

An Entrepreneurial Opportunity in Civil Aviation & Defence Aerospace Sector in India

Dr. Chandravadan Goritiyal

Prin. L. N. Welingkar Institute of Management
Development & Research,
Mumbai

Dr. Laxmi Goritiyal

Vivekanand Education Society's Institute
of Management Studies & Research,
Mumbai

Abstract

Aviation and Aerospace sector is coming up as a great opportunity in coming years despite Covid 19 issue. One can very well ignore the failure of Jet Airways and Kingfisher Airlines in India as opportunity of growth is tremendous in India. The country is set to become 3rd largest aviation market by the end of 2020. With big ticket Aircrafts orders from Indian carriers such as Indigo, SpiceJet and current emphasis on Powered by Hour contracts (PBH), many of the aerospace services and manufacturing activities are expected to be performed within India. This creates an opportunity in this sector for new entrepreneurs as well as existing aerospace service providers. Civil aerospace sector expected continuously to grow by 10-15% in India which already evident from past 15 years' growth records of this sector.

Similarly, in Defence Aerospace also many opportunities exist as India's Defense spends are continuously rising. There are from Design solution to actual modification of defence aircraft in order to meet modern Data acquisition and combat requirement. Many of the components can be manufactured in India subjected to developing R&D with the help of Original Equipment Manufacturer (OEM) or on Own. Here government ensured that the OEM will be supporting the Indian Company due to offset obligation.

This sector has already given many opportunities to entrepreneurs. These opportunities range from small component manufacturing in India to big Airframe parts. Also in service sector starting from providing ground services to provide critical design services for aircraft manufacturing companies. Such opportunities need to be taken up in India at current time as many of these areas are untapped so far and hence Entrepreneurs can be used the same for their growth as well as create job opportunities.

The research paper mainly emphasizes on what and which kind of business opportunities exist in the present aerospace market? It also discusses about whether Civil and Defence Aerospace/ Maintenance, Repair & Overhaul (MRO) industry should be considered as a big investment opportunity in India? Does the current, 'Make in India' initiative by government of India is also expected to provide further boost to aerospace products manufacturing?

Primary research in the form of interviews was taken from the people associated with civil and defence aerospace Industry. These views along with specific opportunities discuss in this research article will be helpful for existing as well as future entrepreneurs for considering this sector for investment as well as potential growth.

Key Words: Original Equipment Manufacturer (OEM), Maintenance, Repair & Overhaul (MRO), Directorate General of Civil Aviation (DGCA), Federal Aviation Administration (FAA), European Aviation Safety Agency (EASA), Finite Element Method (FEM), Computational Fluid Dynamics (CFD), Turn Around Time (TAT), Center for Military Airworthiness & Certification (CEMILAC) & The Director General of Aeronautical Quality Assurance (DGAQA), Research & Development (R&D), Small & Medium Enterprises (SME), Defence Procurement Procedure (DPP)

Introduction:

Civil Aviation sector:

Civil Aviation expected to give many opportunities in India. Currently as a country we are having 630 commercial aircrafts (Subtracting Jet Airways 100 Aircrafts) as compared to 3500 aircraft in China and more than 7000 aircraft in USA. By 2023 aircrafts in India expected to grow in substantial numbers and India may become third largest aviation market in the world. With current increasing trend in number of civil aircrafts and requirement of maintaining turnaround time (TAT) pushes lot of aerospace activities needed to be carried out within the country. Further many of aircraft parts are fall under Dangerous Goods (DG) category especially safety related equipments; hence maintenance of such component outside India will be costly affair due to very high logistic cost. In such cases airlines prefer to keep such product maintenance within India as it is cost effective. Tremendous rise in aircrafts numbers warrants, significant aerospace service provider's requirement. Further COVID 19 Pandemic there will be a great demand of local services including Major Maintenance & Component Maintenance within country. This gives great opportunity to Indian SME's to make fortune in aerospace sector. Aerospace products manufacturing was never a lucrative business to Indian entrepreneurs but with expected number of aircrafts forced us to consider this sector as an opportunity. However, 'Directorate General of Civil Aviation' (DGCA) hardly allowed aerospace component manufacturing in India. Presently aerospace maintenance service providers are not allowed to use local manufactured parts in place of OEM parts. In fact, tools and test benches were also not allowed to be copied in India. So, this sector always remained subdued. However, Air India as a national carrier got some relaxation to this in the process of indigenization of tools and test equipment for the nation to save rare foreign currency since last few decades. 'Directorate General of Civil Aviation' (DGCA) supported for this move of Air India. Apart from Air India, DGCA always remained reluctant to allow indigenization of aerospace parts

manufacturing in India.

