Aerospace and Defence
Global Aerospace and Defence Industry
Global Defence industry

**Key Segments in Aerospace and Defence Industry**

- Defence
- Civil Aviation
- Space

**Global defence spending**

- Global military expenditure was $1739 bn in 2017, an increase of 1.1% in real terms on 2016, accounting for 2.2% of Global GDP in 2017.
- Top 5 spenders – USA, China, Saudi Arabia, Russia and India – accounting for 60% of global military spending.
- Defence market size is anticipated to exceed USD 10.5 billion by 2023, growing at a CAGR of over 6.1% from 2016 to 2023.*

**Spending of Top 10 Nations, as a share of GDP (%)**

<table>
<thead>
<tr>
<th>Country</th>
<th>2017</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Korea</td>
<td></td>
<td></td>
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<tr>
<td>Germany</td>
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<tr>
<td>Japan</td>
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<td>UK</td>
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<td>Russia</td>
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<tr>
<td>Saudi Arabia</td>
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<tr>
<td>China</td>
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<tr>
<td>USA</td>
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</tbody>
</table>

Source: SIPRI military expenditure database – Fact Sheet, May 2018

*https://www.gminsights.com/industry-analysis/defense-market

**The share of world military expenditure of the 10 nations in 2017**

- Spending in Asia & Oceania amounted to $477 billion in 2017
- While the share of the USA on global defence spending has declined, the share of Asia, Oceania and the Middle East has collectively increased
- In Asia, top countries in Defence spending includes China, India, Japan, South Korea and Australia
Global Aerospace Scenario

Revenue Passenger Kilometres (RPK) Growth, Jan-Oct 2018

Commercial Operations

► EBIT margin, % revenues – 6.8% (2018E)
► Net profit - $32.3 billion (2018E)
► The global commercial fleet size is expected to grow at 3-4% CAGR over the next two decades
► Passenger traffic in different routes across the globe is expected to grow on an average at close to 5% CAGR till 2035

Top 20 aerospace and defence companies by 2017 revenue include:

1. Singapore
2. Bangalore
3. Prestwick
4. Dubai

Factors affecting A&D Sector

Rising GDP in emerging economies
Volatility in commodity prices

Fluctuations in Exchange Rates
Change in Oil prices

Source: Army industry outlook 2019, IATA, December 2018, SIPRI Military Expenditure Database
## Key Focus areas of companies in A&D: Trends

<table>
<thead>
<tr>
<th>Industry trends</th>
<th>Megatrends</th>
<th>Industry redefined</th>
<th>Empowered consumer</th>
<th>Geo-political shifts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The future of work</td>
<td>Resourceful planet</td>
<td>Changing military dynamics</td>
<td>The future of warfare</td>
</tr>
<tr>
<td>Digital technologies for A&amp;D</td>
<td>Focus on emerging markets</td>
<td>Heightened M&amp;A activities</td>
<td>Driving growth through innovation</td>
<td>Focus on environment friendly and fuel efficient products</td>
</tr>
</tbody>
</table>

### Operational excellence to improve EBITDA and control costs
- Emphasis on customer and focused product portfolios
- Using big data to forecast demand, supply and prices
- Expanding geographical footprint through organic growth
- Developing fuel efficient and environment friendly commercial aircraft
- Operational excellence to improve EBITDA and control costs
- Utilizing cloud computing for more efficient and agile operations, minimize production variability and improve quality
- Win key defence contracts in emerging markets
- Increased R&D around digital warfare and cybersecurity
- Operational excellence to improve EBITDA and control costs
- Continuous performance improvement initiatives and new service offerings through IIoT
- Global supply chain network
- Focus on dual use technologies that can be used for both military and civil purposes
- Supply chain optimization, integration with suppliers and customers
- Increased adoption of 3D printing in manufacturing of key parts and components
- Forming alliances and JVs with local players in emerging markets to win key contracts
- Considering opportunities to replace fossil fuels with more environment friendly bio-fuel options
- Technology transfer and investment in local industry to discharge offset obligations
- Investing in R&D for next generation programs

*Source: EY Research*
Global Value Chain

Aerospace Manufacturing Value Chain —

► The capital-intensive aerospace manufacturing industry is characterized by a high focus on technology
► The aerospace value chain is complex and is characterized by a long project life cycle spanning R&D, engineering design, manufacturing, assembly and aftermarket (spare parts and service), as shown here:

Transformation of the Aerospace Supply Chain— Increasing outsourcing to low cost manufacturing locations.

