Introduction

Planning Commission had constituted a Working Group Under the Chairmanship of Secretary, Civil Aviation for the formulation of 12th Five Year Plan (2012-17) for Civil Aviation Sector vide its Order No.18/1/2011-Tpt. dated 6.4.2011. Copy of the order is at **Annexure-1**. The terms of reference of the Working Group on Civil Aviation are as under:-

i) To review the physical and financial performance of various constituent units of Aviation Sector with special focus on Ministry of Civil Aviation and its constituents indicating the achievements and failures with particular reference to Eleventh Five Year Plan targets.

ii) To project growth in passenger and cargo traffic (both International and Domestic) and assess the capacity requirements in terms of passenger and cargo volumes for each year of the Twelfth Five Year Plan.

iii) To assess the airport infrastructure requirement in view of growth in passenger and cargo traffic (both International and Domestic).

iv) To formulate strategy for development of Civil Aviation keeping in view its role and the need to (a) set up regulatory framework, (b)to promote private sector.

v) To formulate programme for the development of constituent units of Civil Aviation Sector; separately indicating the physical targets and financial outlays for each year of the 12th Five Year Plan. The programme should show distinctly the requirements for replacements, modernization, and augmentation of capacity, role of private sector, technological developments and the need for making the sector commercially viable in a competitive domestic and international environment.

vi) To assess the internal resources of the Sector in the 12th Five Year Plan and suggest measures to augment them so as to make the sector self-reliant.

vii) To review the progress made in improvement of air connectivity in the North-East and other remote areas for provision of reliable air services and in this context, review of existing Route Dispersal Guidelines as well as to assess and estimate the requirement of funds for investment in development of airports in the North- Eastern Region during the 12th Plan.

viii) To indicate the direct employment expected to be generated for various categories of the staff in the course and after the execution of different programmes for each year of the 12th Five Year Plan.

ix) To assess the security, safety and allied support requirements including advanced technologies in use for civil aviation sector in the Twelfth Five Year Plan period.

2.0 The Working Group on Civil Aviation in turn decided to appoint four Sub-Groups to go into specific areas of plan formulation and make recommendations for the Twelfth Five Year Plan in respect of Civil Aviation Sector for consideration of the Working Group. Copy of the order constituting Sub-groups under the Working Group is at **Annexure-II**. On the basis of inputs received from these sub-groups, and on the basis of deliberations in the meetings of Working Group and other suggestions and feedback received by the Ministry from various stakeholders, the Working Group has finalized this report.

3.0 Role of Air Transport

3.1 Civil Aviation is a key infrastructure sector that facilitates the growth of business, trade and tourism, with significant multiplier effects across the economy. Doubtlessly, air transport has contributed to the rapid growth in India's international trade in recent decades by offering a reliable and faster mode of transport services to move products and personnel across long distances. Therefore sustaining a viable aviation industry is vital if the economy is to reap the full benefits of the future growth in foreign trade and investment. Industries that rely most heavily on air transport for their international freight shipments include high growth sectors such as pharmaceuticals, office equipment and electronic equipment sectors besides those that have high value to weight products. Therefore high growth sectors in emerging markets are also among the most heavily dependent on the services of the aviation industry. Increased air connectivity enables manufacturing enterprises to exploit the speed and reliability of air transport to ship components across firms that are based in different and distant locations thereby minimizing the inventory cost. Countries with higher connectivity are stated to be in general more successful at attracting Foreign Direct Investment.

3.2 Role of air transport in the development of Tourism industry is crucial. Tourism makes a large and growing contribution to the Indian economy. The Tourism Satellite Account developed for India for the year 2002-03 confirms tourism as one of the largest sectors in the economy. Tourism value added accounts for 2.78 percent of the GDP in terms the direct contribution; when indirect effects are also accounted for, the share of tourism in the GDP is 5.83 percent. In absolute terms, tourism related jobs are estimated to be in the region of about 21 million. [1] Employment in the Indian tourism industry is dependent on the aviation industry since 90% of foreign visitors out of 5.11 Million arrived by air in the year 2009.[2]

3.3 Contribution of Civil Aviation sector to India's GDP in 2009 including its catalytic impact is estimated to be 1.5% as per the recent study carried out by Oxford Economics. The study has also estimated that the sector supports a total of 9.95 million jobs including the sector's

[1] Tourism Satellite Account for India, Ministry of Tourism, Govt.of India/NCAER,2006
[2] Indian Tourism Statistics 2009,Govt. of India, Ministry of Tourism

contribution to tourism.[3]This demonstrates the significant footprint the aviation sector has on the Indian economy.

3.4 In the Global economy every $ 100 of output produced and every 100 jobs generated by air transport trigger additional demand of some $325 worth of output and 610 jobs in other industries.[4] Air transport is crucial for the distribution of high value to weight products.

3.5 Civil Aviation sector makes a substantial contribution to the public finances**.** These include, the Service tax paid by the passengers, corporate tax paid by airline companies, airport operators and other ground support service enterprises, MRO firms and the income tax paid by their employees, besides the revenue collected through taxes on fuel and equipments.

3.6 However, National Accounts Statistics does not fully reflect the contribution of Civil Aviation Sector to the total economic activities/ output of the country. It has therefore been decided in the Ministry of Civil Aviation to explore the possibility of independently assessing the direct, indirect and induced economic impact of Civil Aviation Sector. An Advisory Committee has been constituted under the Chairmanship of Secretary, Ministry of Civil Aviation to steer the process in this regard on 21st July, 2011.

3.7 Thus the economic foot print of the Civil aviation sector which reflects the value addition and the direct and indirect job created by the activities of the sector appear to be much deeper and wider in terms of its multiplier effect.

[3] Economic Benefits from Air Transport in India, 2011, India Country Report, Oxford Economics
[4] Economic Contribution of Civil Aviation -Ripples of Prosperity, ICAO

4.0 The Vision

4.1 The Indian economy is passing through a high growth phase. The real GDP per capita of India which grew at a CAGR of 3.9% during 1992-2001, grew at a much higher CAGR of 5.9% during 2001-2011[5]. India was one of the few countries that led the recovery from the global financial crisis of 2008-09. It is expected to continue on the high growth path for 12th plan period (2012-17).The Indian civil aviation industry is proudly celebrating 100 years of its existence (1911-2011). These 100 years have seen wide ranging changes, as the country emerged from colonial subjugation and a long period of slow growth to become an economic powerhouse.

4.2 The 12th Five Year Plan period is crucial. The right vision, coupled with efficient execution may catapult India into the league of top aviation markets by the end of the Plan period. India has the potential to become a leading hub for passenger and cargo traffic. India can reap its demographic advantage as a wide section of the population nurtures an aspiration to fly. India also has the natural talent to drive innovation and technology development in the area of aircraft design and manufacturing. There are challenges. Air-travel is not prevalent among the masses. The following graph shows there is a direct correlation between development of an economy and air travel penetration.

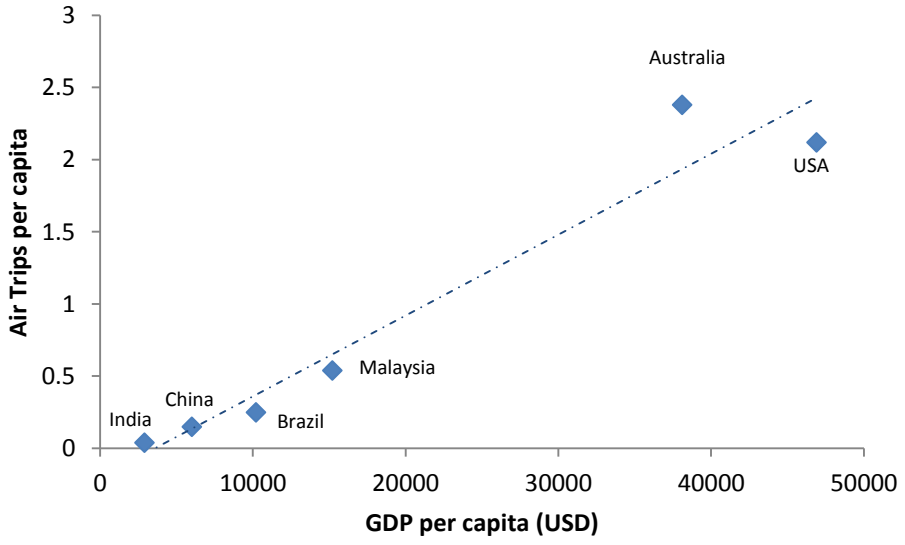


Figure 1: International comparison of air traffic penetration

Source: World Bank, FAA, DGCA India, CAAC, Malaysia Ministry of Transport, BTRE Australia, ANAC Brazil

[5] Source: Reserve Bank of India (RBI)

4.3 Global comparison of air travel penetration[6] shows that India (at 0.04 air-trips per capita per annum) stands far behind the developed countries like US and Australia (2 air-trips per capita per annum). China's domestic traffic is five times the size of India's despite having a population just 10% larger. There is significant growth potential for the Indian civil aviation industry as economy grows, disposable incomes rise and the value of time becomes more precious. ***The 11th Plan has propelled the Indian aviation sector on a high growth path. In FY 11, India has already made its place among the 10 largest aviation markets of the world.***

The vision for the Indian civil aviation industry for the 12th Plan period is:

> ***"To propel India among the top five civil aviation markets in the world by providing access to safe, secure and affordable air services to everyone through an appropriate regulatory framework and by developing world class infrastructure facilities"***

In order to facilitate this significant growth potential, India will need more airports, higher capacity, supporting infrastructure, finance and human resources. All this would require progressive and positive fiscal regime and policies and collaborative approach between the government and industry.

[6] Air trips per capita per year = Domestic passengers carried in a year/ Total population

5.0 Review of performance during the 11th Plan

Civil aviation industry by virtue of its dynamics is vulnerable to economic recessions, natural disasters and political upheavals. The Indian civil aviation industry managed to exhibit resilience to the recent global economic slowdown. Both passenger and cargo traffic have shown robust growth and there has been modernization and augmentation of capacities, in a major way, at various metro and non-metro airports. Some of the key achievements during last five years include the following:

- India has become the 9th largest civil aviation market in the world
- The passenger handling capacity has risen three-folds from 72 million (FY 06) to 233 million (FY 11)
- The cargo handling capacity has risen from 0.5 million MT (FY 06) to 3.3 million MT (FY 11)
- Connectivity to North Eastern region has risen from 87 flights per week to 286 flights per week
- Four international airport projects were successfully completed through the public-private partnership (PPP) mode - Greenfield development of Hyderabad and Bengaluru international airports and modernization of Delhi and Mumbai international airports
- The Airport Economic Regulatory Authority (AERA) was established to safeguard the interests of users and service providers at Indian airports
- As of now five Indian carriers are operating on international routes

Total Passengers handled at Indian airports during the 11th Plan period grew at an annual average growth rate of 11.5%[7] . Cargo handled at the Indian airports during the 11th Five year plan grew at an average annual growth rate of over 11%.

[7] Assumed total PAX handled for 2011-12 is 166 Million

Segment-wise review of performance

5.1 Airports

5.1.1 The private sector played an unprecedented role during the 11th Five Year Plan by acting as a key contributor for the development of PPP airports. Total investment made by private airport operators in the last five years was to the tune of Rs 30,000 crores spread across Greenfield development of Hyderabad and Bengaluru international airports and modernization of Delhi and Mumbai international airports[8]. A major achievement during the 11th Plan was the commissioning of Terminal 3 (T3) and associated infrastructure at the Delhi international airport in a record period of 37 months. T3 has an annual throughput capacity of 34 million passengers and the entire Delhi airport project required an investment of Rs 14,000 crores[9].

5.1.2 Airports Authority of India (AAI) continued its unparalleled role in creating air connectivity across the nation, incurring an expenditure[10] of around Rs 12,500 crores during the 11th Plan period. AAI is upgrading and modernizing 35 non-metro airports in the country, including those at Agra, Ahmadabad, Amritsar, Bhopal, Jaipur, Pune and Goa, at an estimated cost of around Rs 4,500 crores. Of these 35 airports, 26 have already been developed, while the remaining are likely to be completed by end of 2012. AAI is also enhancing air connectivity in the Northeast by way of Greenfield airport at Pakyong (Sikkim).

5.1.3 Until recently, AAI was the only major player involved in developing and upgrading airports in the country. The last five years have seen the arrival of several private players in this industry.

5.2 Airlines

5.2.1 The airline landscape in India has transformed radically in recent years. In 2003, there were just 4 carriers – Air India, Indian Airlines, Jet Airways and Air Sahara, all operating full service models. The private carriers in those days were limited to operating domestic routes only. In 2011, there are 6 air carriers operating 11 different brands, as

- Air India + Alliance Air + Air India Express
- Jet Airways + Jet Konnect + JetLite
- Kingfisher Airlines + Kingfisher Red

[8] Source: Association of Private Airport Operators (APAO)
[9] Source: Delhi International Airport Limited (DIAL)
[10] Source: AAI

- IndiGo
- Spice Jet
- Go Air

Indian carriers catered to 54 million domestic passengers during FY 2011. International traffic to and from India was 38 million passengers during the same period. The traffic growth has resulted in increased capacity of domestic carriers in the form of Available Seat Kilometers (ASKM) at around 8% along with capacity utilization with average passenger load factor having crossed the 75% mark by 2011. To cater to the growing demand during 11th Plan, the domestic carriers more than doubled their fleet size[11] from around 200 to 430.

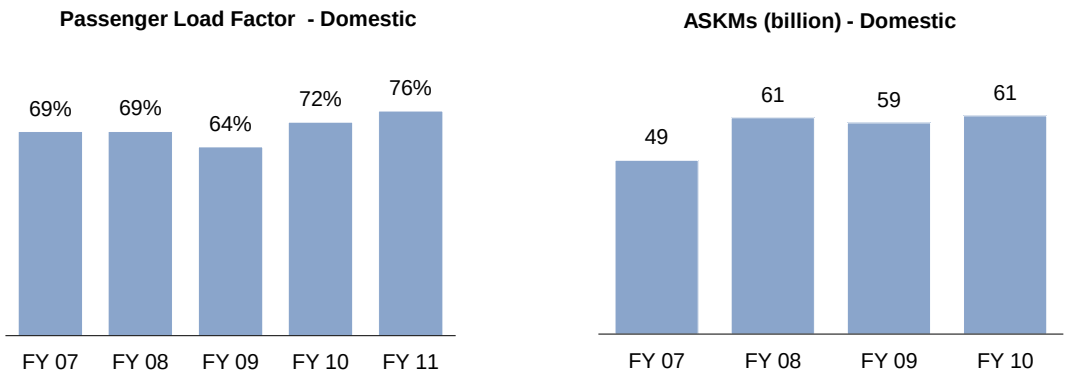


Figure 2: Passenger Load Factor and ASKMs for domestic operations of Indian carriers

Source: Indiastat, DGCA

The 11th Plan period saw an increasing trend among domestic carriers to embrace the Low Cost Carrier (LCC) model. Total market share of LCCs including the low cost arm of Full Service Carriers has crossed 70% suggesting a significant shift in the business model of airline industry in India. Despite the phenomenal growth in traffic, most Indian carriers are reeling under losses. During the three year period between 1 Apr 2007 and 31 Mar 2010, Indian carriers incurred an accumulated operational loss[12] in excess of Rs 26,000 crores, of which three large airlines accounted for nearly Rs 23,000 crores.

5.3 General Aviation

5.3.1 India has witnessed a significant growth in the number of non-scheduled airline operators with total number of operators having crossed 200 in 2011 from 36 operators in 2000.

[11] Source: KPMG estimates, data from airlines, annual reports, Aviation Center of Excellence
[12] Sources: KPMG estimates, news articles, annual reports of airlines

The present ownership pattern indicates a fragmented sector with majority of the players owning less than 4 aircrafts. As per DGCA, the General Aviation (GA) fleet in India comprises around 800 small aircrafts and 300 helicopters. Around 20% of this fleet size is expected to be more than 25 years old and may not be operational. Industry sources indicate that revenues of the General Aviation industry in India are expected to grow to more than Rs 1,100 crores by end of 11th Plan growing at an impressive annual rate of 15%. The fleet of business jets has expanded from around 55 in 2007 to around 120 in 2010.[13]

5.4 Cargo handling

5.4.1 India's impressive growth in international and domestic trade over past few years has augured well for the air-cargo industry in India. Total freight traffic handled by Indian airports increased at a CAGR[14] of 10.9% in last five years to reach 2.33 MMTPA by 2011. International cargo, which accounts for two-thirds of the total cargo handled, is mainly concentrated at metro airports like Mumbai, Delhi, Chennai, Bangalore and Hyderabad. During the 11th Plan period, these international airports witnessed entry of several leading private domestic and global cargo operators such as Celebi, CSC, Menzies bringing in the latest technology and best practices.

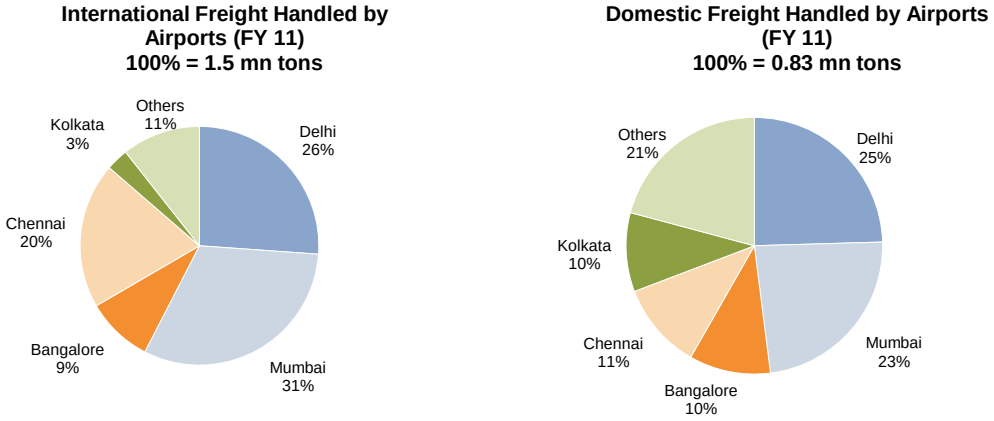


Figure 3: Airport wise break up of international and domestic freight handled in FY 11

Source: AAI

5.5 Ground handling

5.5.1 Ground handling business at Indian airports has grown to reach a size of approximately Rs 2,000 crores per annum. This segment witnessed the entry of several large domestic and

[13] Sources: Ascend database
[14] Source: AAI

global players such as SATS, Celebi, Bird Group, Menzies, etc. AI-SATS is a joint venture between national carrier Air India and Singapore Air Transport Services. In 2011, MoCA announced a new ground handling policy under which only three ground handlers would be allowed at each of the six metro airports in the country. One would be an Air India subsidiary while the other two can be selected by the airport operator through competitive bidding.

5.6 Maintenance, Repair and Overhaul (MRO)

5.6.1 The Indian MRO industry is estimated[15] to be around Rs 2,200 crores per annum. Buoyed by the Indian aviation growth, several strategic alliances for MRO facilities set up were announced during the 11th plan, e.g., Air-India JVs with Boeing and Airbus, GMR-MAE, HAL-TIMCO, Air France KLM-Max Aerospace, etc. Development of a few MRO facilities were completed during the 11th Plan including Thales Avionics Maintenance centre at Gurgaon, Airworks facility at Hosur and Duke Aviation facility at Nagpur. However, there are certain tax related issues which are said to be acting as bottlenecks for the growth of this industry. These are discussed separately elsewhere in this report.

[15] Source: Ascend database

6.0 Organization-wise review of performance during 11th Plan period

6.1 The Civil Aviation Sector is broadly structured into three distinct functional entities, regulatory-cum-developmental, operational and infrastructural. The safety and secutiry regulatory functions are performed by Directorate General of Civil Aviation and Bureau of Civil Aviation Security. Operational functions are performed by Air India, Pawan Hans Helicopters Limited and other scheduled/non-scheduled Airline Operators. The infrastructural facilities are provided by the Airports Authority of India and other Private Airport Developers.

6.2 Key objectives of the 11th Plan were to provide world class infrastructure; safe, reliable, and affordable air services so as to encourage growth in passenger and cargo traffic; and air connectivity to remote and inaccessible areas with special reference to North Eastern part of the country.