Probable reason of lacking in Manufacturing of aerospace component business India are following:

- Limited technical know-how with Indian Manufacturers.
- Original equipment manufacturers (OEM) of aerospace parts were never sharing the information for product processes and equipment in order to maintain their monopoly.
- Reluctance of Indian manufacturer to adapt high quality standards due to cost issues and limited quantity of requirement of Aerospace industry
- Limited knowledge of Indian R&D and Design Agencies for Finite Element Method (FEM) & Computational Fluid Dynamics (CFD) which are part of design and analysis requirement of aerospace sector.
- International Certification such as EASA and FAA are very expensive and they are very expensive to maintain also. These certifications are mandatory as parts released after servicing and repair under these certifications are only accepted and used globally by other airlines.

If we as a country overcome above issues, then we may also become manufacturing hub for aerospace parts. Further India can also become Maintenance, Repair & Overhaul (MRO) hub for A320 as well B737 Aircrafts which are the largest used Aircraft models in India.

China made a big stride in Aerospace sector mainly due to its policies to protect its own industry and extracting benefits from foreign orders. In China, Aircrafts order for national as well as private carriers placed by state altogether. Due to this, state directly negotiates with Aircraft Manufacturers and gets great value deals with offsets benefits. This results in Indigenization of aircraft parts. State ensures local industry development while placing order. In fact, aircraft manufacturers like Airbus and Boeing are forced for local manufacturing in China.

However, Post Covid19 issue, lot of precision manufacturing may be transferred to India. Indian authorities already started working on Industry friendly policies which will definitely give scope to new entrepreneurial ventures.

In recent past India could able to stuck only one big deal in civil aviation space. Where in India asked to Boeing to develop MRO facility for B777 Aircraft at Nagpur. On similar line, we may expect indigenization through transfer

of technology for manufacturing of aerospace products in India.

Defence Aerospace:

Defence Aerospace sector in India always remained distant dream for private players. This sector requires huge investment against assured return. Mainly because of transfer of Technology, bureaucracy & decision delay issue. Further weapons and its system are also not allowed to be manufactured in India.

In India, we have limited level technology knowhow. With the current technology and manufacturing ability we may not able to compete with foreign firms in Defence procurement. But with current make in India drive and 'Center for Military Airworthiness & Certification's (CEMILAC) openness for acceptance of Indian manufactured parts may result in much awaited growth in defence aerospace sector. Moreover, as mentioned above the offset provision will be giving good business opportunities to Indian component manufacturers. Offset policy brings mandatory business for Indian Vendors from foreign suppliers.

Further the deal between India and France for Rs. 58,000 crore or 7.8 billion Euros for 36 off-the-shelf Dassault Rafale twin-engine fighters has made sensation in defence aerospace sector. This deal has an offset clause through which France has to invest 30 per cent of the 7.8 billion Euros in India's military aeronautics-related research programs and 20 percent into local production of Rafale components. This has rejuvenated the offset opportunities in Defence aerospace sector for Indian entrepreneurs.

For better understanding, in Defence aerospace business Aircraft parts can be divided in to critical and non-critical spares. Non-critical spares can be manufactured in India without much technology transfer issues. However, for setting up this facility complete R&D capability requires. This fact is well received by Center for Military Airworthiness & Certification (CEMILAC) and The Director General of Aeronautical Quality Assurance (DGAQA) which gives acceptance to this manufacturing on certain Terms & Conditions.

Many investors are ready to invest in these manufacturing only if they have clear visibility on acceptance of manufactured parts by government agencies and also has guaranteed business. Practically in government tenders no guaranteed business is assured as the contracts are normally awarded to "L1" (Lowest Bidder) contractors. This has created reluctance among entrepreneurs for investment. However, being the limited competition this business opportunity cannot be ignored.

For manufacturing, critical components of aerospace industry, India require greater investments in R&D. This requires skilled engineers and scientist. Lot of technological support is required for this. More over getting regulatory approval for such product is very difficult as Regulators themselves are not confident on Indian products quality and technology prowess. However, the global demand for these is high and as an opportunity may be considered.

