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HOW INDIA CAN BECOME A PREFERRED SECOND SOURCE FOR GLOBAL AIRCRAFT PROGRAMMES

Preface

India’s aerospace sector finds itself at a crossroads – moving from being a significant market for aviation to becoming a reliable partner for the production of aircraft in the world. The growth of aircraft globally along with India's increase in being the third largest civil aviation market in the world, more and more global original equipment manufacturers (OEMs) are looking to expand their supply chain into regions that are resilient and cost competitive as oppposed to just relying on traditional manufacturing bases such as the USA and Europe. India’s goal to establish itself as a second source of supply in addition to being a basic component producer reflects the trends of the global marketplace, the requirements of the industry, and changing geopolitical structures that are impacting the way OEMs approach supplying aircraft and related products.

However, showing intent and having the opportunity to become a preferred sourcing partner do not guarantee operational success. The experience gained from working within global aerospace organizations demonstrates that it is adherence to discipline and repeatability, quality and certification, and predictable delivery (in addition to cost and capacity) that ultimately establish the credibility of the supplier in the minds of the customer. The above creates the foundation for understanding where India’s roadmap will lead if it wants to move from being viewed as a potential partner to being recognized as a preferred supplier in the growing global aerospace market.

1) What does "second-source" mean in global aerospace supply chains?

In most cases, aerospace defines a "second source" as another company that has the technical capabilities to produce the same Aerospace component(s) and/or systems (s). It provides the same (or better) Quality, Certification, and Delivery Reliability as an existing Original Equipment Manufacturer (OEM) or Tier-1 supplier. A second source should not only offer an alternate capacity; it should also represent a Qualified and Trusted Interchangeability with respect to the OEM or Tier-1 supplier.

Because of the high level of safety and performance standards required in aviation, the aerospace industry has a very low risk tolerance. Therefore, Original Equipment Manufacturers (OEMs) build redundancy within their supply chain to:

- Diminish the possibility that they will be affected by geopolitical, labour, or material disruptions;
- Diminish Concentration risk (overdependence on a single geographic location);
- Provide a method for providing a Capacity buffer during periods of high demand (i.e., Aircraft factory needs higher production due to increased orders); and
- Allow them to improve Price through Competitive Sourcing.

To be considered a credible alternative supplier, the Alternative Supplier must adhere to strict guidelines, such as Quality Certification (AS9100 and NADCAP) and Traceability, Documentation, and System Compliance. Only Suppliers with demonstrated Process Maturity and FAA and/or EASA Regulatory Approval can be used to source many of these Components.

Ultimately, being considered a Second Source in India will require that the Unique Second Source can provide a supply signal that is Equal to, or Better than, the current supplier; not just a lower price point.

2) What OEMs look for: certification, quality maturity, delivery reliability, cost structure, supply-chain processes.

Global aerospace original equipment manufacturers (OEMs) usually gauge their potential suppliers using very rigorous criteria.

a) Quality/Certification Criteria - AS9100 is the world's most widely used quality management system standard for the aerospace industry. It incorporates requirements from the ISO 9001 standard, as well as specific aerospace requirements for safety, traceability (tracking components throughout their manufacturing processes), and control of manufacturing processes. These requirements are mandatory for all suppliers that enter into contracts with OEMs.

NADCAP Accreditation is a requirement for suppliers of specialised processes, including non-destructive testing (NDT) and heat treatment. Vendors that offer more specialised processes will usually become NADCAP-accredited suppliers to deliver higher-value work packages to their OEM customers.

The acceptance of a supplier's products by the FAA or EASA is critical to the supplier's success, **as if the FAA/EASA does not accept a product during the supplier's certification process**, **it will prevent the supplier from exporting to certain countries** or from entering into contracts with international OEMs.

Why Certification Matters - Certification is critical to the aerospace industry, where zero defects are tolerated, and minimizing risk in terms of repeatability and traceability of product quality is essential.

b) Quality, Maturity, and Operational Discipline - OEMs look for suppliers who show consistent and stable manufacturing processes and do not simply comply with requirements from time to time. Signs include:

- Documented controls of their processes via flow chart(s) and control plan(s).
- Use of statistical process control (SPC) to demonstrate that dimensions and

other product characteristics are uniform.

- Root cause analysis (rather than simply correcting the surface cause of an issue).
- People are trained to stop production if they see a safety issue.

These methods reduce variation and develop confidence in the ability of their suppliers to deliver to their OEM customers' larger-volume contracts.

c) Delivery Reliability - In aerospace, the necessity of meeting timelines and providing delivery predictability, along with 98% to 100% acceptance rates, is an issue that cannot be compromised, due to the fact that a delay requires rescheduling and disruptions occur further down the line in assembly operations.

d) Cost Structure - The importance of cost competitiveness in all business sectors is a factor for OEMs. However, operational efficiency and total cost of quality (including warranty, rework, and inspection costs) often exceed any pure labour cost savings.

e) Supply-Chain Processes - OEMs assess suppliers based on their ability to manage tier-2 and tier-3 suppliers throughout their supply chain, and their resilience to survive and be agile during extreme demand fluctuations.

