

Can IBSA Countries Cooperate in Civil Aviation Manufacturing?¹

Managing Ambition with Rationality

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¹ A regional airplane is defined as a feeder airplane with a seating capacity ranging from 60 to 100 persons, usually used for domestic routes and for flying shorter distances, less than six hours at a stretch. An airplane is an aircraft with wings. An aircraft is a general term used for a flying machine that includes those heavier than air namely airplanes and helicopters and those lighter than air i.e. balloons and airships.

1. Introduction

IBSA Initiative in the Context of Civil Aerospace

The Minister of Foreign Affairs of South Africa, H. E. Dr. Nkosazana Dlamini Zuma, the Minister of External Affairs of India, H.E. Mr. K Natwar Singh and the Foreign Minister of Brazil, H.E. Mr. Celso Amorim, met in Cape Town on 10 and 11 March 2005 for the second Meeting of the Trilateral Commission of the IBSA Dialogue Forum, and released the Cape Town Ministerial Communiqué.

Apart from a wide range of issues and positions discussed in the communiqué including UN reforms, WTO Ministerial and Millennium Development Goals, of particular relevance is the section on IBSA sectoral cooperation, which discusses practical approaches to intensify cooperation on sectors such as tourism, agriculture, scientific research and information technology (ICT Initiatives)

Specifically, the IBSA Communiqué discussed approaches to cooperate on scientific research and development (Paragraph 40) and on transport via a Trilateral Aviation Agreement and Maritime Transport Agreement (Paragraph 54)

On 15 September 2004, South African President Thabo Mbeki, after a meeting with the visiting Indian President A.P.J Abdul Kalam, said ‘South Africa, India and Brazil are considering starting a joint program to produce medium-size passenger airplane. Since we need airplane that are bigger than a ten seater and smaller than a 300 seater, why don’t these three countries come together and see if they could produce these kinds of airplane. The airplane venture could pool India’s expertise in military airplane, Brazil’s capabilities in producing passenger planes and South Africa’s electronics expertise.’²

Soon after, the South African government announced an Aerospace Industry Support Initiative. To be implemented in partnership with the Council for Scientific and Industrial Research, the Aerospace Industry Support Initiative will include a high-level advisory task team comprising a number of stakeholders, business people and industrialists. The third point specifically mentions partnering with Brazil in the development of new products in the defence and regional travel industry, as well as utilising synergies between India, Brazil and South Africa.³

Government officials expressed enthusiasm on exploring means to pool resources in the civil aviation manufacturing sector, an in particular to produce an airplane for civil aviation. A representative of the Department of Foreign Affairs, South Africa said “While we cannot compete on larger airplane, as Boeing and Airbus have a monopoly. India and Brazil manufacture light airplanes and South Africa manufactures components. Once the three countries cooperate and pool their technologies, we do not need to constantly depend to buy from the North. The potential of India is particularly huge, given that India

² ‘South Africa, India, Brazil mull venture to build passenger planes’ Bloomberg News, 16 September 2004

³ International Marketing Council of South Africa (IMC), ‘Aerospace Industry gets wings’. 29 November 2004 (Official Website www.southafrica.info, Visited on 25 September 2005)

has about 200 airplanes catering to a billion population compared to over 6000 commercial airplanes in the US catering to 300 million population”⁴

However similar statements have not appeared from the Brazilian and Indian side.

Basis of Selecting the Civil Aerospace Sector

The purpose of this IBSA project was to explore and analyse the trade and economic relations between India, Brazil and South Africa. Given the political proximity between these countries and recent attempts to forge closer trade and economic cooperation, it was necessary to understand the perceptions of stakeholders on the same.

The first component of the research was in the form of a field survey of businesses in the three countries. This involved a questionnaire-based interview of individuals in decision-making positions in exporting firms regarding their views on hurdles/means for promoting trade and investment within IBSA countries. A total of 30 representatives from ten sectors formed the sample size for the survey in each country, along with representatives from the government and business chambers, taking the total number of interviews to be over 100.

The field survey was followed by the study of a single sector to understand whether IBSA countries can cooperate in that sector. Subsequent to intense deliberations regarding the sector to be selected, the three countries decided on the civil aerospace sector, and to study whether IBSA countries could cooperate in the development or promotion of a regional jet. Importantly, as enumerated above, there was clear expressed interest from the governments to explore such as initiative.

This was probably the only sector that found acceptance amongst businesses in all three countries. The following are the key reasons for selecting the civil aerospace sector, for possible cooperation:

- IBSA airplane/engine/spares can provide cheaper airplanes/engines for other developing countries.
- valuable foreign exchange can be saved by indigenous production.
- brain drain can be harnessed, since a large proportion of aerospace professionals particularly from India leave for Northern countries.
- better employment prospects are generated domestically, for instance conservative figures put the total employment created by Boeing and Airbus in the US and UK at 250,000. This does not include foreign suppliers.
- IBSA countries could also earn valuable foreign exchange by exports.
- the aerospace industry can spur newer innovations, for instance in the US and EU, the aerospace industry has been responsible for innovations used in other sectors including development. Technologies used in aerospace have been used to improve

⁴ Interview with Anil Sooklal, Deputy Director General, Asia and Middle East, Department of Foreign Affairs, Government of South Africa as quoted in Business Standard, 13 May 2005, ‘India, Brazil, South Africa forum mulls airplane production’,

fire fighting equipment, develop lightweight artificial limbs, improve medical imaging etc (Technology Spillovers).

- there is a perception that airplanes need to be customised to the Southern economies, for example they need to be more fuel efficient, rugged, 70 to 100 seater that play the role of a feeder airplane and need not necessarily have a first class and would be cheap. This research envisages exploring this possibility.

Scope of the Paper

The aerospace industry comprises of the civil aircraft manufacturing industry, the defence aircraft manufacturing industry, space programs such as satellites and launch pads, air defence for instance missiles, and components and R&D relating to all of the above.

The civil aviation industry comprises of the civil aviation manufacturing industry and the commercial airlines, which implies that the civil aviation manufacturing industry is an intersection set of the aerospace and the civil aviation industry. However, in general, civil aviation industry refers to the commercial airlines industry and the manufacturing industry falls within the ambit of aerospace.

The civil aviation manufacturing industry in turn constitutes a wide domain of sectors namely large airplanes and their components, regional jets, civil helicopters/rotors, engines and components.

This paper restricts its scope to exploring the scope for IBSA cooperation in regional jets. However given the highly entwined nature of the industry, the paper also contains information regarding the aerospace industry as a whole. Several reasons mandated that the scope of exploring cooperation within the aerospace sector is to be restricted to regional jets.

Defence manufacturing being a highly restricted industry in all three countries, access to information is quite limited.

In all the three countries, space technology was exclusively within the mandate of the government. Also it is a highly guarded and secretive industry, with the private sector in the three countries in no position to influence.

This resulted in short-listing the civil airplane sector on account of relative ease of access and presence of a small but active private sector.