The Defence Procurement Procedure (DPP) 2013& 2016 says the objective of the Defence Offset Policy is "to leverage capital acquisitions to develop Indian defence industry by fostering development of internationally competitive enterprises, augmenting capacity for research, design and development related to defence products and services, and encouraging development of synergistic sectors like civil aerospace and internal security". Using these DPP guidelines this sector may try for indigenization of Aircraft parts as government has created echo system for defence aerospace manufacturing by provisioning for offsets.

Point to be noted that Services like research and development (R&D), maintenance, repair and overhaul (MRO) and technology transfers are not the part of offset requirements. This provision was removed in 2013 due to absence of regulatory oversight mechanism for these services. Whereas these should be the key for development in manufacturing.

SME has to obtained Indian Offset partner (IOP) status for getting advantage of offset. Whenever global tenders are floated and foreign vendors compete for the same, then they have to offload 30% of this contract value to Indian IOP after award of the contract. Thus IOP status enable them for getting the subcontract from foreign equipment supplier. Once the IOP is awarded the contract through foreign OEM, Defence offset Management Wing (DOMW) will be in touch with foreign vendor as well as IOP for monitoring obligation clause and its fulfillment.

In all Defence aerospace seems to be a great opportunity for the SME's of India.

Objective of the study:

The present paper mainly focuses on the following major objective:

- a. To identify the Entrepreneurial opportunities in Civil Aviation and Defence Aerospace which are underserved.
- b. To understand why the identified sectors are attractive for investment.

Materials and Method:

Tools for data collections: Primary and secondary data

Primary Data: Interviews of corporate leaders in Civil (Commercial/ General) Aviation and Defence Aerospace sector.

Research Type:

It's a Qualitative research where interviews were taken from professionals of Defence Aerospace Industry.

Here Stratified sampling carried out. Strata was taken from the sector only as the sector personal has the knowledge.

Conceptual Limitation:

a. Study is subject to getting approval of Small & Medium Enterprise (SME) in civil aerospace sector from Indian Civil Aerospace Regulator such as Director General of Civil Aviation (DGCA), European Aviation Safety Agency (EASA) and Federal Aviation Administration (FAA). As without approval parts cannot be used in Civil Aircrafts.

b. Study is limited to offsets benefits for SME's in Defence Aerospace sector.

c. Assumption made that Center for Military Airworthiness & Certification (CEMILAC) & The Director General of Aeronautical Quality Assurance (DGAQA) approval is good for defence manufacturing. However, starting an Industry requires clearance from other authorities such as registration as per company law, Chief controller of Explosive (CCOE) license, Ministry of Environment and Forest (MOEF), Pollution Control Board (PCB) if required and others.

Discussion and Results:

Aerospace Industry professionals were very confident and optimistic about Indian Scenario for aerospace Industry. This sector has limited competition with very high growth expectations. Initial investment for this Industry is high and hence it is always advisable to do investment in stages. Experience professionals with great engineering aptitude are must to get desired performance in this sector.

Outcomes of Survey:

Various questions discussed with Aerospace community. Their views were noted and the results are discussed and elaborated in the following data.

In Civil / Commercial aerospace sector, there are few opportunities which are listed below:

1. Maintenance, Repair & Overhaul (MRO) facility for Base Maintenance & Component maintenance: In India capability of this MRO is mainly available with Air India

and partly with Jet Airways (which has already shuts the operation 2019). However, rest of the airlines i.e., eighty per cent of civil aviation space doesn't have MRO capability. These airlines send their aircraft to neighboring countries such as Sri Lanka, Singapore, and Dubai. This is nothing but direct transfer of Indian requirement to foreign countries resulting in loss of job opportunities for Indian people. The Indian carrier gives excuse stating MRO facilities are dearer in India as compared to our neighboring countries. However, this issue sorted out by government post implementation of GST and reduction in import duty for MRO's. Further if infrastructure status given to this Industry it will give great boost to this sector because of tax breaks and long term financing options.