6.3 The 11th Plan outlay in respect of Civil Aviation Sector was Rs.49267.00 crores including budgetary support of Rs.1900.00 crores. Organization-wise details of outlay and expenditure incurred during the 11th plan period are given in Table below:

11th Plan performance of Constituent Units of Civil Aviation

(Rs. in crores)

Sl No.	Organisation	11th Plan Outlay	Actual Exp. 2007-10	Prov. Actual Exp. 2010-11	Projected Exp. 2011-12	Total 11th Plan Anticipated Exp.	Exp. as % of 11th Plan outlay
1.	Ministry of Civil Aviation (Sectt.)	(10.00)	(2.75)	(5.83)	(9.50)	(18.08)	180.8
2.	Air India Ltd.	32730.71	19034.72 (800.05)	3418.96 (1200.00)	5749.36 (1200.00)	28203.04 (3200.05)	86.17 (-)
3.	Airports Authority of India	12964.21 (1461.68)	7270.29 (254.4)	2503.12 (316.06)	2774.15 (280.15)	12547.56 (850.61)	96.79 (58.19)
4.	Pawan Hans Helicopters Ltd.	603.50 (20.00)	223.96 (15.00)	277.10 (40.00)	296.20 (3.00)	797.26 (58.00)	132.11 (290)
5.	Hotel Corporation of India Ltd.	75.00	27.50	1.25	15.00	43.75	58.33
6.	Air India Charters Ltd.	2475.26	2066.48	1.68	20.00	2088.16	84.36
7.	Indira Gandhi RashtriyaUran Akademi	(42.00)	(35.40)	(0.60)	(5.00)	(41.00)	(97.62)
8.	Directorate General of Civil Aviation	(258.80)	(146.69)	(3.50)	(60.00)	(210.19)	(81.22)
9.	Bureau of Civil Aviation Security	(72.20)	(1.07)	(5.89)	(136.35)	(143.31)	(198.49)
10.	Aero Club of India	(35.32)	(20.92)	(4.73)	(6.00)	(31.65)	(89.61)
	Total	**49267.00** (1900.00)	**28829.78** (1276.28)	**6222.66** (1576.61)	**9071.56** (1700.00)	**44124.00** (4552.89)	**89.56** (239.63)

Note: Figures in brackets indicate budgetary support

Table I

Most organizations, with the exception of Hotel Corporation of India, have incurred expenditure as per their projected allocations. Organization-wise performance details are discussed in the following paragraphs.

Air India Ltd

6.4 The merger of Indian Airlines Ltd. And Air India Ltd with National Aviation Company of India Ltd. was made in August, 2007 to enable the new company to generate further momentum, as the combined strength of the two companies will give various synergy benefits. The name of the merged entity "National Aviation Company of India Ltd." was again changed to "Air India Ltd" with effect from 24th November, 2010.

6.5 Against the 11th Plan approved outlay of Rs.32730.71 crores, the anticipated expenditure of Air India Ltd during 11th Plan period is Rs. 28203.04 including the budgetary support of Rs.3200.05 crores in the form of equity infusion. Out of the total approved outlay of Rs.32730.71 crores, Rs.31603.39 crores was earmarked for aircraft acquisition project and the balance amount of Rs.1127.32 crores for non-aircraft projects such as building projects, workshop/engineering facilities, procurement of ground support equipment, corporate computerization, vehicles, other general equipment etc.

6.6 Air India Ltd ordered 93 aircraft comprising of 50 Boeing aircraft (8 B777-200 LR, 15 B777-300 ER & 27 B-787-8 aircraft) and 43 Airbus aircraft (19 A319, 20 A321 and 4 A320). Out of these 93 aircrafts, 85 aircrafts were projected to be received during the 11th Plan period. The aircraft acquisition project of Air India Ltd is by and large going as per the laid down programme barring deferment of delivery of 3 B 777-300ER aircraft as well as delay in induction of B 787-8 aircraft due to production delay by M/s Boeing. Out of the 27 B-787-8 aircrafts ordered by Air India, 20 B-787-8 aircrafts were projected to be received in 11th Five year plan, however, only 8 aircrafts are likely to be received during FY 2011-12.[16]

6.7 The physical and financial performance of Air India Ltd. During 11th Plan period in terms of profitability is enclosed as **Annexure-III** and **Annexure-IV** respectively.

[16] Report of Sub-group

Airports Authority of India

6.8 The approved 11th Plan outlay of Airports Authority of India is Rs.12,964.21crores including budgetary support of Rs. 1461.68 crores. Out of Rs.12,964.21crores, Rs.6,973.40 crores was provided for non-metro airports and the balance of Rs.5,990.81 crores for metro airports. The anticipated expenditure of Airports Authority of India during 11th Plan period is Rs. 12,547.56 crores including budgetary support of Rs.850.61crores.

6.9 Airports Authority of India has taken up development of Chennai and Kolkata airports besides up gradation and modernization of 35 non-metro airports. Work at 26 non-metro airports has been completed and these airports have been put to operation by the end of Financial Year 2010-11. Up gradation and augmentation of capacity of civil infrastructure at other non-metro airports across the country are continuing. Development of Green Field airport at Pakyong, Sikkim is in progress.

6.10 In order to further improve the CNS/ATM services and to be at par with the developed world, Airports Authority of India and Indian Space Research Organization have jointly undertaken the implementation of GPS Aided Geo Augmented Navigation (GAGAN) System over Indian airspace. The first phase of the project has been completed and the second phase is in progress.

6.11 At Delhi and Mumbai airports, the Joint Venture Private partners together hold 74% equity with the balance 26% being held by Airports Authority of India. With the completion of Phase-I work of IGI Airport, a new integrated Terminal-3 has become operational with 34 million passengers handling capacity per annum covering both international and domestic passengers, 168 check-in counters, 24 remote check-in counters, most modern 5 level in-line baggage system, 98 immigration counters, 78 aero bridges, multi-level car parking (4300 capacity), 3000 CCTV, 352 screening machines etc. This recognition is a new beginning in creating World-class infrastructure with PPP in the aviation sector in India.

6.12 The Green Field airports at Hyderabad and Bangalore have been developed by M/s Hyderabad International Airport Ltd. and Bangalore International Airport Ltd respectively. The Joint Venture partners in both the companies hold 74% of the equity capital, 13% is being held

by Airports Authority of India and the balance 13% by respective State Governments. Both these airports have already been commissioned and put to operation.

6.13 The physical and financial performance of Airports Authority of India during 11th Plan period in terms of profitability is enclosed as **Annexure-V** and **Annexure-VI** respectively.

Pawan Hans Helicopters Limited

6.14 The approved 11th Plan outlay of Pawan Hans Helicopters Limited is Rs.603.50 crores including budgetary support of Rs.20.00 crores against which the anticipated expenditure during 11th Plan period is Rs. 797.26 crores including budgetary support of Rs.58.00 crores. Major portion of the 11th Plan outlay is earmarked for acquisition of helicopters. During 11th Plan period the company has procured 7 Dauphin N3 helicopters, 3 AS 350 B3 helicopters and 2 Mi-172 helicopters are likely to be received in Jan/Feb., 2012. PHHL created basic helipad and other infrastructure facilities at Rohini for operationalizing the heliport during Common Wealth Games and thereafter first commercial flight from this helipad was undertaken on the raising day of PHHL i.e. on 15th October, 2010. Further, action with regard to development of full heliport is in progress. The company has created helipad and other required infrastructure facilities at Akshardham for Commonwealth Games 2010 and other purposes thereafter.

6.15 The physical and financial performance of Pawan Hans Helicopters Ltd. During 11th Plan period in terms of profitability is enclosed as **Annexure-VII** and **Annexure-VIII** respectively.

Hotel Corporation Of India Limited

6.16 The 11th Plan approved outlay of Hotel Corporation of India Limited is Rs.75.00 crores, against which the anticipated expenditure is Rs.43.75 crores. The plan out lay was meant for the up gradation of the Hotel Centaur guest rooms and modernization of the Flight kitchens. Due to financial crunch, however, only operationally required equipments were replaced. As there were plans to give away some of the units of the company on management contract, plan expenditure of the concerned units was kept on hold. However, the plans to give some of the units on management contract did not materialize.

6.17 The financial performance of Hotel Corporation of India Ltd during 11th Plan period in terms of profitability is enclosed as **Annexure-IX.**

Air India Charters Limited

6.18 Against the 11th Plan approved outlay of Rs.2475.26 crores, the anticipated expenditure of Air India Charters Limited during 11th Plan period is Rs.2088.16 crores, which is 84.36% of the approved outlay. Air India Charters Limited ordered 18 B 737-800 aircraft out of which 12 aircraft were scheduled to be received during the 11th Plan period. The company has already taken delivery of all 12 B 737-800 aircraft. In case of non-aircraft projects, only operationally essential projects were undertaken due to liquidity crunch.

6.19 The physical and financial performance of Air India Charters Ltd. During 11th Plan period in terms of profitability are enclosed as **Annexure-X** and **Annexure-XI** respectively.

Directorate General Of Civil Aviation

6.20 The anticipated expenditure of Directorate General of Civil Aviation during 11th Plan period is Rs.210.19 crores against the approved outlay of Rs. 258.80 crores. The major scheme of the Directorate envisaged for implementation during 11th Five Year Plan period is "New Flying training Academy in Gondia" for training of pilots. This has been completed. To step up regulatory control through intensive advance training, a large number of officers of the Directorate have been trained under COSCAP and EU projects. The shortfall in expenditure is mainly due to non-finalization of the scheme of construction of DGCA Headquarters.

Bureau of Civil Aviation Security

6.21 During 11th Plan period, the Bureau of Civil Aviation Security is likely to spend Rs. 73.31 crores as against the approved Eleventh plan outlay of Rs.72.20 crores and actual allocation of Rs. 222 crores. One of the major schemes, namely, setting up of Civil Aviation Security Training Academy is at approval stage. All other projects like Access Control system, Radiological equipment, Advance Imaging Technology etc are being pursued during the year-2011-12.

6.22 Implementation of the restructuring and strengthening of BCAS which includes creation of infrastructure of office Building, acquisition of some modern equipment including enhancing the manpower requirement at both the BCAS Headquarters and regional level is going slowly. Hence, budget provision Rs. 70.00 crores under these heads, may not be able to be spent during the 11th Five year plan.

Indira Gandhi Rashtriya Uran Akademi

6.23 Indira Gandhi Rashtriya Uran Akademi (IGRUA) is an autonomous body. It was decided to professionalize the management of IGRUA, increase the number of trainees and upgrade the standards of training by entering into management contract with experts and professional agencies in the field. A management contract was accordingly signed with CAE Flight Training (India) Private Limited, a wholly owned subsidiary of CAE Inc, Canada on 7.2.2008 for an initial period of 10 years without affecting the legal entity of IGRUA. The management contract partner took over the administration w.e.f 01.03.2008.

6.24 IGRUA is provided grants-in-aid to pursue its plan projects. Against the approved outlay of Rs.42.00 crores, the anticipated expenditure of IGRUA during 11th Plan period is Rs.41.00 crores. Facilities at IGRUA have been upgraded to impart training to 100 pilots per year.

Aero Club of India

6.25 Aero Club of India is granted grants-in-aid for its plan projects. The anticipated expenditure of Aero Club of India is Rs.31.65 crores against the 11th Plan approved outlay of Rs.35.32 crores. During 11th Plan period Aero Club of India has procured four single engine Cessna aircraft, one multi engine aircraft, two single engine simulator and one multi engine Baron G-58 trainer aircraft.

7.0 Growth projections for the 12th Five Year Plan

7.1 Methodology

- Passenger and cargo traffic forecasts were developed by multiple agencies such as AAI, MoCA, KPMG, etc.
- Various estimation methodologies had been applied by different agencies including a log linear time series regression model of passenger and cargo traffic against GDP and IIP
- Traffic projections by various agencies were found to be range-bound and largely consistent with each other
- After detailed deliberations, the Sub-Group has arrived at a consensus on reasonable growth rate estimates for the 12th Plan period (2012-17) for various segments of the civil aviation industry. These are discussed in the succeeding paragraphs.

7.2 Passenger traffic forecasts

The Sub-Group on Forecast of air traffic concluded that the domestic passenger throughput[17] would grow at an average annual rate of around 12% between FY-12 and FY-17. The domestic passenger throughput is expected to touch around 209 million by FY-17 from 106 million in FY-11. Similarly, international passenger throughput is estimated to grow at an average annual rate of 8% during the 12th Plan period to reach 60 million passengers by FY-17 from 38 million in FY-11. This is depicted in the graph below.

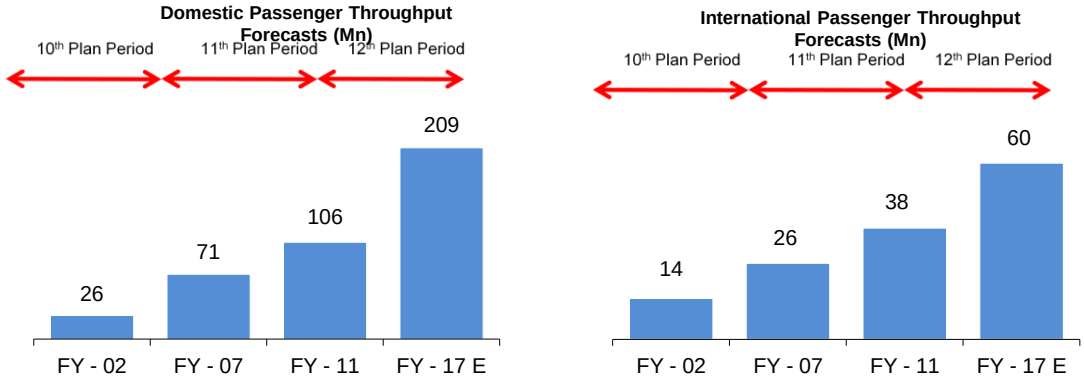


Figure 4: Domestic and international passenger traffic growth trend

[17] 'Throughput' is defined as the number of passengers handled at the airports. A domestic passenger is typically counted twice in the "throughput" calculation (on departure and arrival at an Indian airport). An international and transit passenger is counted once for the throughput calculation.

7.3 Cargo traffic forecasts

The Sub-Group on Air traffic forecast projects the domestic and international cargo to grow at a rate of 12% and 10% respectively during the 12th Plan period. The international cargo is projected to reach around 2.7 Million Metric Tonnes Per Annum(MMTPA) and domestic cargo to around 1.7 MMTPA by FY-17.

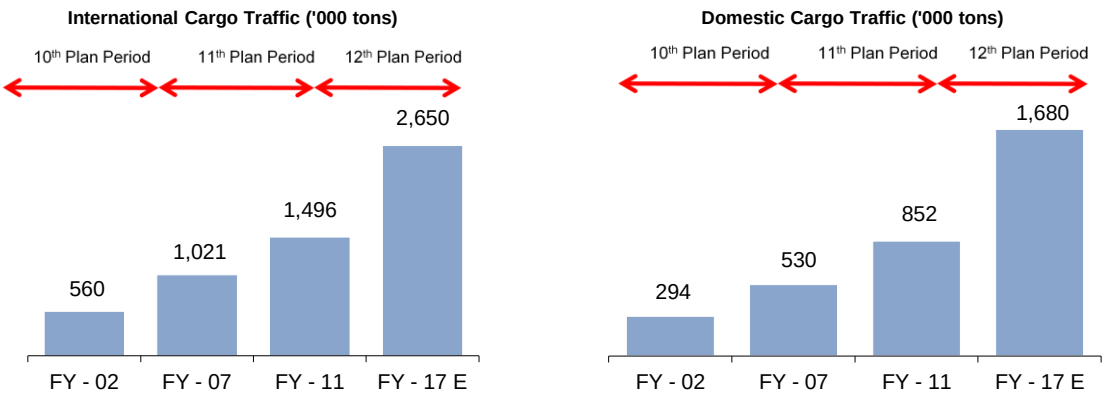


Figure 5: Growth trend in international and domestic cargo throughput

7.4 Segment-wise investment requirement and key enablers

Significant and continuous investment is required to be made in the Civil Aviation sector to ensure that the growth in air traffic is managed safely and efficiently. It may be recalled that the basic rationale of opening up of certain sectors to competition has been to cater to the enormous size of investments required for a growing economy and the need to bring in cutting edge technology and the associated best practices of the industry. This position continues to hold good even today in view of the phenomenal growth in the air traffic being witnessed and more so for meeting the future requirements for the next decade and thereafter. Going forward, air traffic growth will be strong and sustained which will in turn drive the investment requirements for air port infrastructure, including Air Navigation Services related infrastructure, air line industry, general aviation, training academies, building capacity in the regulatory bodies etc. By 2020, Indian Aviation market will reach third position in the Global Ranking in terms of size of the Industry next only to USA and China. Aviation infrastructure needs to be developed to facilitate unconstrained growth of the aviation market. Not only the investment requirements have to address the existing capacity constraints in various airports but also should address requirements in the context of growth scenario forecast for the next decade and thereafter.

(A) Airport Infrastructure

Passenger terminal capacity in all airports put together is expected to be 230-240 million by 2012 and by 2017 it would be about 370 million across all airports as per the investment plans of the operators. Cargo growth presently being witnessed will necessitate investment in specialized cargo terminal and equipments. Independent investments suggest an additional requirement of 30 functional airports by 2017 and about 180 functional airports in all in the next 10 years. Until recently, development, maintenance and ownership of air port facilities in the country was vested with the Air ports Authority of India. With the opening up of the air port sector for private participation, five airports are under the PPP model and these are Hyderabad, Bangalore Delhi, Mumbai, and Cochin. Currently, 60% of air traffic is handled by airports under PP mode and the rest by AAI. Therefore any discussion on investment requirements for airport infrastructure should take in to account the position in respect of both AAI and JV airports from the point of view of ownership. Another important component of the airport relates to air side infrastructure which includes runways, taxiways and apron. In all the airports of the country, AAI continues to provide Air Navigation Services which includes Communication, Navigation, and surveillance and air traffic management services. Signs of capacity shortages have already reemerged in four out of five metro airports in the country.

Investments in Cargo terminals and other infrastructure required for carrying out cargo operations in the airports are considered quite important. Also, there is a pressing need to augment Off-Airport cargo processing facilities on the lines of Container Freight Stations/ICD so that congestion and delays in cargo terminals at airports can be reduced. Air cargo terminals attached to the airports could at the best be a transit point if availability of space is an issue. Congestion and delays in air cargo terminals in some of the major metro airports have become chronic. India's image as a reliable supplier in international markets is crucially dependent upon the performance levels of air cargo terminals in the country. Investments need to be made for up gradation/expansion of capacity and modernization of processes/systems to cater to the growing requirements. This needs immediate and effective intervention.

It is pertinent to note that by the financial year ending 2012 beginning from 2007, Private Airport Operators would have invested about US $ 7 billion including third party investment towards infrastructure for providing ancillary aviation services. Budgetary support from

Government for investment in development of airports in remote areas and regions which need special consideration from socio economic and connectivity point of view for AAI will be part of the requirements for investment. Regional airport development to cater to the emerging air traffic in Tier II and Tier III Towns may initially require budgetary support during the initial period of its operations and until such time the operations become viable. Even at present, there are only 12 – 13 airports of AAI that are making profit with current level of operations.

Thus, growth in the passenger and cargo traffic requires significant investments in terms of construction of new airports, expansion and modernization of existing airports, improvement in connecting infrastructure (road, metro, sea link, etc.) and better airspace management.

Estimates received from AAI and the industry indicate that the Indian airports would require an investment of about Rs 67,500 crores during the 12th Plan of which around Rs 50,000 crores is likely to be contributed by the private sector.

