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SP's Aviation

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JULY • 2011

Airbus: BUZZ AT THE SHOW

PAGE 36

Le Bourget 2011 saw Airbus overwhelmed with a series of orders thereby emerging a very strong player in the aviation world

A380

+

- NO PLANE NO GAIN
- KEY PROGRAMMES OF REGIONAL AVIATION
- INDIAN AIR FORCE TOP BRASS SPEAK
- INTERVIEW: CASSIDIAN AIR SYSTEMS' CEO BERNHARD GERWERT
- BUSINESS AVIATION'S ROLE IN ECONOMIC GROWTH

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TABLE *of* CONTENTS

SP's Aviation
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ISSUE 7 • 2011

36 It was the best ever show for Airbus which had record breaking orders. It was the best ever in terms of units.

Cover Story

PARIS, JE T'AIME

In any major international air show, the presence of new combat jets takes on iconic proportions, but at Le Bourget this time, it was civil aviation which overshadowed the military

Cover Photo:
Airbus had never had it so good
Image By: *A. Ernoult ñ Sunlight Image/Fotolia*

NEXT ISSUE:
Infrastructure for Corporate Aviation - India

TABLE *of* CONTENTS

PLUS...

SP GUIDE PUBLICATIONS

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A Word *from* Editor

The CAS has expressed concerns about the military nexus between China and Pakistan, while the incoming Chief talks about 'people and mission' focus and delves on how the IAF is transforming itself

The first three days of the 49th International Paris Air Show it rained. The next three days it 'rained' aeroplanes. Airbus picked up 730 orders worth $72.2 billion; ATR notched up 88 orders to the tune of $2.8 billion; Boeing managed 142 purchases at $22 billion, besides a few other deals. The show at Le Bourget, however, was not just about big-ticket deals, but also about the growing environmental concerns and the industry's response to it. Aptly, the show organisers had invited, Solar Impulse, the revolutionary small aircraft powered by solar energy, as special guest. The 'green theme' at the show was pronounced.

In this issue, R. Chandrakanth, who was part of the *SP's Aviation* team at the Paris Air Show, gives an overview of how the civil aviation sector is on a rebound mood, while military spend has decreased in the West, but is growing in the East. From the show, there are interviews with ITT on air traffic management initiatives and with CAE on simulation and training programmes in India. In the article on emerging regional aircraft, the author writes about how new players from China, Russia and Japan will be cutting into the share of the two big regional players, Embraer and Bombardier, although it may take some years.

The cover story is on Dassault Aviation's Rafale, the omnirole fighter aircraft, which is one of the finalists in the medium multi-role combat aircraft (MMRCA) acquisition programme of the Indian Air Force (IAF). Those campaigning for Rafale are talking about how 'combat proven' the aircraft has been in the theatres of Afghanistan and Libya. Meanwhile, Lockheed Martin's Communications Director has created a flutter by revealing that the company was prepared to offer the F-35 joint strike fighter for the IAF, subject to clearance by the US Government. Whether any official moves have been made from either side is not known.

From the US, LeRoy Cook writes about the benefits of business aviation and how the National Business Aviation Association (NBAA) slogan "No Plane, No Gain" is catching up as many corporates understand how using an aircraft adds to competitiveness in businesses.

The two interviews—one with the outgoing Chief of the Air Staff Air Chief Marshal P.V. Naik who retires on July 31 and with the Vice Chief of Air Staff Air Marshal N.A.K. Browne who takes over, make interesting reading on the thought processes of the leaders at the helm. The CAS has expressed concerns about the ever-growing military nexus between China and Pakistan, while the incoming Chief talks about 'people and mission' focus.

The VCAS delves on how the IAF is transforming itself into a potent strategic force with full spectrum capability in keeping with our national aspirations. In the coming decade, the IAF envisions itself to be a modern force with cutting edge technologies; flexible, adaptable and nimble.

With IAF's transformation, there is a move to pressure the Ministry of Defence to appoint an Air Marshal as the Chairman and Managing Director of Hindustan Aeronautics Limited (HAL) after the present incumbent Ashok Nayak retires on October 31.

Jayant Baranwal
Publisher & Editor-in-Chief

HYPERS ON HORIZON

A new hypersonic jet, dubbed zero emission hypersonic transportation (ZEHST), was anounced at Le Bourget airport on June 19, a day ahead of the start of the Paris international Air Show. The plane which debuted in mockup form is expected to travel at four times the speed of sound, or roughly 5,000 kilometers an hour. The project is being overseen by Airbus' parent company, EADS based in Toulouse, France. The aircraft, as EADS said, could be standard in 2050 and the demonstration technologies could be ready for the first prototype taking to the skies by the end of this decade.

VIEWS

THE BIENNIAL PARIS INTERNATIONAL Air Show, known for springing up surprises from the blue, has once again lived up to its reputation , debuting the ZEHST—albeit in a model form. The concept envisages an airliner which will carry around 100 passengers, at the upper layers of stratosphere, hurtling at four times or more than the speed of sound, astonishingly cutting down travel times between destinations—Delhi to London in 80 minutes or Tokyo to Los Angeles in two and a half hours. Have the aircraft designers found a worthy successor to Concorde, the only commercially exploited supersonic transport in the world till date?

To redux, Concorde was designed in the 1960s with the combined efforts of British and French aviation companies. With its delta wing, cigar-shaped fuselage, four under-belly engines with massive air intakes and a long narrow nose which drooped during take-offs and landings, Concorde was indeed a majestic aircraft. The aircraft flew for more than three decades in commercial service and contrary to general belief, profitably before it retired in 2003, in the wake of an only unfortunate accident in France, the effects of 9/11 terrorist attacks and some political factors. However, while Concorde may have retired, human desire to fly faster cannot be curbed forever. The quest for supersonic travel has continued unabated. The US, Russia, France and Japan are all involved in the field of futuristic SST designs, which apart from airliners has also generated intense research interest in the area of supersonic business jets (SSBJ). But the idea for the airliners to travel at hypersonic speeds has been comparatively a recent phenomenon. In 2008, a British team had-through its A2 programme-conceptualised a hypersonic aeroplane that could ferry up to 300 passengers from Brussels over the North Pole to Sydney in about four and a half hours. But actual unveiling of the model of a hypersonic passenger aircraft, that too by the parent company of the biggest manufacturer of airliners in the world, indicates that Airbus means true business in developing the concept to reality. Also, the Airbus' concept to meet the divergent/contradictory propulsion requirements in the different regimes of a hypersonic cruise airliner is quite different. While the proposed A2's four Scimitar engines use the turbine based combined cycle (TBCC) concept, or a double bypass turbofan ramjet to meet the differing propulsive requirements through a single power source, the Airbus has opted for using separate power plants to look after the specific regimes of hypersonic travel.

PHOTOGRAPH: EADS

Embedded at the rear end of the ZEHST's fuselage would be a set of conventional jet engines to launch the aircraft from a normal airport runway. Once at a suitable height, the pilot would engage a pair of rocket engines to quickly ascend to about 32 km height at the upper reaches of stratosphere and accelerate to M 2.5. Once there, underwing ramjets would be brought into operation to accelerate and cruise at around Mach 4. Nearing the end of the journey, ramjets would be switched off for a gliding descent, with conventional jet engines re-ignited to enable a normal landing at the destination airport. The use of separate power plants for each regime of flight would result in the application of simpler technologies which are already available. According to EADS, the first prototype should be ready by 2020 with the aircraft taking to skies for commercial flights by about 2050.

Sounds exciting? The low seat capacity may prove to be an impediment for a regular airline travel but could always be corrected with stretched models as the development progresses. Twice as fast at Mach 4 than the Concorde, the real plus points for the ZEHST would however be that unlike its notorious predecessor, it would neither rattle the ground with irksome sonic booms because of the height at which it would fly, nor would it pollute the atmosphere or drill holes in the ozone layer because of the propellants (hydrogen, oxygen, biofuels) it would use.

Welcome - 'Green Concorde'. SP

—Air Marshal (Retd) V.K. Bhatia

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PILATUS PC-7: IAF'S TRAINER AIRCRAFT

The $1 billion (Rs 4,500 crore) deal to purchase new basic trainers for the Indian Air Force (IAF) has been put on hold after serious allegations surfaced about discrepancies in the procurement process. The Ministry of Defence (MoD) is taking a re-look at the selection process following a request from South Korea to investigate concerns about the validity of commercial documents submitted by a Swiss firm that was declared as the lowest bidder. The procurement process has now been slowed down as the MoD as well as the IAF, are scrutinising the selection process. As reported by The Indian Express, Swiss firm Pilatus had emerged as the cheapest, making it the automatic winner of the competition.

VIEWS

THE AIR FORCE ACADEMY (AFA) at Hyderabad and the Flying Instructors' School (FIS) at Tambaram, the two institutions in the IAF operating the Hindustan Aeronautics Limited (HAL) built HPT-32 piston engine aircraft as the basic trainer since the mid 1990s, were suddenly left without a basic trainer when, following a crash at AFA end July 2009 in which two experienced flying instructors were killed, the Training Command of the IAF decided to ground the entire fleet.

Strangely enough, this was a repeat of the scenario witnessed exactly two decades earlier when the fleet of HAL-built HT-2 basic trainer aircraft had to be grounded permanently when one of the most experienced and professionally capable flying instructors at FIS perished along a trainee flying instructor in a crash that was attributed to structural failure during an aerobatic manoeuvre. In both the situations, after grounding of the basic trainer fleets, the basic training stage i.e. Stage I, was shifted to the HAL-built HJT-16 Kiran jet trainer. However, the situation obtaining in 2009 was different in two ways. In 1989, after grounding of the HT-2, all three stages of training were carried out on Kiran aircraft with Stages I & II on the Mk I and Stage III on Mk II. In 2009, Stage III was being progressively shifted to the Hawk132 advanced jet trainer. But the major difference was that in 2009, the Kiran fleet itself was nearing the end of its total technical life and the fleet was in a badly depleted state.

PHOTOGRAPH: SP GUIDE PUBNS

Shortage of Kiran Mk I aircraft necessitated the induction of the Mk II version into Stage II. Also, as it may take another two years before new induction into the basic trainer fleet can commence, the IAF may have no option but to dismantle the Surya Kiran Aerobatic Team to augment the rapidly dwindling fleet of Kiran aircraft now required for both Stage I and II.

Selection of Pilatus Aircraft of Switzerland announced in May this year as the vendor for the supply of 75 PC-7aircraft off-the-shelf was indeed good news and definitely more than just a light at the end of the tunnel. However, till such time the allegations made by Korean Aerospace regarding irregularities in the procurement process are investigated and the final selection of the vendor is made, the IAF cannot be certain of the time frame in which the new trainer may be inducted. Also, the situation with regard to sourcing the remaining 106 aircraft continues to be hazy at this point in time. While one report indicates that 106 trainer aircraft are to be built by HAL, it does not clearly state whether these would be manufactured under licence from the vendor supplying the first 75. This option would have been most convenient for HAL that has accumulated considerable expertise in the regime of 'licence manufacture'.

HAL is reported to be working on its own indigenous design called the Hindustan Turbo Trainer (HTT) 40, based on Air Staff Requirements issued by the IAF. However, there appears to be little or no progress so far and the time frame for delivery cannot be predicted with any degree of certainty. There is also a move by HAL to revive the HPT-32 fleet equipped with a parachute recovery system to enhance the chances of survival in the event of engine failure. After all, the HPT-32 fleet has another 25 years of useful life left.

While there are a number of options available involving HAL, reports indicate that the state owned PSU Bharat Earth Movers Limited which has recently forayed into aerospace, has entered into an agreement with Italian aerospace major Alenia Aeronautica to design and produce a basic trainer aircraft for the IAF. But the fact that the IAF has to depend on foreign sources for even a basic trainer, is indeed a sad commentary on the capabilities of the Indian aerospace industry in general and of HAL in particular. SP

—Air Marshal (Retd) B.K. Pandey

PHOTOGRAPH: SIEMENS

MOTOR GLIDER

World's first serial hybrid electric aircraft was on aerial display at the Paris Air Show

SIEMENS AG, DIAMOND AIRCRAFT and EADS showcased the world's first aircraft with a serial hybrid electric drive system at the Paris Air Show 2011. The two-seat motor glider which was on aerial displays at the show had completed its maiden flight on June 8, this year, at the Wiener Neustadt airfield in Vienna, Austria.

The aircraft was built by the three partners to test the hybrid electric drive concept. In the future, the technology, which is intended for later use also in large-scale aircraft, will cut fuel consumption and emissions by 25 per cent, compared to today's most efficient aircraft drives.

The motor glider, which is based on Diamond Aircraft's HK36 Super Dimona, is the only aircraft of its kind in the world. It is the first to use a serial hybrid electric drive, which has been utilised till date only in cars, as an integrated drive train. The plane's propeller is powered by a 70kW electric motor from Siemens. Electricity is supplied by a small Wankel engine from Austro engine with a generator that functions solely as a power source. A Siemens converter supplies the electric motor with power from the battery and the generator. Fuel consumption is very low since the combustion engine always runs with a constant low output of 30kW. A battery system from EADS provides the increased power required during takeoff and climb. The accumulator is recharged during the cruising phase.

The next development step will be to further optimise the entire drive train. Siemens scientists are currently working on a new electric motor that is expected to be five times lighter than conventional drives. In two years, another aircraft is expected to be equipped with an ultra-light electric drive. Siemens' Drive Technologies Division has already used integrated drive trains in other applications like marine drives. The knowhow gained in these areas has now been applied in the aviation industry as well. Combined with the corresponding product portfolio, the components of the drive train can be optimally adjusted to one another. SP

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Final COUNTDOWN

The wings and fuselage of the nEUROn UCAV demonstrator were mated in early June at the Istres, France flight-test base of Dassault Aviation

THE FINAL ASSEMBLY OF DASSAULT nEUROn unmanned combat air vehicle (UCAV) demonstrator is in full swing at Istres, France. According to the company, the six nation collaborative programme is on schedule. All subassemblies have been delivered, including the low-observable parts of the structure coming from Dassault's Argenteuil and Biarritz factories.

Thierry Prunier, Senior Vice President UAV and UCAV programmes, has said that although only one Neuron air vehicle is being completed for flight test, up to four examples of each subassembly have been built. The additional examples are being tested in the "global integration rig" at Istres, or for other "real-hardware-in-the-loop" tests. Four pre-integration rigs have been used: one at Saint-Cloud, France, for the flight control system; two at Getafe, Spain, for the ground control and datalink management systems; and one at Linköping, Sweden, for avionics.

During the last quarter of 2011, the Dassault Aviation team will perform the ground tests of the nEUROn, which would be followed by the first engine run-up by 2011 end. The maiden flight is scheduled by mid-2012. This will include down time for low-observability testing in a French anechoic chamber, followed by second and third-phase flight tests in Sweden and Italy.

The nEUROn was originally planned by Dassault as "AVE Grand Duc" and later it evolved into a European cooperation including Swedish Saab, Greek EAB, Swiss RUAG Aerospace, Spanish EADS CASA and Italian Alenia

The Dassault team, assisted by the teams from various industrial partners, will perform the final layout, piping, electrical wiring and equipment fitting, as defined in the digital mock-up reference established by the six partners on the virtual plateau, as well as the final assembly. SP

PHOTOGRAPH: DASSAULT AVIATION - S. RANDÉ

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The economy of scale does not follow acquisition of a bigger aircraft, which will need a larger hangar, more expensive maintenance, and steeper operating costs. By the same token, if your company does need longer range and more seats, this is an excellent time to make an acquisition.

By **LeRoy Cook, Missouri, USA**

PHOTOGRAPHS: EMBRAER & WWW.FALCON2000S.COM

THERE'S NO DEBATING THAT many regions of the world are going through tough economic times. Keeping a company running under such conditions requires much work to find business and secure it against the competition. Rather than selling a company plane, it's more than likely a good time to put one to work. The advantages of flying a business aircraft can make the difference between survival and forced acquisition. The secret is to fly smart, not wasteful.

Determining the use of a company-owned or leased aircraft is frequently an agenda-driven exercise. All too often, the desire to have the largest and most impressive airplane on the airport, overrides the practical needs of the company. Or, a buying opportunity may be presented that seems too good to pass up, even if the aircraft doesn't fit the company's requirements. Conversely, a slash-and-burn efficiency expert, hired to cut costs and "trim the fat" at a company, will view the flight department as a wasteful extravagance. In all these cases, it's a preset agenda that drives the management decision; that's not the best way to run a company.

