# Aerospace Business - India

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Immersion Week Seminar Sep-2015





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## Indian Civil Aerospace Market

- Indian aviation sector with a growth rate of 18%
- India retains the second-highest growth rate worldwide
- 9th largest civil aviation market.
- 163 Million passengers in 2013.
- 3rd largest aviation market by 2020.
- 800 aircraft by 2020.
- India plans to increase the number of operational airports from 100 to 250 by the year 2030.





## Indian Civil Aerospace Market

According to the Investment Commission of India, Investment opportunities of US \$110 billion are being envisaged up to 2020.

**US** \$80 billion in new aircraft

□ US \$30 billion in development of airport infrastructure



Fleet expansion programme			
YEAR	AIRLINE	AIRCRAFT ORDERED	No of AIRCRAFT ORDERED
2014	IndiGo	Airbus A320 neo	250
2013	Lion Air	Airbus A320	234
2012	Lion Air	Boeing 737 Max	201
2011	AirAsia	Airbus A320 neo	200
2011	IndiGo	Airbus A320 neo	180
2011	Southwest Airlines	Boeing 737 Max	150
Source : Ai	rbus and Boeing		

## Indian Defense Aerospace Market

- Military expense of USD 45.2 Billion with 2.2% of GDP
- World ranking 8 as per International Institute for Strategic Studies
- Projections for 2045
  India's Spending in Purchasing Power Parity (PPP) stands at USD 654
   Bn.



References: https://en.wikipedia.org/wiki/List\_of\_countries\_by\_military\_expenditures

## **Government Aerospace Companies**



Hindustan Aeronautics Limited



National Aerospace Laboratories



Defence Research and Development Organisation



Indian Space Research Organisation



## **Hindustan Aeronautics Limited**

- HAL is an Indian state-owned aerospace and defence company based in Bangalore, Karnataka.
- HAL built the first military aircraft in South Asia.
- It is currently involved in the design, fabrication and assembly of aircraft, jet engines, helicopters and their spare parts.
- Several facilities located across India, operated by HAL include Nasik, Korwa, Kanpur, Koraput, Lucknow, Bangalore and Hyderabad.
- Hindustan Aeronautics Limited (HAL) was ranked 40th in flight International's list of the top 100 aerospace companies last year.



Fighter Jet - Tejas



Trainer - Kiran



Advanced Light Helicopter Dhruv



HAL supports Airbus and Boeing

- Airbus A320 Forward Passenger Doors
- Boeing 777 Uplock Box Assembly
- Boeing 737 Freighter Conversion Kits
- Boeing F/A 18 Gun Bay Door
- Boeing P-8 I Weapon Doors & Tailcone
- Eurocopter Ecureuil composites
- Boeing -3D-Modelling / Digitisation of Drawings



## **Hindustan Aeronautics Limited**

Engines Aircraft sub systems **Avionics Systems** Raw materials **BOI Items** 

IIeC	Airbus
	Zodiac Aero Electric
	Honeywell
D C	UTC Aerospace
ms	Israel Aerospace industries
L L C	Tyco Electronics
S√s	Thyssenkrupp Materials
	Aleris Aluminium Koblenz Gmbh
	Metalliages

Attrition Challenges faced Project schedule delay Cost overrun



## **Hindustan Aeronautics Limited**

Name of the Joint Venture	Purpose of JV	JV Partners & Shareholding Pattern
BAeHAL Software Ltd	Design, develop & market Software, Firmware and Computer programmes	BAe Systems PLC,UK - 11%, BAe HAL Employees - 40% Welfare Trust, India, HAL - 49%
Indo Russian Aviation Ltd	Supply of all types of Aircraft (Russian Origin) Engines, Accessories, Aggregates, Systems & Spares of all kinds of aviation equipment.	Russian Firms: RAC- MiG, - 31%, Ryazan SIP, - 10%, Aviazapchast Plc, - 6% Indian Firms: ICICI Bank - 5%, HAL – 48%
Snecma HAL Aerospace Pvt. Ltd	To establish a Center of Excellence for production of Precision Aero Engine components and assemblies as an Export Oriented Unit.	Snecma, France - 50% HAL – 50%
International Aerospace Manufacturing Private Ltd	Manufacturing compressor rings, turbine blades and nozzle guide vanes.	Rolls-Royce Overseas Holdings Ltd, UK - 50% HAL – 50%
Multirole Transport Aircraft Limited	Co-design / develop and Co-produce Multirole Transport Aircraft	UAC-TA & Rosoboron export Russia - 50% HAL – 50%
HATSOFF Helicopter Training Pvt Ltd	Military and civil helicopter pilot training services through operation of a flight training devices to be operated by the company	CAE Inc, Canada - 50% HAL – 50%
Tata HAL Technologies Ltd	Engineering design services in aero structures and also the captive offshore and onsite workload from OEMs including offset programme	TATA Technologies Ltd, India- 50% HAL – 50%
HALBIT Avionics Pvt. Ltd	Design , Development & Marketing of aircraft simulators & all related applications for Indian & International markets	Elbit Systems, Israel- 26%, Merlin Hawk , Associates, India - 24%. HAL – 50%