Investor	Investment Category	INR (Crores)
AAI[18]	Airport projects	17500
Private Investments	By Airport Operator	40,000
	By Others (Concessionaires, Third Party, etc.)	10,000
	Subtotal	**50,000**
	TOTAL	**67,500**

Table 2: Expected investments in airports during 12th Plan
Source: Sub-group report

Key enablers for Airport Infrastructure

The **key enablers** required to achieve the projected growth are as follows:

i. **Holistic support from state governments for positioning India as a global hub**: Airports are a part of a holistic infrastructure plan for the city and state as a whole. Airports have a symbiotic relationship with trade and tourism opportunities in the airport's hinterland, as in, each feeds the other. The support from the state governments for the airport's success is therefore vital. This needs to come in the shape of multimodal connectivity, utilities, security and lower VAT on ATF.

ii. **Enhancing penetration of air travel among the middle classes:** In India, air travel is still looked upon as an 'elite' mode of travel and has not permeated all sections of the nearly 600 million strong middle class. There is a need for the government and industry to

[18] Refer Annexure XIII for detailed projections of capital expenditure by AAI

work together and bring down air fares in order to make air travel affordable for middle class population without at the same time affecting the viability of the airline operations in the country. The revolution in the mobile telephony industry from an 'elite' service to a mass service is a case in point.

iii. **Adopting 'No-frills' airport model**: Given the mandatory fixed costs and lower traffic, the financial viability of tier II/III airports are a matter of concern. There is a greater need to come up with a 'no-frills' airport model without compromising on safety and security.

iv. **Encouraging global aviation assignments**: Indian companies, increasingly, are winning bids for airport development and operations internationally. The government must support such efforts in view of enhancing the prestige of India's aviation sector and in creating opportunities for other Indian companies.

v. **Reforms regarding policy and regulations**: There are certain key areas where there is a divergence of opinion between the regulator AERA and the industry. There is need for a stable, transparent, and predictable regulatory regime with a mechanism for time-bound resolution of issues to create a sense of certainty in the sector.

vi. **Provisioning all-weather operations and night landing facilities**: A joint effort between government and the industry can facilitate all-weather operations and night-landing at Indian airports. This would provide impetus for greater tourist traffic and development of air-connectivity especially to the hill regions.

vii. **Evolve innovative funding solutions**: Given the risks, lenders are cautious when issuing long term debt to airport operators. Financial support, especially for developers and airlines serving tier II & III cities, is critical. Following ideas can be evaluated:

- Allowing airport companies to issue tax free infrastructure bonds
- Ensuring greater ECBs for the sector by specifying separate sectoral limit
- Facilitating Airport Development Fee (ADF) for pre-funding of airports

viii. **Facilitation by government**: A large number of institutional clearances are required for airports. Facilitation support by the government would be absolutely vital for new airport projects. A case in point is the National Facilitation Committee, headed by the

Cabinet Secretary, which played a key role in the timely completion of the Terminal 3 of Delhi Airport.

ix. **Ensuring independent decision-making and protection of sensitive business information by PPP airports**: There is a serious concern among the PPP airports about coming under CAG/RTI regulations. Business-logic driven decision-making and confidentiality of sensitive information must be ensured to a level as in other sectors, for sustaining the interest of private players.

x. **Tax incentives**: The following fiscal incentives need to be considered in order to facilitate greater investments in the sector:

a. Infrastructure status and income tax exemption under Sector 80IA should be extended to brown-field expansion of airport business

b. Benefit under schemes like 'Serve from India Scheme' (SFIS) can be made available to the airports

c. Income tax exemption should be provided to the surplus of Passenger Service Fee – Security Component (PSF-SC)

d. Service tax should not be levied on Airport Development Fees as it is a capital receipt and not a revenue receipt.

(B) Air Navigation Services (ANS) [19]

Air Space and Air Traffic Management infrastructure assumes critical importance in the context of the Indian Air Transport sector moving to the next growth phase. This is more and beyond physical infrastructure. Broadly, it involves deployment of equipments relating to CNS (Communication Navigation and Surveillance) and Air Traffic Management Systems. Technology being a dynamic variable, the equipment and systems of the air navigation services and the underlying technology has to match with the progress in airborne technology. This is a dynamic process. Therefore there is a need for constant up gradation of the systems and the equipments that are the part of Air Navigation Services. Presently air navigation services in India are provided by Airport Authority of India. Air Traffic Forecast for India suggests that the traffic both passenger and cargo by the scheduled operators and by the non scheduled operators covering general aviation and helicopters are likely to witness strong and sustained growth in the next

[19] Refer Annexure XXI for detailed projections of capital expenditure by ANS

decades to come. Therefore aircraft movements are also likely to grow in the future at a faster rate than that was witnessed in the past. The likely emergence of regional airlines to cater to air transport needs of Tier II and Tier III Towns and the growth of Low Cost Carriers as an important set of player in the market will no doubt hasten the pace of growth of aircraft movements. Besides this, there will be an impact of increasing over flight services on account of growth of aviation market in the neighboring region of Middle East and rest of Asia that are also growing fast.

AAI is gearing up to meet the challenges of rapid growth in aircraft movement. The Indian air navigation system master plan includes significant investment in modernization of airport infrastructure, up gradation of Communication Navigation Surveillance (CNS), Air Traffic Managements and Meteorological Equipment, Enhancing Manpower and Training Infrastructure and harmonization with global initiatives and regional air navigation plans. India's GPS aided GEO augmented Navigation system known as GAGAN Developed by AAI with the support of ISRO is likely to be rolled out by 2013. In order to build up the required infrastructure for air navigation services in the country, significant investment is required to be made by AAI in technology, training and in augmenting skilled manpower including adequate number of air traffic controllers (ATC). Industry sources suggest that the investment required for ANS alone would be not less than US $ 7 billion for the next 5 – 6 years. Presently, there is a shortage of Air Traffic Controllers. Unless concerted efforts are taken to develop and retain adequate number of skilled manpower, sustaining the air traffic growth without having safety implications will be daunting task. Corporatization of air navigation services is expected to pave the way for raising resources towards funding the ANS infrastructure.

MoCA has constituted a committee for formulating the next generation ANS master plan to enhance capacity and safety levels in the face of higher air traffic movements in future. The ANS infrastructure would move towards greater integration and automation with implementation of state-of-the-art technologies. The system would include a centralized Air Traffic Flow Management with networked VHF and Radars capable of providing dynamic sectors, which permits alignment with traffic pattern. Existing software and hardware infrastructure would be upgraded or replaced.

The following table provides an estimate of the investments expected during the 12th five year plan in ANS infrastructure:

Investment Category	Investment (INR cores)
Air navigation services (infrastructure & air safety)	3,700
GAGAN Project	700
Total	**4,400**

Table 3: Investment in ANS infrastructure during 12th five year plan
Source: ANS, AAI

(C) Airlines

Anticipating significant growth in traffic, most Indian carriers have placed orders to augment their aircraft fleet. As per KPMG estimates, airlines in India are expected to add around 370 aircrafts worth Rs 150,000 crores to their fleet by FY-17. Fleet expansion at this scale would require airlines to explore multiple funding options including capital markets, long-term borrowings and leasing etc. Two Indian carriers have already expressed their plans to raise Rs 2,500 crores each through Initial Public Offers by FY-12.

Airline	Number of aircrafts expected to be added by 2017	Estimate value of aircrafts to be added (Rs crores)
Air India	40	18,000
Go Air	22	8,100
Jet Airways	79	32,000
JetLite	20	7,600
Kingfisher	78	29,700
Spicejet	68	26,100
Indigo	69	26,100
TOTAL	**376**	**147,600**

Table 4: Expected fleet expansion by Indian carriers
Source: KPMG

Multiple methods such as direct lending, operational lease, finance lease, sale-and-lease-back etc are being adopted by airlines for financing aircraft acquisitions. Of late, sales and lease back method has become popular as it allows airlines to optimize their cash flow.

The **key enablers** required to achieve the projected growth are as follows:

i. **Policy changes on ATF pricing:** Cost of ATF (40-50% of their total operating cost) is a formidable challenge for the financial health of airlines. This has been a long standing issue that requires an immediate resolution. ATF prices in India are distorted because:

- It is subjected to a multitude of cascading taxes by different government entities
- Despite being an input fuel (similar to coal and gas), it is subjected to sales tax as

high as 30%

- As per KPMG analysis, it is nearly 60% costlier than competing hubs like Dubai, Singapore and Kuala Lumpur and hurts India's competitiveness. Many a time, air-tickets to these global locations are cheaper than that for locations within India.

Following table illustrates comparison of ATF prices in India with competing hubs:

Location	**Price/kilolitre (USD)** [20]
India	1400
Singapore	825
Bangkok	880
Kuala Lumpur	810
Dubai	840

Table 5: ATF prices comparison

Source: KPMG analysis, news articles, Oil Marketing Companies

Sensitivity of Industry profitability to Oil Prices

- Between October 2010 and March 2011, the Indian Oil Marketing companies raised the price of aviation fuel 12 times resulting in a 45.24% increase from Rs.40,728/kl to Rs.61,199/kl. According to a study carried out by Center for Asia Pacific Aviation (CAPA) assessing the sensitivities of the potential impact of higher average oil prices in April 2011, up to US$95-100/barrel, other things remaining constant, only LCC might make modest profits but will continue to perform better than full service carriers. However, above US$ 110 the entire industry starts to be impacted since at these levels the fare differentiation between them becomes less significant.

ii. **Help local players reach foreign skies:** The mandatory and unilateral restriction on Indian carriers of having '5-years operational experience and 20-aircraft fleet' before being allowed to operate on international routes is discriminatory. This rule should be given a relook, particularly in absence of any similar restriction in other countries.

iii. **Thrust on technology and innovation**: There is a need to develop robust R&D capacity in India. India's successes in the complex arenas of space, missile and nuclear technology are an inspiration. The key enabler would be the coming together of

[20] These numbers are as of May – Aug 2011

government, industry and academia to work on cutting edge technologies.

iv. **Allow investments by foreign airlines in domestic carriers:** More funds, technical know-how and global access can be unlocked by allowing foreign players to take equity stake in Indian carriers. Consensus on this issue needs to be developed at the earliest.

v. **Holistic 'Incredible India' campaign:** A coordinated effort is required between the ministries of tourism, civil aviation and trade and commerce, for an aggressive brand building of India. This also needs engagement with the state governments to ensure last mile issues related to tourism infrastructure, services and security. Word of mouth publicity by returning tourists has a stronger impact than any amount of brand-building.

vi. **Connectivity to Tier II & III cities**: Airlines must be supported by way of price discounts at Tier 2/3 airports till the time that the traffic reaches a reasonable level. This can be explored by way of AIDF discussed later in the note.

(D) General Aviation

The General Aviation (GA) market in India is expected to grow at 10% per annum to cross Rs 1,600 crores by FY-17. Industry sources indicate that around 300 business jets, 300 small aircrafts and 250 helicopters are expected to be added in the current GA fleet by FY-17. A total investment of more than Rs 20,000 crores in General Aviation is expected during the 12th Plan period.

Today business jets are no longer seen as a luxury but as a tool for enhancing productivity. Tourism is another key growth driver for general aviation in India. The helicopter market in India is equally promising, with growing requirements in tourism, mining, corporate travel, air ambulance, homeland security etc.

The **key enablers** required to achieve the projected growth are as follows:

i. **Regulatory framework for equitable treatment to GA operators:** With the current traffic load of scheduled flights at metro airports, GA aircrafts, at times, get a lower priority compared to scheduled operators. Delays in takeoff and landing clearances may defeat the purpose of investments in GA aircrafts. A joint review committee should be formed by MoCA and DGCA with representation from non-scheduled and GA operators to review the existing regulatory and operational framework.

ii. **Support infrastructure:** It is important to develop the supporting infrastructure at airports in Tier 2/3 cities including night-landing facilities, enhancement of passenger amenities and state support in statutory services (like security) to boost the GA industry. GA facilities at metro airports need an upgrade in terms of separate terminal, parking space, etc.

iii. **Upgradation of non-operational air-strips:** Non-operational air strips need to be upgraded in places of economic significance such as ports, mining areas, tourist places and industrial clusters. These need to be done at the lowest possible cost without compromising on safety. The air-strip may attract a small number of GA flights initially and if it has a strong business case, it may ultimately lead to full scale operations in future, with significant benefits to the local economy.

iv. **Airfield information:** GA aircrafts and helicopters at times use airports and helipads that are not in general use. It is extremely important to create a reliable and regularly updated database of all airports and airstrips in the country. It is also important to improve coordination with IAF airfields and introduce basic low-cost navigational aids in these small airports.

v. **Development of heliports**: Development of heliports is important to support the growth of general aviation in India, especially in areas that cannot have runways for financial or terrain-related challenges. There is a need to consider developing a PPP policy for development of heliports. There is also a need to develop standardized route operating procedures for helicopters.

vi. **Monitoring and oversight:** Monitoring of over 150 GA operators may be a mammoth responsibility for DGCA. The numbers are expected to increase in future. The option of a separate monitoring and facilitation agency for GA may have to be evaluated.

(E) Cargo Handling

The entry of leading private air-cargo companies has brought in a wave of increasing automation, mechanization and process improvement initiatives at major air-cargo terminals in the country. Such investments in air-cargo handling at key airports such as Delhi, Mumbai, Bangalore, Hyderabad, etc. are expected to yield higher air-cargo throughput and improved service levels. The current share of air-cargo compared to other modes of cargo-transportation

is fairly low in India. The potential for air-cargo growth in India can be gauged from the fact that some of the global airports such as Hong Kong, Dubai and Incheon (Seoul) handle more cargo volume than all Indian airports put together. The present operating parameters (daily throughput, dwell times) at most air-cargo terminals of the country are far from international best-practices.

The following **key enablers** would be imperative for growth of India's air-cargo industry:

i. **Higher automation**: Poor cargo handling infrastructure at airports leads to spoilage & pilferage, increased turnaround times and degradation in the quality of items causing perception issues for Indian exports. There is an urgent need to facilitate efficiency in air-cargo through IT tools and automated material handling.

ii. **India as a trans-shipment cargo hub**: Given its geographic location, India can aspire to become an international cargo hub. To begin with, India needs to facilitate trans-shipment of cargo to and from our neighboring countries, many of whom do not have regular air services to key markets in Europe and Americas. Trans-shipment has been a significant source of revenues for global international airports such as Incheon, Hong Kong and Singapore as seen in the following table:

Airport	Cargo Handled (mmtpa)	Trans-shipment Cargo (mmtpa)
Hong Kong	4.6	1.5
Incheon	2.7	1.2
Singapore	1.7	0.8

Table 6: Transshipment volumes at global airports
Source: Airports websites, KPMG analysis

Trans-shipment at Indian airports is currently negligible. Major bottlenecks are absence of dedicated transshipment infrastructure at airports and lack of clarity on the trans-shipment procedures. Conservative estimates by KPMG indicate that the Indian subcontinent alone can offer trans-shipment opportunity of 80,000-100,000 MT per annum.

Dwell time reduction: Cargo dwell times for large Indian airports currently range from 3 to 5 days as compared to an average of 4 to 12 hours at leading global airports! Reduction in dwell time and faster clearance of cargo are extremely critical for India. The following table highlights our glowing disparity with global standards:

Airport	Dwell Time – Exports	Dwell Time – Imports
Delhi	*40-45 hours*	*110-120 hours*
Sharjah	4 hours	4-8 hours
Singapore	6 hours	3-6 hours
Incheon	2-3 hours	2-8 hours

Table 7: Dwell time at international airports
Source: KPMG analysis

iii. **24x7 Customs operation**: A review of the current customs clearance procedures is extremely important. There is also a serious need for Indian Customs to operate in a 24x7 environment. This would require close and regular interaction between MoCA, Central Board of Customs and Excise (CBEC) and the industry. The following table illustrates the operating hours of customs at leading airports across the world:

Airport	Cargo Handled (mmtpa)	Customs operating hours
Delhi	**0.60**	**1 Shift**
Mumbai	**0.67**	**1 Shift**
Hong Kong	4.6	24 x 7
Dubai	3.0	24 x 7
Incheon	2.7	24 x 7
Shanghai Pudong	2.6	24 x 7
CDG, Paris	2.0	2 Shifts
Changi, Singapore	1.7	24 x 7
Schiphol, Amsterdam	1.6	2 Shifts
Suvarnabhumi, Bangkok	1.3	24 x 7

Table 8: Customs operations at international airports
Source: Airports' website, AAI, KPMG analysis

iv. **Establishment of Air-Freight Stations (AFS) in the hinterland:** A significant amount of congestion, damage and pilferage are caused by the current practice of cargo being brought to terminal in loose units (cartons, etc.) which is then unitized into pallets or containers before being loaded onto aircrafts. This problem can be alleviated by setting up AFS' in the hinterland. Customs check, X-ray screening, palletization, etc. can take place at the AFS and airport terminals would only act as a 'processing gateway' between airlines and cargo carriers. Success of Containers Freight Stations (CFS) for marine cargo

is a clear indication of the need for a similar concept in the air-cargo industry.

(F) Maintenance, Repair and Overhaul (MRO)

Indian MRO industry is expected to triple[21] in size from Rs 2,250 crores in 2010 to Rs 7,000 crores by 2020. However, this future size may still be small compared to the present MRO industry size of other countries such as UAE (Rs 8,000 crores per annum) and China (Rs 10,000 crores per annum).

India has the potential to be an MRO hub due to the growing aircraft fleet, location advantage and availability of talent. Given the growth of Indian aviation, it is logical to encourage MRO infrastructure to support the growth in the sector. Moreover, low cost carriers would also prefer servicing of aircrafts locally to save cost and time in a highly competitive market.

The following **key enablers** would be imperative for India to become a preferred MRO hub:

i. **Elimination of discriminatory taxation policy for domestic MRO players**: Due to discriminatory tax policy, Indian MRO players have to suffer an additional tax burden of nearly 40% over foreign MROs. These are in terms of import duties, VAT and service tax. This has led to Indian carriers taking their aircrafts, at a high cost, to other MRO locations like Dubai, Singapore, Malaysia etc, since it still works out to be more cost-effective than in India. It therefore appears that our taxation policy has actually created business for our competing countries. The resultant tax revenues in India from MRO are a fraction of what could have been. There is a need for an urgent review and reversal of this anomalous taxation policy.

ii. **Abolition of import duties for spare parts**: Due to high import duties, (not applicable to foreign MROs) local MROs are not able to maintain an inventory of key spare parts. This at times leads to aircrafts being grounded for longer periods. Abolition or reduction of import duties for spare parts will cut short the timelines for servicing the aircrafts.

iii. **Treatment as import substitution:** Given that the aerospace and MRO industry in India is in its infancy, and that there is a heavy dependence on foreign MROs, the output of this sector should be treated as import substitution, and supported as such. For instance, manufacturing of power sector equipment for domestic industry is treated as deemed exports and hence is free from taxes.

[21] Source: Ascend database

Budget 2011 has imposed a MAT of 18.5% on all SEZs. Aerospace SEZs such as the ones coming up near Nagpur, Belgaum and Hyderabad can be considered for exemption from MAT. There can be a clear sunset clause wherein the fiscal benefits can be gradually withdrawn once the sector achieves a critical mass.

iv. **Impetus on MRO joint ventures**: The government needs to incentivize airlines to set up their dedicated MRO hubs in India through three-way joint ventures with MRO service providers and airport companies. This assures sustained business for the venture as well as cost advantage for the airlines.

v. **Streamlining of licensing and security clearance procedures**: According to private players, receiving approvals for an MRO establishment is extremely challenging. Currently the license is given out as a ground handler instead of an MRO player which suggests that no distinction is made between these two very distinct services.

In case of urgent repairs of a grounded aircraft, that may require foreign specialists to be flown in at short notice, the amount of time taken for getting security clearance for such experts is highly time consuming. This renders them ineffective since the opportunity cost of a grounded aircraft is extremely high. There is an urgent need to streamline clearance procedure so that there is a logical balance between business exigencies and security considerations.

(G) Ground Handling

By 2017, ground handling market is expected to double[22] from present Rs 2,000 crores to Rs 3,900 crores. A number of global ground-handling players have aggressive expansion plans in India. This would, however, depend significantly on supportive government policies and requisite airport infrastructure development.

The Ministry proposed a ground handling policy for 6 metro airports limiting the number of ground handling agencies therein. This has been contested by airlines. The matter is currently sub-judice in the Hon'ble Supreme Court.

Mechanization and modern ground handling processes would be the key to ensuring efficiency. There should be proper monitoring mechanism to oversee and enforce service level agreements between airlines and ground handling agencies.

[22] Source: KPMG analysis, Financial Express

8.0 Key Challenges of Civil Aviation Sector

8.1 Air Connectivity in North-Eastern Region and Other remote areas

8.1.1 North-East Region of India comprises of eight states viz. Assam, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Tripura and Sikkim. Most of the places in the North-Eastern states are inaccessible due to inadequate road/rail facilities. Only viable means of transportation in the region is by air. At present, air services are available to/from 11 airports in the North-Eastern Region.

8.1.2 During the last five years from 2006-2011 (till date), total number of flights operated on domestic network vis-à-vis flights in North-Eastern Region, Jammu & Kashmir Region, Andaman & Nicobar Island and Lakshadweep Island are indicated below.

Flight Details	Flights/week					
	2006	2007	2008	2009	2010	2011
Total on Domestic Network	8724	10624	11048	11063	11315	12107
North-Eastern Region	259	285	298	286	347	370
Jammu & Kashmir	104	116	110	113	120	179
Andaman & Nicobar Island	24	42	42	35	40	42
Lakshadweep Island	06	13	10	07	13	10

Table 9

It is evident from the table that connectivity to NER, J&K,A&N islands and Lakshadweep has grown at 43%,72%,75% and 67% respectively which are higher than growth in total domestic Network at39% during the period from 2006 to 2011.

