

# Aerospace Ambitions Taking Wings

As leading aerospace majors, attracted by the booming civil aviation sector in India, begin sourcing components and assembling products here, domestic information technology leaders are busy expanding their exposure to the vibrant sector, writes **Rajiv Pai.**



India's civil aviation sector is flying high. Liberalisation has revolutionised the industry, making air travel affordable even for the common man. According to projections by the Union Civil Aviation Ministry, domestic air traffic is expected to surge from 29.82 million passengers in 2007-08 to 52.32 million by 2016-17. International traffic is estimated to rise from 20.96 million to 32.99 million in the same period.

Toulouse-based Airbus, which projects an annual passenger traffic growth in India of 7.7 per cent until 2025, foresees demand for around 1,100 aircraft from domestic airlines over the next 20 years. Its American rival, Seattle-based Boeing Company, expects Indian carriers to order 911 new commercial aircraft worth \$86 billion over the same period. While Indian carriers had a combined fleet size of 184 aircraft by end-2005, the unprecedented orders they have placed will raise this tally to around 600 by 2010.

This massive induction of aircraft is expected to place considerable demands on India's airport infrastructure. This sector is receiving a good deal of attention from the government, which is framing policies that are designed to ensure the emergence of India as a global aviation hub. Besides, India's offset rules, that prescribe reinvestment into the country of 30 per cent of all deals valued at over \$75 million, are obliging aerospace partners like Boeing and Airbus to set up units in, or source materials from, India.

The offset policy's transfer of technology and licensed indigenous production clauses are also expected to build up a credible support industry that will help India eventually emerge as a major aviation manufacturing and assembling hub. The country is now moving from parts manufacturing to engineering, information technology enabled services, and research and development (R&D). Overseas majors are outsourcing an increasing amount of work to the traditional domestic sub-assemblies segment. Industry watchers expect large deals and joint ventures with global aviation majors.

Promising airports on par with the best in the world by 2010, the government has conferred infrastructure status on them and is devising innovative PPP (public private partnership) initiatives in pursuit



**STRATEGIC MARKET:** The massive induction of aircraft is expected to place considerable demands on airport infrastructure

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of its policy. "Airports, being the nuclei of economic activity, assume a significant role in the national economy," asserts Union Civil Aviation Minister Praful Patel. "As this is a capital-intensive sector, there is an obvious need for perspective planning with a vision for the next 20 years and to muster the combined resources of the public and private sectors, both domestic and foreign."

In December 2005, flag carrier, Air India, placed the largest ever order in India's civil aviation history - for 68 Boeing aircraft - worth \$11 billion. This followed a \$2.25 billion order by domestic flag carrier Indian for 43 Airbus jetliners. Both Air India and Indian have now been merged as Air India under NACIL (National Aviation Company of India Ltd).

Alongside Air India, orders placed over the past three years by Jet Airways (for

53 aircraft), SpiceJet (30), Air Sahara (10) and the Indian Air Force - for three B737 Boeing Business Jets for VIP travel - have totalled 164 Boeing aircraft exceeding \$25 billion at current list prices. "As most of these aircraft will be delivered by 2012, they will be used for fleet renewal and route expansion, and are truly opening up the country and the world for travellers and business," claims Dinesh A. Keskar, Boeing's senior vice-president, sales (commercial airplanes).

Airbus has orders for 373 aircraft from Indian carriers ranging from the A320 to the A380, the world's largest passenger jetliner, says Miranda Mills, vice-president, sales, for Airbus India. With five on order, Kingfisher Airlines will be the launch customer for the A380 in India. Kingfisher has also ordered 66 other Airbuses, while its merged partner, Air Deccan, ordered 62. Other carriers that have ordered aircraft from Airbus include IndiGo (100), Jet (15), Go Air (18), Flyington Freighters (12) and Air India (11).

"We are pursuing an integrated enterprise strategy to become India's preferred aerospace and defence partner and provider," says Keskar. Boeing has established relationships with suppliers in India since 1991, but is now increasing the pace and depth of its engagement not only through its products and services, but also via software development, engineering and technology as part of its globalisation strategy.

"Not related to the offset, Boeing did commit up to \$100 million for an MRO (maintenance, repair and overhaul)



**MRO HUB:** International aviation companies are looking at setting up MRO facilities in India

centre, up to \$75 million for a pilot training centre and up to \$10 million for pilot training grants," he notes. In February, Boeing drafted a deal with Tata Motors' subsidiary, TAL Manufacturing Solutions Ltd, for manufacturing structural components (floor beams) using new technology with advanced titanium and composite materials for Boeing's 787 Dreamliner programme.