This has led the OEMs to:
► Work with low cost manufacturers in emerging markets in India China & Brazil
► Maintain a supplier base that is spread around the world
► Share the risk of development with the suppliers

In deciding whether or not to outsource, aerospace majors evaluate several criteria. These include:
► Expertise — Supplier expertise to reduce costs and improve quality
► Growth — To be accelerated through buying capabilities rather than building internal capabilities
► Scale — Leverage supplier scale to reduce airline costs
► Labour costs — Access suppliers that face lower labour rates
► Investments — Leverage supplier investments in hardware and expertise to reduce airline investments
Aerospace and Defence Industry in India
**India Overview**

### Indian Defence Sector

- India’s defence allocation was recorded in budget 2017-18 stood at $41 bn, 5.3% increase in compared to budget 2016-17.
- Cumulative capital budget till the end of 12th to 14th Five Year Plan (2012-2027) for the Indian Air Force (IAF) is projected to be approximately US $218 billion (INR 14,131 crore); out of which 69% is towards acquisition of aircrafts and aero engines.
- Total defence capital spending is estimated at USD 75.38 billion (INR 4.9 trillion) between FY 2017 and FY 2020.
- India’s MRO segment is estimated to grow at 10 percent and reach USD 2.6 billion by 2021.

### Industry Structure

- Industry comprises public sector players, private sector domestic companies and foreign players.
- Private Players mainly involved in the supply of raw material, semi-finished products, parts and components to Defence Public Sector Undertakings (DPSUs).

### Defence Public Sector Undertakings

- IAF planned expenditure - US $150 billion on **aircraft and aero engine** in the next 15 years, is expected to grow by 10-15% every year.

**Source:** Invest India, CII, EY Research,
India Overview

Indian Aerospace Sector

► International passenger grew YoY by 10.43% to reach 65.48 million in FY18 and is expected to become 76 million in FY20E.
► As of December 2018, India has 102 operational airports.
► Global commercial aircraft fleet is expected to grow at a CAGR of around 4% during 2016-2035.
► Expected to be 3rd largest domestic civil aviation market in the world by 2020

Total air passenger journeys to, from & within India (annual)

► Aviation Industry in India is expected to witness Rs. 1 Lakh Cr. worth investments in next 5 years.
► Boeing has forecast a need for over 39,600 aircraft to be added during 2016-2035, with approximately 38% deliveries to airlines in the Asian region.
► Airbus has forecast a demand for 33,070 new aircraft deliveries during 2016-2035.

Source: IATA, CII, EY Research
Government of India Initiatives

Changes in Defence Procurement Procedures-2016

<table>
<thead>
<tr>
<th>Defence Procurement Procedure-2016</th>
<th>Introduction of new category of acquisition –Buy (Indian-IDDM), having the highest preference for procurement of defence equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Contract threshold increased from INR 300 crore to INR 2000 crore for offsets in defence</td>
</tr>
<tr>
<td></td>
<td>Reduction in procurement timelines:</td>
</tr>
<tr>
<td></td>
<td>Introduced a new procurement category, <strong>Buy (Indian–Indigenously Designed, Developed and Manufactured)</strong>, or ‘Buy (Indian – IDDM)’ to speed up procurement.</td>
</tr>
</tbody>
</table>

► Procurement is governed by the DPP
► DPP governs all Capital Acquisitions undertaken by the MoD, Defence Services and Indian Coast Guard

► Under the Industries (Development and Regulation) Act 1951, an industrial license (IL) is required for manufacturing Defence equipment
► The applicant must be an Indian company or partnership and has to apply to the Department of Industrial Policy and Promotion (DIPP)