In conclusion, a second-source supplier that can demonstrate credibility must combine certification, process maturity, delivery excellence, cost competitiveness, and supply-chain resilience.

3) India’s current aerospace manufacturing landscape: strengths, gaps, and capability clusters.

Strengths

Rapid Growth of Exports and OEM Participation - Over the past five years, India's aerospace exports have grown over tenfold. As a result, Indian companies provide

and source parts and services to the world's original equipment manufacturers (OEMs) for over USD 2 billion annually. This number is expected to continue to grow over the coming years.

Multiple OEM Participation - Indian suppliers are integrated into the OEM supply chain of several major vehicle manufacturers. Airbus, Boeing, Rolls-Royce, Safran, and Honeywell are examples of OEMs sourcing parts and services from Indian companies, ranging from fuselages to electrical components and systems.

Advanced emerging industrial hubs - Several industrial clusters are beginning to form in Bengaluru, Pune, Coimbatore, Chennai, and Hyderabad, which will help facilitate the growth of micro, small and medium enterprises (MSMEs), original equipment manufacturers (OEMs), and maintenance, repair, and overhaul (MRO) operations by providing shared infrastructure, talent, and ecosystem synergies.

Government strategic incentives - The Government of India offers many initiatives to encourage manufacturing in India. These include the "Make in India" campaign, export incentives, and the Defence Offset policy that foster industry competitiveness and encourage investment from OEMs.

Challenges & gaps

The relative market share of the global aerospace industry is small - Currently, India's share of the worldwide aerospace supply chain is approximately 1-2% of the overall market, which is well below expectations given India's significant potential.

Certification bottlenecks - Although many of India's firms have received AS9100 certification, the number of firms with NADCAP accreditation is limited, especially among smaller MSMEs, slowing entry into higher-value work packages.

Aluminium, titanium, and specialty alloy raw material sourcing - Reliance on imported sources for these materials increases the time & expense of production

which in turn affects the overall competitiveness of the products.

Skills mismatch for skilled aerospace manufacturing workers - Advanced aerospace manufacturing requires skills such as precise machining, metrology, and quality systems; many current suppliers in India are still developing these skills.

4) Case Studies - Successful and Challenging Partnerships in the Aerospace Sector in India

A) Tata Boeing Aerospace Ltd (TBAL) - TBAL is a joint venture between Tata and Boeing in Hyderabad that designs and produces the fuselage for the Apache helicopter and other aerospace components, showcasing India's capability to deliver complex assemblies with a substantial amount of indigenous content to a worldwide market.

TBAL has manufactured and delivered multiple hundreds of fuselages, thus demonstrating India's validity in Boeing's supply chain.
Wikipedia

The key success factors for TBAL include the following:

- The sustained investment to develop the necessary skills and infrastructure for its employees
- Strict adherence to international quality and delivery standards
- Collaboration and development of a large network of micro and small enterprises (MSMEs) to support the supply of Tier-2 and Tier-3 parts

B) Aequs Aerospace - Aequs is a manufacturer and supplier of aerospace parts and assemblies for Boeing, Airbus, Safran, and other aviation/OEM customers and has achieved 90% of its annual revenue through the aerospace industry.

Aequs' recent IPO and planned expansion into high-value manufacturing demonstrate that India continues to position itself favorably on a global scale in aerospace programs.

Overcoming Challenges:

- Transitioning from basic machining techniques to complex machining techniques with a high level of quality will take time, investment, and support.
- As Original Equipment Manufacturers (OEMs) continue to demand more vertical integration from their suppliers (from raw material processing through to the end assembly), companies such as Aequs must continue to work closely with their OEM partners to develop and implement this integrated approach.

C) Micro and Small Enterprises (MSME) Case Studies - Both Hical Technologies and JJG Aero have seen a rapid increase in their businesses because of the development of supplier networks, while not necessarily by means of their own separate accomplishments.

Key Takeaways:

- Continued reliability and quality by even a small supplier will lead to continued and repeat contracts with OEMs
- Localised capabilities, with ongoing operational discipline, can be expanded into higher-value components over a longer period.

5) Certifying & Regulatory Requirements

The path to becoming a preferred second source is greatly impacted by the completion of the certification and regulatory requirements:

a) AS9100 - AS9100 is the quality management standard that serves as the benchmark for the aerospace industry; it is built on ISO 9001 with additional industry-specific criteria such as documentation, traceability, and defect

prevention. Therefore, AS9100 certification, as the basis for OEM contracts, is a requirement for most aerospace manufacturers.

b) NADCAP - Accreditation for special processes, such as Heat Treatments or NDT, provides certification that the supplier's special processes are at the level of rigor that is expected for aerospace applications. As such, it is typically required for parts that cannot be relied upon to pass final inspections only.

c) FAA/EASA Recognition - For suppliers to be able to supply parts that feed into certified aircraft, they must demonstrate to the regulatory agencies, such as the FAA and EASA, that their parts comply with the design data, traceability, and audit controls established for certified parts.

d) Government Support - To facilitate accessing certification pathways and to help build R&D/testing infrastructure within India, the Indian Government has rolled out programs to align Indian Aerospace Standards with those of the global acceptance regimes and to allow Indian suppliers to enter into more profitable opportunities faster.