Over a period of time, the air connectivity in the North-Eastern Region has grown from 290 flights per week in Summer Schedule 2007 to 370 flights per week in Summer Schedule 2011. Out of these 370 flights per week, a total of 113 flights per week are being operated by ATR42/72 type of aircraft for intra North-Eastern region connectivity. Airline-wise details of the

flights given in the following Table suggests that the traffic to NER and intra-NER is shared by all the Scheduled Domestic operators.

Airline	Flights/Week								
	SS 07	WS07	SS08	WS08	SS09	WS09	SS10	WS10	SS11
NACIL (I)	39	41	40	40	41	42	42	60	60
Alliance Air	72	73	74	68	68	64	64	71	71
Jet Airways	38	38	34	37	37	37	37	37	48
JetLite	14	14	28	28	28	28	28	28	38
Air Deccan	68	61	62	62	73	45	45	51	45
Kingfisher	27	24	20	21					
Spicejet	7	7	7	7	14	14	21	35	42
IndiGo	25	27	28	35	41	42	49	58	59
Go Air	-	-	-	-	7	7	7	7	7
Paramount	-	-	-	-	7	7	-	-	-
TOTAL	**290**	**285**	**293**	**298**	**316**	**286**	**293**	**347**	**370**

SS:summer schedule;WS: Winter Schedule

Table 10

In addition to scheduled air services, non-scheduled air services are being provided by North East Shuttle (a non-scheduled operator) with small aircraft. Pawan Hans Helicopters Ltd is also providing helicopters services in Arunachal Pradesh, Meghalaya, Tripura and Sikkim with subsidy from Govt. for carriage of passengers, emergency/medical evacuation, VIP transportation and Tourism. Global Vectra a private Helicopter operator also operates passenger services in Arunachal Pradesh.

8.1.3 It is also encouraging to note that few States have started taking pro-active measures to promote air connectivity in their areas which includes development of airports, promotion of

flying schools etc. States have started realizing that reduction in operations costs of airlines is the only way they can be attracted to fly to "thin routes".

Route Dispersal Guidelines

In accordance with the Route Dispersal Guidelines, all routes were divided into three categories viz. Category I, II and III. The route network existing at the time of formulation of route dispersal guidelines was evaluated based on capacity deployment on routes in terms of ASK deployed. Route categorization was based on traditionally surplus generating routes (Category I), loss making routes (Category II) and the remaining routes (Category III). The Category I routes were largely inter-metro routes and generated surplus that cross-subsidized losses largely on Category II routes which served regions of difficult terrain and destinations in remote areas. Implementation of Route dispersal guidelines aimed at ensuring that all players in the liberalized era would deploy capacity to destinations in remote areas and would participate equitably in providing air transportation to remote areas.

Following 12 inter-metro routes connecting metropolitan cities directly out of all routes were categorized as Category I routes:

Mumbai-Bangaluru	Mumbai-Hyderabad	Kolkata-Delhi	Delhi-Bangaluru
Mumbai-Kolkata	Mumbai-Chennai	Kolkata-Bangaluru	Delhi-Chennai
Mumbai-Delhi	Mumbai-Trivandrum	Kolkata-Chennai	Delhi-Hyderabad

Category II routes included routes connecting airports in North-Eastern region, Jammu and Kashmir, Andaman & Nicobar and Lakshadweep. Category III routes were routes other than those included in Category I and Category II. The guidelines also mandated a category within Category II, referred to as Category IIA or intra Category II, which consisted of routes exclusively within the North-Eastern region, Jammu & Kashmir, Andaman & Nicobar and Lakshadweep. The historical data of ASK deployed in these route categories was compiled for almost 10 years to arrive at the percentages specified in the Route dispersal guidelines. It was obligatory on the part of scheduled airlines to deploy on Category II, IIA and III routes, a specified percentage of capacity deployed in Category I routes as per the following:

i) On Category II routes, at least 10% of the capacity deployed on routes in Category I.

ii) On Category IIA routes, at least 10% of the capacity deployed on routes in Category II.

iii) On Category III routes, at least 50% of the capacity deployed on routes in Category I.

The Route Dispersal Guidelines also mandated that for rendering the prescribed minimum service on routes in Category II and III, an operator may at his option provide the service either by aircraft in his fleet or with aircraft in any other operator's fleet on mutually agreed terms with the prior approval. To promote tourism, the Ministry of Civil Aviation declared operations on Cochin-Agatti-Cochin route as Category IIA in Jun 2006.

Issues of Concern

- ***Despite some degree of success of Route Dispersal Guidelines in ensuring air connectivity to North-Eastern Region, Jammu & Kashmir and other places, it is a fact that air connectivity has largely been confined to very few airports in these regions.***
- ***The air connectivity is largely concentrated on routes connecting state capitals.***
- ***Air connectivity has not increased proportionately on routes connecting Island airports.***

Although all the scheduled domestic airlines are complying with mandatory capacity deployment requirements contained in Route Dispersal Guidelines, however, some parts of the country still remain unconnected by air services or partly connected. A closer scrutiny of the RDG reveals that ***RDG in itself offers only a partial solution to the issue of regional connectivity***. The tendency has been that even in Category II and Category III routes, Airlines are said to prefer to resort to cherry-picking or cream skimming and adopt only those routes which are comparatively more promising or lucrative while leaving the unviable sectors unserved or underserved. The RDG being a matter of internal cross-subsidization between financially viable and un-economical routes for airlines, it does not appear to be sustainable to continue this in the long run given the nature and extent of remote and inaccessible areas in the country to be covered and the financial crisis the airline industry is facing. There is a strong view emerging in this sphere that in order to achieve the social objectives prescribed under the RDG, innovative mechanism needs to be evolved to achieve maximum impact. Under these circumstances, it is felt that ***there is a need to revisit the Naresh Chandra Committee Report that recommended Essential Air Services Fund (EASF***). The relevant portions of the Naresh Chandra Committee Report in this regard are reproduced below:

"As regards maintaining essential air services on routes that are strategically important but are commercially unviable, the government should provide explicit subsidy support, preferably through direct budgetary transfers or the imposition of a sector-specific cess or a combination of both. In addition, such support should be allocated through a transparent process of minimum subsidy bidding. Here it is noteworthy that competitive tendering of subsidy for maintaining essential air services is a well-established practice in several countries, as it allows such routes to survive but on the basis of fair competition and at the lowest cost possible to the tax payer. For instance, the Remote Areas Subsidy Scheme (RASS) in Australia and the Essential Services (EAS) Programme in the U.S. are broadly based on minimum subsidy bidding."

The current arrangement for ensuring essential air services is not satisfactory. Review of route dispersal guidelines could at the best is a short term solution. A sustainable and durable solution in the long run could be found only in direct intervention. Development of small low cost 'no-frill' airports and regional airlines to be encouraged through providing direct subsidies in a transparent manner both for airport operator and for the carrier. Suggestions have come to set up at least one heliport in each district headquarters as Helicopter Service is assuming important role in specific operations like disaster management emergency medical services, law enforcement and training purposes, etc. A framework of analysis is required to be developed for deciding a set of parameters to evaluate proposals for locating airports in the country.

Airport Infrastructure in NER

There are 22 Airports and civil enclaves in the NER. Amongst these there are seven fully operational AAI airports in NER i.e. Agartala, Barapani (shilling), Dibrugarh, Dimapur, Guwahati, Imphal and Lilabari. In addition, there are four civil enclaves at IAF Airports in Jorhat, Bagdogra, Silchar and Tejpur which cater to scheduled civil flights.

A. <u>Operational Airports</u>

There are seven fully operational AAI Airports in NER i.e. Agartala, Barapani (Shillong), Dibrugarh, Dimapur, Guwahati, Imphal and Lilabari. In addition, there are four civil enclaves at IAF Airports in Jorhat, Bagdogra, Silchar and Tejpur which cater to scheduled civil flights.

B. <u>Hub at Guwahati, Agartala, Imphal and Dibrugarh</u>

As advised by the Ministry of DoNER, AAI has plans to develop Guwahati as a inter-regional hub and Dibrugarh, Imphal and Agartala as intra-regional hub. In this connection, AAI

has already planned to construct three aircraft Maintenance Hangars at Guwahati and one each at Dibrugarh, Imphal and Agartala in order to facilitate early morning and late night air connectivity to and from the region.

C. Status of Non-operational Airports

(i) Daparizo Airport

As a part of PM package for North-East Daparizo Airport in Arunachal Pradesh Shall be developed by AAI for 20 seater aircraft operations in Phase-I and for ATR-72 Operations in Phase-II Master Plan has been finalized and cost estimates for Phase-I development is being prepared.

(ii) Tezu Airport

Teju airport in Arunachal Pradesh is being developed by AAI with the financial grant of Rs. 79 Crores from MoDoNER, Govt of India as a part of PM package. The existing airport alongwith additional 108 acres of land has been handed over to AAI by the Arunachal Govt. Work for construction of boundary wall has already been taken up. Other major works shall be taken up as soon as already sought environmental clearance is obtained from MoEF.

(iii) Ziro, Along and Passighat Airport

Ziro, Along and Passighat in Arunachal Pradesh will also be developed as apart of PM package by IAF with civil enclave area as identified by Defence to be developed by AAI.

(iv) Rupsi Airport

It has been decided that Rupsi Airport in Assam be handed over to IAF by AAI, earmarking land to develop civil enclave by AAI. BTC has agreed to the proposal of development of Rupsi airport in lieu of new Greenfield airport in Kokrajhar provided a proper road connectivity is ensured between Kokrajhar and Rupsi by the State Govt.

(v) Kamalpur

Kamalpur in Tripura beiongs to AAI and can be developed for ATR-72 type of aircraft operations subject to availability of additional 50.5 acres of land already projected to the State Govt. State govt. is yet to respond in this matter.

(vi) Kailashahar, Aizwal and Khowai Airports

There is no proposal to develop Kailashahar, Aizwal and Khowai Airports.

D. Greenfield Airports in NE Region

(i) Pakyong (near Gangtok), Sikkim – AAI is already constructing a Greenfield airport in all modern amenities for ATR 72 type of aircraft operations. The site is 33 Kms. South-West of Gangtok. PDC is june,2012.

(ii) Itanagar – A Greenfield airport to cater for AB-321type of aircraft operations has been proposed, initially, a site in Banderdeva was identified and a feasibility study was carried out. Preliminary cost of the project is Rs.812 crores. Likely completion cost is Rs. 989 crores. However, it was found to involve huge costs due to enormous earth cutting and deforestation required to enable further development. A preliminary study carried out by AAI at an alternate site both from technical as well as execution point of view with cost reduction. This new proposal prepared for further guidance in Feb.2011.

(iii) Chietu ,Kohima,Nagaland – A Greenfield airport to cater for ATR-72 type of aircraft in fair weather conditions has been proposed. AAI has already submitted a DPR to MoCA Govt. of India Clearance from Govt. of India is awaited Approximate cost of the project is Rs.865 Crores.

Certain New initiatives proposed by the Ministry in the last section of this report contains a section on creation of Essential Air Services Fund for addressing issues of connectivity in North Eastern region and other remote areas.

8.2 Viability of the Sector

Viability of Airline Industry is central to entire sector and crucial for sustaining growth. The decade 2000-2010 witnessed a profitless growth phase of the air lines industry. FY 2010-2011 witnessed revival of strong market growth resulting in profitability for some domestic carriers. ***Airline Industry in India suffers from huge debt burden – close to US $ 20 billion (estimated for 2011-12).*** Half of this debt is aircraft related and the rest for working capital loans / payments to airport operators and fuel companies. Three airline groups account for a large proportion of this debt and they need to raise capital to boost equity and liquidity.FDI Policy does not permit foreign airlines investment there by denying access to potential sources of capital and expertise.

To manage the next growth phase safely and efficiently, significant and continuous investment will be required for providing efficient and reliable services for movement of goods and services by air. The ***future of India's aviation growth is critically linked to the health of the airline industry.*** The rapidly changing air transport environment dictated by the global economic

fortunes is forcing airlines to seek structural adjustments in order to survive. One of the major challenges of the air traffic industry in India is the high and growing debt burden of the carriers. While there are number of structural factors that are responsible for this phenomenon, the ***operating cost environment is adversely impacting the financials of the airline sector***.

There is a perception that taxation of air transportation constitutes a tax on a luxury good and is thus justified. This is largely misplaced since with deregulation and growth of air services, air transport is as much a mode of transportation for the common man as the Railways. Today over 70% of the domestic air travel market in India is on low-cost-carriers undertaken by a budget conscious traveler. Inappropriate taxes, either in terms of their magnitude or their form, can seriously distort the market for air transportation services. Because the demand for airline products is often derived from the final demands for goods and services, as well as from the desire for individuals to travel, distortions to ticket prices have the potential of adversely affecting output. In particular, they penalize those industries most reliant on high-speed, scheduled transport – industries generally having the greatest potential to contribute to productivity and national output.

Aviation sector in India face many taxes on the inputs to production – fuel, aircraft leases, airport charges, air passenger tickets, air navigation service charges, maintenance costs, fuel throughput fees, into-plane fuel fees, and other items subject to service taxes. These fees and taxes on inputs are either not present in other matured aviation markets, or are much lower there. The Indian air transportation industry is thus laden with very high costs and larger operating losses than their other counterparts globally. This is not to say that air transport industry should be completely exempt from taxation – rather, it is a matter of distortion that needs to be addressed.

Fiscal regime governing Aviation Turbine Fuel (ATF)

One of the key cost drivers for the airline industry which is the pivotal segment of the entire civil aviation sector is the price and taxes payable for aviation turbine fuel (ATF) by the scheduled domestic carriers in India. A number of representations received from airlines in India suggest that the rates of value added tax on ATF is high which affects the financial viability of their operations. ***In most of the States VAT applicable on ATF is in the region of 25-30%. Fuel cost alone constitutes nearly 40% of the operating cost of the airlines in India. There is no doubt***

that the current regime of aviation fuel taxation regime adversely impacts the financial performance of Indian air carriers particularly in the domestic sector. If aviation fuel taxes are disproportionately higher without any basis, then it retards the industry development vis-à-vis the overall growth in the economy and limits its potential contribution to economic well being. Multiple and higher levies on ATF will impact the operating cost environment of air lines.

Following the dismantling of 'Administered Price Mechanism' (APM), prices of ATF in India are based on the "International Import Parity Prices", and directly linked to the benchmark of Platt's publication of FOB Arabian Gulf ATF prices (AG); and do not relate to the actual cost of producing ATF in India. ATF prices for domestic operations thus also include Freight charges from Gulf to India; Customs Duty if applicable; domestic transportation and other charges; Excise Duty (including cess); Value Added Tax (levied by the State Governments) averaging across the country at 25% as add-ons to the AG prices, besides the Oil Companies' marketing margin; and throughput charges paid to the Airports. Therefore, it is suggested that the ATF prices as well as the state level levies/surcharges on ATF should be rationalized to minimize the cascading effect of tax regime so that the operating cost environment of the airlines is conducive for providing affordable air services to the common man in the country.

Two changes in the existing tax regime governing ATF that have been suggested by the industry are: One, include ATF in the unified Goods and Service Tax or in the alternative, accord ATF the status of "declared good" that carries lower and uniform tax. Second, switch over to levy of specific rate of duty instead of advalorem duty structure because when fuel prices go up, the aviation industry in India gets doubly hit because the same rate of VAT applied on a higher and increasing value means higher amount of tax out go. It is also important that the Oil Marketing Companies are mandated to ensure transparency in the fixation of ATF prices as a very large proportion of ATF supplies are from the few PSU Oil Marketing companies.

Tax regime governing third party MRO

India's growth in Civil Aviation during the past decade would have provided an excellent and a unique opportunity to develop the nascent Aviation MRO industry in India. Development of the MRO (Maintenance Repair and Overhaul) industry would have leveraged and developed both the skilled human resource expertise in India, as also laid the foundation of advancements in the aerospace sector. As per industry estimates, the Indian Commercial Aviation MRO market which

is currently valued at around $ 800 million is expected to reach $ 1.06 billion by 2015 and $ 2.5 billion in 2020.

Airlines need line-maintenance and major maintenance for their aircraft; engine maintenance; and maintenance for airframe components, accessories & repairs. The MRO industry in India suffers from lack of adequate number of credible third-party MRO facilities. While captive MRO operations of existing airlines provide the basic infrastructure and expertise for development of the MRO industry, there is also a need for third-party maintenance & overhaul to support the requirements of the domestic airlines. Airlines in India currently outsource major checks and aircraft servicing to MRO hubs like Singapore, Malaysia and Dubai. It is only minor checks which are handled in house. To emerge as an MRO hub for the region, there are regulatory and infrastructural limitations that need to be addressed. There is also a need to ensure uniformity in tax structure and tax incidence on varying trade practices. High taxes tend to more than offset India's advantages in terms of low labour costs. Indiscriminate taxes undermine operating viability and greatly reduce the advantages of efficiency necessary to develop a world class industry.

The high tax regime in India is considered as a major deterrent for growth of the MRO industry. This makes aircraft servicing about 40% to 50% more expensive in India than competing destinations in the region, like Singapore, Dubai, Colombo, among others. Servicing an aircraft in India entails service tax of 10.36% (there is no such service tax overseas).Importing spares involves customs duties of over 24%; 12.5% VAT; and 4% octroi. Some of these taxes are only applicable to third party MROs and not to air lines conducting their own maintenance. This amounts to forcing a business model on the sector through fiscal instruments with attendant consequences for distortions in the system.

In summary, taxation of air transportation sector as a whole is disproportionately high which retards the industry's development vis-à-vis the overall growth in the economy, and limits its potential economic contribution. To fully reap the economic benefits of air transportation, airlines must be treated as economic assets rather than as convenient source of taxation. Air travel should not be treated as a luxury good, but as a necessary and normal service consumed by all strata of society including common people and should be taxed accordingly. It is well known that passenger demand is very sensitive to the price of air tickets. Typically, a 10% rise in price will reduce demand for domestic air traffic travel by about 12% as per the price elasticity

of demand calculations. High Tax regime on aviation in general and on ATF will reduce the wider economic benefits available from aviation, resulting in a negative impact on economic growth and overall government revenue bases.

8.3 Safety

8.3.1 With the advancement in aviation activities in India, ***the challenges to keep the skies safe need to be met appropriately. Safety is of paramount importance***. The expansion of air transport in India is among the fastest in the world. This is being reflected in the double digit growth rates of passengers and aircraft orders placed by Indian carriers. To meet this growth ***there is an immediate need for improvement in existing infrastructure***. The accident and incident rates are measured as the number of occurrences per 100,000 operations. As the number of operations increase, it is a challenging task to keep the rate in check. The congestion in the skies also poses a threat of near-misses and collision warnings. The increase in number of movements affects runway safety, ramp safety, incursions and excursions, ramp congestion, precautionary landings, aborted take offs, and other serious situations affecting safety. Proactive measures are needed to avoid hazardous situations by having institutionalized mechanisms in place to ensure a high degree of safety. ***The implementation of Safety Programme by DGCA and safety management systems by all stake holders needs to be ensured***.

Strengthening Safety regulatory framework and infrastructure

8.3.2 A comprehensive audit of DGCA was carried out by ICAO in 2006 as part of ICAO's universal safety oversight programme. There were 70 observations made highlighting the need for strong DGCA organization capable of discharging its functions. The critical areas analyzed including technical manpower, training of personnel, legislation, oversight capability and resolution of safety issues etc.

8.3.3 Areas found to be deficient included adequate technical guidance for DGCA inspectors, hiring and retaining technical personnel in DGCA, establishment of an on-going surveillance programme of air operators and resolution of identified safety issues. In the last few years DGCA has taken adequate action and most of the findings and audit observations have been resolved. However, in the light of recent increase in aviation activity and the anticipated growth, DGCAs infrastructure will need to be upgraded and the organization modernized to meet the challenges of growth. The infrastructure development includes proper working environment. Ever since the

bifurcation of DGCA and creation of Airports Authority, the residual DGCA has remained stagnant in terms of manpower, equipment, office accommodation and new developmental projects. Construction of adequate office accommodation will provide good working environment. Many DGCA offices have been working from congested and ill maintained buildings. Construction of modern offices for Head quarters and regional offices will improve the efficiency and image.

8.3.4 The ***Schemes proposed under the 12th Plan are aimed at DGCAs capacity building***. Though ***availability of qualified human resources and their training continues to be a challenging task,*** DGCA has endeavored to establish and institutionalize systemic reforms. Establishment of a training academy is a step towards ensuring that all officers receive proper induction training, recurrent training and training on special subjects to improve their skills. Dedicated staff for the training academy has already been sanctioned. As a joint venture with AAI, the training academy will ensure world class capability to enhance the skills of inspectors in various fields.

