passenger travel numbers are up (and) flight frequencies are up. We can all sense the pent-up demand for travel. It's even

more imperative that we set the platform of Singapore Airshow now to allow all these decision-makers and top industry makers to come and have discussions around them, and how we can navigate our way out of this pandemic."

Held every two years, the Singapore Airshow is attended by government and military delegations, as well as senior corporate executives around the world. The eighth edition saw more than 13,000 trade attendees and almost 600 participating companies from more than 39 countries/regions; representing more than 70% of the top 20 global aerospace companies.

Recovery and Prospects of Growth

Singapore's Deputy Prime Minister and Coordinating Minister for Economic Policies Heng Swee Keat officiated the opening ceremony of the event on 14 February. In his speech, Mr Heng noted that the Singapore Airshow was "the largest trade and exhibition show to be held in Singapore since the start of the COVID-19 pandemic". He further noted that the show was being held at "an appropriate time", as the global aviation and aerospace sectors look forward to recovery and new opportunities.

Quoting data from the International Air Transport Association (IATA), Mr Heng noted that international air travel passenger volume was expected to recover to 55% of pre-COVID levels within the year, from about 20% in 2021, and reach pre-COVID levels by 2025 or 2026. He reiterated Singapore's commitment to the safe re-opening its borders and economy. "This Airshow also underlines our belief in the long-term prospects of the aviation and aerospace sectors. As demand recovers, the Asia Pacific region is projected to become the largest aviation market in the world, accounting for more than 40% of new aircraft deliveries in the next two decades... The aviation sector also has a strong multiplier effect on adjacent industries, including logistics, hospitality and professional services."



Visitors connect on Day 2 of the region's biggest Airshow. Photo: Singapore Airshow.

INFOCUS

At a press conference ahead of the Airshow, the Singapore Economic Development Board (EDB) also showed that the domestic aerospace manufacturing industry output had been growing year-on-year since April 2021. In December that year, output grew nearly 60% year-on-year. "Together with our industry partners, we are turning a corner," said Mr Lim Tse Yong, EDB's vice-president of capital goods.

Sustainability at the Fore

In line with the global agenda on climate change, Singapore Airshow 2022 also featured the inaugural "Sustainable Aviation Forum" on 16 and 17 February in partnership with Alton Aviation Consultancy. Through several moderated discussions, experts from public and private sectors discussed challenges and opportunities within sustainable aviation, including the topic of sustainability of future technology in areas of air mobility and aviation operations. Focus areas included the roles of regulators, innovations in engine technology, sustainable aviation fuel, and MRO.

The Singapore Airshow also adopted sustainability efforts by going largely paperless – which is atypical of airshows. The traditionally printed show directory evolved into an electronic format, and online platforms such as a digital media centre were created to minimise printing. The event was also powered by solar energy generated from 15,000 panels installed on the roof of the Changi Exhibition Centre. "We are playing our part in advocating for more eco-friendly events, and taking intentional steps to reduce our carbon footprint," said Mr Leck.

Breath-taking Aerial Displays

This year's Singapore Airshow saw a total of eight flying displays and flypasts from four air forces and two commercial companies.



Panelists of Session 2 of the Sustainable Aviation Forum at Singapore Airshow 2022 – "Building Sustainability into Aviation Operations Today". Photo: Singapore Airshow.

The Indian Air Force's Light Combat Aircraft (LCA), called Tejas, flew for the first time at the Singapore Airshow with impressive stunts and manoeuvres over Singapore's skies. Indonesia's Jupiter Aerobatic Team, also known as 'The Jupiters', was back after the 2018 edition, thrilling the audiences with their six-plane formations and precision flying. Returning with two performances this year, the Republic of Singapore Air Force featured an F-16C fighter jet displaying solo aerobatics, and a pair of AH-64D Apache attack helicopters. The United States Marine Corps' F-35B Lightning II – the world's first short-takeoff, vertical landing stealth fighter – made its appearance once again, as

well as the United States Air Force's B-52 Stratofortress in a fly-by.

An integral part of the Singapore Airshow, the flying displays are testament to the strong bilateral ties between Singapore and participating Air Forces.

Commercial plane watchers were also treated to demo fly overs by Airbus' A350-1000 and Boeing's wide-bodied B777-9. Members of the public were also able to catch the spectacular display performances via livestream.

Singapore Airshow is scheduled to return from 20 to 25th February 2024 for its ninth edition.



Two AH-64D Apache attack helicopters performing an aerial manoeuvre as part of the Republic of Singapore Air Force (RSAF)'s aerial display. Photo: MINDEF Singapore.

ADVERTORIAL

MRO ASIA-PACIFIC RETURNS LIVE IN SINGAPORE

MRO Asia-Pacific, the region's premier event for maintenance, repair and overhaul, is set to return to Singapore in an in-person format from 20 to 22 September 2022.

Join producer Aviation Week Network and local partner AAIS (Association of Aerospace Industries Singapore), as we bring together the most influential members of the aviation MRO industry, locally and globally, to discuss the latest issues and concerns of operators and their service providers and suppliers.

MRO Asia-Pacific promises to deliver:

- Integrated content that encompasses end-to-end MRO from leasing to IT to engines
- Key decision makers, airline buyers and industry leaders
- Peer-to-peer learning with case studies, proven methodologies and realistic approaches
- Open platform for OEMs, airlines, MROs, suppliers and buyers to build contacts and exchange ideas
- One-stop-shop for all MRO products and services on the industry's leading exhibition floor

The Conference segment will feature experts and senior industry professionals from aviation and aerospace companies like AAR, Air India, Asia Digital Engineering, BOC Aviation, FL Technics Asia, HAECO, SIAEC, ST Engineering and more.

Presentations and panel discussions at the conference will discuss:

- Recovery trajectory & geopolitical pressures
- Regional outlook & projections
- Market spotlights on India, Advanced Air Mobility and Passenger-to-Freighter aircraft
- Attracting and retaining talent

The Exhibition connects buyers with products, services and technologies to address specific needs in the commercial aerospace industry.

Solution providers can showcase their latest and best products and services in the renowned exhibition hall. Visited by the top MRO thought leadership and buyers in the world, this is an opportunity to feature innovative MRO tools and technologies. Exhibitors can ensure facetime with key airline industry decision makers, generate leads and build brand awareness.

