

# Aerospace

Factsheet 2012

## Singapore: Asia's Aerospace Hub

### At a Glance

Singapore is well known globally as an aviation hub. With over 390 accolades under its belt, Changi Airport is recognised as one of the world's best international airports. We are also a regional leader in aerospace maintenance, repair and overhaul (MRO) and manufacturing. Since 1990, Singapore's aerospace industry has grown at a compounded annual growth rate of over 10% to become the most comprehensive MRO hub in Asia. In 2011, our industry achieved a record output of over S\$7.9 billion, and employed over 19,000 workers<sup>1</sup>.

Today, there are over 100 international companies carrying out MRO activities in Singapore. We possess nose-to-tail capabilities that include airframe maintenance, engine overhaul, structural and avionics systems repair, as well as aircraft modifications and conversion. These core competencies, coupled with our commitment to quality and safety, have made Singapore a recognised one-stop solutions provider for airlines' maintenance and repair needs.

Besides MRO, leading aerospace OEMs and suppliers also carry out a variety of manufacturing activities here. These companies look to Singapore for our strong engineering capabilities, a comprehensive IP regime, a productive workforce and a pro-business environment. Products manufactured in Singapore include auxiliary power units, engine casings, engine gears, valves, electrical power systems and galley equipment. This year, Singapore will also begin to manufacture fan blades and assemble large civil aero-engines.

Aerospace-related research and development (R&D) in Singapore has grown significantly over the past few years. Major aerospace companies have already established R&D centres here that leverage on the capabilities of our local research institutes and universities.

Due to our excellent connectivity, Singapore is also the location for several aerospace regional distribution centres (RDCs). This includes the RDCs of key aerospace companies such as Airbus, Boeing, Embraer and GE Aviation.

<sup>1</sup> Source: EDB Research and Statistics Unit

## Key Investments

### MRO

Singapore has a comprehensive range of nose-to-tail MRO capabilities for both passenger and freighter aircraft. The continued expansion and investment by aerospace companies further augment Singapore's position as the region's MRO centre. Recent new investments include:

**Bell Helicopter** and **Cessna Aircraft Company**, part of Textron, is establishing its new 160,000 sq-ft facility in Seletar Aerospace Park. The new facility will provide maintenance support, completions and customisations. In addition, this new facility will augment its existing spares distribution supply centre, and strengthen the company's sales and customer support in the Asia Pacific region.

**Fokker Services Asia** will be establishing its new Asia Pacific full services facility, to provide integrated support for regional aircraft platforms in Seletar Aerospace Park. The new hangar will be about 1.5 times larger than its existing hangar, and offer greater capacity to accommodate additional regional aircraft. Fokker's enhanced capabilities will complement Singapore's strengths in commercial aviation.

**Hawker Pacific Asia** has been operating in Seletar airport since 1976. This year, the company will be opening its customer service and sales centre and expanding its regional headquarters in Singapore. With the new centre, the company will expand its MRO capacity, and increase its service offerings to provide maintenance support for larger business jets.

**Panasonic Avionics Corporation** and **Singapore Airlines Engineering Company (SIAEC)** established a joint venture to maintain and repair in-flight entertainment (IFE) and communication systems for most Airbus and Boeing aircraft including new-generation models such as the Airbus 380 and Boeing 787 Dreamliner. Panasonic Avionics Corporation Services Singapore will be a Centre of Excellence in the Asia Pacific Region for IFE MRO and will benefit airlines by offering one-stop OEM support solutions.

**Rockwell Collins** has established Boeing 787 Dreamliner avionics repair capabilities at its Singapore service centre to support Boeing's customers in the Asia Pacific Region. This is the company's first repair centre outside of the

United States to have established these new capabilities.

**Safran Electronics** formed a joint venture with **SIAEC** for a dedicated Centre of Excellence & OEM warranty repair centre for avionics components. The company's new facility opened in 2011.



### Manufacturing

Singapore's strong manufacturing base, skilled manpower and focus on science and engineering is ideal for aerospace manufacturing activities. Highlights include:

**Rolls-Royce's** establishment of a facility in Singapore to manufacture hollow titanium wide chord fan blades (WCFBs). This will be Rolls-Royce's first facility outside UK to manufacture this specialist component. The factory is located at Rolls-Royce's Seletar campus alongside the company's other new facility for the assembly and test of large commercial aircraft engines, and is slated to commence manufacturing this year. Rolls-Royce's campus at Seletar will create some 500 jobs when fully operational.