Again in February, Boeing signed an agreement with the Indian Institute of Science (IISc) and IT firms Wipro Technologies and HCL Enterprise to develop wireless and other network technologies for aerospace-related applications. Boeing has also involved institutions like the National Aeronautics Ltd and the Indian Institute of Technology, Kanpur in other R&D projects.

Keskar is convinced that India is beginning to become an aviation hub. An MRO facility, like the one Boeing is developing at Nagpur, gives India-based operators the option to avoid the higher cost and

India has an abundance of people with highly developed information technology skills.

additional time of flying their aircraft and support staff to other countries for scheduled heavy maintenance checks. For example, though Air India currently does in-house maintenance work, it can conduct heavy maintenance checks at the MRO centre. "We hope that other carriers will take advantage of this opportunity that could potentially reduce the cost and time that other options might



require," observes Keskar. "Nagpur was selected because it will provide a convenient, centralised location for India and regional-based airlines to schedule routine maintenance and overhaul work, and to have repairs completed."

Mills too sees India's emergence soon as an international aviation hub. "India is a strategic market for Airbus and we would want to be directly involved with

the changing aviation landscape regardless of manpower costs," he emphasises. Airbus claims it benefits Indian industry through outsourcing the manufacture of parts and sub-assemblies as well as by providing engineering and IT services. Its deal with Bangalore's Hindustan Aeronautics Limited (HAL) in 1988 for building passenger doors for the A320 proved so successful that it extended the contract in 2004 to cover an additional 1,000 sets of doors. HAL now manufactures half of the A320 doors for Airbus.

"India has an abundance of people with highly developed IT skills and is also one of the world's biggest growing aviation markets, so it makes sound business sense to want to share and be a part of it," says Mills.

A year ago, European Aeronautic Defence and Space Company (EADS), Airbus's parent company, forged a joint venture called IAV with Rajiv Chandrasekar's Bangalore-based Jupiter Aviation and Logistics. In January, IAV signed an MoU with NACIL to collaborate on an MRO venture, likely in Nashik at a cost of \$120 million.

"Airbus is not involved in the MRO industry anywhere in the world, but does have the MRO Network comprising 15 members," says Mills. Indian carriers have

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technical in-house capabilities for minor work, he explains, but MRO work such as overhauls and major checks is carried out in Singapore and Dubai.

Airbus estimates the Asia-Pacific aircraft and engine MRO market to touch \$12.90 billion by 2011. A number of foreign and Indian companies are looking to set up MROs in India.

EADS has set up a \$250 million Airbus Engineering Centre in Bangalore that focuses on modelling simulation and aerodynamics for all Airbus aircraft, including the A350 and the A380. The centre is primarily meant for high-end engineering analysis and design. By 2010,

**BULGING BOOKS**

THE order books of the two largest aircraft manufacturers – Boeing and Airbus – are bulging with deals signed in recent years by airlines from India:

**BOEING:**

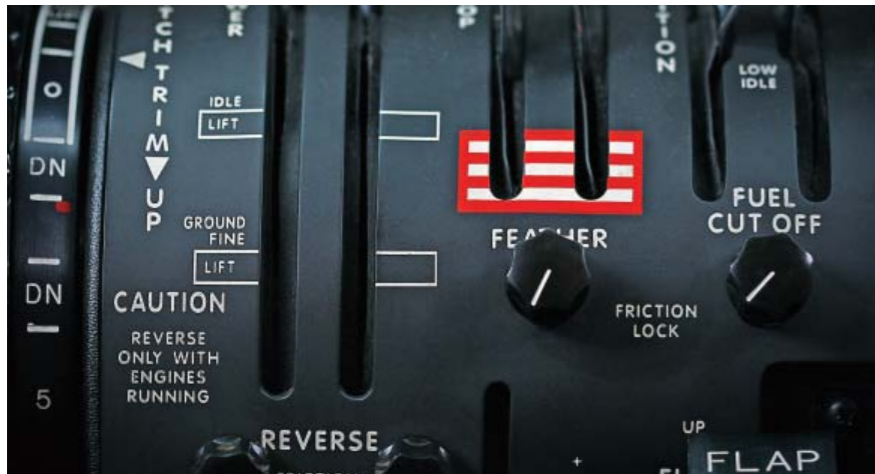
- Air India - 68 aircraft
- Jet Airways – 53
- Air Sahara (now JetLite) – 10
- SpiceJet – 30
- Indian Air Force – 3 (for VIP travel)