This paper has two objectives, firstly, to assess the capability and future direction of Indian civil airplane manufacturing sector and secondly, to explore the possibility of cooperation amongst IBSA countries, to manufacture regional jets. This paper does not intend to be a source document for the aerospace industry in India.

The author has surveyed representatives from the aerospace sector in India, which account for over 90 percent of the total production in the sector. This includes the lead

civil aviation manufacturers (which are also the lead aerospace defence manufacturers), the apex body of the private aerospace sector, the lead coordinating agency between the private and the public sector, the leading industrial chamber, as well as small private sector companies.

Apart from primary information, secondary information is sought from numerous sources and is used wherever necessary.

2. The Global Civil Aviation Manufacturing Industry

The civil aviation manufacturing industry is an important constituent of the global aerospace industry. The aerospace industry is one of the largest high-technology employers in advanced countries. By 2000, there were 1,220,000 aerospace employees in the world of which 49 percent were in the United States, 35 percent in the European Union, 7.5 percent in Canada, 2.7 percent in Japan and 5.7 percent in the rest of the world. Within this industry, the civil aviation-manufacturing sector is the most important. In 2000, 66 percent of European aviation manufacturing employees were in civil production and 33 percent in the military sector. The figures in the United States were 59 percent and 41 percent respectively.⁵

The following table compares the domestic production and trade of select countries.

Table 1. Production, Exports and Imports of Select Countries in US\$ million (1997 rate)⁶

	Production		Exports		Imports	
	1991	2001	1991	2001	1991	2001
All countries	242,216.2	320,530.4	194,291.6	214,381.2	187,067.8	210,680.3
US	118,661.6	160,577.4	88,443.3	82,224.6	24,276.6	51,553.7
EU	65,875.3	96,873.0	88,064.2	94,025.9	91,185.8	85,194.8
UK*	20,167.2	22,552.5	22,513.1	11,950.6	12,109.4	11,209.3
Japan	5,079.6	7,338.4	1,531.2	3,164.4	9,195.1	8,702.9
China	4,509.4	20,850.6	85.0	1,236.7	3,039.9	5,905.9
Brazil	24,589.6	8,896.4	1,068.1	6,920.2	4,035.5	3,756.4
South Africa	481.9	630.3	21.4	673.8	2,201.7	1,597.1
India	127.0	212.7	31.6	53.7	666.1	1,103.5

*UK is included in EU, however it is also stated separately

Two players, Boeing (US) and Airbus (EU) dominate the global large civil airplane manufacturing industry (+ 100 seater). In 1988, Airbus controlled 16 percent of the market, climbing rapidly to 37 percent in 1996. By 2004, however, Airbus has rocketed to over 50 percent of the market.⁷

⁵ Jorge Niosi, (2002) 'Aerospace clusters and knowledge spillovers, Clusters in high-technology' Montreal, UQAM

⁶ Appendix table 6-1 (Page 1 of 23), World industry and trade data for selected countries or economies and industries: 1980–2001, Science and Engineering Indicators 2005

⁷ Jeffrey Everette Hardee, 'Airbus and Boeing: A Comparison', Arizona State University, September 2004

Global production of regional jets is dominated by two manufacturers, Bombardier (Canada) and Embraer (Brazil). Production of current-generation regional jets has grown exponentially over the last 11 years from two regional jets delivered in 1992 to well over 300 delivered in 2003. Bombardier and Embraer have completely displaced European regional jet manufacturers (BAE and Fokker) in the global market. Regional jets are gaining popularity in airlines all over the globe. For instance in the US, regional jets accounted for 1.5 percent of the domestic fleet operations, which increased to ten percent in 2000, and to 30 percent in 2004.⁸

Three companies dominate the manufacture of airplane engines, Pratt and Whitney and General Electric from the US, who rank first and second, followed by Rolls Royce, UK. Airplane engines are the single most expensive component of an airplane, accounting for 20 percent of the value of an advanced airplane.

“The cost of developing an airplane makes it particularly prohibitive for new players to enter the market. For example, Boeing spent US\$ 10 billion to develop the 747, while Airbus spent US\$ 2.5 billion to develop the A350. General Electric spent US\$ 3 billion to develop the GE 90.”⁹

The Brazilian Aerospace Industry: A Brief Note

‘Embraer is the world’s leading manufacturer of commercial jets up to 110 seats. As of September 30, 2005, it had a total workforce of 17,046 people, and its firm order backlog totaled US\$ 10.4 billion.’¹⁰

Embraer is also Brazil's second-largest exporter. It is responsible directly and indirectly for 150,000 jobs in Brazil and accounts for over 80 percent of the revenue of 200 small and medium-sized businesses.¹¹

Embraer is trying to break into a new market, for jet airplane seating 70-100. According to the US Transportation Department, 61 per cent of all flights in the US take off with roughly that number of passengers. The new Embraer airplane are designed to fit into a niche where larger planes of capacity greater than 100 made by Boeing and Airbus usually operate but uneconomically, using the same avionics, controls flight deck and engineering as larger planes, passenger headcounts in that range. Thus the Embraer, 170/190 series of commercial jets is designed to fill a gap between regional planes, which usually seat up to 70 people, and large commercial jets but with all the comforts of the

⁸ ‘The US Jet Transport Industry: Competition, Regulation, and Global Market Factors Affecting U.S. Producers’, U.S. Department of Commerce, March 2005

⁹ The data is adopted from Bill Gordon ‘Japan's Aerospace Industry’, November 1997, <http://wgordon.web.wesleyan.edu/papers/aerosp.pdf> (visited on 12 October 2005)

¹⁰ Embraer Press Note, 10 November 2005, as on official website www.embraer.com

¹¹ ‘Brazil Sector Overview, Aerospace’ April 2005, *UKTI, Sao Paulo*

latter. As a result of these developments, Embraer is considered one of the hottest manufacturers in the aviation industry today.¹²

Embraer is not exactly what one would call an indigenous establishment. Infact, it is a highly global company. “95 percent of Embraer’s suppliers are located abroad. International suppliers are responsible for over 60 percent of final cost (and 38 percent of final cost is represented by Embraer), thus providing an indicator of the reduced importance of local knowledge flows (Cassiolato et al., 2002)”¹³

Brazil is also an important player in the international maintenance, repair and overhaul (MRO) market. The increase in maintenance outsourcing and the relatively low labour costs in Brazil have allowed MRO providers like VEM, GE Celma and TAM Technical to flourish. Varig Engenharia e Manutenção (VEM), the wholly-owned MRO subsidiary of the Brazilian flag carrier Varig, has profited from its cost advantage. For many contracts, VEM estimates it is at least 20 percent cheaper than US-based MROs and 30 percent to 40 percent less expensive than rival European workshops.¹⁴

On one hand Brazil is sourcing most of its aerospace components from abroad, on the other it is strong in MRO, leading to a logical deduction that the Brazilian strength lies in its engineering side, i.e. services and not in manufacturing. Embraer’s strength is in assembling components from all over the globe to manufacture and airplane and not in manufacturing them.

