AIR TRAFFIC MANAGEMENT

Deliberations

- INTERVIEW: S.R. RAGHAVENDRA RAO OF AAI
- AIR SPACE MANAGEMENT
- PLUS - IGRUA: THE BEST FLYING TRAINING INSTITUTE
- INTERVIEW: TONY FERNANDES OF AIRASIA
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Air traffic management solutions for India.
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With air travel having become less expensive, the problem of air space management has acquired greater importance.

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Next Issue: Aviation as a Tool of Corporate Management
Managing Air Traffic

With air travel having become less expensive, the exercise of maximising the number of aircraft that can be packed into the finite air space available, has acquired greater importance.
AFTER NEARLY TWO YEARS IN the doldrums, the Indian airline industry is once again beginning to display signs of vitality. The volume of passenger traffic is growing steadily and the mood in the airlines is generally upbeat. However, it will take some time for the huge losses the airlines have collectively accumulated in the recent past, to be wiped out. The optimism is palpable even in the national carrier Air India that with cumulative losses touching ₹17,000 crore is deeper in the red than the private airlines and may take years for complete recovery.

Prospects of the return of prosperity in the industry has rekindled the spirit in training establishments related to civil aviation. Rajkumar takes a guided tour of Helicopter Academy to Train by Simulation of Flying (HATSOFF). This recently commissioned ₹300 crore facility is indeed a boon for the trainees and helicopter operators in the country alike as it provides the badly needed quality rotary wing training at competitive cost practically at their doorstep. As for training in the fixed wing regime, Vasuki Prasad delivers an insight into the Indira Gandhi Rashtriya Uran Academy (IGRUA), a premier civil flying training establishment that under the management control by CAE, is set on a growth trajectory to meet with future demand of pilots for the civil aviation sector. IGRUA is clearly ahead of other flying training establishments in the country.

S.R. Raghavendra Rao, Executive Director, Planning, Airports Authority of India (AAI) in a conversation with Mahesh Acharya elaborates on the current situation, ongoing and future projects as also the imponderables that impinge on the planning process and limit options for the AAI. A.K. Sachdev looks at how performance based navigation (PBN) has the potential to resolve some if not all the problems that afflict air traffic management in the country. In fact a seminar by the Air Traffic Controllers’ Guild (India) scheduled for October 20-21, 2010 for which SP Guide Publications is a corporate sponsor, will focus on the larger issue of developing India as an “aviation business hub”. There is an inescapable need for balanced focus on all sectors of the industry especially on the infrastructure segment.

In an interview with SP’s, Tony Fernandes, the CEO of Air Asia recounts his bold venture to jump into the fray and take over the Malaysian Government-owned heavily bleeding AirAsia and not only successfully turn it around but is determined to make AirAsia the largest foreign carrier in India. While dealing with the airline industry in India, Joseph Noronha points out the irony that even as a nuclear power aspiring to undertake manned space missions and with one of the fastest growing aviation industries in the world, India continues to be totally dependent on foreign sources for airliners. In his second article, Joseph Noronha reviews the opportunities and challenges that lie ahead on the global scene for the aerospace majors—Airbus, Boeing and Bombardier. Welcome aboard and happy landings.

B.K. Pandey
Editor
INFRRASTRUCTURE

Integrated ATF Facility at Mumbai Airport
Mumbai International Airport Limited (MIAL) and public sector oil companies IOCL, HPCL and BPCL are to jointly develop a single integrated aviation fuel outlet for airlines at Terminal 1A of the Chhatrapati Shivaji International Airport (CSIA). MIAL and the three public sector oil marketing companies will set up Mumbai Aviation Fuel Farm Private Limited, a joint venture company in which each of the entities would hold 25 per cent stake. Currently, each of the oil marketing companies operates its own oil supply facility. Sanjay Reddy, Managing Director, MIAL said in a press statement that it was an important milestone in the transformation of CSIA and MIAL. The JV company will create a modern and efficient aviation fuel facility to cater to the needs of airlines operation from CSIA.

BAPL
BAPL is in the process of developing an aerotropolis in the Dungapur-Asansol region over approximately 2,300 acres of land which would comprise an airport, industrial park and logistics hub, IT park, supporting township including a solar valley which will be a solar power equipment manufacturing hub. The total project is valued at ₹10,000 crore. West Bengal Industrial Development Corporation (WBIDC) is in the final stage of the land acquisition process.

Mumbai airport saturated
Speaking at a roundtable titled ‘Mumbai’s Second Airport: Time to Think Big’, jointly organised by Observer Research Foundation (ORF) and Bombay First, S.K. Datta, Executive Director, Jet Airways stated “Managing operations at Mumbai airport, which has nearly reached saturation in terms of airline traffic, has become a nightmare. Irrespective of when and where the second airport is developed, the government must as an interim measure, increase the existing capacity and efficiency of the current airport. If this is not done urgently, airlines would be forced to discontinue flights to Mumbai. As per aerospace analyst Hormuz P. Mama who has prepared a detailed report for ORF, the proposed airport at Navi Mumbai would be a gross mistake as with a maximum annual capacity of 50 million passengers, it would reach saturation in 25 years after commissioning. When that happens, Mumbai will not have land available for the development of a third airport. While there is much debate on the environmental aspect, the more serious problem is that the site is too small for an airport of adequate size for Mumbai. Delhi airport is being developed with a capacity of handling 100 million passengers annually.

Bellary Airport Project
The Government of Karnataka has awarded the contract for development and operation of the Greenfield airport at Bellary by Chennai-based Marg Limited, a diversified infrastructure development company. Marg will develop the required infrastructure for the project, which is expected to be completed in 24 months from the date of signing of the contract. In December 2008, Marg was awarded a 30-year contract by the Government of Karnataka to design, develop, operate and manage the Greenfield airport at Bijapur under the public-private partnership (PPP) model. In addition to terminal buildings, runways and control tower, Marg will develop access facilities and build utilities necessary to serve the airport during the operational phase. It will undertake development of amenities and other infrastructure like an aviation academy, convention centre, business parks, shopping mall, flying club and entertainment parks. Bellary is on the threshold of development with companies from diverse sectors looking to set up facilities in the region, with steel being a key sector.

GVK’s plans for Bangalore Airport
GVK Power & Infrastructure, which owns 29 per cent of Bangalore International Airport Ltd (BIAL), plans to buy Siemens Project Ventures’ 40 per cent stake in the airport and take majority control. GVK emerged as the second-largest stakeholder in the company with 29 per cent earlier this year after acquiring 17 per cent in BIAL from India’s largest engineering firm Larsen and Toubro (L&T) for ₹686 crore. It also bought out Zurich Airport’s stake for ₹484.6 crore last year. Both deals were priced at ₹105 a share. The Karnataka government and the AAI together hold 26 per cent. Zurich Airport still holds a 5 per cent stake. The Bangalore airport is valued at ₹5,000-6,000 crore. Siemens, despite holding a majority stake in BIAL, plays no role in the management. The engineering major built the airport along with L&T, and is required to stay invested for a specific period, in accordance with the terms of the ownership agreement. The company’s lock-in period ends only in 2015, though it can dilute 14 per cent in June 2011 and a further 26 per cent in 2015. GVK also plans to invest ₹1,000 crore in expanding and modernising existing facilities. Terminal 1 capacity will be expanded from the existing 11 million to 17 million passengers by 2012. Work on the second terminal would start in 2011 and would be completed by 2015.

REGULATORY
WTO verdict
As per European government officials, a ruling by the World Trade Organisation (WTO) has found that Boeing received illegal aid from the US government agencies. With an earlier WTO ruling going against Airbus, European officials have again called for a negotiated settlement to a bitter battle with the US over aircraft subsidies. Both the US and the EU filed charges related to illegal subsidies against each other at the WTO after the former President George W Bush unilaterally walked out of a 1992 aircraft-aid accord with the EU. A WTO ruling can invite sanctions against countries that fail to comply with its rulings. The report follows hard on the heels of a WTO decision in June that Airbus SAS received aid worth billions of Euros from low-interest government loans to develop planes, including the A380 superjumbo. Now, with both sides held at fault for breaking rules, the verdict increases the chances of a negotiated settlement over the issue of aid to plane manufacturers. The battle between American Boeing Co and European Airbus SAS became increasingly bitter with Airbus overtaking Boeing in the market for commercial aircraft in 2003.

INDUSTRY
Caribbean Airlines becomes new ATR customer
European Turboprop manufacturer ATR and Trinidad and Tobago’s Caribbean Airlines have announced the closing of a deal for the purchase of 9 ATR 72-600 aircraft. With this $200 million order, Caribbean Airlines will become a new ATR operator. The aircraft are configured with 68 seats and equipped with the new ATR-600 series avionics suite and with the new Armonia Cabin. Deliveries will start in late 2011. With its fleet of brand new ATR 72-600s, this flag carrier will replace its current fleet of five Dash-8 300 aircraft, while adding new frequencies linking Trinidad and Tobago and surrounding destinations.
of Boeing in India, “There is strength and resilience in the Indian commercial sector. The potential for future growth of air travel, both domestically and internationally, is among the greatest in the world,” he said.

**Flydubai secures billion dollars aircraft financing**

Dubai’s first low-cost airline flydubai has announced aircraft financing worth more than $750 million in deals with General Electric Capital Aviation Services and BBAM. The financing will take care of the next nine aircraft flydubai is due to receive and secures all the airline’s financing requirements until June 2011. Both deals are eight-year term sale and leaseback agreements. The agreement with GECAS is for six aircraft, taking the total number of flydubai aircraft GECAS finances to 10. BBAM are adding another three aircraft to meet their total commitment of six.

**IndiGo to acquire 150 aircraft**

The government has cleared IndiGo’s proposal to acquire 150 Boeing aircraft worth around $2.7 billion. IndiGo, which currently operates a fleet of 21 aircraft, will induct seven more in the current calendar year as it launches overseas flights. The airline plans to operate around 50 aircraft by 2014. The empowered committee of the Civil Aviation Ministry has cleared the acquisition of 46 new aircraft for over $4.07 billion by the three low-cost carriers, SpiceJet, IndiGo and JetLite. Deliveries will begin from November this year, coinciding with the US President Barack Obama’s state visit to India. Of the new acquisitions, Boeing has orders for 32 aircraft while Airbus has 14. Government clearance for purchase of airliners by SpiceJet comes nearly six months after the in-principle approval to rival IndiGo to buy 150 new aircraft.

**SpiceJet to acquire 30 Boeings**

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**GoAir seeks advance delivery of aircraft**

With domestic air travel growing, in order to expand quickly, budget carrier GoAir has asked Airbus to advance delivery of 10 aircraft by a year. GoAir had ordered 20 Airbus aircraft in 2007 for $1.2 billion and has taken delivery of 10 of these. It expects to receive the remaining aircraft by March 2013 as against the earlier time line of April 2014. As per the airline, prospects of growth in the Indian air travel market was good and the domestic market was likely to get a further boost in the forthcoming festival season. With improving aircraft utilisation and control on costs, the airline hopes to break even in 18 months from now. The airline would be able to undertake international operations only after it achieves a fleet strength of a minimum of 20 aircraft. Currently, the focus is on exploiting opportunities in the domestic market.

