

# Ascend



 **ST Aerospace**  
A company of ST Engineering

*Creating Value For You - Worldwide*

# perspectives

Welcome to the inaugural issue of *Ascend*, our newsletter that's designed to keep you abreast of what's happening at ST Aerospace.

Today, ST Aerospace provides products and services to a growing list of defence and commercial customers. At the last count in December 2010, we have a total of 315 customers in 65 countries, we have operations spanning the Americas, Asia Pacific and Europe, and employ over 8,000 staff of varied nationalities and cultures.

The main objective of this newsletter is to provide our valued customers, staff, associates and all stakeholders an avenue to be updated with the latest happenings, developments, solutions, innovations and initiatives undertaken by various business units in the ST Aerospace group.

We plan to issue *Ascend* once every six months, and softcopies will be available on our website - [www.staero.aero](http://www.staero.aero). I hope you will enjoy reading *Ascend* and find it informative and useful. We do also welcome your feedback to help us further improve our publication.

As we forge ahead into a new year, we will strive to deliver the best that we can for you. We look forward to your continued support.

**Chang Cheow Teck**  
President



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# Twenty Years and counting

2010 marks ST Aerospace's 20-year partnership with Japan Airlines (JAL). To commemorate our long-standing relationship with JAL, we organised a celebratory event and JAL's General Manager, Engineering and Maintenance, Mr Nobuhiro Sato, graced the celebration as our Guest-of-Honour.



Our relationship began when JAL became a shareholder of our subsidiary, ST Aerospace Services. Through the years, we have built a mutually rewarding partnership, and JAL has contributed to our growth as we built and invested in new capabilities.

Starting with the first JAL aircraft – a Boeing 747 inducted for the compliance of the Section 41 Pylon Modification – JAL has increased the scope of work entrusted to us. Our workscope expanded to include heavy maintenance checks and modification works on pylons, cabins and cockpits on various types of aircraft. The latest project that we completed was a cabin modification on two of JAL's 767 aircraft.

Over the years, we have deepened friendships with JAL employees at all levels, and value our relationship with JAL as a partner and a customer. Twenty years is a significant milestone in our relationship, and we look forward to growing this successful partnership.

## Engine MBH™ Contract for an entire fleet

In March 2010, ST Aerospace announced the award of a ten-year engine Maintenance-By-the-Hour (MBH™) contract to provide comprehensive engine maintenance and engineering support to Jet Airways and its low cost carrier subsidiary, JetLite. We will maintain a total of 143 CFM56-7B engines and provide on-wing, off-wing and on-site support, as well as fleet technical and asset management support.

The contract was won through an extensive international tender exercise. Despite the tough competition, we managed to stand out with our proven track record for quality, reliability and on-time delivery. This contract award affirms Jet Airways' trust and confidence in our ability to meet their long-term needs.

This contract marks the beginning of our partnership with Jet Airways in their engine fleet management, and we look forward to providing more MBH™ programmes to the industry.



# Growing from Strength to Strength



Underscoring their continued confidence in our quality and uncompromising services, Spring Airlines has awarded ST Aerospace a contract extension of our component Maintenance-by-the-Hour (MBH™) support by a further eight years.

The contract will expand our current support of the airline's fleet of 15 Airbus A320 aircraft to an expected fleet of up to 78 aircraft, affirming our standing as their trusted supplier. We were also conferred the Service Excellence Award during Spring Airlines' first Suppliers Conference.

We see component availability and quick turnaround time as key elements in ensuring the success of our MBH™ programme. Thus, we set up our very own import / export and logistics facility in Guangzhou in 2007 to support our maintenance and logistics business in China. Through this facility, and together with our global component distribution network, we are able to improve delivery lead time of components to customers worldwide. As of September 2010, ST Aerospace is contracted to support a worldwide fleet of more than 700 aircraft on the MBH™ basis.

## Supporting RSAF's Next Generation Training Needs

ST Aerospace recently added another feather to our cap when the Republic of Singapore Air Force (RSAF) awarded us a contract to procure 12 Alenia Aermacchi M346 aircraft and ground-based training system for their fighter pilot training in Cazaux, France. This acquisition is for RSAF's Advanced Jet Trainer (AJT) replacement programme.

ST Aerospace will undertake the overall management of the AJT programme, with Alenia Aermacchi providing the M346 aircraft, and Boeing supplying the ground-based training system. Committed to supporting RSAF's next generation training needs, ST Aerospace will ensure that the aircraft and systems delivered meet the exacting requirements of the RSAF.

In 2008, ST Aerospace teamed up with Alenia Aermacchi and The Boeing Company to form a consortium to jointly bid the M346 aircraft for RSAF's AJT replacement



programme. The acquisition cost of the aircraft, ground-based training system and associated spares are worth S\$543m, and delivery of the first aircraft is expected in 2012.

ST Aerospace currently provides a full spectrum of maintenance, engineering and logistics support - covering flight line operations, aircraft, component and engine maintenance, engineering services, inventory and warehouse management - on RSAF's current fleet of advanced jet trainers. We have provided depot maintenance for RSAF's A-4SU / TA-4SU fleet in Cazaux since 1999 and were contracted in 2007 to widen the scope of the maintenance programme to Total Aviation Support.

# Moving to the Next Level

ST Aerospace has developed a long-standing partnership with the Republic of Singapore Air Force (RSAF). Originally commissioned to supply depot maintenance services, our relationship has evolved and moved beyond maintenance, repair and overhaul (MRO) services. Today, we offer the RSAF a comprehensive and innovative performance-based logistics programme. Under this arrangement, we provide integrated logistics solutions to multiple RSAF platforms, covering the helicopter, fighter, trainer, transport, and unmanned aerial vehicle (UAV) fleet of aircraft. We also ensure that RSAF's aircraft are operationally ready.