The United States is its largest customer and largest supplier of parts. U.S. has a percentage of 65% on Embraer purchases.¹⁵ However, in terms of ownership, though private players own 50.5 percent of Embraer, non-Brazilian shareholders own less than 10 percent.¹⁶ Hence, while final sales and component purchase dependency is very high, ownership dependency is low.

South African Aerospace Industry

Six research, development and manufacturing companies, Aerosud, Altech Defence Systems (ADS), ATE, Denel, Grintek, and Reunert dominate the South African aerospace defense industry. South African aerospace and defense contractors cover a wide but shallow technological base. This is both its strength but also its weakness. According to some reports, South Africa’s largest single manufactured foreign exchange earner is that of defense, electronics and aerospace systems and components. However,

¹² http://pd.cpim.org/2004/0613/06132004_snd.htm (visited on 12 September 2005) People’s Democracy (Weekly Organ of the Communist Party of India (Marxist), Vol. XXVIII, No. 24, June 13, 2004

¹³ Jorge Niosi (2002) Aerospace clusters and knowledge spillovers, Clusters in high-technology Montreal, UQAM

¹⁴ Articles ‘Flying South’ and ‘Break the Border’, Airplane Economics Magazine, March – April 2005, visited on 29 June 2005

¹⁵ International Marketing Insights, United States Department of State, 2004

¹⁶ Adopted from Eleanor Broad, Ben Choi, Daniel Drum and Sergio Lagunes ‘Embraer’s Creation of Value for Shareholders and the Brazilian Economy’ Columbia Business School, Chazen Web Journal of International Business, 2005

for most high-tech turnkey systems, it is still reliant on imports from largely European suppliers.¹⁷

South Africa has established itself as the only Accredited Maintenance Organisation (AMO) and MRO hub for southern Africa; gaining access to this market also ensures distribution of consumables, rotatables, spares, and the after market into all of sub-Saharan Africa for commercial and general aviation products.¹⁸

Early in 1998, the French company Thomson-CSF (now Thales) bought 50 per cent of ADS. In 1999, the Swedish company Celsius, which was about to merge with SAAB, took 49 per cent of South Africa's Grintek, while DASA, the German component of the European giant EADS, bought 33 per cent of Reutech Radar. In May 2002, a company called Turbomeca Africa was established for the local manufacture of aero-engine components. It was a 49:51 percent arrangement between Denel Airmotiv and Turbomeca, which was itself a joint subsidiary of Rolls-Royce and the French aero-engine company SNECMA. Saab, a Swedish aerospace multinational and BAE, a UK based aerospace giant, have invested approximately US\$ 6 billion in FDI in South Africa, its largest high-technology FDI. The South African government perceives benefits equivalent to Rand 104 billion via offsets, counter-purchase and foreign investment.¹⁹

This signifies a higher dependency on European MNCs for ownership.

¹⁷ US Commercial Service brief on African Aerospace and Defence
<http://www.buyusa.gov/southafrica/en/300.html> (Visited on 1 November 2005)

¹⁸ US Commercial Service brief on African Aerospace and Defence
<http://www.buyusa.gov/southafrica/en/300.html> (Visited on 1 November 2005)

¹⁹ Gillian McEwan (2003) 'Defence offsets and the South African Aerospace Industry' UPE, 7

3. The Indian Civil Aviation Manufacturing Sector²⁰

In 2005, the Indian civil aviation manufacturing industry, located for the most part in Bangalore, India's IT powerhouse, was valued at US\$ 150 million. However it is expected that in the next 3-4 years, it will grow to about US \$1 billion.²¹

The Public Sector

The Indian aerospace industry is for the most part, government owned. Aeronautical Development Agency (ADA), Hindustan Aeronautics Limited (HAL), Indian Space Research Organisation (ISRO), National Aerospace Laboratories (NAL) and Defense Research and Development Organisation (DRDO), all public sector enterprises, form the core of the sector. The lead organisations employ over 50,000 employees and are in operation for over 60 years. However, its size is approximately 0.13 percent of the US industry and one percent of the Chinese industry, indicating a long road ahead. (Refer data in Table 1)

Table 2. Leading Organisations Involved in Aerospace in India²²

Organisation	Main Activity	Whether involved in Civil Airplanes/Transport Airplanes
ADA	Nodal agency for the design & development of Light combat airplane	No
ISRO	Development of satellites, launch vehicles, Sounding Rockets and associated ground systems.	No
NAL	India's pre-eminent civil R&D establishment in aeronautics and allied disciplines.	Yes, but restricted to design
DRDO	Designing, developing and production of state-of-the-art sensors, weapon systems, platforms and allied equipment for Indian Defence Services.	No
HAL	Designing, manufacturing and maintenance of aerospace equipment, civil transport airplane, helicopter and missiles	Yes

NAL, the leading civil aerospace research laboratory, has spearheaded the effort to design and develop HANSA (a two seater trainer airplane) and SARAS (a 14 seater commuter airplane) for the civil sector. However for the most part, NAL has been a research laboratory specialising in aerospace research in complex areas of computational fluid dynamics, experimental aerodynamics, wind tunnel testing, flight mechanics and control,

²⁰ For the most part, information is adapted from the Genser Brochure 2004 available at www.genser.com (Visited on 15 August 2005)

²¹ Andrew Dinsley 'Sector Report: Aerospace (Civil), India', 12 August 2005, UK Trade and Investment

²² Information is obtained from official websites of respective organisations

propulsion, composites, structural design, analysis and dynamics, materials, surface modification, aerospace electronics and systems and parallel processing. Hence manufacturing civil airplanes, though designed at NAL, is outside the scope of NAL.

HAL is without doubt, India's leading aeronautics manufacturer, and is a public sector unit under the Ministry of Defence, Government of India. In 2004-05 the turnover reached a record of Rs. 44250 million, exports of Rs. 1490 million and profit of Rs. 6300 million.²³ However, the percent of defence production to civil production of HAL was 94:6 in 1993-94.²⁴ The transport airplane division of HAL was set up in 1960 to manufacture the HS-748, a medium haul turbo-prop passenger transport airplane. Over the years, it has vastly developed its infrastructure and capabilities and undertaken the manufacture of 15-19 seater multi role utility airplane (Dornier DO - 228), agriculture airplane (HA-31), basic trainer airplane (HPT - 32) and variety of aerospace structural assemblies and components for both domestic and international market.

Apart from the above, some of the main domestic players involved in supplying equipment to the Indian aviation industry include Electronics Corporation of India Limited (ECIL) and Bharat Electronics Limited (BEL), also public sector enterprises.