Foreign Trade Policy

Foreign Direct Investment Policy (FDI)

Industrial Licensing Policy

Offset Policy

Defence Procurement Procedure (DPP) and offset guidelines

► The offset policy is a part of the DPP
► The policy stipulates a mandatory offset requirement of a minimum 30% for procurement of Defence equipment in excess of INR 3 billion (USD46.15 million)

► FDI over 49% allowed through Government of India approval in ‘modern technology’
► FDI upto 49% via automatic route in manufacturing of small arms and ammunition
► 100% FDI in brownfield airport projects under automatic route

Source: Ministry of Defence, Govt. of India; Foreign Investment Promotion Board
Karnataka’s Aerospace and Defence Industry
Karnataka’s Unique Advantages

An Investment Hub for Aerospace and Defence Industry in the country

► Establishment of HAL in Bengaluru in December 1940 by Walchand Hirachand and the Maharaja of Mysore heralded the beginning of Karnataka’s aerospace industry

► Karnataka produce quarter of India’s aircraft and spacecraft

► Karnataka’s the first state in the country to roll out a dedicated Aerospace Policy (2017-23) to boost the sector in the state by providing sector specific incentives and propose tailor made initiatives for the sector

► Special package of incentives & concessions shall be provided to large, mega, ultra-mega and super-mega projects on case to case basis

► State Government has developed Hi-tech Defence and Aerospace park in 3000 acres of Land with world class infrastructure next to Kempagowda International Airport, Bengaluru, which includes Aerospace SEZ in 252 acres of Land

► Hi-tech Defence & Aerospace Park containing facilities like MRO with direct access to KIAL, Testing Center, Hardware/ embedded technology center, technology innovation center including a certification/calibration center, a common finishing facility and housing

► Aequus has developed India’s first private Aerospace SEZ in 300 acres of land at Belagavi and it is operational

► Develop Greenfield airports at Shivamogga, Vijayapura, Hassan and Gulbarga through the PPP model

► Karnataka has the advantage of presence of number of top companies in IT/ITes and electronics hardware, many of them being integrated in supply chain of integrated sector

► Of all aircraft and helicopters available with the country’s Defence Services, 67% originates from Karnataka
Karnataka’s Aerospace Hub: Growth Drivers

What is driving Karnataka’s Aerospace Hub?

1. **High-growth sizable market**
   - Presence of more than 2,000 small and medium enterprises focused on component manufacturing, tooling & testing equipment and assembling

2. **Existing Supply Chain Ecosystem**
   - Supply chain has been developed by organizations located around Bengaluru, including HAL, NAL, Taneja Aerospace, Dynamatic Technologies, Air Works India Engineering Pvt. Ltd., UTC Aerospace

3. **Manufacturing Expertise**
   - Leader in heavy manufacturing, Headquartered PSUs such as HAL, NAL, BHEL, BEML, etc.
   - Therefore, has the advantage of a well developed ecosystem for high value manufacturing
   - Bengaluru has the largest hub of semiconductor design companies, outside the Bay Area in California. Nearly 70% of the country’s chip designers work Bengaluru and around 80% of the sector’s revenues in design are from this city alone

4. **Expertise in IT and skill sets**
   - Karnataka-based professionals have developed deep IT domain experience
   - Bengaluru is the world’s fourth-largest technology cluster and Silicon valley of India

5. **Proximity to Vendor Base**
   - Presence of more than **2,000 small and medium enterprises** focused on component manufacturing, tooling & testing equipment and assembling

6. **Institutional Support**
   - Fast tracked approvals through Single Window Mechanism
   - First state to bring policy dedicated to Aerospace and Defence Sector
   - Tremendous potential for activities in MRO

India’s flagship aircraft manufacturing and aviation research organizations are located in Karnataka
- Hindustan Aeronautics Limited (HAL)
- National Aeronautical Laboratory (NAL)
- Aeronautical Development Agency (ADA)
- Contributes 65% to aerospace related exports from the country
Global Companies: Investment in Karnataka

