

Aerospace Cities of the Future 2018/19 Winners



SINGAPORE RETAINS ITS LEADING POSITION AS **fDi**'S AEROSPACE CITY OF THE FUTURE FOR 2018/19, WHILE LONDON AND PRESTWICK HAVE RISEN TO SECOND AND THIRD PLACES, RESPECTIVELY. **CATHY MULLAN** DETAILS THE RESULTS

Singapore has once again proven its attractiveness to investors by topping **fDi**'s second Aerospace Cities of the Future ranking. In 2017, FDI job creation in the aerospace sector peaked in Singapore, with an estimated 1400 jobs. This is the highest level of job creation in the city's aerospace sector since greenfield investment monitor **fDi** Markets started recording data in 2003.

Two multinational companies – US-based United Technologies Corporation subsidiary Pratt & Whitney, which manufactures aircraft engines, and France-based Thales Group, which provides technology services for the aerospace sector – expanded their respective maintenance and repair facilities in this time.

Pratt & Whitney invested \$85m in the expansion of the site, which was one of several big investments in the city-state's aerospace sector in 2017, while the expansion by Thales Group increased repair volume by nearly one-third to make the facility the company's largest repair hub globally.

Landing in London

London ranks in second place overall, topping the Connectivity category and ranking third in Innovation and Attractiveness. The UK capital is an international travel hub, with direct access to more than 300 global



destinations from its six local international airports. Investors in the aerospace sector can import and export goods from one of six ports in proximity of the city, the highest number of accessible ports of all locations in the study.

There are nearly 100 aerospace-related companies based in the city and just under 15,000 engineering companies. Germany-based Lufthansa Technik opened a warehouse for component supply at Heathrow Airport in mid-2016, quoting regional proximity and the ability to reach other UK airports easily as a key reason for investing.

Located just over 50 kilometres south-west of Glasgow, Prestwick in Scotland ranks third. A small town with fewer than 15,000 inhabitants, Prestwick has been home to an international airport since the 1930s and boasts an appeal to returning investors. US-based Spirit Aerosystems, which provides components and assembly structures for commercial aircraft, has expanded its site at Prestwick Airport three times since 2014, most recently in mid-2017, when it announced the creation of an additional 100 jobs with the establishment of a new production facility at the site.

Methodology

To create a shortlist for fDi's 'Aerospace Cities of the Future 2018/19' ranking, the fDi Intelligence division of the Financial Times collected data using specialist online FDI tools fDi Benchmark and fDi Markets as well as other sources. Data was collected for 54 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 the subcategory rankings.

In addition, surveys were collected under a sixth category, FDI Strategy, for which there were 14 submissions. Locations that ranked in the top five in this category were given bonus points, which contributed to their overall score. Together, the data subcategory rankings and the FDI Strategy ranking make up the overall 'Aerospace Cities of the Future 2018/19' ranking. ■



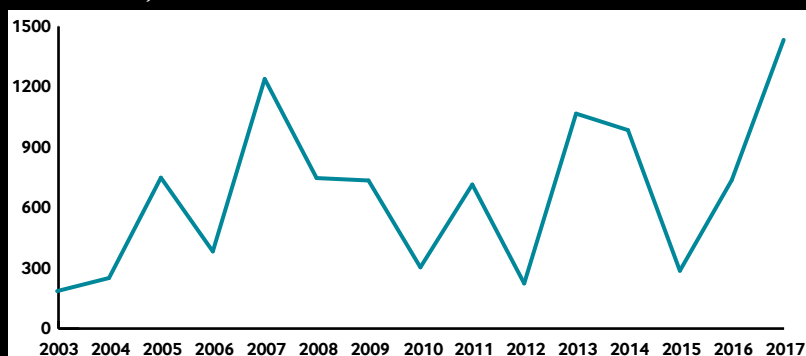
"WE WILL CONTINUE TO BUILD ON OUR CORE STRENGTHS TO MAINTAIN OUR POSITION AS ASIA'S PREMIER AEROSPACE HUB"

TAN KONG HWEE, EXECUTIVE DIRECTOR,
TRANSPORT ENGINEERING, SINGAPORE
ECONOMIC DEVELOPMENT BOARD

TOP 10 AEROSPACE CITIES: OVERALL

RANK	CITY	COUNTRY
1	Singapore	Singapore
2	London	UK
3	Prestwick	UK
4	Bangalore	India
5	Dubai	UAE
6	Paris	France
7	Shanghai	China
8	Dublin	Ireland
9	Santiago	Chile
10	Beijing	China