By Attending MRO Asia-Pacific, you will:

- Develop best practices, learn from industry thought-leaders, and find out what the airlines are looking for in terms of problem solving.
- Source suppliers, meet product engineers and identify new technology.
- Be part of the leading destination for airlines and MRO professionals to learn about, test and purchase new MRO solutions and services.

MRO Asia-Pacific and the co-located Aero-Engines Asia-Pacific will provide opportunities to expand your network in a uniquely personal environment. Whether you are looking to grow your customer or supplier base or strengthen existing relationships, MRO Asia-Pacific is the place to be!

Scan to learn more



AVIATION WEEK 

MRO

ASIA-PACIFIC

September 20-22, 2022
Singapore



MRO Asia-Pacific, the region's premier event for Maintenance, Repair and Overhaul, returns LIVE in 2022

Speakers Include:



Martynas Grigalavicius
CEO,
FL Technics Asia



Arun Kashyap
Executive Director
Engineering,
Air India



Mahesh Kumar
CEO,
Asia Digital
Engineering



Yen Ping TAN
VP & Head of Cabin
Interior and Engineering,
Commercial Aerospace,
ST Engineering



Shevantha Weerasekera
Senior Advisor/VP,
Engineering and
Fleet Management,
Cebu Pacific

GET THE DETAILS mroasia.aviationweek.com

AVIATION WEEK 
NETWORK

#MROAP



Co-located with

AVIATION WEEK 
AeroEngines
ASIA-PACIFIC

September 21-22

Platinum Sponsor



Gold Sponsors



Purposeful Partnership



DAWN OF COMMERCIAL AVIATION IN SINGAPORE

Singapore's first purpose-built civil airport, Kallang Airport, was built atop 300 acres of reclaimed mangrove swamp in the Kallang Basin area. The airport opened its doors to the world in 1937, witnessing glamorous air travellers, amazing flying machines, and later, raging war battles. After it ceased operations, Kallang Airport became home to organisations such as the Singapore Youth Sports Council and People's Association (PA), and was gazetted for conservation in 2008. In this continuation of a series of essay commissioned by *Aerospace Singapore*, Mr Goh Yong Kiat recounts the beginnings of Kallang Airport and its significant role in establishing Singapore's position on the international aviation map.

In 1937, one of the finest airports of its time was opened in the great far east. The Singapore Marine and Land Airport or simply Kallang Airport, as it was called, was launched by His Excellency the Governor of Straits Settlements, Sir Shenton Thomas, on 12th June 1937.

To mark the start of the opening, the Governor flew in on an Imperial Airways Atalanta airliner, the G-ABTJ 'Artemis', which he boarded at RAF Seletar. Escorted by 24 warplanes

from the Royal Air Force (RAF) and the Straits Settlements Volunteer Air Force (SSVAF), 'Artemis' made an impressive arrival as it landed at 4:30 pm on the circular grass strip of the spanking new airport.

About 70 aircraft of various types participated in the opening ceremony. This included airliners from Imperial Airways, Qantas, KLM, KNILM and light planes, such as the autogiros from the Singapore and Malaya flying clubs, as well as two Dutch privately-owned

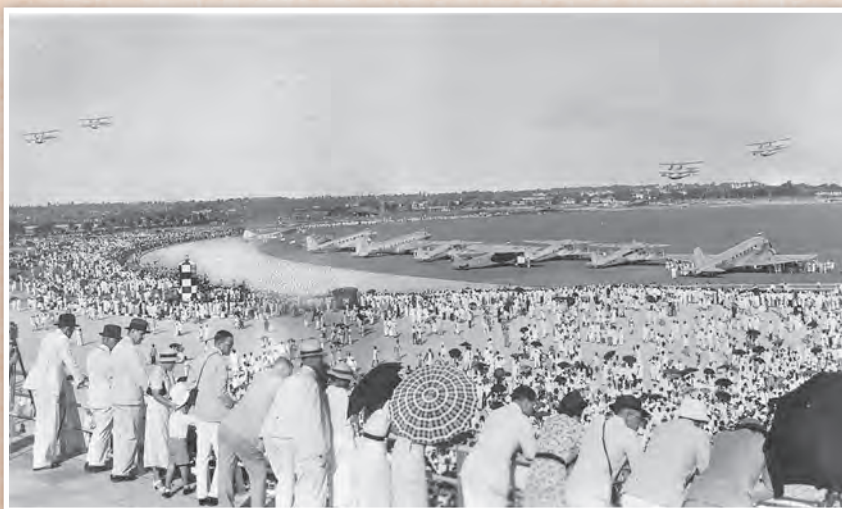
aircraft. Military participation included the RAF squadrons based in Singapore and six aircraft from the Dutch military services.

A signal rocket was fired to signal the official inauguration of the new airport. This was followed by a series of air displays to celebrate a significant milestone in Singapore's aviation history.

The Aviation Miracle of the East

Kallang's aerodrome, opened on all sides and bordered on the south by sea, offered facilities for both land and marine aircraft. A circular grassy field gave a free run of 3,000 feet in any direction. Flying Boats could alight on a seaplane approach channel, 600 feet wide and 3,000 feet long, and would anchor in a dredged and buoyed channel. They could be hauled up out of the basin on a reinforced slipway for repairs.

The terminal building, with its iconic architecture was of ultra-modern appearance in its time. Its interiors, including railings and columns, were detailed with Art Deco ornamentation, reflecting early British modernist architecture. The main terminal building had two side blocks with attached hangars and a cylindrical control tower at its heart. Located on the ground floor were the airline offices, a post-office



A crowd of spectators catching the air displays at the opening of Kallang Airport in Singapore on 12 June 1937. Photo: RAFSA Collection, courtesy of National Archives of Singapore.



Diagram of airport facilities and approach patterns for Kallang Airport. Image: George Palmer Putnam Collection of Amelia Earhart Papers, Rights held by Purdue University Libraries.

and a shop. At one end was a restaurant with a large roof veranda which could take up to 2,000 spectators. At the other end were the Customs, passport offices and medical headquarters, arranged specially for easy access of arriving and departing passengers. Kallang Airport was also the first airport in the world with quarantine and disinfecting services.