March 2009
India’s first public-private aerospace research consortium and it is devoted to emerging network technologies and concepts

- Launched the Boeing Research & Technology-India centre to carry out continued collaboration with Indian R&D organizations
- Launched Engineering and Design centre in a big way to establish the facility at Hi-tech Defence and Aerospace park

December 2009
European Aeronautic Defence and Space company
Committed research operations in Bengaluru

- The innovation centre will work with IISc in Bengaluru to design simulators and develop software. Located at the Airbus engineering centre, the India branch of EADS Innovation Works is the third facility outside Europe and second in Asia after Singapore

March 2010
Create a manufacturing joint venture company in Bengaluru with Hindustan Aeronautics Limited

- The new company, a 50:50 joint venture between Rolls-Royce and HAL, will manufacture compressor shroud rings. Construction of a new purpose-built production facility, incorporating the latest in modern manufacturing techniques

May 2009
Research, development & engineering facility in Bengaluru

- Inaugurated a Rs.253.09 crore ($50 million) research, development & engineering facility at Orion, Bangalore in May 2009. The new R&D facility will accommodate 3,000 people and have laboratory facilities, simulators, and a training centre

Transforming Business: India’s most dynamic state, positioned as an aerospace destination
<table>
<thead>
<tr>
<th><strong>Global Companies: Investment in Karnataka</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mahindra Aerospace</strong></td>
</tr>
<tr>
<td><strong>2007</strong></td>
</tr>
<tr>
<td>Signed an agreement</td>
</tr>
<tr>
<td>Design and development of a new general aviation aircraft with NAL, CSIR and the Government of India</td>
</tr>
<tr>
<td>This is the first public private JV in the aircraft design sector in India</td>
</tr>
<tr>
<td><strong>Infosys</strong></td>
</tr>
<tr>
<td><strong>Partner in forward integration and helps build aircraft components and systems for customers, such as Boeing and Airbus, through local vendors</strong></td>
</tr>
<tr>
<td>Delivering Software and Engineering services for aerospace clients, the company is now part of the product supply chain.</td>
</tr>
<tr>
<td><strong>CSIR-NAL</strong></td>
</tr>
<tr>
<td>Wind-tunnel testing center</td>
</tr>
<tr>
<td>National Aerospace Laboratories is the primary simulation testing facility for aircraft engines in India</td>
</tr>
<tr>
<td><strong>Wipro</strong></td>
</tr>
<tr>
<td>Helps build electronic warfare systems, radars, aviation electronics and flight simulators locally for US defence contractors, such as Lockheed Martin and Northrop Grumman</td>
</tr>
<tr>
<td>Company also maintains a tie-up with Britain’s largest defence manufacturer, BAE Systems, to build sub-systems for aircraft engines that power business jets</td>
</tr>
<tr>
<td><strong>HCL</strong></td>
</tr>
<tr>
<td>Leading software firm with a good clientele in engineering services for aviation and aerospace sector</td>
</tr>
<tr>
<td>Strategic partner for Boeing’s Dreamliner program. Also augmented its aviation and aerospace capability by its joint venture with Smith’s Aerospace and by its acquisition of Axon Consulting which has strengths in aviation MRO.</td>
</tr>
</tbody>
</table>
Aerospace Clusters in Karnataka

► State Government has established a state of the art Aerospace Park in 3000 acres of land with a 252 acre sector specific SEZ at Devanahalli next to Kempegowda International Airport, Bengaluru

► State Government allotted 610 acre of Government land at Gubbi in Tumakuru District to HAL to establish the Light Utility Helicopter Manufacturing Facility, which will act as an anchor to attract a cluster of aerospace SMEs to Tumakuru

► Hi-tech Defence & Aerospace Park at Devanahalli and MRO centres at KIAL and Mysore, and a defence manufacturing cluster at Managaluru are also being planned

► Focus on Cluster approach for inclusion of enterprises, financial providers, suppliers, service providers, common facilities such as testing laboratory at potential locations of the State. It is proposed to create three clusters with the relevant focus areas and institutions.