**787 Dreamliner delivery delayed**

Already behind schedule by nearly three years, issues related to the Rolls-Royce engine would further delay delivery of the futuristic 787 Dreamliner to the first quarter of 2011. The much-awaited futuristic aircraft, which has created an aviation industry record by being the largest selling aircraft before launch, promises customers big advances in aviation technology and up to 20 per cent fuel savings on the long-haul routes it is meant to fly. In an age of dramatically rising fuel prices this was a major USP for the aircraft along with its design, avionics and passenger comfort. Launched in 2004, the Dreamliner programme was supposed to result in first deliveries to launch customer All Nippon Airways in 2008. A string of technical glitches but primarily supply-chain related problems saw the first flight being made only in December 2009. Apart from futuristic technology, the programme also attempted a very ambitious globalised production plan with parts being sourced from various centres around the world. This resulted in qual-
ingly seen as a vital corporate tool? In the US, hundreds of Fortune 500 companies now flaunt their own aircraft, with companies arguing that this vital conveyance saves time and boosts productivity. A recent CNN report quoted Mitsubishi Heavy Industries, Japan’s first passenger jet manufacturer, as saying, “The MRJ is based on MHI’s cutting-edge technology used in the development and manufacture of both military and commercial aircraft. MHI will be responsible for production of major components such as fuselage, wing, empennage, core system and for final assembly and equipment installation. With its state-of-the-art aerodynamic design, noise analysis technologies and a game-changing engine, the MRJ will cut fuel consumption, emissions and noise, thereby improving its competitiveness and profitability. Powered by Pratt and Whitney’s highly-fuel efficient and most advanced PurePower PW1000G engine, the MRJ will have a range of about 3,400 km. Other components such as hydraulic system, electrical, flight control computers and avionics, landing gear, etc will be manufactured by global majors in the respective fields.”

Airline Finance

Kingfisher job cuts
In the last annual general body meeting of Kingfisher Airlines, UB Group Chairman and CEO Vijay Mallya stated that there were several employees on the rolls of the airline whose need for retention in the organisation would be reviewed. “We will look at some structural changes in combination of jobs and job profiles as well but without any large-scale layoffs. We are looking at rationalising our human resources cost base,” he said. Kingfisher planned to apply for more international flight routes to beat possible competition from SpiceJet and IndiGo as both the airlines would soon be eligible to fly overseas. Mallya said that with civil aviation staging a strong recovery, Kingfisher that had earlier deferred new aircraft purchases because of economic slowdown and general over-capacity in the sector, has decided to reactivate delivery stream from Airbus from 2012. Besides, Mallya said that Kingfisher had cut non-fuel costs to the extent of ₹530 crore in 2009-10, compared to the previous fiscal.

Airlines on path of recovery
With the global economy recovering, the International Air Transport Association (IATA) revised its 2010 industry outlook and is now projecting a profit of $8.9 billion, up from the $2.5 billion it had forecast in June. But IATA was cautious and said that a reality check was in order since there are lingering doubts about how long this upturn will last, particularly in Europe and North America, where the after effects of recession still linger on. IATA, which represents about 230 airlines comprising 93 per cent of scheduled international air traffic, said revenues were expected to grow to $560 billion, $15 billion more than previously forecast. This is only slightly below the $564 billion in revenues achieved in 2008 when the previous economic cycle peaked and prior to the start of the financial crisis. While carriers in the Asia-Pacific region are expected to post a $5.2 billion profit, better than the $3 billion recorded during the previous peak in 2007 and double the previously forecast $2.2 billion, Europe will still stay in the red in 2010.

Air Safety

Aircraft tracking mobile phone
A cheap mobile phone application that can track the precise location of passenger aircraft in the sky could prove a serious threat to the aviation industry. Security experts have called for its immediate ban. With the plane Finder AR application, developed by a British firm, Apple iPhone and Google’s Android users can point their mobile phones at the sky and see the position, height and speed of the aircraft. The application labelled as an aid to terrorists by security experts, shows the airline, flight number, departure point, destination and also the likely course features that could...
be used to target aircraft with a surface-to-air missile. The application intercepts automatic dependent surveillance-broadcasts (ADS-B) transmitted by most passenger aircraft to a new satellite tracking system that supplements and in some countries replaces radar. Though British and European air traffic control systems have to yet adopt the technology, it is being fitted in all new aircraft, which now constantly broadcast their positions. Following 9/11, a senior FAA official had warned that ADS-B could be used by terrorists as broadcasting the identity and location of aircraft would open the door for a terrorist to attack a specific aircraft or airline. It is reported that more than 2,000 people have downloaded the Plane Finder AR from iTunes since it was launched last month.

Checks on aviation training schools
The Air India crash at Mangalore on May 22 that killed over 150 people has galvanised the civil aviation ministry into action. Realising that the scores of pilots, cabin crew and aircraft engineers being churned out by training institutes mushrooming across the country, if not trained properly, may dilute professional standards and adversely affect air safety, the aviation ministry has asked the Directorate General of Civil Aviation (DGCA) to conduct an audit of all such institutions. The training institutes will be assessed by a special team of DGCA officials and aviation experts and approved to ensure that trainees are well-versed with all safety requirements. The regulatory body, which investigates all incidents but whose outcomes are seldom publicised, was asked to take punitive actions after fixing responsibility in all cases of non-adherence to safety regulations. The DGCA is reviewing flight duty and rest period for airline crew and regulations are also being framed for effective fatigue management system.

AIR CARGO

Rise in domestic air cargo traffic
According to information provided in the Lok Sabha by Praful Patel, Minister for Civil Aviation, domestic air cargo traffic registered a 25 per cent increase in 2009-10 to 691 metric tonnes (mt) over the previous year’s 552 mt, marginally exceeding the government target of 686 mt for all airports in the country. Although international cargo movement rose by over 10 per cent to 1,270 mt for the year compared to 2008-09, it fell short of the target of 1,402 mt by around 9 per cent, primarily on account of the global economic slowdown. Airports Authority of India (AAI) has forecast around 10 per cent annual growth in international cargo traffic for the next five years from 2010-11 to 2014-15. For the domestic cargo, the anticipated growth is around 15 per cent in the first two years and 12 per cent in the subsequent years.

MRO

Air Works-Scandinavian Avionics Pact
Mumbai-based maintenance, repair services provider Air Works India Engineering Private Ltd has entered into a joint venture (JV) with Scandinavian Avionics, Denmark, to form a new avionics firm, SA Air Works India. The JV will provide avionics services including cabin entertainment upgrades, in-flight communications, safety applications, weather systems and other airborne electronics in commercial aviation, general aviation and for defence applications. Based in Gurgaon, the avionics facility has been awarded EASA part 145 certification as well as Part 147 and 21 support from Scandinavian Avionics, which certifies SA Air Works to undertake repair support for more than 5,000 parts, training for pilots, technicians and mechanics as well as avionics and interior solution for any type of aircraft. The JV company will have its presence across India including Mumbai and Hosur near Bangalore. The move marks an extension for the Danish company into the rapidly expanding Indian market through an established Indian services provider that has established itself as a major aviation sector services provider for over 50 aircraft types, for over 100 customers across 12 maintenance locations. Air Works is India’s only EASA certified MRO with approvals for ATR42/72, Airbus A320, and Boeing B737. With a strong network of OEM relationships, Air Works is an authorised service centre for Rockwell Collins, Gulfstream, Bombardier, Honeywell, AgustaWestland, Bell Helicopter, and Superjet International. Through its Air Livery subsidiary, Air Works is one of the world’s largest providers of aircraft paint services. It is currently in the process of enhancing airline MRO capability with the development of four additional hangars at Hosur Airport to support its dedicated MRO centre, an FBO terminal, an aircraft repainting facility and a flying training institute.

OPERATIONS

Passengers Traffic in August 2010
As per an official release, domestic passenger traffic on IndiGo airlines fell to 3.99 million in August 2010 from 4.08 million in the previous month. For the January-August 2010 period, however, the number of passengers rose from 19.3 per cent to 33.91 million against 28.42 million in the corresponding period of 2009. Kingfisher led with 7.97 lakh passengers, Jet Airways followed with 7.79 lakh. Passenger figures carried by other airlines are Air India (domestic) 7.30 lakh, IndiGo 6.56 lakh, SpiceJet 5.02 lakh, JetLite 2.99 lakh and GoAir 2.26 lakh. Jet Airways had 19.5 per cent market share while JetLite had a 7.5 per cent. Kingfisher had 20 per cent of the market. Air India (domestic) 18.3 per cent, IndiGo 16.4 per cent, SpiceJet 12.6 per cent and GoAir 5.7 per cent. Kingfisher reported the highest seat capacity utilisation of 80.9 per cent, followed by IndiGo 74.5 per cent, JetLite 73.2 per cent, GoAir 72.0 per cent, Jet Airways 70.4 per cent, SpiceJet 70.3 per cent and Air India (domestic) 65.5 per cent.

Surface movement radar at Mumbai
The much-awaited installation of a system at the Mumbai airport that helps air traffic control to electronically monitor all movements in the operational area on the ground is likely to be carried out soon. The Airports Authority of India (AAI) had procured two advanced surface movement guidance and control system (ASMGCS) from the US firm Raytheon in June last year for the Chhatrapati Shivaji International Airport, which handles around 630 flights a day. The surface movement radar (SMR) gives air traffic controllers an electronic view of every movement on the ground including aircraft and vehicle movement across the apron, tarmac, and taxiways and parking bays. It is particularly useful in poor visibility and at night. The ASMGCS comprises three types of equipment—the SMR, multilateration transponder (MLAT) and Auto Detection System (ADS). While the two SMRs are to be installed near the runway, 12 MLATs will cover the entire operational area and the ADS will be installed in all vehicles inside the airport.
Virgin Galactic launches world’s first manned commercial space vehicle

The US company Virgin Galactic has completed the first piloted free flight of SpaceShipTwo, named the VSS Enterprise, which is the world’s first commercial manned space flight system. The spaceship was released from its mother ship at an altitude of 45,000 ft (13,700 metres).

The VSS Enterprise achieved manned free flight from over 45,000 ft and successfully glides to land at Mojave Air and Spaceport. During its first flight, the spaceship was piloted by Pete Siebold and was assisted by Mike Alsbury. The two main goals of the flight were to carry out a clean release of the spaceship from its mother ship and for the pilots to free fly and glide back and land at Mojave Air and Spaceport in California.

The other objectives of the flight including verification that all systems worked prior and following the clean release of enterprise; initial evaluation of handling and stall characteristics; qualitative evaluation of stability and control of SS2 against predictions from design and simulation work; verification of performance by evaluating the lift-to-drag ratio of the spaceship during glide flight; practise a landing approach at altitude and finally descend and land, etc were successfully completed. Virgin Galactic is now on the way to becoming the world’s first commercial space line with 370 customers.

—SP’s Airbuz News Desk

Now drones can do everything autonomously and no human assistance is required while landing, refuelling and take off. The first prototype of Aerovel’s Flexrotor, named Pandora had its maiden test flight recently. The table-top sized aircraft is designed for more than 3,000 km range with an endurance exceeding a day and a half. Aerovel is developing the hover-capable Flexrotor drone which has its own automated docking station and no human ground support is needed.

The drone is being developed by Tad McGeer, Aerovel’s President who had earlier created the small ScanEagle drone for the fishermen and US Navy. While ScanEagle relied upon a pneumatic catapult launcher, the Flexrotor would do away with the requirement.

McGeer is developing the drone using vertical takeoff and landing (VTOL) abilities. Tiny wingtip thrusters would do the same job as a helicopter’s tail rotor and counteract the torque of the drone’s main propeller in hover-mode. It would permit the Flexrotor to land in its auto-base, refuel and launch back into the air with no human intervention.

—SP’s Airbuz News Desk

E-mail your comments to: letters@spsairbuz.net
For more information and video, visit: www.spsairbuz.net
WHICH NUCLEAR POWER ASPIRES TO put an astronaut in orbit, and perhaps even land on the moon, but has so far not produced a single airliner? The answer is India. Each of the 400 or so aircraft on the inventory of the country’s airlines is procured from abroad.

According to the Centre for Asia Pacific Aviation (CAPA), Russia and China are separately developing next-generation aircraft programmes with the launch of the MC21 (Irkut/UAC) and C919 (Comac/AVIC) narrow-body programmes, respectively, to challenge Airbus and Boeing, whose aircraft are increasingly dominating their home markets. Brazil—no stranger to domestic aircraft production—could also come up with a new and larger airliner, leaving India as the sole member of the potentially world-beating BRIC group of nations with a glaring dependency on foreign aircraft manufacturers.