Just eight days after Kallang Airport was opened, Singapore witnessed the arrival of aviation pioneer, Amelia Earhart, in her attempt to circumnavigate the globe in her Lockheed 10E Electra, NRT6020. Just before 5.30 pm on 20th June 1937, Miss Earhart and Captain Fred Noonan landed at Kallang Airport in their silver twin-



Doctor making a health inspection of the Electra crew (Amelia Earhart and Fred Noonan) upon arrival at Singapore Airport, June 20, 1937. Image: George Palmer Putnam Collection of Amelia Earhart Papers, Rights held by Purdue University Libraries



View of the Kallang Airport control tower. Photo: Niadijam, CC0 via Wikimedia Commons.

engine plane after a 1,000-mile flight from Bangkok. On arrival, Miss Earhart described Kallang Airport as a magnificent airport and "an aviation miracle of the east".

Why Kallang Airport?

With the rapid progress in commercial aviation and airlines starting to connect cities, the need for a commercial airport was urgently felt. Singapore could not rely solely on RAF Seletar, a military airfield in the north of the island, which hitherto, had been handling commercial air traffic. The announcement to build Kallang Airport was made by Governor Cecil Clementi on 31 August 1931.

Plans for Kallang Airport was also testament to a deliberate attempt of making Singapore a major node – first, with the UK-Australia 'Kangaroo Route' – and a gateway to the region. In his announcement, Sir Cecil Clementi proclaimed, "Looking into the future, I expect to see Singapore become one of the largest and most important airports of the world".

AEROCOMMUNITY

A location near to the city, and direct road links to the centre of commerce was important. The airport would also need to have features for the landing and take-off of flying boats as well as landplanes used by airlines of the time. "It is, therefore, essential," continued Sir Clementi, "that we should have here, close to the heart of the town, an aerodrome which is equally suitable for landplanes and for sea planes; and the best site, beyond all question, is the Kallang Basin."

The reclamation of the swampy lands of Kallang Basin began in April 1932. The task was not one devoid of impediments. There arose the problem of evicting squatters settled on the swamp land. The eviction of squatters, both Malays and Chinese, was the subject of a very careful study which had received the approval of the Colonial Secretary and of the Malay Member for Singapore. The programme provided for the compensation and provision of replacement sites for the relocation of houses in at least four alternative locations.

Boom in commercial aviation

The opening of Kallang airport immediately spurred several significant developments in Singapore's commercial aviation scene. On 28th June 1937, Wearne Air Services, the first airline to be formed in Singapore, started a thrice weekly service to Kuala Lumpur and Penang using a de Havilland DH.89 Rapide, dubbed the VR-SAV 'Governor Raffles'. With the arrival of a second Rapide, VR-SAW 'Governor Fullerton', the frequency was increased to daily flights in September. Wearne Air Services also became the first company to offer postal air services in Malaya, with letters carried on passenger flights to the airline's destinations.

Singapore saw its beginnings as an international air hub. At the time, Australian flag carrier Qantas was

already operating London-bound services known as the 'Kangaroo Route'. In an early form of codeshare arrangements, Qantas flew from Brisbane to Singapore, where passengers then connected onto Qantas's partner, Imperial Airways, which flew to London Croydon. The journey took up to 12 and a half days of "hopping" across Asia and Europe, including overnight stops and a train ride over Mussolini's Italy.

In May 1938, the Dutch announced that it would bring London within eight days of Sydney when the KNILM service between Batavia and Australia would be introduced. This gave a challenge to

Imperial Airways and Qantas to provide a faster schedule with its flying boats. Indeed, by 26 June 1938, passengers were introduced to a new service which would enable them to fly all the way from London to Australia on the Short S.23 Empire flying boats without a change of aircraft. Singapore gained new importance as a vital link in the world's air routes with the extension of the Empire flying-boat service beyond Singapore to Australia and the new KLM/KNILM service from Batavia to Australia.

By the first anniversary of the opening of Kallang Airport, Imperial Airways had switched from the Atalanta landplanes to the luxurious Empire flying-boats, while the Dutch had replaced their fleet of DC-2s on the Far East service with the bigger and faster DC-3s.

International air transport history was made on Saturday afternoon of 10th May 1941, when the 42½-ton Boeing 314 Clipper, NC18602, named the "California Clipper" landed on the waters in front of Kallang Airport. Operated by the Pan American Airways, this was the inaugural scheduled airline service from San Francisco to Singapore. To US shippers and businessmen, this meant that travel



A DC-3 belonging to KLM en route to the Netherlands at Kallang airport, 1939. Source: Leiden University, CC BY 4.0

AEROCOMMUNITY

time to Singapore had been cut from 25 days by steamer to just six by air.

Regular passenger airline services through Singapore were steadily expanded. Kallang airport became the place of call for the most important airlines of the time; Imperial Airways, KLM, Qantas, and KNILM. In addition to the England-Australia route with Qantas, Imperial Airways also ran weekly services from Penang to Hong Kong, while KLM airliners from Holland to Djakarta called at Singapore. When war engulfed the region in late 1941, these services were continued at first at a reduced frequency, and later shelved.

The War Years

With mounting tensions in east Asia, the RAF sent in Brewster Buffalo single-seater fighter aircraft to beef up



Twelve Brewster Buffalo Mark Is of No. 243 Squadron RAF, based at Kallang, Singapore, in flight over the Malayan jungle in formations of three, accompanied by a Bristol Blenheim Mark IV of No. 34 Squadron RAF (lower right), based at Tengah. Photo: Imperial War Museum Collections

the defences of Malaya and Singapore. Two new squadrons, equipped with the Buffalos were formed at Kallang, largely with airmen who had just arrived in Singapore from England and New Zealand.

These were later augmented by Hawker Hurricanes hurriedly shipped over from the Middle East. Kallang also saw the transit of RAF Blenheim bombers which were dispatched shortly after their arrival to the north to counter the Japanese invasion forces.

When the Japanese launched their invasion of Malaya and Singapore on 8 December 1941, Kallang was the principal fighter airfield.

By January 1942, it was the only operational fighter airfield in Singapore, as the other airfields (Tengah, Seletar and Sembawang) were within range of Japanese artillery at Johor Bahru, and suffered from heavy bombardment.

Japanese forces landed on Singapore northern shores on the morning of 8th February. Air battles went on over the island for the rest of the day. By nightfall, it was clear that Kallang, the last airfield standing, could no longer be used as a base. The remaining Hurricanes were withdrawn to Palembang, Sumatra and the Japanese had full control of the skies over Singapore. On Chinese New Year Day, 15 February 1942, the British surrendered Singapore to the Japanese invading forces.