Through the years, our partnership has also expanded to undertake pilot training. On behalf of the RSAF, ST Aerospace trains pilots who have graduated from the Basic Wings Course to prepare them for further duties as Transport and Rotary Wing pilots. Transport pilots are fully trained by ST Aerospace while Rotary Wing pilots undergo ground

school and simulator training with us. We also provide the RSAF with a ground-based training system comprising simulators, computer-based training, mission planning and debriefing systems.

Through our relationship with RSAF, we have developed in-depth understanding of their operational, training and maintenance requirements. We have also established strong friendships with operators and logisticians. Subsequently, our capabilities have grown to enable us to take an active role in supporting RSAF's overseas detachments and missions, including United Nations missions as well as Humanitarian Aid and Disaster Relief missions.

With our team of experienced engineers and comprehensive capabilities, ST Aerospace is committed to providing a full range of cost effective aircraft maintenance and engineering solutions to the RSAF.





# Meeting Requirements All Round

As a leading supplier of component repair and overhaul services, ST Aerospace offers more than 25,000 component repair and overhaul capabilities for commercial and military aircraft.

This extensive range of capabilities allows us to support a wide variety of aircraft components. In addition, acquisitions and joint ventures have allowed us to expand our global footprint as we extend our offerings in Asia, Europe and the rest of the world.

Catering to a global customer base, we have successfully managed requests on more than 600,000 components to date, and have an annual throughput of over 80,000 components. ST Aerospace supports a large variety of components for Airbus, Boeing and military aircraft as well as helicopters, regional jets and general aviation aircraft.

In particular, seeing a rise in demand for low cost carrier platforms such as the Airbus A320 and Boeing 737 aircraft, we will continue to expand our component repair and overhaul capabilities to provide comprehensive support for these platforms. Our current capabilities include an extensive variety of components, and we are looking to invest and add more in the future.



## Landing Gear Capability

We offer landing gear repair and overhaul services for commercial, helicopter and military aircraft platforms through our operations established in Oslo, Madrid and Singapore. These facilities are OEM repair and warranty centres, and are certified by various national regulatory bodies including FAA, EASA, CAAS and CAAC. In-house rework capabilities with direct OEM support allow us to provide comprehensive and competitive solutions.



# Powering Up the Future

ST Aerospace has been appointed by General Electric (GE) Aviation Services to provide global on-wing support for GENx-1B and GENx-2B engines over 20 years.

With this appointment, ST Aerospace joins the ranks of the few GE-approved vendors in the world able to perform servicing works for GENx engines. With formal training by the OEM, we will be able to provide customers with an added confidence and assurance of high quality maintenance services. In addition, the team will receive first-hand information on the progress and future developments of the engines. This certified training enhances our in-house knowledge, allowing us to provide customers with value added solutions.

Our team underwent training for on-wing support services at GE's Customer Technical Education Centre in Ohio, US. The visit was fruitful and insightful. Our team received valuable technical knowledge in maintaining the new engines. During the training, our team acquired skills to manage the main on-wing activities expected during the engines' Entry-in-Service phase. These activities included engine

change on-wing, line replacement units change, fan-stator/propulsor split and mate, full video borescope as well as bore-blending.

Designed to power the Boeing 787 Dreamliner and 747-8 aircraft, the new engines will soon be introduced into the market. Our completion of the on-wing support service training at this early phase will facilitate us to meet the needs of our customers as they arise.

"The opportunity to work side-by-side with a renowned engine manufacturer on an engine before it is granted approval for flight has broadened my technical horizon."

Teo Cher Chye, Senior Engineer, On-Wing Support team

# MD11 Centre of Excellence

Over the past 16 years, ST Aerospace has built a reputation as a Centre of Excellence for the McDonnell Douglas MD11 aircraft. Having a diversified range of maintenance, repair and overhaul (MRO) services, we are able to provide our customers with integrated maintenance and engineering solutions. To date, we have redelivered in excess of 830 MD11 aircraft to our international customers worldwide.

Placing a high emphasis on safety, we believe in providing quality, reliable and timely maintenance and engineering solutions to customers. Our quality standards are regularly audited and approved by major airworthiness authorities worldwide.

ST Aerospace's first MD11 aircraft was inducted into our Singapore facility in September 1994 for heavy maintenance checks. Since then, we have ramped up our operations and are now able to service the MD11 aircraft at our global airframe facilities in the Americas and Asia Pacific. Having a global footprint provides ease and convenience to our customers who operate the MD11 aircraft, as we support them wherever they are.

Through the years, we have also invested and upgraded our MD11 capability to include a wide spectrum of maintenance and modification solutions, ranging from full letter checks, airframe structural modifications, ageing aircraft modifications and corrosion prevention and control programmes, to passenger-to-freighter (PTF) conversions.

On MD11 PTF conversions, ST Aerospace has always prided ourselves as having a strong engineering capability, with an ability to provide flexible and customisable PTF programmes that meet our customers' needs. PTF is something that we have always done and performed well in, and our track record is a testament to our vast experience as well as our conversion and engineering capabilities.

We started our MD11 PTF programme in 2001, when we were awarded a contract to convert 13 MD11 passenger aircraft to a freighter configuration. With a good beginning, we managed to clinch and build a good orderbook for MD11 PTF conversions. To date, we have successfully redelivered 62 MD11 aircraft, and are the only MRO provider that has converted the most number of MD11 aircraft.

ST Aerospace has earned the respect of our customers for our excellent performance and outstanding track record in our support for the MD11 aircraft. We look forward to strong and lasting relationships with our customers that will continually advance our mutual goals of aviation safety, reliability and customer satisfaction.



ST Aerospace recently announced that we aim to establish an airframe facility in Guangzhou, China. A joint venture with Guangdong Airport Management Corporation, our Guangzhou facility will provide maintenance and modification solutions to Airbus and Boeing aircraft. With Guangzhou being an aviation hub in Asia, the new facility will be operated and managed as part of our global network of MRO facilities. It will leverage our Total Aviation Support capabilities to offer high quality and reliable services for customers worldwide.