Bengaluru’s Heli-taxi Service

Bengaluru is set to launch a helicopter taxi service from its international airport to Electronics City & Whitefield, helping passengers save hours in commute and beat the city’s traffic

Thumby Aviation will start the service with one helicopter, eventually expand to connect Whitefield, the HAL airport, and some high-rise buildings that have rooftop helipads, based on the demand
India’s first Private Aerospace SEZ is operational at Belgaum

- Formally inaugurated in November 2009 to focus on aerospace components and sub-systems by building a precision engineering and manufacturing end-to-end eco-system (supply chain cluster)

- AEQUS has established India’s first precision engineering SEZ at Belagavi, Karnataka

- Spread over 300 acres and currently houses an engineering services facility, a precision machining facility and a sheet metal facility propose to expand the SEZ in 500 acres of Land

- Activities include design and development engineering, aerospace grade special metals warehouses, aerospace castings and forgings, precision machining, sheet metal working, composites, special processing, fasteners, assemblies, testing, certification, etc. for mechanical and electronics (Line-replaceable Units (‘LRUs’)) systems and sub-systems

- Enable completely finished modules and sub-systems to be made within the SEZ to enable it to function as an end-to-end eco-system for aerospace products

- Customers include Airbus, UTAS, Eaton, Baker Hughes, Schlumberger and Bosch

- Proximity to Mumbai, Bengaluru and Hyderabad as well as ports in Goa, Mumbai and Mangaluru, a four-lane road to connect the zone with NH-4, makes it an important investment destination
Manufacturing in Karnataka

Major Players
**Vision**

To position Karnataka as a vibrant aerospace hub of Asia and a globally recognised aerospace destination by creating enabling environment for holistic and sustained growth of the Aerospace Sector.

**Mission**

With a mission to achieve substantial progress in the Aerospace sector, targets have been set from year 2013 through 2023 in two phases i.e. Phase I (2013-18) and Phase II (2018-23).

**Policy Highlights**

- **Phase I (2013-18)**
  - Attract investments to the tune of INR 24,000 crores (4 Billion USD) in Aerospace sector.
  - Create additional employment opportunities (direct and indirect) to about 40,000 persons in the next five years by a process of inclusive development.
  - Increase the contribution of Aerospace sector towards enhancing the share of industry in the State’s GDP from 28% to 30%.

- **Phase II (2018-23)**
  - Attract investments to the tune of INR 36,000 crores (6 Billion USD) in the Aerospace sector.
  - Create additional employment opportunities (direct and indirect) to about 60,000 persons in the next five years by a process of inclusive development.
  - Enhance the contribution of Aerospace sector towards increasing the share of industry in the State’s GDP from 30% to 32%.

**Objectives**

- To make Karnataka a preferred global destination for manufacturing of aircraft, aircraft systems & sub-systems, assemblies and components.
- To create an eco-system comprising infrastructure, education and R&D to make the State a conducive hot spot for aerospace industry.
- To make Karnataka a magnet for global tier-1 Suppliers.
- To make Karnataka as one of the leading MRO hubs in Asia.
- To make available ready to-employ human resource pool for the industry.
- To strengthen R&D infrastructure for achieving innovative and cutting edge technologies.
- To create enhanced facilitation mechanism for ease of doing business through industry friendly policy frame work.
**Policy Highlights**

**Incentives**
- Investment Promotion subsidy
- Exemption from Stamp Duty
- Concessional registration charges
- Reimbursement of Land Conversion Fee
- Subsidy for setting up Effluent Treatment Plant
- Interest subsidy for Micro Enterprises
- Exemption from tax on Electricity Tariff
- Interest free loan on SGST to Large, Mega, Ultra Mega and Super Mega enterprises and many more incentives on case to case basis

**MRO focus**
- Focus on Defence manufacturing and opportunities in Maintenance, Repair and Overhaul (MRO) sector
- Encourage set up of MRO facilities
- Develop globally competitive skills and capabilities
- Encourage airports in the State MRO as strategic activity
- Thrust on MSMEs