During the Japanese Occupation of Singapore, the Japanese Army made modifications to the runway at Kallang to accommodate their heavy bombers. Over the circular grass landing ground, they built a single runway spanning 5,500 feet long and 165 feet wide; running from the sea to the north-east and crossing Mountbatten Road. The runway consisted of about 4 inches of concrete and 9 inches of hard core.

Commercial aviation traffic at Kallang Airport took an unwelcome pause.



Aerial photographs by the British Royal Air Force between 1940 to 1970s, from a collection held by the National Archives of Singapore. Crown copyright.

EMERGING THEME: GEOSPATIAL TECHNOLOGIES AND UNMANNED AIRCRAFT SYSTEMS

Geospatial technology, digital construction, and unmanned aerial vehicles (UAV) were highlighted at the recent Geo Connect Asia 2022 exhibition and conference.

Geospatial development is an important dimension of Singapore's Smart Nation initiative, and a Geospatial Masterplan has been developed to guide the development and adoption of geospatial solutions. This was according to Mr Edwin Tong, Minister for Culture, Community and Youth and Second Minister for Law, who delivered the opening address at the opening ceremony of Geo Connect Asia (GCA) 2022.

Held at the Sands Expo & Convention Centre from 1 to 2 June 2022, the second edition of Southeast Asia's flagship geospatial and location intelligence technology trade event drew 2,000 professionals from 36 countries and over 40 exhibitors. The conference segment saw close to 80 prominent speakers and moderators, spurring robust discussions on the application of geospatial technology across multiple industry verticals.

In his speech, Minister Tong also illustrated the relevance of geospatial technology in the development of Smart Cities, citing the example of Volocopter using geospatial technology

to plan the integration of air mobility with urban transport networks. Minister also toured the exhibition showground, which included 12 companies comprising the Singapore Pavilion, led by SGTech.

With developing interest in the integration and use of UAVs for the collection of geospatial data, members of the Singapore UAS Community by AAIS were well-represented amongst other solution providers, educational institutions and commercial exhibitors at GCA 2022. These included Heron Technology Pte Ltd, MF Media Academy Pte Ltd, Viscoy Pte Ltd and YJP Surveyors Pte Ltd. The Singapore UAS Community also had a booth to network with others in the geospatial community.

The Conference themed "Imagination meets reality: placing geospatial solutions at the heart of decision-making" featured presentations by several UAV players and two panel discussions on drones. The first panel, discussing "Drones for good and goods: building excellence across ASEAN", was moderated by Mr Robin Thevathasan of AAIS.



Panel on "Drones for good & goods", held on day 2 of the event.

Panellists included Mr Abhinand Pillay of Aerodyne who also delivered the keynote, Mr Ryan Lee of Heron Technology, Mr Benjamin Williams of the Singapore Red Cross Society, and Mr Yue Keng Mun of Temasek Polytechnic. The panel explored the role of technology (e.g. 5G) in enabling drone operations, and the viability of a portable unmanned traffic management system to support humanitarian drone operations in rural environments.

The second panel on 'Innovative drone-based solutions: revolutionising business applications' took a more case driven approach and was moderated by Mr Mohd Safuan Mohd Zairi of MRANTI. Panellists were Mr Ariffin Aris of AECA Solutions, Mr Rob Sanchez of China Construction, Mr Simon Morris of Quantum Systems and Mr Vincent Aw of Singapore Land Authority.

GCA is set to return to Singapore for its third edition from 15 to 16 March 2023. Event organiser, Montgomery Asia, plans to launch of a dedicated UAV-focused industry show, Drones Asia, at GCA 2023.



The Singapore pavilion at Geo Connect Asia 2022 Photo: Montgomery Asia



MAKE YOUR MARK FOR
THE GREATER GOOD

JAN 2023
INTAKE

MAKE YOUR MARK ON A NEW FRONTIER

BEng Aerospace Systems

The Bachelor of Engineering Aerospace Systems offered by SUSS School of Science and Technology (SST) is an Honours programme that provides a firm grounding in aerospace engineering (material, structure, aerodynamics, control, propulsion, design), avionics systems, aviation management and a wider perspective on how it could benefit society so that you can achieve new heights in your aerospace career.

Unique features:

- Distinctive programme that combines academic study with practical hands-on experience
- Rigorous curriculum in aerospace engineering, avionics systems and aviation management
- Relevant and real-world knowledge in solving aviation maintenance and applied research issues

Apply now at
suss.edu.sg/apply



SUSS
SINGAPORE UNIVERSITY
OF SOCIAL SCIENCES



NICOLETTE PANG
BEng Aerospace Systems

AEROSPACE LEADERS' DIALOGUE SINGAPORE 2022

AAIS members, leaders and senior executives from the industry gathered at the inaugural Aerospace Leaders' Dialogue Singapore (ALDS) 2022. The event featured a fantastic line-up of speakers from across the aerospace sectors, in what was described as a "confluence of some of the best minds in Aviation".

Organised by AAIS on the sidelines of Singapore Airshow 2022, ALDS took place on 17 February 2022 at the Park Royal Collection Marina Bay in front of a small audience, with a simultaneous livestreamed telecast. The theme for this inaugural executive dialogue was 'Sustainability, Innovation and Technology for the Future of Aerospace'.

The event kicked off with opening remarks by AAIS President Wong Yue Jeen. Mr Wong warmly welcomed the international speakers and guests back to Singapore and the recommencement of such in-person events after

a hiatus of almost two years. In his address, Mr Wong noted that it could take another year or two for aviation to fully recover from the impact of the pandemic. Nevertheless, the momentum for recovery had begun with encouraging growth seen in both commercial passenger and air cargo traffic in the more recent months. He said it was, therefore, "timely that we turn our attention to the future and make sure we are positioned well for it."

Participants were privileged to hear from high profile industry leaders with presentations from Airbus, Boeing, GE Aviation, Liebherr-Aerospace and Rolls-Royce. Many important

insights were shared on the efforts, developments, and challenges to enabling the aviation and aerospace industries to achieve Net-Zero Emissions by 2050. Speakers also spoke on the innovative technologies and services being developed within their organisations to contribute to business and environmental sustainability. The two ensuing panel discussions touched on corporate priorities on the road to recovery, renewable energies, workforce and capability development and other pertinent industry concerns.