# Mational Aerospace Laboratories

- National Aerospace Laboratories (NAL), is India's second largest aerospace firm after Hindustan Aeronautics (HAL).
- CSIR-NAL mandate is to develop aerospace technologies with strong science content, design and build small and medium-sized civil aircraft, and support all national aerospace programmes.
- NM5 Five Seater General Aviation Aircraft, country's first public-private partnership (PPP) for development of civil transport aircraft in collaboration with M/s Mahindra Aerospace Pvt Ltd (MAPL).

SARAS - Multirole light transport aircraft, SARAS is the first civilian aircraft designed and developed in India. Two prototypes have been built and flown



Saras

HANSA - Two-seat, all composite aircraft, certified by DGCA in the year 2000 under JAR-VLA certification



Hansa

# Indian Space Research Organisation

- Established in 1969, Head Quarters in Bangalore with annual budget of USD 1.1 Billion
- Extra-terrestrial exploration First mission to the Moon: Chandrayaan-1
- Mars Orbiter Mission (Mangalayaan), India is the first country to enter Mars orbit in first attempt. It was completed at a record cost of \$74 million.
- ISRO'S Mars mission is the cheapest so far. Just Rs.
  450 crore. "That is Rs. 12 per km. Equivalent to Auto Fare.
- Antrix Corporation Limited, the commercial arm of Indian Space Research Organization (ISRO), has finalized contracts to launch 16 satellites of six countries in the coming years
- PSLV launched 40 foreign satellites



### Indian Private Aerospace Companies



## **Aerospace Product Companies**

Company Name	Products and Services
Taneja Aerospace and Aviation Limited (TAAL), Hosur, Near Bangalore	Aircraft Structural Manufacturing: Only Private sector company manufacturing entire aircraft in India Partenavia P68C- 6 seater aircraft build and fly Thrope T211- Sports aircraft build and fly Saras- Aircraft structural build Hansa- Fully composite aircraft build PSLV, GSLV – Sub booster rocket structure Maintenance Centre: TAAL has DGCA maintenance approval for Cessna and light transport aircraft Air Works India MRO uses TAAL facilities Airfield – Accommodate A320, 737, ATR series
Mahindra Aerospace, Bangalore	Manufacturing: Aircraft sheet metal parts Surface treatment & NDT Heat treatment Aero structural assembly Strategic Partnerships: Magellan Aerospace- Metallic components and major structural assembly Airbus group company- Premium Aerotec - Multi year contract to supply metallic components GE Aviation- Produce small, metallic complex structural sheet details and assemblies

### **Aerospace Product Companies**

Company Name	Products and Services
Dynamatic Technologies Limited, Bangalore	Aircraft Structural Manufacturing: Wing and Rear Fuselage of the India's Pilotless Target Aircraft - LAKSHYA Ailerons & Wing Flaps for the Intermediate Jet Trainer HJT-36 Major Airframe Structures for the Sukhoi 30 MKI Fighter Bomber Flap Track Beams for the Airbus Single Aisle A-320 Family Parts for CH-47 Chinook helicopters Strategic partnerships and Contracts awarded: Airbus tier-1 supplier for flap-track beams for A320 and A330 IV with AeroVironment for LIAV
Tata Advanced Systems, Hyderabad	Aero structures Manufacturing: Sikorsky- S92 cabin Lockheed C-130 Hercules centre wing boxes and empennages Pilatus PC-12NG UAV - Indian Armed Forces for surveillance UAV- Israel Aircraft Industries Missile Systems Radar Systems Command and control systems Homeland security solutions Optronics systems