8.3.5 An ambitious scheme has been proposed to introduce IT systems in DGCA. Though airlines have introduced modern computer based maintenance and operational techniques, DGCA is yet to introduce similar working procedures. A comprehensive computerization plan has therefore been proposed in the Plan. This will revolutionize the working and record keeping. A database of Pilots' qualifications, tests, medical records, engineers' qualifications, air traffic controllers and other licensed personnel is essentially needed to replace the paper records held so far. Also, there is an urgent need to computerize the examination process by introducing on-line and on-demand examination system which will utilize a computerized question data bank, and eliminate any likely chances of unfair means in the examination process.

8.3.6 The Plan includes schemes to procure equipment for medical tests for defence medical establishments, which is an on-going scheme. The Plan provides for modernizing its accident investigation capability, by providing necessary tools. An Accident Investigation division independent of DGCA has already been established in the Ministry of Civil Aviation.

8.3.7 Adequate provision has been made in the Plan to institute studies with the help of ICAO and other international safety agencies. This scheme will help introduce modern international concepts in managing the safety issues, regulatory reforms needed, and augmenting work in specialized areas such as general aviation, helicopter operations, seaplane operations, maintenance and repair organizations, future navigation systems etc. In a dynamic organization

such studies will bring reforms in procedures on a continued basis. In addition, DGCA will continue to play an important part in the aviation scenario in South Asia due to its leadership and dominant role in ICAO managed cooperation project (COSCAP-SA). The programme is working since 1998 and will continue through the 12th Plan. DGCA's infrastructure will need to be upgraded and the organization modernized to meet the challenges of growth. The infrastructure development included proper working environment, comprehensive computerization plan including computerization of the examination process by introducing on-line and on-demand examination system. Immediate need is to have an independent Safety Regulator without any further delay and the capacity building of DGCA in terms of recruitment and training of all safety related technical personnel. DGCA needs to be restructured and strengthened with modernized processes and skills before it is subsumed into the Civil Aviation Authority (CAA) that is on the anvil. The CAA Bill is under examination in the Ministry.

8.3.8 It is therefore, necessary that the 12th Plan is presented with a foresight for all round development of the sector under a strong and efficient regulator.

8.4 Human Resource Development

Key trends and forecast

The impressive growth in Indian aviation has resulted in a similar growth in employment opportunities in the sector. However, the ***supply of available skilled manpower has not been able to match the requirement. With passengers and aircraft fleet likely to triple by 2025, the need to augment the skilled manpower supply is immediate***.

As per KPMG, total manpower requirement of airlines is estimated to rise from 62,000 in FY-2011 to 117,000 by FY-2017. This includes the number of pilots, cabin crew, aircrafts engineers and technicians (MRO), ground handling staff, cargo handling staff, administrative and sales staff. Benchmarks provided by ICAO for different classes of personnel (pilot, cabin crew, etc.) per aircraft were used to arrive at the above estimates.

Similar analysis was performed for projecting manpower requirements at the airports. Employee per million passenger ratio for large airports (Delhi, Mumbai, Chennai, Kolkata, Bengaluru and Hyderabad) was found to be around 65 whereas for remaining airports this ratio was around 200. Based on the projected passenger traffic and assuming the employee per million passenger ratio to become leaner for smaller airports as modernization and other efficiency improvement

initiatives are undertaken, the manpower requirement (including ANS) for the airports is estimated to increase from current 20,000 to 26,000-30,000 by FY 2017.

In addition, aviation industry is typically estimated to generate indirect and induced employment of nearly six times the direct employment. With direct employment across airports and airlines to be around 150,000 by FY-17, the aviation sector in India is expected to provide an indirect and induced employment to around 1 million people by FY-17.

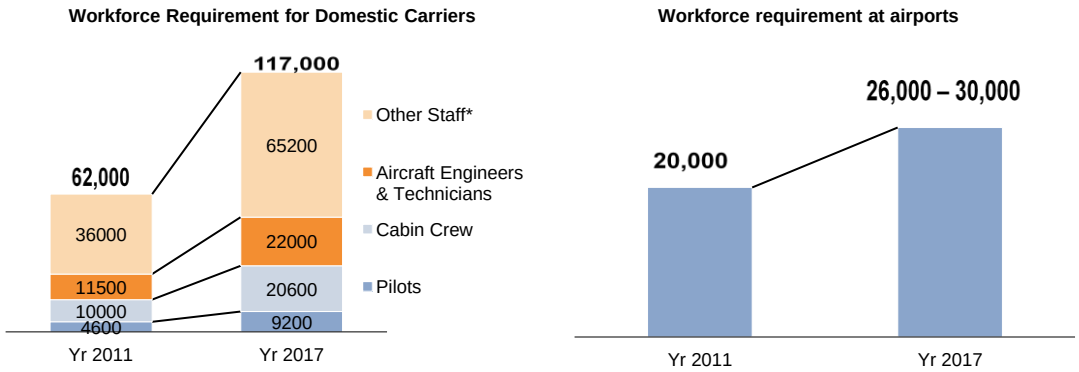


Figure 6: Manpower requirements estimates for Indian aviation sector

**Note: Other Staff includes ground handling staff, administrative staff and sales & marketing staff in airline industry*

Source: KPMG analysis, data from AAI/ airlines/airports, annual reports, manpower/aircraft ratio from ICAO

Key enablers

i. **Pilot training academies:** India currently has over 4,500 pilots, including 400 expatriates. With the doubling of fleet size expected by 2017, India will require a total of around 9,000 pilots by 2017. This implies an average addition of at least 800 pilots per year for the next five years, not accounting for attrition and replacements of expatriate pilots (about 400), required to be phased out by end of 2013.

   Currently 23 out of 40 institutes for pilot training are non-operational. The remaining 17 institutes offer training facilities for commercial pilots with an annual turnover of over 100 pilots. There is acute shortage of trained type rated pilots/commanders in India. In addition, many courses of some of the pilot training institutes are not recognized by DGCA, leading to high rejection rates. Exams are conducted every three months compared to weekly exams in developed countries.

   Shortage of pilots leads to an artificial increase in their salary levels which hurts the profit

margins of airlines, especially the LCCs. As witnessed recently, the shortage of commanders and co-pilots has resulted in unethical practices. While DGCA and the police authorities have taken prompt and strict actions, there is a further need to plug loopholes and restore faith in the examinations and licenses.

There is a need to increase the number of pilot training academies and the capacity of existing academies by way of capital subsidies. Foreign investment in pilot training academies needs to be encouraged. The success of CAE at Rae Bareli and Gondia should be replicated at other locations also.

Many developed countries allow trainee pilots to get a CPL within 12-15 months of training vis-à-vis two years in India. DGCA may consider evaluating how the training duration in India can be brought at par with global norms without compromising on safety standards. DGCA may also consider increasing the frequency of exams from 4 per annum to at least one per month.

The Indian Air Force (IAF) has one of the finest pilot training infrastructures in the country. There is a need to collaborate with them to explore ways in which their facilities and staff can be used for producing civilian pilots without affecting IAF's operational requirements.

ii. **ATC training academies:** The number of Air Traffic Control Officers (ATCO) has grown from 1,500 in 2008 to around 1,900 in 2011. ***There is still a shortage of around 350-400 ATCOs***. According to the International Labor Organization (ILO), the stress level of ATCOs ranks higher than that of a surgeon in an emergency operation. Given the unique nature of this service – zero tolerance for error and high levels of technical skills requirement ***– this shortage is a cause for severe concern.***

AAI runs ATC training facilities at the Civil Aviation Training College (CATC), Allahabad and at the Hyderabad Airport. It takes nearly three years for an ATCO trainee to be fully capable of handling independent operations. With the planned introduction of satellite based navigation (GAGAN), the role of ATCOs may become relatively easier but the number of ATCOs will still need to be augmented to keep pace with the increase in air traffic.

Training and capacity building of ATCOs should be an immediate priority. Partnership options with international ATC training institutes should be explored to enhance capacity of CATC. The enhanced capacity can also help CATC earn additional revenue in the long run

by training foreign ATCOs and providing consultancy services to global ATC service providers.

It is appropriate to consider the option of allowing private players to set up ATCO training facilities, subject to adequate supervision by AAI. This may be started in a PPP mode first and thereafter be made fully open to private sector in the long run.

iii. **Addressing the shortage of aircraft engineers, technicians and cabin crew:** There are 77 DGCA approved Aircraft Maintenance Engineer (AME) institutes producing around 5,000 engineers every year. AMEs and Technicians need to undergo a minimum one year experience on the heavy aircrafts and pass the DGCA examination to get type-rated license.

Cabin crew strength has increased from around 4,000 in FY 2002 to around 10,000 in FY 2009. The requirement would increase significantly as the fleet sizes of Indian and global carriers expand in the near future.

More number of institutes offering courses related to aerospace engineering and cabin crew need to be opened. Global collaborations for R&D, aircraft component manufacturing and assembly should be encouraged. Options of collaborating with the Indian Air Force to build capacity should be explored.

iv. **Building MRO Training institutes**: Although India enjoys a significant cost advantage, it has a ***shortage of qualified MRO personnel who can carry out complicated repairs on the latest aircrafts and components***. There is a strong case for establishing MRO training institutes to help develop capability of certified MRO engineers.

9.0 12th Five Year Plan proposals

9.01 Organization-wise 12th Plan projected outlays of the constituent units of Civil Aviation Sector are detailed below:-**(Rs. in crores)**

S.No.	Organisation	Budgetary Support 2012-17	IEBR 2012-17	Total proposed outlay 2012-17
1.	Ministry of Civil Aviation (Sectt.)	300.00	0.00	300.00
2.	Air India Ltd.	19911.00	13052.67	32963.67
3.	Airports Authority of India	5073.00	12427.00	17500.00
4.	Pawan Hans Helicopters Ltd.	1010.00	725.00	1735.00
5.	Hotel Corporation of India Ltd.	75.00	0.00	75.00
6.	Air India Charters' Limited	0.00	25.00	25.00
7.	Indira Gandhi Rashtriya Uran Akademi	95.00	0.00	95.00
8.(a)	Directorate General of Civil Aviation	671.00	0.00	671.00
(b)	Aero Club of India	233.94	0.00	233.94
9.	Bureau of Civil Aviation Security	1145.00	0.00	1145.00
	Total	**28513.94**	**26229.67**	**54743.61**

Table 11

9.02 To meet the projected traffic growth during the 12th Five Year Plan, both aircraft and airport capacities will be increased, airports to be modernized and upgraded to increase passenger facilities and speed up cargo clearance, strengthen security and safety measures for safe and reliable air services, improve air connectivity to NE Region, other remote areas and tourist destinations, create the right infrastructure for the rapid growth of helicopter operations, introduce seaplane operations, generate employment and to provide better infrastructure for training to make available qualified human resources. The objective is to achieve "Faster, more inclusive and sustainable growth" during the 12th Five Year Plan.

Outlays For The 12th Five Year Plan (Organisation-Wise)

9.3 Ministry Of Civil Aviation(Sectt.) 12th Plan

(Rs. in crores)

Sl. No.	Name of Scheme	12-13	13-14	14-15	15-16	16-17	Total
1	Enhancing competitiveness of Indian carriers in international operations & aviation studies	4.0	5.5	3.5	3.5	3.5	20.0
2	Application of IT tools and capacity building in the aviation sector	3.0	4.0	4.0	4.0	4.0	19.0
3	Publicity and consumer awareness	2.5	3.0	3.0	3.5	3.5	15.50
4	Conference & Seminars related to Aviation Sector	3.0	4.0	5.5	7.5	10.5	30.50
5	Development of Aero-space Industry	1.0	1.0	1.0	1.0	1.0	5.0
6	Innovations in Governance	1.0	1.0	1.0	1.0	1.0	5.0
7	National Aviation University	10.0	30.0	20.0	20.0	20.0	100.0
8	Essential Air Services to Remote and Inaccessible Areas	20.0	20.0	20.0	20.0	20.0	100.0
9	Establishment of Civil Aviation Museum	1.0	1.0	1.0	1.0	1.0	5.0
	Grand Total	45.5	69.5	59.0	61.5	64.5	300.0

Table 12

Rationale for enhancement:

i) *Enhancing competitiveness of Indian carriers in international operations & aviation studies:* The total outlay under this Head is Rs.3.10 crores for the current financial year (FY), 2011-12. This scheme is aimed at providing optimal utilization of capacity for the designated airlines of India given the constraints of Airlines and Airports. Keeping in view the fast emerging status of Indian Civil Aviation in the global arena, an average raise of 35% over the five year plan is planned. The objectives of the

scheme are likely to be attained by March, 2014 and thereafter a maintenance fund would be required. Therefore, from 2015 onwards, the fund requirement has been pegged at 3.5 crores.

ii) *Application of IT tools and capacity building in the Ministry:* The total outlay under this Head is Rs.2.4 crores for the current FY, 2011-12. The aim of this scheme is to enhance effective management and control in the field of Civil Aviation. It provides improved expertise and skill of management level officers. As IT is integral to Civil Aviation, an average raise of 35% over the five year plan is planned. The objectives of the scheme, also, are likely to be attained by March, 2014. As IT sector requires continuous upgradation thereafter, a maintenance fund for the regular upgradation of the IT skills, training, capacity building and related hardware and software would be required. Therefore, from 2015 onwards, the fund requirement has been limited to 4 crores. Today, issues faced by Civil Aviation Sector are not only complex but also require expertise cross cutting a number of disciplines. It is therefore considered necessary to have expertise on disciplines such as Environment, Legal, Security, Core Technical, Regulatory, Economic and on International best practices in the Secretariat of Ministry of Civil Aviation through appropriate methods of procuring such Professional Services.

iii) *Publicity and consumer awareness:* The total outlay under this Head is Rs.2 crores for the current FY, 2011-12. The aim of this scheme is to empower the consumers by keeping them informed about Aviation Sector and address their concerns. As it is important to make consumers aware, an average raise of 30% over the five year plan is suggested as publicity and consumer awareness are ongoing processes. A maintenance fund for promoting proper consumer awareness would be required.

iv) *Conference & Seminars related to Aviation Sector:* The total outlay under this Head is Rs.2 crores for the current FY, 2011-12. The scheme is aimed at developing Civil Aviation Sector in India. Frequent seminars and conferences are required to be arranged for spreading & development of best practices in the industry and keeping abreast of globally as well as domestically. An average raise of 38% over the five year plan is suggested.

9.4 Air India Limited

9.4.1 The outlay for the 12th Five Year Plan has been projected as Rs.32,963.67crores. This includes Rs.11,187.67crores for Aircraft Projects, Rs.1,865.00 crores for Non-Aircraft Projects and the balance amount of Rs.19,911.00 crores as budgetary support from the government in the form of equity infusion. The summary of the 12th Plan projected outlay and number of aircraft likely to be received is as under:-

Year	Financial Outlay (Rs. in crores)	No. of aircraft to be received
2012-13	7464.10	5
2013-14	5771.81	2
2014-15	7507.68	5
2015-16	6056.01	2
2016-17	6164.07	3
Total	**32963.67**	**17**

Year –wise details of the proposed outlay are at Annexure-XII

Table 13

9.5 Airports Authority Of India

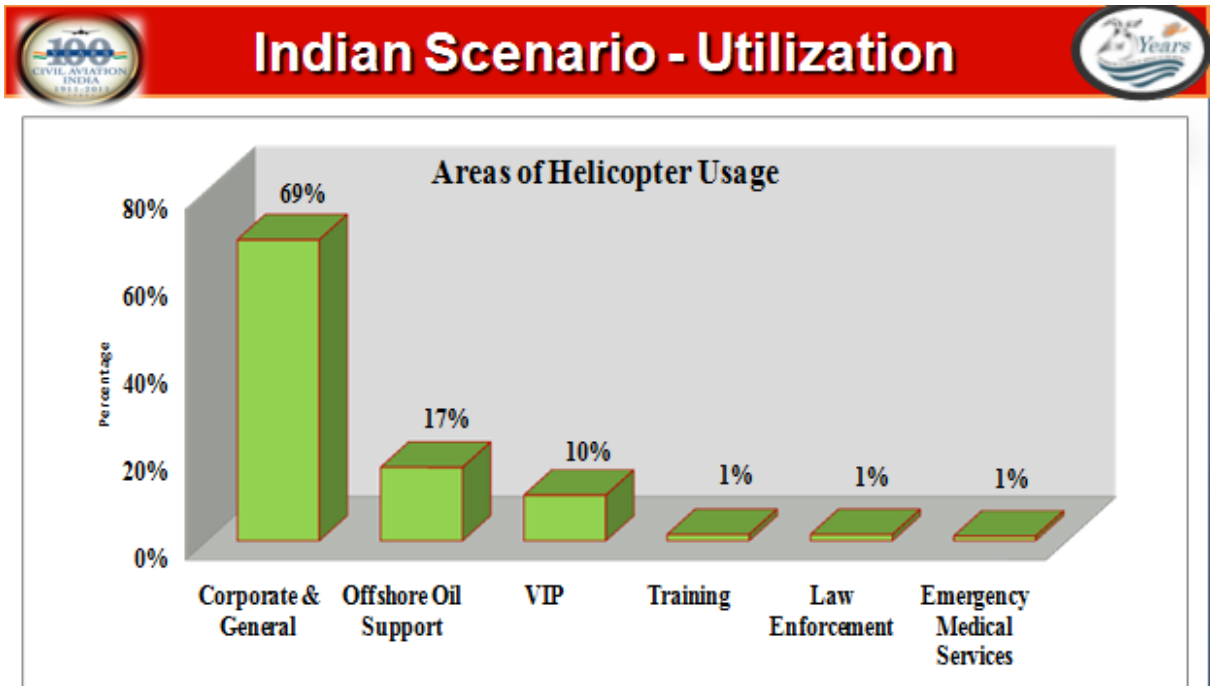
9.5.1 The 12th Plan projected outlay of Airports Authority of India (AAI) is Rs.17,500.00 crores including budgetary support of Rs.5073.00 crores. For non-metro airports, AAI has earmarked Rs.7032.00 crores for aerodrome works, Rs.3700.00 crores for air navigation services(infrastructure & air safety), Rs.700.00 crores for GAGAN project,Rs.3000.00 crores for security, Rs.100.00 crores for IT and Rs.378.00 crores for ground safety services (including aviation safety equipment). In addition, Rs.1043.00 crores has been provided for Kolkata airport, Rs. 1091.00crores for Chennai airport, Rs.97.00 crores for misc. schemes and Rs.359.00 crores for equity contribution to JV companies namely DIAL, MIAL, BIAL and HIAL as well as in NFTI, Gondia. Year-wise details of the proposed outlay are at **Annexure-XII.**

9.6 Pawan Hans Helicopters Limited

9.6.1 While there are around 35,000 Helicopters in operation worldwide, in India the share is even less than a meager 1% at just over 300 helicopters, despite being the second most populous nation in the world witnessing a sharp economic growth. While in the last two decades, with the opening of the Indian economy, there has been considerable improvement in

the size of the aviation industry and a significant growth in number of customers who are availing such services. At the same time, Indians have the lowest propensity to travel by air amongst the BRIC countries, making less than 0.1 trips per capita in 2009, on a par with Belarus and Senegal, according to Airbus data. Although the airline industry is expanding at a rapid rate in India at present with aircrafts over $40 Billion in the order pipeline, connectivity remains inadequate through much of India, and airport infrastructure is virtually non-existent in many smaller cities.

There is an urgent and realistic requirement and possibility of increasing the size of the helicopter industry by addressing the persistent and latent requirements such as that of Non passenger services including Medivac, Disaster Management, Law Enforcement etc. which is seriously lagging behind conventional uses at present.



The Strategic Plan of the Ministry of Civil Aviation covers the roadmap for the Aviation Industry over a Five year period. Keeping the Helicopter Industry in view and its growth potential proposals for development of this industry may be thought of on the following lines in future: wherein:

i. The number of civil helicopters may increase from the present 300 to over 500.

ii. Enhanced connectivity of the North East India through helicopters.

iii. Seaplanes operations to be encouraged for tourism in conjunction with Helicopter services, from being almost non-existent today except for lone operations pioneered by PHHL in Andaman and Nicobar Islands.

iv. Meeting the strategic requirements such as that of Law & Order Agencies.

v. Development/Extension of City ports/Heliports in at least 3 new Metro locations (apart from Rohini, New Delhi) in India and therefore giving a fillip to helicopter usage for passenger/VIP travel, Tourism and other requirements such as Medevac, Disaster Management etc. with deployment of additional 20 helicopters.

vi. Connect and cover all of India with air (helicopter) connectivity to all the 600 plus districts in India by deploying upto 178 helicopters, equivalent to at least 30% of the total number of districts ensuring total seamless coverage for Law enforcement, Disaster Management, Emergency and primary medical care, medivac etc.

vii. Development of Hadapsar-Pune as a full fledged Heliport, Centre of excellence for MRO, Training of Pilots and Technical Manpower, Simulators, training aids, Flight Following System/Technology updates, R&D Hub and as a world class Aero-sports club offering model building/flying, motorized gliding, paragliding, parasailing, hot air ballooning activities to professionals as well as enthusiasts.

viii. Development of NIASS & PHTI .

ix. Creation of other infrastructure.