Table 3. Indian Aerospace Sector: State of the Infrastructure as represented by the leading player

Variable	Current State in India
Government Support	Yes
Research and Development	Private companies are encouraged
Education Institutions	Skill-sets exist in IITs, IISc and IIMs
Skilled Human Resources	Available within the country
Financial Resources	Available through EXIM bank and major banks
Manufacturing Efficiency	Needs to be improved. Augmentation required
Capital Equipment	Needs to be augmented

“India is in a position to manufacture everything, even 100 seater airplanes. However, whether there is an export market for the same, is a more pertinent question. Currently there is a 60 – 100 seater on the drawing board, but this a long term plan, and a conservative estimate would be ten years.”²⁵

The Private Sector

The private sector in India, for the most part, are engaged in seeking outsourced work from Tier I companies in the public sector, and have few exports. The public sector enterprises are supported by over 300 small and medium enterprises, and very few large enterprises with small aerospace activities. The total employment in the private aerospace sector is approximately 15,000 employees, with each company comprising between 20 to

²³ <http://www.hal-india.com/financials.asp> (Visited on 14 October, 2005)

²⁴ Deba R Mohanty (2004), ‘Changing Times? India’s Defence Industry in the 21st Century’, Bonn International Centre for Conversion, Paper 36, 20

²⁵ Interview with Dr. Somashekhar, NALTECH, August 2005

200 employees. Most these organisations are integrated into the supply chains of the public sector organisations.

The supporting organisations are gaining strength in manufacturing and supplying quality components to the lead organisations, though they have limited capacity to engage in activities like global logistics, global marketing, warehousing, project management, legal, administration, global contracts management etc. The lead organisations themselves, as a part of their lean policy, have started outsourcing extensively from these private sector organisations.²⁶

U.S. companies such as Boeing, GE, United Technologies, Raytheon, Honeywell, Northrop Grumman, Lockheed Martin, Textron are already operating in the Indian market. All of the leading foreign aviation equipment suppliers, especially from Russia, Israel, the UK, France and Poland are also active in the Indian market and provide stiff competition to U.S. companies.

In the private sector, Taneja Aerospace and Aviation Limited (TAAL) is the only company to have forayed into the manufacture of commercial airplanes, an activity outsourced from Partenavia of Italy, though currently discontinued. TAAL, along with few other companies such as Pinaki Technologies and Raj Hamsa Ultralight are also involved in manufacturing sports airplanes and microlight airplanes. However these are beyond the scope of this paper. Also, in components manufacturing, Larsen & Toubro, the US\$ 1.7 billion engineering company, is emerging as a player in the air defense equipment manufacturing business.”

Society of Indian Aerospace Technologies and Industries (SIATI), founded in 1991, is the apex chamber of commerce for the aerospace sector. SIATI’s membership comprises of over 300 companies engaged in diverse activities ranging from manufacture of jets to manufacture of cutlery in commercial airplanes.

It is of particular importance to take note that in 1999, the European Association of Aerospace Industries (AECMA) membership, The SIATI equivalent in Europe, comprised of 700 companies dedicated to advanced aerospace and around 80000 suppliers and service companies across Europe which form part of the supply chain for various components, products and services in aerospace.²⁷

Structural Issues in the Indian civil airplane industry

Demand side

The growth rate in the Indian domestic passenger traffic is about 15 percent and will gallop to 100 million by 2010. Over US\$ 25 billion of airplane purchases are lined up in

²⁶ Genser brochure 2004 (Available at ww.genser.com)

²⁷ ‘Aerospace SMES: A Source of Innovation Across Europe’, Speech by General Secretary of AECMA, Peter Fichtmiller at a SME Symposium, Brussels, 1999

the next 5-7 years.²⁸ This is clearly changing the landscape of the manufacturing sector in India. The dominance of the public sector is slowly being balanced by growing role of the private sector. 'This imbalance (between Civil and Defence, and Private and State) is changing, and 2004-05 will be seen as the watershed. Whilst the Indian Defence sector is estimated to be worth over US\$ 12 billion, in 2004 the Indian civil aviation sector accounts for US\$ 22.5 billion worth of foreign exchange transactions annually, whilst another US\$ 96 billion are generated from civil aviation activities.'²⁹

“At the current state of the civil airplane and engines industry, India will have to pay attention to several factors that play a crucial role in developing an internationally competitive aerospace sector.

Firstly, infrastructure is the key factor; good manufacturing facilities, uninterrupted communication systems, public utility services etc are a few areas where the government needs to strive further.

Secondly there are no near profits, and a company has to invest human and financial resources for a long time before breaking even. Hence investors have to plan long term and the concept of fly-by-night operators is non-functional.

Thirdly, certification is the key to market access. A large number of tests relating to tensile strength, temperature, tension etc are required, which involves heavy expenditure.

Fourthly, Indian companies do not have a track record in the civil airplane segment. With credible organisations like Boeing, Airbus and Embraer in the market, there is little incentive for airlines to experiment with newer airplanes.

Finally, import control mechanisms in destination countries and export control mechanisms in India, will play a crucial role, while the latter can be tackled since it is endogenous, the risk of import barriers exists.”³⁰

The Indian aerospace industry is undergoing structural changes. The earlier trend of buyer-seller relationship is increasingly substituted by co-development and co-production. Indian aerospace companies are being considered as Tier II suppliers.

From a strategic perspective, it is important to note that the Indian manufacturers have not been able to capitalise on the current demand of airplanes in India. Also, on account of the long time-lags required for development, one may expect the first commercial output in the form of a 60 – 100 seater airplane by 2020, a period of fifteen years from now.

However there appears a silver lining. Most airlines prefer to maintain a young fleet of airplanes. Air India, which is considered to be maintaining an ageing fleet has an average

²⁸ Economic Times, 28.06.2005 “The Big Asian Aviation Story” M.K. Venu

²⁹ Andrew Dinsley ‘Sector Report: Aerospace (Civil), India’, 12 August 2005, UK Trade and Investment

³⁰ Interview with Ajay Lele, Indian Defence Studies Association (IDSA), July 2005

age of 15 years, while Jet has a younger fleet at four years. There is no ‘average’ retirement age as such, but the age at which 50% of the passenger fleet will be removed at the forecast end-point of 2024 is as follows: 18 years for turboprops, 22 years for regional jets, 28 years for narrow-bodies and 25 years for wide-bodies.³¹ Hence, India may be well placed to capitalise on the steady demand that may arise on account of re-purchases and component replacements.

Since, domestic demand is a crucial variable in the economics of domestic airplane manufacturing, a high domestic demand can boost confidence a long way. This explains, to an extent, the reason why US and Europe are manufacturing airplanes today, and not Japan. However, with the emergence of mandatory MFN treatment within the WTO, the government may not be in a position to directly influence the purchase of domestic airplanes by domestic airlines.