ALDS 2022 was supported by the Singapore Economic Development Board and live-streamed with the sponsorship of DJET Air. Our deepest appreciation to the panel speakers and their staff, and to attendees, both in-person and on live-stream.



AAIS President Wong Yue Jeen delivering his opening remarks



Some 40 senior executives from the AAIS membership attended the event in person



Panel discussion 2 featuring (from left) AAIS Chief Executive Sia Kheng Yok (moderator), Dr Valerie Manning of Airbus, Nicolas Bonleux of Liebherr-Aerospace & Transportation and Dr Bicky Bhangu of Rolls-Royce

Panel of Speakers – ALDS 2022



Dr Valerie Manning
Senior Vice President, Training and Flight
Operations Services
Airbus



Dan Abraham
Senior Vice President of Commercial Sales,
Marketing, and Business Development
Boeing Global Services



Kathy MacKenzie
President & CEO, Commercial Engine
Operations
GE Aviation



Nicolas Bonleux
Managing Director and Chief Commercial Officer
Liebherr-Aerospace & Transportation



Dr Bicky Bhangu
President, Southeast Asia, Pacific & South Korea
Rolls-Royce

SINGAPORE AEROSPACE TECHNOLOGY LEADERSHIP FORUM (SATFL) 2022

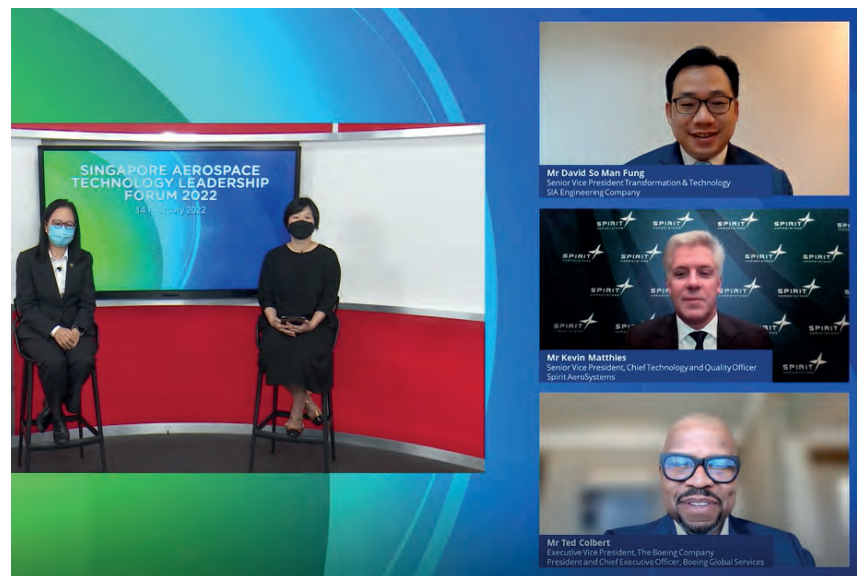
Held on 14 February, SATFL 2022 kicked off a series of thought-provoking conferences and industry engagement events that took place during the week of the Singapore Airshow. Co-organised by A*STAR and AAIS, SATFL 2022 was conducted virtually with the theme, 'Relaunching Aviation'.

In his keynote address, Minister (MOM/MTI) Dr Tan See Leng emphasised the government's commitment to continue supporting the transformation and upskilling of the aerospace workforce, as well as the industry's strategic research initiatives.

The first of two panel sessions was moderated by Gayle Chan of DSTA, with speakers: Ted Colbert of Boeing, David So Man Fung of SIAEC, Kevin Matthies of Spirit AeroSystems, and Lee Hui Fung

of ST Engineering. The panel addressed technologies that have or are being developed as aerospace companies 'Position for Recovery', touching on implementation, change management, human capital development and other factors to consider in implementing new technologies within their organisations.

The second panel on 'Strengthening Future Readiness' was moderated by Robin Thevathasan of AAIS, featuring speakers: Sabine Klauke of Airbus, Fassi Kafyeke of Bombardier, Francis Preli of Pratt & Whitney, Grazia Vittadini of Rolls-Royce and Bernhard Quendt of Thales. The session saw robust discussions on the path to Net Zero, touching on collaborations across the industry, electric and hydrogen-powered flights, and SAFs.



Distinguished panellists and moderator of SATFL 2022 'Position for Recovery' session

SINGAPORE PAVILION @ SINGAPORE AIRSHOW 2022

Together with members, partners and exhibitors, AAIS had an exciting and fruitful week, facilitating exhibitors under the Singapore Pavilion at the Singapore Airshow 2022. Our calendar for the week was packed with face-to-face and virtual B2B meetings for members and exhibitors, as well as conducting industry briefings for international industry delegations and connecting them with the Singapore aerospace community.

The Singapore Pavilion featured a great selection of small and medium enterprises (SMEs) representing a diverse cross-section of the local ecosystem. Capabilities showcased include parts design, leasing, surface treatment and special processes, aircraft ground services, specialised

unmanned aircraft systems, digital solutions, and others.

Among VIPs who visited, we were pleased to welcome Minister of Transport S Iswaran, SMS Defence Heng Chee How, Chief Defence Scientist Tan Peng Yam, Chief of Defence Force LG Melvin Ong and Chief of Navy RADM Aaron Beng on the first day of the exhibition (15 February), as well as JTC Chairman Tan Chong Meng, CEO Tan Boon Khai, and JTC Board members on Day 2 (16 February).

We thank all visitors for dropping by the AAIS booth, and exhibitors, members and partners for their strong support and participation in our Airshow programmes.