# Creating Value W

Operating a global network of facilities in key aviation hubs in the Americas, Asia Pacific and Europe, ST Aerospace today serves a diverse customer base that includes many of the world's advanced military forces, air freight operators and leading airlines.

Besides assurance of cost competitiveness, ST Aerospace is steadfast in our focus to create value for customers. Placing a high emphasis on safety, ST Aerospace believes in providing quality, reliable and timely maintenance and engineering solutions to customers. Be it freighter conversions and other aircraft modification, avionics upgrades or fleet modernisation, ST Aerospace is committed to providing solutions that enhance the long term asset value on our customers' aircraft fleet.

Today, with a total hangar space capable of accommodating 28 wide-body and 39 narrow-body aircraft, we are able to provide global support for an extensive suite of aircraft maintenance and modification solutions for a wide range of commercial and military aircraft. The continued expansion of our global MRO network into cost efficient locations and newer capabilities will enhance our value proposition to better serve our customers.

Our vision is to develop total integrated service capabilities in each of the locations that we operate in, so that we can better serve our customers locally.

## Americas

ST Aerospace has been ramping up operations in the Americas, commissioning hangars at Panama and San Antonio, Texas, US. Our Panama facility specialises in MRO work for narrow-body aircraft and currently has a capacity to accommodate six narrow-body aircraft. Last year, our Panama facility added Airbus A320 capability and gained Federal Aviation Administration (FAA) certification to serve A320 operations in the Americas. We also added Embraer E190 capability, augmenting the wide range of aircraft types we support globally.

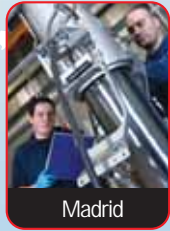
At our San Antonio facility, we added a new two-bay wide-body hangar to the existing six wide-body and seven narrow-body hangars.

## Asia

The new Guangzhou facility will initially house two wide-body hangars, which are capable of accommodating four wide-body aircraft. Located within the Guangzhou Baiyun International Airport and subject to approval from the Chinese government, the facility will commence operations two years after incorporation.



Copenhagen/London/  
Oslo/Stockholm



Madrid



Singapore



Shanghai



Xiamen



Guangzhou



Ballarat

# orldwide

Besides this, we unveiled our new airframe hangar at Pudong International Airport in Shanghai, China, earlier in March. The strategic location of the new facility at Pudong complements our existing operations at Hongqiao International Airport and provides flexibility to customers operating in and flying into Shanghai.

Also in Xiamen, China, we have a joint venture company with Xiamen Aviation Industry Co. This facility will initially be equipped to provide MRO and total support services for the CFM56-5B and CFM56-7B engines that power narrow-body aircraft such as the 737 and A320 family of aircraft. Construction of the facility began last year, and we hope to be operational by end 2011. Our Xiamen facility will complement our engine facility in Singapore and enhance our capability to provide integrated MRO solutions.

In the engines business, ST Aerospace was selected by GE Aviation Services to be an On-Wing Support provider for GEnx-1B and GEnx-2B engines that power the 787 and 747-8 aircraft. Preparations for the On-Wing Support service are underway, as we invest in the set up of capabilities, leveraging our global MRO network and relationships with operators that have ordered GEnx-powered aircraft.

## Europe

Our component business continues to grow in Europe. Our Maintenance-By-the-Hour (MBH™) support programmes also continue to gain popularity among operators of the 737 and A320 family of aircraft. Initially tailored for start-up airlines and low cost carriers, the MBH™ solution has achieved considerable success with traditional airlines as well.

To enhance our component service offerings, ST Aerospace established a landing gear MRO joint venture with Iberia Maintenance in Madrid, Spain in late 2008. Earlier this year, our Madrid facility gained FAA certification, and is currently the only certified FAA Part 145 landing gear maintenance repair station located in Spain that specialises in the maintenance needs of A320, A330 and A340 landing gears. Another noteworthy mention is that we managed to achieve the FAA certification in less than two years. This is a shorter period than the typical duration for certification processes for new repair stations in Europe.

Given our global footprint and investments in capabilities, we are able to support and provide integrated services for customers all around the world. As we grow, we will continue to explore possibilities of expanding our global footprint and reach out to better serve our customers, and be there wherever they need us to be.

# Boeing 757 conversion capability



In August 2010, we introduced a second conversion line for the Boeing 757 PTF programme in Singapore, bringing the total aircraft lines for this conversion at ST Aerospace to five. Today, the work is spread over two locations – in Mobile, Alabama and Singapore – and we have successfully completed converting 30 of the 87 aircraft contracted by FedEx Express.

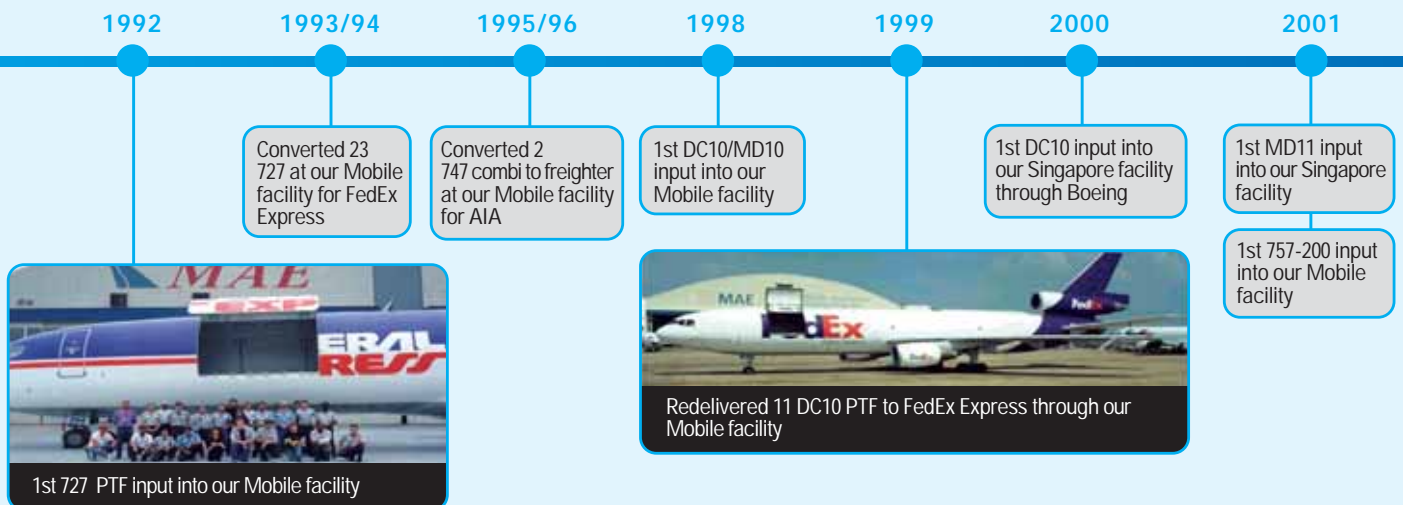
Our expertise and experience in the 757 freighter conversion validate the claim that we are truly one of the few MRO providers in the world with an in-house aircraft design engineering capability that offers a wide range of customised engineering and design solutions. Importantly, as a licensee of Boeing data, we bring customers the benefits of Boeing's continued product support system during the operational life of their 757 aircraft.