2. Support services like Performance Base Contract (PBC) or Pay by Hour (PBH) Contracts: Indigo Airlines started an innovative trend in India by off-loading regular maintenance to PBC / PBH contractors. Wherein, component maintenance contractor is paid on the basis of aircraft availability for flying. Presently, all the other private airlines are following Indigo airline. This ensures that aircraft availability for flying throughout the year. For example, Indigo offered PBC contracts to Air France Industries and Jet Airways offered it PBC contracts to Lufthansa Technik prior to closing down. Further these PBC contractors may prefer to off load many of the component maintenance to Indian service provider due to logistic and other commercial consideration. This area is again leading to an opportunity for entrepreneur.

3. Component or parts manufacturing: In Civil Aviation India never manufactured aircraft components. Even though many good manufacturing companies exporting their products to Airbus and Boeing. However, with the current emphasis by the Government on "Make in India" will bring immense opportunities in this sector. In USA, aircraft components are manufactured by many SMEs. These SMEs can manufacture aerospace parts after obtaining Parts Manufacturers Approval (PMA) from Federal Aviation Agency (FAA). FAA is an aviation regulator in USA which allows aircraft component manufacturing under its supervision and regulation. Because of this many of the SME's are giving the world class products and many a times these products are outsourced by Original Equipment Manufacturer (OEM) from these SME's. However, in India DGCA doesn't allow aircraft parts and equipment's to be manufacture. This is mainly because of following limitations:

a. Limited product information shared by OEMs which doesn't qualify for indigenization.

b. Shortage of regulatory staff as this requires deep

involvement of DGCA officials in product development.

c.No strict quality control followed by Indian manufacturers because of huge involvement of cost. Very few Indian companies use 6 sigma concepts for quality.

d.Lack of flow of funds for research and development.

e.Long gestation period in aerospace sector for product realization due to mainly regulatory approval.

4.Aircraft special tools and test benches manufacturing: There are many special tools are required for testing of aircraft component. OEM purchased tools are very expensive. OEM keeps price of these special tools high to discourage Indian manufacturer for developing aircraft component testing capability. However, this tools and test benches can be manufactured in India at fraction of the OEM prices. The only problem is customer for these test benches and special tools will always going to be limited. This business is yet to be explored by the Indian manufacturer.

5.Training Services AI & AR/VR based: This is a good opportunity as training is one among the cost diver for airline Industry. This training can be made more effective by way of training & certification of Airline or MRO staff through the training center which has capability based on Augmented Reality/virtual reality or Artificial Intelligence. Again this training center need to obtain DGCA 147 approval.

Based on the interview and discussion with Industry professional some of the areas in Defence Aerospace sector were always remained underserved. The interview results point out following opportunities:

1.Design Engineering and FEM /CFD analysis services for Aircraft upgrade& New Design: The services of this nature can be set up with relatively low investment as it involves cost of software acquisition or developing new software. But it requires personnel with good amount of software and design knowledge. Experienced professionals always preferred here as they understand the Aerospace design intricacies and specific requirement. People with good academic background and from premium institutes are always preferred because of their technical depth and authoritative decision over design aspect. The professionals of above organization need to have knowledge about the “Procedure for Design, Development and Production of Military Aircraft and Airborne Stores' (DDPMAS)” which is a document released by Ministry of Defence. The document defines the procedure to be followed by various agencies involved in the design, development and production of military aircraft. Application of design knowledge meeting the framework

defined by DDPMAS will give a workable solution to industry. Hardly any agency available in India which can provide services of this nature. Hence intellectuals in this domain should enter into this segment.

2.Aerospace Structures Manufacturing: This requires a big amount of investment along with technology collaboration. Aerospace structures manufacturing requires high amount of technical knowledge, equipment's. With the introduction of composites in Aerospace structures the Aircraft structures have become more light weight but it increased the complexities of manufacturing and design processes. This manufacturing process requires good facility with sophisticated (robotics) machineries and hence it is capital intensive. The set up cost of facility and cost of production from such facilities are too high in foreign countries as labor is costly in those countries. But this gives good opportunity for Indian businesses as cost of labor is low in India.

3.Components & Parts manufacturing: This requires very high level of precision manufacturing & technical competency. This can be easily achieved through Original Equipment Manufacturers (OEM) willingness to transfer the technology. Otherwise it requires lot of R&D spends. With the defence offset clause we can expect OEM will be transferring part of the technology. This will create good business case for Indian manufacturer. Further many of the Aircraft parts are manufactured in Bangalore today and Bangalore has become really an aerospace hub.