It might seem unfair to compare India with Russia or China, but take Brazil. Around four decades ago, Brazil was similarly placed with no aerospace industry worth the name. The government, determined to do something about it, established Embraer in 1969. Progress was slow to begin with—agricultural aircraft, small training aircraft and gliders were Embraer’s stock products. Two decades passed before its first regional jet took to the skies. The company was privatised in 1994 and it was only in the last decade that it began to make a mark on the global scene with its E-Jets series and world class Business Jets. Embraer is now ranked as the third largest manufacturer of commercial aircraft in the world. Even giants like Airbus and Boeing keep a wary eye on it. Could there be a better model for India?

GRAND GROWTH
Commercial aviation in the Asia-Pacific region is growing rapidly. Boeing estimates that over the next 20 years the region’s airlines will acquire around 9,000 new aircraft, shelling out an estimated $1.2 trillion (₹56,06,636 crore). Strong demand for single-aisle planes in India and China mean that about 5,600 of these airliners will be narrow-bodies. At present, Boeing, Airbus, Embraer and Canada’s Bombardier compete in this segment. By 2016, the Chinese, Japanese and Russian manufacturers are likely to enter the fray. Why not India then? According to Anand Mahindra, India’s huge domestic aviation market gives it a “tremendous home-base advantage”. He feels that it is important for Indian businessmen to understand that the big domestic market “allows us to become world-class players.”
The potential of the country’s airline industry is staggering. Last year, Boeing projected an Indian demand for 1,000 commercial aircraft worth $100 billion (₹4,60,000 crore) over the next 20 years. Airbus estimates 1,032 aircraft worth $138 billion (₹6,34,800 crore) over the same period—making India the world’s fifth largest market. And at India Aviation 2010 held in March, the ever-optimistic Praful Patel, the Civil Aviation Minister said, “I don’t think a great country in geography and size like India can do with less than 2,000 to 3,000 planes in the next 10 years.” He also felt that India needed at least 400 airports to keep pace with the growing demand. The logic is irrefutable. Since the country currently has a woefully low aviation services penetration rate, such figures may not be overstated.

YES, WE CAN
There is no reason why India cannot manufacture its own commercial aircraft. With a huge reservoir of technical and managerial talent available at a relatively low cost, the world-class capability of its information technology firms and the country’s favourable geographical location between the major markets in East Asia, the Middle East and Europe are added advantages. It does not lack aerospace manufacturing experience either. Before 2000, public sector behemoth Hindustan Aeronautics Limited (HAL) dominated the defence scene. HAL has 19 production centres and nine research and development facilities across seven locations in India, almost all dedicated to the defence market. It also helps the emergence of a growing commercial industry by subcontracting some work to private firms like the country’s largest engineering company Larsen and Toubro Ltd (L&T), automotive firm Mahindra and Mahindra Ltd (M&M) and the Tata group.

Bangalore-based National Aerospace Laboratories (NAL), the aerospace arm of the Council of Scientific and Industrial Research (CSIR), is another state-owned entity and has so far designed Hansa and Saras. Hansa, a two-seat trainer, is on the inventory of some flying clubs but has not yet seen commercial success. Saras is a 14-seat light commercial aircraft in the making for almost two decades and intended to be the first passenger plane to be designed and manufactured entirely in the country. It was undergoing extensive flight testing, when in March last year, one of the two Saras prototypes crashed killing its three-member crew. Following an official investigation, the Directorate General of Civil Aviation (DGCA) did not find any technical flaw in the Saras aircraft, but raised some human and supervisory issues. It found fault with the management of the project and highlighted design issues such as unstable flight control laws. It recommended that the NAL consult other aircraft manufacturers for flight trials. Accordingly, a team from Russian civil aircraft maker Myasishchev Design Bureau (MDB) is at NAL to assist Indian designers produce key design changes in the project. These modifications, as well as building a replacement prototype, mean that the certification process will be delayed and could take another year or more. The Indian Air Force (IAF) is expected to be the first customer for the indigenously designed and built multi-role Saras.

RTA – THE RIGHT CHOICE
NAL also has its eye on a more ambitious project. A booming airline industry means that it is now becoming commercially attractive to build larger planes for the domestic market. Think of a regional jet (or turboprop) that can carry a hundred passengers over distances of up to 1,000 km, but does not compete with planes of major manufacturers like Airbus or Boeing. These are the kind of planes, tentatively labelled Regional Transport Aircraft (RTA) that would be most in demand when the promised 400 Indian airports become operational over the next decade or so. Many towns and cities in India remain unconnected by air due to their rudimentary facilities, so short take-off and landing abilities and capability to operate from ill-equipped airfields becomes essential. India’s punishing climatic diversity also demands an all-weather capability.

A year-long feasibility study was recently approved for the RTA, with commercial production targeted to begin in six years. NAL will head the multi-disciplinary ₹2,500 crore programme to design and produce the aircraft, with a similar amount likely to be invested in manufacturing and building a national service network. L&T and M&M have both evinced keen interest in the project. The RTA was originally conceived as a 70-90 seat turboprop aircraft, but NAL is now thinking of using next-generation jet engines as an alternative, besides increasing the capacity between 90 to 110 passengers. The plane would probably have a fly-by-wire control system, modular avionics and advanced synthetic displays. It is planned to be at least 30 per cent more fuel-efficient and have half the running cost of currently available aircraft. Low carbon footprint, minimum noise and enhanced comfort levels are other key QRs. Whether the RTA can deliver on these ambitious goals, remains to be seen.
**PROGRESS IN THE PRIVATE SECTOR**

The story of India would be incomplete without mention of M&M’s aviation arm, Mahindra Aerospace. Mahindra’s experience in aviation manufacturing was earlier limited to the joint design with NAL of a five-seat plane—designated NM5-100 and expected to fly later this year—and the production under licence of 24 five-seat light Australian planes named Seabird Seeker for Jordan-based Seabird Aviation. With the acquisition of two Australian aerospace firms, Aerostaff Australia and Gippsland Aeronautics last December, Mahindra Aerospace became the first private Indian company to acquire the capability to manufacture aircraft. Mahindra group now aspires to turn its aerospace arm into an Indian version of Embraer.

Can India do it? Last year, Dhiraj Mathur of PricewaterhouseCoopers said, “The Indian aerospace industry is one of the fastest-growing aerospace markets in the world and has attracted the interest of major global aerospace companies. All segments in the aerospace industry are showing a significant level of growth. India has several advantages, such as talent availability, manpower cost competitiveness, liberalised civil aviation and defence policies, a strong domestic manufacturing base and the presence of specialist capabilities amongst others, that positions it favourably to become the manufacturing and MRO hub for global and domestic aerospace companies.”

Years of rapid economic growth is spurring the rising demand for domestic aircraft. Factor in a possible overseas market yearning for more cost-effective choices than Airbus and Boeing have to offer, and the potential is huge. How long will the captains of Indian industry let this golden opportunity go a-begging? Offset requirements mean that foreign aerospace companies will be queuing up to rope in Indian partners to fulfil their contractual obligations. Under the offset clause, companies signing major defence deals need to source 30 to 50 per cent of the value of the contract awarded from India—whether in IT, engineering, manufacturing, supply chain, maintenance or MRO. India is expected to spend $100 billion (₹4.60,000 crore) on defence modernisation programmes over the next 10 to 12 years. This implies a huge $30 billion (₹1.38,000 crore) offset size. In addition, aircraft manufacture is increasingly becoming software dependent and India’s proven competence in this field will be a major advantage in the years to come. A liberal law on Special Economic Zones (SEZ) that provides attractive fiscal benefits for developers and manufacturers is also spurring the establishment of aerospace SEZs like those at Belgaum and Devanahalli near Bengaluru, Hyderabad, Nagpur and Chakan (Pune).

An aspiring aerospace power should possess the capability to produce the full range of aviation hardware. The government should, therefore, strive to manufacture a home-grown airliner as a national mission. Infrastructure and funding constraints need to be overcome and certification processes streamlined to expeditiously get new aircraft into production. Perhaps most importantly, India’s core advantage—private enterprise, which contributes over 85 per cent to the economy, needs to be leveraged. Taking a cue from Embraer’s experience, which took off only after it was privatised, the government wisely intends to rope in private partners for the RTA. There are 33 world-class Indian corporations to choose from. If M&M, L&T or the Tata group were involved, the chances of India becoming a major airliner manufacturing hub would be brighter. The country’s airlines are projected to buy hundreds of passenger planes to cater to the rising demand for air travel. But when will “Made in India” become the norm? ☛

→ IAF is expected to be the first customer for the indigenously designed and built multi-role Saras

IAF is expected to be the first customer for the indigenously designed and built multi-role Saras
SP’s AirBuz (SP’s): India’s airlines are expanding their operations to new routes to connect Tier II and III cities that have business potential from tourism. What measures does AAI plan to implement to operationalise unused airstrips in these cities?

S.R. Raghavendra Rao (Rao): Infrastructure development at the existing airports is an urgent requirement. To begin with, 58 airports in Tier II and III cities will be developed under the 11th Five Year Plan currently underway. Terminal buildings and extension of runways are major thrust areas. Only two of the Tier II city airports have facilities to base airliners. It is necessary to create facilities for airlines to base their aircraft in these upgraded airports, as business travellers generally fly out in the morning and return home by late evening. This necessitates locating operations and maintenance crew at the Tier II city airports to carry out the necessary maintenance activities at night so that the aircraft is ready for an early morning departure. AAI is committed to provide the basic infrastructure. It is up to the airlines to develop their business plans to exploit the new infrastructure and facilities being created.

SP’s: Is the absence of basic infrastructure the only hurdle to operate out of these airports?

Rao: Airlines face difficulty in positioning operations and maintenance crew at the Tier II and Tier III city airports as these cities do not offer facilities that a metro or a large city may offer. Lack of hangar facility is also one of the difficulties projected by the airlines. Despite the lack of hangar facilities, airliners are based at places like Kozhikode as the airport generates substantial passenger traffic and hence the revenue.

SP’s: Why did it take us so long to realise that smaller cities also need airports?

Rao: AAI had always been aware of the need for functional airports at smaller cities with potential for business or tourism to provide convenient air connectivity. Ideally, the need for new airport or upgradation of an existing one should be projected by airlines. Even if it is so, it takes a minimum of two years to develop an airport and there is no certainty that airlines will undertake operations after completion of the airport as by then business plan of airlines that is sensitive to a host of factors, may have changed. For example, an airline with plans to operate ATR aircraft may abandon plans to acquire this type of aircraft altogether and may opt for larger jets. So the airport now becomes a white elephant. One such airport was developed with all the infrastructure and manpower support provided by AAI. But in 2007, the low-cost carrier that had earlier decided to operate from this airport was bought over by another airline which did not want to operate from the newly upgraded airport. Decisions by the managements of airlines are influenced by the nuances of their business plans. AAI just develops or upgrades airports.

SP’s: What is it that prevented expansion when private airliners entered the market?

AAI is now embarked upon improving its marketing efforts.

Upgradation of 58 airports in Tier II and Tier III cities, currently embarked upon by the Airports Authority of India (AAI) in the 11th Five Year Plan, is perhaps not as difficult a task as it is to sustain profitable operations at the newly upgraded airports. There are technical, social, economic and political paradigms that determine the development of existing or Greenfield airports. The new philosophy is to first develop the infrastructure and initially accept lower levels of profit. On behalf of the Ministry of Civil Aviation, the AAI is responsible for executing all airport related work in the country, says S.R. Raghavendra Rao, Executive Director, Planning, Airports Authority of India in an exclusive tête-à-tête with SP’s AirBuz Correspondent Mahesh Acharya at Bengaluru.
**Rao:** Airports in few of the Tier II and Tier III cities have existed for quite some time now and in some cases there was better connectivity earlier than we have now. For example, states in the Northeast where the government is now focussing on providing better air connectivity, was indeed well connected in the 1980s when Vayudoot was operating its fleet of 20-seat aircraft that smaller airports could handle. AAI is now extending runways as airlines are inducting larger aircraft in this region. There are many airports that can easily be upgraded and the capacity enhanced, but the airlines do not have the aircraft type that can be operated out of these airfields. The current fleet of 40-50 seat aircraft owned by airlines needs longer runways. Besides, airlines also have to consider break-even operations that depend upon the load factor. If the load factor decreases, airlines will find some technical or operational reasons to discontinue operations at such airports. If the airlines operate on a regular basis, they will gain confidence of the people travelling who will then use their services and the volume of traffic will eventually grow. AAI is now embarked upon improving its marketing efforts. There is sometimes a mismatch between what airlines expect and what AAI can offer.