ST Aerospace first commenced the 757 PTF conversion programme in 2004 when Boeing licensed Israel Aerospace Industries (IAI) and ourselves to jointly develop a Supplemental Type Certificate (STC). IAI later dropped out of the programme while we went on to manage the programme and engineering development of the STC.

The first 757 conversion work was undertaken for DHL. In 2001, together with Boeing, we delivered the first production 757 Special Freighter to DHL. By 2004, all 17 aircraft were redelivered to DHL.

ST Aerospace now offers the 14-pallet, 14½-pallet and 15-pallet configurations to suit different customers' requirements.

## ST Aerospace's PTF Conversion Milestones



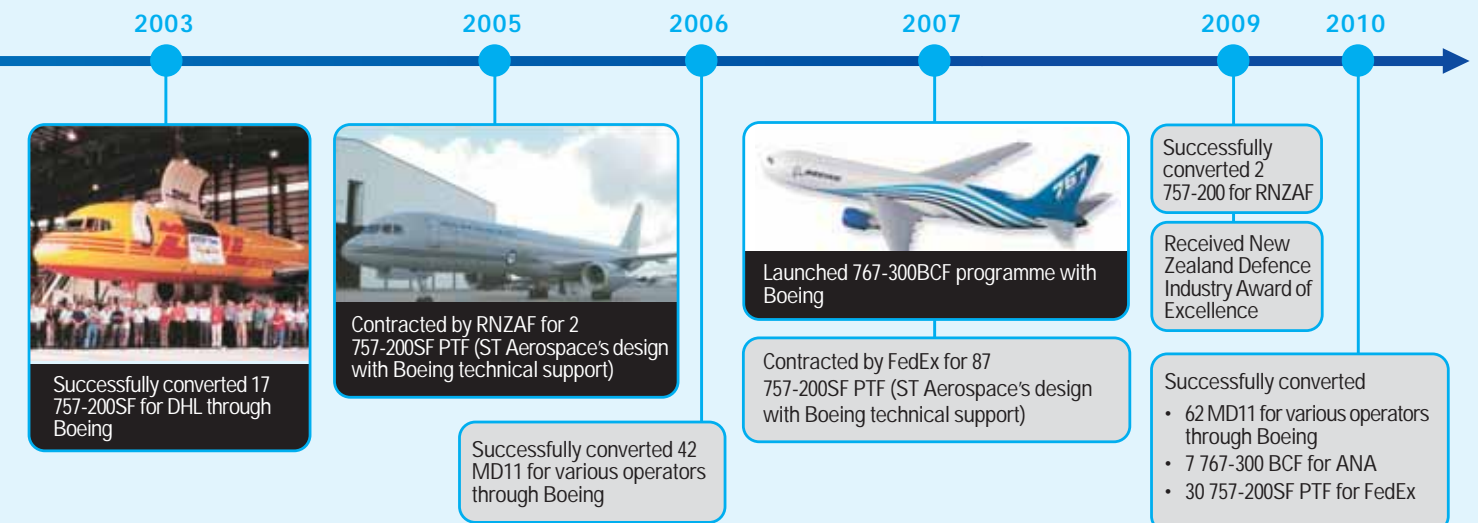


Also, ST Aerospace holds a US Federal Aviation Administration (FAA) awarded STC for the 14-pallet configuration. This STC was developed in-house by our Engineering & Development team using original manufacturer licensed data, and is the only 757-200 PTF STC based on Boeing's data. ST Aerospace was awarded the STC on 2 April 2008, a mere 11 months from aircraft induction to STC approval. We recently obtained two STCs from the Civil Aviation Administration of China (CAAC) and Transport Canada respectively. These STCs were developed based on our existing FAA-approved STC.

Besides PTF conversions, ST Aerospace was also involved in the development of a unique multi-role combination solution for two Royal New Zealand Air Force's (RNZAF)

757-200 aircraft. The configuration allowed for the carriage of passengers, freight, mixed passenger-freight, Very-Important-Persons and Aero-Medical Evacuation. Although the work was conducted for a defence operator, the design, modification and certification were performed in accordance with the FAA STC process. Both RNZAF aircraft were successfully redelivered with enhanced capabilities and are now in operational service.

For our innovative and adaptive engineering design, ST Aerospace was awarded the Defence Industry Award of Excellence by the Defence Industry Committee of New Zealand. The award is a testimony of ST Aerospace's expertise, experience and engineering finesse.





# Engineering Developments

Complementing our varied strengths as the largest airframe maintenance specialist in the world, ST Aerospace goes beyond MRO capabilities, exploring engineering initiatives to add to our offerings: avionics, cabin interior and PTF conversions.