6) Practical roadmap: what India needs in 0 - 2 years, 2 - 5 years, and 5 - 10 years to be credible.

0 - 2 Years: Foundations and Expansions

A. Certification Ramp-Ups - Place importance on AS9100 and NADCAP certification for significant MSME cluster areas.

B. Strengthening Tier-2 and Tier-3 Suppliers - Improve the quality of supply chains through the development of common tooling, shared quality cells, and co-located metrology labs.

C. Increased Infrastructure - Provide more location choices for an aerospace-specific park with clean rooms, test laboratories, and material storage areas.

D. Regulatory Support - Provide rapid approval for regulatory certification and export market requirements.
(Expected Result: There will be a larger pool of certified suppliers providing reliable delivery performance.)

2 - 5 Years: Growth and Building Confidence

A. Improving Design and Engineering Capabilities - Create engineering centres of excellence that consider design for manufacturability and variant engineering.

B. Raw Material Strategy - Work with major metal producers globally to enable domestic primary processing of Aluminium and Titanium with a standard for Aerospace Quality.

C. Digitisation and Data-Driven Decision-Making - Establish advanced layer technology to utilise IoT, SPC, and Digital Twin technologies for the monitoring and control of manufacturing processes.
(Expected Result: Able to manufacture assemblies with medium and high complexity.)

5 - 10 Years: Realising Alternative Sources

A. Establishing Alternate Production Lines - Establishing parallel certified production lines capable of being dual-sourced.

B. MRO and Testing Hub Capability Development - Create an indigenous hub for MRO Services (like SAFRAN Twin MRO hubs in Hyderabad) for regional support in Asia.

C. Trust to OEMs Globally: Long-Term Contracts - Enter into long-term supply agreements for safety-critical parts along with a shared IP business model.

7) Risks and mitigation (IP, workforce, supply-chain depth, infrastructure).

Risk: Limitations on the ability to provide technology that is Intellectual Property (IP) protected or proprietary.
Mitigation: Establish agreements between OEM and IP framework to legally protect the sharing of advanced technologies.

Risk: Lack of advanced manufacturing and aviation skills within the workforce.
Mitigation: Create aviation academies and train the workforce through apprenticeships that require certification to help bridge the skills gap.

Risk: There is a significant lack of depth in the tier 2 and tier 3 levels of the Supply Chain.
Mitigation: Develop supplier development programs to strengthen smaller suppliers through co-investment by original equipment manufacturers (OEM).

Risk: There is currently inadequate aerospace-grade (e.g., testing, tooling, logistics, power, precision equipment) infrastructure.
Mitigation: Utilize public-private partnerships to develop aerospace industrial clusters that have a common set of facilities.

Risk: The regulatory certification process takes too long.
Mitigation: Establish dedicated teams to process aerospace certifications to accelerate certification of new products.

8) Clear, Actionable Recommendations for the Indian Government

- Should create quality and certification acceleration units for the Aerospace industry.
- Establish a funding source for an Aerospace Testing and Materials Centre that is shared.
- Provide tax incentives based on the quality level of the exports.

For Suppliers in India

- Have AS9100/NADCAP compliance as the priority and continue to improve the quality of products and services.
- Create the capability to manufacture in a data-driven environment.
- Collaborate with engineering partners for the support of design.

For Global OEMs and Investors

- Develop educational/training and certification programs jointly.
- Partner with suppliers to build the infrastructure and metrology labs.
- Develop a clear pathway for the approval of second-source suppliers and/or second-source qualification in a multi-year agreement.

Conclusions

India is establishing itself as the second most favourable location for the global aircraft programmes of OEMs. India will need to build its capabilities beyond the existing capacity and cost advantage, building to a position of being an international quality producer. The Indian Aerospace ecosystem that thrives on the MSME community, OEM partners, and government support, is developing on this path, but needs to continue to execute and focus on certification and capability depth.

At Global Wealth Management, we believe in enabling sustainability transitions and can guide investment strategies in this space. We are ready to partner with investors and corporates to build these pathways.

References

- IBEF - India's aerospace growth & OEM sourcing expansion
- IBEF - India's aerospace firms turning to global OEMs
- ETManufacturing - OEMs source over $2B from India annually
- Reuters - Aequs expansion & OEM demand
- Tata Boeing JV (Apache fuselage)
- AS9100 standard overview
- Aerospace MSME supply chain details
- Safran MRO expansion in Hyderabad
- Global OEMs sourcing more aerospace components from India
- Global aerospace firms turn to India amid Western supply-chain crisis
- IndiGo lines up Rs 1,100 crore MRO facility at Bengaluru airport
- Tamil Nadu eyes major aerospace/defence investments via a corridor
- Airbus to set up R&D centre in India & source ~$1B+ components
- India's Aequs eyes higher-value aircraft parts as Airbus supplier launches IPO
- India's Boeing AH-64 Apache production at Tata-Boeing JV
- Aerospace firms expand sourcing from India amid global supply chain disruptions
- How Indian firms are gaining ground on global aerospace giants