**SP’s: Any example of a situation where such a mismatch may occur?**

**Rao:** Airlines have been seeking concessions from AAI for operating out of smaller airports. But some concessions for scheduled operators are already in place. For example, there are no landing charges for aircraft with less than 80-seat capacity. An airline would expect an airport to be available matching its requirements, at all times of the day irrespective of the economics of the airport operator. While fleet management and viability are the focus of airlines, airport operators have their own compulsions and imperatives. Airport infrastructure once built becomes an immovable and irretrievable asset.

**SP’s: Will the development of these new airfields be undertaken by AAI or the state government, or, will it be a public-private partnership (PPP) model?**

**Rao:** All the three routes are available. In the Northeast it is totally the responsibility of the AAI as private investors are not forthcoming. Greenfield airports are purely PPP model. However, AAI does have a role in providing air traffic management. The state government should also be involved in airport operations. There are some Merchant Airports like in Vidhyanagar in Bellary operated by the Jindals. The state government also works towards airport development through the PPP model as it provides the land. So in a way, it is public contribution. AAI is inevitably a partner to provide air traffic management services. AAI has 13 per cent equity in Greenfield airports at Bengaluru and Hyderabad and is a JVC partner in Mumbai and Delhi.

**SP’s: What would be the approximate cost for upgrading non-metro airports?**

**Rao:** Approximately ₹50-100 crore is required to upgrade each airport depending upon various factors. This year, AAI has earmarked ₹4,500 crore, of which 80-85 per cent will be utilised. In the 11th Five Year Plan (2007-12), ₹12,400 crore has been allotted to AAI for airport development.

**SP’s: Could you name the cities where work is already in progress and what has been the progress so far? What is the timeframe by which these airports are expected to be operational?**

**Rao:** Work is in progress in 85 per cent of the 58 airports and is in different stages. Some airports are ready for operations. Work on terminal building and runway extension is interlinked. In some airports both are completed together, while in others, the terminal work is yet to begin due to complexities involved in acquiring land. For example, the Goa airport is owned by the Navy and the AAI has land acquisition issue there. Approximately 60 per cent of work planned has been completed.

**SP’s: Any water/sea-based airport in the list and if so, how would it be different from land-based airport?**

**Rao:** AAI is contemplating expansion of the runway at Juhu by extending it into the sea. It is in the planning stage now. This is going to be a challenge on account of the environmental issues which have to be overcome. Although AAI has commissioned consultants for a study, no facility for operating from a water surface is on the cards yet.
airport keeping various factors like land availability, topography, volume of traffic and aircraft type that can be comfortably handled.

SP’s: At the India Aviation 2010, Minister for Civil Aviation Praful Patel announced that work on 12 new Greenfield airports may begin soon. Will this affect the development of airfields earmarked by AAI? What is the position regarding establishment of a commercial airport within 150 km of an existing one?
Rao: No, Greenfield airports will not affect the development of other airports by AAI. While permitting a Greenfield airport, it is taken into consideration that no operational airport should be there within 150 km of the proposed Greenfield airport. However, there can be exceptions. For example, there is demand for new airport in Noida and Meerut. The location of Greenfield airports is driven by what is called as a catchment area of 150 km. There can be other compelling reasons for upgrading an airport within 150 km of a Greenfield airport. For example, if passenger volume of Delhi Airport goes beyond 40 million, a new airport may come up in Noida or Meerut to ease the pressure on Delhi airport.

SP’s: Can you tell us how many unused airfields are there in India and which state has the maximum airfields?
Rao: AAI does not have a precise account. A study is being commissioned to take stock. There are around 500 airports and airfields in the country. They are owned by different agencies such as state governments, private parties, defense and the AAI. The AAI is involved in the management of 139 airports either belonging to it or in which AAI is a stakeholder. Some of the airports are not yet operational. We are providing air traffic support services to some merchant airports like the ones in Mundra and Vidyanagar.

SP’s: Which non-metro airports would be given priority for development and why?
Rao: AAI generally accords priority for development that is driven by airlines or state governments. For example, the Mysore airport was driven by the Government of Karnataka. Similarly, the Government of Gujarat, Tamil Nadu and Orissa are actively pursuing to develop airports in their states.

SP’s: Are there any plans to upgrade the air traffic management system in the country? What is the state of the GAGAN project?
Rao: AAI’s plans to upgrade ATM system are on track. The GPS Aided GEO Augmented Navigation (GAGAN) project suffered a month setback due to the failure of ISRO’s GSLV recently that was carrying load for the project. GAGAN will become operational in the next three years. Technology demonstration phase of this project is over and final operational phase is underway that will be completed in approximately two years.

SP’s: What systems make up the GAGAN project?
Rao: GAGAN has ground-based systems geographically dispersed all over the country at various locations. It is a satellite-based air navigation system as opposed to ground based navigation systems which overcomes the limitations of Terrestrial NavAids Systems.

SP’S: The system of rubber stamp on hand baggage tags is being followed at airports in India. This practice is no longer followed at airports in the US or Europe? Do we plan to review our outdated system of security check at airports to reduce harassment to passengers?
Rao: Bar coded baggage handling technology is available. Both the IATA and the airlines are keen to see the system implemented and have been demanding to know why it has not been done as yet. This is a subject related to passenger facilitation for which airlines and Bureau of Civil Aviation Security (BCAS) need to get together and take a decision. Airlines are somewhat reluctant to use the bar coding technology as some issues are yet to be resolved. I am sure AAI will sort out the differences and this system is bound to come in due course.

SP’s: What are the steps being taken to reduce congestion and delays at the busy airports during morning and evening hours?
Rao: Shifting the base of aircraft away from busy airports could be a strategy to decongest busy airports during peak hours. It can be considered by the airlines.

SP’S: In Delhi, the traffic is often disrupted due to fog in the winter. Are any concrete steps being taken to minimise such disruption?
Rao: Yes, AAI has installed one of the most modern CAT IIIB landing facilities at Delhi airport. To use it, airlines need to have pilots trained and certified for CAT IIIB landing. However, sometimes airlines find it easier and more convenient to reschedule flights rather than invest in training of pilots.

SP’s: Do airports in India have functional Safety Management Systems?
Rao: Yes, every operational airport in the country has a safety management cell and before AAI implements any major changes, it has to study hazards and risk management, which is part of safety management. The DGCA is also involved in the process.

SP’S: It is understood that there is serious shortage of air traffic controllers in India and the problem is compounded by unattractive pay scales and inadequate training facilities. What is the situation now in this regard?
Rao: Last month we recruited 350 candidates to be trained as air traffic controllers. This will alleviate shortages to some extent.

SP’S: There is often conflict between civil and military aviation in respect of management of air traffic, sharing of airspace and airfield infrastructure? What steps needs to be taken to improve the synergy between civil and military aviation?
Rao: The situation is now improving as there is better cooperation between civil and military aviation agencies to address conflicting issues. We meet quarterly to review the situation and there are monthly meetings at the Air Headquarters (Air HQ) also. In the last quarterly meeting, Air HQ projected the requirement of very high frequency omni-directional range distance measuring equipment at Yelahanka military airfield due to its close proximity with Bengaluru International Airport. This is under consideration.

SP’S: What are the current limitations for promoting helitourism or last mile connectivity to these unused airfields?
Rao: Unused airfields can be used for helitourism. Helicopter operations are quite possible at airfields where no ATC facilities are available. For example, helicopters operate to Kedarnath and Badrinath. These locations like several other similar locations do not have ATC facilities. However, standard operating procedures have to be adhered to.
Commissioned in 1999, the Cochin International Airport, which has the distinction of being the first international airport to be built in India through the public-private partnership route, is set to add a new feather to its cap. It has been nominated to incubate India's first Required Navigation Performance (RNP) project. The approach procedure would be developed by Quovadis, a subsidiary of Airbus Industrie. The project, already underway, is expected to bring in benefits in the areas of enhanced safety and more efficient management of the congested airspace in the vicinity of airports.

Air Space Management
In general, the problem of air space management can be seen as consisting of two subsets, one dealing with en route flying and the other with the terminal stage. With air travel having become less expensive, proliferate and voluminous since the 1980s in the US and Europe, and in India since 2005, the exercise of maximising the number of aircraft that can be packed into the finite air space available en route as well as in the terminal phases of flights, has acquired greater importance. The International Civil Aviation Organisation (ICAO) has had a role to play in regulating and standardising the initiatives in this direction and has enshrined the basic concepts and principles into a Performance Based Navigation (PBN) Manual, commonly referred to as ICAO Document 9613. This article looks at what PBN is and the promise of benefits it holds for aviation in the future.

With the rising volume of air traffic in the 1980s generating in its wake the inevitable air space management problems, the ICAO, through its future air navigation systems (FANS) Special Committee, issued a manual on required navigation performance...
As envisaged then, RNP was intended to lay down the navigation performance required by the users within a defined airspace. As the ICAO RNP definitions were not detailed enough for practical use, especially in continental and terminal airspace, additional requirements were developed. Simultaneously, in different parts of the world, area navigation (RNAV) was gradually developed with specific requirements. This process resulted in a proliferation of standards; interested readers would have come across an assortment of terms such as B-RNAV, P-RNAV, US-RNAV, RNP 10, RNP/RNAV and RNP SAAAR with a great deal of confusion regarding concepts, terminology and definitions.

In order to address this confusion, in 2003, ICAO set up the Required Navigation Performance and Special Operational Requirements Study Group (RNPSORSG) to develop an understanding of the PBN concept. This concept encompasses both RNAV and RNP, and can be said to have replaced as well as revised the previous RNP concept. Thus the new ICAO PBN Manual published in 2008, bears the same document number (9613) as the previous RNP Manual, but supersedes it. The 36th assembly session of ICAO held in September 2007, voted a resolution urging all states “to implement RNAV and RNP Air Traffic Services (ATS) routes and approach procedures in accordance with the ICAO PBN concept...” Gratifyingly, most ICAO member states are moving towards consummation of the PBN concept as contained in the ICAO PBN Manual.

The manual is divided into two parts; Volume I is entitled ‘Concept and Implementation Guidance’ while Volume II deals with ‘Implementing RNAV and RNP’. Volume I introduces airspace concept developed to satisfy strategic objectives such as safety, capacity, flight efficiency and to mitigate environmental impact. Airspace concepts include details of the practical organisation of the airspace and its operations as well as the communication, navigation, surveillance/air traffic management (CNS/ATM) assumptions on which it is based. Practical organisation of the airspace includes air traffic services (ATS) route structure, separation minima, route spacing and obstacle clearance. Thus the airspace concept hinges on the airspace design. Once fully developed, an airspace concept provides a detailed description of the target airspace organisation and operations within that airspace and can, when complete, be anything from five pages for extremely simple airspace changes to a document running into several hundred pages.

**WHAT IS PBN?**
Hierarchically, PBN belongs to the ‘navigation’ part of the concept of airspace management (see diagram, left). A navigation application is the use of a navigation specification (a set of aircraft and aircrew requirements) in conjunction with a NAVAID Infrastructure i.e. ground or space-based navigation aids requirements such as VOR-DME, DME-DME, GNSS and IRU. There are two types of navigation specifications—RNAV and RNP. Both deal with performance, functionality, navigation sensors and aircrew procedures, but RNP includes an onboard navigation performance monitoring and alerting function. This function allows the crew to detect when the RNP system is not achieving or cannot guarantee with a sufficient level of integrity, the navigation performance both lateral and longitudinal. Thus RNAV and RNP specifications provide:

- The performance requirements of the onboard RNAV sys-
tem in terms of accuracy, integrity, availability and continuity.

- The required navigation functionalities of the RNAV system in order to meet with the required performance.