In conclusion, the total Plan Outlay projected for acquisition of helicopters/aircraft and other projects during the XII Five Year plan period and its funding through GBS aggregates to Rs 1010 crores. However, the PHHL shall approach other Central Government Departments/agencies for provision of an appropriate amount in their budget to meet the above-mentioned targets on law & order, disaster management, primary and emergency medical care and medivac etc. Year-wise details of the proposed outlay are at **Annexure-XIV.**

9.7 Hotel Corporation Of India Limited

9.7.1 Hotel Corporation of India has projected an outlay of Rs.75.00 crores during 12th Plan period , which will be met out of budgetary support to be provided by the Govt. Year-wise details of the proposed outlay are at **Annexure-XV.**

9.8 Air India Charters Limited

9.8.1 The projected 12th Plan outlay of Air India Charters Limited is Rs.25.00 crores. This amount has been earmarked for other capital expenditure such as equipment for workshop/engineering facilities, corporate computerization, furniture & fixtures and other general equipment. The entire expenditure will be borne out of the internal & extra budgetary resources of the company. Year-wise details of the proposed outlay are at **Annexure-XVI.**

9.9 Directorate General Of Civil Aviation

9.9.1 The endeavor of Directorate General of Civil Aviation (DGCA) during 12th Plan period will be to promote safe and efficient Air Transportation through regulation and proactive safety oversight system. Schemes proposed under the 12th Plan are aimed at DGCA's capacity building. The 12th Plan projected outlay of DGCA is Rs.671.00 crores out of which Rs.191.00 crores has been apportioned for machinery & equipment, Rs.200.00 crores for construction of DGCA Hqrs.,

Rs.150.00 crores for construction of office buildings and residential quarters at regional offices of DGCA and Rs.50.00 crores for establishment of training academy of DGCA. Also, Rs.80.00 crores has been made for upgradation of skills of officers and staff of DGCA through domestic & foreign training, modernization of DGCA, advertising & publicity, development projects & consultancies/studies, annual contribution to Safety Oversight Programme of ICAO (COSCAP), aviation training project involving international agency/foreign countries, seminars & conferences related to Civil Aviation, foreign travel of DGCA officials for inspection & allied matters etc. The entire outlay is to be funded by the government in the form of budgetary support.

Machinery and Equipment

(a) Procurement of equipments for Aircraft Engineering Directorate

Proposed outlay: Rs.2.50 crores

It is proposed to make a provision of Rs.2.50 crores during 12th Five Year Plan for procurement of Machinery & Equipments for Laboratories of Failure Analysis, CVR & DFDR Analysis, Material Testing, Fuel Testing, Structural Testing, Non-Destructive Testing, Instrument Testing, Noise & Vibration and Fatigue Testing including upgradation of accessories & spares for AED Directorate. The objective of the scheme is to enhance DGCA's capability and expertise to perform various forms of testing, flight data recorder analyses etc. required to investigate aviation accidents, component failures, fuel quality samples, various type of material properties for use in aviation as a means of indigenization, undertake noise and environment studies etc. DGCA has established laboratories for testing of materials, fuels, metallographic examination of failed components etc. The laboratories have been functional in the Aeronautical Engg. Dte. for decades and have proved very useful in assisting failure investigation in the case of accidents and incidents. The scheme envisages upgrading the testing laboratories of aeronautical products.

(b) Equipment for Aircraft Accident Investigation and Monitoring of Flight Recorder Data for Preventing Accidents

Proposed outlay:Rs.2.00 crores

The top most priority of DGCA is to promote safe air transportation by ensuring sustainability and enhancement of the current safety level in scheduled operations and bringing down the accident/incident rate in helicopters and general aviation. It

is, therefore, proposed to provide adequate number of Accident Investigation kits to Air Safety Officers/Investigators and the requisite equipments to Aerodrome Inspectors for carrying out their functions efficiently. It is proposed to make a provision of Rs.2.00 crores during 12th Five Year Plan for procurement of Aircraft Accident Investigation and routine monitoring of aircraft data analysis for incident/accident prevention for Air Safety Directorate.

(c) Procurement for Medical Equipment

Proposed outlay: Rs.2.50 crores

At present, speed is lacking in respect of medical examinations of large number of pilots being conducted. Therefore, a scheme for provision of necessary modern equipments to Air Force Hospitals designated by DGCA has been planned to induce automation and bring about speed and efficiency. It is proposed to make a provision of Rs.2.50 crores during 12th Five Year Plan for procurement of Medical Equipments for the Approval Air Force Medical Centers for medical check-up of Pilots.

(d) Equipment for Modernization of Examination System

Proposed outlay: Rs.10.00 crores

A proposal for conducting Pilot/AME licensing Examination through online/on-demand examination has been finalised. The objective of the scheme is to modernize the examination system to ensure that the pilots and engineers accomplish the required knowledge base before they start flying. It is the aim of the scheme to move to a paperless examination system. It is proposed to make a provision of Rs.10.00 crores during 12th Five Year Plan for development of On-Demand Examination system at DGCA & its Regional Offices for CEO.

(e) Information Technology(IT)

Proposed outlay: Rs.174.00 crores

A scheme for productivity enhancement, cost effectivity with the introduction of IT led applications and governance in the areas has been proposed. This would allow DGCA to free up productive time and resources and refocus on core tasks. It is proposed to make a provision of Rs.174.00 crores during 12th Five Year Plan under

Information Technology for DGCA project and for procurement of Equipment & Software for the DGCA Hqrs. & its Regional/Sub-Regional Offices.

Major Works

(a) Construction of DGCA Hqrs.

Proposed outlay: Rs.200.00 crores

It is proposed to construct a new efficient, energy & environment friendly building called "DGCA Bhavan" for DGCA so that all the wings to DGCA will be at one place, which will improve the working efficiency of the officers and also facilitate the common people to get their work done at one place. It is proposed to make a provision of Rs.200.00 crores during 12th Five Year Plan towards construction of DGCA Bhavan.

(b) Construction of Office Buildings and Residential Quarters at Regional Offices of DGCA

Proposed outlay: Rs.150.00 crores

DGCA has four regional offices and 16 sub-regional offices. It is proposed to construct office buildings at various regional/sub-regional offices to provide proper office accommodation for effective regulatory office. It is proposed to make a provision of Rs.150.00 crores during 12th Five Year Plan for construction of office buildings and residential quarters at regional/sub-regional offices of DGCA.

(c) Establishment of Training Academy

Proposed outlay: Rs.50.00 crores

To establish DGCA training academy to provide training to DGCA officers and to aviation industry on matters related to safety oversight and operational procedure etc. DGCA training academy may be a part of Indian Aviation Institute which has been established as a co-operative society. The main constituents of Indian Aviation Academy are Airports Authority of India, DGCA and Bureau of Civil Aviation Security. A combined building of the Academy has been proposed on a cost sharing basis. It is proposed to make a provision of Rs.50.00 crores during 12th Five Year Plan for establishment of Training Academy for DGCA.

Revenue

(a) Upgradation of skills of DGCA officers through foreign training

Proposed outlay: Rs.12.50 crores

It was observed during an ICAO audit that DGCA officers are required to be given more exhaustive training so that they can carry out their duties in more effective

manner. These training programmes will improve the skill of the DGCA officers and based on the foreign trainings, DGCA will be able to develop more trainers, who will further impart trainings to the other officers. It is proposed to make a provision of Rs.12.50 crores during 12th Five Year Plan for upgradation of skills of officers of DGCA through foreign training.

(b) Upgradation of skills of DGCA officers through domestic training

Proposed outlay: Rs.15.00 crores

It is proposed to make a provision of Rs.15.00 crores during 12th Five Year Plan for upgradation of skills of officers of DGCA through foreign training

(c) Modernization of DGCA

Proposed outlay:Rs.10.00 crores

Modernization of DGCA is essential to improve the efficiency in discharge of DGCA officers has been identified. It is proposed to make a provision of Rs.10.00 crores during 12th Five Year Plan for modernization of DGCA.

(d) Advertising and Publicity

Proposed outlay: Rs.10.00 crores

A Publicity Scheme has been introduced to spread awareness about aviation safety, regulations, passenger rights & redressal and publicity of strategic objective of DGCA. It is proposed to make a provision of Rs.10.00 crores during 12th Five Year Plan for Advertising & Publicity.

(e) Development Projects and Consultancies/Studies

Proposed outlay: Rs.10.00 crores

This scheme is intended to commission studies for conducting development projects in specific areas related to aviation namely review of regulatory framework, review of organizational structure, procedural and safety regulations in specified areas of aircraft operations. It is proposed to make a provision of Rs.10.00 crores for this scheme during 12th Five Year Plan.

(f) Annual Contribution to Safety Oversight Programme of ICAO

Proposed outlay: Rs.2.50 crores

Contribution to COSCAP Programme (Co-operative Development of Operational Safety and Continuing Airworthiness- South Asia) under the aegis of ICAO, is a joint programme

of seven SAARC countries, namely India, Pakistan, Nepal, Bhutan, Bangladesh, Sri Lanka and Maldives. The programme is aimed at assisting the participant States in developing their air regulations and standards and to improve their independent oversight capabilities. The seven participating States contribute finances to the programme in accordance with the services rendered to the individual State and as determined by ICAO, Headquarters. To meet the above international obligation, it is proposed to make a provision of Rs.2.50 crores during 12th Five Year Plan for payment of Annual Contribution to Safety Oversight Programme of ICAO.

(g) Aviation Training Projects Involving External International Agency/Foreign Countries

Proposed outlay: Rs.10.00 crores

DGCA has to forge appropriate bilateral, regional and multi-lateral co-operation to enhance the safety oversight capabilities and technical competency in the identified areas. Some of these initiatives are promoted through Bilateral Aviation Safety Agreement (BASA), USA-India Aviation Co-operation Project(ACP), EU-India Civil Aviation Co-operation, etc. In this regard it is proposed to make a provision of Rs.10.00 crores during 12th Five Year Plan for the Aviation Training Project involving External International Agency/Foreign Countries.

(g) **Seminars and Conferences Related to Civil Aviation**

Proposed outlay: Rs.5.00 crores

DGCA's (Asia Pacific) conference is scheduled to be held in India during October, 2012. In this regard it is proposed to make a provision of Rs.5.00 crores during 2012-13 of 12th Five Year Plan.

(h) **Foreign travel of DGCA officials for Inspection & Allied Activities**

Proposed outlay: Rs.5.00 crores

A provision of Rs.5.00 crores has been made for foreign travel of DGCA officials for inspection and allied activities.

Year-wise details of the proposed outlay of DGCA are at **Annexure-XVII.**

9.10 Bureau Of Civil Aviation Security

9.10.1 The Bureau of Civil Aviation Security is headed by the Commissioner of Security (COSCA) who is the ex-officio "Appropriate Authority" of India, discharging national and international

obligations by developing and implementing the national Civil Aviation Security Programme under obligations incorporated in Annex. 17 of the Chicago Convention. The Bureau, as such has the dual responsibilities of ensuring aviation security of the country by laying down security standards, procedures, equipment and attributes of personnel as well discharging international obligations by implementing security imperatives under International Conventions.

9.10.2 Right from its inception in 1978 as a separate entity segregated from the Director General Civil Aviation, the Bureau has not been able to keep up with the increase in quantum of activities and responsibilities for want of adequate facilities and manpower. At present, the officers of the Bureau are discharging multiple responsibilities in several areas of responsibility – for ensuring maintenance of security standards. All these areas of activities need dedicated proficient manpower to achieve the expected standards and quality outcomes. The Bureau is handicapped for want of dedicated training facilities and faculty, adequate staff support, adequate representation in the Regions etc.

9.10.3 The Bureau of Civil Aviation Security is working out its future plans of strengthening organizationally and technologically vis-à-vis the current security scenario. Amongst the prominent measures proposed to be undertaken are electronic perimeter surveillance and protection, automated smart card access control at air ports, organizational restructuring including adequate representation in the regions to ensure appropriate level of deployment of personnel and related infrastructure requirements.

9.10.4 The 12th Plan projections have been worked out, keeping in view the realistic requirements at the Bureau of Civil Aviation Security Hqrs. and the regional offices.

9.10.5 The major schemes which have been prioritized as per their importance and are proposed to be undertaken in next five years, is given in the succeeding paras. The requirements have been worked out with the following guiding principles:-

a) Development of an appropriate legal framework for effective implementation of its commitments under Annex 17 of Chicago convention.
b) Review of the National Security Programme to respond constantly to emerging security requirements.

c) Deployment of advanced imaging technologies for reduction of threat arising out of unlawful interferences in a phased manner fully taking into consideration social and cultural sensitivities.

d) Establishing a highly trained dedicated and specialized aviation security force for better security of airports and other aviation properties / installations.

e) Achieving 100% screening of outbound cargo to eliminate threats arising from sophisticated IEDs.

f) Installation of technologies at airports and cargo terminals for detection of radiological substances.

g) Assuming leadership in Asia Pacific Region in issues of security.

h) Adoption of global best practices for significant reduction and elimination of threats arising out of unlawful interferences.

i) Restructuring of the existing regulatory framework of BCAS.

j) Establishment of an Aviation Security Advisory Council in the Ministry with experts and user group on issues of security.

k) Implementation of e-governance scheme and development of bilingual interactive website in order to provide maximum information to users and in order to create a transparent work culture.

l) Implementation of Automated Airport Entry Pass Issue System to reduce discretion and introduce transparency in the system.

9.10.6 While reformulating 12th Plan projections following basic parameters have been followed:

(i) Optimization of the existing resources and prioritizing the needs on the basis of essentiality factor,

(ii) Adopt the most cost effective approach and amalgamate needs with available resources to minimize fund requirements for new schemes,

(iii) Reorganizing and Restructuring the Bureau of Civil Aviation Security for competent handling of enhanced responsibilities, in view of the exponential growth of the aviation sector.

9.10.7 The salient features of the 12th Five Year Plan projections of the Bureau of Civil Aviation Security are as given below scheme wise (12th Plan 2012-2017):

(i) **Construction of Office Building and residential building for Regional Offices**:

Proposed Outlay Rs. 215.00 Crores:

Bureau of Civil Aviation Security (BCAS) has four regional offices one each at Delhi, Mumbai, Calcutta and Chennai. The Mumbai office does not have its own office accommodation. It was accordingly proposed to construct office and residential accommodation at the airport. Due to privatization of Mumbai Airport, a suitable location could not be identified. AAI have been directed to submit plan for location of Bureau of Civil Aviation Security (BCAS) office at Sahar/Juhu Airport Mumbai. AAI have projected an estimated cost of Rs. 12.23 crores for the project. The proposal for setting up of new regional offices at Amritsar, Hyderabad, Guwahati and Ahmedabad has been approved. It is proposed to construct office and residential buildings for these new regional offices. The cost of these new office buildings is to be met by BCAS. Apart from above requirement, ICAO has recently studied the BCAS and recommended for BCAS regional offices in all the operational airports all over the Country. For creation of all the infrastructure facilities including manpower, BCAS proposes to spend Rs. 100.00 crore on this project. Hence total requirement on the scheme is Rs. 215.00 crores.

(ii) **Purchase of equipments/Access control system / setting up integrated control Rooms, Communication system and Vehicles at 80 Regional Control Rooms for RDCOS and Headquarters for operational purpose.**

Proposed Outlay Rs. 316.00 crores:

Bureau has eight regional offices at Delhi, Mumbai, Calcutta, Chennai, Amritsar, Hyderabad, Guwahati and Ahmedabad which are to be equipped with security related equipment. Apart from above requirement, ICAO has recently studied the BCAS and recommended for BCAS regional offices in all the operational airports all over the Country. It is proposed to adopt continuing modernization & upgradation of various operational, communication & office equipment as also the training equipment every year, so as to keep pace with the enhanced responsibilities & demands on BCAS vis-à-vis the changing AVSEC Scenario. Setting up of control Rooms, Communication system and Vehicles at 80 Regional Control Rooms will be required for operational purpose.

There is an urgent need for enhanced secured access control at airports- especially at international and sensitive and hypersensitive airports. A new system of access control through Smart Card has been introduced. Hence it is proposed to allocate Rs. 316.00 crores under this scheme during the 12th Plan.

(iii) **Grant- in- aid for setting up of civil aviation security training academy (Indian aviation academy)**

Proposed Outlay Rs. 170.00 crores:

MCA have decided to establish a joint training academy of Bureau of Civil Aviation Security (BCAS), DGCA and AAI at NIAMAR under the aegis of Indian Aviation Academy. An MOU has been signed between AAI, DGCA, BCAS and NIAMAR. The Proportional cost of this to be shared by BCAS. The sharing cost of BCAS has been estimated Rs. 53.40 crores by AAI. It is proposed to allocate Rs. 60.00 crores for this scheme. Apart from above, up gradation of 4 Training Centres at Metro RDCOS and setting up of Civil Aviation Training Institute at new Regional Offices are to be commenced. Hence Rs. 110.00 crores proposed for this scheme.

(iv) **Information technology:**

Proposed Outlay Rs. 89.00 crores:

The large volume of requests being received by Bureau of Civil Aviation Security(BCAS) are being processed manually and the paucity of manpower, sometimes leads to delays in processing applications for issuance of airport entry passes. This leads to dissatisfaction among the applicants and stakeholders. Due to lack of enabling environment including process, systems and infrastructure, there is not adequate transparency in issuance of passes and applicants are not clear about the status of their applications and the time frame within which it is expected to be processed and delivered. Monitoring by senior officials is also not possible. To improve efficiency and bring about transparency, an automated system of issuing Airport Entry Passes has been introduced. Integrated Biometrics Automated AEPS System, Wide area network, Performance Audit, Quality Control Programme, Information Technology upgradation of BCAS etc. are to be carried out. Development of bilingual interactive web based portal in order to provide maximum interface with the users in order to create a transparent work culture has also been proposed. Hence it is proposed to allocate Rs. 89.00 crores under this scheme.

(v**) Re-structuring of BCAS**

Proposed Outlay Rs. 65.00 crores:

ICAO has recently studied the BCAS and recommended for BCAS headquarter building and manpower in all the operational airports all over the Country. Keeping in view of these recommendations, following outlays have been included in the re-structuring scheme:

(a) Construction of Regional Office Building:

Proposed Outlay: Rs. 50.00 crores:
Restructuring proposal has been approved in 2009. Action to fill up the post is in progress. Four new regional offices at Amritsar, Hyderabad, Guwahati and Ahmedabad are to be set up. Proposal for construction of the Hq. building at the Cost of Rs. 27.72 Crores was approved. But the construction could not start due to pending approval of NDMC. The proposal is under consideration in MCA. Rs. 50.00 crores is proposed for this project in the scheme in the 12th Five year plan.

(b) Expenditure on Salary and Allowances, Domestic Travel Expenses, Office Expenses, Foreign Travel Expenses, Professional Services, Other Administrative Expenses, Rent Rates & Taxes for newly created regional offices:

Proposed Outlay: Rs. 15.00 Crores:
Expenditure on Salary and Allowances, Domestic Travel Expenses, Office Expenses, Foreign Travel Expenses, Professional Services, Other Administrative Expenses, Rent Rates & Taxes for newly created regional offices is to be met from the Plan Budget until the allocation under Non-Plan Budget is made. Hence, Rs. 15.00 crores has been allocated for this purpose in the scheme in the 12th five year plan.

(vi) **Conferences, summits, training and capacity building :**

Proposed Outlay : Rs. 10.00 crores:
This scheme has been introduced for conducting various types of national and international trainings, workshops, seminars etc. for keeping this Bureau up-to-date with international standards of security. Hence Rs. 10.00 crores has been earmarked for this scheme.

(vii) **Research and Development**

Proposed Outlay Rs. 20.00 crores:
Research and Development of Civil Aviation Security will be done.

(viii) **International Co-operation**

Proposed Outlay Rs. 1.00 crore:
India has been member of ICAO's CASP-AP Programme since 2007-2008. For this programme, every year, India has to pay its contribution amounting to US$ 35,000. It is proposed to keep Rs. 20.00 Lakh per annum for this purpose in the 12th Five year Plan.