**Thales'** establishment of an avionics manufacturing facility in Singapore for various Airbus aircraft including the A320 and the A330. Key avionics systems that are solely manufactured here include the Flight Management and Guidance Computers, Spoiler-Elevator Computers, Flight Augmentation Computers and the Liquid Crystal Display Units. Singapore is one of the company's two manufacturing facilities in the world for Boeing 787 Dreamliner's Electric Conversion System.

## Supply Chain Management

Singapore's connectivity and robust infrastructure have made it ideal for aerospace companies to site their regional distribution centres here. Highlights include:

**Boeing Integrated Materials Management's (IMM)** new Asia Regional Centre in Singapore. The IMM centre helps maintain and manage airlines' spare parts inventory, providing items to the airlines as needed.

**Embraer**, which chose Singapore to locate its regional logistics and spares hub to hold more than US\$9 million worth of spares and rotables to provide round-the-clock spare parts, maintenance, repair and inventory services for customers in the region.

Other companies with spares distribution facilities in Singapore include **Airbus, Bombardier, GE Aviation, Messier-Bugatti-Dowty, Pratt & Whitney**, and **Rolls-Royce**.

## R&D

Singapore is fast establishing itself as an R&D hub. In 2010, Singapore's gross expenditure on R&D grew by 7.4%, from S\$6 billion to S\$6.5 billion. The total number of research scientists and engineers (RSEs) in the public and private sectors rose 6.4% from 25,608 in 2009 to 28,296 in 2010, with the private sector employing 55.3% or 15,640 of all RSEs. In the World Economic Forum's 2011-2012 Global Competitiveness Report, Singapore is ranked 2<sup>nd</sup> in the world and 1<sup>st</sup> in Asia for having the best protection in intellectual property. Highlights include:

**A\*STAR Aerospace Program**, a consortium formed in 2007 to conduct pre-competitive research work with strong industry participation in the aerospace domain. To date, there are 19 companies in the consortium including Boeing, EADS, GE, and Honeywell.

The **Industrial Postgraduate Program (IPP)**, a scheme introduced by the Singapore Economic Development Board in 2011 to build up a pool of postgraduate manpower with critical R&D skill-sets for roles in industry, through the provision of postgraduate training in a corporate R&D environment. Under the program, PhD students spend the majority of their time working on research projects in company's premises.



Companies that have participated in the IPP thus far include:

- **EADS Innovation Works (IW)**, which established its first research and technology (R&T) centre outside of Europe in Singapore. The Singapore centre undertakes R&D for EADS' businesses ranging from aerospace to defence and security systems. IW Singapore focuses its activities on three key domains: MRO, energy and security. Under the IPP, IW Singapore has PhD students from Nanyang Technological University, National University of Singapore and Singapore Management University working on industrial-oriented topics for their theses. These students are also fulltime staff of IW Singapore.
- **Thales**, which established an R&T centre in Singapore, a global Centre of Excellence for specific technologies with military and civil applications. The R&T centre in Thales Solutions Asia is one of the four Thales corporate R&T centres in the world, and the company's first outside Western Europe. The company will commence training for PhD students under the IPP in 2012.

## Training

Singapore is committed to developing its talent base to meet the needs of the industry. Aerospace courses and specialisations offered at local technical and tertiary institutes remain highly popular, and our schools produce over 1,500 aerospace trained graduates annually<sup>2</sup>. Singapore has also evolved to be a training hub for the region. Highlights include:

The **Boeing Flight Services** training campus, which is one of Boeing's 20 training campuses worldwide. The campus offers pilot training for aircraft such as the Boeing 787 Dreamliner and Boeing 777. The company also provides maintenance and cabin safety training.

**Eurocopter's** very first full-flight simulator (FFS) for the Dauphin AS365 N3/N3+ helicopter model to be located in South East Asia. The FFS will be housed at the Eurocopter South East Asia (ESEA) Training Centre, which is co-located with ESEA's main operations and MRO facilities in Seletar Aerospace Park. The FFS will expand the training centre's existing training capabilities, enabling the company to offer a full suite of integrated aftermarket services, and strengthening its customer support for the Asia Pacific region.

