

Aerospace Cities of the Future 2016/17 Winners



SINGAPORE HAS BEEN CROWNED **fDi**'s INAUGURAL AEROSPACE CITY OF THE FUTURE, WITH DUBAI IN SECOND PLACE AND SHANGHAI IN THIRD. **CATHY MULLAN** REPORTS

Singapore, the world's only island city-state and **fDi**'s most recent Global City of the Future, has been named as the Aerospace City of the Future for 2016/17, in the first study of its kind conducted by **fDi** Intelligence. Between 2011 and 2015, the city attracted 39 projects in the aerospace sector, according to greenfield investment monitor **fDi** Markets, which powered it to first place in the FDI Performance category. The study showed Singapore outperformed every other city in terms of investment in the aerospace sector and overall FDI project numbers.

Forty-one per cent of these inward investments were in sales operations, while investment in maintenance operations accounted for more than 30% and logistics for over 10%. Major aerospace investors include Netherlands-based Airbus Group, Canada-based Bombardier and US-based United Technologies Corporation. Meanwhile, China's Haite Group established an aviation training centre in Singapore, describing it as a "trans-hub for Europe and the Pacific" and a "maintenance, repair and overhaul [MRO] centre for Asia-Pacific".

This is directly in line with promotion efforts by EDB Singapore, the agency responsible for developing the city-state as an investment destination. EDB positions Singapore as an Asian destination for MRO investment, and claims 25% of all MRO output in the region



comes from the city-state.

Singapore's Seletar Aerospace Park, which spans 300 hectares, offers companies world-class infrastructure and runway access, alongside plentiful opportunities for cluster integration. The park is not the only draw for investors, however, as Singapore also boasts a low unemployment rate of 1.9% and high GDP per capita of more than \$82,000 at purchasing power parity.

The city-state recorded the highest level of exports and imports in aircraft and spacecraft on a per capita basis of all locations analysed, helping it to first place in the Economic Potential category. Every two years, it hosts the world-renowned Singapore Air Show, where government delegations and private sector executives meet to interact and do business. More than 1000 companies from nearly 50 countries and 3000 delegations from 90 countries attended the event in 2016.

Peak year for Dubai

Last year proved to be a record year for aerospace investment in Dubai, which finished second in the Aerospace Cities of the Future 2016/17 ranking. Twenty-six inward investment projects were recorded in the aerospace sector between 2011 and 2015, with projects, jobs and capital investment all peaking in 2015, bucking what had until then been a downward trend.

Air France KLM, which recently established a logistics facility in the city, describes Dubai as "the hub of the Middle East", citing its geographical location as the reason for investment. More than 230 locations are in reach of the three airports within 80 kilometres of Dubai, and four ports lie within 100 kilometres of the city. The Middle East's busiest port, Jebel Ali, is a 30-minute drive away, making Dubai a connected and attractive option for aerospace companies seeking to import and export their goods. More than 1100 exhibitors presented at the biennial Dubai Air Show in 2015, where some \$37.2bn-worth of orders were arranged.

Innovative Shanghai

Shanghai, the most populous city analysed for fDi's Aerospace Cities of the Future 2016/17 ranking, has taken third place. Between 2011 and 2015, the city attracted 1191 inward

TOP 15 AEROSPACE CITIES: OVERALL

RANK	CITY	COUNTRY
1	Singapore	Singapore
2	Dubai	UAE
3	Shanghai	China
4	London	UK
5	Bangalore	India
6	Beijing	China
7	Paris	France
8	Querétaro	Mexico
9	Dublin	Ireland
10	Tianjin	China
11	Amsterdam	Netherlands
12	Aberdeen	UK
13	Hamburg	Germany
14	Madrid	Spain
15	Casablanca	Morocco

investment projects, with 11 in the aerospace sector. Moreover, 154 of the total projects were R&D-based and 83 in advanced manufacturing. The city provides an environment of innovation and research for aerospace investors, with six of its universities featuring in the QS Ranking of Top 300 Universities in Engineering, Mechanical, Aeronautical and Manufacturing, the highest number of any location analysed.

The city is also home to the Shanghai National Civil Aerospace Industrial base, which was established in 2007 and comprises an aerospace R&D centre, an aerospace park designed to attract hi-tech companies and industries and an aerospace museum.