## Avionics

Through the years, we have built extensive military avionics capabilities and successfully completed helicopter and fixed wing mission computers. Our expansion to provide upgrade solutions with a "strap-on" mission computer concept enables upgrades to be done without modifying existing software on the aircraft. Our solutions are based on existing mission computer hardware with the ability to be customised to individual needs.

Apart from mission computers, we have expertise in avionics systems modernisation. In September this year, we celebrated the redelivery of the first C130 modernised prototype aircraft to the RSAF. This aircraft was equipped with an indigenously designed glass cockpit and a modernised avionics suite that significantly improves the aircraft's operational readiness, despatch reliability and operational efficiency. Being Global Air Traffic Management (GATM) compliant, the new avionics suite enables the aircraft to navigate safely, efficiently and accurately through CNS/ATM<sup>1</sup>-regulated airspace, reducing the aircraft's response time in emergency operations.

The C130 modernisation took about 2½ years, from the design process to the maiden flight – a significant achievement for such a large-scale modification. ST Aerospace's ability to offer this innovative solution and complete the modernisation within the contractual schedule is a further testament to our engineering expertise.

With our added experience in integrating commercial avionics onto small light helicopters, our foray into civil avionics will focus on passenger needs in terms of entertainment, health and safety applications using wireless Internet technology.

We are also exploring the possibility of developing an aircraft Wi-Fi avionics suite that will allow passengers to surf the Internet, access email and even stream videos. Future applications could include real-time health monitoring and other flight deck operations.

Eventually, we could even enable flight data to be transmitted to the flight operations centre via broadband, reducing the current dependency on black boxes installed in aircraft.

## Cabin Interior

This year, ST Aerospace completed a few interior modifications and obtained our first EASA STC for an Airbus A320 aircraft for Jetstar Asia. Our latest cabin modification is a DC8 VIP modification commissioned by a private Middle Eastern customer. It was a feast for the senses for the team as they worked with intricate vanities, posh interiors and cabinetry.

Leveraging our established programme management and aircraft engineering expertise, our cabin interior refurbishing capability has since grown from 2000. We have also built rendition capability, engineering certification and strong ties with a number of key component suppliers.

<sup>1</sup> CNS/ATM - Communication, Navigation, Surveillance, often associated with air traffic management.

Currently an EASA Design Organisation Approval holder, we intend to apply for the EASA Product Organisation Approval (POA). This will allow us to offer shorter turnaround time with alternative options to our customers.

## PTF Conversions

PTF conversions are one of ST Aerospace's core businesses. Over the past 18 years, we have established ourselves as a Centre of Excellence for conversions including engineering capability. We have built extensive PTF experience and track record for the Boeing 727, 747, 757, 767, DC10 and MD11 aircraft.

In 2007, we were awarded our largest PTF contract to date, a conversion contract for 87 757-200 FedEx aircraft into a 14-pallet configuration. Another area of interest is the development of the 757 combi and 757 multi-role configurations. We have aptly demonstrated our competencies and capabilities with the RNZAF programme.



We are proud to have received the New Zealand Defence Industry Award of Excellence as a result of this programme.

With an increased demand for freight aircraft, we plan to leverage our expertise to develop cost effective and innovative PTF and multi-role solutions for other platform types.

# ST Aerospace Designs Next Generation UAV

ST Aerospace prides itself on being able to provide customised solutions to meet customers' requirements. Developed for fully autonomous flight operations, our family of UAV is designed to maximise commonality of components and features that enable ease of operation as well as minimise logistics overheads.

Indigenous to Singapore, the Skyblade III system - including the flight control computer - allows high customisability to fit user requirements.

Acquired by the Singapore Armed Forces to enhance tactical surveillance capabilities, the Skyblade III is easily deployed with minimal logistics to carry out day and night surveillance missions. It is also a highly mobile piece of equipment, suitable for use in constrained spaces or on board a ship. With an endurance of more than 60 mins and a modular design to allow a variety of payloads, it

employs a deep stall recovery mechanism with airbags, making landing more predictable and reliable.

With the success of Skyblade III, we will continue to expand our offerings and grow our UAV business.

A multi-role tactical UAV, the Skyblade IV has an unswept chord centre wing and tapered outboard wings, with V tail surfaces and a pusher engine.

Through a catapult-assisted launch, requiring no runway for takeoff, and a parachute recovery, the Skyblade IV is suitable for missions such as reconnaissance, surveillance, battle damage assessment, search and rescue, artillery fire support, target tracking and maritime or coastal patrol. It is fully autonomous with real-time imagery and telemetry downlinks.

A revised prototype Skyblade IV was unveiled at the Singapore Airshow this year. Improvements included modularity, maintainability and performance.





# Kaizen effort wins national recognition

At the Singapore Workplace Safety Awards held in July, our Super Puma Tail Boom cum Trolley project won an award in recognition of our innovation and efforts to achieve a more secure and safe work environment, minimising lost time and effort that result when accidents occur.

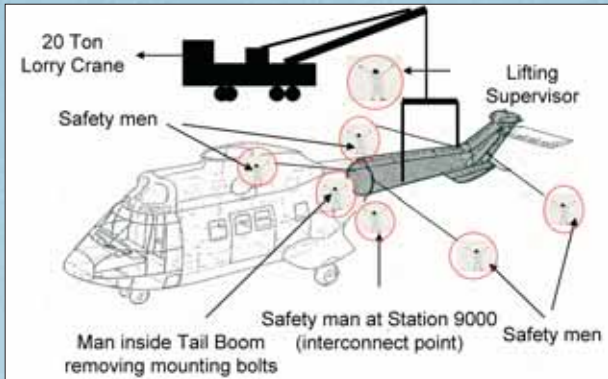
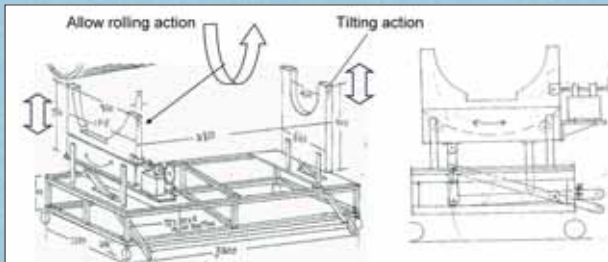
One of the critical inspection and servicing tasks during the maintenance of the Eurocopter Super Puma involves the removal and re-installation of the tail boom section of the aircraft. The conventional approach entails the use of a 20-tonne lorry crane to lift the tail boom section away from the aircraft structure after dismantling and also to reposition it prior to re-assembly. Considerable manpower and coordination effort are needed to mitigate the risks of the complicated lifting and manoeuvring operation, which requires competent and qualified personnel.