**Lufthansa Technical Training (LTT)**, which partnered Temasek Polytechnic to jointly offer a diploma course for Licenced Aircraft Engineers (LAEs). LTT also provides basic and aircraft type maintenance training for aerospace technicians and engineers.

## Leasing

With a comprehensive double tax avoidance agreement (DTA) network of 67 countries and a competitive corporate headline tax rate at 17%, Singapore is set to be the choice location for aircraft and engine leasing companies looking to tap into the Asia Pacific market. All the top 10 leasing companies in the world<sup>3</sup> have offices in Singapore. Highlights include:

**Aviation Capital Group**, one of the ten largest aircraft leasing companies in the world, with a fleet of over 240 aircraft consisting of primarily Airbus A320s and Boeing 737s. Since 2010, the Singapore office has been actively expanding and booking assets to support the business in Asia Pacific.

**BOC Aviation**, the largest aircraft leasing company in Asia, and headquartered in Singapore. Since its establishment in 1993, BOC Aviation has been steadily expanding its presence and is on track to enlarge its presence in the rapidly growing Asia Pacific market.

## Seletar Aerospace Park

The Seletar Aerospace Park is a dedicated aerospace park that serves to host an integrated cluster of activities including aerospace MRO and manufacturing; business & general aviation activities; and education, research and training. Launched in 2007, the 320-hectare Seletar Aerospace Park continues to attract strong interest from the industry. Companies such as Eurocopter, Fokker Services, Hawker Pacific, and Rolls-Royce have established new facilities at the Park.

Over the past year, specially designed ready-built facilities such as the Component Manufacturing, MRO Facilities and the Business Aviation Complex, have been introduced to provide a quick start-up for new entrants.

- The Business Aviation Complex, which opened in November 2011, targets to support the development of Singapore as a business and regional aviation hub. The seven-storey multi-tenanted building provides light industrial, engineering support/services, warehousing and storage space specifically for business aviation activities. This has proved highly popular amongst industry players. Within two months of its opening, more than 70% of the complex was occupied.
- JTC Corporation has also developed the Component Manufacturing and MRO Facility (CMMF). The CMMF is a collection of seven ready-built plug-and-play standard factories. Each unit is sized between 3,000 to 3,600 square metres and has a column-free production area with a ceiling height of 7 metres.

Over time, more new amenities will be added to the Park to serve the needs of our companies.

<sup>2</sup> Source: Ministry of Manpower: Singapore Yearbook of Manpower Statistics, 2011. Excludes students from private institutions.

<sup>3</sup> Source: Flightglobal: Aircraft Finance 2011



## About the Singapore Economic Development Board

The Singapore Economic Development Board (EDB) is the lead government agency for planning and executing strategies to enhance Singapore's position as a global business centre. EDB dreams, designs and delivers solutions that create value for investors and companies in Singapore. Our mission is to create for Singapore, sustainable economic growth with vibrant business and good job opportunities.

## Outlook & New Growth Opportunities

The long term prospects of the aerospace industry remain highly positive despite the short term uncertainties in the global economy. Air traffic and aircraft fleet size in Asia are poised for strong growth, bolstered by rising demand from regional economies such as China, India and ASEAN countries.

The global aerospace industry is also in a phase of exciting development. The Boeing 787 Dreamliner has just been brought into service. New aircraft such as the Airbus A350 are anticipated to be delivered in the near future, and more efficient engines such as the CFM Leap-X and the Pratt & Whitney PW1000G are being introduced. The drive towards greater fuel efficiency will increasingly push next generation aircraft to employ new technologies, including extensive use of composites in airframes, and the development of more fuel efficient engines.

Singapore is committed to the further development of our manpower capabilities and infrastructure to support future growth in MRO, manufacturing and R&D activities in Singapore. This will put us in strong position to capitalise from emerging trends and emerging markets in Asia Pacific.

EDB's 'Host to Home' strategy articulates how we are positioning Singapore for the future. It is about extending Singapore's value proposition to businesses not just to help them improve their bottom line, but also to help them grow their top line through establishing and deepening strategic activities in Singapore to drive their business, innovation and talent objectives in Asia and globally.

For more information on EDB, please visit [www.sedb.com](http://www.sedb.com)

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