The following key points represent certain structural problems in the Indian aerospace industry:

Lower Salaries and Brain Drain

Salaries at India’s leading public sector enterprise range from Rs. 17000 per month for a qualified engineer with one – two years experience to Rs. 24680 per month for a scientist with seven years experience and a professional engineering qualification. These salaries, even when discounted with purchasing parity, are low, compared to global averages. “Production workers in the aerospace industry earn higher pay than the average for all industries. Weekly earnings for production workers averaged \$934 in aerospace product parts manufacturing in 2002, compared with \$619 in all manufacturing and \$506 in all private industry. Above-average earnings reflect, in part, the high levels of skill required by the industry and the need to motivate workers to concentrate on maintaining high quality standards in their work.”³²

Promoting Private Sector: Intent Deficit

Almost all the private companies interviewed in this survey expressed that strong government backing is crucial, and often necessary for promoting the private sector in the aerospace industry. Some respondents feel that this initiative is half hearted. For instance, offsets, which are being negotiated for purchase of Boeing or Airbus airplanes are exclusively for the public sector and the private sector is unable to gain from the offsets directly.

Recently, HAL has decided to outsource 30 percent of all manufacturing by 2005, and double this figure to 70 percent in two years. It has short-listed 1349 vendors for the same.³³ However the private sector is still completely dependent on the public sector for

³¹ ‘The Outlook 2005’ Rolls Royce, 10

³² Aerospace Product and Parts Manufacturing 38, (NAICS 3364) Employees in Aerospace (SPEEA); and the International Union of Allied Industrial Workers of America. (2002)

³³ Business World, 12 September 2005, Special Report on Indian Aerospace Industry “Ready to Fly”, 48

its revenues, and as a result its enterprise. This excess dependence on the public sector is resulting in integration of supply chains, and a feudalistic relationship, that may also result in the public sector to influence whether a private sector company should or should not engage in exports.

In all countries where aerospace is a large industry, government policies play a major role. The governments in Brazil, China and Russia are the first customers of indigenous products. Further, they encourage the domestic industry by insisting on offset development and manufacturing of planes ordered in large numbers by domestic airlines. The Indian government has done neither of this.³⁴

Also, the private aerospace sector is relegated to producing lower order in the form of alloys etc. Very few companies are involved in complex avionics.

Bureaucracy and Access Control

Since aerospace is primarily defence driven, it operates under immense bureaucratic control. Projects are kept under wrap. Technologies are not disclosed. Clearance requirements are huge. In several instances, the same degree of information is freely available on the internet and more sophisticated material is accessible from foreign universities. However Indian authorities are happy classifying information as confidential, thwarting the growth of the sector.

Standards are one of the biggest access barriers faced by the private sector today. International standards required to penetrate global markets are very expensive. Also, Indian standards such as those set 'military grade' products set by the Directorate General of Civil Aviation

Lack of a Development Model

HAL started work on the Advanced Light Helicopter in 1984, but the first sale happened in 2002, a development period of 18 years. Such similar delays in the development of aerospace components for instance engines, reveals need for improvements in project execution. In the US, the time required for conversion of a drawing board design to a model is two-three years, while in India, even for leading companies it is 15 years.

³⁴ Business World, 12 September 2005, Special Report on Indian Aerospace Industry "Ready to Fly", 48

4. Current State of International Collaborations

Collaboration in Civil Aviation Manufacturing

India is emerging as a hotspot for global airplane manufacturers, not just as a market but also as an outsourcing destination.

Boeing chose HCL Technologies as a software development partner for the 787 Dreamliner. According to Boeing's Senior Vice-President Thomas Pickering, HCL Technologies will focus its software development services on two aspects of the 787 programme. First, it will provide a hosting platform for the flight test computing system to support the requirements of the 787 global team. Second, the company will be providing software development services to many of the 787 systems partners."³⁵

Boeing is also working with the Indian Institute of Science (IISc), Bangalore, in a strategic alliance to conduct research in aerospace materials, structures and manufacturing technologies. The alliance with IISc will provide innovative ideas and help infuse the best of these technologies into Boeing. The focus of the Boeing-IISc strategic alliance spans the range from nanotechnology, structural alloys, composites, smart materials and structures, process modeling and simulation, manufacturing technologies and prototyping through substructure fabrication and testing. These are technologies of critical importance to the future of aerostructures.³⁶

HAL is presently supplying A320 doors to Airbus of the value of US\$ 80 million. It is likely to gain an estimated \$540 million of business from Airbus as part of a 30 percent 'offset' obligation, which the airplane maker has to fulfil, while selling planes to India.³⁷ Airbus has clearly said that it would eventually source about half of its components from suppliers outside Europe, double the current level, as a way to boost its global reach (market access) and cut costs.³⁸ This represents newer opportunities for India's aerospace sector.

Airbus's new venture A-380, which completed its maiden flight on 27 April 2005 and has received confirmed orders for 159 airplanes and commitments from 16 buyers, also represents gains for India's aerospace sector. Airbus has industrial relationships with Infosys, HCL Technologies, Midhani, Computervision and Videocon in India. Infosys worked on the design and development of the top and bottom skin extensions within the inner fixed trailing edge for the A380. HAL, based on a successful A320 engagement, is involved in talks with Airbus to develop components for the A380.³⁹

³⁵ BBC, 9 February 2005, <http://news.bbc.co.uk/2/hi/business/4250223.stm> (Visited on 1 October 2005) and HCL Official Press Release, February 2005

³⁶ 'Indian IT's pie in the sky' The Financial Express, 25 July 2005

³⁷ Economic Times, 14 December 2004, <http://economictimes.indiatimes.com/articleshow/957925.cms> (Visited on 22 August 2005)

³⁸ 'Airbus to outsource more work outside Europe' Reuters, Tokyo, 26 October 2005

³⁹ 'Airbus betting big on Indian IT skill', Silicon India, 22 June 2005, based on press briefing with Airbus Regional Press Manager David Velupillai.

Both Boeing and Airbus are competing aggressively over contracts in a growing Indian airplane market, with buyers ranging from Air-India to a host of private carriers. Indian Airlines had decided to buy 43 airplanes from Airbus. Industry sources say that apart from prices, counter-purchase agreements and offsets are playing an important role in securing contracts from public sector enterprises. It has also been pointed out that more work will be outsourced to India as most of the orders from the state-run carriers will be linked to counter-purchase agreements, signifying growth in Boeing and Airbus outsourcing in India.⁴⁰

Snecma, a French engine manufacturing company and HAL are setting up a 50:50 joint venture to manufacture components for engines such as the CFM56 of America's General Electric, which powers some Boeing and Airbus airplanes. Snecma will transfer technology to the joint venture company, providing HAL additional export avenues and greater access to civil aerospace industry. Apart from civil airplanes, the joint venture also focuses on helicopter engines.⁴¹

The EU-India Civil Aviation project, supported by the European Commission, the Ministry of Civil Aviation in India, the European Association of Aerospace Industries (AECMA, representing the European aerospace manufactures), Hindustan Aeronautics Limited (HAL) and SIATI (Society of Indian Aerospace and Industries), is focussed on strengthening civil air safety and stimulates cooperation between the EU and Indian civil aviation authorities and aerospace industries. With a total investment of EUR 32 million (approximately Rs. 1590 million) contributed by the EU, the Government of India and the European aerospace industry, this project, the largest EU-India joint economic cooperation project, was formally launched in February 2001.