Methodology

To create a shortlist for fDi's Aerospace Cities of the Future 2016/17, the fDi Intelligence division of the Financial Times collected data using the specialist online FDI tools fDi Benchmark and fDi Markets, as well as other sources. Data was collected for 72 locations, under five categories: Economic Potential, FDI Performance, Cost Effectiveness, Innovation and Attractiveness and Connectivity. Locations scored up to a maximum of 10 points for each data point, which were weighted by importance to the FDI decision making process in order to compile both the subcategory rankings as well as the overall 'Aerospace Cities of the Future 2016/17' ranking.

In addition, surveys were collected under a sixth category, FDI Strategy, for which there were seven submissions, which make up our spotlight feature. ■

SECTORS AEROSPACE

TOP 10 AEROSPACE CITIES: ECONOMIC POTENTIAL

RANK	CITY	COUNTRY
1	Singapore	Singapore
2	Abu Dhabi	UAE
3	London	UK
4	Paris	France
5	Beijing	China
6	Shanghai	China
7	Tianjin	China
8	Dublin	Ireland
9	Houston	US
10	Hamburg	Germany

TOP 10 AEROSPACE CITIES: CONNECTIVITY

RANK	CITY	COUNTRY
1	London	UK
2	Dubai	UAE
3	Amsterdam	Netherlands
4	Brussels	Belgium
5	Hamburg	Germany
6	Houston	US
7	Broughton	UK
8	Seattle	US
9	Burnley	UK
10	Fort Lauderdale	US

TOP 10 AEROSPACE CITIES: INNOVATION AND ATTRACTIVENESS

RANK	CITY	COUNTRY
1	Bogotá	Colombia
2	Singapore	Singapore
3	Brussels	Belgium
4	Huntsville	US
5	Berlin	Germany
6	Madrid	Spain
7	Aberdeen	UK
8	Seattle	US
9	London	UK
10	Wichita	US

TOP 10 AEROSPACE CITIES: COST-EFFECTIVENESS

RANK	CITY	COUNTRY
1	Tunis	Tunisia
2	Xi'an	China
3	Kuala Lumpur	Malaysia
4	Mielec	Poland
5	Xiamen	China
6	Casablanca	Morocco
7	Hyderabad	India
8	Bangalore	India
9	Tianjin	China
10	Bangkok	Thailand

TOP 10 AEROSPACE CITIES: FDI PERFORMANCE

RANK	CITY	COUNTRY
1	Singapore	Singapore
2	Dubai	UAE
3	Bangalore	India
4	Querétaro	Mexico
5	Shanghai	China
6	London	UK
7	Paris	France
8	Mexicali	Mexico
9	Beijing	China
10	Broughton	UK



Dubai ranks second overall in fDi's Aerospace Cities of the Future 2016/17 ranking

DUBAI AEROSPACE INVESTMENT, JANUARY 2011 TO DECEMBER 2015

YEAR	PROJECTS	CAPEX	AVERAGE CAPEX	JOBS CREATED	AVERAGE JOBS	COMPANIES
2011	8	212.9	26.6	318	39	7
2012	5	94.8	19.0	379	75	5
2013	2	44.2	22.1	132	66	2
2014	2	49.6	24.8	80	40	2
2015	9	391.3	43.5	3,047	338	9
Total	26	792.8	30.5	3,956	152	24

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JUDGING CRITERIA

ECONOMIC POTENTIAL

- Inflation rate
- GDP
- GDP per capita
- Average annual GDP growth rate (2010-14)
- Projected average annual GDP growth rate (2015-19)
- Unemployment rate
- Exports in aircraft, spacecraft and parts thereof (trade values \$ – 2011-15) per capita
- Imports in aircraft, spacecraft and parts thereof (trade values \$ – 2011-15) per capita

FDI PERFORMANCE (2011-15)

- Outward FDI
- Outward FDI per 100,000
- Outward FDI in aerospace sector
- Inward FDI
- Inward FDI per 100,000
- Inward FDI in aerospace sector
- FDI in R&D and DDT
- FDI in advanced manufacturing
- Number of mega projects by capex in the aerospace sector (over \$100m)
- Number of mega projects by jobs in the aerospace sector (over 1000 jobs)
- Number of mega projects by jobs in the aerospace sector (over 1000 jobs) per 100,000 people
- Number of jobs created in the aerospace sector by all inward FDI
- Number of jobs created in the aerospace sector by all inward FDI per 100,000 people
- Number of expansion/co-location projects in the aerospace sector
- Number of expansion/co-location projects in the aerospace sector per 100,000 people