Minister S Iswaran (left), dropping by for a visit at iHawk Global Pte Ltd's booth



Buzz and excitement at the Singapore Pavilion at Singapore Airshow 2022, held from 15 to 18 February

Singapore Pavilion exhibitors

Company Name	Booth No.
ACP Metal Finishing Pte Ltd	A – C11
Airtec Corporation (Asia) Pte Ltd	A – C14
Alpsun Pte Ltd	A - D12
Apps-Connect Pte Ltd	A – C15
CBMM Supply Services and Solutions Pte Ltd	A – C13
Diamond Aviation Pte Ltd	A – D16
Hope Technik Pte Ltd	A – C23
Hypercoat Enterprises Pte Ltd	A – D24
iHawk Global Pte Ltd	A – D08
Transfingo Aviation Solutions Pte Ltd	A – D06

Coordinated by:



Supported by:



DIALOGUE WITH EASA EXECUTIVE DIRECTOR

In collaboration with the EASA regional office in Singapore, AAIS co-organised a dialogue session with EASA Executive Director Patrick Ky on 18 May 2022 at the Swissotel Stamford Hotel. The session welcomed a strong turnout of more than 60 senior executives and industry leaders.

The session began with a welcome by Mr David Waller, EASA representative in Singapore, and was moderated by AAIS President, Mr Wong Yue Jeen. Mr Patrick Ky made a short presentation touching on key topics including innovation, aviation safety, urban air mobility, artificial intelligence, and



underlined the aviation industry's focus on sustainability and a "Green Recovery". He also gamely took on questions from senior executives and industry leaders in attendance, covering manpower crunch issues



and geopolitical challenges in Europe impacting aviation globally.

Our deepest appreciation to Mr Patrick Ky, the EASA regional office and all attendees of the dialogue.

AAIS NEW MEMBERS' NIGHT

AAIS held our inaugural New Members' Night on 18 May 2022 at Parkroyal Beach Road. This new event was put together to welcome and introduce new corporate members that have joined AAIS in the past six months.

With the easing of the safe management measures, we were delighted to be able to gather

in-person and facilitate face-to-face introductions between representatives of member companies and members of the AAIS Management Committee.

AAIS President Mr Wong Yue Jeen warmly welcomed new members, providing a preview of activities in the coming months. Participants had an enjoyable evening as connections were made and stories were shared.

AAIS VP Richard Wong then capped off the first AAIS New Members' night with a toast.

We look forward to catching up with more members at upcoming events, including our quarterly HOST Networking session. Keep a lookout for HOST and other upcoming in-person activities in our newsletters, and do register to attend!



VIRTUAL BUSINESS MISSION JAPAN

AAIS was pleased to facilitate a virtual business mission to Japan from 24-28 January 2022, in partnership with SME Support Japan (Organization for Small and Medium Enterprises and Regional Innovation, Japan).

This marked the fourth year of our members' participation in the annual 'CEO Business Meeting Event for Innovative Industry', which involves business meetings with Japanese SMEs. The pre-arranged B2B matching and meetings were held online, supported by interpreters and business advisors.

Participating companies were:

1. ACP Metal Finishing Pte Ltd
2. CW Aero Services Pte Ltd
3. Diamond Aviation Pte Ltd
4. KBG Contract Machining Pte Ltd



Participants had positive feedback for the programme:

- "Good and in-depth. Managed to get some potential customers."
- "Well organized and good translators available."
- "A good arrangement for matching companies which can achieve mutual benefits. All

meetings went smoothly and we will have further discussions with the companies."

We thank SME Support Japan for this opportunity and look forward to more engagements and physical networking events with Japanese companies when the situation allows.

MRO AMERICAS 2022

The MRO Americas exhibition and conference was held at the Kay Bailey Hutchison Convention Center in Dallas, Texas (USA) on 26 to 28 April 2022.

Alongside more than 800 exhibitors on the show floor, two companies from Singapore took the opportunity to showcase their capability, namely Rexadvance Technology and Topcast Aviation Supplies. Other members like KeepFlying, also took the opportunity to visit. The show attracted more than 15,000 trade visitors seeking to reconnect with suppliers and vendors, post-pandemic.



#BREAKTHEBIAS: AVIATION AND AEROSPACE CAREERS IN SINGAPORE

In conjunction with International Women's Day (IWD), AAIS, together with the Women in Aviation International Singapore Chapter (WAI-SG), and the NTU Aerospace Society organised a hybrid event on 16 March 2022 to discuss aviation and aerospace careers in Singapore. The discussions centred around the theme for this year's IWD – 'Breaking the Bias'.

This hybrid event was conducted in-person with a small live audience of students at the Nanyang Technological University, and livestreamed online. The programme kicked off with welcome remarks by Ms Marie-Louise Philippe, President of WAI-SG. We were pleased to have Ms Susan Goh of SIA Engineering, Ms Leong Wai Kuan of UPS and Ms Michelle Woon of Dnata share reflections on their careers in

a conversation moderated by Mr Oliver Chamberlain of AAIS Management Committee and Rolls-Royce, and hosted by Mr Chinmay Bhandari of NTU Aerospace Society.

The panellists gave their views on the representation of women in aviation and aerospace in Singapore and shared their experiences on career development, overcoming challenges and triumphs in a dynamic and exciting industry. Students and industry professionals also participated in discussions in person and via livestream touching on career progression, diversity and inclusion, and the future of the industry, among others.



From left: Ms Michelle Woon of DNATA, Ms Susan Goh of SIA Engineering and Ms Leong Wai Kuan of UPS

9100-SERIES STANDARDS REVIEW SESSIONS

The Singapore Aerospace Quality Group (SAQG), a community under the umbrella of AAIS, conducted two 9100-series standards review sessions on 11 & 12 January 2022, with the active participation of representatives from Singapore-based companies that are certified to the 9100-series quality management system standards.

The participants, who represented various sub-sectors, including airframe, avionics, component, defence, engine and special processes, gave their views based on experiences from

implementing the 9100 standards within their organisations.

The International Aerospace Quality Group (IAQG) produces the AS9100 standard as a set of guidelines used by the aerospace industry for implementing a Quality Management System. The standard is modified for the aerospace industry from the internationally recognised standard ISO 9001. The ISO 9001 standard is reviewed every five years to determine what changes, if any, are required to keep the standards up-to-date and relevant. IAQG supports these

changes and considers additional requirements that reflect the needs of the aerospace industry today to keep the AS9100 series of standards updated.

The comments gathered during these sessions will contribute to upcoming updates to be made by IAQG. We thank the participants for their commitment and contributions. There will be similar sessions in the near future, and we welcome interested companies/representatives to contact us (quality@aaais.org.sg) to be part of the SAQG.

AIRCRAFT LEASING TAX FORUM – BUDGET 2022

Held on 31st March 2022, this hybrid event discussed the latest tax developments from Singapore Budget 2022 that will impact the Aircraft Leasing industry.