JOBS CREATED IN THE AEROSPACE SECTOR THROUGH FDI: SINGAPORE, 2003-2017



Source: fDi Markets. Includes estimates

**TOP 10 AEROSPACE CITIES:
ECONOMIC POTENTIAL**

RANK	CITY	COUNTRY
1	Dublin	Ireland
2	Singapore	Singapore
3	New York	US
4	Los Angeles	US
5	Santiago	Chile
6	Beijing	China
7	Paris	France
8	London	UK
9	Abu Dhabi	UAE
10	Shanghai	China

**TOP 10 AEROSPACE CITIES:
CONNECTIVITY**

RANK	CITY	COUNTRY
1	London	UK
2	Dubai	UAE
3	Amsterdam	Netherlands
4	New York	US
5	Hamburg	Germany
6	Singapore	Singapore
7	Fort Lauderdale	US
8	Hong Kong	Hong Kong
9	Paris	France
10	Burnley	UK

**TOP 10 AEROSPACE CITIES:
INNOVATION AND ATTRACTIVENESS**

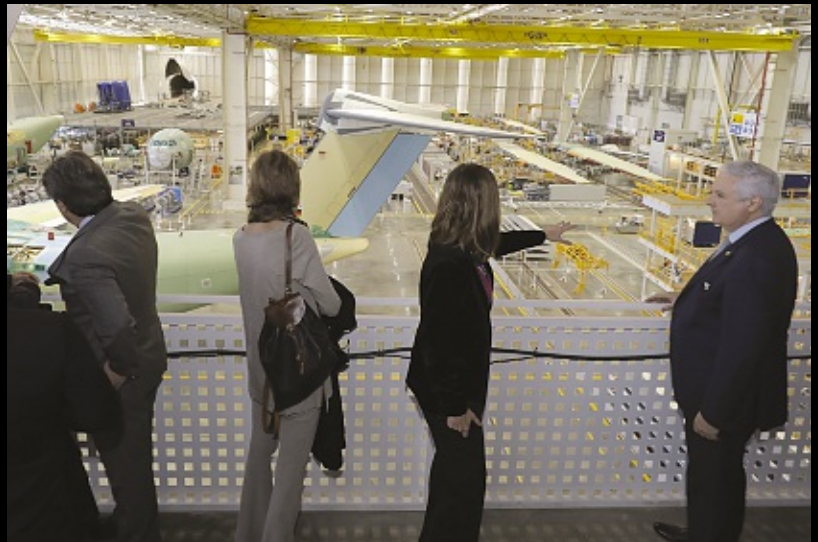
RANK	CITY	COUNTRY
1	Bogota	Colombia
2	Mississauga	Canada
3	London	UK
4	Santiago	Chile
5	Singapore	Singapore
6	Beijing	China
7	Aberdeen	UK
8	Munich	Germany
9	Melbourne	US
10	Hamburg	Germany

**TOP 10 AEROSPACE CITIES:
COST-EFFECTIVENESS**

RANK	CITY	COUNTRY
1	Nagpur	India
2	Mielec	Poland
3	Hyderabad	India
4	Sofia	Bulgaria
5	Bangalore	India
6	Casablanca	Morocco
7	Kuala Lumpur	Malaysia
8	New Delhi	India
9	Seville	Spain
10	Chihuahua	Mexico

**TOP 10 AEROSPACE CITIES:
FDI PERFORMANCE**

RANK	CITY	COUNTRY
1	Singapore	Singapore
2	Dubai	UAE
3	Bangalore	India
4	Shanghai	China
5	Paris	France
6	London	UK
7	Prestwick	UK
8	Dublin	Ireland
9	Mexicali	Mexico
10	Queretaro	Mexico



“THIS IS A CONFIRMATION OF OUR INDUSTRIAL TRAJECTORY’S ROLE IN KEY PROGRAMMES FOR THE EUROPEAN AEROSPACE INDUSTRY”