To eliminate the need for the lifting operation, our team designed and built a Super Puma Tail Boom Stand cum Trolley that is robust, mobile and equipped with rolling, tilting and height-adjustable features. Strapped to the equipment and towed away safely when the removal and re-installation processes are completed, the Stand cum Trolley makes operations safer. At the same time, it has improved productivity by 90%. This process, which normally takes seven men eight hours to complete, can now be accomplished by three men in two hours. In addition, workers' fatigue is reduced. The project team also cultivated teamwork and out-of-the-box thinking during this exercise to seek continuous process improvement.

Whether it is a downturn or upturn, ST Aerospace has continued to undertake process improvement, business innovation and lean productivity initiatives to work faster and utilise fewer resources. With an emphasis on continuous improvement and innovation throughout various aspects of operations and work processes (from design, materials, planning, quality to production), our Kaizen approach of continuous improvement engages active inputs from all employees - from senior and middle management to line supervisors and production workers. It has also reinforced among employees the value of teamwork and a greater appreciation of competitive challenges.



# Safety Month 2010 in October



Another recent example that showcases our continuous improvement culture is a Kaizen project on the installation of a fire suppression system onboard the MD11 freighter-converted aircraft. The modification includes installing sensors as well as the intelligent fire monitoring and suppression system within the ceiling of the main cargo deck.

The project team applied Kaizen tools such as standardised work combination sheets to complete the modification on the first aircraft together with a C check in 25 days. During the process, the team examined each task and the man-hours allocated. Having identified that most effort was needed in installing the penetrators, argon and foam tanks, which had to be aligned at varying heights together with offset positioning from the aircraft centerline, the team overcame all the engineering and maintenance issues by working together to come up with an innovative solution.

The solution implemented by the team reduced cycle time and enabled the check to be done within a turnaround time of 23 days and the modification within 15 days. For the customer, this meant that the aircraft need not be removed from service for the modification while maintaining the maintenance schedule. Less down time translates to improved revenue and profitability for the customer. For us, it also meant a more effective use of hangar capacity.

Kaizen is a team-based, lean programme that reviews work processes to improve efficiency and cut costs while improving cycle and lead times. ST Aerospace adopted the Japanese methodology in 1997, and refined it to the concept of Kaizen Plus in 2003 with appropriate Six Sigma tools. To date, we have completed more than 340 Kaizen projects, improving on efficiency to exceed customers' demands.



As one of the initiatives under the SEAL of Quality, ST Aerospace kicked off our annual Safety Month in October. Now in its 11th year, various safety promotional activities were held during the safety month to enhance safety awareness and promote a safety-oriented culture across the ST Aerospace group of companies in Singapore, as well as the Americas, Asia Pacific and Europe. Activities planned for the month include:

- **FOD Walk**, where employees walk en-masse across the apron and comb the area for Foreign Object Damage (FOD) in recognition of the importance of preventing damage from FOD. FOD costs the aerospace industry about US\$1.1 to 2 billion a year and as much as ten times that amount in indirect costs, arising from delays, aircraft changes, incurred fuel costs and unscheduled maintenance, causing significant damage to aircraft and parts as well as injury.
- **Team-based Conventions** were used to identify concerns, propose solutions and collaborate on initiatives related to safety and health issues in the workplace. Safety Improvement Teams (SIT) and Workplace Safety & Health Innovation (WSHI) are examples of team-based conventions.
- **Safety Seminar** took place with management and external speakers from aviation authorities and customers. Subject matter experts were also invited to speak and address a broad range of safety-related topics.

Some of this year's notable speakers include ME7 Lee Ling Wee, Head of the Air Logistics Department at the RSAF; Mr Goh Chye Guan, Director of the Industry Capability Building Workplace Safety and Health Council in Singapore; Mr Mark Blair, Vice President of Base and Propulsion Maintenance at FedEx Express; and Mr Lim Jit Ting, Country Manager, Business Area Business Assurance for Det Norske Veritas, South East Asia.

Apart from the above activities, competitions, exhibitions, employee citations and publications were also held to ensure a comprehensive and even outreach of the safety programme to all employees.

During this year's Safety Month, we launched a safety video that was created with an emphasis on safe work practices. This safety video will be used in briefings to instill in our staff the importance of safety in the workplace.

# Innovation Competition 2010

We held our annual Innovation Competition in July this year, and received 18 responses from various business units. Started in 2002 to encourage staff to seek ideas and think out-of-the-box to add value and bring about improvements in our work, this competition facilitates interaction and builds camaraderie. We believe in sharing and exchanging unique, creative and innovative ideas within the organisation to develop new ways of doing things, allowing us to progress and stay ahead of the competition.

## GOLD Winner: Wire Continuity Check Test Set

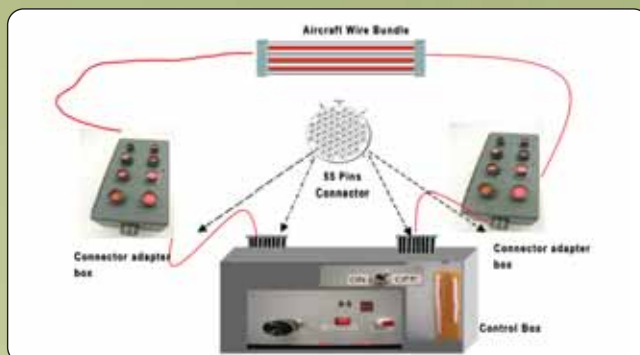
This innovative solution helps to speed up wire continuity testing and eliminates human errors. This test system is projected to generate savings based on our 767-300 Boeing Converted Freighter (BCF) conversion work, yet still helps to achieve a challenging 90-day turnaround time.