The session kicked off with updates from Mr Low Zhi Hong, Account Manager, Capital Goods at EDB on the Aircraft Leasing Scheme. This was followed by a presentation by Ms Tan Bin Eng, Partner, Business Incentives Advisory Singapore at Ernst & Young (EY), who provided an overview of the key tax considerations for the aircraft leasing industry, an analysis of the Singapore tax environment, as well

as recent and anticipated updates to relevant global tax rules.

Ms Tan then joined Mr Lim Tse Yong, Vice-President and Head, Capital Goods & Conglomerates at EDB, for a frank and insightful panel discussion, moderated by AAIS Management Committee member, Mr Kevin Chow (CEO, Thales Solutions Asia). The panel took questions from the audience and discussed developments in the leasing industry, highlighting opportunities for Singapore as global tax rules are adjusted and leasing organisations re-strategise their businesses across various regions.



From left: Tan Bin Eng of EY and Lim Tse Yong of EDB, and moderator, Kevin Chow of Thales

The event was the first in-person seminar for members held at the AAIS premises in 2 years. The session was conducted and live-streamed from the new hybrid premises at AAIS. We thank all our speakers for the excellent insights and members for participating and contributing to the discussions in person and online.

MRO MARKET OUTLOOK, TRENDS AND IMPLICATIONS

This hybrid event which took place at the new AAIS hybrid training premises on 1st April 2022

featured Mr David Stewart, Partner at Oliver Wyman. Tapping on his expertise and more than 35 years of aviation and consulting experience, David provided

an analysis of the outlook for MRO and the forces that are set to shape the industry in the next decade.

In his presentation, David shared that global aerospace MRO spending was projected to recover to pre-COVID levels by 2023, and grow at a

CAGR of 8.9% in the next 3 years, to surpass US\$100 billion by 2026. He noted that recovery would be bumpy across regions, highlighting that the global fleet recovery will be led by the narrowbody aircraft, which are projected to make up about 64% of the fleet by 2032 versus 58% in January 2020.

David also shared useful insights specific to the Singapore aerospace MRO industry and took questions from in-person and online attendees on topics ranging from the Chinese aerospace market, manpower and talent and additive manufacturing, among others. We thank David for sharing his perspectives and analyses, and all in-person and online attendees for their active participation.



Mr David Stewart with in-person participants of the hybrid event

INTERNATIONAL AIR TRAVEL RECOVERY IN SINGAPORE AND THE REGION

The third instalment of our new series of hybrid events on 'International Air Travel Recovery in Singapore and the Region' was held on 21 April 2022, featuring industry analyst and consultant, Brendan Sobie of Sobie Aviation.

Brendan shared in-depth analyses of data including passenger traffic, airline operations and airport capacity figures from Singapore and around the

region, and discussed projections on the recovery curve. He noted an uneven and bumpy recovery trend for air travel within the Southeast Asia region, highlighting the impact of China's continued closure (zero-covid policy) on air travel recovery and Singapore's leading position within the ASEAN region.

Brendan also discussed changing international travel patterns and his views on industry actions needed to adapt to

these changes and the 'new norm'. His presentation was followed by a lively and interactive session with questions from both in-person and virtual attendees, touching on industry trends in the near future and the role of technology in the post-pandemic air travel era.

We thank Brendan for an insightful and beneficial session and all attendees for their active participation.



AVIATION SUSTAINABILITY FROM AN AIRLINE PERSPECTIVE

Held on 25 January 2022, this webinar featured Mr Chen Fook Ping, Vice-President of Sustainability at Singapore Airlines. Mr Chen shared insights on the Singapore Airlines Group's sustainability efforts. His presentation covered sustainability with respect to Climate Action, Responsible Consumption and having a Positive Impact on Society.

Last year, the Airline committed to a 2050 net zero carbon emissions target. It plans to achieve this by maintaining a young and modern fleet, operating efficiently, adopting sustainable aviation fuel and maintaining a carbon offset programme. To promote responsible consumption across its operations, it is practising the 5Rs of waste reduction, conserving

water and applying digital solutions. Finally, the Airline also hopes to use its business as a force for good in society.

To round off the session, Mr Chen observed that to achieve its sustainability and climate goals would require an "all hands on deck" approach involving all its partners – OEMs, suppliers, technology providers and government.

OUR NEW MEMBERS



Ordinary Membership
CBMM Supply Services and Solutions Pte Ltd

KeepFlying® is backed by Singapore based CBMM Supply Services and Solutions Pte Ltd., ascertains financial and risk forecasts in a post pandemic era where creditworthiness and legal hassles can consequently present pitfalls when repossessing an Aircraft or Engine in case of an Event of Default.



Ordinary Membership
Precision Heliparts Singapore Pte Ltd

Precision Heliparts Singapore Pte Ltd, a leading provider of products and value-added services to the aerospace and defense industry worldwide. PAG provides MRO & Supply Chain Solutions for Fixed and Rotary-wing aircraft. PAG subsidiaries have MRO and manufacturing capabilities on over 150,000 products in four vertical categories – Avionics, Components, Engines and DER/Manufacturing/Sub Assembly.



Ordinary Membership
Volocopter Asia Holding Pte Ltd

Volocopter is building the world's first sustainable and scalable urban air mobility business to bring affordable air taxi services to megacities worldwide. With the VoloCity, the company is developing the first fully electric "eVTOL" aircraft in certification to transport passengers safely and quietly within cities.



Associate Membership
Chee Fatt Co. (Pte) Ltd

Chee Fatt has been working closely with some of the world's largest organizations around the world, supporting their operations across multiple industries that include Aerospace, Building & Construction, Civil Defence, Manufacturing, Marine & Offshore, Mining, Oil & Gas and Ship Building & Repair.



Associate Membership
Global Resources Aviation Pte Ltd (Rishworth Aviation)

For 35 years over 100 airlines and aviation companies have trusted us to recruit and resource their operations with the right staff and engagement models. Whether building long term talent pipelines, developing bespoke staffing models, or managing one-off projects, the team at Rishworth Aviation are ready to deploy our global staffing expertise.