The Aero technologies summit held in Bangalore, India from 26 - 28 November 2004, was the most significant single event under the EU-India Civil Aviation project. The aim of the summit was to foster business relationships between European Indian companies comprising four sector: airplane, engines, equipments and space. Leading aerospace companies from EU and India participated in the summit. There were about two hundred delegates representing 35 European companies and over 40 Indian companies.⁴²

Maiden Entry in Regional Jets: A long Way to go

SARAS is a serious attempt by Hindustan Aeronautics Ltd. to move up the ladder from being a Tier II components manufacturer to a full-fledged manufacturer with an independent brand in civil aerospace. With a development cost of Rs. 1570 million, certification is expected by 2007.⁴³

40 <http://www.indiadaily.com/editorial/1559.asp> (Visited on 15 October 2005) 'Boeing and Airbus rush towards India to outsource services and software' Sonal Chopra 9 February 2005

41 'HAL, Snecma sign agreement on JV' Business Standard, 21 July 2005

42 SIATI <http://www.siatiaero.com/siati.html#6> (visited on 18 September 2005)

43 Business World, 12 September 2005, Special Report on Indian Aerospace Industry "Ready to Fly", 41

The prototype, flown by NAL in 2005, weighed 5118 kg, which is disturbingly high, close to 25 per cent higher than the design empty weight of 4125 kg. On being questioned about this overweight, NAL's project director said it was a "minor problem" which would be corrected in due course of development. Fact of the matter is that a 25 per cent weight penalty is huge and reducing it will take considerable work including some re-designing, especially since the prototype carried only 4 seats and few of the fittings and attachments.⁴⁴

While NAL has claimed that Saras would cost anywhere around "a third less" than comparable airplane, several experts have estimated the cost gap to be less than 15 per cent, considering the extent of foreign sourced components including the engine, and especially taking into account the possible poor economies of scale even with the projected demand of around 250 airplane in 20 years.

There is also considerable competition from smaller airplane in the commuter and even in the executive segment such as the widely sold and famous planes from Beechcraft, Piper and Citation, which are nowadays also available on lease on quite favourable terms.⁴⁵

Collaborating on Regional Jets: Tying with Traditional Partners

The Russian manufacturer Ilyushin, maker of many famous large civil and military transport airplane including several in service in India, had proposed a collaboration agreement with HAL in the early '90s to make airplane in the feeder airplane segment. The project was sought to be pushed during several high-profile visits by Russian government leaders to India. Even MoUs were signed but the project never even reached the drawing board stage. Today, the market for regional airplanes is nearing saturation with each of the three big players including Embraer having roughly 30 per cent market share. The Russians are still trying with different potential partners including China, but the task is proving increasingly difficult with over US\$ 30 billion worth orders having been placed for this class of airplane.⁴⁶

In 2005, HAL publicly expressed enthusiasm in moving ahead with exploring a long-term plan to develop a 60–100 seater airplane. During the MAKS 2005 Airshow, HAL evinced interest in exploring the possibility of forming a joint venture with the Russian Sukhoi airplane manufacturer to produce a passenger jet.

Under the Russian Regional Jet (RRJ) programme, Sukhoi Aviation Holding is developing a family of jets to carry 60 - 95 passengers. Co-designed by Boeing, the jet is scheduled to make its maiden flight by 2007 with deliveries set to begin in 2008. Sukhoi proposes to sell 800 jets by 2020. HAL has already appointed SBI Capital as financial consultant to evaluate the viability of investing in the Russian-led consortium to manufacture a family of regional jets for the global market. India has already expressed

⁴⁴ http://pd.cpim.org/2004/0613/06132004_snd.htm (visited on 12 September 2005) People's Democracy (Weekly Organ of the Communist Party of India (Marxist), Vol. XXVIII, No. 24, June 13, 2004

⁴⁵ *ibid*

⁴⁶ *ibid*

its intention to invest US \$100 million in the venture, which expects to corner about 16 per cent (about 800 airplane) of the total market share for the short haul airplane.⁴⁷

The future plans of HAL Transport Airplane Division (TAD),⁴⁸ enumerated below, clearly indicate an ambition to focus on regional jets

- 14 seater Saras airplane, under development at National Aeronautical Laboratory (NAL), Bangalore, will utilise intricate CNC parts like Wing Panels as well as Assemblies built at TAD Kanpur. Division is presently participating in Design and Prototype Development of Saras and series production is planned at TAD Kanpur.
- Series production of 100 seater Multi Role Transport airplane will be taken up by TAD Kanpur. The airplane is under co-design and development at HAL's Airplane Research and Design Centre, Bangalore in association with Russian partners.
- Co-production of 50-70 seater ATR-42/72 airplane from Phase-II (Assembly from knocked down kits), to meet the requirements of various Civil and Military operator is planned at TAD.

⁴⁷ http://www.aviasalon.com/en/news/HAL_INDIA_29-08-05 (Visited on 29 August 2005)

⁴⁸ As available on the official website

5. IBSA Relationship in the Civil Aviation Manufacturing Sector

*Trade Relationship*⁴⁹

HAL has no trade relationship with Brazil. Apart from small components on communication systems, for instance Multi-Sensor Warning Systems from Avitronics, for the Advanced Light helicopter, there is no major import from South Africa. Also, exports to South Africa relate to spares, and repair, and are very small.⁵⁰ The major imports come from US and EU, while the major exports are diversified across a large number of countries namely US, France, UK, Malaysia, Mauritius, Nepal and Namibia. HAL's exports have also constituted a small component of its imports. For instance in 2004-05 HAL's imports were Rs. 26810 million while its exports were Rs. 1490 million.

Amongst the ten leading private sector companies, the apex private sector business chamber for aerospace, SAIPI and the leading private sector facilitating organisation, Genser, none have any trade relationship with Brazil or South Africa.

In general, the aerospace industry in India is well informed. All respondents were aware of Embraer, Brazil, and a host of South African companies such as Denel and Grintek.

HAL and Embraer have been interacting in the past few years. HAL has expressed its interest in cooperating with Embraer on outsourcing of work packages for various programmes, establishing a regional service centre of Embraer and marketing of Embraer's transport airplane in South-east Asia.⁵¹

HAL's interaction with Denel is quite limited. As part of CII's Defence Industries Mission to South Africa in November 2002, HAL's representatives visited Denel to discuss on business opportunities. However no further movement has taken place.

NAL also have no trade relationship with Brazil or South Africa. NAL is a constituent of the India Council for Scientific and Industrial Research (CSIR), hence it is not in a position to independently decide on international collaborations, but its engagements are based on the collaborations established by CSIR.⁵²

India's only private sector player, which has ventured into manufacturing of small business airplanes, TAAL, has no economic relationship with Brazil or South Africa.