### Aerospace Engineering Service Companies

Company Name	Capabilities	Customers	Head count	Turnover
Axis Cades Digitech, Bangalore	Design, Analysis, PLM, Systems and Tech Pub	Airbus, Fokker, Boeing, REIMS Aviation	1229	USD 13.6 million
Infosys, Bangalore	Design, Analysis, PLM, Systems and Tech Pub	Airbus, Boeing, Gulfstream, Bombardier	179,523	USD 2.26 billion*
Wipro Technologies, Bangalore	Design, Analysis, PLM, Systems and Tech Pub	Airbus, Boeing, Gulfstream, Bombardier	158,200	USD 8 billion*
Tata Consultancy Services, Bangalore	Design, Analysis, PLM, Systems and Tech Pub	Airbus, Boeing, Lockheed Martin	319,000+	USD 15.5 billion*
HCL Technologies, Bangalore	Design, Analysis, PLM, Systems and Tech Pub	Airbus, Boeing, HAL, Bombardier, UTC Aerospace systems	106,107	USD 5.95 billion*
Quest Global, Bangalore	Design, Analysis, PLM, Systems and Tech Pub	Airbus, Boeing, Bombardier, Pratt & Whitney, Rolls Royce	9900+	USD 500 million
Fair Tech Engineering Service Private Limited, Bangalore	Design, Analysis, Product support, testing and Software	Airbus, Boeing, HAL, Bombardier	500	USD 1 Million

### Foreign Aerospace Companies in Bangalore





Where ingenuity takes off







MOOG

### Foreign Aerospace Companies in Bangalore What do they produce

Company Name	Products built in India
UTC Aerospace Systems	Evacuation Systems, Aircraft Interiors systems- Lighting, Cargo and Specialty Seating systems, Sensors and integrated systems- Wiper, Motor drive system, Actuation systems
Honeywell	Turboprobe engines, Auxiliary Power Units (APU), Avionics, Indian engineers play a key role in Technology development
GE Aviation	MOU signed with Mahindra aerospace to collaborate on manufacturing opportunities for aero structures.
Textron	Engineering service
Safran	High-tech components for CFM56 aircraft engines, jet engines and carbon brakes, Largest ever biometric project (Aadhaar Program)
Moog	Servo motor R&D and manufacturing in India



## Airbus India Presence

## Airbus Company and its operations

Engineering Centre Airbus Training India Sonovision-Aetos 500 direct employees More than 5,000 local jobs

Procurement worth of 400 million dollars from Indian suppliers in 2014

#### Industry Partnerships

Tata Consultancy Services QuEST, AxisCades Infosys, HCL, Geometric, Tech Mahindra

Hindustan Aeronautics Ltd. Dynamatic Technologies Quest Global Tata Mahindra and AEQUS Research & Technology and University Partnerships

Airbus Innovations Group Tata Institute of Fundamental Research-Mathematics of Complex Systems

Two-years, part-time Aero MBA programme by the TBS & IIMB



### **Boeing India Presence**

#### **Boeing Company** and its subsidiaries

Headquartered in Delhi Research & Technology centre in Bangalore Field service offices in Mumbai and Delhi

Jeppesen in Hyderabad Narus in Bangalore Continental DataGraphics in Chennai

#### Industry Partnerships

HCL, Infosys Wipro Tata Consultancy Services Cyient (formerly-Infotech)

Hindustan Aeronautics Ltd. Bharat Electronics Limited Dynamatic Technologies Tata Advanced Materials Limited (TAML)

#### Research & Technology and University Partnerships

NAL - Collaborative research in aerodynamics IISc - Research in materialssciences

DST-Aerospace manufacturing

Building a Skilled Aerospace Talent Pipeline

Nettur Technical Training Foundation (NTTF).

### Aerospace Eco Systems in Bangalore



#### Aero SEZ

- Country's first aerospace SEZ has been set up in Belgaum in November, 2009
- Aerospace SEZ in a 250-acre space near the new airport in Bangalore
- Defence Manufacturing Hub & HAL's component manufacturing site in Chitradurga district
- Hindalco houses an alumina plant produces metallurgical alumina



#### Talent Pool

- Pool of skilled technical manpower HAL, DRDO, ISRO, NAL, IISC, IIMB based in Bangalore
- Global manufacturers are comfortable outsourcing to India due Presence of technical skills and fluency in the foreign language
- Infuse \$ 500 million into the economy in ten years.



#### **Government policies**

- 100% Foreign Direct Investment on automatic route in all areas, except air traffic services.
- 100% tax exemption for airport projects for a period of 10 years
- Defence Offset Policy minimum of 30% > Rs. 3 billion

## Make in India



# Make in India – Major Projects



![](_page_23_Picture_0.jpeg)

## Make in India- Aviation

![](_page_23_Figure_2.jpeg)

## Conclusion

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#### Challenges:

- Access to technology
- Funding
- Raw material availability and its high cost
- Certification processes

![](_page_24_Picture_7.jpeg)

#### Opportunities:

- Potential opportunities in the "design to build" lifecycle are tremendous
- Rapidly developing engineering services/R&D expertise
- Potential global hub for both manufacturing and MRO
- Low cost & High skill manufacturing
- Large commercial aircraft market with rising passenger traffic
- Increasing military and defence expenditures