Every business has its own set of needs, and meeting its travel requirements requires practical analysis. If the firm's headquarters is located near an airline hub with frequent flights to the company's destinations, it makes economic sense to use the airlines' services. However, is it logical to limit the firm's growth to only those markets served by public transport? Can the airline schedule accommodate the company's needs or will the employees have to cut short their work to take their flights? What happens if the task takes longer to accomplish than anticipated?

It doesn't take a lot of contemplation to conclude that a company airplane will solve many problems. Sitting around airline terminals wastes productive time, even with the capabilities of wireless communication and take-along workstations. The fact remains, doing a day's business via airline can often require three days of travel, simply to arrive on time and allow for contingencies. Yes, we're saving the firm money, but we're also wasting a lot of productive time.

A SENSIBLE APPROACH

Getting back to basics, we need to examine why business aviation makes sense, and particularly as it applies to our individual company. The airlines should be used for pure economic reasons, whenever their services fit our needs. The company plane is an adjunct and not a replacement for public transport. But when it's needed, it can be priceless.

A company's flight department is somewhat akin to a standby power generator stationed outside a corporate facility. From a purely economic standpoint, the cost of installing and maintaining that emergency power source is a demonstrable waste. But when its output is needed to keep the offices open and ship the product, it's worth every penny that's invested in it. The rest of the building and personnel can't function without its contribution.

Thus, we can begin our valuation of the company airplane as an insurance policy. It can make it possible to meet the commitments under unpredictable circumstances, kept ready just in case it's needed. Having it available makes the CEO sleep better at night because if a problem arises somewhere in the widespread operations of the firm, he knows that the aircraft is ready to go.

In lean economic periods, perceiving and seizing an opportunity makes the difference between surviving and going under. The chief advantage of a business aircraft—or perhaps its only advantage—is its flexibility. Being able to respond quickly on the company's schedule, even changing course in mid-flight, is its forte. If an emergency crops up at a plant in a remote location, the company plane can be dispatched with the people needed to assess and correct the problem. If a client or potential client wants to meet, the company aircraft can make it possible. Being flexible is vital when the business is tough.

The other reason for keeping a business airplane is security. If only the company personnel are on the aircraft, business can continue without fear of disclosure; dispatches and equipment can be flown without question; and long, tedious wait lines in the terminal are avoided. Corporate espionage is an art form among rapacious competitors. A private aircraft is just that—private.

The flexibility of corporate aviation is most useful when the destinations are not located near well-served air carrier points. There are many communities with no or infrequent airline flights, yet with great potential for development. The right business plane can use the smaller airports near these cities, giving the flying company an advantage over less flexible competitors.

Productivity is another critical component of economic survival. The most expensive of a company's assets and the most valuables are its people. Making the most of their time, particularly the vital ones in highly-placed positions, is its key to operating efficiently. A company aircraft makes it possible to have them back at work the next morning, rather than stuck in

FLEXIBLE OPTIONS: BUSINESS JETS LIKE EMBRAER'S PHENOM 300 OFFER RELIABLE AND SECURE ENVIRONMENT FOR CONDUCTING CORPORATE BUSINESS

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a distant city. Moreover, it may be possible to convince the workers and clients to make quick day trips rather than half-week excursions and forestall them, seeking less-stressful opportunities elsewhere.

BEYOND WORTH

How much is the plane worth to a company? As our analogy of the stand by generator shows, one episode may pay for the asset. Having a highly-compensated executive sitting idle in a hotel or airport waiting room is extremely costly for a company. Hours spent on the road are hours taken away from decisions in the office and staff interaction. And yet, not having top management able to visit company installations on a convenient schedule means those individuals are not as well informed about overall operations. The company aircraft not only saves a valuable employee's time, it fosters productivity of such people as well.

Using a corporate aircraft wisely, rather than lavishly, requires proper application of the asset. If the average trip length is 320 km, it makes little sense to buy a large-cabin jet to commute between plants. If a company is entering corporate aviation for the first time, it is rational to start small and expand as the need is proven. Not all business aircraft are jets and not all are turbine powered. The Beech Baron or Piper Seneca piston-engine twins, for instance, can serve adequately over stage lengths of a few hundred kilometres. A small cabin size is not as noticeable if the passengers are riding less than an hour. The advantages of pressurisation and higher speed may be foregone if a Cessna Caravan can be acquired and operated for considerably less than a Pilatus PC-12.

BIGGER IS NOT BETTER

There are some impressive bargains in larger business aircraft as today's rough business climate forces divestiture. It is best not to be tempted into acquiring such an aircraft if it does not fit the company's needs. The economy of scale does not follow acquisition of a bigger aircraft, which will need a larger hangar, more expensive maintenance, and steeper operating costs. By the same token, if your company does need longer range and more seats, this is an excellent time to make an acquisition. Initially, though, it's best to start small and move up later.

The revitalisation of turboprop airplanes has perhaps been spurred by the need to meet economic reality. A Beech Super King Air can handle many of a corporate jet's missions, and it will reach some airports which a jet cannot. Even a single-engine TBM 700 or 850 will cover a company's territory quickly and efficiently, compared to a light jet. Again, right-sizing the company airplane to the firm's need is the key to avoiding the trap of maintaining an underutilised and over-expensed flight department.

PRESENTING THE EVIDENCE

Documenting the sometimes nebulous value of a company-owned aircraft can be difficult. However, in late 2010, an exhaustive study was performed by NEXA Advisors for the National Business Aviation Association (NBAA), examining the performance of 600 small- to-medium companies listed with Standard & Poors. On comparing the results achieved by users of corporate aircraft against non-user companies; in nine separate parameters, the advantage of aircraft utilisation was quite clear.

Even when weighted for company size, thereby avoiding potential bias from a large company being able to absorb a flight department's costs, the advantages remained. Companies using aircraft enjoyed nearly twice the share price growth; the earnings far outpaced those of non-user companies; and both the return on assets and return on equity were stronger for the aircraft-using firms. This was true even though the study contained some difficult business years from 2005 to 2009.

Why is this so? Quite evidently, non-financial drivers such as customer satisfaction, employee satisfaction, innovation and risk management and compliance come into play, all contributing to the company's success. It is hard to place a value on being able to visit three or four clients or plants in a day, or having the ability to respond to an urgent need in hours instead of days. But the positive financial results are there in the study, in both small and medium companies using corporate aircraft.

Predictably, the studied users of business aircraft were predominantly located outside the major population regions of the United States; 28 per cent were headquartered in the metropolitan areas of New York, California, Florida and Texas, while 72 per cent had their headquarters in the remainder of the country. Being able to travel on demand from their diverse home offices contributed mightily to the companies' success, and also enlarged their respective fields of opportunity. The NEXA study is available at www.noplanenogain.org.

When the company plane is needed, its value is far more than the price tag established by an accounting department. Esoteric reasons may outweigh mere cost. For instance, inviting a client to a weekend getaway at a ski resort may look like a junket, when it's really a means of cementing a valid business relationship. A company plane makes these face-to-face contacts possible, as they would not happen otherwise. Some assets have value beyond mere price. SP

FULLY DIGITAL

More than 20 Falcon aircraft are currently operating in India. Almost half of the new aircraft orders are for the Dassault flagship Falcon 7X

John Rosanvallon,
President and CEO, Dassault Falcon Jet

IN A WORLD WHERE timely response to emerging opportunities can be the deciding factor on whether a company wins more business; the corporate jet offers a clear competitive edge. Despite the growth of the Internet and video conferencing, Indian business leaders are finding that they need to be where the action is-—face-to-face to be successful. A private jet not only offers the advantage of timely personal response to business and management needs, it offers unequalled security, privacy and productivity en route.

Companies using a Falcon jet to span the globe also have the unique advantage of flying directly to smaller airports closer to their destination saving even more time over airline travel. For those companies having multiple plants in far away places, a private jet saves so much time over the airlines, it is possible to do two days' work in one.

A company jet acts as an "onboard office' or boardroom allowing business people to work in privacy and comfort throughout the journey. Being in the air does not mean being out of touch, with the availability of an array of sophisticated onboard communications technology, from satellite phones to video conferencing.

As India's economy continues to emerge strongly, the private sector is playing its role in developing business across the country and increasingly beyond, with these companies doing business internationally and globally. Reaching business centres across such a large country and beyond, will increasingly entail the use of private aircraft as essential business tools.

Regulation and basic infrastructure such as local airports and fixed-based operators (FBOs) may be lagging behind the demand emerging for business aviation, but there is little doubt that business jets will add impetus to the already thriving Indian economy. Studies in the US and Europe clearly show the positive economic impact of business aviation. In those studies, it was confirmed that business aircraft owners are more successful on a sales per employee basis as well as financial basis.

Dassault's share of the Indian market is already strong and growing. Private investment in aviation infrastructure, supported by the Indian authorities, makes the dynamic market even more attractive. Dassault Falcon has more than 60 per cent share of the market for premium, large cabin/long haul aircraft and we are rapidly consolidating this position with an increase in local customer support and parts services. A network of new authorised service centre is also under consideration, in addition to Air Works, Mumbai, which was approved last May.

More than 20 Falcon aircraft are currently operating from airports in Bangalore, Chennai, Delhi, Hyderabad and Mumbai, and another 10 aircraft are on order for delivery to Indian customers within the next two years. Almost half of the new aircraft orders are for the Dassault flagship Falcon 7X, the first business jet equipped with a fully-digital flight control system.

The performance of the Falcon fleet is especially valued in India, where short airfields, elevated runways and high temperatures are common. The Falcon aircraft are also more economical to operate and more environmentally responsible than any other large cabin aircraft. Their efficient design and technological optimisation means less weight, 20-60 per cent less fuel consumption and lower emissions than competition.

Dassault Falcon aircraft are very well suited to the Indian customer, offering long-range—the Falcon 7X can connect Mumbai to Cape Town, Bangalore to the challenging London City Airport in the heart of the city (the only jet in its category to meet the demanding requirements of the airport with its steep approach and noise restrictions)—and performance.

We have always been convinced about the potential for growth in business aviation in India. Business jets are now seen in the region as a powerful tool to enable quick and convenient access to customers within the country and worldwide.

We believe in the bright future of business aviation in India and are committed to expand further our presence in the country. SP

BETTER RETURNS

Studies have found that businesses which use business aviation as a solution to some of their transportation challenges return more to shareholders than companies in the same industry that do not utilise business aviation

Daniel Keady
Vice President-Sales
South Asia-Pacific/India, Hawker Beechcraft

BUSINESS AVIATION IS DEFINED as the use of a general aviation airplane for a business purpose. It is essential to tens of thousands of companies of all types and sizes around the world that are trying to compete in a marketplace that demands speed, flexibility, efficiency and productivity. The vast majority of these companies are in the US—85 per cent—are small- and mid-size businesses, many of which are based in the dozens of markets across the US where the airlines have reduced or have inconvenient services. As the market continues to explode in India, this is much the same model.

A company's decision to utilise business aviation for any mission depends on a variety of factors, including availability of commercial service in the departing or arrival destinations, the number of sites to be visited in a single day, the number of employees travelling, the need to discuss proprietary matters en route, the need to move specialised equipment and a host of other considerations. The following list details some of the primary reasons companies utilise business aviation as a solution to some of their transportation challenges:

- Accessing communities with little or no airline services
- Poor road infrastructure to reach the destination
- Reaching multiple destinations with efficiency
- Ensuring flexibility
- Increasing flexibility
- Providing a better return to shareholders
- Schedule predictability and reliability

With respect to the economy, general aviation contributes to economies by creating output, employment and earnings that would otherwise not occur. Direct impacts, such as the purchase of a new aircraft, multiply as they trigger transactions and create jobs elsewhere in the economy. Examples of this include pilots, mechanics, engineers, operations companies, ground handling, the Directorate General of Civil Aviation (DGCA) jobs, sales jobs, flight attendants, etc. Additional to these benefits there is also a financial benefit to the government given India's current tax codes. The bottom line is, studies have found that businesses which use business aviation as a solution to some of their transportation challenges return more to shareholders than companies in the same industry that do not utilise business aviation. And if India businesses are more productive and profitable, this translates to a better, stronger and more productive Indian economy. SP

FLEXIBLE & EFFICIENT: BEECHCRAFT KING AIR 350I

PHOTOGRAPHS: HAWKER BEECHCRAFT

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ROBB REPORT "BEST OF THE BEST" SUPER-MIDSIZE BUSINESS JET, 2008/2010

NO PLANE NO GAIN

Not having a company airplane can be hazardous to the financial health of a business, because of opportunities lost and contacts missed. The "No Plane, No Gain" cliche has proved to be valid and easy to remember, both for public dissemination and as a tool to convince the reluctant CEOs.

PHOTOGRAPHS: CESSNA, GULFSTREAM, HAWKER BEECHCRAFT & EMBRAER

By **LeRoy Cook, Missouri, USA**

CAPTIVATING SLOGANS ARE A popular advertising method and motivational theme. Some would-be memorable phrases stay with us for generations, others drift away in the first breeze. And some are "recycled" into slightly modified form so that they can be adapted for a new use.

It was the latter case that was applied to the "No Plane, No Gain" slogan, recently resurrected by the National Business Aviation Association (NBAA) in cooperation with the General Aviation Manufacturers Association (GAMA). Both of these organisations have an interest in promoting the wise use of business aircraft, whether it is to grow membership of companies operating such aircraft or in building and selling the aircraft.

The intent of No Plane, No Gain is to draw non-aviation people of influence to the concept that using an aircraft to conduct a company's business creates more opportunities for growth. In other words, if your firm does not operate a plane, it will show less gain in the yearly sales numbers. Given the often poor image of corporate aviation in the press, which may characterise the company plane as a "royal barge", used only for recreational outings by the overpaid top brass, the message certainly needs dissemination.

No Plane, No Gain, of course, is a play on words taken from the term "no pain, no gain", as originally pushed by sports trainers to encourage athletes to continue their workout despite aching muscles and tiredness. Soreness is desirable, they claim, if you want to see gains in muscle mass and endurance. The secret is to achieve the right balance; avoid destructive overuse of the body, pushing it just enough to gain healthy benefits.

The original No Plane, No Gain campaign was started by NBAA and GAMA in 1993, during a slump in activity and was successfully used for several years. The formula was brought back in early 2009, after the infamous appearance before the US Congress of American automobile makers, who used corporate jet aircraft to travel from their Detroit headquarters to the US Capitol to seek federal loan funds. Such travel was portrayed by the press as a lavish perquisite, financed by the sacrifices of mismanaged workers. In fact, it was probably a logical way for the highly-compensated executives to keep a schedule for their meeting with the government committee in charge of bail-out monies. The crestfallen auto executives should have risen to the challenge and pointed out the worth of their time, which was too valuable to be wasted in airline terminal waiting rooms. Maybe sharing a ride would have looked better.

MAKING THE POINT

Does No Plane, No Gain make sense? Surveys and analyses have conclusively shown that companies using a corporate aircraft do show greater growth and profitability than non-flying firms. They will perform above the average of their peers, the only reason being according to NBAA and GAMA, their ability to respond quickly to corporate travel needs. Only a company-owned or leased aircraft can move key personnel to necessary sites, and most importantly bring them back again the same day.

The point being made is that the company plane is a necessity instead of a luxury. Businesses with no private aircraft will not do as well as those who fly, unless their activity is entirely local in nature. Even then, they limit their potential for growth.

Is this demonstrable? By looking at comparisons of similar companies with and without internal air support, the business aviation users stand out as above-average. To be sure, there must be a need to travel, and the use must be proper to benefit the company. In the opinion of flinty-eyed shareholders, like any asset, an idle aircraft is a tempting target for disposal and one that can be prone to misuse. To justify its cost, the airplane must be put to work and the work must be in the company's best interest. To increase utilisation, sharing an aircraft to maximise return on investment is a popular concept.

The No Plane, No Gain message may be wasted on aviation people, who already have knowledge of, and belief in, such a concept. To reap the slogan's potential, it has

IN THE TOP RUNG: THE GULFSTREAM G650 WITH ULTRA-LARGE-CABIN, ULTRA-HIGH SPEED BUSINESS JET IS, QUITE SIMPLY, THE GOLD STANDARD IN BUSINESS AVIATION; THE HAWKER 4000 HAS AN INNOVATIVE DESIGN AND IS FASTER AND MORE EFFICIENT

ULTRA LARGE COMFORT BIZJET: MANUFACTURED BY THE BRAZILIAN AEROSPACE FIRM EMBRAER, THE LINEAGE 1000 HAS COMFORTABLE SEATING FOR 19 PASSENGERS

to be delivered to the unconvinced, to start the conversation and perhaps make the board of directors consider acquisition of an airplane. In NBAA/GAMA's view, the purchase of a company plane should be no different than investing in over-the-road trucks or building a new production line. That it makes company growth possible should be the only criterion for consideration.