SIATI was not aware of exports going to or coming from Brazil and South Africa, However there were aware of visits by representatives of companies from these countries.

⁴⁹ This section deals exclusively with the relationship between civil aerospace manufacturers and not between manufacturers are commercial airlines. Embraer purchases by Indian companies are covered elsewhere in the section.

⁵⁰ Official position of Hindustan Aeronautics Ltd (Interviewed in August 2005)

⁵¹ Official position of Hindustan Aeronautics Ltd (Interviewed in August 2005)

⁵² Interview with Representative, Nal-Tech, (Interviewed in August 2005)

In terms of awareness, while companies were informed of aerospace companies in South Africa and Brazil, namely Denel, Aerosud and Embraer, none were aware of the IBSA initiative.

The respondents were asked whether IBSA countries can cooperate on developing a 60-100 seater airplane. The following matrix summarise the general opinion, regarding complementarities amongst IBSA countries.

Table 4. Cooperation on Regional/Feeder Jets: Exploring Complementarities

Country	Core Strengths in Airplane manufacturing	Concerns/Why benefits may not arise
India	Defence airplanes	<ul style="list-style-type: none"> - Offsets from Boeing and Airbus may benefits the domestic industry more than an IBSA airplane - The Indian industry does not have an aerospace brand of international repute. - India has yet to manufacture an airplane above 20 seats, so the first step is to outsource assembling and component manufacturing for international company.
Brazil	Commercial Airplanes	<ul style="list-style-type: none"> - An IBSA airplane will cannibalise on sales of a highly successful Brazilian manufacturer, Embraer - Brazil may not gain any value by cooperating with India and South Africa, since its civil manufacturing industry is quite advanced.
South Africa	Electronics, in particular communication and security systems	<ul style="list-style-type: none"> - South Africa may not provide enough advantages, to be included as a joint venture partner. - Though its location is ideal, it may face pressure from US AND EU, since a substantial part of the private aerospace industry is FDI from the US and EU.

A leading researcher, tracking the Indian civil aerospace industry elucidated, “An IBSA airplane is too ambitious. Firstly there is direct competition to Embraer, which the Brazilian government will be concerned about. Secondly, what form of value addition will South Africa contribute, is an important question to ask? Thirdly if these countries are already linked to European and US consortiums it will be much more difficult to develop parallel capabilities.”⁵³

⁵³ Interview with Ajay Lele, Indian Defence Studies Association (IDSA), July 2005

Lack of Traditional Relationship

Within the industry, respondents felt that IBSA countries were not traditional defence and aerospace partners. “IBSA cooperation on aerospace, is difficult to digest. Geopolitically, India-China-Russia could be a more useful partnership, given the geographical proximity and huge markets.”⁵⁴

Also, from a economics perspective, there were no unique advantages that the IBSA cooperation could provide. “Cooperation with Brazil and South Africa on aerospace may not provide any competitive advantages over cooperating with other countries.”⁵⁵

India intends to align with traditional partners on the aerospace sector. Firstly South Africa has never been a traditional aerospace collaborator. The South African government has bought defence related products in the past including few HAL helicopters, however India has not bought much from South Africa, in the aerospace sector, except recently, some communication and electronics for defence manufacturing i.e. the Advanced Light Helicopter (ALH).

The China Factor

The Chinese government has listed aviation as a strategic sector, and is expanding international cooperation, and increasing investment at all levels, with the most important share going to manufacturing. China has a strong background in manufacturing regional airplanes, with a string of successful ventures starting from Yunshu 7, shelved 20 years ago, followed by Yun-12, and now a modern airplane Ark-60, a 60 seater, which can travel for 1600 kms at a stretch at a maximum speed of 506 km/hr. Xian Airplane Industry, one of the 150 manufacturing companies of the Chinese umbrella manufacturer China Aviation Industry Corporation (AVIC), claims that the operational economics of the airplane are a third cheaper than the similar models in the market, while industry sources estimate the price to be approximately US\$ 7.75 million.⁵⁶ Clearly the benchmarks are set, for exploring another regional airplane.

In December 2002, Embraer entered into a joint venture with subsidiaries of AVIC. The agreement provides for the manufacture, sale, and after-sale support of the ERJ 145 (Embraer Regional Jet 145). Embraer owns 51 percent of the joint venture. Thus, Embraer may not be in a position to explore strategic collaboration with newer partners in Asia.

The US Department of Commerce lists China as the biggest competitor to US aerospace industry in the future.⁵⁷ In the same report, it lists Russia, Japan, South Korea and China as most significant non-US and non-EU aerospace suppliers, and does not mention India

⁵⁴ Interview with Vippan Raj Dutt, Indian Airlines, July 2005

⁵⁵ Interview with Dr. Somashekhar, NALTECH, August 2005

⁵⁶ ‘China’s leap forward’, Airplane Economics Magazine, 2005 (Visited on 29 June 2005)

⁵⁷ ‘The US Jet Transport Industry: Competition, Regulation, and Global Market Factors Affecting U.S. Producers’, U.S. Department of Commerce, March 2005

or South Africa as countries with a small aerospace sector. However, it does cover Embraer, Brazil as a leading global producer of regional jets.

Distances will increase costs

Aerospace is a cluster-based industry. Close proximity is of crucial importance. Considering that IBSA countries are geographically non-contiguous, logistics costs would be prohibitive. Further linking supply chains across three continents will pose another coordination problem.

Dominance of South-North Relationship

The most industrialised economies of the world have accounted for nearly all the aerospace collaborations of India. Boeing and Airbus, and their partners are playing a dominant role in record-breaking outsourcing activities from India. In addition, technology transfer and MRO activities are gaining momentum. The same is true for Brazil and South Africa.

Even in aggregate terms, in 2005, India's trade with G8 countries, the most industrialised nations (US, Canada, Italy, the UK, France, Germany, Japan and Russia), increased by 17 per cent to reach \$48 billion, and accounted for 25 per cent of the nation's total trade with the world. The share of India's exports to G8 countries, constituted 33.6 per cent of its total exports in 2004-05, while the share of G8 imports declined from 22.5 per cent in 2003-04 to 20 per cent in 2004-05 in dollar terms.⁵⁸ This is a beneficial trend for India.

The following matrix maps the opinion of industrial representatives, on whether IBSA countries can develop an airplane suitable for Southern countries, that what is currently available.