- The allowed navigation sensors in order to meet the required performance.

- The flight crew requirements in order to achieve the required performance.

In addition, RNP specifications include the onboard performance monitoring and alerting requirement.

RNAV and RNP specifications are designated as RNAV X (e.g. RNAV 1) or RNP X (e.g. RNP 4). For both RNAV and RNP designations, the letter 'X' refers to the lateral navigation accuracy in nautical miles that is expected to achieve at least 95 per cent of the flight time by the aircraft operating within the airspace, route or procedure. Volume II of the PBN manual contains seven chapters standardising the NAVAID infrastructure and the navigation specifications for seven navigation applications, three RNAV and four RNP.

**BENEFITS**

As compared to a visual approach, improved safety is envisaged as PBN would exploit the capabilities modern aircraft and guidance systems to reduce the risk of controlled flight into terrain (CFIT), and also to achieve higher degree of stabilisation of approaches with a constant descent angle.

Air space management would also improve by optimising traffic capacity through smoother flows and more efficient routes. PBN would permit increased airport access by way of curved and contained trajectories, and of course lower minima. Thus airport access could be maintained in bad weather conditions and conflicting airport procedures could be segregated. Needless to say, the optimisation of trajectories would result in increased flow of air traffic.

The facilitation of a continuous descent approach would permit redesigning of the procedures to achieve:

- More efficient non-precision approaches
- Optimum thrust settings
- Reduced take-off thrust settings
- Improved aircraft performance in terms of take-off weight

The contribution of PBN would also be visible in the context of the 'green aviation' concept inasmuch as it would permit noise impact reduction, fuel savings, shorter flight paths and green approaches, all resulting in alleviating airspace congestion.

In general terms, PBN would facilitate more efficient design of airspace and procedures which collectively result in improved safety, access, capacity, predictability, operational efficiency and environment, the last on account of lower fuel burn and thus reduced emissions. Specifically, improved access and flexibility for point-to-point operations help enhance reliability and reduce delays through more precise terminal area procedures.

**IMPLEMENTATION OF PBN IN INDIA**

The fact that the PBN manual is published by ICAO as a manual, it implies that it does not have a binding status that standards and recommended practices (SARPs) have on member states. It is expected that member states will make rules and regulations in conformity with the PBN manual. An ICAO letter dated April 27, 2007, addressed to all member states says that "the material provided contains the PBN implementation guidance for the air navigation service provider as well as guidance on the issuance of operational approvals for PBN for different phases of flight".

So where is India placed in the area of PBN implementation? It is heartening to note that the majority of the aircraft flying in India is of the new generation that can adapt easily to meet the requirements of PBN operations. The Airports Authority of India (AAI) has drawn up a PBN Implementation Roadmap which lays down the strategy for the development and application of PBN procedures in alignment with ICAO APAC Regional PBN Implementation Plan which deals with Asia-Pacific region. The AAI roadmap plans to implement PBN procedures at 14 international and 62 domestic airports and defines short-term (2009-12), medium-term (2013-16) and long-term (beyond 2016) objectives. On its part, the ICAO has urged all member states to implement the PBN by 2016. A space based augmentation system designated as GPS-Aided GEO Augmented Navigation (GAGAN) has been developed jointly by the Indian Space Research Organisation (ISRO) and AAI and its final operational phase is likely to be completed by 2011 after which it will enter the certification phase.

The Indian aviation fraternity can look forward to 2016 by which time the user friendliness of the air space over India should have been enhanced through the full implementation of PBN.
INSIDE A SOCATA TOBAGO TB 20 aircraft, at Furatsganj airfield, about 100 km from Lucknow, a trainee supervised by his instructor, completed the pre-start checks. Gull doors closed, engines started and after a brief warm up, the aircraft taxied to the threshold of Runway 09. Upon clearance from the ATC, the aircraft lined up on the runway and applied take-off power. The feel was quite different from what one may experience in an airliner. At airspeed of 80 knots, the aircraft smoothly rotated, taking wings into a beautiful morning with the sun, the Ministry of Civil Aviation, and a 25-year glorious history of the Indira Gandhi Rashtriya Uran Academy (IGRUA) behind its majestic flight into the morning sky.

Better known as IGRUA, this premier flying training institute of India celebrated its silver jubilee in September 2010. Its foundation stone was laid by the former Prime Minister, Rajiv Gandhi, who was once upon a time an airline pilot flying the Boeing 737-200s for Indian Airlines. Since then, the academy has followed the philosophy of excellence through continuous betterment, discipline and modern training infrastructure. IGRUA offers a training environment with an air of professionalism that is as good if not better, than other by flying training institutions. An exploration of IGRUA reveals so much—its fleet, maintenance, safety standards, ground training, flight training, aerodrome and training aids, instructors and finally, the trainees.

INITIAL GROOMING
It is the dream of wannabe pilots in India to enter the best flying training institute of the nation, IGRUA. One aspirant said, “I don’t know anything about flying. But I know that it is the best and here I’ll learn all that I need to.” The process of selection is stringent with only the best being enrolled for the limited vacancies. The selection is based on an all-India written examination and a test with the help of a specialised software to verify psychomotor skills, followed by an interview. The success rate is ten per cent. Wing Commander (Retd) Sudesh Kumar, the Chief Ground Instructor (CGI) at the Academy, is assigned the onerous task of managing the selection process. Soon after the selected trainees join IGRUA, the CGI and his team of four highly experienced instructors, all retired officers from the Indian Air Force (IAF), begin a four-month ground training programme. The subjects include navigation, air regulations, aviation meteorology, aircraft technical and radio telephony.

After the theory classes are completed, the Chief Engineer and his staff conduct a week-long technical session at the Flight Operations Centre (FOC) wherein students are explained about the parts of the airplane, flight controls, instruments, systems and everything else that a pilot should know about the aircraft that he is required to fly. Thereafter, an experienced flight instructor conducts classes on the aircraft specific Airplane Flight Manual (AFM) which contains...
a description of the airplane and systems, airplane performance, operating limitations, and normal and emergency procedures. The students are then put through a training programme on the fixed-base simulator of either the TB-20 or the Diamond DA-40 where they get their first taste of flying without actually leaving the ground.

**TRAINER AIRCRAFT**

The workhorse of the IGRUA fleet years back, was the French Socata TB-20 Trinidad, from a company that supplies aero structures for the Airbus A-330 and A-340 family of aircraft. The TB-20 is a single piston engine, four seat, low-wing airplane that is high on performance and the dream of trainee pilots. The cockpit is conventional with electro-mechanical gauges that although romantic in appeal, do not hold much significance in the present world of glass cockpits, wherein a single screen may display multiple flight, navigation and system parameters. The different modes can be selected by the pilot for greater situational awareness.

Since IGRUA’s aim is to train students in line with the needs of airlines, the high performance TB-20 fleet of which only five out of the 12 remain operational, is being progressively replaced by the modern single piston engine Diamond DA-40 aircraft from Diamond Industries of Austria. The first set of Diamond DA-40s arrived at IGRUA in August 2009 which was followed by the second lot three months later. In all, 14 brand new aircraft joined IGRUA’s trainer fleet. The aircraft is an excellent trainer with a full glass cockpit featuring Garmin G1000 units which provide all the required information on two multi-function display units. These also provide the aircraft’s position as seen on a map providing the pilot with better situational awareness. Also on the single engine piston fleet are six Czech Morava 242-L aircraft from Zlin. These aircraft, which arrived in 2005, feature a stick control like the Diamond DA40s, and unlike the TB-20 which sport the classical yoke. Initial training is sometimes imparted on the classical analogue cockpit 242-L before transition to either the DA-40 or the TB-20.

Obtaining one’s multi-engine rating licence requires 10 hours on a multi-engine aircraft. For this, IGRUA has two Beechcraft King Air C-90 of the 1986 vintage. These globally popular aircraft provide students the much needed hands-on experience on multi-engine aircraft and their first taste of airline-like flying. Pankhuri Aggarwal of the fifth ab initio batch says, “Flying the C-90 was very different from flying the single engine lighter planes. The aircraft is extremely stable, but the environment in which we flew was unlike anything we had experienced before.” Two brand new Diamond DA-42 aircraft are slated to join the multi-engine fleet in the near future.

Ensuring that these marvellous metallic birds remain in flying condition is the task of a very enthusiastic Krishnendu Gupta, the Chief Engineer at IGRUA. The Engineering Department has excellent facilities for overhaul and maintenance of aircraft. There is strict adherence to procedures laid down by the manufacturer and approved by the Directorate General of Civil Aviation (DGCA). The facilities include a quality control cell, facilities for the maintenance of avionics, batteries and instruments. There is also a non-destructive testing shop and an engineering store. The facilities not only minimise ground time for the aircraft but also provide high standards of air safety.

**FROM THE GROUND UP**

Within IGRUA’s campus are located hostels, staff quarters, play-grounds, a mess and most importantly, the Ground Training Department (GTD), which houses something which no other flight school
infrastructure / PILOT TRAINING

in India can boast of—a full flight simulator (FFS) of the C-90A. It allows student pilots to get a good feel of the aircraft before stepping into the real multi-engine turboprop. Apart from this, IGRUA has four other fixed-base simulators—two cockpit procedure trainers for the TB-20 and two Diamond DA-40 fixed base simulators. Pre-training on simulators provides a student high level of comfort, confidence and familiarity, essentials for flight training and air safety. A DA-42 simulator is on its way to IGRUA.

EARNING WINGS

About two kilometres from the campus is located the airfield (ICAO designation VIRB) with a 6,000-ft runway, hangars, flight operations centre (FOC) and the ATC. The Flying Training Department is headed by the former Chief Flying Instructor, Air Vice Marshal Rajesh Lal. With him are 14 flight instructors including nine young assistant flight instructors (AFI) of civil flying background. This is a deviation from the normal practice of inducting experienced retired IAF officers. However, the young AFIs are of high professional calibre and have been able to live up to the expectations of IGRUA. While three of the AFIs were inducted earlier, for the first time, in December 2009, IGRUA inducted the other six from amongst its top ex-students.

In fact, the growth in aircraft fleet and instructors is a result of the increase in the intake of students. Five years ago, when the Indian civil aviation sector was reeling under a severe shortage of pilots, Air India, which had plans of acquiring 68 aircraft, projected a need for 100 pilots every year, till around 2014. Air India had been absorbing almost all of the 40-odd pilots graduating annually. IGRUA was the only flying training institute to boast of campus selection. However, as IGRUA could not cope with the demand, Air India recruited pilots from overseas. It was then that IGRUA entered into a management contract with a global aviation giant, CAE, Canada, which is a world leader in flight simulation and training. IGRUA is now one of only 10 such flying training institutes globally, that are part of the CAE Global Academy. Under CAE, the training period has been reduced from two years to 15 months and intake enhanced from 45 to 100 students annually. With larger intake followed by induction of new aircraft and flight instructors, the expansion of IGRUA has indeed been rapid. Says Air Marshal (Retd) Vinod Kumar Verma, Director, IGRUA, “Yes, we do have challenges. We are the best, but we can get better. As of now, our prime focus is on maintaining high standards and quality of flight instruction, despite the increased intake.”

Avineesh Gupta, one of the three young AFIs, is a testimony to the high standards. He briefs his students in a clear, concise and methodical fashion with an amiable demeanour that not only puts students at ease to ask questions without any apprehensions, but also effectively drives the exercises they would practice.

FOCUS

An extremely passionate Sushank Gupta, who recently commenced flying training, is all praise for the kind of duties students are made to perform at the FOC. Before the commencement of flying training, Sushank managed dispatch which included keeping a track of pilots going for and returning from flying, taxi-out and taxi-in times and refuelling of aircraft. Exposure to such activities helped widen horizons. Captain Praveen Chandra, a commander on the Airbus A-320 aircraft was trained with the 10th batch. Entering IGRUA as a PPL holder, he obtained a CPL. Having gone through two different flight training institutes, he says, “IGRUA is very professional and pushes people to fly, something that does not happen at other flight schools.”