JUAN ESPADAS, MAYOR, SEVILLE

JUDGING CRITERIA

ECONOMIC POTENTIAL

- Population
- UE rate
- Inflation rate
- GDP
- GDP per capita
- Average annual GDP growth rate (2012-2016)
- Projected average annual GDP growth rate (2017-2021)
- Exports in aircraft, spacecraft and parts thereof (trade values in \$, 2013-2017) per capita
- Imports in aircraft, spacecraft and parts thereof (trade values \$, 2013-2017) per capita

FDI PERFORMANCE

- Outward FDI (2013-2017)
- Outward FDI per 100,000 (2013-2017)
- Outward FDI in aerospace sector (2013-2017)
- Inward FDI (2013-2017)
- Inward FDI per 100,000 (2013-2017)
- Inward FDI in aerospace sector (2013-2017)
- FDI in R&D and DDT (2013-2017)
- FDI in advanced manufacturing (2013-2017)
- Number of mega-projects by capex in the aerospace sector (over \$100m) (2013-2017)
- Number of mega-projects by capex in the aerospace sector (over \$100m) per 100,000 people (2013-2017)
- Number of mega projects by jobs in the aerospace sector (over 1000 jobs) (2013-2017)
- Number of mega projects by jobs in the aerospace sector (over 1000 jobs) per 100,000 people (2013-2017)
- Number of jobs created in the aerospace sector by all inward FDI (2013-2017)
- Number of jobs created in the aerospace sector by all inward FDI per 100,000 people (2013-2017)
- Number of expansion/co-location projects in the aerospace sector (2013-2017)

- Number of expansion/co-location projects in the aerospace sector per 100,000 people (2013-2017)

COST EFFECTIVENESS

- Annual rent for prime Grade A office space (\$ per sq m)
- Annual rent for prime Grade A industrial space (\$ per sq m)
- Cost to import (\$ per container)
- Cost to export (\$ per container)
- Average salary (\$) for semi-skilled worker
- Average salary (\$) for skilled worker

INNOVATION & ATTRACTIVENESS

- Number of patents in aerospace sector (2003-2015)
- Number of patents in aerospace sector (2003-2015) per 100,000
- Number of top 300 universities in engineering – mechanical, aeronautical and manufacturing (QS University Rankings)
- 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

AEROSPACE CONNECTIVITY

- Number of airports within 50 miles (80 kilometres) of the city
- Number of international destinations served
- Quality of overall infrastructure, 2015
- Number of ports within 100km (medium)
- Number of ports within 100km (large)
- Number of ports within 100km (very large)
- Number of ports within 100km (medium+)



CHIHUAHUA: THE NEXT TALENT-BASED AEROSPACE HUB

A look at why the state of Chihuahua in Mexico is using its highly skilled workforce and location to assert itself as a major global aerospace location

The northern state of Chihuahua, Mexico, boasts aerospace giants such as Honeywell, Fokker-GKN, Safran Group, Bell, and the joint venture between Embraer and Zodiac Aerospace, EZ Air. It is home to one of Mexico's largest aerospace manufacturing operations and it's still going strong with its growth potential.

During the past decade, some 39 new manufacturing operations and two research and development centres in the aerospace sector have set up shop in Chihuahua, making the state one of the most important players in Mexico's aerospace industry. This growth is based on a hard-to-match mix of competitive advantages: a large, union-free, highly qualified and stable labour force; strong infrastructure; and sophisticated industrial property developers able to offer investors all the support they need for a 'soft landing' when they invest there. All of these factors have turned the state into a strategic location for most major aerospace groups. Today, it accounts for 30% of the industry's employment in all of Mexico with strong growth potential for the next few years.

But the state's manufacturing capabilities go beyond traditional sheet metal and harness assemblies. Honeywell has three manufacturing operations, which include the largest

CHIHUAHUA: HIGHLIGHTS

■ More than 98% of region industry engineers and technicians are local.

■ International agreements in place with universities for student mobility.

■ New training programmes which usually last three to six months.

■ Specialized training options are available for all organizational levels.

machining center for turbine components in Latin America and one special processes operation employing more than 1200 people.

Canadian OEM Bombardier has also trusted the supplier base and certified labour in Chihuahua by developing its supply chain through companies such as TigHitco Latinoamerica, Kaman Aerospace, Arnprior Aerospace, PAM and Metal Finishing, which are supplying most of the sheet metal aerostructural parts that Bombardier purchases in Mexico.