**Special Interventions**
- Boosting exports
- Harnessing Human Resources and focus on R&D
- Operationalization of HI-tech Defence Aerospace Park (BAP) and Bengaluru Aerospace SEZ (BASEZ)

**Differentiators**
- Focus on cluster approach
- Aerospace University and Flying school
- Funding Ventures through Karnataka Aerospace Venture Capital Fund (KARAVEN)
- Aerospace, Research & Innovation Centre

**Progress achieved**
Karnataka Aerospace Policy has been received well by the industry and since 2013-14 the State has approved 119 project proposals with a proposed investment of Rs. 11,820 crore with an employment potential for about 35,000 persons

**Other Initiatives**

**Classification of Zones**
Classified in zones as per Karnataka Industrial policy 2014-19: Incentives to Zone 4 unlike industrial policy 2014-19
- Hyderabad Karnataka Area – HK Zone 1 and HK Zone 2
- Other than Hyderabad Karnataka taluks –Zone 1, Zone 2, Zone 3 & Zone 4

**Clusters**
- North Cluster – Belagavi & Bidar
- Central Cluster – Davangere & Chitradurga
- South Cluster – Bengaluru, Tumakuru, Mysuru & Mangaluru
Robust Academic Environment

- Indian Institute of Science and Indian Institute of Management, enable the development of well qualified technical experts who can be absorbed into aerospace majors’ operations
- Almost 1,500 acres are being provided to the Indian Institute of Science to set up its second campus in the Chitradurga district
- Government Flying Training School at Jakkur, Bengaluru
- State Government in partnership with GoI, National Skill Development Corporation (NSDC), and Bangalore Chambers of Industry and Commerce (BCIC) has proposed to set up India’s first Multi-Skill Training Institute for Aerospace and Aviation

- Bengaluru has been a preferred hub of the GoI Defence Labs
- Indian Institute of Science and Council for Scientific Industrial Research offers opportunities in research and training for aeronautical graduate
- Government-funded Indian Space Research Organization headquartered in Bengaluru shares good synergies with other firms operating in aviation and aerospace sector.
- The Aeronautical Society of India formed a platform where engineers, industrialists and professionals could work together for the industry
- Projects such as the Aerospace Technology Center and Aerospace Common Finishing Facility, envisioned in the policy are being set up to provide support facilities to SMEs at Devanahalli
- Government of Karnataka partners with Dassault Systèmes to Set Up a Center of Excellence in Aerospace & Defence
Investment Opportunities

Karnataka has a mission to attract investments of Rs. 60,000 crores (USD 10 billion) over a period of 10 years.

India is rapidly building capabilities to emerge as a preferred destination for manufacturing of aerospace components and State of Karnataka is the hub for aerospace industry.

Multiple opportunities to invest in Aerospace Component manufacturing, sub-assemblies and aircraft manufacturing with MRO facilities.

Incentives and concessions like anchor unit subsidy, exemption from stamp duty, concessional registration charges, exemption from electricity duty (duration depending on the size of the project), entry tax exemption, etc.

Strong backward linkages in the sector with the Society of Indian Aerospace Industries and Technologies (SIATI) recording membership of approximately 300 small and medium-scale industries.
Commissioner for Industrial Development and Director of Industries & Commerce
2nd Floor, Khanija Bhavan, No.49, Race Course Road, Bengaluru 560 001
Ph : 91-80-2238 6796, Fax : 91-80-2238 9909
Email: commissioner@karnatakaindustry.gov.in

Additional Chief Secretary to Government Commerce & Industries Department
106, 1st Floor, Vikasa Soudha, Bengaluru 560 001
Email: acscikar@gmail.com

Managing Director Karnataka Udyog Mitra
3rd Floor, East Wing, Khanija Bhavan, Race Course Road, Bengaluru – 560 001
Phone : 91-80-2228 2392
Email: md@kumbangalore.com

Chief Executive Officer Invest Karnataka Forum
3rd Floor, East Wing, Khanija Bhavan, Race Course Road, Bengaluru – 560 001
Phone : 91-80-2228 2392
Email: ceo@investkarnataka.co.in

Contact Details