ON THE RIGHT TRACK

Apart from the attributes listed above, IGRUA boasts of navigation equipment which no other flight school in India possesses. The airfield has its own class A VOR-DME, a radio navigation aid, with a range of 120 nautical miles at an altitude of 10,000 ft. Also installed is a instrument landing system (ILS) for aircraft approaching the runway from the East.

The radio navigation aids allow students to fly in a procedure-bound environment similar to that followed at major airports by airliners. Even while operating under visual flight rules (VFR), students tune in to the VOR to ensure that they fly within the boundaries of Fursatganj airspace and land using the ILS. Compared to their counterparts at other flying training institutes or schools, trainee pilots at IGRUA have a better understanding of instrument flying due to the opportunities available to utilise the available radio aids.
The good thing about IGRUA is that the airfield is exclusively for use by IGRUA. The airspace extends 12 nautical miles in all directions with the Northern and Northeastern sectors extending to 25 nautical miles. Fursatganj ATC controls aircraft up to an altitude of 4,000 ft above which the responsibility is transferred to Lucknow ATC. The restricted airspace, which is designated by the Airports Authority of India as VI(R) 152, gives trainee pilots the facility to operate without interference by any other traffic. The airfield is fully equipped for night flying with standard runway and taxi track lighting. Also installed are precision approach path indicators which provide a visually guided approach to the runway.

**FLYING SAFE, FLYING HONEST**

Air safety is accorded due importance and high priority at IGRUA. Flight safety meetings are conducted on a regular basis where aircraft accidents, incidents and safety-related issues are discussed in the presence of the director and other staff. Mass briefings, including weather reports supported by satellite pictures from the India Meteorological Department, are held. Emergencies and as voluntary disclosure, errors committed by students are discussed to enhance safety. Students are encouraged to actively participate in discussions to develop the right orientation for safe airline flying. Flying procedures already in place if diligently followed, allow no room for unsafe flying. The only way to ensure safe flying, apart from providing the right training and sound theoretical knowledge, is by ensuring proper discipline. Indiscipline on the ground or in the air is not tolerated at the academy.

**EVERGREEN, EVER GOLD**

When an IGRUAN is seen with golden wings and his epaulettes, it is without doubt that these honourable accoutrements are well earned. At the epaulette ceremony, delighted students deserving to take on an added golden stripe that speaks of their truly hard-earned ability to take on higher responsibilities. Many pilots in Air India today are from IGRUA. A commander with Air India, while discussing IGRUA’s plans for the silver jubilee celebrations with the CGI, in the lighter vein says, “If all the IGRUA alumni make it to the celebrations, the entire Indian airline industry will come to a grinding halt.”

Painted in bold red on the walls of the FOC are the words, “Through these portals pass some of the best pilots in the world.” This is a constant reminder of the fact that the professional conduct of those trained at IGRUA must reflect the legacy of the 25-year-old premier institute. IGRUA is truly one of its kind, second to none in India and part of a small elite group of flying training institutes the world over. “This is not a flight school or a flying club,” says Pankhuri Aggarwal and adds, “this is an academy and the best.” The significance of IGRUA to the Indian civil aviation industry is akin to what the Indian Institute of Technology is to the scientific community and the Indian Institute of Management to the domain of management.

**THE RUNWAY AHEAD**

While year after year, IGRUA saw students being placed on campus, year 2009 scripted a different story. In the wake of the deep recession in the airline industry witnessed on a global scale and the losses that it was fast accumulating, Air India did not turn up for campus placements. As of now, about 80 students are awaiting employment. The Director says, “Air India is expected to turn up for placements in the near future.” While this has brought back smiles on the faces of the 80-plus students who have a CPL with multi-engine rating, reality bites back with the specifics, “Around 30 are expected to be picked up.” With around 4,000 CPL holders in the country left jobless, the competition for recruitment is going to be very stiff.

Although the prospect of employment of freshers in the aviation industry is improving, the rate is still a long way from meeting the expected demand for pilots which was forecast in 2007. With Kingfisher taking online some of the pilots they had kept on ground; IndiGo calling for pilots for their expanding A320 fleet; Jet Airways taking in ab initio and type rated pilots; Air India losing some of their crew to age, and DGCA eventually coming down upon foreign pilots in the Indian skies, job prospects for pilots graduating from IGRUA are set to improve.

However, the tough times are not yet over. With every passing month, more licence holders join the ranks of their fellows on ground. Judging by the positive trend in the industry, there is reason to cheer; but till their dreams take wings, even the best will have to gaze skywards, with the rational hope being their best friend.
HELICOPTER ACADEMY TO TRAIN BY SIMULATION OF FLYING (HATSOFF) is a new joint venture (JV) between the aerospace major Hindustan Aeronautics Limited (HAL) and the world leader in flight simulators, Montreal-based Canadian Aviation Electronics Limited (CAE). HATSOFF is a ₹300 crore helicopter 'roll on-roll off' full fidelity simulator project, India's first and the third of its kind in the world. The "roll on-roll off" feature entails flying simulation on more than one type of helicopter.

On an invitation from Wing Commander (Retd) C.D. Upadhyay, a renowned test pilot and the Chief Executive Officer (CEO) of HATSOFF, I had the privilege of visiting the facility and also fly the simulator under the keen eyes of the CEO and Wing Commander Krishna, another ex-Indian Air Force test pilot.

The state-of-the-art facility has been set up in a record time of one year and it houses impressive training equipment and infrastructure. The roll-on cockpit of Bell 412EP is ready for operation, while that of Dauphin is yet to be installed. This project incorporates revolutionary air-cushion transportation for the roll-on cockpit modules, which is the first of its kind in the world. The facility has been certified by the European Aviation Safety Agency (EASA) and the Directorate General of Civil Aviation.

HATSOFF is classified and certified as a Level D simulator, which according to Upadhyay, is the highest performance rating for flight training equipment and is a category that occupies the top slot in the family of simulators. A Level D simulator is a full-motion simulator with vibration platform and exceptionally good visual display system. Hours of training or flying time logged on this platform is equated with flight time on actual aircraft. This implies that a pilot can be declared fit to fly the actual aircraft purely on the basis of having successfully completed the prescribed number of hours on the simulator.

Historically, the development of simulators for training on helicopters has lagged behind that of fixed wing aircraft primarily on account of the difficulty in simulating six-axis motion. Compared to the fixed wing re-
corporating a Dhruv Flight Training Device (FTD) which will be lower than a Level D simulator. The difference between the two is that the FTD will not have full-motion capability. It will have similar display graphics but on a fixed platform. Today the FTDs available in the world are highly capable and offer a realistic feel of flying. Hopefully, the Dhruv FTD will match those standards.

The visuals on the HATSOFF simulator are excellent as they are based on liquid crystal on silicon (LCoS) projection system and not on the conventional cathode ray tube (CRT). This is the second such facility in the world to incorporate such a projection system. The software employed for the visuals is Medallion 6000, which is specially designed and customised for military missions.

All in all, it was an impressive visual display. My first observation was the perspective of the ground while stationary was much higher than expected. Apparently, this was the price paid for obtaining collimated display for both the pilots, i.e. to eliminate the parallax error of distant objects as viewed by both the pilots. When I raised the aircraft to a hover, the control feedback and response were good. I then carried out a take-off. The vibrations simulated were lifelike— exactly as one would experience in a helicopter. Physical sensations of climb, descent and turns were good and the frontal and side view from the cockpit was very realistic. The sky was turned dark for the second take-off. Depiction of night lighting and the stars in the sky were realistic. One could really feel the sit down (touchdown) at the time of landing. On the third circuit, Krishna demonstrated an engine off auto-rotative landing from the co-pilot’s seat. That was very interesting. In a flying career spanning some 6,500 hours, I had never experienced an actual engine-off landing in a helicopter. The touchdown was definitely hard and the loss of direction on skids at touchdown was perceptible. As the rotor rpm winds down after touchdown, there would be a loss of direction on an actual machine.

So far, Indian pilots have had to go abroad to fly in a simulator as a part of conversion training on the Bell 412. With the commissioning of HATSOFF, this would no longer be necessary. Apart from lower costs, aviation companies would not have to tie down their machines and instructors for conversion training as has been the requirement so far. Proficiency levels can be assessed by a neutral agency outside the zone of influence of the aviation company to which the pilots belong. For military pilots, armament training sorties can be undertaken on a military variant cockpit without expenditure of weapons. Similarly, it would be expedient to train for flying with night vision goggles (NVG). Saving of flying hours through the use of simulators may not be expedient to train for flying with night vision goggles (NVG). Saving of flying hours through the use of simulators may not be regarded as a critical factor for the military as military aircraft generally remain under-utilised through their life cycle and may have to be phased out or replaced even when left with substantial residual life. While adequate flying hours are available for training on military aircraft fleets, the real benefits from simulators would accrue in training by way of training for serious or multiple emergencies that cannot be easily carried out on the actual aircraft.

By utilising the facility for a minimum of 16 hours in a 24-hour cycle, HATSOFF hopes to break-even in nine years. That is a lot of flying and the number of pilots available in India alone would not be sufficient for optimum utilization of the simulator and would have to depend on foreign pilots to defray costs. With EASA certification as a type rating training organisation (TRTO), HATSOFF would be in a position to train and certify overseas pilots for better capacity utilisation.

All in all, it has been a good beginning for HATSOFF and as the saying goes, ‘Well begun is half done.’
A helicopter properly equipped and modified for rescue and emergency medical evacuation substantially enhances efficiency of the exercise of rescue of accident victims and their speedy transportation to a medical centre.

By Our Staff Reporter

Considering the huge gap existing in Helicopter Emergency Medical Services (HEMS) in India, Eurocopter, the global leader in the helicopter industry, has started connecting with the healthcare sector and also with helicopter operators here.

Presently in India, the Indian Air Force (IAF) mostly carries out HEMS operations while the civil aviation sector is lagging behind. Eurocopter points out that even in countries such as Nepal it is the civil aviation which operates HEMS. Recently six mountaineers who were trapped at an altitude of 6,900 metres were rescued using a Eurocopter HEMS.

As the helicopter industry in India is in a nascent stage, conditions have to be created for rapid growth of HEMS, Eurocopter states and mentions issues such as lack of funds for the speedy transportation of accident victims and patients; lack of heliports; regulatory provisions restricting freedom of operations by helicopters both by day and night; pilot training etc need to be sorted out. Any effort at introducing HEMS in India on an appreciable scale necessitates the government’s involvement as a major partner.

Eurocopter mentions that a helicopter properly equipped and modified for rescue and emergency medical evacuation substantially enhances the efficiency of the exercise of rescue of accident victims and their speedy transportation to a medical centre. Eurocopter has two popular models — EC 135 and EC 145. Currently, eight out of every 10 emergency medical helicopters are from Eurocopter as these are said to be the only ones that have been designed for HEMS, with large cabin, rear and slide access to easier stretcher loading, protected tail rotor and lowest noise signature. These machines are capable of flying at varied altitudes and under the most challenging conditions.

Pawan Hans signs MoU with Met Department

Pawan Hans Helicopters Ltd (PHHL) has signed a Memorandum of Understanding with the India Meteorological Department (IMD) for further ensuring safety of helicopter operations. The MoU was signed by R.K. Tyagi, Chairman and Managing Director, PHHL and Air Vice Marshal Ajit Tyagi, Director General, IMD.

As per the MoU, the Met Department will provide support to helicopter operations of PHHL at all the airports in the country and will install and operationalize Automatic Weather Stations (AWS) to provide meteorological data at remote locations or helipads. IMD will also make available online brief on weather to all the PHHL pilots. Pawan Hans will provide sites for installation and will be responsible for acquisition of the land and help in airlifting of equipment and staff from the nearest IMD locations to Automatic Weather Stations.

This MoU will help in better coordination for flying helicopters, will enhance safety aspects and will also help IMD disseminate inputs by way of de-briefs of the actual weather conditions in the far flung areas of the country.