EUROPEAN ATTRACTION

European firms don't lag behind either; the now merged Safran Group and Zodiac Aerospace have a combined footprint of nine facilities (four

from Safran and five from Zodiac). Safran Electrical and Power has a 480,000-square-foot campus where it designs and produces 99% of all the electrical wiring for the Boeing 787 Dreamliner. It also produces 80% of all the electrical wiring for the Airbus A380, the largest aircraft of the world with 550 kilometres of wire, and 50% of electrical wiring for the Airbus A350 is designed in Chihuahua by Safran Engineering Services. Overall it employs more than 4,000 people. Zodiac houses nine divisions: seats, seat shells, electrical power systems, interconnect Americas, lighting solutions, inflight innovation, actuation systems, water and waste systems, and evacuation systems. This operations makes emergency slides, gas tanks, landing gears, food tables, arm pads and headrests employing more than 2,700 people spread across five facilities.

INVESTMENT HUB

Over the past six years, Chihuahua has attracted more than \$1.1bn of foreign investment a year, continuing a trend that has made it one of Mexico's most successful states in securing manufacturing investment. Chihuahua's secret lies in its highly skilled labour pool of 3.4 million inhabitants with an average age of 25 years old. The region has very mature engineering capabilities, backed by a pool of 59 universities and technological institutions, and 65 vocational/technical institutions. Its supply chain integration and logistics are also important; Chihuahua has the longest border with the US of all Mexican states, accounting for 40% of the entire Mexico-US border, dotted with 10 border crossings and five ports of entry.

None of these investments, however, would be possible without the support of a sophisticated research and training support network centred around the Center for Advanced Materials Research (Cimav) and the state-of-the-art, high-technology training centre, Cenaltec. Cimav has a wide range of scientific research disciplines, including material synthesis and processing techniques. It also has material characterisation and analytical testing facilities, which is Nadcap certified. On the technical front, Cenaltec trains specialist operative personnel, mostly through short-term programmes adapted to meet the industry's specific needs, with 80% hands-on learning and instructors with more than 20 years of experience in the industrial sector.

You'd be hard pressed to find an up-and-coming aerospace hub that combines a large ecosystem of established companies with the growth potential of a young and qualified labour pool and a privileged logistic platform, but if there was ever a location that comes close to the perfection, it's definitely Chihuahua.

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FDI Strategy

BRAZIL'S SÃO JOSÉ DOS CAMPOS, CANADA'S MISSISSAUGA AND CINCINNATI IN THE US TAKE THE TOP THREE PLACES FOR FDI STRATEGY IN fDi's AEROSPACE CITIES OF THE FUTURE 2018/19 RANKING. CATHY MULLAN REPORTS

Brazil's São José dos Campos, with its high concentration of research companies in the aerospace sector, finishes first in fDi's Aerospace Cities of the Future 2018/19 FDI Strategy ranking. The city has a team of seven staff dedicated to promoting investment in the aerospace sector and is home to the Brazilian Aerospace Cluster, which encourages co-operation between 100 large, medium and small companies. The companies involved aim to establish partnerships to promote economic and social development.

Additionally, the city boasts a high volume of land for the development of the aerospace sector, including an area close to the airport that is suitable for large-scale operations, such as a maintenance and repair facility or a logistics campus.

The Technology Park of São José dos Campos measures 188,000 square metres, and houses the Brazilian Aerospace Cluster. Technology companies based in the park have access to commercial space and infrastructure, as well as management training programmes and the opportunity to promote their business-to-research organisations and funding bodies.

Mississauga's major cluster

Home to Pearson International Airport – the main point of connection for international visitors to Toronto – Mississauga is second in the FDI Strategy ranking. The city's aerospace cluster is the largest (in terms of number of businesses and employment figures) of all major centres in Canada. More than C\$31bn (\$24bn) is exported through Pearson International Airport, which represents 4% of Ontario's total GDP.

The city's economic development department recently employed an advanced manufacturing business integrator, who works directly with companies on a range of topics from supply chain and export market development to business-to-business



“OUR CITIZENS WILL NOW CARRY ONE MORE IMPORTANT REASON TO JUSTIFY THEIR CHOICE OF LIVING AND INVESTING IN OUR CITY”

FELICIO RAMUTH, MAYOR, SÃO JOSÉ DOS CAMPOS

connections and workforce assistance, making their investment as successful a transition as possible.