Designed in-house, it is cost effective, compact and lightweight, with a low power consumption. This scalable system can also be easily adapted for use on other aircraft modification programmes.

## GOLD Winner: UAV Mission and Flight Control Computer

The advanced fault tolerant computer for UAV mission and flight control implements a high performance / low power design. Incorporating a dual redundant (hot standby) design with fault-tolerant software, it can achieve a high level of reliability and availability, meeting the needs of today's UAVs with a greater degree of autonomy and longer flight endurance.

Through this development, ST Aerospace has built our dual redundant capabilities and fault-tolerant mission processor design and partitioned memory architecture for software.



Find us at the following events:

23 - 25 February 2011

**AUSA Winter Symposium & Exposition**

Fort Lauderdale, USA

1 - 6 March 2011

**Avalon 2011 Australian International Airshow and Aerospace & Defence Exposition**

Victoria, Australia

12 - 14 April 2011

**MRO Americas**

Florida, USA

4 - 5 May 2011

**Airline Purchasing & Maintenance Expo**

London, UK

20 - 26 June 2011

**Paris Airshow**

Paris, France

16 - 19 August 2011

**AUVSI's Unmanned Systems North America**

Washington D.C., USA

13 - 16 September 2011

**Defence & Security Equipment International**

London, UK

27 - 29 September 2011

**MRO Europe**

Madrid, Spain

17 - 20 October 2011

**Hercules Operators Conference**

Georgia, USA

October 2011

**Cargo Facts Aircraft Symposium**

USA

10 - 12 October 2011

**AUSA Annual Meeting & Exposition**

Florida, USA

8 - 10 November 2011

**MRO Asia**

Beijing, China

# A Master Award

Tan Kian Sing became the first ST Aerospace employee to be awarded the Merit Award in the Master in Defence Technology and System (MDTS) programme – a post-graduate programme jointly organised by the National University of Singapore and the US Naval Postgraduate School. We caught up with him for a few words on his achievement.



**Overall, how did you find the course?**

It was an enriching course, with a good mix of the general aspects of defence functions such as logistics and C3 systems. It also provided an in-depth look at the technicalities of various specialisations and a focus on military applications. The course was also an excellent networking platform for members of various defence organisations.

**How does the course prepare you for your work and projects in ST Aerospace?**

The course offered insight into a systems engineering approach to problem analysis. Seeing the big picture in a problem by considering upstream and downstream issues together tends to lead to a more holistic solution than breaking up the problem into smaller parts and solving them separately.

**What are some of your memorable moments during your course?**

As part of a three-day system engineering module, the class was divided into four teams to compete in building a robot to collect balls. The competition simulated a project undertaking in our professional lives, and started with the teams bidding for parts in an auction. After an unsuccessful bid, one team encountered severe difficulties and fell far behind. Amazingly, they came up with a superior creation in the end and wowed the class with their creativity.

**What do you think contributed to you achieving the award?**

Support from my fiancée, family and the company.

**What advice do you have for engineers going for the same programme?**

While learning is important, we should remember to take the opportunity to network and build ties with fellow course mates.



## Flying High with Training

ST Aerospace strongly believes in people development, training and empowering our employees to be all-rounded and competent individuals. We spend about 3% of our annual payroll on training and development purposes, and each employee receives an average of 75 hours of training yearly.

We adopt a holistic development approach that encompasses training in a wide range of areas including functional skill training, aviation authorities requirement training, recurrent and safety-related training, customer service and productivity-related training such as Kaizen.

To keep abreast of technological advancements, we also send employees for post-graduate degrees to enhance our capability and competency index. Apart from this, selected employees are given opportunities to attend executive management programmes at world renowned business schools.

The aviation industry is among the most exciting and dynamic sectors in the world today. After almost 14 years with ST Aerospace - and counting - Service Engineer Bernard Koo has a few thoughts on what it takes to excel in this fast-paced industry. Bernard leads the CHUKAR (an unmanned aerial target drone) maintenance team. We manage to squeeze some time out of his busy schedule for a quick chat.

Bernard believes that the ability to stay focussed in the face of changes is important. "Working in the aviation industry means dealing with new challenges and expectations every day," he says. "New aviation technologies come up all the time, and the industry is constantly developing and advancing. It is after all, an ever-evolving and advancing industry, and unpredictability has become the nature of my job," states Bernard.

Besides embracing advancing technology, Bernard also sees safety as a must in this line and holds ST Aerospace's mission "We Keep Aircraft Flying Safely" close to his heart. "Safety is the foremost concern of customers, and this is one aspect we cannot have any lapses in," he shares.

In addition to safety, efficiency and expertise are two other factors that customers look out for.

Bernard feels that as a service provider, it is crucial to have thorough knowledge of one's own area of work, as customers experiencing difficulties will look towards their suppliers for guidance. "Customers will consult us when they need to troubleshoot a problem that arises, so we need to be able to think on our feet and out of the box," he adds.



Bernard Koo

The fast pace of change in the industry, coupled with customer requirements and needs that consistently evolve with time, means a thirst for knowledge and innovative thinking are crucial. "Given the progressive nature of aviation, it is important to keep learning and improving, continually upgrading ourselves on the latest technologies and finding alternative ways to overcome seemingly impossible challenges," enthused Bernard. He adds that this ethos of ongoing improvement drives his team to constantly find ways to maintain and improve the CHUKARs that are currently in service.

The CHUKAR team generally spends up to six months maintaining and reconfiguring the various aircrafts for missions. Bernard's biggest challenge lies in having to customise the aircrafts to match each mission's objectives. Safety of his men is also a prime concern. "We battled turbulent sea conditions during one of our sea launching and retrieval exercises. We almost lost the aircraft. Fortunately, we managed to trace a recovery signal and everyone went home safe."