(ix) **Implementaion of advance imaging technology:**

Proposed Outlay Rs. 1.00 crore:

MCA have decided to deploy advanced imaging technologies for reduction of threats arising out of unlawful interferences in a phased manner fully taking into consideration social and cultural sensitivities. New Access Control System and advance imaging technology at Airports is to be implemented. Hence a token provision of Rs. 1.00 crore has been made for this project.

(x) **Installation of radiological detection equipment**:

Proposed Outlay Rs. 100.00 crores:

MCA have decided to achieve 100% screening of outbound cargo to eliminate threats arising from sophisticated IEDs. For this purpose new technologies for detection of radiological substances would be installed at airports and cargo terminals. Rs. 100.00 crores would be required for this purpose.

(xi) **Implementaion of NISG projects**

Proposed Outlay Rs. 158.00 crores:

National Institute of Smart Government (NISG) has submitted proposal to develop and implement the complete revamp of BCAS on the information technology field to make all the airports much more secure in the country. Hence Rs. 158.00 crores have been earmarked for this scheme.

The entire expenditure will be met out of the budgetary support to be provided by the government.

List Of Projects To Be Taken Up During 12th Plan Period With Gross Budgetry Support By BCAS

(Rs. in crores)

Sl. No.	Name of Scheme	12-13	13-14	14-15	15-16	16-17	Total
1	Construction of office accommodation at regional offices	40.0	45.0	70.0	30.0	30.0	215.0
2	Purchase of equipment/ PIC System/ Setting up Control Rooms, Communication system and Vehicles at 8 Regional Control Rooms and operational purpose	60.0	60.0	80.0	70.0	46.0	316.0
3	Setting up of Civil Aviation Security Training Academy	70.0	40.0	20.0	20.0	20.0	170.0
4	Information Technology	18.0	18.0	18.0	18.0	17.0	89.0
5	Restructuring of BCAS & construction of BCAS(HQ) building.	20.0	15.0	10.0	10.0	10.0	65.0
6	Conferences summits, training and Capacity Building	2.0	2.0	2.0	2.0	2.0	10.0
7	Research and Development	4.0	4.0	4.0	4.0	4.0	20.0
8	International Co-operation	0.2	0.2	0.2	0.2	0.2	1.0
9	Implementation of Advance Imaging technology	0.2	0.2	0.2	0.2	0.2	1.0
10	Installation of Radiological Detection Equipment	70.0	10.0	10.0	5.0	5.0	100.0
11	Implementation of NISG projects	15.0	30.0	30.0	30.0	53.0	158.0
	TOTAL	299.4	224.4	244.4	189.4	187.4	1145.0

Table 14

9.11 Indira Gandhi Rashtirya Uran Akademi

9.11.1 Indira Gandhi RashtriyaUranAkademi (IGRUA) has projected an outlay of Rs.95.00 crores for 12th Plan period for purchase of additional 14 aircraft, setting up of MRO hub at IGRUA, Setting up of AME school at IGRUA, extension of tarmac at Sultanpur for parking IGRUA aircraft.

The entire outlay is to be funded by the government in the form of grants-in-aid. Year-wise details of the proposed outlay are at **Annexure-XVIII.**

9.12 Aero Club Of India

9.12.1 The 12th Plan projected outlay of Aero Club of India is Rs.233.94 crores out of which Rs.130.10 crores has been earmarked for flying training, Rs.80.65 crores for development of aerosports, Rs.2.11 crores for IT and Rs.21.08 crores for project management. The entire outlay would have to be met out of grants from the government. Year-wise details of the proposed outlay are at **Annexure-XIX.**

10.0 Assessment Of Internal Resources During 12th Plan Period

10.1 The plan proposals of Ministry of Civil Aviation include proposals of PSUs namely, Air India Ltd. and its subsidiaries Hotel Corporation of India Ltd. & Air India Charters Ltd., Airports Authority of India and Pawan Hans Helicopters Ltd. While Air India Ltd. incurred total loss of Rs.20320.86 crores during the first four years of 11th Five Year Plan, the losses of Hotel Corporation India Ltd. and Air India Charters Ltd. were Rs.63.6 crores and Rs.1009.52 crores respectively during the same period.

10.2 The cumulative profits of Airports Authority of India and Pawan Hans Helicopters Ltd. during the first four years of 11th Five Year Plan were Rs.3327.76 crores and Rs.93.28 crores respectively. The profit of Airports Authority of India during 2010-11 was Rs.846.39 crores as against the profit of Rs.1081.87 crores during 2007-08. The profit of Pawan Hans Helicopters Ltd. also decreased from Rs.23.17 crores in 2007-08 to Rs.9.40 crores in 2010-11.

10.3 Compared to 11th Plan period, the projected I&EBR generation during 12th Plan period is 48.82% less. Internal resources projected to be generated during 12th Plan period is 67.74% of the total projected I&EBR for 12th Plan period. During 11th Plan period, the projected internal resources was 33.78% of the total projected I&EBR for 11th Plan.

10.4 Total projected I&EBR during 12th Plan period is Rs.26494.03 crores. The internal resources and extra-budgetary resources projected to be generated during 12th Plan period are 67.74% and 32.26% respectively of the total projected I&EBR for the five year plan period. The 12th Plan projected outlay of Air India Ltd. is Rs.32963.67 crores including budgetary support of Rs.19911.00 crores. Thus, Air India will be utilizing IE&BR of Rs.13052.67 crores out of Rs.13152.67 crores projected to be generated by the company during 12th Plan period. Out of its 12th Plan projection of Rs.17500.00 crores(including budgetary support of Rs.5073.00 crores), Airports Authority of India will utilize I&EBR of Rs.12427.00 crores from its projected I&EBR generation of Rs.12469.93 crores. The 12th Plan projected outlay of Pawan Hans Helicopters Ltd. is Rs.17500.00 crores including budgetary support of Rs.1010.00 crores. Pawan Hans Helicopters Ltd. will utilize IEBR of Rs.725.00 crores from its projected I&EBR generation of Rs.764.99 crores.

10.5 The projections for generation of Internal and Extra Budgetary Resources (I&EBR) by the Public Sector Undertakings under Ministry of Civil Aviation during the 12th Five Year Plan are as under :-

PROJECTIONS for 2012-2017

(Rs. in crores)

S. No.	Name of PSE	Internal Resources	Bonds/ Debentures/ Borrowings	ECB/Suppliers credit	Others	Total I&EBR
1.	Air India Ltd.	4763.34	0.00	8389.33	0.00	13152.67
2.	Airports Authority of India	11324.91	200.00	0.00	945.02	12469.93
3.	Pawan Hans Helicopters Ltd.	412.79	0.00	0.00	352.20	764.99
4.	Hotel Corporation of India Ltd.	69.42	0.00	0.00	0.00	69.42
5.	Air India Charters Ltd.	1377.55	0.00	0.00	(1340.53)	37.02
Total		**17948.01**	**200.00**	**8389.33**	**(43.31)**	**26494.03**

Table 15

10.6 The projections for generation of Internal and Extra Budgetary Resources (I&EBR) by the Public Sector Undertakings under Ministry of Civil Aviation during each year of the 12th Five Year Plan are detailed at **Annexure-XX.**

10.7 The anticipated expenditure during 11th Plan period is Rs.44124.00 crores of which the I&EBR component is 89.68% and the budgetary support component is 10.32%.

11.0 Aviation Environment Protection in Civil Aviation

11.1 Importance of Transport Sector

11.1.1 The issue of transportation and the environment is paradoxical in nature. From one side, transportation activities support increasing mobility demands for passengers and freight. On the other side, transport activities have resulted in growing levels of motorization and congestion. As a result, the transportation sector is becoming increasingly linked to environmental problems. With a technology relying heavily on combustion of conventional fossil fuels (hydrocarbon based fuels), notably with the internal combustion engine, the impacts of transportation over environmental systems has increased with motorization. This has reached a point where transportation activities are a dominant factor behind the emission of most pollutants and thus their impacts on the environment.

11.1.2 The transport sector contributes 23% of the total CO2 emissions in the world according to the latest estimates of the International Energy Agency (IEA). The transport sector's direct emissions from combustion fuels over the 1971 to 2006 represent a rising share of total global emissions. Road transport is responsible for the highest share of emissions globally. Within road transport, automobiles and light trucks produce well over 60% of emissions, but in low- and middle-income developing countries, freight trucks (and in some cases even buses) consume more fuel and emit more CO2 than the aforementioned light-duty vehicles. Road transport is also associated with emissions of criteria air pollutants, such as carbon monoxide (CO) and oxides of nitrogen (NOx), as well as particulate matter (PM). These emissions have a high negative impact on human health, particularly in densely populated urban areas.

11.1.3 Transport-related CO2 emissions from developing countries will contribute in increasing proportion to global CO2 emissions unless mitigating measures are implemented. There is now a growing international consensus that future targets for CO2 reductions in the post-2012 Climate Policy Framework will not be achieved unless CO2 contribution from the transport sector in developing countries is appropriately addressed.

11.1.4 The steady increase of gross domestic product (GDP) per capita in many developing countries will continue to drive demand for mobility and vehicle ownership and use. And with the concentration of wealth around cities, an increasing share of light-duty vehicles are found in

and around cities, clogging streets and adding to problems of air pollution , road safety, noise, and CO2 emissions as well. A proper approach to dealing with the CO2 emissions must be integrated with efforts to meet these other challenges.

11.2 The Transport – Environment Link

11.2.1 The relationships between transport and the environment are multidimensional. Some aspects are unknown and some new findings may lead to drastic changes in environmental policies, as it did in regards of acid rain and chlorofluorocarbons in the 1970s and 1980s. The 1990s were characterized by a realization of global environmental issues, epitomized by the growing concerns between anthropogenic effect and climate change. Transportation also became an important dimension of the concept of sustainability, which is expected to become the prime focus of transport activities in the coming decades, ranging from vehicle emissions to green supply chain management practices. These impending developments require a deep understanding of the reciprocal influence between the physical environment and transport infrastructures and yet this understanding is often lacking. The main factors considered in the physical environment are geographical location, topography, geological structure, climate, hydrology, soil, natural vegetation and animal life.

11.2.2 The main environmental dimensions of transportation are related to the causes, the activities, the outputs and the results of transport systems. Establishing linkages between these dimensions is a difficult undertaking. Furthermore, transportation is imbedded in environmental cycles, notably over the carbon cycle. The relationships between transport and the environment are also complicated by two observations:

- First, transport activities contribute among other anthropogenic and natural causes, directly, indirectly and cumulatively to environmental problems. In some cases, they may be a dominant factor, while in others their role is marginal and difficult to establish.
- Second, transport activities contribute at different geographical scales to environmental problems, ranging from local (noise and CO emissions) to global (climate change?), not forgetting continental/ national/regional problems (smog and acid rain).

11.2.3 Establishing environmental policies for transportation thus have to take account of the level of contribution and the geographical scale, otherwise some policies may just move the problems elsewhere and have unintended consequences. A noted example are local/ regional policies that have forced the construction of higher chimneys for coal burning facilities (power plants) and induced the continental diffusion of acid rain. Thus, even if an administrative division (municipality, country, state/province) have adequate environmental enforcement policies, the geographical scale of pollutants diffusion (notably air pollutants) obviously goes beyond established jurisdiction.

11.2.4 In addition to the environmental impacts of the network, traffic and modes, economic/ industrial processes sustaining the transport system must be considered. These include the production of fuels, vehicles and construction materials, some of which are vey energy intensive (e.g. aluminum), and the disposal of vehicles, parts and infrastructure. They all have a life cycle timing their production, utilization and disposal. Thus, the evaluation of the transport-environment link without the consideration of cycles in the environment and in the product life alike is likely to convey a limited overview of the situation and may even lead to incorrect appraisal and policies.

11.3 Dimensions

11.3.1 Transportation activities support increasing mobility demands for passengers and freight, notably in urban areas. But transport activities have resulted in growing levels of motorization and congestion. As a result, the transportation sector is becoming increasingly linked to environmental problems. The most important impacts of transport on the environment relate to climate change, air quality, noise, water quality, soil quality, biodiversity and land take:

- **Climate Change**. The activities of the transport industry release several million tons of gases each year into the atmosphere. These include lead (Pb), carbon monoxide (CO), carbon dioxide (CO2), methane (CH4), nitrogen oxides (NOx), nitrous oxide (N2O), chlorofluorocarbons (CFCs), perfluorocarbons (PFCs), silicon tetraflouride (SF6), benzene and volatile components (BTX), heavy metals (zinc, chrome, copper and cadmium) and particulate matters (ash, dust). There

is an ongoing debate to what extent these emissions may be linked to climate change and the role of anthropogenic factors.

- **Air quality**. Highway vehicles, marine engines, locomotives and aircraft are the sources of pollution in the form of gas such as carbon monoxide(CO), nitrogen dioxide (NO2), sulphur dioxide (SO2) and nitrogen oxides (NOx) in the atmosphere and particulate matters emissions that affects air quality causing damage to human health. Acid precipitation has detrimental effects on the build environment, reduces agricultural crop yields and causes forest decline.
- **Noise**. Transport noise emanating from the movement of transport vehicles and the operations of ports, airports and rail yards affects human health. Noise is traumatizing for the hearing organ and that may affect the quality of life by its unpleasant and disturbing character. Long term exposure to noise levels above 75 dB seriously hampers hearing and affects human physical and psychological wellbeing. Increasing noise levels have a negative impact on the urban environment reflected in falling land values and loss of productive land uses.
- **Water quality**. Transport activities have an impact on hydrological conditions. Fuel, chemical and other hazardous particulates discarded from aircraft, cars, trucks and trains or from port and airport terminal operations, such as de-icing, can contaminate rivers, lakes, wetlands and oceans. Because demand for shipping services is increasing, marine transport emissions represent the most important segment of water quality inventory of the transportation sector.
- **Soil quality.** The environmental impact of transportation on soil consists of soil erosion and soil contamination. Coastal transport facilities have significant impacts on soil erosion. Shipping activities are modifying the scale and scope of wave actions leading to serious damage in confined channels such as river banks. The removal of earth's surface for highway construction or lessening surface grades for port and airport developments have led to important loss of fertile and productive soils. Soil contamination can occur through the use of toxic materials by the transport industry.
- **Biodiversity.** Transportation also influences natural vegetation. The need for construction materials and the development of land-based transportation has led to deforestation. Many transport routes have required draining land, thus

reducing wetland areas and driving-out water plant species. Many animal species are becoming extinct as a result of changes in their natural habitats and reduction of ranges.

Thus, transportation has a wide array of environmental externalities, some of which can be reasonably assessed while others are mostly speculation (often taken as facts by environmentalist groups). Externalities are also occurring at different geographical scales, and some may even overlap over several. The bottom line is that better transport practices, such a fuel efficient vehicles that reduce environmental externalities are likely to have positive economic, social and environmental consequences.

11.4 Future Energy Trends

11.4.1 India's rich natural resources, hospitable terrain, over 2,000 years of Indo-Gangetic civilization, and its tolerant and nonviolent traditions made it a fertile ground for foreign invasions throughout. During these years, India was perceived more as a market than as a factory, and lost out severely in technological development.

11.4.2 Not until independence did India establish sound foundations of scientific and technological learning and research in the 1950s and 1960s. Despite achieving successes in atomic energy and space technology, 40 percent of its population, particularly in rural areas, lacks electricity and other kinds of commercial energy like modern cooking fuels. This is the greatest challenge in the energy sector. Availability of and access to energy are the catalysts for growth and the eradication of poverty. India ranked as the world's seventh-largest energy producer and the fifth-largest energy consumer in 2004 and its per capita energy consumption, at 455 kilograms of oil equivalent (kgoe), was low compared to the global average of 1,750 in that year. It must increase primary energy supply by 3 to 4 times, and its electricity generation and supply capacity by 5 to 6 times over 2003-04 levels to meet the basic energy needs of its citizens.

11.4.3 Demand for petroleum has risen steeply due to phenomenal growth of road transport and the share of cargo transported by road increased from 14 percent in 1950-51 to 61 percent in 2004-05, and passenger road transport rose from 15 to over 80 percent. In 2004, India had 73

million registered automobiles. The automobile industry expects to continue to grow between 10 and 15 percent in the coming years. Similarly, AAI has forecasted for the next 5 years a sustainable growth rate of 16% for international and 20% for domestic aviation sector.

11.5 Conclusion

11.5.1 It is now evident that economic activity, population growth and transport sector energy intensity are the main factors driving transport sector emissions growth especially in developing countries. Developing countries are not expected to slow down their economic growth to control their CO2 emissions because these countries have neither mandatory nor voluntary commitments to reduce CO2 emissions under the Kyoto Protocol. Thus, the main strategy to limit the growth of CO2 emissions in the transport sector in these countries in the future would be the decoupling or weakening of the growth of CO2 emissions from economic growth.

11.5.2 Rapid switching to clean fuels and shifting over to public transportation, including rail and water transportation, could help achieve this objective. Fiscal instruments, such as subsidies for public transportation, clean fuels and clean vehicles, would be helpful in triggering fuel switching and modal shifting activities. Moreover, regulatory instruments, such as vehicle efficiency standards, vehicle occupancy standards, congestion charges, investments in road maintenance and congestion reduction, would also be required to reduce transportation energy intensity and thereby reduce transport sector CO2 emissions.

12.0 New Initiatives under 12th Five Year Plan

12.1 Essential Air Services Provision to Remote regions

Most of the places in the North-Eastern states are inaccessible due to inadequate road/rail facilities. Only viable means of transportation in the region is by air.In many parts of such remote regions, air service is the only effective mode of transport. Air Connectivity to remote and inaccessible areas is crucially dependent upon availability of infrastructure and viability of air traffic operations. Air services to remote or peripheral destinations may not be commercially viable, mainly due to a very low traffic volume, and therefore they would not be provided by the commercially conscious airline enterprises. The current arrangement for ensuring essential air services to the remote and inaccessible areas of the country through the mandate of Route Dispersal Guidelines is not satisfactory. Feedback received from the states suggests that connectivity to many parts of their states continue to be underserved or unserved.

Review of route dispersal guidelines could at the best is a short term solution. A closer scrutiny of the Route Dispersal Guidelines (RDG) reveals that RDG in itself offers only a partial solution to the issue of regional connectivity. The RDG being a matter of internal cross-subsidization between financially viable and un-economical routes for airlines, it does not appear to be sustainable to continue this in the long run given the nature and extent of remote and inaccessible areas in the country to be covered and the financial crisis the airline industry is facing. There is a strong view emerging in this sphere that in order to achieve the social objectives prescribed under the RDG, innovative mechanism needs to be evolved to achieve maximum impact. Under these circumstances, it is felt that there is a need to revisit the Naresh Chandra Committee Report that recommended Essential Air Services Fund (EASF). The recommendation of Naresh Chandra Committee in this regard is as follows:-

"The key to achieving the goal of expanding the reach of air services in the country appears to be in abolishing the route dispersal guidelines. Such a step would enable major airlines to focus their efforts on the routes of their choice and, more importantly, create room for the emergence of specialized airlines to service the remaining short-haul, regional and feeder routes. As regards maintaining essential air services on routes that are strategically important but are commercially unviable, the government should provide explicit subsidy support, preferably through direct budgetary transfers or the imposition

of a sector-specific cess or a combination of both. In addition, such support should be allocated through a transparent process of minimum subsidy bidding. Here it is noteworthy that competitive tendering of subsidy for maintaining essential air services is a well-established practice in several countries, as it allows such routes to survive but on the basis of fair competition and at the lowest cost possible to the tax payer. For instance, the Remote Areas Subsidy Scheme (RASS) in Australia and the Essential Services (EAS) Programme in the U.S. are broadly based on minimum subsidy bidding."

A Committee was constituted by Ministry of Civil Aviation vide order dated 13.4.2011 under the Chairmanship of Shri Rohit Nandan, the then Joint Secretary to recommend inter-alia measures to boost regional connectivity. This committee too recommended establishment of Regional Air Connectivity Fund.

World over, it is not uncommon to come across direct intervention mechanisms evolved by the Governments to provide essential Air Connectivity to underserved and unserved regions. Existing EAS schemes, most of which are applied to domestic air services, have in common, a number of features: they are aimed at linking small communities with larger ones; involve support for the operation of services or routes, rather than to the airline *per se*; the support generally comes from central budgetary allocations; the mechanism involves a transparent public competitive tender or application process for carrier selection; the provision of subsidies, the concession or licence granted is contractual and time-limited; and, the regulatory elements may cover frequency, capacity, levels and conditions of air fares, and standard of service.

In order to further encourage provision of air transport services on such un-economical but essential routes it would be desirable to consider providing explicit subsidy support from Essential Air Service Fund (EASF), to be established in this behalf, through a transparent process of minimum subsidy bidding. This would enable such subsidy to go to the most efficient carrier at the lowest cost to the public and may also lead to development of the region as a result of the enhanced connectivity. A transparent mechanism will identify un-economic routes, decide minimum capacity requirements and oversee the bidding process.