**AIRBUS:**

- Indian (now merged with Air India) – 43
- Kingfisher Airlines – 71
- Air Deccan (now part of Kingfisher) – 62
- IndiGo – 100
- Jet Airways – 15
- Go Air – 18
- Flyington Freighters – 12
- Air India – 11

**READYING FOR TAKE-OFF:** Indian expertise is increasingly being sought in designing complex aircraft systems





**THE NEXT FRONTIER:** Indian firms are developing wireless and network technologies for aerospace-related applications

some 300 engineers will be employed by the centre, which will eventually be fully integrated into Airbus's global engineering network.

Indian IT firms such as Infosys Technologies Ltd, Tata Consultancy Services Ltd, Satyam Computer Services Ltd and HCL Enterprise have become part of the Airbus supply chain, by working as sub-contractors through its global suppliers. "Through an expanding list of partners and suppliers, Airbus is well placed to play a large role in the development of the Indian aviation sector," says Mills.

Lufthansa Technik AG, a leading MRO services provider signed an agreement with Kingfisher for its new Airbus A320

fleet. Over the next decade, Lufthansa Technik will serve Kingfisher via a total component support with provision of components at the carrier's hub in Mumbai. "The arrangement enables Kingfisher to participate in one of the world's largest pools for aircraft components," says Wolfgang Weynell, Lufthansa Technik vice president for marketing and sales.

"Based on the increased volume of components, Lufthansa Technik's Indian subsidiary will set up a regional component pool to support Kingfisher, as well as future customers within India," adds Weynell. "Operating a fast-growing network in India, we need an established partner to back up our operations and

to increase our efficiency at the same time," points out Kingfisher executive vice president (maintenance and engineering) Hitesh Patel. "The experience will be an important factor in our success in a very competitive market."

India's ambitions in the aerospace segment are indeed taking wings as a growing number of partnerships are being forged by international majors with rapidly emerging local firms. The next few years will see the country emerge as a civil aviation hub, not just in terms of passenger traffic and airport infrastructure, but also in its capabilities in designing, manufacturing and assembling aircraft and their components.



**POWERING AHEAD:** India is a logical place to develop a supply chain

## DESIGNING COCKPITS, CRUCIAL COMPONENTS

TCS Ltd, Infosys Technologies and Wipro are among India's top three information technology companies. But they also happen to be among the growing number of Indian companies that are increasingly being involved by aircraft majors like Boeing and Airbus in the design of aeroplanes, their complex systems and sophisticated components that go into the making of modern jet planes.

With the order books of leading aircraft manufacturers bulging with contracts from different airlines, demand for aviation outsourcing is soaring. Aircraft majors – both aerospace original equipment manufacturers and tier-one suppliers – are increasingly going in for outsourcing of engineering services (ESO), especially to Indian IT majors. Most of these outsourcing contracts relate to high-end services that Indian companies and organisations have mastered in recent years.

A study by Booz Allen Hamilton, a global strategy and technology consulting firm, for the National Association of Software and Service Companies (NASSCOM) – 'Globalisation of Engineering Services – the Next Frontier for India' – in 2006 found that India was well-positioned to increase its market share in engineering off-shoring from 12 per cent to 30 per cent by 2020.

Global spending on engineering services is expected to grow to \$1.1

trillion by 2020, according to the study. Aerospace engineering accounts for about 8 per cent of the total market. At present, just about \$15 billion of engineering services is off-shored – with India accounting for about 10 per cent of it. But the overall ESO market is expected to rise to \$225 billion by 2020, with India accounting for \$60 billion of the segment, says the Booz Allen Hamilton study.

Aviation and other related off-shoring business coming India's way will add up to \$10 billion in less than five years, it has been estimated.

Boeing recently entered into an agreement with the Indian Institute of Science (IISc), Wipro and HCL Technologies to develop wireless and other network technologies for aerospace-related applications. The agreement makes the US aerospace giant along with the IISc's Society for Innovation and Development (SID), and the two leading IT firms part of a new Aerospace Network Research Consortium (ANRC), India's first public-private aerospace research consortium.