The well-respected senior has proven to be an exemplary leader, one whom his juniors look up to. "I believe in inspiring my team positively and it's this mentality that has helped me so far. Positive thinking and teamwork are very important for doing a good job; along with professionalism, expertise and experience."

Bernard's persistence in his pursuit of excellence may endear him to his colleagues, but to him, he is simply following his passion. "I was captivated by the sophisticated technology behind unmanned aircraft and that passion has simply sparked the interest that continues to drive me today. Truth is, I was really just pursuing a fascination."



## A Day in the Life of our Service

"I believe in inspiring my team positively. Success is something one has to work hard for and it's this mentality that has helped me so far."

# Engineer

## Futsal 2010



ST Aerospace enjoyed some World Cup action with our annual Futsal tournament. Held on 3 July, 25 teams from various business units came together to compete for the championship trophy.

Although there was a slight drizzle in the morning, spirits were not dampened. Morale was high, and family members joined in the fun by cheering on the teams.

The main highlight was the friendly match between our management and the union. Everyone crowded around the pitch, wanting to catch a glimpse of our management in action. Though our management team lost, they sweated it out and put up a good fight against the union team.

The crowd got more excited as the games moved nearer the finals. Everyone was anxious to find out who would clinch the trophy for 2010. At last, after much anticipation, the ST Aerospace Services team emerged the winner for the main tournament.

## The Heart of Service

Long before Corporate Social Responsibility became a buzzword, ST Aerospace was already playing a part in contributing back to the community we operate in.

We have been a strong supporter of various charitable causes for over two decades. One of our long-standing beneficiaries is our adopted charity - the Moral Home for the Disabled. We also support a variety of other worthy causes such as providing educational bursaries.

In the past decade, we have gone beyond contributing cash to volunteer our time and effort to help the less fortunate. Some activities we embarked on include spring cleaning residences, holding recreational and social gatherings, and organising festive celebrations.

As part of a yearly tradition, our Mobile facility in Alabama, US, partners St Jude Children's Research Hospital in their annual fundraising golf tournament. We sponsor a cabana during the event and invite groups of patients to enjoy the day with us and our long-standing customer, FedEx, who shares our commitment to this worthy cause.



## Work Hard, Play Hard

Achieving and maintaining a healthy work-life balance is an important facet of ST Aerospace's culture. One of the most keenly contested events in ST Aerospace is our annual Coastal Run.

Held on 22 May, this year's run attracted about 300 participants, including colleagues from our sister companies: ST Electronics, ST Kinetics and ST Marine. Our competitive runners quickly took up position at the starting line while non-competitive runners assembled in a more relaxed mood.

At 8 am sharp, the race was flagged off by ST Aerospace's President, Mr Chang Cheow Teck.

Last year's champion, ST Aerospace Engines, returned as champion again this year, followed by ST Aerospace Systems and the Corporate / Engineering & Development Centre team.



## Capabilities

### Airline Services

- Services
  - Maintenance operations control
  - Fleet technical management
  - Line maintenance
  - Maintenance information system - AMOS

### Aircraft Maintenance & Modification

- Services
  - Line, light & base maintenance
  - Modifications, conversions & refurbishments
  - AOG support and aircraft recovery & repairs
  - Engineering design & development
- Aircraft Types
  - **Commercial:** A300, A310, A320 family, A330, A340, 727, 737, 747, 757, 767, 777, DC8, DC9, DC10, MD10, MD11, MD80, MD82, MD90
  - **Military:** A4, F5, F16, AS332, Bell 212, 214, CH47, EC120, UH1H/AB205, C130, F50, KC135
  - **General Aviation:** ATR42, Beechcraft, Bombardier CRJ200, CRJ700, Cessna Citation 152, 172, Embraer ERJ135, ERJ145, E190, Learjet 35, 36, 45, 55, 60, PAC CT4, Piper Warrior

### Component Total Support

- Services
  - Component Maintenance-By-the-Hour (MBH™)
  - Asset management
  - Repair management
  - Component technical management
  - Component repair & overhaul
  - Landing gear and braking system repair & overhaul
  - Aerostructures repair & overhaul
- Aircraft Types
  - **Commercial:** A300, A310, A320 family, A330, A340, 727, 737, 747, 757, 767, 777, DC9, DC10, MD80, MD90, Q400, F50
  - **Military:** A4, AV8A, C130, E2C, F4, F5, F16, KC135, P3, S211
  - **Helicopters:** Bell 205, 206, 212, 214, 222, 230, 407, 412, 427, 430, CH47, AS332, SA330, AS355, AS365, EC120, Sikorsky S58, S61, S76, UH1H
  - **General Aviation:** ATR, BAe, Beechcraft, CASA, Cessna, De Havilland, Donnier, Fokker, Learjet, Lockheed, Nomad, Piper, Pilatus, Shorts

### Engine Total Support

- Services
  - Engine technical management
  - On-wing maintenance
  - Off-wing maintenance
  - Asset management
  - Engine Maintenance-By-the-Hour (MBH™)
  - GEnx on-wing support
  - Specialised component repair services
- Engine Types
  - CFM56-3/ -5B/ -7B
  - Pratt & Whitney JT8D-STD/-200/F100
  - Rolls Royce Allison 501/T56
  - General Electric J85/F404
  - Honeywell T53/T55
  - Turbomeca Makila

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## Taking care of everything under the sky to keep you up in the air.

Total Aviation Support is a concept we champion. Be it aircraft maintenance or modifications, engines or component support, maintenance planning, engineering services or material needs, ST Aerospace is ready all over the world, providing support to help improve your performance. As the world's leading third party MRO service provider, we're always at your side — keeping you flying safe and ensuring the safety and comfort of your customers.



Aircraft Maintenance & Modification



Component Repair & Overhaul



Engine Repair & Overhaul



Engineering & Materials Services