EASF would also be utilized for the development of low cost regional airports as well as those that are owned either by the AAI or by the State Governments. It may even be considered for JVs or Private Airports which are publicly used. The EASF may also be made available for development of Heliports. About one-third of EASF would be ear-marked for providing critical viability gap funding to regional airports in under-served/un-served areas. This would include setting up of ATC services. The grant in this regard may be on one-time basis or on a recurring basis for 3 to 5 years till that airport stabilizes.

It is proposed to establish an exclusive fund to provide explicit and direct subsidies to airlines (SOPs/RSOPs/Non-Scheduled operators) to make up for viability gaps on these routes for the airlines and for airports to be set up in the identified areas. Detailed policy guidelines would be evolved after due consultations with the stakeholders. This fund may either be termed as EASF as envisioned by Naresh Chandra Committee or Regional Air Connectivity Fund (RACF) to reflect its purpose and character. A token provision of ***Rs.100 Crores*** may be approved for this purpose. Separately, the Ministry would consider augmenting the fund through a cess on domestic passengers chargeable through the ticket by airlines and deposit in the EASF/RCF on the pattern of current PSF.

New Initiatives under 12th Five Year Plan

12.2 National Aviation University

Air transport in India has witnessed unprecedented growth in the recent past. During the period 2003-2010, the domestic air traffic in the passenger segment grew at a CAGR[23] of 19.3% and reached 53 million level and the international passenger carried grew at a CAGR of 12.6% and reached 38 million. The upside potential for growth of the Civil Aviation sector in India is huge. India is likely to be the fastest growing aviation market in the world in the next decade. Recent estimates suggest that domestic air traffic will touch 160 – 180 million passengers per annum in the next 10 years and the international traffic will exceed 80 million passengers per annum from their current levels. When translated into fleet requirement, this works out to about 1000 commercial fleet as against the current level of about 400 with the scheduled commercial airlines and a total of 681 operational general aviation aircraft including 250 helicopters and 108 business jets[24].in the country. The real challenge is to manage the phenomenal growth of air traffic with safety. Safety should be of paramount importance. Closely related to safety in Civil Aviation is skill augmentation in its entire dimension. The task ahead would be of identifying the different categories of personnel required whether technical, managerial, pilots & cabin crew, trainers etc to meet the needs of airport development & operations (both green & brown field either at AAI or PPP airports), ANS/ATM facilities, and airline operations. With emerging sectors like MRO in near run and aerospace in longer run, which are expected to grow in size, the need for technical personnel will surge even further. The implementation of stringent standards to cope up with the growing air traffic is crucially dependent upon the 'skills and competency' of the work force. A skilled and competent workforce is essential to create a safe and efficient aviation industry. Without this India cannot join the ranks of the leading aviation nations. A vibrant, world class education and training sector is therefore essential to meet the rising demand for skilled workforce at all levels.

Given the exponential growth of air traffic services in the country and the likelihood of this trend continuing in the next two decades, the need to address issues relating to allied Services like Aviation Education and Training in India is significant. It has been estimated that the requirement of skilled personnel for various categories of skill sets required in the Civil Aviation

[23] CAGR refers to Compounded Annual Growth Rate
[24] India Business & General Aviation report 2011; CAPA Research & Market Analysis Unit

Sector would be enormous and several times the current level of deployment of skilled personnel. This has already been discussed elsewhere in the report. That means the pressure on the education and training capacity is immense. The existing infrastructure is insufficient to meet even today's requirements. Education and Training capacity even in a limited sense is required to support:

i) Requirement of new employees to match growth;
ii) Replacement of retiring employees;
iii) Refresher training for existing staff to keep pace with regulatory and technological changes;
iv) Attrition of staff who migrate overseas

Independent Forecast suggests that India will require an additional 300 to 350 thousand employees in the Aviation Sector in India alone over the next decade. Operational staff viz. Pilots, Engineers and Cabin Crew will need to grow from the present level of 32 thousand to over 90 thousand by 2020. Generally, the total airline workforce is approximately double the operational staff numbers. Airport employees, Air Traffic Controllers, Ground Handlers, Catering Staff, Retail and Security Staff are estimated to triple from 90,000 at present to 270,000 within ten years. India has approximately 1900 Air Traffic Controllers compared to a sanctioned strength of 2200. There is a need to increase the capacity of current training facilities to keep pace with growth as well as to provide recurrent training to existing controllers. It is estimated that an additional 2500 to 3000 ATCs will be required over the next five years. Further, the existing ATCs would also require upgraded training as at present AAI is making significant investment in modernizing equipments and operations under the future Indian Navigation System Master Plan. AAI is working with ISRO on developing GAGAN, which is a Satellite Based Navigation system and would be functional by 2013. Again this will change the concept of controlling air space in to managing of air space for which the necessary manpower needs to be developed with proper training.

Barring a few, it is said that the quality of flying schools in India is not satisfactory. Airlines and Type Training Organizations report serious concerns with quality of output. In the absence of sufficient high quality pilots available from within the country, India continues to hire Foreign Pilots.

Indian has the potential to be an Aerospace Hub. Huge investment is expected to be made in the Aerospace Engineering Sector. Aircraft and Original equipments manufacturer are of the view that shortage of skill is an impediment to growth. Similarly, requirement of maintenance engineers by Airlines and MROs is another major area of concern. Aircraft Maintenance Engineers play an important role in the upkeep and service availability of aircraft. As the size of the industry grows, airlines will need to employ adequate number of AMEs to perform the required maintenance and inspection of the aircraft. Industry sources suggest that the graduates of the Aviation Maintenance Engineers Training Institutes have limited employability.

Skill shortage is even more serious in general Aviation impacting its development and safety. Quality Training Institutions, Quality Instructions and Quality Instructors are an essential pre-requisite to the growth of a strong and safe General Aviation Sector. Note that the General Aviation Fleet Forecast made by Independent agencies suggest that the size of the fleet would be about 2500 aircrafts and around 900 helicopters in the next 10 years .

The demand for skilled personnel in the Civil Aviation Sector is a global phenomenon. Therefore, the Indian Aviation and Training Sector needs to keep an eye on the opportunity that is emerging in this space, wherein India could be a low cost high quality education and training hub for the World.

The opportunity cost of not investing in human capital required for Civil Aviation sector at this juncture would result in, reduced growth, increased cost of operations, compromise on safety and missed opportunities.

The following Government Training Institutes in India are engaged in the provision of Education and Training Services in the Civil Aviation Sector:

i) IGRUA

ii) NIAMAR

iii) Civil Aviation Training College ,Allahabad and Hyderabad airport

Besides the above Institutions, there are number of private institutions offering in disciplines relating to various facets of Civil Aviation sector. Currently there are 42 functional pilot training

institutes (of which only 17 are operational) and 77 AME training institutes along with a large number of Airhostess training institutes. Despite the existence of such private institutions in India that provide Aviation Education and Training, there is consensus that the number of programmes offered, the depth of course contained and the infrastructure facilities available with them are not sufficient to meet the needs of the industry. Also, the quality of a substantial number of them is not up to the standard that is expected of them. There is no flying training institute for training civil helicopter pilots in the country. The focus of the institutes so far has been in conducting the programmes to meet the immediate needs of the industry. There is also a near total absence of credible institutions undertaking serious research or providing research facilities in the field of Civil Aviation. Therefore, higher education and extensive research in frontiers of technology, and science that is fundamental to long term interest of the sector is of vital importance. Establishing strong research base in Civil Aviation to prepare the skill base to meet the global competition and to emerge as a leading air transport service provider in the world is of paramount importance.

It is found that there is a near absence of qualitative and duly recognized formal Educational programmes; leading to award of Diploma/Degree/Post Graduate Degree in the field of civil Aviation in the country. As a result of this, all major as well as minor agencies/organizations in the sector have to mostly recruit generalists and invest considerable resources in post recruitment training.

It is therefore necessary to establish National Aviation University to cater to the growing educational and training requirements of the Civil Aviation Sector.

Launching of certificate/diploma/ degree programmes in various streams of Civil Aviation by the proposed National Aviation University will not only meet the ever growing requirement of professionally qualified personnel but will also create a strong base with a pool of scientific and technical manpower in the Civil Aviation Sector so that India can potentially become an Aviation Education Hub for many countries in the region. To meet the growing needs of the shipping sector of India, the Indian Maritime University had been set up by an Act of Parliament in the past, in a similar way to meet the needs of the Aviation sector as well we would have to set up the University by an Act of Parliament in order to give it a legal sanctity. In course of time the University is expected to become a centre for excellence in the field of Civil Aviation which

would keep track of fast changing technology and other global developments to facilitate constant review of norms and standards for Aviation Education and Training including aspects relating to accreditation and grant affiliation to other private institutions.

The need for an Aviation University was also recommended by the Kaw Committee in 2006:

> "It is recommended that: A National Aviation University should be established under the Ministry of Civil Aviation and all the training setups in its attached offices like DGCA and the Bureau of Civil Aviation Security as well as the training institutions of public sector undertakings like Airports Authority of India, Pawan Hans Helicopters Ltd., National Carriers etc. should be brought under its umbrella."

From the foregoing analysis it is evident that there is enough justification and an urgent need to establish the National Aviation University for our Country. The total capital outlay for establishment of the National Aviation University needs to be funded by the government of India. Although appropriate user charge regime will be in place in the University system of Admission, Examination, Training, Evaluation, Research, etc the revenue gap during the initial years of its operation may also have to be met from the Plan Outlay of the Ministry of Civil Aviation.

Ministry of Civil Aviation, Government of India has set up an Inter-Ministerial Committee under the Chairmanship of Secretary, Civil Aviation for guiding the preparation of a Detailed Project Report containing various components of the Project Proposals which will also be discussed with the stakeholders at the appropriate stage. In the preparation of DPR, adequate emphasis will be laid in studying and documenting the global best practices in this regard.

Thus the foregoing discussion establishes the need for setting up National Aviation University in India and the time has come for taking concrete action towards setting up the same. Towards this purpose, a token provision of Rs100 Crores has been kept as plan out lay for National Aviation University in the 12th Five year plan as a new initiative.

New Initiatives under 12th Five Year Plan

12.3 Development of Aerospace industry

Matters relating to aero space are within the scope of subjects allotted to Ministry of Civil Aviation as per Allocation Business Rules. Considering the growth prospects of Air Traffic in the country, the potential for large scale acquisition of aircrafts by the carriers in India, and the competitive advantages arising out of growing pool of scientific and technical manpower in the country it is felt necessary to consider initiating activities towards development of aero space industry for Civil Aircrafts. Although manufacture of aircraft and components in private sector is allowed, private industry has not taken up development programmes due to the long gestation period and perception of significant risk. As a result, nothing concrete has been achieved in this sphere. China would be coming out with a commercial civilian aircraft in the next 3-4 years. Further, independent traffic forecasts suggest that by 2020 or so, the number of aircraft required in the Indian market would exceed one thousand. Most of the requirements would be in the narrow body segment to cater to the needs of Tier II and Tier III towns. Also India could capture the pie of Aerospace outsourcing due to significant cost advantages. Skilled labour cost is 60% cheaper than USA & Europe. Foreign aircraft manufacturers view India's demand potential as an opportunity to outsource manufacturing work, partly due to offset requirements, but mostly to derive cost benefits. Global aerospace majors are facing a shortage of engineering talent. India has a large talent pool. Therefore, it is high time that efforts are initiated to take up Aerospace development programmes in the country for meeting the needs of Civilian aircraft. At present, almost entire range of aeronautical products, components, raw material is imported. The development of aeronautical products needs to be taken up as a plan scheme and adequate provision should be made in the Plan proposals of Ministry of Civil Aviation.

Objectives of the Scheme

The focus of the scheme would be on indigenization of aeronautical products. Indian Aeronautical Industry should be able to produce a small/mid-sized aircraft using indigenous resources, to provide connectivity to all parts of the country thereby generating employment, industry and prosperity to the people. The vision can be realized by providing low cost air travel from low cost airport terminals to the remote areas, cities of business interests, tourism etc. This would require low cost aircraft in substantial number and if produced indigenously will give

substantial boost to Indian aeronautical industry. It is considered necessary that a road map of the progress path be prepared with small steps and a focus on goal. A question may arise as to why such manufacturing activity has not happened till now. Mainly, the scale of production required to achieve competitiveness is arising only now because of the exponential growth rate of air traffic. Given the vibrant growth of air traffic in other countries in Asia-Pacific region coupled with successful achievement of Bilateral Safety Agreement with USA, there is now an enormous potential to develop aerospace technologies.

Components of the Scheme

1. Development and Production of a small (20 seat) turboprop aircraft. The aircraft engines, propellers, avionics and the landing gear can be imported. Gradual indigenization shall be achieved.
2. An aircraft of smaller capacity for executive travel should be selected for series production under license, by a private industrial house.
3. The aircraft development organization may outsource development of components, appliances, equipment, hardware, materials etc. to private enterprises, who have R&D capability. There are many organizations in India who are producing world class automotive components, and technological prowess exists in these companies, including CSIR, IITs and other engineering colleges.
4. Government incentives in the form of grants shall be provided for encouraging the activity and cost control.

Development of Back-end Capabilities and Technologies

Private industrial manufacturers may be awarded product development programs. Work needs to be done in the development of technologies. Some examples may include Development of Aluminum alloy, sheets, bar-stock, extrusions, forgings etc.

Organizations will be encouraged to develop aircraft quality materials meeting the established specifications, for domestic consumption and for export. Tyre manufacturing capability should be developed as there is already adequate consumption with the airlines presently. Testing capabilities need to be added to the manufacturing facilities. Since high quality technical knowhow is involved, International JVs will be encouraged by providing help in allotment of land for factory, and other tax benefits which will attract foreign manufacturers to have JVs.

Cabin refurbishing materials, seats, meal trays, window panes, lights, floor beams, carpets, plastic moulded cabin panels etc can be manufactured easily as these are non-critical items. Electric wires and cables of different ratings and development of appliances to ITSO standards can be undertaken by the industry with the assistance of DGCA. In short, there is an enormous potential for indigenization and manufacture of aeronautical products in India.

Proposal

It is proposed that the scheme should be included in the 12th Plan as a new scheme and a fund of Rs. 5 Cr created for development of capabilities for manufacture of indigenous Civil aircraft and other aeronautical products industry.

New Initiatives under 12th Five Year Plan

12.4 Innovations in Governance

Given the significance attached to the concept of Innovation in the "Decade of Innovation" to enhance growth and competitiveness in the economy in general it is highly relevant to promote and encourage innovation in all fields of Civil Aviation Sector. In the course of implementation of policies and programs in the civil aviation sector, a need is felt to involve non-governmental not for profit organizations to achieve better results. Such an approach is followed worldwide and has gained acceptance among stakeholders. In India too, in many sectors, involvement of voluntary organizations has resulted in commendable success. However, this has not happened in civil aviation sector. As a new initiative, Ministry of Civil Aviation proposes to involve the voluntary sector in certain crucial areas where wider participation by stakeholders can make a difference in terms of effectiveness.

The areas where scope for participation by voluntary organizations exists include safety, security and environment. These three areas pose key challenges in managing the higher growth trajectory of air traffic service in India during the next two decades. In these areas of Safety, security and Environment in civil aviation, there is a need to supplement efforts of regulator with independent initiative involving voluntary organizations with the necessary financial support.

Voluntary organization can play a crucial role raising the level of safety awareness among the community of people living in the airport surroundings. Safety awareness could be about safety hazards arising out of bird hits, wild life strike damages etc. According to FAA wildlife strike database 121,000 (Civil and USAF) wildlife strikes have been recorded over between 1990 and 2010 and 92% of the bird strikes to commercial aircraft occur at or below 3,500 ft AGL (above ground level). Community needs to be made aware of safety hazards in setting up slaughter houses in the vicinity of airport to avoid the menace of bird hits. Modern jet aircrafts are fast and relatively quiet and their engine fan blades are often more vulnerable than propellers to wildlife-strike damage**.** Educating the community about the dangers of letting cattle to stray in to airport premises or in its vicinity is quite important. Even in cases of land acquisition for airport development and in related matters voluntary organizations can play an important role in bring about consensus in complex matters.

Another area of importance recognized word over in the context of aviation safety pertains to **aerospace occupational safety and health**. Australia among other countries for example has formed Australasian Aerospace Occupational safety and Health Association, as a voluntary organization. The foundation members include OH &S professionals. Awareness campaigns by such voluntary organizations among workforce on issues such personal protective equipment, hazardous materials, occupational safety and health aspects of environment / waste management can go a long way in improving the safety levels in & around the airport premises. It is therefore important to have a forum for sharing the dissemination of occupational health and safety and expertise, facilitates exchange of ideas, formulate and recommend procedures, materials etc. with the aim of improving occupational health and safety practices with in the civil aviation sector.

Some of the major causes of aviation accidents are attributed to human errors. Much of the human errors are in general caused by **fatigue, high stress level** of aviation personnel like pilots, air traffic controllers and other operational staff all of whom work on shift duties. Since air traffic controllers have an incredibly large responsibility while on duty, the ATC profession is regarded around the world as one of the most difficult jobs today, and can be notoriously stressful. The pressure is high for commercial airline pilots too. They are not only expected to guarantee the safety of passengers, but to also keep their flights on-time, even when flying in inclement weather. A pilot's irregular working hours and routes lead to continual layovers in various cities and, often, to jet lag.[25]These categories of aviation personnel needs to be kept on high alert conditions as the work environment requires them to have high degree of reflexes. Thus, the nature of work of aviation personnel such as pilots, air traffic controllers (ATCs) and other operational staff with in the airport premises requires that these personnel need to be highly motivated and relaxed. Today, for example the number of air traffic controllers in the country for civil aviation is much below the required strength. This puts additional burden and pressure on the ATCs.

In India as well as in overseas, organizations have started seeking the help of ancient Indian system of yoga therapy to relieve people of their fatigue and stress and to restore ideal work – life balance. Voluntary organizations can play a crucial role in addressing safety concerns arising out of stressed out people in ATC etc.

[25] www.careercast.com

New Initiatives under 12th Five Year Plan

12.5 Establishment of Civil Aviation Museum

The Civil Aviation Museum shall enshrine the evolution and development of aviation and spaceflight in India, and so seek to educate and inspire the nation by :

- Preserving and displaying aeronautical and spaceflight material and data of technical and historical interest and significance to national programmes.
- Developing educational material and conducting programmes to enhance public understanding of and involvement in, the development of aviation and spaceflight.
- Conducting and disseminating new knowledge on aviation and spaceflight and their related technologies.

The aim is to archive the development of aviation in India, collect, preserve and display aeronautical equipment and provide educational material for the study of aviation and spaceflight sciences. A token provision of Rs.5.00 crores has been made for this scheme in the 12th Plan.

The first commercial plane flew in India on 18th February 1911 between Allahabad and Naini carrying mails. The epochal period since then has been witness to an enormous growth in India in all aspects of Civil Aviation and as a result India is the 9th largest civil aviation market in the world. This forward march is likely to culminate in India becoming one of the three largest markets in the world by 2020. The momentous occasion is being celebrated in a befitting manner by organising centenary celebrations all over India spanning throughout the year 2011-12. As such, this is an opportune time to establish the long cherished National Air & Space Museum to enshrine India's aviation history heritage and so inspire future generations of Indians.

The Museum shall house the largest collection of historic aircraft and spacecraft with artifices that range in size from PSLV rockets to jetliners, gliders to space helmets to microchips and so on. The Museum shall be a vital national centre for historical research on aviation and spaceflight with their related sciences and technologies.

Proposed Home of the Museum : Where better than in a dedicated area within Safdarjung Airport, the heart of New Delhi and the home of the very first flying club and airport in the country.

Space Requirement : With the old Airport Terminal Building at Safdarjung Airport as the entrance, incorporated should be the adjoining tarmac area, possibly 5-10 acres of land space and including the disused hangars at the northern end of Safdarjung Airport, with specially designed superstructure (impression of flight into the future).

Displays : A variety of aircraft (civil and military) types with ancillary equipment (cockpits, engines etc.). Original artefacts of all types related to aviation, supported with data, neatly presented. Displays would be highly educative and visitor-friendly ('Hands-on').

Resources : One time capital expenditure and annual maintenance costs would be calculated based on the final design. The objective should be to make the museum self-sustaining within five years, with generation of revenue from ongoing activities such as aviation conferences and promotion of research with appropriate facilities provided etc.

Continual Activities : Conference and research projects, technology presentations, aviation scholarships, restaurants and cafes, seminars, workshops and research publications, souvenir shops.

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