Tie-up with BRO

Pawan Hans has also signed a contract with Border Roads Organisation (BRO) wherein it will airlift personnel, equipment, cargo etc. of BRO to their distant locations in the North East. The contract was signed by Lt. Gen. M.C. Badhani, Director General, BRO and R.K. Tyagi. PHHL will make available a twin engine MI-172 helicopter in the region.

This contract is expected to help PHHL to explore the possibility of providing helicopter support services to BRO in other areas/projects across the country and support BRO projects in far-flung and inaccessible areas.
SP’s Air Buz (SP’s): Nine flights into India—how has the response been? Will you be storming some more “unexplored” cities or will it be a cautious approach?

Tony Fernandes (Fernandes): We’ve made a good start. We’ve managed to get word out there about AirAsia connecting India to Southeast Asian Nations (ASEAN) and our other destinations beyond the region such as Australia, Japan, Korea and the UK. AirAsia operates short-haul flights to Bangalore, Chennai, Hyderabad, Kochi, Kolkata, Thruchirappalli and Trivandrum. AirAsia X, our low-cost long-haul affiliate, operates long-haul flights to Mumbai and New Delhi.

We’re not opening a new Indian destination soon, but we have plans in place to connect the subcontinent to more of our existing destinations. We would love to open a Bangkok to India route.

SP’s: While all or most of the traffic is expected to be leisure, which is seasonal, how will Air Asia shore up revenues from these connections?

Fernandes: AirAsia enjoys a mix of leisure and business travellers. The seasonality of leisure travel does not affect us like it affects other airlines. Also, our constant offer of low fares coupled with premium services attracts travellers the year round.

SP’s: What is the 2010 target for India—number of destinations, number of passengers, market share, etc?

Fernandes: We’re not adding destinations to the nine we already
have in India for the rest of this year, but we’re looking at opening more routes to India. We would love to connect more Malaysian cities and Bangkok to India. There is room for the opening up of new routes and for an increase of frequencies on existing routes. We expect passenger volume to pick up, especially in the fourth quarter, which is traditionally our strongest.

It would be fantastic to have AirAsia become the biggest foreign airline in India. We’ve achieved this in Singapore, and it would be great to replicate this feat in India, home to over 1 billion people.

**SP’s**: You will be creating a market and I guess this is going to be the most difficult part of it. What challenges exist in creating an air travel market in India?

**Fernandes**: One of the challenges is propagating the concept of low-cost air travel in India. There is a need to get more information out there about how low-cost airlines operate and why we’re able to offer lower fares, for instance. In the case of AirAsia, we’d like the travelling public to know more about how extensive our network is—we have the most extensive network of destinations in ASEAN—that we have great flight frequencies, a very young fleet of Airbus aircraft and stringent flight safety standards.

There’s also the challenge of the rise in fuel prices. Although for now we are not overly worried because we have strong ancillary income to serve as a buffer against fuel price hike, still we hope that prices don’t shoot up.

**SP’s**: The talk now is point-to-point instead of hub-to-hub, what does this mean to a low cost airline?

**Fernandes**: AirAsia is a point-to-point carrier. This model has helped drive our success and is the way to go for LCCs.

**SP’s**: You have ordered 175 A320 aircraft (delivered 78). What is the update on the deliveries? Also for AirAsia X, what is the update on the 25 A330 orders?

**Fernandes**: We’ve been receiving deliveries of the A320. AirAsia X has been receiving delivery of A330 aircraft. We now have an all-Airbus fleet for our Malaysia-based operations. Our Thailand- and Indonesia-based operations will also have all-Airbus fleets within this year.

**SP’s**: What are the new non-aeronautical routes that you are looking at to shore up revenues? And what percentage of AirAsia’s revenues does it make up for?

**Fernandes**: We’ve been monetizing our website, which draws millions of visitors from around the world. This year to date alone, airasia.com has drawn more than 33 million unique visitors. The volume of visitors makes AirAsia’s website a powerful selling platform.

We’ve been getting revenue from other non-airline products such as by selling tickets to shows through RedTix and a wide range of products through AirAsia Megastore, an online shopping portal.

Ancillary income is important to our bottom line and we derive revenue from products and services such as Baggage Supersize, AirAsiaGo, AirAsia Insure, AirAsia Courier, Pick a Seat and AirAsia Megastore. Last year, ancillary income for the entire AirAsia Group (AirAsia Berhad, Indonesia AirAsia, Thai AirAsia) was approximately RM 603.5 million, 14.6 per cent of the group’s revenue. As of the first half of 2010, the group’s ancillary income was RM 460.9 million.

**SP’s**: What is the roadmap for AirAsia?

**Fernandes**: AirAsia has already established itself in Asia and has gone beyond the region. We also fly to Australia and the UK. Further down the line, depending on when we get delivery of the A350s, we’ll also look at flying to the West Coast of the United States.
A big battle may be brewing in the skies. For the first time since the aerospace giants Airbus and Boeing established near-total dominance of the single-aisle jet market with the iconic A320 and B737 airliners, they are bracing for a fight. A clutch of competing companies are getting ready to take on the big two.

By Joseph Noronha
Goa

For the first time since the aerospace giants Airbus and Boeing established near-total dominance of the single-aisle jet market with the iconic A320 and B737 airliners, they are bracing for a fight. A clutch of competing companies are getting ready to take on the big two.

Airbus 320: High on demand globally

Photographs: Abhishek / SP Guide Publications

Cast that almost 17,000 new narrow-bodies (about 70 per cent of total sales) would be delivered over the next 20 years. The reason for the optimism of the manufacturers is not far to seek. Single-aisle aircraft are the planes of choice of the low-cost carriers (LCC), and the LCC’s operating philosophy having tasted success over the last few years is spreading like wildfire across the globe. There is also the accelerating demand for narrow-bodies in Asia, especially from China and India. India’s leading LCCs—IndiGo, Spicejet and GoAir—are reportedly planning to nearly double their fleet capacity over the next year and a half or so. All their additional aircraft will be single-aisle models.

Bombardier is planning the first flight of the new CSeries in 2012 and entry into service in 2013. It is offering the aircraft in two versions—the 100- to 125-seat CS100 and the 120- to 149-seat CS300. In July, it forecast that airlines worldwide would purchase 6,700 planes in the 100 to 149 seat class during the next 20
years with the unstated hope that the CSeries would corner a significant share of sales. Some analysts believe that sooner or later the company will be tempted to graduate to the 150-plus seat category. This would constitute a direct assault on the Airbus and Boeing narrow-body bastions. Will Bombardier dare, or won’t it? The company itself dismisses such speculation saying, “We already have a whole bunch on our plate.”

**H O P E A N D C O N F I D E N C E**

Hopeful of reaching design freeze on the CSeries, Bombardier says it is fully confident that the aircraft will perform as advertised. The company already has 90 firm orders from Deutsche Lufthansa AG, Ireland’s Lease Corporation, International and US-based Republic Airways. The Republic’s recent order for 40 aircraft seems to have made Airbus and Boeing sit up. Suddenly, there is animated discussion about re-engining the A320 and B737NG. Bombardier has a further 90 options for the CSeries. But that is nowhere near the number of orders it eventually needs to make the new plane profitable. It is also in negotiations with about 65 airlines and aircraft leasing companies worldwide. Some aerospace consultants are sceptical about Bombardier’s ability to meet the ambitious 2013 target for a programme which has both cutting-edge technologies and distant suppliers. They state that the excruciating delays in the development of the Airbus A380 and Boeing B787 jets due to supplier hassles and technical glitches. They ask, why should the Bombardier experience be any different? Bombardier says it has a long experience of using a global supply chain and insists the CSeries development schedule is realistic.

Although the risk of producing an all-new aircraft is great, the rewards are potentially much greater. The CSeries is currently the only modern aircraft specifically designed for the 100- to 149-seat market. Bombardier claims it will be a joy to environmentalists, emitting 20 per cent less CO₂ and 50 per cent less NOₓ, while flying four times quieter than current comparable aircraft. Its carbon-fibre wing already meets the planned weight objectives. It has been performing rather well in testing, giving rise to hopes that there could be opportunities for further weight reduction. The company claims that the wing, engine and landing gear combination is optimised to obtain the maximum benefit of the ultra-high 12:1 bypass ratio of the engine.

**P U R E A N D P O W E R F U L**

Indeed, a striking feature of the CSeries is its all-new engine. Pratt & Whitney (P&W) specifically developed the PurePower 1000G Geared TurboFan (GTF) for Bombardier. The engine will be under optimisation for the next six months, and type certification is scheduled to start early next year. This advanced engine is projected to cut Specific Fuel Consumption (SFC) by 20 per cent, constituting the largest slice of the 15 per cent reduction in operating costs that Bombardier claims for the CSeries.

How will the PurePower 1000G achieve its drastic drop in SFC? Thanks to a specially designed 3:1 reduction gearbox located aft of the fan, the LP compressor and LP turbine can spin at the higher speeds required for optimal performance. At the same time, the fan can turn at the lower speeds it prefers, which reduces the fan pressure ratio, allowing more air to flow through the bypass and keeping the blade tip velocities below Mach 1.0 for reduced drag and noise. All in all, the engine has fewer parts and operates at lower temperatures. P&W claims that its new baby will be quieter and cleaner than anything currently on offer. It predicts 20 per cent lower maintenance costs over current engines though a rival characterises this claim as outrageous. The new engine partially offsets the weight penalty of a larger bypass by using advanced lightweight materials for the fan blades and other components. However, competitors are quick to point out that its gearing system and associated oil cooling equipment make it more complex than other turbofan engines, potentially rendering it more prone to failure.

Apart from the CSeries, the PurePower 1000G has also been selected to power other single-aisle aircraft like the Russian 150- to 210-seat Irkut MS-21 and the Japanese 70-96 passenger Mitsubishi Regional Jet. And though rivals like Rolls-Royce and General Electric have somewhat similar engines in various stages of development, they are years behind P&W in bringing a totally
new engine to market. Then there is CFM International. Its upgraded CFM56-7BE "evolution" engine for the Boeing B737NG is the precursor of much bigger improvements in the near future. The CFM LEAP-X high-bypass turbofan engine series is slated for first use on the Chinese 168-190 seat Comac C919 when it enters service in 2016. LEAP-X is projected to provide a 15 per cent decrease in SFC through a doubling of the bypass and core pressure ratios, along with reductions in NOx emissions, through new combustor technologies.

**COMPETITION EVERYWHERE**

Should Airbus and Boeing be worried by the prospective launch of the CSeries and other single-aisle aircraft? Not for many years. Despite their trials and tribulations with some of their major programmes, both manufacturers are delivering new aircraft at a scorching pace. They currently enjoy around 88 per cent market share in the 100 to 200 seat single-aisle market segment. The trouble is that emerging competitors like Bombardier, Comac and others could produce irresistibly economical offerings to lure customers who actually need just 150 seats, thus nibbling at the lower end of the market. And if the upstarts do make it big, the impressive market share of the two major players could eventually be slashed significantly.

Boeing's dilemma is acute. After all, the B737 is historically the world's best-selling commercial jet. Since its first version was launched, Boeing has delivered more than 6,000 B737s, and has a further 2,000 aircraft on order. The company is now mulling three possible options—to continue with incremental improvements on the B737, re-engine it or launch an all-new replacement. It is slated to make its choice by the end of the year. Boeing knows there is nothing simple or inexpensive about re-engining—the pylon would change, the empennage would change and the landing gear might have to change, besides other modifications. It is also concerned that a re-engining programme could potentially imperil its healthy B737 order book.

Right now, Boeing is preoccupied with the delayed launch of its B787 Dreamliner. In all likelihood, the B787's revolutionary lightweight carbon-composite fuselage and wings, plus other cutting-edge technologies, will be prominent in the company's next clean-sheet design. With scaled down B787 systems and an advanced fuel-efficient engine incorporated, Boeing aims to offer its next new single-aisle with around 15 to 20 per cent reduction in direct operating costs over other similar aircraft. If it opts to re-engine the B737 with power plants from CFM International and/or P&W, a 2016 entry into service might be a realistic target.