STUDYING PERFORMANCE THROUGH A DOWNTURN

According to a 2001 study, a survey of S&P 500 peer groups from 1992 through 1999 showed that business aircraft operators earned 141 per cent more cumulative returns than did the non-operators. In the same difficult period, the ratio of sales to total assets declined by 15 per cent for non-operating companies, but only five per cent for companies' using a business aircraft.

Is this because aircraft-operating companies were older and better established and thereby able to afford the use of airplanes? No, because an examination of 32 companies who began operating an aircraft after the 1995 economic slowdown showed that those companies who had just begun aircraft operations returned 343 per cent to their shareholders from 1995 to 1999, versus 177 per cent for non-operators. Clearly, the move to utilise company aircraft made a difference.

What were the sample sizes? Of the 334 companies surveyed, 240 were aircraft users; 185 were long-term aircraft operators, while 55 were in a group that began to use corporate aircraft between1992-1999. A total of 94 non-operators held out with no aircraft use over the study period.

Some of reasons most often given for using business aviation were the ability to access communities with little or no airline service. In the US alone, only 500 airports have commercial airline service, while 5,000 can be reached by business aircraft. Another reason given was the ability to reach multiple destinations quickly and efficiently, often in a single day. Also cited was supporting the travel needs of many types of employees (72 per cent of passengers were non-executives) and moving critical and sensitive equipment without entrusting it to a common carrier. Finally, the flexibility of responding to changing demands and circumstances were deemed important, because such needs aren't usually known in advance.

The study wanted to know if using business aircraft could be shown to improve revenues by increasing customer intimacy or accelerating transactions. Would face-to-face contact increase customer satisfaction? And would employee satisfaction be improved by the resulting beneficial work environment? These benefits, though difficult to directly prove, were reported broadly and given credit for influence on the results.

> Surveys have conclusively shown that companies using a corporate aircraft do show greater growth and profitability than non-flying firms

From these and other independent studies, the worth of a properly-utilised business aircraft is quite clear. Not having a company airplane can be hazardous to the financial health of a business, because of opportunities lost and contacts missed.

The No Plane, No Gain cliche has proved to be valid and easy to remember, both for public dissemination and as a tool to convince reluctant CEOs. Initially established as a three-year programme, the campaign may continue as business aviation proves its value during turbulent economic times. SP

PHOTOGRAPH: SP GUIDE PUBNS

Our thought process is based upon consolidating our capabilities rather than being adversary-centric

The ever-growing military nexus between China and Pakistan has become a great concern for India. In the second instalment of the interview with **Air Marshal (Retd) V.K. Bhatia**, Chief of the Air Staff **Air Chief Marshal P.V. Naik** throws light on the steps taken by the IAF to neutralise any challenge.

SP's Aviation **(SP's): Is the IAF encountering any roadblocks in its quest to achieve a 'transformed avatar' through a detailed and sustained modernisation programme and by adopting dynamic and proactive doctrines and operational concepts? If yes, could you explain as to what are the likely impediments and how is the IAF planning to deal with them?**

Air Chief Marshal P.V. Naik (CAS): Modernisation of the armed forces is an inescapable necessity, if we need to achieve our national security objectives and counter any threats. Though there are concerted efforts, defence procurement takes a long time to fructify owing to various reasons. After all, we need to get the best deal. It has impacted our preparedness in the past. However, measures have been instituted and the new procurement procedures have removed many bottlenecks in the erstwhile system. Our modernisation plans are fructifying at a faster pace now. All capital procurements are being done as per the procedure laid down in DPP, which is a comprehensive and transparent document.

SP's: What has been the IAF's progress chart in terms of acquiring the desired core competencies pertaining to strategic reach, precision attack and all-weather strike capabilities? What more needs to be done?
CAS: As I just mentioned, the IAF is following a comprehensive programme for achieving core competencies, especially strategic reach, precision attack and all-weather capabilities. Plans are in the pipeline to acquire more airborne warning and control system (AWACS), air-to-air refuelling (AAR) aircraft, heavy airlifters, advanced combat aircraft, modern helicopters, precision guided munitions (PGMs) as well as space and net-centric capabilities. These assets when employed in fusion will enhance our strategic reach and enable air dominance. Similarly, the upgrades in various fleets are also aimed at improving the targeting and all-weather capabilities. Sustained efforts are being made to train our personnel to achieve the laid down conceptual and functional objectives.

SP's: There is apprehension in some quarters that the 'offset' obligations for the medium multi-role combat aircraft (MMRCA) deal is so large (close to ₹22,500 crore) that the Indian defence industry would not be able to absorb. Is it true? Would it affect the opening of the commercial bids and in taking the programme forward to its logical conclusion? Please comment.
SP's: The offset obligation in the MMRCA deal is 50 per cent of the foreign exchange component. As the acceptance of necessity (AON) is for ₹42,000 crore, the total value of offsets obligation is expected to be in the range of ₹15,000-18,000 crore ($3.5-4 billion approx.). The Indian industry would be able to absorb these offsets as a large percentage of the offset projects would be in the direct purchase (DP) category, wherein, the foreign vendor would directly buy defence products or services from the Indian offset partners (lOPs). The evaluation of technical offset proposals would not affect the opening of commercial bids as the Technical Offset Evaluation Committee (TOEC) report would be completed before the opening of commercial proposals.

SP's: While there is a general awareness that the aerospace industry in India needs to have meaningful participation by the private sector for the country to achieve its goal of self-reliance, the actual progress on the ground is still far from satisfactory. What in your opinion needs to be done to accelerate the process and how can the IAF assist in this regard?
CAS: Successive technology denial regimes and our inability to absorb high levels of technology are the main challenges. Our private sector needs to be ready to absorb high level of technology and adhere to stringent quality and airworthiness requirements as aerospace technology is an ever-evolving field and the emergence of cutting-edge technology is very rapid. While some IAF procurement is from indigenous sources, a large part of the indigenous production is still heavily dependent on imports of components from foreign sources. The government is also further simplifying the already existing 'Make' category. The Defence Production Procedure (DPP) issued this year is aimed at achieving self-reliance in defence production and to create conditions conducive for the private industry to take active role in indigenisation of defence industry and enhance the potential of small and medium enterprises (SMEs) in indigenisation, so as to broaden the defence reaserch and development (R&D) base in our country. The government has been encouraging participation by Indian industry in defence production. The 30 per cent offset clause in all capital procurements above ₹300 crore is sure to boost the Indian industry. Government is also in the process of formulating a Defence Production Policy that would address all the issues pertaining to indigenous production. The government proposes to strengthen the defence R&D base of private sector by setting up separate funds for the same. A public version of the IAF's long-term vision is being made available to enable the industry to enhance their technology base.

SP's: There are recent reports in the media on the ever-growing military nexus between China and Pakistan including the presence of Chinese military formations in Pakistan Occupied Kashmir (PoK). How serious is the security threat to India and what specific steps are being taken by the IAF to prepare itself for a two-front challenge?
CAS: Chinese interest in terms of infrastructure development in Pakistan is obviously a concern. We are aware of the security implications. I believe that it is no longer a question of one-front or a two-front scenario. We should be able to neutralise any challenge. That is why I mentioned earlier that our present thought process is based upon consolidating our capabilities rather than being adversary-centric. The infrastructural development of airbases in the North-east is in full swing including activation and operationalisation of other airfields and equipping them suitably. Some of our abandoned airfields in Jammu & Kashmir area have been activated and steps are under way to upgrade the infrastructure. Regular operational exercises are conducted to ensure IAF's preparedness at all times.

SP's: There are contradictory views on the CDS issue. One stating that in the absence of an actual CDS, HQ IDS is nothing but an enlarged Defence Planning Staff, which was its forerunner; the other stating that even with the post of CDS lying vacant, the IDS is providing the necessary synergy for which it was formed. As Chairman Chiefs of Staff Committee (COSC) with the CISC working under you, how do you look at the whole issue? Can the present 'status-quo' carry on serving the purpose indefinitely? Please comment.
CAS: Jointness is the way of the future. Future scenarios would necessitate armed forces to operate jointly and in close coordination to achieve national goals. This is only possible if all actions, from planning to execution, are done in a joint environment. For the armed forces to accept and absorb the CDS concept, HQ IDS has a major role to play. Service HQs and HQ IDS have to create an environment which would help in accepting change willingly and with minimum turmoil. In my opinion, HQ IDS is doing a fair job in enhancing jointmanship.

SP's: Has there been any progress in the creation of the much awaited Space Command? What would be the likely shape and size of Space Command? Being the biggest user of space-based assets, what role do you envisage for the IAF in setting up the said organisation including 'command and control' issues?

CAS: Till very recently, exploitation of space by the Indian armed forces had a very limited objective. Our foray into space is a nascent venture and as of now we are consolidating our requirements. It would take a highly focused approach before we attain full-fledged space capabilities. At present, the Integrated Space Cell at the IDS is coordinating the requirements of the armed forces with ISRO. Organisational issues, infrastructure, etc are secondary and the primary issue is integration and operationalisation of space capabilities for overall force enhancement. Once the operational capabilities are in place, the organisational issues would automatically fall into place. IAF would definitely have a major role in our national military space doctrine as and when it is formalised.

SP's: You would agree that having had to ground the trouble-prone and highly unreliable HPT-32, the IAF is in dire need to acquire a new basic trainer to streamline flying training. The IAF indeed went on a fast track to initiate the acquisition process. With all the competing vendors' products having been flight-evaluated sometime ago, what is being done to accelerate the process for signing the contract to ensure in-service induction of the selected aircraft in the shortest possible time?
CAS: The procurement case is being expeditiously processed and has now reached the contract negotiation stage.

SP's: The latest reports regarding issuance of global RFIs to procure spare parts for weapon systems of Russian origin clearly exposed Russia's scant interest in living up to their commitments for the 'after-sale' product support. The problem is so acute that leave alone older equipment, even the still in-production Su-30 MKIs are not spared, resulting in unacceptable low serviceability of this frontline aircraft, which the IAF can ill-afford. On the other hand, India continues to place great trust on Russia by going ahead with major joint ventures such as the PAK-FA fifth generation fighter and MTA, et al. Could you throw some light as to how this dichotomy is being addressed by the IAF?
CAS: The issuance of global request for intent (RFI) to procure spares and weapon system of Russian origin is a step towards greater transparency and competition in global defence procurement. Defence procurement publication like DPM-09 and DPP-09 and their availability in open domain is a step in this direction. As far as the after sales product support for Russian origin weapon system is concerned, we have faced some problems earlier and Russian original equipment manufacturers (OEMs) are honouring the product support commitment entered into between the Government of India and the Russian Federation. Su-30 MKI aircraft are now being produced in India by HAL under transfer of technology (ToT) agreement. More than 100 aircraft have been produced by active participation and support of Russian OEMs.

SP's: Have all the anomalies in the Sixth Pay Commission been resolved to the satisfaction of the Services? Also, what impact has it had on the manpower intake? Is the IAF envisaging a greater role and bigger participation by women to augment its human resources? Please explain.
CAS: The Pay Commission has been quite reasonable and has definitely improved the quality of life of our personnel. However, there are certain issues that are yet to be resolved. The Service HQ is actively pursuing these issues with the government. The government on its part is sensitive and open to the concerns of the armed forces and all these issues are likely to be resolved satisfactorily in the near future. Implementation of the Sixth Central Pay Commission (CPC) has had a positive impact on the manpower intake of the IAF too. Insofar as women are concerned, the IAF has been proactive in granting commission to women in all branches of the IAF except the fighter stream. An inter-services study is now in progress to help formulate a long-term policy for future employment of women in the armed forces.

SP's: It is indeed laudable that in their drive to modernise, the IAF is spearheading the other two services, but it is also true that a lot more has to be done to achieve the desired multifaceted capabilities to meet the emerging challenges. Time availability being a crucial factor, do you feel that there is a requirement for the IAF to accelerate the pace of modernisation/force build up? If yes, do you think that there is a case for the IAF to get greater budgetary support for capital acquisitions? But more than that, would the IAF be in a position to absorb the governmental largesse in a timely manner?
CAS: The capability building process of IAF is progressing at a rapid pace with procurements being processed as per our time lines. Adequate funds are made available by the government that has ensured timely fructification of our projects. The DPP-11 is quite comprehensive and has brought in more clarity in the procurement procedures. Overall, the modernisation programme of the IAF is progressing well.

SP's: Lastly, having spent more than two years in the exalted office, what in your opinion has been the major milestones achieved by the IAF under your stewardship? Which way is the IAF heading and how do you see this glorious service in a decade from now?
CAS: IAF is alive to the changing global and regional strategic environment. We continue to acquire modern combat elements and upgrade our existing inventory to remain prepared and well-equipped for meeting the security requirements of our country. We have adequate combat experience and our human resource pool is highly professional and well trained with enormous exposure. Today, IAF is a reckonable aerospace force, capable of facing any challenge. The long-term plans of IAF are driven by the imperatives of focusing on the modernisation to enhance its potential across the entire spectrum of operations, with due regard to the perceived security concerns. Combat support elements and infrastructure would have to cater to the requirements of a larger geographical area and increased responsibilities. Procurement of modern combat aircraft, force multipliers and guided weapons is planned to enhance the reach and precision during operations. In future, the IAF will have adequate strategic reach to address security threats/opportunities within our areas of interest and to meet out of area contingencies (OOACs), peacetime military tasks, counter-insurgencies, anti-terrorist actions and international obligations as a major power. SP

(Concluded)

Dassault Rafale is the first omnirole combat aircraft by design. It has the capability to carry out different complex combat assignments during the same sortie, be it ground attack, beyond visual range (BVR) air-to-air combat or interceptions.

A FIGHTER PILOT'S DREAM

By **Air Marshal (Retd) B.K. Pandey**

ASCION OF THE Mirage family the Rafale from Dassault Aviation of France is the latest and the most potent twin-engine combat platform to burst on the military aviation scene at the dawn of the 21st century.

VARIANTS

A technological marvel, the Rafale is available in three distinct variants—single-seat Rafale C for land-based combat operations, single-seat Rafale M for carrier operations and the two-seat Rafale B for land-based combat operations. The three variants share a common airframe and weapon/mission system. The differences between the naval and land versions is only in respect of the undercarriage and the arresting hook fitted at the rear of the fuselage. The Rafale has balanced performance between subsonic and supersonic regimes, either in heavy or lighter air-to-air combat configurations. Moreover, 'terrain following' modes allow the Rafale to automatically fly unobserved at very low altitudes in all-weather conditions, optimising its survivability in a high threat environment. The twin-engine configuration also enhances survivability significantly on long-range missions over inhospitable terrain, jungle, mountains, deserts and oceans. Additionally, it provides a high degree of safety against bird strike while operating at ultra low altitude.

PHOTOGRAPHS: DASSAULT AVIATION

DIMENSIONS	
Wing span	10.90 m
Length	15.30 m
Height	5.30 m
WEIGHT	
Overall empty weight	10 t
Maximum take-off weight	24.5 t
Fuel (internal)	4.7 t
Fuel (external)	up to 6.7 t
STORE STATIONS	
Total	14
Heavy weight	5
AIRCRAFT PERFORMANCE	
Maximum thrust	2 x 7.5 tonne class Turbofan engines
Limit load factors (g)	–3.2 / + 9 g
Maximum speed	M 1.8 / 750 kt
Approach speed	less than 120 kt
Landing ground run	450 meters without drag chute
Service ceiling	50,000 ft

OMNIROLE CAPABILITY

As per Dassault Aviation, the Rafale is the first omnirole combat aircraft by design. It has the capability to carry out different complex combat assignments during the same sortie, be it ground attack, beyond visual range (BVR) air-to-air combat or interceptions. Its competitors classify their aircraft as 'multi-role' or 'swing-role'. Technologically, the omnirole concept puts the Rafale in a class of its own with cohesive integration of systems on board, catering to diverse mission requirements as highlighted during the operations in Libya. Dassault introduced the 'omnirole' capability for air-to-air and air-to-ground missions with the 'F2-standard' in the French Air Force and in the French Navy in 2006. Dassault Aviation's Executive Chairman, Charles Edelstenne said, "Our fighter is employing its omnirole capabilities in this theatre, enabling it to carry out

DESIGNED FOR ALL MISSIONS FROM DAY ONE

The Rafale has been designed from the onset of the programme to replace all types of aircraft in service with the French forces and to take over all their roles: Air policing and defensive counter air; air-to-ground and air-to-sea attack; nuclear deterrence and air reconnaissance.