COST EFFECTIVENESS

- Annual rent for prime grade A office space (\$/square metre)
- Annual rent for prime grade A industrial space (\$/square metre)
- Average salary for unskilled worker (\$)
- Average salary for semi-skilled worker (\$)
- Average salary for skilled worker (\$)

INNOVATION AND ATTRACTIVENESS

- Number of patents in aerospace sector (2003-15)
- Number of patents in aerospace sector (2003-15) per 100,000
- Number of top 300 universities in engineering – mechanical, aeronautical and manufacturing (QS University Rankings)
- PwC Top 100 companies in aerospace
- PwC 2015 global aerospace manufacturing attractiveness index
- Number of companies in the aerospace sector 2015
- Number of companies in the aerospace sector 2015 per 100,000 people
- Number of aerospace companies as a percentage of overall companies 2015
- Number of companies in the engineering sector 2015
- Number of companies in the engineering sector 2015 per 100,000 people
- Number of engineering companies as a percentage of overall companies 2015

CONNECTIVITY

- Number of airports within 80 kilometres of the city
- Number of international destinations served
- Quality of overall infrastructure 2015
- Number of ports (medium+) within 100 kilometres

FDI Strategy

WITH AEROSPACE A CRUCIAL JOB-CREATING SECTOR, THE INDUSTRY'S KEY HUBS ARE WORKING CLOSELY WITH LOCAL GOVERNMENTS TO KEEP THEIR COMPETITIVE EDGE THROUGH TOP-QUALITY EDUCATION AND TRAINING PROGRAMMES, TAX INCENTIVES AND LOGISTICAL EXCELLENCE. **CATHY MULLAN** REPORTS ON THE CITIES GETTING IT RIGHT

Chihuahua, Mexico

Chihuahua city, the capital of Chihuahua state along Mexico's northern border, plays an important role in the Mexican aerospace sector. A cluster established in 2008 has resulted in the creation of more than 17,000 jobs and exports totalling \$1.5bn.

The local government works closely with domestic academic institutions and investors in the cluster to create an innovative and productive environment by integrating the supply chain, education, technology and infrastructure. An academic entailment leader works closely with educational institutions to ensure they offer qualifications relevant to the aerospace sector, while companies collaborate to attract big projects – combining certifications, capabilities and expertise and presenting a streamlined and knowledgeable environment for aerospace companies.

In addition to plentiful industrial parks and buildings, there is an international airport, while a maintenance, repair and overhaul park is under development. Five ports of entry and 10 US border crossings afford potential investors access to the world's largest aerospace market, and free-trade agreements with 44 countries enable investors to import and export easily.

Colorado Springs, Colorado, US

At the base of the Rocky Mountains, Colorado Springs has a thriving aerospace and defence sector. Approximately 70,000 people are employed in the industry – which accounts for more than 44% of the local economy – in a wide range of companies from IT and manufacturing to cybersecurity and consulting. Five military installations are located in the city, which enjoys a relationship with the US Air Force and other government defence organisations. In 2010, more than \$1.9bn in research funding was granted to universities in the state of Colorado by NASA and other government and private sources.

The city is home to the University of Colorado (Colorado Springs), one of the Colorado Space Coalition's six members, which offers specialised degrees in aeronautical engineering through its College of Engineering. Elsewhere in the city, the US Airforce Academy boasts the country's only undergraduate space programme, in which students have the opportunity to design, build and operate a satellite.

The local government has a range of measures to support investors, including a commercial aeronautical zone; tax incentives for aircraft production; aircraft and aircraft parts sales and use tax exemp-

tion; and an aircraft manufacturer new employee credit.

Fort Lauderdale, Florida, US

A principal city of the South Florida metropolitan area, Fort Lauderdale's aerospace sector is focused around the Fort Lauderdale Executive Airport, which provides an airport infrastructure and facilitates the development of aviation businesses. The airport area houses more than 150 aviation sector companies and employs over 5000 people. The airport is equipped with 447 hangars and an 81-hectare industrial airpark, providing more than 140,000 square metres of office, warehouse and industrial space.

There are investment incentives, such as the qualified target industry refund, which is a tax incentive for investors in a range of sectors including aerospace, and a foreign trade zone, which offers incentives to encourage business development. The airport management committee runs an annual internship programme to local aerospace and aviation students, which produces experienced graduates for potential investors.

Mississauga, Ontario, Canada

Nestled on Lake Ontario, just west of Toronto, Mississauga is home to Canada's largest aerospace cluster.