Airbus has sold over 3,200 aircraft of the A320 family and the plane is currently claimed to be the best-selling jet globally with more than 2,400 orders on its books. It is currently evaluating the CFM International LEAP-X and P&W PurePower 1000G GTF as optional power plants for its proposed A320 New Engine Option (NEO) upgrade, and is likely to make its decision by the end of the year. If Airbus goes ahead with re-engining, it feels it could offer 15 per cent lower fuel burn without meddling too much with the stunningly successful A320 recipe. Airbus stresses that re-engining might be offered as a possible option, probably around the end of 2015.

While Airbus and Boeing are still in the process of choosing their power plants, Bombardier officials believe that a new engine alone would provide no more than 10 per cent improvement in fuel efficiency. In contrast, the CSeries is offering a 20 per cent gain in fuel burn over existing jets—half from its next-generation GTF engine and the other half from the use of composites and advanced technologies such as fly-by-wire. Airbus insists the CSeries will have 'absolutely no business case' if Airbus and Boeing launch re-engined versions of their A320 and B737 families. Boeing feels that China's planned Comac C919 represents a bigger threat—the most significant third competitor since the narrow-body segment became a duopoly in 1997. After all, the C919 will be sold into the world's fastest growing airline market, China, pitching it into direct competition with Airbus and Boeing's single-aisle jets.

Till now Embraer, the maker of the E-Jets family, of which the largest version, the E195, can take up to 122 passengers, has been Bombardier's closest rival. Embraer is also expected to decide by the end of the year whether or not to re-engine and incorporate newer
technology into the E-Jets or bring a larger-capacity, clean-sheet design to market. And Embraer is capable of formidable competition.

CUSTOMER IS KING
Manufacturers, airlines, leasing companies and MRO service providers have made huge investments in the existing Airbus and Boeing single-aisle aircraft and their engines. Any decision to adopt new technology must also deliver enough benefits to make the investment advisable. Almost 40 per cent of airline operating costs come from aviation fuel so oil prices will be a major factor in deciding whether new engines—which promise double-digit improvements in fuel efficiency—will be really worthwhile. Manufacturers continuously strive to improve their engines, for the sake of their customers as well as to keep environmentalists at bay. But incremental improvement alone could serve to delay the introduction of new, highly-integrated and optimised aircraft. It could have an adverse effect on the industry’s ability to deliver “step change” reductions in fuel consumption and emissions.

Though the first B737 dates as far back as 1968 and the first A320 to 1988, replacing a family of aircraft cannot be done overnight. Airbus stated earlier this year that it does not see a new narrow-body emerging until 2025, or later. Neither can Boeing’s next generation single-aisle aircraft be expected before the mid-2020s. A major reason is that new technologies in the pipeline are not yet sufficiently developed to incorporate into clean-sheet designs. In a decade or so, composites manufacturing, fly-by-light, and other technologies that can save weight and improve aircraft performance, would achieve sufficient progress to make a new aircraft truly new. Conversely, a clean-sheet aircraft begun today would probably only be more of the same. It is unlikely to be the step change that customers and environmentalists crave for.

But airlines are eager to achieve double-digit gains in fuel efficiency that engine advances could win them. Fed up with huge fuel bills, they are clamouring for increased economy. For instance, Southwest Airlines, which has a fleet of 541 aircraft (all Boeing B737 variants), is asking aircraft manufacturers to develop a new narrow-body aircraft, saying that today’s offerings are unable to deliver the major improvement in efficiency that the airline industry needs. It says it cannot wait 10 to 15 years for an entirely new airplane that will provide 25 per cent or more gain in SFC. Qatar Airways is strongly in favour of re-engining the Airbus A320 family. Air France also wants Airbus to dramatically lower the operating expense of its single-aisle models. And when United Airlines placed its 50-plane wide-body order last December, it firmly rejected the “old technology.”

Both Airbus and Boeing insist that the market will ultimately dictate their decision on whether to go ahead with the proposed single-aisle re-engining plans. The A320 and the B737 are selling briskly and both manufacturers have recently announced plans to increase production. Why would they want to rock the boat? Fleet commonality savings could also outweigh many of the advantages that new programmes may bring. On the other hand, developing a new model from scratch would take perhaps 8-10 years and could cost four times as much as re-engining. Although adapting the A320 or B737 to new engines would require billions of dollars in investment, the risks of a re-engined model are minimal. If the companies opt for re-engining, better-performing airliners could hit the market within five years at manageable costs. That is why Airbus’ proposed A320 NEO plan seems a near certainty. Boeing, for its part, has still to make up its mind on whether to re-engine or design an all-new aircraft. Its re-engining options are comparatively more restricted due to the lower ground clearance of the B737 wing.

All eyes are on Airbus and Boeing as they ponder over their response to the CSeries. Although emerging competitors like Bombardier, Embraer, Comac and Irkut will surely nibble narrow-body market share, re-engined Airbus and Boeing models can probably keep them at bay for a decade or so. By then the investment and technology should be available for a clean-sheet solution. The picture will be clear by early next year. Whatever happens, the single-aisle segment most likely will look very different five to seven years from now, with a host of new fuel-efficient models on offer. And finally the customer will win.
On June 26, 2010, a GA8-TC Airvan, a single engine aircraft from Gippsland Aeronautics, a reputed aircraft manufacturer in Australia, was unveiled by Mahindra Aerospace to the media and others at the hangar of the National Aeronautical Laboratories (NAL) located at HAL Airport, Bengaluru.

Mahindra Aerospace, an AS 9100 certified company, is the aircraft and aero-structure manufacturing division of Mahindra & Mahindra Ltd and has decades of experience in global aerospace design and development programmes. The company combines this experience with knowledge of aerospace regulations and familiarity with operational environments to provide timely, accurate, cutting-edge technical products to customers. It offers a wide range of services ranging from conceptual design to production of aerospace components, aero-structures and complete aircraft.

In December 2009, Mahindra Aerospace bought majority stakes worth ₹175 crore in two Australian aerospace firms, aircraft manufacturer Gippsland Aeronautics (GA) and Aerostaff Australia that manufactures sheet metal components and assemblies for global aerospace majors. GA is already a reputed brand in General Aviation catering to a range of requirements of aircraft such as for crop dusting, disaster relief and air cargo. GA has so far delivered over 250 FAR 23 certified aeroplanes in 38 countries.

These acquisitions have heralded Mahindra's entry into the aerospace market which will open up opportunities for Mahindra Aerospace not only in the commercial aviation segment but also in the lucrative defence offset regime. According to the estimates by the company, business opportunities in the aerospace market could be in the region of $5 billion (₹23,000 crore). Mahindra Aerospace plans to use GA’s facilities in Australia to manufacture 8-, 10- and 14-seat turboprop aircraft, those in the assessment of the company would be economical and cost-effective on short hauls. At the unveiling ceremony, the company announced its intention to “become a significant player in the market for small turboprop aircraft.” As per Anand Mahindra, the Vice-Chairman and Managing Director, Mahindra Group, the aim of the company is to become the Indian equivalent of Embraer, the renowned aircraft manufacturer in Brazil.

Currently, Mahindra Aerospace is engaged in the joint development of a five-seat single piston engine aircraft designated as the NM5, in association with the NAL, Bengaluru. This aircraft may be manufactured at the GA facility in Australia for the export market. Eyeing the opportunities presented by the growing aerospace market in India, Mahindra Aerospace plans to invest ₹250 crore in aircraft and component manufacturing facilities. The company already has a five-acre facility in Malur on the outskirts of Bengaluru and is making efforts to acquire another 20 acres of land in the Aerospace SEZ in Devanahalli, north of Bengaluru. The Aerospace SEZ near the Hyderabad International Airport is also an option under consideration by the company. This probably is a better option as the SEZ is ready and the government of Andhra Pradesh is responsive. The company is clearly embarked on building capabilities in the next three years in a range of aerospace products to exploit opportunities as and when these arise. The focus is on consolidation of the latest acquisitions to meet with market expectations. GA had already received “type certification” for its 18-seat aircraft from the Australian Civil Aviation Safety Authority and has orders for a substantial number of 10-to14-seat machines.

The Airvan, which was displayed on June 26, is the first aircraft manufactured in Australia to circumnavigate the world. Piloted by Australian nationals Ken Evers and Tim Pryse, the Airvan was on a mission with multiple objectives. Apart from authenticating ruggedness and reliability of the Airvan, the adventurous flight was undertaken to commemorate the centenary of powered flight in Australia by Harry Houdini on March 18, 1910 and raise $1 million (₹4.6 crore) to increase awareness in the world about malaria.
The mood in the airline industry in India appears to be generally upbeat these days. Since the last quarter of 2009, the volume of traffic has maintained an increasing trend propelled by rising demand for business travel. The impetus for growth in air travel has been provided by revival not only in the Indian economy, but in the global economy as well. Despite rising fares, both full service carriers (FSC) and low-cost carriers (LCC) are reporting decent load factors. During the recessionary phase, private airlines went through a number of corrective steps including the painful exercise of trimming excess capacity returning leased aircraft, leasing out their own and rescheduling delivery of new orders. The yields are now reported to be stable and encouraging. Some of the leading private carriers such as Jet Airways, IndiGo and SpiceJet have posted profits in the last quarter and Kingfisher is likely to do so in the near future. As per assessment by the Centre for Asia Pacific Aviation (CAPA), profits of the private airlines in India collectively could reach $300 million (₹1,400 crore) in the current financial year. There is definitely a good reason for the private airlines to cheer as they seem to be emerging intact from their two-year long struggle for survival.

But CAPA is less optimistic about the performance of Air India estimating that its loss for the current financial year is about $700 million (₹3,200 crore). Air India’s woes can be attributed to a number of flawed decisions and mismanagement especially during the last two decades. Running an airline is a challenging exercise fraught with risks. It is a capital intensive business, sensitive to a host of factors such as competition, changes in government policy/regulatory provisions, volatility in the price of fuel, epidemic, war and the economic upheavals. During the recent global economic meltdown, over 30 airlines in the US had to shut down owing to unsustainable business models.

In the nearly five decades of its existence, both Air India and Indian were able to withstand buffeting by many of these adverse factors with the government paying a heavy price for their sustenance. Profitability was really never an issue as these two airlines were the nation’s flag bearers. These were not run as business enterprises with financially viable business models, but as departments of the Central Government with characteristic inefficiency and associated ills. The emergence of the private carrier consequent to the liberalisation of the civil aviation sector in the 1990s changed everything for government-owned airlines—Indian and Air India. They lost monopolistic status and in the face of stiff competition, their market share shrunk rapidly. The success of the low-cost model aggravated matters further and on account of the rising financial burden on the government, it became clear that Indian and Air India had either to perform or perish. Two major decisions, one involving major fleet rejuvenation that entailed procurement of a large number of aircraft and the merger of Indian and Air India in August 2007 to form the National Aviation Company of India Limited, have generated controversy both within and outside the airlines. Since the merger, the combined entity has been operating as Air India and losses have continued to mount.

In the last week of July 2010, under the dynamic leadership of Arvind JadHAV, the Chairman and Managing Director since May 2009, Air India unveiled an ambitious plan for restructuring prepared under directions from the government that is reluctant to continue supporting the airline indefinitely. In the recent past, the government has infused as equity a sum of ₹2,000 crore in the airline. Containing a slew of measures, the plan for revamp of Air India has been drawn up to exploit the rapidly growing aviation market and the predicted robust growth in passenger traffic in the coming decade. The airline hopes to achieve break even in operations and neutralise the cumulative loss of ₹17,000 crore by 2014-15. The national carrier has already ordered 111 aircraft, a mix of Airbus and Boeing including the controversy-ridden and inordinately delayed Boeing 787 Dreamliner, increasing its fleet strength substantially over the next five years. This is a commitment that would demand heavy investments and could impose colossal financial burdens on the airline already weighed down by a debt burden of ₹18,000 crore.

After two years of gloom in the industry, the tide seems to be finally turning not only for the private carriers but hopefully for Air India as well.

—By B.K. Pandey, Bengaluru
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