The Rafale is slated to become the sole type of combat aircraft operated by the French Air Force and the French Navy.

The Rafale is a true omnirole fighter: its multirole capability is significantly enhanced thanks to the simultaneous management of all the missions by the aircraft navigation and weapon system, together with the pilot's multirole ability henceforth acting as a "Battle Manager".

A CUTTING-EDGE MISSION SYSTEM WITH THE BEST IN SENSORS AND DATA FUSION

The Rafale is fitted with the most technologically advanced sensors:

- An active electronically scanned array radar (AESA),
- An electronic warfare integrated self-protection system (SPECTRA),
- A front sector optronic system (FSO),
- A data link (Link 16 or national data link).

By way of an optimised data fusion, they provide the pilot with a full and accurate tactical situation awareness.

AESA RADAR: THE FUTURE OF AIR DEFENCE

The Rafale AESA radar is the most advanced fighter radar in its category.

The AESA brings superior detection and tracking range, electronic scanning agility and the ability to track targets in or out of the search domain, and very high resolution ground mapping with synthetic aperture radar (SAR) modes. The Rafale AESA radar also allows very low altitude flying above uncharted terrain in autopilot-coupled modes in blind conditions.

Electronically scanned array radars which are designed to track all groups of target, can "track while search" (tracking is performed at an optimised update rate and even outside of the search volume).

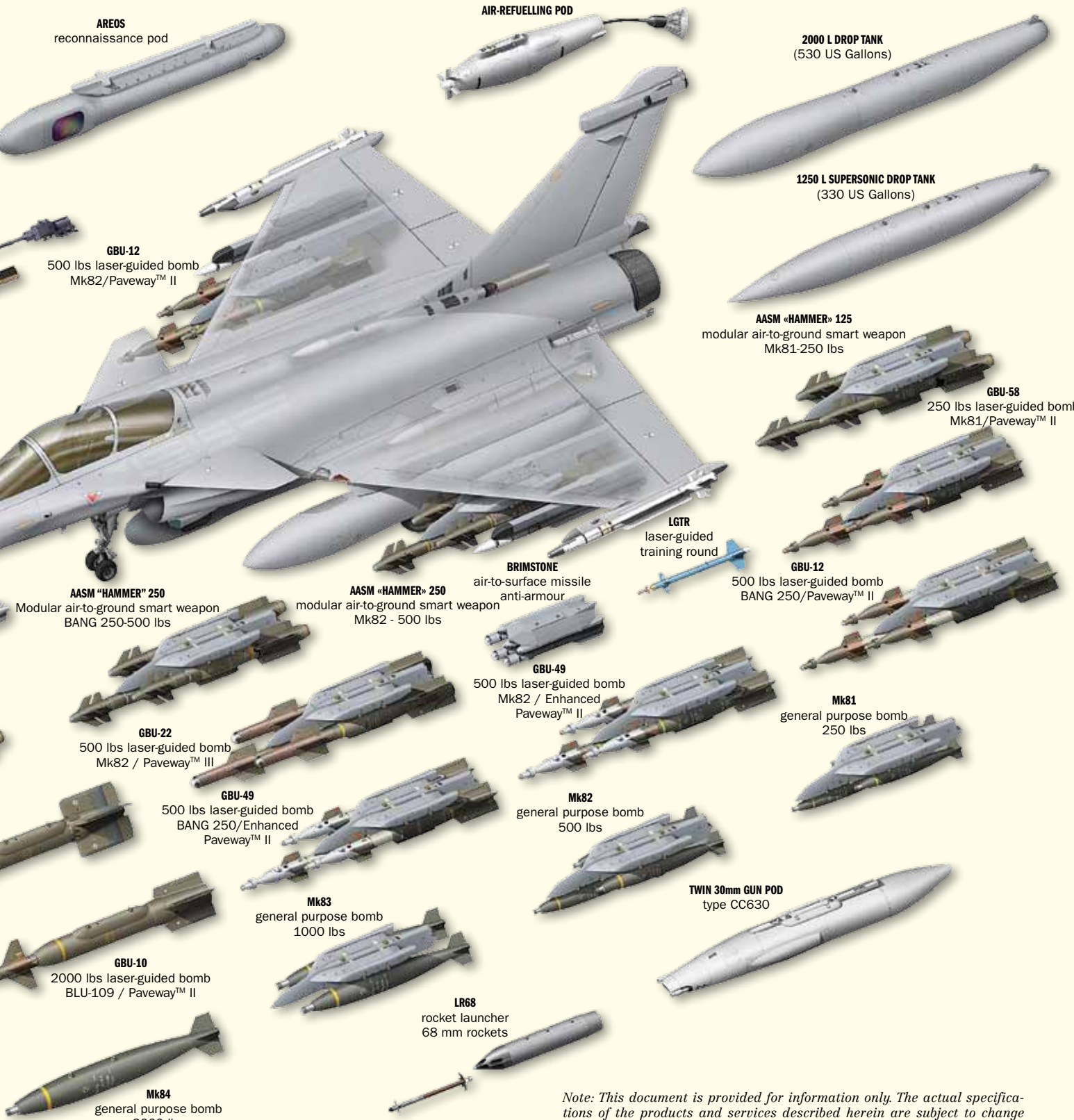
air defence, deep strike, close air support, anti-ship, reconnaissance and buddy-refuelling missions—all from distant land bases or aircraft carriers in missions lasting up to seven hours."

MISSION CAPABILITY—RANGE AND FIREPOWER

The Rafale has state-of-the-art weapon/mission system and has outstanding load-carrying capability. Designed as a compact high-tech fighter capable of carrying a huge external load of fuel tanks, bombs and missiles, it can carry over 15,000 kg of fuel and weapon load, quite an accomplishment for an aircraft weighing less than 10 tonnes when empty. The aircraft is capable of carrying a wide variety of weapons including precision guided weapons with high stand-off ranges in varying combinations. At its maximum permissible all up weight, the Rafale can take off at two and a half times its empty weight—more than any other fighter in its class. Besides it can carry weapons and pods together along with external fuel tanks giving it the combined benefit of both extended mission range and maximum fire power. This capability also accords the platform unrivalled flexibility in mission planning and execution.

Currently, the aircraft has been cleared to operate the following weapons:

- MICA, air-to-air interception, combat and self-defence BVR missiles, in their IR (heat-seeking) and EM (active radar homing) versions.
- AASM stand-off, modular and propelled, air-to-ground precision guided weapons with inertial/GPS and inertial/GPS/infrared guidance kits, or with the future inertial/GPS/laser guidance variant.
- SCALP long-range stand-off missiles.
- Exocet anti-ship missiles.
- Laser-guided bombs.
- Conventional air-to-ground ordnance.
- Nexter 30 M 791 high-power 30mm gun carried internally and capable of firing 2,500 rounds per minute.
- The upcoming Meteor extreme long-range air-to-air missile.
- Customer-selected weapons.



ADVANCED SENSORS

The Rafale is fitted with the most technologically advanced sensors and equipment as under:

- Front sector optronic system
- Electronic warfare integrated self-protection system
- Data links
- Airborne reconnaissance and observation system (AREOS)

By way of an optimised data fusion, they provide the pilot with full and accurate tactical situation awareness.

Front Sector Optronics: Developed by Thales and Sagem, the FSO system is fully integrated into the aircraft. Operating in the optronic wavelengths, it is immune to radar jamming and it provides covert long-range detection and identification, high resolution multi-target angular tracking and laser range-finding for air, sea and ground targets. The internal FSO provides a tele-lens picture of the target (ground or airborne) with range measured by the incorporated laser. The covert approach capability of the FSO is especially valuable in air policing and intercepts, where the TV picture of the target provides early visual identification and detection of suspect manoeuvres.

SPECTRA: This is a fully internal electronic warfare system that leaves all the stores points available for weapons, fuel tanks or pods. Jamming of radar, laser and missile threats and decoying with chaff and flares are performed according to the latest intelligence available at mission launch time. The SPECTRA is fully integrated into the mission system, providing threat geo-location and identification data to the data fusion process.

Data links: Data links allow sharing a common tactical picture between wingmen and between the formation and command and control centres. They bring superior situation awareness to all participants, encompassing air, sea and ground components of the forces. Through the data fusion process, they bring even more to the Rafale, actually placing it in a different league with a true battle management capability.

AREOS: The airborne reconnaissance and observation system pod developed by Thales allows day and night photography at all altitudes, with the capability of instantaneous transmission in flight of the photos to a ground station. The remarkable overall performance of its sensors for stand-off reconnaissance at extreme ranges means that AREOS can be considered as a pre-strategic asset.

OPERATIONAL CAPABILITY ENHANCEMENTS AHEAD

From 2013, the Rafale will be delivered with the new active electronically scanned array (AESA) radar. Known to be the most advanced fighter radar in its category, the new AESA radar technology from Thales offers many operational advantages such as superior detection and tracking range, electronic scanning agility and the ability to track targets in or out of the search domain and very high resolution ground mapping with synthetic aperture radar (SAR) modes. It also provides enlarged surveillance coverage in azimuth, and significantly ameliorated reliability thanks to the introduction of the new redundant transmit/receive modules. This new RBE 2 variant will be fully compatible in terms of detection range with the future extreme long-range Meteor air-to-air missile. The Rafale AESA radar also allows very low altitude flying above uncharted terrain in autopilot-coupled modes in blind conditions.

The other improvements that have been approved include a new missile launch detector and a new generation FSO which will offer improved target detection and identification performance. All these systems will significantly increase the Rafale's "omnirole" combat effectiveness against increasingly modern threats.

DETERRENCE CAPABILITY

The deterrence capability of the Rafale is derived from the following attributes:

- Extended mission range performance opens new strategic options.
- Unrestricted fire power with all type of weapons.
- Proven power projection capability and interoperability.
- Sustained air superiority based on outstanding data fusion and sensor technology.
- Open architecture. SP

People & mission would be my focus

Vice Chief of Air Staff Air Marshal N.A.K. Browne, soft spoken and picture of sobriety, will take over as the Chief of the Air Staff on retirement of Air Chief Marshal P.V. Naik on July 31, 2011. He brings with him a wealth of experience both at the operational and management levels that will undoubtedly provide a renewed impetus to the transformation that is under way in the IAF. In a candid interview with ***SP's Aviation***, the VCAS spoke to **Air Marshal (Retd) B.K. Pandey** about the responsibilities that lie ahead in his next assignment.

PHOTOGRAPH: PIB

***SP's Aviation* (SP's): As the Chief of the Air Staff-designate, what is your vision of the role and responsibilities of the IAF in the next 30 years to meet the challenges before the nation, which is emerging as a regional power?**
VCAS: The IAF has come a long way from its beginning as a tactical force. We are transforming into a potent strategic force with full spectrum capability in keeping with our national aspirations. The IAF vision addresses not only the physical security of India but also the protection of our core values and enhanced national interests based on the country's growth profile and aspirations. In the coming decade, the IAF envisions itself to be a modern force with cutting-edge technologies; flexible, adaptable and nimble. While I would be articulating my personal vision for the IAF only when I take over, I can mention at this stage that "people and mission," would be the focus. It is only when we align the entire human resource with the mission of the IAF, we will be able to meet the challenges of a rapidly changing security environment.

SP's: Today, the strength of combat squadrons has declined to under 30 and is likely to decrease further in the near future. What is your vision of the shape and size of the IAF in the next 30 years and in what time frame would the plans to restore the force levels be actually translated into reality?
VCAS: The IAF currently has around 34 combat squadrons comprising a mix of modern and older generation fighter aircraft and possesses the combat capability to face any challenge to our national security. Peaks and troughs are phases that all organisations go through. I would like to believe that we are close to the bottom of the loop in terms of the numbers and the only way forward in the coming years is to go up. Induction of new platforms and sensors over the next five years would ensure that the IAF retains its cutting-edge at all times. On a different note, I would like to reiterate that capability building and not number crunching is the way to achieve this.

In a distinguished career spanning nearly four decades in the Indian Air Force (IAF), Air Marshal Browne has held a number of important command and staff appointments. An alumnus of the National Defence Academy, he is a Fighter Combat Leader and has served as an instructor at the Tactics and Air Combat Development Establishment as also at the Defence Services Staff College, Wellington. A graduate of the Air Command and Staff College, Albama, USA, he had undergone training with the RAF in the UK on Jaguar aircraft and went on to command a Jaguar Squadron. He was the Joint Director at Air War Strategy Cell at Air Headquarters, Chief Operations Officer and Air Officer Commanding of a Su-30 base, Assistant Chief of the Air Staff (Intelligence) and Deputy Chief of Air Staff (DCAS) at Air Headquarters. Before assuming the appointment of VCAS, he was the Air Officer Commanding-in-Chief, Western Air Command, the premier Command of the IAF.

SP's: Do you feel that in a unipolar world, it would be desirable for India to develop a long-term strategic and military partnership with the USA in order to play a leading role in the region?
VCAS: Polarity today is determined not only by military power, but is also a function of economic power and the power of human capital. I do not agree that we are today in a truly uni-polar world. Try telling that to the Europeans or the Chinese. I think we are headed towards a multipolar world order with India displaying immense potential to contribute to this multipolarity. IAF has very cooperative and symbiotic relationships with most of the Air Forces in the world today, including that of the USA. We similarly have robust strategic relationships with Russia and look to building strong strategic relationships with the EU and countries like Brazil and South Africa.

SP's: Development of the armed forces in India has been somewhat Pakistan-centric, humiliation by China in 1962 notwithstanding. How do you see the equation with China in the event of a full-scale military confrontation with or without collusion with Pakistan?
VCAS: While I agree that a Pakistan-centric approach was certainly a factor in the earlier decades, the strength and capability of the Indian armed forces allows us the flexibility of developing a capability-based force structure that caters to diverse threats across more than one front. The IAFs long-term perspective plan caters to such developments. The Government of India has initiated a major thrust for the development of the Eastern sector. The IAF has planned the necessary infrastructure development in the Eastern sector which is being executed in

the Eleventh and Twelfth Five Year Plan periods. We are upgrading and operationalising several airfields and advanced landing grounds in the Northeast. We are also strengthening our air defence and offensive capabilities in this sector in a planned manner. We are aware of the operational capability of the PLAAF. I can assure you that in terms of capabilities, we are fairly balanced on both fronts. However, in terms of their air assets across our area of responsibility, we definitely expect to address the issue by capability-based quality assets that include platforms and infrastructure, apart from experience of our human resource to operate in varied terrain and environment. Some steps have already been taken in this regard.

SP's: What is your view on the statement by the Head of Inter-Services Intelligence (ISI) of Pakistan that potential targets in India had already been identified and rehearsals carried out? How should India respond as a nation to this spirit of blatant aggression?
VCAS: I do not think that this comment warrants any reaction from our side. I would discount the statement as hasty and basically aimed at deflecting attention from the core issue that the people of Pakistan are asking their government.

SP's: It has taken four years since the issue of request for proposal (RFP) for the MMRCA. In what time frame in your opinion can the IAF expect a final decision and induction of the selected aircraft?
VCAS: The process of procurement for medium multi-role combat aircraft (MMRCA) began in November 2004, as per the Defence Procurement Procedure (DPP). As you are aware, there were six contenders in the project. They were subjected to the gruelling process of technical and field evaluation in India and abroad and two aircraft viz Eurofighter Typhoon from EADS and Rafale from Dassault Aviation (which met all the requirements as stipulated in the RFP) have been selected as per laid down procedures. At present offset evaluation is in progress after which the commercial proposals of the two vendors will be opened to determine the lowest bidder. We are hopeful about the finalisation of the contract before the end of the year.

SP's: Elimination of the F-16IN Super Viper and the F/A-18 Super Hornet is being seen by some as a setback to the Indo-US strategic partnership. What is your view in this regard?
VCAS: I must share with you here that our test pilots flew approximately 275 hours during the flight evaluation stage spread over 660 test points and all the vendors were highly impressed with the professionalism displayed by the IAF's evaluation team. I must also mention that the only consideration which dictated the short-listing of the two aircraft i.e. Rafale and Eurofighter, were professional, technical and flight evaluation considerations. There were no strategic or political considerations whatsoever. The entire responsibility was left on the IAF and I am very proud that we did a good job. At the same time, people need to be assured that the Indo-US strategic partnership goes far beyond the MMRCA deal. Our military-to-military relationship has already entered a critical and self-sustaining phase with induction of C-130J and the likely induction of the C-17 strategic airlift aircraft. Overall, we should not read too much into the issue.