Associate Membership
High Commission of Canada in Singapore

The Canadian Trade Commissioner Service was established in 1895 & assists Canadian companies looking to export, invest abroad, or develop R&D partnerships using our extensive network of more than 1,000 trade commissioners, in over 160 cities across Canada and the world. The TCS also assists foreign companies planning to establish a physical presence in Canada &/or looking to source innovative solutions.



Associate Membership
LRQA Limited (Singapore Branch)

LRQA is a leading global assurance provider. By bringing together unrivalled expertise in certification, brand assurance, cybersecurity, inspection and training, decades of experience in risk management and mitigation and a keen focus on the future, we're here to support our clients as they build safer, more secure, more sustainable businesses.



Associate Membership
Sodick Singapore Techno Centre Pte Ltd

SSTC is wholly owned by Sodick Singapore. Located at JTC Cleantech Park, Jurong Innovation District, SSTC was set up to showcase the newest technologies developed by Sodick for the manufacturing industry. One of the key objectives is to introduce Smart Industry Transformation solution and Additive Manufacturing (3D Printing) to the precision engineering companies in Singapore and regional countries.

AAIS TRAINING CALENDAR

The Professional Development arm of AAIS offers a spectrum of training and development programmes throughout the year. These range from general or soft-skill courses to industry-specific certification courses.

AEROSPACE AND INTERNATIONAL STANDARDS/ CERTIFICATION

Understanding & Implementing AS 9100:2016 QMS*
15 September 2022
20 October 2022

AS 9100:2016 Internal Auditor Course*
15 & 16 September 2022
20 & 21 October 2022

Understanding & Implementing AS 9120:2016 QMS*
15 September 2022
20 October 2022

AS 9120:2016 Internal Auditor Course*
15 & 16 September 2022
20 & 21 October 2022

PROBITAS AS/EN/JISQ 9100:2016 Lead Auditor Course
12 to 16 September 2022

ISO 9001:2015 Internal Auditor Course
18 & 19 August 2022
1 & 2 September 2022
6 & 7 October 2022

ISO 9001:2015 Lead Auditor Course
22 to 26 August 2022
5 to 9 September 2022
10 to 14 October 2022

ISO 14001:2015 Internal Auditor Course
18 & 19 August 2022
6 & 7 October 2022

IRCA ISO 14001:2015 Lead Auditor Course
22 to 26 August 2022
10 to 14 October 2022

ISO 45001:2018 Internal Auditor Course
1 & 2 September 2022

IRCA ISO 45001:2018 Lead Auditor Course
5 to 9 September 2022

ISO 9001:2015 + ISO 14001:2015 + ISO 45001:2018 QEHS Internal Auditor Training
10 to 12 August 2022
19 to 21 September 2022

ISO 22301:2019 Internal Auditor Training#
11 & 12 August 2022
27 & 28 October 2022

IRCA/CQI Certified ISO 22301:2019 Lead Auditor Training
15 to 19 August 2022

IRCA/CQI Certified ISO 27001:2013 Lead Auditor Training#
19 to 23 September 2022

ISO 50001:2018 Internal Auditor Training#
11 & 12 October 2022

IRCA/CQI Certified ISO 50001:2018 Lead Auditor Training#
31 October to 4 November 2022

INDUSTRY PRACTICES

Human Factors and Error Management*
7 October 2022

Aircraft Interior Design, Engineering & Safety#
31 October to 3 November 2022
(4 half weekdays)

EASA REGULATIONS

EASA Part 21 Subpart J - Design Organisation Approvals (DOA)#
19 to 22 September 2022
(4 half weekdays)

EASA Part M, including SEARIF Part M Continuing Airworthiness#
27 to 30 September 2022
(4 half weekdays)

EASA Part 21 Initial Airworthiness#
10 to 13 October 2022
(4 half weekdays)

FAA REGULATIONS

FAA Part 21 Certification for Products, Parts, PMA, and TSOA#
15 to 18 August 2022
(4 half weekdays)

FAR 145 Approved Training Programs - Train the Trainer#
5 & 6 September 2022
(2 half weekdays)

NADCAP

Introduction to Pyrometry
22 & 23 August 2022

Nadcap Checklist Review - Chemical Processing
20 & 21 October 2022

QUALITY TOOLS & TECHNIQUES

Root Cause Analysis (RCA)
8 & 9 September 2022

Failure Mode & Effect Analysis (FMEA)
29 & 30 August 2022
25 & 26 October 2022

Measurement System Assessment (MSA)
15 & 16 September 2022

SPECIAL PROCESSES (NEW)

Welding Applications for Aerospace Qualification*
12 to 14 September 2022

Pyrometry Heat Treat Applications for Aerospace Qualification*
19 to 21 September 2022

NDT Level II - Penetrant Inspection Applications for Aerospace Manufacturing Qualification*
26 to 29 September 2022

NDT Level II - Magnetic Particle Inspection Applications for Aerospace Manufacturing Qualification*
3 to 6 October 2022

Shot Peening Applications for Aerospace Qualification*
10 to 12 October 2022

Flap Peening Applications for Aerospace Qualification*
17 to 19 October 2022

Visit www.aais.org.sg/training for the most updated list of training courses.



AAIS Training

Legend:

#Virtual Instructor Led Training (VILT)
*Hybrid Classroom Training

*Information is accurate at time of printing.
AAIS reserves the right to re-schedule or cancel any course due to unforeseen circumstance.

For enquiries, contact Jen Ng at +65 6922 1788 or email us at training@aais.org.sg



Association of
Aerospace Industries
(Singapore)

Feature prominently in the Singapore Aerospace Suppliers Directory 2023



**Get a marketing
package that suits
your needs and
budget today!**

For booking or enquiries, please contact

Ms Agnes Chua
Director - Sales & Marketing / Head - Publications
Mobile: +65 9182 8161
Tel: +65 6922 1778
Email: agneschua@aaais.org.sg

- A biennial publication, the Singapore Aerospace Suppliers Directory (SASD) is the only Singapore publication that offers an unrivalled marketing platform for aerospace companies and aerospace related products & services suppliers.
- The directory features a comprehensive listing of aerospace suppliers registered in Singapore including distributors of aircraft parts equipment, components, fuels lubricants, toolings, and providers of special processes including precision machining, heat treatment, inspection & testing, surface treatment and peening.
- The publication is widely distributed to the international aerospace communities, at various airshows and aviation industry exhibitions.
- Join us in the 9th edition of the SASD now! Standard advertisement rates apply.