Table 5. Scope for an IBSA Airplane: Based on An Opinion Mapping Exercise

Characteristics of a Southern airplane	General opinion on whether an IBSA airplane would meet these requirements better than what is currently available	Reasons
Cheap	Not necessarily	<ul style="list-style-type: none"> — Logistics would be expensive given the distances between the three countries — Boeing, Airbus, Embraer can lower costs on account of initial sunk costs — India first experience in manufacturing Saras, revealed that the cost advantage was less

⁵⁸ 'India's trade with G8 countries up', The Economic Times: 11 July 2005

		than 15 percent
Rugged	Not necessarily	<ul style="list-style-type: none"> - The global aerospace sector works on a very high quality coefficients and currently available airplanes have required international certification, and are quite suitable to Southern requirements. - Further, most airplane manufacturers have often customised their planes to suit buyer demands - Finally there is no concept of 'differential standards' for the South, since aerospace is a sector, which follows strict norms of certification, maintenance, replacement and testing.
Fuel Efficient	Not necessarily	<ul style="list-style-type: none"> - Currently the leading aerospace companies in the North are also the leading research hubs for fuel saving technology.
Comparative Advantage	Not necessarily (for India)	<ul style="list-style-type: none"> - India does not have a comparative advantage in manufacturing civil airplanes. According to several industry representatives, gains from investing one rupee in IT or biotechnology related infrastructure would be much more than the same investment in airplane manufacturing.

Areas of Cooperation: Industry Perceptions

Currently, India finds itself in a confused state as far as aerospace cooperation with Brazil and South Africa are concerned. In the short term, it poses a strong competitor for South Africa in the MRO and component-manufacturing segment, while in the long run, its ambitions to develop a regional jet may result in competing with Embraer, Brazil's global face in global aerospace. In such circumstances, cooperation possibilities, clearly lie in areas outside civil airplane manufacturing.

IBSA countries can cooperate in the civil aerospace sector, but not necessarily in civil airplanes, where 'cooperation complementarities' are low, and trade complementarities

may be high. India has superior technology in space technologies India is one of the fewer countries to develop a launching vehicle that can be used to launch satellites in different orbits, for instance Polar Satellite Launch Vehicle (PSLV) and Geosynchronous Satellite Launch Vehicle (GSLV). India is helping the US launch a satellite, and is also an equal partner in the European “Galileo Project”, a three billion euros project, which after completion will be a constellation of 30 satellites orbiting at an altitude of 24,000 kms. India be investing approximately US\$ 200 – 300 and will also develop and launch satellites under the project.

India can help Brazil and South Africa in their satellite related requirements such as communications and weather forecasting.⁵⁹

Embraer offers an excellent range of regional jets. Paramount Airways, is Embraer’s first customer for the new ERJ 170, and has ordered 5 jets, two 70-seat ERJ-170 aircraft and three 78-seat ERJ-175s. Brazil is well positioned to cater to the growing demand of regional jets in India.

Within the domain of cooperation in civil airplane manufacturing, HAL expressed interest in the following areas of cooperation with Embraer⁶⁰

- Outsourcing of manufacturing
- Regional service centre for Embraer in Asia
- Marketing of Embraer’s transport airplane in Asia

In South Africa, HAL is interested in sale of components, however not particularly in civil aerospace.

SIATI stated that future aerospace cooperation, if envisaged within the IBSA initiative should involve shared research and development, joint marketing arrangements and technological exchanges.

Maintenance, repair and overhaul (MRO)

The global MRO market including modifications, airframe heavy maintenance, component maintenance, line maintenance and engine maintenance is worth US\$ 38 billion. Since airplane maintenance is a labour intensive enterprise, it is estimated that maintenance shops charge US\$ 35 per man hour in El Salvador (South America), US\$ 45 per man hour by independent maintenance providers in the US and US\$ 65 per man hour for in-house maintenance by US airline companies.⁶¹

If India is in a position to beat these numbers, it can explore the MRO market more seriously, particularly for Embraer in the Asian market.

⁵⁹ Interview with Ajay Lele, Indian Defence Studies Association (IDSA), July 2005

⁶⁰ Official position of Hindustan Aeronautics Ltd (Interviewed in August 2005)

⁶¹ Articles ‘Flying South’ and ‘Break the Border’, Airplane Economics Magazine, March – April 2005, downloaded on 29 June 2005

In terms of available infrastructure including engagement of the private sector, India is well suited to play an important role in the MRO segment, on account of its emerging strength as an outsourcing destination. The following table enumerates India's strength in systems that are required for being a strong MRO player.

*Table 6. India as an Outsourcing Destination*⁶²

System	Components	Indian Companies
Aero engines	Inlet casing, fan, combustion chamber, turbine blade, vanes, nacelle	Quest, Infotech Enterprises, TCS
Aero Structures	Wing, fuselage, doors, pylon, bulkheads, keels, tailcones	Infosys, HCL, Quest, CADDES, CMS Software
Accessories	Gear box, sensors, clamps, airplane interiors, precision components, landing gear, actuators, pumps	Accord Software, HCL, Genser Aerospace, Taneja Aerospace
Ground Support System	Test rigs/bed, transportation stands, lifting equipment, belt loaders, precision measuring equipment (gauges)	L&T, NEST Avionics, Tata Power
Avionics	Flight control systems, flight management systems, cockpit displays, communication devices, navigation systems	HCL, Silver Software, Accord Software, Wipro

While South Africa may not gain from MRO activities in India, firstly because it is an MRO leader in Africa, and secondly because it does not have a manufacturing base that requires MRO services. On the other hand, Brazil may require to set-up MRO operations in India, as the number of Embraer clients grow in India.

⁶² Source: P. Hari, 'Ready to Fly', Special Report on Indian Aerospace Industry, Business World, 12 September 2005, 43

7. Concluding Remarks

In the first section this paper provided a justification of the choice of the civil airplane-manufacturing sector in the context of the IBSA initiative. Section II gave a brief summary of the global industry, along with the South African and Brazilian industry. Section III described the civil aviation-manufacturing sector in detail. Section IV gave a glimpse of the exposure of the sector to global collaborations, followed by its engagement with regional jets. Section V focussed on the current state of business relationship between IBSA countries in the civil aviation-manufacturing sector, revealing the inadequate level of trade. Based on a survey of major players in India, it suggested that IBSA cooperation on a regional jet was not a feasible idea. However, IBSA countries could explore other avenues, for instance collaborating on research and development.

The key messages of the survey were

1. Competing with Boeing and Airbus through a South-South cooperation should not be the aim of the IBSA Initiative on aerospace
2. IBSA countries may not be able to collaborate on a smaller feeder airplane due to conflict of interests
3. IBSA countries should engage in rational cooperation relating to component manufacture, joint research and development and MRO activities
4. IBSA countries should continue to collaborate with key strategic partners, which is clearly in the best commercial interests of the three countries
5. As expressed by few respondents, investment of one dollar in promoting domestic manufacture of an airplane will yield lesser benefits than the same investment in IT or biotechnology. Hence India should focus on sectors of comparative advantage.
6. India can play an important role in the space sector, which is an emerging area of competence. These include satellites, launch pads and collaboration on space and communication programs.

This paper suggests that commercial relationships cannot be based on political proximities. Within the IBSA relationship, as well as future Indian engagement with regional cooperation it is necessary to ensure meaningful economic gains, which is clearly the foundation on which cultural and political relationship can deepen.