SP's: In your view does the Indian aerospace industry have the capacity to absorb offsets worth $5 billion related to the MMRCA contract? What might be the effect on the induction schedule of the aircraft in case the Indian aerospace industry is unable to cope with such voluminous business in a limited time frame?
VCAS: The provisions and scope of the offset policy provides for multiple methods to discharge offset obligations. The vendors prior to submitting their offset proposals are expected to have interacted with their potential IOP (and would have identified and finalised their offset offers accordingly). For the MMRCA project, the offset proposals are currently being evaluated by the TOEC. Necessary penalty clause as per DPP would form part of the offset contract to ensure timely completion of the offset obligation by the vendor. It needs to be understood that even though the main contract and offset contract are executed co-terminus, the performance of offset implementation will not affect the main contract as they are two different contracts. It is a challenging task and I am quite confident that the Indian industry has the capability and capacity to absorb the offsets. You may be aware that the Tatas, Mahindras, and a host of other companies are gearing up for this.

> "The IAF vision addresses not only the physical security of India but also the protection of our core values and enhanced national interests based on the country's growth profile and aspirations."

SP's: It is understood that the existing fleet of aircraft of Russian origin in the IAF are afflicted with poor product support by the OEM and that global tenders are being floated for the supply of spares. In this background, would it be prudent to go ahead with the fifth generation fighter aircraft (FGFA) and the MTA projects with Russia and sail into an uncertain future?
VCAS: Yes, I am aware that there have been some problems of product support for aircraft purchased from the erstwhile USSR. Russia has been a trusted and reliable partner of the Indian military aviation story for the last five decades. I am sure that we will be able to impress on them the need to deliver spares and products that meet our requirements.

FGFA and MTA are joint development programmes between India and Russia where HAL is an equal partner. In earlier cases, HAL was only a production agency. Therefore, under this joint development programme, better product and spares support can be expected. Towards this, HAL too would need

to upgrade their facilities and expertise to jointly produce world class platforms.

SP's: How does fifth-generation technology of the Russian aerospace industry compare with that of the US and Europe? How effectively will the FGFA fulfil the requirements of the IAF in the years to come?
VCAS: As per our understanding, fifth-generation technology of the Russian aerospace industry is comparable to that of the US and Europe. As we have seen with Su-30MKI, Russian technologies have supported our capability building process in the past. FGFA will be a stealthy swing role fighter aircraft which will be a frontline force multiplier for the IAF in the next decade. Beyond this, I think it is too premature to comment on the potential of the FGFA.

> "It is only when we align the entire human resource with the mission of the IAF, we will be able to meet the challenges of a rapidly changing security environment"

SP's: As per reports in the media, RFP for a new engine for the Jaguar fleet floated earlier has been withdrawn. What are the options before the IAF now for the upgrade of the Jaguar fleet?
VCAS: The RFP was withdrawn because one of the vendors pulled out. However, this is a temporary phase and the case for re-engining is being progressed as per the provisions of Defence Procurement Procedure.

SP's: Are there any plans to acquire additional C-130J Super Hercules and if so, in what time frame? What has been the experience with the aircraft so far?
VCAS: Yes, there are plans to acquire additional six C-130J-30 aircraft from the US. These aircraft are expected to be inducted by 2014-15. We have inducted four aircraft so far and the experience of operating them has been good.

SP's: What are the plans for the operational deployment of the Tejas?
VCAS: After the recent successful flight of the light combat aircraft (LCA) on January 10, 2011, initial operational clearance (IOC-1) has been achieved. Operational deployment would be decided after the final operational clearance. It is premature to comment on its operational deployment.

SP's: The IAF has been without a basic trainer for nearly two years. What is the position with regard to selection of the vendor and in what time frame can the IAF expect induction of the new aircraft in numbers sufficient to resume training on the new machine?
VCAS: Seventy-five basic trainer aircraft are being procured from the global market. CNC commenced on April 21, 2011, and was finalised by the end of June 2011. The contract is expected to be concluded within this year and the delivery would commence 20 months after the date of contract. Feasibility of achieving expeditious deliveries will be discussed by the CNC with the L1 vendor.

SP's: What has been the experience of the IAF with the Hawk AJT so far?
VCAS: The IAF has inducted 24 aircraft as direct supply from BAE Systems, UK. Further, till date, 25 licence-built aircraft have been supplied by the Hindustan Aeronautics Limited out of the contracted total of 42. Though HAL experienced teething difficulties in the manufacture of the initial batch of aircraft, these have now been overcome and the production rate has picked up well. The Hawk has proved to be a good advanced jet trainer and our young pilots have adapted well in frontline fighter squadrons.

SP's: What steps do you propose to initiate to upgrade the quality and competence levels of human resources in the IAF?
VCAS: The IAF has already initiated a number of measures to upgrade the competence of its HR at all levels. My focus as alluded to earlier is going to be on people and mission. Creating knowledge-based workforce that is continuously trained by a modern and flexible professional military education system would be a key priority. To my mind, knowledge, education, technology orientation and skill sets are the four key competencies that our human resource has to possess in order to match up to the challenging requirements of the day.

SP's: What is your view on the issues of employment of women in combat roles and grant of permanent commission to them?
VCAS: The employment of women in combat roles is a tri-Service issue for which a tri-Service committee was set up in 2006. Based on the recommendations of the study conducted by HQ IDS in 2006, the COSC in their meeting on November 14, 2006, had determined as a tri-Services policy, that women officers should be excluded from combat roles.

After the High Court judgement on March 12, 2011, the IAF has implemented the judgement in totality and granted permanent commission to 21 serving and 20 retired SSC women officers.

SP's: What is your view on the appointment of Chief of Defence Staff?
VCAS: I feel the present structure for joint operations that we have followed over the years has served us well. The Kargil operations were a case in point. Joint planning with flexible autonomy in handling tactical situations would have greater chances of success than rigidity and linear approaches. To my mind, too much has been made of the Chief of Defence Staff (CDS) issue without addressing the other core issues of the Kargil Review Committee report and Group of Ministers (GoM) report like integration of the Ministry of Defence (MoD) with the three service headquarters (HQ) and increasing the robustness of politico-military interfaces. For the armed forces to accept and absorb the CDS concept, the above issues need to be addressed concurrently with HQ IDS playing a major role in the integration process. SP

While programmes from the new players are on, Embraer, Bombardier and ATR (turboprop) are on their toes, not just to keep in shape, but also to stave off the imminent competition, albeit delayed

HIGH IN SPIRITS: EMBRAER HAVE ACHIEVED A SIGNIFICANT MILESTONE AFTER CONCLUDING SALES ORDERS OF E-JETS FAMILY OF AIRCRAFT OVER THE 1,000 MARK

Teasers at the Show

By **R. Chandrakanth**

ATR WAS UPBEAT AT the Paris Air Show having bagged 88 orders and 42 options, estimated at $2.8 billion (₹12,600 crore), a record for ATR. The Chief Executive Officer of ATR, Filippo Bagnato was under the arc lights as he announced ATR plans and how regional aircraft would be a vital cog in the aviation wheel.

Bagnato's comments are some indication to the shape of things to emerge in the regional aviation market. "In the next 20 years, the market for turboprops will be about 3,000 aircraft. As fuel cost for an airline is likely to go up from 26 per cent to 30 per cent this year, airlines which will shape themselves around a correct product will be able to make money." Turboprop is one of the answers. "In the regional segment of up to 75 seats, 75 per cent of the regional aircraft sold since 2005 are turboprops." He also indicated that one-third of the turboprop requirement would be met by larger turboprops as the markets get dynamic.

ATR, which is celebrating 30 years, has logged 1,152 orders, having delivered over 900 aircraft. "Today, we have over 4,500 flights per day and the operator base has gone up to 175 from 145 in the 2009 Paris Air Show. We need to do a second ramp up in production. Next year, we will have to increase our volume of production by around 35 per cent compared to this year's volume."

The fact that lessors are getting interested in turboprop, Bagnato remarks is a pointer to 'ATR being a good profitability tool for airlines'. One of the major lessors, GE Capital Aviation Services (GECAS), has a fleet of 150 ATR and during the show, GECAS ordered 15 ATR 72-600 (with options for 15).

Will this growth continue? Bagnato is positive. The economies are slowly bouncing back and air traffic is going to explode.

NEW PERFORMERS

That explains the emergence of new players from Japan, Russia, China and India, in addition to the regional jet duopoly of Brazil's Embraer and Canada's Bombardier.

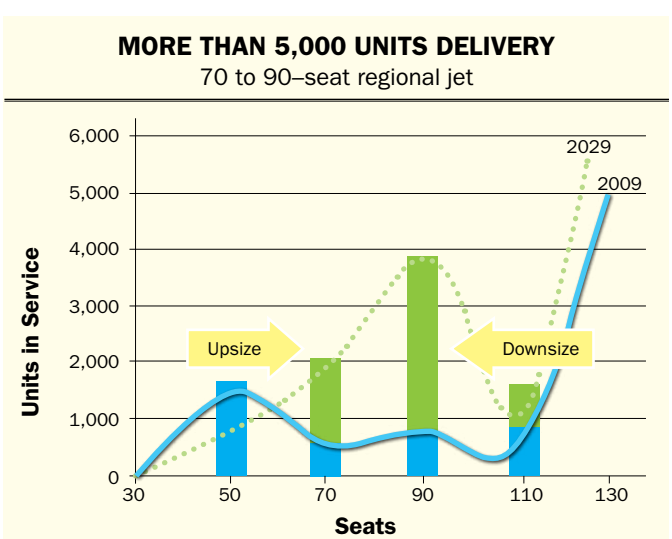
Japan's Mitsubishi Regional Jet (MRJ) has pegged passenger traffic to be three times higher after 20 years with demand for 70 to 90 seat class aircraft going beyond 5,000

PHOTOGRAPHS: EMBRAER & EADS

MARATHON RUN: ATR, WHICH IS CELEBRATING 30 YEARS, HAS LOGGED 1,152 ORDERS AND DELIVERED OVER 900 AIRCRAFT

units due to the market trend of "up-sizing" from 50-seat RJs and route-transfers from mainline jets to large RJs in consequence of high fuel price and low passenger yield (see graph on the next page).

Despite such a number being music to ears, MRJ was not able to garner any deals at the Paris Air Show. The only announcement was its tie-up with Boeing for customer support services, while the first MRJ delivery has been rescheduled for 2014 from the last quarter of 2013. It is sitting on the Trans State order of up to 100 MRJs.



However, another new entrant Russia's Sukhoi Superjet was in a song and dance mood, having clinched 24 orders, 12 each from Blue Panorama Airlines from Italy and PT Sky Aviation, an Indonesian carrier. It was celebration time for Sukhoi not just because of the orders but the Russian Prime Minister Vladimir Putin sat through its debut flying in Paris. The first Superjet 100 is already flying between Yerevan and Moscow for Armavia Airlines.

The country to watch indeed is China, a huge market opportunity as well as a growing manufacturing hub. The Commercial Aircraft Corporation of China is on course to launch the ARJ21, a 105-seat regional aircraft which will help in domestic route-networking of the Asian giant. The air traffic in China has grown nearly four times the global rate of 4.3 per cent since 1990 and has the propensity to accelerate the growth.

While these programmes from the new players are on, Embraer, Bombardier and ATR (turboprop) are on their toes, not just to keep in shape, but also to stave off the imminent competition, albeit delayed.

EMBRAER IN HIGH SPIRITS

The biggest regional jet player, Embraer was in high spirits at Le Bourget, having achieved a significant commercial programme milestone after concluding recent sales that pushed the number of orders for its E-Jets family of aircraft over the 1,000 mark.

"This is a truly remarkable achievement when you con-

sider that we reached 1,000 orders just seven years after the first delivery in a segment that is one-third the size of the narrow-body market," said Paulo César de Souza e Silva, Embraer's President of Commercial Aviation. "We're extremely pleased to see our E-Jets helping regional airlines, network and low-cost carriers' optimise their operations, develop new markets and substitute old jets with the benefits brought by our state-of-the-art brand-new family of aircraft."

Embraer's 20-year market outlook which was unveiled at the show, suggests order prospects are strong at the top end of the 30- to 120-seat aircraft capacity segment. "Nearly half of the predicted volume of new aircraft will be needed to satisfy expected traffic growth and address right-sizing opportunities in established markets. The other half will replace the world's ageing fleet with more efficient, environmentally-friendly aircraft. We are continually studying new technologies, including research with renewable fuels, to ensure our products comply with the strictest noise and emissions standards," Cesar added.

Embraer is the only manufacturer to have designed a family of four new-generation airplanes specifically for the 70- to 120-seat segment. Since the programme was formally launched in 1999, the E-Jets have redefined the traditional perception of regional aircraft by operating in a wide range of applications. Today, the aircraft are flying with full-service mainline airlines, low-cost carriers and regional companies. E-Jet customers have configured their aircraft with features usually found on larger airplanes, such as satellite radio, live television entertainment systems and premium class cabins.

Embraer foresees world demand for 7,225 new jet deliveries in the 30- to 120-seat capacity segment over the next 20 years. The equivalent market value is estimated to be $320 billion (₹14,40,000 crore). Of this total, 3,125 jets are projected to be delivered between 2011 and 2020, and the remaining 4,100 units between 2021 and 2030.

BOMBARDIER PLEASED AS PUNCH

Bombardier too had champagne flowing as it notched up orders to the tune of $4.7 billion (₹21,150 crore) for CSeries and also the business jets Global 7000 and 8000. In June alone, five new customers joined the CSeries programme. Braathens Aviation and three unidentified customers placed firm orders for 33 CSeries aircraft and Korean Air signed a letter of intent (LoI) for up to 30 additional CSeries jetliners. In addition to the firm orders placed in June, commitments for 49 additional aircraft (options and LoI) were also placed.

"The Bombardier Commercial Aircraft team couldn't be more pleased with its performance at the show," said Gary R. Scott, President, Bombardier Commercial Aircraft. "Our new aircraft is now sold out into 2014, with a few remaining slots in 2015, as a result of our recent momentum," he added.

The Canadian manufacturer forecasts 13,100 deliveries in the 20- to 149-seat capacity segments in the period 2011-2030, with the world fleet growing from 11,000 to 17,400. The main markets will be North America, China and Europe.

The show goes on! SP

HARD SELL

The campaign for IAF's acquisition of 126 MMRCA is hotting up for a European showdown. It is between Eurofighter Typhoon and Dassault Rafale. The **CEO of Cassidian Air Systems, Bernhard Gerwert** outlines the plans for **Eurofighter** to ***SP's Aviation***.

SP's Aviation **(SP's): How do you view the latest development and the short-listing of Eurofighter and Rafale?**
Bernhard Gerwert (Gerwert): We are very pleased to continue the Eurofighter Typhoon campaign in India. During rigorous field evaluation trials, our combat aircraft has demonstrated its outstanding capabilities to the Indian Air Force. We are confident that at the end of the selection process, the Government of India will be convinced that the most capable and advanced multi-role combat aircraft on the market is the best choice for safeguarding the nation's security in the next decades.

SP's: Europeans once again seem to be leading one of the mega deals in India. How optimistic can you be for this market?
Gerwert: The Eurofighter Partner Companies are optimistic at the prospect of winning India as a strategic partner because we can offer India the most modern combat aircraft available on the world market. Eurofighter has a life span of more than 40 years ahead. This means there is a tremendous in-built growth potential, in which we would like India to participate as a new partner of the entire programme.

Our industrial partnership offer exemplifies our unique value proposition. We propose India unprecedented transfer of cutting-edge technology and at the same time we are keen on winning the country as a manufacturing and development partner for the global Eurofighter programme. Plugging India into the global value chain of the Eurofighter programme will boost the development of an indigenous aerospace and defence industry in India. Getting the best combat aircraft technologies and becoming a partner in its further development, is an opportunity for India which no competitor can match. With Eurofighter Typhoon, India will gain access to a wide array of sensitive technologies from four leading defence and aerospace companies in Europe.