CHIHUAHUA IN NORTHERN MEXICO HAS SEEN THE CREATION OF 17,000 JOBS AND EXPORTS TOTALLING \$1.5BN IN ITS AEROSPACE CLUSTER SINCE 2008



Toronto Pearson International Airport, North America's second busiest airport for international passengers, is located in the city and welcomes more than 40 million passengers travelling to over 180 destinations annually. Not just a passenger hub, 15% of Ontario's total GDP passes through the airport, which is equipped with 111,000 square metres of warehouse space and can process over 1 million tonnes of cargo annually.

In total, 219 aerospace companies operate in the city, including aerospace manufacturing companies, airlines and airport services companies, employing upwards of 24,000 people. Investors can take advantage of many general and sector-specific assistance programmes from Ontario's state government, including the Advanced Manufacturing Fund, which offers between C\$10m (\$7.72m) and C\$20m per project to support cutting-edge technologies and large-scale operations. The City of Mississauga partners with many sector-specific organisations, including the Aerospace Industries Association of Canada and the Ontario Aerospace Council, to develop the sector locally.

Mobile, Alabama, US

Mobile, a port city on Alabama's southern coast, has a knack for attracting big names in aerospace FDI. The city is home to 32 aerospace companies, employing more than 2500 people, including Airbus, which invested in a \$600m manufacturing facility to build its A320 aircraft series.

The University of South Alabama works closely with Airbus to shape the courses and classes on its degree programmes to ensure the availability of talented graduates. In the past

decade, employment in the aerospace sector increased by 19%, mainly due to the Airbus anchor investment, which encouraged smaller supply chain companies to locate in the area.

The Port of Mobile, which feeds into one of the US's largest waterway systems, and the two airports located in the city make for an attractive logistics option. Furthermore, the local airport authority has 1620 hectares ready for development, and Mobile Aeroplex, a former US Air Force base turned industrial park, is situated less than two kilometres from the port, offering plentiful import and export opportunities. In central Mobile, a software corridor comprising software development and innovation companies provides the hi-tech supply chain services for the aerospace industry.

Moscow, Russia

Moscow's aerospace industry employs more than 38,000 people, with state organisations PJSC United Aircraft Corporation and Rostec State Corporation at its core. Moscow is also home to some of the industry's major companies, including Boeing (which established a technical centre in the city) and Airbus (which set up the Airbus Engineering Centre, in a joint venture between Airbus, RTI and Kaskol). With a focus on research and innovation, the city boasts one-third of all Russia's research companies and personnel, has 20 technoparks dedicated to innovation and hi-tech industries, and offers investors infrastructure benefits and financial incentives.

Besides its four airports, Moscow has the largest railway hub in the Commonwealth of Independent States, featuring two ring railways,

nine radial railways and more than 2700 kilometres of track. Forty per cent of transit goods pass through the city, making it a logistics hub with great potential. An aviation training centre was constructed at the Skolkovo Innovation Centre in 2015 to provide flight and technical training in the aerospace industry.

Saint Louis, Missouri, US

Known as the 'gateway to the west', Saint Louis is home to some major players in aerospace manufacturing, including Boeing, BAE Systems and Lockheed Martin. In 2014, more than 22,000 people were employed by over 100 aerospace companies. Boeing's defence, space and security division, which posts revenues of more than \$30bn, established its headquarters in the city, which is also home to the third largest rail centre in the US, and Lambert-St Louis International Airport, combining to produce a major transportation and distribution centre.

In addition, investors can take advantage of the high quality of graduates the city produces from its 30 universities. There are a range of aerospace research and education programmes available, including the Aerospace Research and Education Centre, which promotes research, education and technology transfer in the sector; and Flight Safety International, which trains pilots and flight crews and is located beside the airport.

Wolverhampton, UK

Wolverhampton is one of the UK's largest clusters of tier-one aerospace companies, with investment from UTC Aerospace Systems and Moog, which operates a manufacturing facility producing hardware for military and commercial aircraft. Investors can choose from several sites including Lupus Park, within the aerospace quadrant of i54, an enterprise zone located five kilometres from Wolverhampton; and Pantheon Park, a new development in the east of the city, offering bespoke industrial units up to 38,000 square metres.

The city council offers aerospace companies a range of services, such as support with planning applications, recruitment and access to grants. In addition, the University of Wolverhampton runs aerospace degree courses to ensure investors have access to quality talent with relevant qualifications. ■

MOSCOW
EMPLOYS MORE THAN 38,000 PEOPLE THROUGH ITS AEROSPACE INDUSTRY, WHICH INCLUDES BOEING AND AIRBUS