"We have a great need for advanced affordable aerospace network R&D," says Naveed Hussain, engineering and technology vice-president for Boeing in India. "It is part of Boeing's strategy to leverage top research capabilities anywhere in the world and we look forward to working with our Indian

partners to benefit from their tremendous capabilities and talents in this area."

According to Professor Veni Madhavan, chief executive of SID, "This collaborative approach will help permit research at IISc to be utilised for appropriate and interesting applications in the aerospace industry." Researchers from Boeing Phantom Works, the company's advanced R&D unit, and Commercial Airplanes will be part of the team. Aerospace giants like Boeing and Airbus and even smaller players like Bombardier are opting for ESO, outsourcing a growing range of complex tasks to partners in India. These cover areas like structural design and development, control system design, simulation, cockpit equipment support software and embedded development.

Aerospace engineers from India's leading IT firm, TCS, for instance worked in partnership with Oracle to use radio frequency identification (RFID) tags for critical parts used in aircraft maintenance and repairs at the Heathrow airport warehouse of Virgin Atlantic, helping the airline to slash costs and increase efficiencies. RFID technology is now widely used in the aerospace industry, helping airlines track employees, baggage and parts and components.

TCS and state-owned aerospace major Hindustan Aeronautics Ltd (HAL) have a strategic tie-up to provide

cutting-edge engineering solutions for the global aerospace industry. TCS has been providing IT and engineering services to many international aerospace companies, while HAL is a leading Indian military aircraft design and development organisation. The objective of the strategic tie-up is to provide 'compelling value propositions for global clients.'

TCS has worked with aerospace majors like AVIO, Boeing, B/E Aerospace, EADS, Dunlop Aerospace, GE Aircraft Engines, SME Aerospace, Goodrich and Pratt & Whitney, while HAL has worked with Airbus, Boeing, Honeywell, BAE Systems, EADS, SNECMA group and Rolls Royce.

The Tata group IT major plans to increase the headcount at its aerospace practice in Bangalore by over 50 per cent every year for the next few years. The company is investing in demonstration labs, innovation centres, embedded avionics systems and hardware and software testing.

Bangalore-based Wipro, which has also partnered with Lockheed Martin, is focusing on network-centric command and control systems, simulators, precision engineering and flight control systems. It has set up 'Ambar Jyoti,' a network-centric operations centre at Gurgaon near Delhi with Lockheed Martin, to develop, demonstrate and experiment with emerging network-enabled capabilities

and applications. It is also working with BAE Systems in the area of flight control systems, and plans to get into commercial simulators as well.

Spirit AeroSystems, the world's largest independent supplier of structures for commercial aircraft – which also has design and manufacturing responsibilities for the forward section, pylons, and the fixed and moveable wing components for the Boeing 787 Dreamliner – has set up an engineering centre at the Infosys campus in Bangalore, together with the IT major. The centre focuses on high-end engineering services including product development, design and analysis of airframe structures, engineering change management and stress engineering support.

The centre is building up as a global virtual real-time operation for Spirit AeroSystems. According to Robert Waner, senior vice-president and chief technology officer, Spirit AeroSystems, "The Infosys centre provides us access to global engineering talent, reduces time-to-market by enabling rapid design and deployment and offers efficient global support across clients, besides enhancing scalability and flexibility to take up multiple aircraft programmes for global customers."

Another Bangalore-based firm, Dynamatic Technologies, also recently entered into a tie-up with Spirit

AeroSystems, for the production of wing structures and assemblies for the Airbus A320. By next year, Dynamatic will emerge as a single source strategic partner for these components and form part of the Airbus supply chain.

According to a Spirit Europe spokesperson, "India is a logical place for us to develop a supply chain that meets our customers' strategic intent."

Infotech Enterprises group, Hyderabad, is another Indian information technology major with vast exposure to the global aerospace industry. The group has completed over five million person hours on aerospace projects and has gained extensive domain knowledge in aerospace engineering. It includes areas like product design and development, embedded systems, product life cycle management and IT solutions. It also has a strategic business unit, Avionics, which provides full-life cycle safety/mission critical software solutions for aerospace with focus on onboard software and hardware development, testing and integration and verification and validation.

Outsourcing of high-end tasks and work related to crucial components and systems to Indian IT companies will continue to grow in the coming years as aircraft manufacturers take advantage of the vast technical and engineering expertise that is available in India.