SP's: As the major partner in the Eurofighter programme and campaign leader in India how do you view the MMRCA offset conditions?
Gerwert: We are confident of meeting the offset requirements of the Indian Government set at 50 per cent. We are engaged in intense discussions with the Indian industry and other stakeholders to firm up various collaborative models which will enable us to meet our offset obligations to the utmost satisfaction of our customer. Even when we submitted the Eurofighter offset offer in August 2008, we already had signed more than 20 memorandum of understanding (MoUs) with major Indian defence and aerospace companies, both public and private. However, our aim is not just to comply with the RFP obligations. We have gone a step further and propose India the unique opportunity for an unmatched industrial partnership which would make it a full participant in the Eurofighter Typhoon programme.

We are interested in boosting the industrialisation of the Indian aerospace and defence industry, for example, by leveraging the huge engineering talent that lies there for mutual benefit. That is how we see our partnership with India—going beyond contractual obligations in order to support India's self-reliance in defence and aerospace industries.

SP's: Do you think the Indian industry can handle 50 per cent of the offset arrangement?
Gerwert: Yes. We started to work on preparing India's industry to meet the challenge of acquiring new state-of-the-art capabilities. In fact, we have initiated an industrial engagement plan in India to ensure a successful transition to the MMRCA. We will move very quickly in case India selects our combat aircraft. To ensure success in terms of time, material, quality and budget, we are ready to engage with HAL and support small and medium-sized companies in India to absorb the envisioned technology transfer and offsets. The Eurofighter partner companies will offer India's public and private industry and research and development (R&D) organisations a customised technological roadmap ensuring the transfer of technology and expertise. This relates not just to the traditional area of production but also to design, development and engineering.

SP's: In the event Eurofighter becomes the final choice, what special commitment would you make to India?
Gerwert: With the full support of the Governments of Germany, the UK, Spain and Italy, we propose to make India an integral participant in the Eurofighter Typhoon programme. That is an unmatched commitment. It also opens up an entirely new potential for cutting-edge defence exports from India. Together with Europe's top defence companies—

PHOTOGRAPHS: EUROFIGHTER

EADS, BAE Systems and Finmeccanica—India could thus co-develop and co-produce future capabilities for the Eurofighter. These capabilities can then also be exported to other countries. Such a collaborative effort would greatly accelerate the development of India's aerospace and defence industry and an independent study forecasted that the selection of Eurofighter Typhoon would create more than 20,000 high-skilled jobs in India.

SP's: What role does Cassidian play in the Eurofighter community?
Gerwert: Cassidian is the Security and Defence Division of EADS which is Europe's leading aerospace and defence company. Cassidian in Germany and Spain is the biggest shareholder within the Eurofighter consortium which comprises four partners from Germany, the UK, Spain and Italy. Looking at the current situation of the MMRCA competition with only two vendors left, it is obvious that four partners can offer more to India than just one.

INTERNATIONAL COMBAT AIRCRAFT: EUROFIGHTER TYPHOON FLIES WITH METEOR MISSILE

SP's: What specific value for India does Cassidian bring in with the other partners?
Gerwert: Eurofighter Typhoon is the only truly international combat aircraft in the world. Europe's leading defence companies and hundreds of suppliers have pooled their core competences to create it. Our success is based on the cross-border cooperation, we live every day. We share sensitive technologies, know-how and processes between our partner companies to a point which our competitors would never contemplate. It is precisely this spirit of trust and technology sharing that we will extend to India, once it accepts our offer. In addition, Eurofighter Typhoon's strategic suppliers are also committed to transfer equipment-related technologies to India, ensuring that these technologies are available for application to India's indigenous programmes. In Europe, there are about 400 suppliers supporting the programme. A similar set-up will be required in India.

SP's: Can you elaborate on the various tie-ups with Indian industry you are working with?
Gerwert: We are continuously creating new assets to support our endeavour to share knowledge, best practices, technologies and resources with India for mutual benefit. As for Eurofighter Typhoon, our goal is to bring key capabilities, skills and technologies to the Indian industry and create a diverse supplier base here which caters to the global programme. HAL, with which we are already in deep discussions, will play a leading role. In addition, there is scope for an active involvement from the private sector. We are talking to both public and private sector companies as part of an industrial engagement plan to ensure a smooth and successful transition to the MMRCA.

Independent of a selection in the MMRCA tender, Cassidian inaugurated India's first ever defence oriented Engineering Centre operated by a foreign company in February 2011. The centre currently employs around 60 highly trained Indian engineers, a figure which is expected to surpass 200 by 2012. Our Engineering Centre will be at the forefront of Engineering and System Development, developing core competencies in the areas of radar systems, protection systems, avionics, engineering and 3D visual simulation, etc. In addition, Cassidian recently received Indian Government approval for a joint venture (JV) with Larsen & Toubro for design, engineering, manufacturing, distribution and marketing in the fields of electronic warfare, radars, avionics and mobile systems for military applications.

In 2010, Cassidian was awarded a contract by the Indian Defence Research & Development Organisation (DRDO) to supply consultancy services to the Indian armed forces in developing the system architecture of its airborne early warning & control (AEW&C) programme. This contract follows the one signed in 2009 with ADA for Flight Testing Consultancy on the light combat aircraft. These examples prove that with the support of Cassidian, Indian authorities will have access to latest technologies.

Another example of supporting India in the field of homeland security is the Tetra network for Andhra Pradesh Police. Cyberabad Police Tetra Network was inaugurated in December 2010, which covers the region of Cyberabad, the high-tech hub that surrounds the city of Hyderabad. Cassidian has also teamed up with its local partner Sanchar Telesystems Limited to provide the Indian Parliament in New Delhi with a digital, GPS-based, encrypted communication system. SP

In any major international air show, the presence of new combat jets takes on iconic proportions, but at Le Bourget this time, it was civil aviation which overshadowed military

By **R. Chandrakanth**
in Paris

"All that is impossible remains to be achieved."
—Jules Verne

I AM BORROWING THE QUOTATION from the website of Solar Impulse, the revolutionary airplane which is powered only by solar energy, and was the 'show stopper' at the 49th International Paris Air Show at Le Bourget. Mega deals aside, the visit of high level delegations aside, acrobatic flying displays aside, the Paris Air Show truly belonged to Solar Impulse as it highlighted the urgency of 'green' solutions in the aviation industry.

Inaugurating the Paris Air Show, the French President Nicolas Sarkozy underscored the 'green theme' by stating that the "Solar Impulse is a reminder that we must think of more energy-efficient aircraft solutions right away. Shaping the future of aviation also means creating sustainable aircraft." The Solar Impulse innovation demonstrated that clean technology can reduce our dependence on fossil fuels which are not just prohibitive in cost but also have adverse environmental impact. The two founders of Solar Impulse—Bertrand Piccard and Andre Borschberg, deserve all the accolades as their effort is a kind of beacon for the aviation industry.

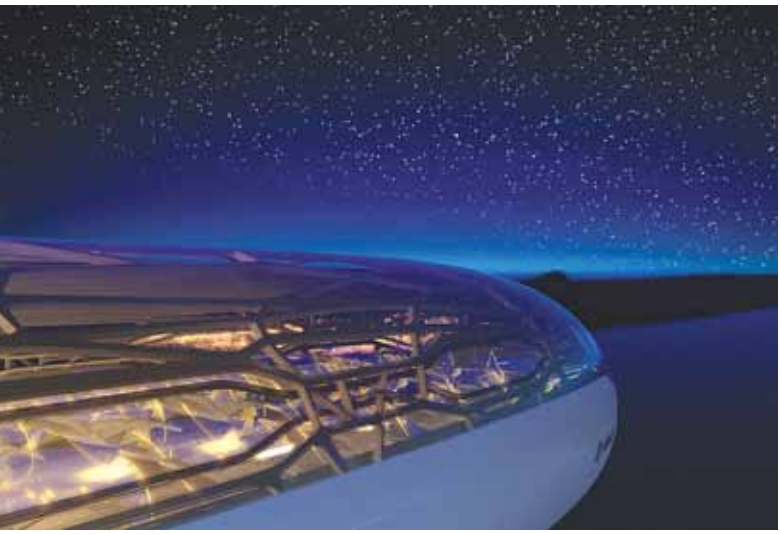
PHOTOGRAPHS: DASSAULT AVIATION, BOEING, BOMBARDIER, EADS, AIRBUS, EUROCOPTER, AGUSTAWESTLAND, GE AVIATION, SONIC STAR AND C.KERMARREC-AVIAXESS-NIZET AERO SIAE








Paris, Je t'aime

"Despite representing only three per cent of global CO2 emissions, the aviation industry is working towards a greener solution. They showed great interest in our project," said Borschberg.

Also making a similar point was the all electric Cri-Cri, jointly developed by EADS Innovation Works, Aero Composites Saintonge and the Green Cri-Cri Association. The Cri-Cri is the world's first four-engine all-electric aerobatic plane. It is also the smallest aircraft in the world.

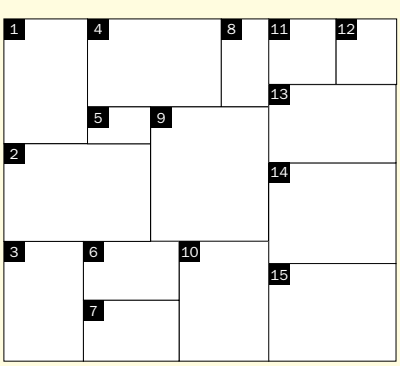
GREEN REFRAIN

At Le Bourget, the 'green refrain' was quite pronounced and the two major commercial airplanes behemoths, Airbus and Boeing, while battling out for big-ticket deals, which the former won hands down, did give considerable attention to 'fuel efficiency'.

The record orders for Airbus—730 aircraft valued at $72.2 billion (₹3,24,900 crore), most of it picked up by A320neo (new engine options) that offers nearly 15 per cent fuel efficiency, reflected the requirements of the industry.

Arch rival Boeing made light of the orders, stating that it would continue its work on accelerating quieter, cleaner aviation technologies. Reducing fuel consumption, carbon emissions and community noise would remain its strategy. Boeing Commercial Airplanes President and CEO Jim Albaugh said, "Airlines today worry about their environmental footprint, fuel efficiency and sustained profitability. Our family of ultra-efficient products directly support these customer needs."

The battle of words between the two aerospace giants continued and grabbed headlines, even while Solar Impulse was enthralling, in its own charming ways, the record visi-



CAPTIONS FOR PHOTOGRAPHS ON PAGES 36-37)

1. ONE OF THE MAIN ATTRACTIONS AT THE 2011 PARIS AIR SHOW WAS THE SOLAR IMPULSE, A PROTOTYPE AIRCRAFT POWERED EXCLUSIVELY BY SUNLIGHT
2. FRENCH PRESIDENT NICOLAS SARKOZY LISTENS TO A PRESENTATION ON THE INAUGURAL DAY OF THE SHOW
3. FRANCE'S DASSAULT RAFALE CELEBRATES 30,000 FLIGHT HOURS IN OPERATION AT THE PARIS AIR SHOW 2011. RAFALE IS ONE OF THE TWO AIRCRAFT DOWN-SELECTED FOR IAF'S MEDIUM MULTI-ROLE COMBAT AIRCRAFT
4. BOEING CHALLENGES INDUSTRY TO MEET UNPRECEDENTED DEMAND FOR AVIATION PERSONNEL
5. KOREAN AIR TO ACQUIRE UP TO 30 BOMBARDIER CSERIES AIRCRAFT
6. EUROCOPTER MAKES ITS PRESENCE FELT AT THE SHOW
7. AGUSTAWESTLAND UNVEILED THE NEW AW189 AT THE PARIS AIR SHOW 2011. THIS IS A NEW GENERATION MULTI-PURPOSE TWIN-ENGINE 8-TONNE CLASS HELICOPTER DESIGNED IN RESPONSE TO THE GROWING MARKET DEMAND FOR HIGHER PAYLOAD, LONGER RANGE AND HIGHER PRODUCTIVITY. THE AW 189 WILL ENTER SERVICE BY 2014.
8. BREITLING GLOBAL AMBASSADOR, HOLLYWOOD STAR JOHN TRAVOLTA POSING NEAR THE AVIAXESS HELICOPTER & JET
9. THE WEATHER CHANGES ABOVE LE BOURGET AIRPORT DURING THE A380'S DEMONSTRATION FLIGHT
10. CHRISTINE LAGARDE, THE THEN MINISTER FOR ECONOMIC AFFAIRS, FINANCE AND INDUSTRY, FRANCE, VISITS DASSAULT AVIATION STATIC DISPLAY. SHE WATCHED FLIGHT DEMONSTRATION OF THE FALCON 7X AND RAFALE.
11. FRENCH PRIME MINISTER, FILLON, WITH CHARLES EDELSTENNE, VISITING DASSAULT AVIATION STATIC DISPLAY
12. ELETTRONICA - ONE OF THE WORLD'S TOP EW SOLUTIONS COMPANY - WAS BULLISH & CELEBRATING THEIR 60TH ANNIVERSARY
13. BOEING 787 DREAMLINER ARRIVES AT LE BOURGET
14. DISPLAY OF CFM LEAP ENGINE
15. BOMBARDIER'S CSERIES PAVILION AT PARIS AIR SHOW 2011

BACK TO THE FUTURE: (EXTREME LEFT TO RIGHT) AIRBUS HAS UNVEILED ITS CONCEPT CABIN WHICH WILL BE OPERATIONAL BY 2050; DESIGNED BY EADS THE ZEHST – A HYPERSONIC PLANE THAT WILL RUN ON BIOFUEL AND HYDROGEN WILL BE A REALITY BY 2021; CONCEPT PLANE FEATURED BY AIRBUS; HYPER MACH WILL REACH SPEEDS OF UP TO MACH 3.6 AND FLY AT 18,300 METRES.

tors to Le Bourget. Airbus drew first blood when President and CEO Tom Enders stated that the A320neo had stolen a march with its 'fuel efficiency' strategy and that there was no new revolutionary commercial airplane technology available till 2030. Albaugh countered "when our competitor says that they don't have the technology for a new small airplane until 2030 or even 2035, we believe them. We do have the technology as a result of developing the breakthrough 787."

Amidst all the Airbus noise, Boeing announced that American Airlines would be its launch customer for the evolutionary ecoDemonstrator programme. Boeing is finalising plans for installing the initial technology applications aboard the first airplane with specific technologies that will be flown in 2012. The programme is working towards reducing noise and emissions during all phases of flight including take-off, cruise and landing.

One of the highlights of the show was the arrival of the Boeing 747-8 Freighter after completing its first transatlantic flight with four General Electric GEnx-2B engines powered by a blend of 15 per cent camelina-based biofuel mixed with 85 per cent traditional kerosene Jet A fuel.

Not just these two companies, several others showcased their 'green' capabilities—ATR proudly announced that it is the first green-certified regional aircraft manufacturer for the lifecycle of its planes; Pratt & Whitney put on display its family of PurePower engines; Air France Industries-KLM Engineering & Maintenance explained how Ecoshine technique on an average used eight cubic metre of water less per aircraft washed; CleanSky held roundtables to further its ambitious aeronautical research programme ever launched in Europe—to develop breakthrough technologies to significantly increase the environmental performances of airplanes and air transport, among others.

MILITARY TAKES A BACKSEAT

In any major international air show, the presence of new combat jets takes on iconic proportions, but at Le Bourget this time, it was civil aviation which overshadowed military. As there is no new fighter jet coming up on the horizon, it was for the in-service fighter jets—Dassault Aviation's Rafale; Eurofighter Typhoon; and Lockheed Martin's F-16 to add to the supersonic boom.

There was a flutter with the arrival of Airbus Military's A400M and also when the innovative Eurocopter X3 helicopter took to the skies. Also garnering some attention was the debut of AgustaWestland's AW189.

However, there were quite a number of defence majors who exhibited weapons and subsystems and had taken substantial exhibition space—Finmeccanica, Lockheed Martin, Northrop Grumman, BAE Systems, Safran, Thales, etc. As per show statistics, 17 per cent of the trade visitors, the largest group, constituted airborne systems (including weapons).

With defence budget cuts in the West, the original equipment manufacturers (OEMs) are looking East for markets and accordingly have chalked out at which shows they need to be present in a more aggressive manner. It is the Middle East and the Asian markets, predominantly India, where arms purchase has been astounding that they need to grab.