Sitting on the Ohio river in the south of the state, Cincinnati is third in the FDI Strategy ranking. Greater Cincinnati is home to more than 185,806 square metres of office space and nearly 525 hectares of industrial land available to investors. The Southwest Ohio Aerospace Region is local to the city, comprising more than 12,000 employees and 69 companies.

It is also the base for the city's AeroHub accelerator, which aims to strengthen the supply chain for aerospace companies, and acts as an incubator where investors can be nurtured and grow their business. The incubator is located just next to GE Aviation's facility in the city, and encourages relationships with the University of Cincinnati Research Institute and Cincinnati State Technical and Community College. ■

TOP FIVE AEROSPACE CITIES: FDI STRATEGY

RANK	CITY	COUNTRY
1	São José dos Campos	Brazil
2	Mississauga	Canada
3	Cincinnati	US
4	Chihuahua	Mexico
5	Singapore	Singapore



SEVILLE FLIES HIGH

A place among the Aerospace Locations of the Future 2018/19 is recognition for a centuries-old industry that continues to pass international milestones

We are in a city, Seville, that is devoted to its aerospace industry. The industry is, in fact, over a century old. Its beginnings date back to 1910. Three quarters of a century ago, it already had its oldest factory, the Tablada (today owned by Airbus Military), where they built aircraft that marked the history of European aeronautics and set milestones for international aviation.

The Dornier Wal, Heinkel 111, HA 200 "Saeta", Northrop F5, C-101, Harrier Plus, C212, CN-235, C295 or the A400M are all aircraft that carry the seal of Seville, and many globally important flights took off from here, such as the 1929 aircraft "Jesus del Gran Poder" from Seville to Bahia, in Brazil, or the 1933 flight by the pilots Barberán and Collar in the "Cuatro Vientos" to Camagüey, in Cuba, which was the first flight to cross the Atlantic without stopping.

Currently, the aerospace industry in the city of Seville and its metropolitan area is composed of 84 enterprises, with an outstanding presence in the aerostructures manufacturing and assembly sector. There are companies engaged in mechanics, engineering, specialised consulting, installation, electricity, testing or composites, with a total annual turnover of nearly €1.8bn.

The aerospace industry workforce in Seville includes 10,050 workers, with 54.42% being operators, 35.07% managers, engineers and university graduates, and 10.51% other professions. It is, therefore, a team of highly qualified professionals. Approximately €11m a

year are invested into R&D. Exports have reached about €1bn and the contribution to GDP is at about 4.86%.

Airbus currently has two factories in the city (Tablada and San Pablo) and their A400M programmes – its final assembly line is in San Pablo, as well as its centre for testing, training and delivery – and A350 programmes are fundamental for Seville's aerospace industry, which is also involved in local and international programmes, including the C295, the CN235, the C212 and the A320.

Although Airbus makes up a good part of the orders, Sevillian companies work for other large manufacturers, such as Embraer, Eurofighter, Boeing, Bombardier, Sikorsky and Agusta, and in the space field, there are companies that have participated in programmes related to the European Space Agency, such as Copernicus or Rossetta. One more example: The Center for Advanced Aerospace Technologies, CATEC, has been recognised by the European Commission with the Innovation Radar Prize for its technology pioneering the use of drones for industrial inspection on contact, covering the fields of automation and robotics, avionics and systems and materials and processes. In fact, CATEC is doing a commendable job with its drone applications in the productive sectors of great importance in Andalusia, such as agriculture and agribusiness.

The aerospace industry in the city of Seville is also an example of the exchange of knowledge between public administrations

and private companies, and between university and business. Therefore, public resources are added to the scientific and technological capabilities, creating an conducive and attractive ecosystem for investment, which, without a doubt, is necessary to support our own way of being and living. In fact, when investing, it is very important for a company to have an institutional, cultural and social enclave in which it can carry out its activity. And Seville is an ideal place to live due to its wide range of cultural, heritage and leisure activities, and its universities, schools, infrastructure and climate.

Together with the broad institutional support, the aerospace industry is clearly recognised by the residents of Seville. In 2019, the city will assume the presidency of the Community of Ariane, which is supposed to be the European capital of the aerospace sector this year. This is a new opportunity for Seville to show that we are aligned with the aerospace industry and that Seville is a city to invest in... and a great place to live, as well.

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