4.Defence Aircraft MRO: There are as many as 2300 defence Aircrafts which needs regular interval base maintenance. This is a good business opportunity for private sector, which requires good amount of technical expertise, approvals and skilled manpower. Defence itself and Hindustan Aeronautics Ltd (HAL) has inbuilt capabilities for the same. However, both have limited capacity and longer Turn Around Time (TAT) of aircraft delivery for service or combat. Defence requires very short TAT for aircraft maintenance and repair. This can be only achieved through private sector participation. Given the huge number of defence aircraft an entrepreneur may explore this as an opportunity. Again, to begin with component MRO capability can also be developed by Indian entrepreneurs which can be enhanced to larger number of aircraft components.

5.Aircraft Modification Services: Indian defence aircraft fleet is ageing and requires regular up gradation. This up-gradation is a huge requirement of defence which is still not fulfilled as we have lack of competent agencies to provide this type of service. Hence this is a good opportunity where only few competitors are present.

6. Aerospace consumables & Specialty chemicals manufacturing: In Aerospace industry, a very special kind of consumables are required which are currently not manufactured in India. This involves manufacturing of various sealant, chemicals, solvents, wires, connectors and hardware etc. However, these need to be manufactured as per US Military standards requirements or approved by The Director General of Aeronautical Quality Assurance (DGAQA). Meeting these requirements of standards will take Indian manufacturer to global arena of suppliers. It is also underserved category of business vertical. Indian chemical manufacturer and special grade hardware or material manufacturer can enter in to this segment also. Further Indian manufacturer may get benefit as many consumables are in Dangerous Goods category and hence transportation cost though overseas country is high and hence Indian manufacturing makes a good sense as far as usage point of view. The companies like Aarti Industries, Atul Chemicals are already started their presence in this Industry which can be further enhanced.

Aerospace support equipment manufacturing: There are many equipment's like pneumatic pressure equipment at remote locations, oxygen filling equipment's, hydraulic system equipment, transport vehicles and aircraft docking systems are required for defence. These equipment providers are rare. Hence it is a good opportunity for Indian investors for developing this support equipment's.

Further to this starting defence aerospace related business has its own limitations:

- Long gestation period to fructify the order from the initial tendering process.
- Approval for authorities takes its own time.
- Many a time's initial investment needed for the order is very high and actual returns generation could take half a decade or more.
- Getting typical aircraft parts are difficult especially for Russian aircrafts.

However, these should not deter investors as India may become the future global aerospace manufacturing hub. This will give many opportunities to Indian companies and they can supply to aerospace industry globally.

Findings:

Civil Aerospace Sector:

Civil Aerospace sector is in growth stage in India. This gives major opportunity for Indian Entrepreneur's. Aircraft component manufacturing, Aircraft Maintenance, Repair Overhaul (MRO) facility, Aircraft special tools and test

benches manufacturing, Support services to Performance Base Contract (PBC) are some of the areas where opportunities exist for new entrepreneurs as well as corporate group. However here approval like EASA/FAA are required to get global acceptance to the parts supplied by MRO organization. Further post COVID 19 issue, India can get many of the Precision manufacturing opportunities.

Defence Aerospace Sector:

Opinion shows Defence has many verticals as an opportunity.

The Defence Aerospace requirement like Design Engineering, Finite Element Method (FEM) / Computational Fluid Dynamics (CFD) analysis of Aircraft structures or contours, Aerospace Structures Manufacturing, Aircraft component manufacturing, Defence Aircraft Maintenance, Repair & Overhaul (MRO) and Aerospace consumables manufacturing are the underserved sectors and gives opportunity for emerging entrepreneurs as well as corporate. However, CEMILAC approval is must to make strides in these businesses.

Offset policy has become a boon for new entrants in aerospace sector. Because it gives them assured business as well as technological knowhow. However, with this these local manufacturers may become complacent and avoid innovation for future growth. It is advisable to use offset as initial trigger for starting the business but later these businesses need to stand on its own for R&D and become self-reliant on technology. Further businesses should develop complete edge over its international counterpart in order to grab the global opportunity for supplies.

Industry expert also suggest that offset obligation has some limitations too. Like execution from government for placing the order can take years. Opinion also points out the fact that this sector is very sensitive to political risk.

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