> With defence budget cuts in the West, the original equipment manufacturers are looking East

INDIAN PERSPECTIVE

Unlike the Chinese presence, India seemed to be way behind with very few companies participating—HAL,

ALSO AT THE SHOW

Ecuador's TAME orders 3 ATR 42-500s

European turboprop manufacturer ATR and Ecuador's national flag carrier TAME signed a contract for the purchase of three new ATR 42-500s, valued at $54 million. It was the first time ATR concluded an aircraft sale with an Ecuadorian airline. This deal also reinforces the growing presence of ATR in Latin America and Caribbean region, where there are some 120 ATRs in operation, plus more than other 40 on order.

Mitsubishi & Boeing join hands

Mitsubishi Aircraft Corporation and Boeing announced a partnership at the Paris Air Show for Boeing to provide customer support services for the Mitsubishi Regional Jet (MRJ) family of regional commercial jets.

Catherine Maunoury's aerobatic display

Catherine Maunoury, Director of the French Air and Space Museum and twice world aerobatics champion, performed flying displays during the show. The holder of two world championships and ten times French champion, Catherine Maunoury has been piloting the Air and Space Museum for nearly one year now. She is the second civilian and the first woman to head the century-old institution that hosts the Paris Air Show every alternate year.

Embraer selects Messier-Bugatti-Dowty for KC-390 military transport jet

Embraer Defense and Security announced at an event during the show that Messier-Bugatti-Dowty has been selected to supply the wheels, brakes, landing gear extension and retraction system, and nose wheel steering manifold for the KC-390 military transport aircraft.

AgustaWestland and Terma sign agreement

AgustaWestland and Terma signed a cooperation agreement in order to jointly explore business opportunities in the fields of aircraft survivability equipment, 3D-Audio, advanced aero structures and other equipment. The cooperation will include joint marketing activities worldwide.

Northrop and Selex MoU to pursue international DIRCM market

Northrop Grumman Corporation and Selex Galileo announced the signing of a MoU aimed at jointly pursuing the international directional infrared countermeasures (DIRCM) market. Capitalising on their unique experience and capability in the development and production of laser-based DIRCM systems, the document further strengthens the existing industry-leading DIRCM strategic alliance and enables the two companies to aggressively target the "rest-of-the-world" DIRCM marketplace.

Datadvance signs software distribution agreement with SAS

Datadvance, a joint venture between EADS and Russian investors specialised in predictive modelling software, and SAS, a leading provider of business analytics software and services, have signed a software cross-distribution agreement at the show. The agreement allows Datadvance to sell SAS products in the European aerospace market and enables SAS to market and sell Datadvance products in Europe.

EADS with Cassidian and Astrium sign MoU with Turkish Aerospace

A MoU covering industrial cooperation and involving the activities of EADS and its divisions Cassidian and Astrium in Germany, Spain, France and the UK has been signed with Turkish Aerospace Industries during an official ceremony at the show. This agreement is designed to boost the exploration of potential collaborative opportunities, including shared and common works with regard to UAV programmes in different classes.

EADS, Aubert & Duval, ERAMET Group and UKTMP reinforce integrated titanium supply chain

EADS and UKAD, the joint venture between Aubert & Duval and UKTMP, have signed a long-term agreement for the supply of titanium semi-finished products for forging parts and fasteners for EADS programmes including Airbus aircraft. The agreement, covers the supply of titanium products until 2022.

EADS showcases VoltAir all-electric propulsion system concept

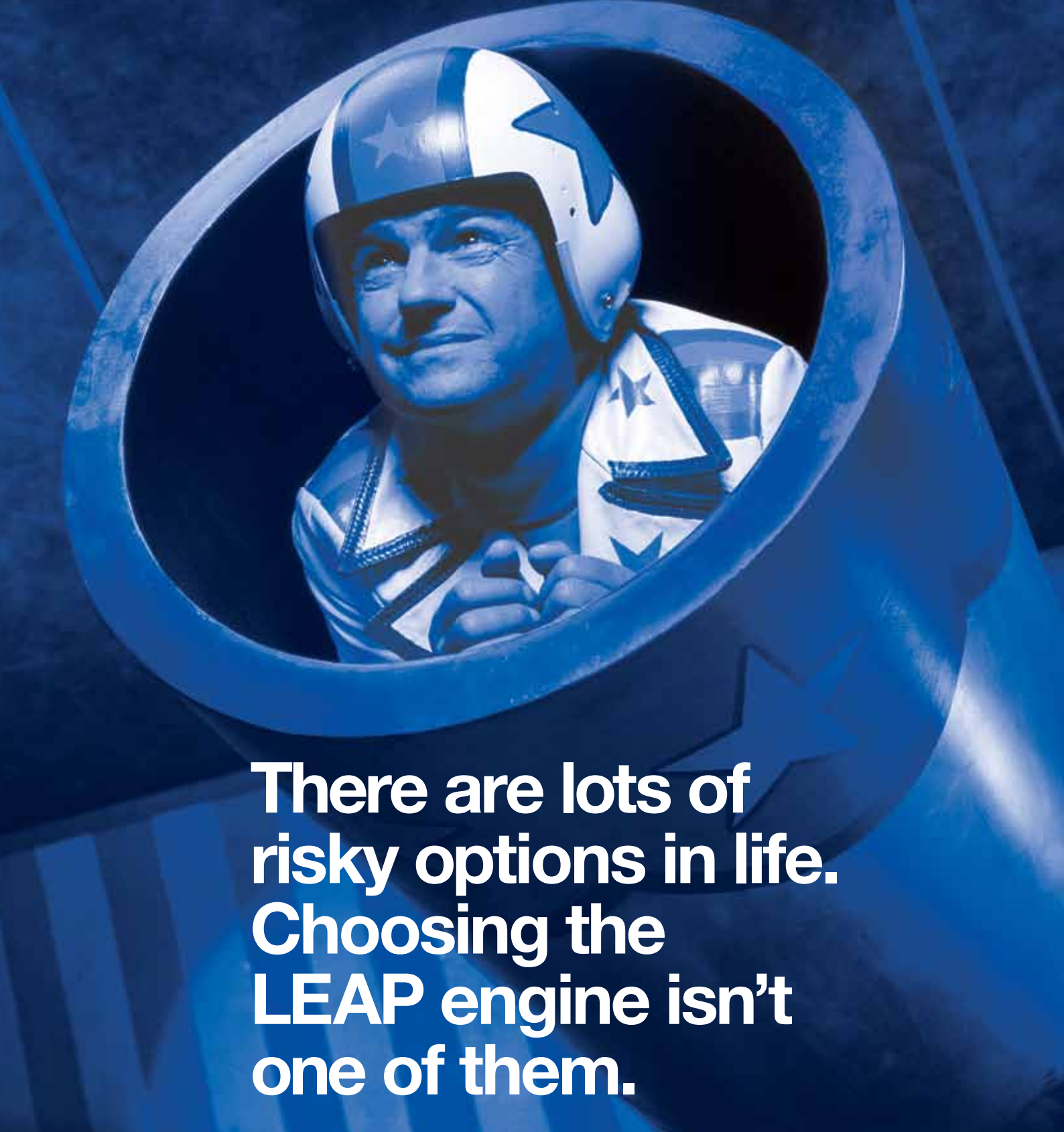
Flying High with batteries, EADS Innovation Works, the corporate research and technology network of EADS, showcased an all electric propulsion system concept at Le Bourget. The VoltAir technology concept platform supports the vision of a zero-emission air vehicle which could become a reality 20 years from today. VoltAir is one of the projects that are grouped under the name of eCO2avia by EADS Innovation Works as part of the EADS Group's research towards achieving the aviation industry's climate protection goals. •

Samtel, Ambica Steels, Quest Global among them. India is seen more of a market opportunity than a manufacturing hub, compared to the Chinese who had products and solutions to offer. The US company Raytheon had exclusive sessions for the Indian media on the products and solutions it was offering…the list was long and running in billions of dollars.

From the Indian perspective, the two contenders for the Indian Air Force acquisition programme of 126 medium multi-role combat aircraft, Rafale and Eurofighter Typhoon, underscored their prowess to the various Indian delegations. The Indian Minister of State for Defence M.M. Pallam Raju was heading one. Some of the OEMs sought clarifications on the Indian procurement procedures and the recently announced offset policy.

RECORD VISITORS

The Paris Air Show had 2,113 exhibitors from 45 countries with a record number of visitors—3,45,000, of which, 1,45,000 were trade visitors. Summing up, the Commissaire General of the International Paris Air Show, Louis Le Portz, said, "It was an outstanding showcase for new technologies and was a clear sign of recovery for the aerospace industry." SP



There are lots of risky options in life. Choosing the LEAP engine isn't one of them.

LEAP

Choosing CFM* to power the A320neo isn't just playing safe, it's playing smart. The CFM history of record-breaking reliability is legendary. Now, the LEAP engine with its proven architecture and ground-breaking technology, delivers 15% lower fuel consumption and 15% lower CO_2 emissions than the engines it will replace. Don't jump into the unknown. Leap into the future. Visit www.cfm56.com/leap

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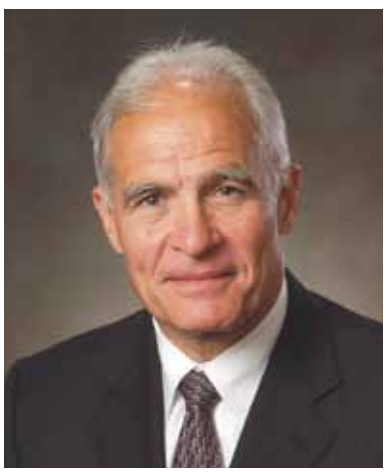
cfm

THE POWER OF FLIGHT

ITT to participate in India's pilot ADS-B programme



With airspace increasingly getting crowded, managing air traffic indeed is a Herculean task. Futuristic technologies are the answer and many defence and aerospace majors are at it. In an interview with ***SP's Aviation*** during the Paris Air Show, **John T. Kefaliotis, Vice President, Next Generation Systems, ITT Defense and Information Solutions**, outlines the key features of ADS-B programme which is being rolled out in the US for nationwide airspace coverage.

By **R. Chandrakanth**

***SP's Aviation* (SP's): Could you give us an update on the air traffic management (ATM) programme in India?**
John T. Kefaliotis (Kefaliotis): We have not been actively engaged in pursuing ATM initiatives in India with the exception of ADS-B. We have been talking with the Airports Authority of India (AAI) for some time now about planning for the automatic dependent surveillance-broadcast (ADS-B) in India. Our latest understanding is that the AAI plans a pilot programme involving installation of certain numbers of ADS-B receivers at some airports.

SP's: Have the locations being identified for the pilot programme?
Kefaliotis: I do not know the details about the physical location of the pilot programme. However, we intend to participate in the programme. I was in New Delhi recently and my understanding from the meetings is that a pilot programme is intended and that the tender would be released within a couple of months. I am told it would be an open tender and we certainly would plan on submitting a bid.

SP's: Is it going to be a tough competition?
Kefaliotis: It is certainly a competitive market. The solution that we provide in the US is a comprehensive nationwide solution that has substantial benefits in terms of network-enabling surveillance infrastructure in the country. To the extent that AAI and India wants to move in that direction, we think we have an outstanding solution.

SP's: What are the unique features of your programme that you are offering in India?
Kefaliotis: ITT understands the requirements of the potential customers and offers them solutions that meet those requirements. What we have discussed with AAI in terms of the US implementation is that it is a comprehensive nationwide solution. In a nation where there are a large number of ADS-B radios to be deployed in order to provide nationwide coverage and a large number of air traffic control (ATC) facilities to which data are distributed, the US solution is highly appropriate. We have centralised control stations into which we bring all the ADS-B data. We validate and do geographic filtering in a central facility and place the data sets on the network so that any ATC facility can subscribe to the data sets. It is a very flexible distribution of data, offering substantial benefits. The ITT ADS-B architecture has been built to very stringent functional and performance requirements and has been subjected to extensive testing by the US Federal Aviation Administration (FAA). The FAA has conducted a formal safety case against that solution. The ADS-B solution has been demonstrably validated by the FAA. The solution is a gold standard.

SP's: Could you throw light on the origin of ADS-B and the milestones achieved by the company, in terms of certification, etc?
Kefaliotis: ADS-B is not a new technology. It's been in validation and standards development in the US with the Radio Technical Commission for Aeronautics (RTCA) and so too in

PHOTOGRAPH: ITT

Europe. There is harmonisation of standards. The concept is not new. In the US, there have been demonstration networks that have been organically integrated by the FAA. The FAA bought radios and installed and integrated them. But in terms of a nationwide integrated solution that was validated and has gone through security and safety certifications, it started with the awarding of contract to ITT in August 2007.

The FAAs ADS-B programme is extensive. It has two links—a 1090 Mhz link intended for air transport and universal access transceiver (UAT) link for general aviation. It has four services; in one service we collect all ADS-B data that the aircraft broadcasts and distribute it to ATC facilities. We also turn around the links. We accept data on the UAT link and broadcast the data on 1090 Mhz and vice versa. We have two broadcast services—one that broadcasts ADS-B reports for traffic i.e. not ADS-B equipped and is under radar surveillance and one for weather and aeronautical information. These services provide unprecedented situational awareness for ADS-B equipped airborne aircraft equipped with proper display technology. ITT was awarded the contract in August 2007 and by October 2008, the FAA declared in-service decision (ISD) for the broadcast services. When FAA does that, it means it meets the functional performance requirements. The system is safe and secure and can be effectively operated as part of the national airspace systems. We continued to roll out ground stations and in 2009 we went through a series of initial operational capability (IOC) demonstrations for the key sites for the display of ADS-B information on controller displays—Louisville Approach Control, Philadelphia Approach Control, Gulf of Mexico data to the Houston En Route Center and Juneau data to the Anchorage En Route Center. In September 2010, the FAA declared ISD for all system services opening the door for completion of nationwide deployment. ITT is actively working to complete this national deployment. We have deployed approximately 340 radios, all system control stations and system monitoring facilities. Eventually, ITT will deploy approximately 700 radios for full nationwide coverage at both high and low altitude. We will complete system deployment by 2013. ITT has performed this programme on schedule and on budget.

SP's: Does India also require deployment of 700 radios considering the geographic size?
Kefaliotis: The number of radio stations required for India would be determined by AAI requirements. ADS-B is a line of sight system depending on the solution, long-range for aircraft operating at an altitude. ITT's experience in the US is that radios provide 260 nautical mile radius coverage. It is the low altitude coverage requirement that will drive the number of radios required. We do not know AAI's requirements. Under one possible scenario, ITT independently estimated that approximately 60 radios would be required to provide quite a good coverage for India.

SP's: What about cost-competitiveness?
Kefaliotis: We do understand Indian procurement practices. We hope to package our solutions to be cost-competitive. We need to look at the pilot programme requirements. Ultimately we have to look at the national requirements. We do believe that our architecture provides substantial benefits.

SP's: Are you in touch with the Indian Space Research Organisation (ISRO) which is implementing the GPS-aided geo-augmented navigation (GAGAN)?
Kefaliotis: We are not in touch with ISRO but we are clearly structuring a programme to have Indian content. We have a commercial and defence office in India. We have not formalised any arrangements as yet.

SP's: Are you talking to the Tata Group which has bagged a contract for modernisation of 30 airports in India?
Kefaliotis: We have been talking to AAI and we will continue to build relationships, including with the Tatas. We have to partner on product development and we do have plans of doing that in India in the near future. The ITT representative in Delhi is an active member of the aviation cooperation panel, a TDA-funded initiative in India.

SP's: Which are the countries where the ADS-B is operational?
Kefaliotis: The countries where ADS-B is operational include Canada, Finland, Australia and others. There has been a lot of deployment in South East Asia as well.

SP's: Does ADS-B have any military application?
Kefaliotis: ADS-B is a cooperative surveillance system and a globally harmonised technology. Various nations will have rules about equipage. In the US, all aircraft have to be equipped with ADS-B by 2020. In Europe, there is a much more aggressive rule. There are exceptions for state aircraft; principally around fighter aircraft. As for transport aircraft, they will be operated routinely in different environment and ADS-B will benefit the transport aircraft. In the US, the FAA delegates airspace to military and in that delegated airspace the military provides ATC services, and to that extent ADS-B becomes a widely accepted surveillance technology the Military ATC facilities will have to have ADS-B data delivered to them. As air defence technology, you can use it to sort out the friendly aircraft but it is a cooperative system. From an aircraft operations standpoint, it is applicable for both military and civil.

SP's: Will the NextGen Equipage Fund be available for India?

We have to partner on product development and we do have plans of doing that in India in the near future

Kefaliotis: It is a US focused fund that ITT has been an active participant in. We have not thought about a similar fund for India. The fund is an option for alleviating the financial barriers currently preventing airlines from rapidly equipping with modernised ATM cockpit technology to enable acceleration of benefits that will be delivered through the FAA's NextGen programme. SP

CELEBRATION TIME: A380 AND A400M IN A FORMATION

THE FINE ART OF FENCING

It was the best ever show for Airbus which had record breaking orders. In terms of units, it was the best ever and in terms of value, it was the second best.

By **R. Chandrakanth**

THE JOSTLING BETWEEN THE two big aircraft manufacturers—Airbus and Boeing—is fodder for the media. At Air Shows, the epees are sharpened and the media is sought after in many different ways. The 49th Paris International Air Show at Le Bourget, the granddaddy of all air shows, was no different. Airbus swamped the show with record-breaking orders, while Boeing's numbers went unnoticed.

Airbus President and CEO Tom Enders and Chief Operating Officer (Customers) John Leahy were beaming from ear-to-ear and even joking about taking a vacation—730 orders with list price of $72.2 billion (₹3,24,900 crore) at the show, pipping past its 2007 record of 728—Airbus has never had it so good.

"It is the best ever show for Airbus in the numbers sold. In terms of units, it is the best ever and in value terms it is the second best. I would like to particularly emphasise that we got additional 600 orders for A320neo (new engine options) at the show. After this show, our colleagues in Seattle still maintain that the neo is only catching up with their 737 Next-Generation (NG)… I can ask, what are the guys in Seattle smoking? I was myself pretty much amazed that we sold this many aircraft. I didn't think it would be such a best-seller only six months after

PHOTOGRAPHS: AIRBUS & BOEING

its launch," remarked Enders.

Boeing orders and commitments notched up to 142 airplanes representing 737NG, 767, 777, 787 and 747-8, valued at over $22 billion (₹99,000 crore). Boeing has been concentrating on wide-body jets, but apparently is not swept by the Airbus narrow-aisle 'clean sweep' and Boeing President and CEO of Commercial Planes Jim Albaugh said that the A320neo was now at par with the 737 NG. The orders at the show are a "powerful validation of the demand for Boeing's fuel-efficient and market-leading products."

Enders has an answer to that. "The market demand is so strong for fuel-efficient planes…we will be investigating how we can ramp up production from the proposed 42 planes a month beginning next year." The A320neo, which will be available from 2015, is equipped with Airbus' Sharklets wing tip devices and the latest generation engines, which together will deliver 15 per cent in fuel savings.

As airline profitability is majorly dependent on the fluctuations of aviation fuel which has been hovering around $100 barrel mark, fuel efficiency will be the single most determining factor when airlines make purchases. Explaining further, Enders said besides the new engine option (CFM International Leap-X or the Pratt & Whitney PW1100G) there was "no other leapfrogging or game-changing technology that would be available until the second half of the next decade." Considering that and also the growing market appetite for narrow-aisle aircraft, the A320neo has positioned itself well.

With pressure now on Boeing, the American company said by the year-end it would take a 'momentous decision' on whether to re-engine the 737 or come out with an all new airplane. Considering the delays to the 787 Dreamliner and the supply-chain issues it has had, analysts point out going for a new engine should be the route it should take.

Albaugh outlined the company's disciplined process to determine whether to re-engine the 737, which could enter service in the 2017 time frame, or introduce a transformational new airplane by 2020.

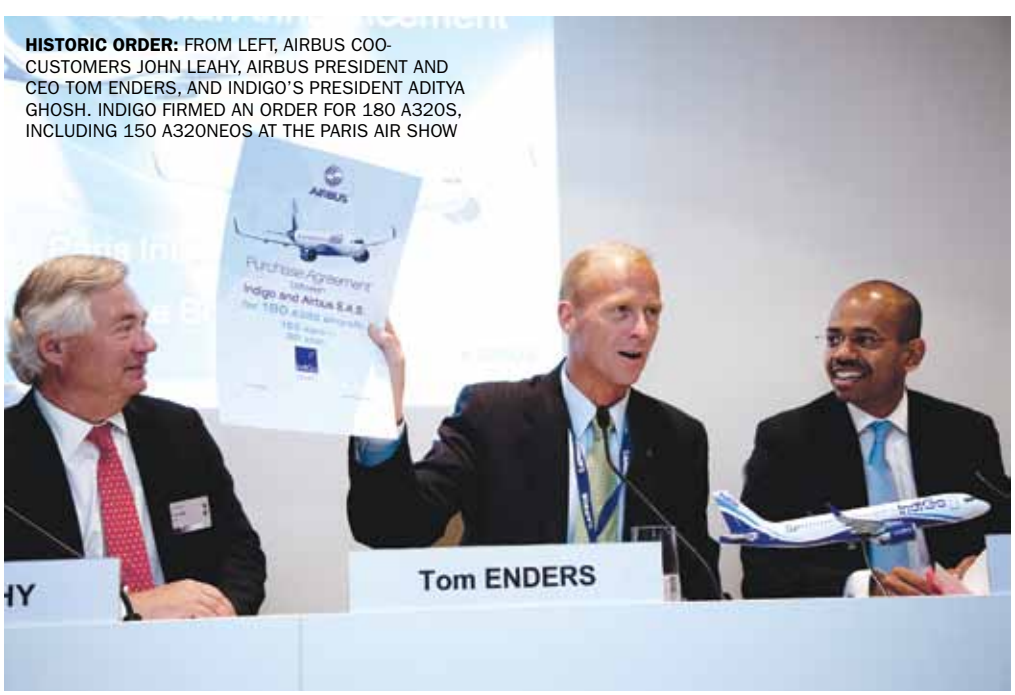
"Re-engining the Next-Generation 737 is technically viable and a real option for us. What we are working on now is whether that's a good enough answer for the next decades in light of the rising cost of fuel and emerging environmental regulations," Albaugh said. "One thing is certain that we will always provide more value to our customers than our competitors."

By improving aerodynamics and engines, Albaugh said that Boeing can deliver a new small airplane that's 20 per cent more fuel-efficient than its predecessor. "When our competitor says that they don't have the technology for a new small airplane until 2030 or even 2035, we believe them," Albaugh said. "We do have the technology as a result of developing the breakthrough 787."

The company also will continue to improve the Next-Generation 737 and reduce fuel burn by an additional two per cent this year. "The 737 is a great airplane, and it will remain the leader in the single-aisle market for years to come," Albaugh said. "We will compete vigorously for the heart of this market in the future."

Boeing India President Dinesh Keskar told *SP's Aviation* that the year-end decision would be a crucial one, but added that the company had technologies for a new airplane. "Don't go by what the competition says about technologies not being available till the end of 2030."

The seat dynamics across the world is determining the strategies of aircraft manufacturers and the two big giants now have to contend with competition coming from new quarters such as Japan, China, Brazil, Russia and Canada. In fact, Enders mentioned that the A320neo had been designed on purpose to take on Bombardier's CS100 and CS300 which has till date 123 firm orders plus 109 options. On the radar also is China's Comac 919.



HISTORIC ORDER: FROM LEFT, AIRBUS COO-CUSTOMERS JOHN LEAHY, AIRBUS PRESIDENT AND CEO TOM ENDERS, AND INDIGO'S PRESIDENT ADITYA GHOSH. INDIGO FIRMED AN ORDER FOR 180 A320S, INCLUDING 150 A320NEOS AT THE PARIS AIR SHOW

Boeing announced its 2011 Current Market Outlook, which forecasts a market for 33,500 airplanes worth $4 trillion (₹1,80,00,000 crore) over the next 20 years. Single-aisle airplanes account for the majority of deliveries over the next 20 years—70 per cent of the airplanes and 48 per cent of the value. Rapidly expanding air service within China and other emerging economies and the spread of low-cost carrier business models throughout the world, drives this market segment. The twin-aisle market, which includes efficient long-

AIRBUS ORDERS AT PARIS AIR SHOW

GE Capital Aviation Services	60 A320neo
Saudi Arabian Airlines	4 A330=300S
SAS	30 A320neo
Air Lease Corporation	50 A320neo 11 A330 1 A321
Transasia	6 A320neo
CIT	50 A320neo
Garuda Indonesia	15 A320 10 A320neo
JetBlue	40 A320neo
Alafco	6 A350 XWBs 30 A320neo
Aviancataca	18 A320 33 A320neo
Republic Airways Holding	80 A320neo
IndiGo (Announced earlier in the year)	150 A320neo 30 A320
Lan Airlines	20 A320neo
Skymark Airlines	2 A380
GoAir	72 A320
AirAsia	200 A320neo
TOTAL AIRCRAFT & VALUE	**730-$72.2 billion**

BOEING ORDERS

Qatar Airways	6 777-300 ERs
Undisclosed customer	15 747-8 Intercontinental
Undisclosed customer	2 747-8 Intercontinental
Air Lease Corporation	14 737-800s 4 (four) options 5 777-300 ERs 4 787-9s
Air Lease Corporation	6 737-800s
Norwegian Air Shuttle	15 737-800s
Aeroflot	8 777-300 ERs
Malaysia Airlines	10 737-800s
GECAS	2 747-8 Freighters 8 777-300 ERs
MIAT Mongolian Airlines	2 737-800s 1 767-300 ER
UT Air Aviation	33 737-800s 7 737-900 ERs
TOTAL AIRCRAFT & VALUE	**142 and $22 billion**

MARKET FORECAST: BOEING INDIA PRESIDENT DINESH KESKAR AT A RECENT PRESS CONFERENCE IN NEW DELHI

SURGING AHEAD: BOEING HAS AN ORDER FOR 33 AIRPLANES FROM AIR LEASE CORPORATION

range airplanes such as the Boeing 787 and 777, is the fastest growing segment of the market, accounting for 22 per cent of the delivery units and 43 per cent of the delivery dollars.

Boeing has forecast that India would need 1,320 new passenger airplanes, valued at $150 billion (₹6,75,000 crore), over the next 20 years and that it would constitute 3.75 per cent of world market. The demand for single-aisle aircraft would be 1,069, constituting 81 per cent of the market, followed by twin-aisle at 16 per cent. Regional aircraft will account for only three per cent and in value terms it will be just about one per cent. However, the low-cost carriers would continue to dominate with two out of three aircraft will be that of a low-cost carrier. As for Boeing's performance, Keskar said Air India and Jet Airways, the two big players, would continue to support Boeing as also some of the other players. SP

Airbus Dances to AirAsia Tunes

AirAsia's first aircraft deal with Airbus was at the 2005 Paris Air Show. In six years, the airline has ordered 375 planes and 35 for AirAsia X.

By **R. Chandrakanth**

TONY FERNANDES HAS A way with words, also with aviation business. Negotiating with such a person must be a challenge, but at the end of the day (night, if you may) it is fun and Airbus executives would vouch for this.

After signing the historic deal for the purchase of 200 A320neo for $18.2 billion (₹81,900 crore), at the Paris Air Show, the Chief Executive Officer of AirAsia, Tony Fernandes recalled to the media how the association with Airbus has been a 'remarkable ride'. "Our first aircraft deal was at the same Paris Air Show in March 2005. In six years, we have ordered 375 planes and 35 for AirAsia X. It has been a remarkable growth in such a short period of time."

In his inimical style, adding interesting anecdotes, Fernandes said, "We signed this deal on Valentine's Day. Tom (Enders), John Leahy, myself and Kiran Rao, (Airbus Executive Vice President, Marketing and Contracts) were in a bar somewhere in Paris. We were supposed to sign a memorandum of understanding (MoU). It was a Tuesday and I said I don't sign on Tuesdays. I told them let's party and we will talk at 12 in the night. Around midnight, Tom nudged and said can we sign now. I said let John dance first. John said I don't dance and I said I don't sign. Then Tom ordered John to dance. After three dances, we signed the deal in true AirAsia style…. I asked one of the girls (from the cabin crew) to kiss the contract and 10 other girls did it. That's how we sealed the contract."

Acknowledging that AirAsia had been successful because of Airbus, Fernandes said, "They have given us a fantastic product. We are now talking about having close to 500 aircraft. I believe there is tremendous growth potential. South West Airlines has 550 aircraft with 300 milllion passenger potential. In South East Asia there are 600 million people and if you add China and India that is over a billion. There is huge potential to fly to destinations never flown before and huge propensity to deliver. Besides Malaysia, we are now in Thailand, Indonesia, Philippines, Vietnam, and a few more are on the anvil. Travel is going to explode."

Fernandes added, "Not many believed that we do well as a low-cost carrier, but Airbus believed us. We believe in Airbus. As for A320neo, it is not just a better engine but also a better aircraft. This deal is not about getting the lowest price. Airbus has provided all round support to a small airline, the ability to go out there and compete with the larger airlines." SP

PHOTOGRAPH: AIRBUS

GLOBAL MRO in India

Air France-KLM MRO to 'gradually increase' stake in Max Aerospace

By **R. Chandrakanth**

AIR FRANCE INDUSTRIES-KLM ENGINEERING & Maintenance will be signing a strategic partnership agreement with Max Aerospace in the coming few weeks to build a global maintenance, repair and overhaul (MRO) network in the Indian subcontinent. AFI-KLM will take a 20 per cent stake in Max Aerospace which already has maintenance facilities in Mumbai. The AFI-KLM partnership will be in the area of component and engine component repair.

Talking to *SP's Aviation*, Franck Terner, President of Air France Industries, said, "The reason for AFI to take a 20 per cent stake is that we respect the Indian partner who has a fair presence. We will study the Indian market and I am sure in the coming years, the equity participation would go to or above 50 per cent." Max Aerospace provides maintenance support to over 150 aircraft operated by all domestic airlines in the Indian market.

Terner said that the MRO would position itself to respond to the requirements of the new aircraft such as the A320neo and Boeing 737NG coming into the market by providing component support facility. AFI-KLM E&M would continue to supply multi-product MRO solutions with capabilities for Boeing, Airbus and regional fleet, notably for new-generation aircraft. The company which has over 150 airline customers worldwide is a leader in component support services for the A320 family, A330, A340 and Boeing 737NG and 777 aircraft.

He said that the company was pursuing a strategy of developing facilities in the world's most strategic regions with its approach to provide quality service while seeking to lower costs; local service delivery for optimised turnaround time and extended capabilities.

Talking about the initiatives the company had taken, Terner specifically mentioned the 'green maintenance' approach. One of the approaches included Ecoshine wherein all 256 aircraft in the Air France fleet will progressively be polished by Roissy Charles de Gaulle and Orly by service provider using its damp de-pollution technique which on average uses eight cubic metre of water less per aircraft washed. The savings on water for 256 aircraft was substantial.

During the Paris Air Show, AFI-KLM E&M tied up with Avtrade, a worldwide specialist in the management and sale of aircraft spares. The combination of know-how between a globally respected MRO, and a spares trading specialist aimed to offer airlines and fleet operators the best component support skills on the market. It would be initially deployed for A330 components.

The AFI-KLM MRO business in 2010-11 resulted in total revenues of €3,090 million (₹19,370 crore), having handled 1,300 aircraft. It had six lakh parts in stock and the engine shop visits numbered 450 a year. The strategy of the company, he said, was two-pronged; cut costs and maintain high quality and performance levels on the one hand, and develop the customer portfolio with high value-added products and services on the other. The company which had enormous training capabilities would now make available training to other MRO providers, likely to generate some revenue.

In April 2011, to complete its industrial infrastructure modernisation programme and achieve total control over very big engine (VBE) maintenance processes, it embarked on the construction of a new engine test cell for use with GE90-94/115; CFM56-5C and GP7200 power plants. The ultimate aim is to be able to handle 110 VBE engines a year. This facility is coming up in Paris at an investment of 43 million Euros and will be ready early next year. SP

> WE WILL STUDY THE INDIAN MARKET AND I AM SURE IN THE COMING YEARS, THE EQUITY PARTICIPATION WOULD GO TO OR ABOVE 50 PER CENT.
>
> **—FRANCK TERNER, PRESIDENT, AIR FRANCE INDUSTRIES**

PHOTOGRAPHS: AIR FRANCE

CAE C-130J Simulators soon in Hindon

CAE, a world leader in providing simulation and training solutions, will be delivering in the fall of this year, the C-130J simulator at Hindon airbase. At the Paris Air Show 2011, **R. Chandrakanth** interviewed **Chris Stellwag, Director, Marketing Communications (Military), CAE**. Excerpts of the interview.

***SP's Aviation* (SP's): Could you tell us about CAE's presence in the defence sector in India?**

Chris Stellwag (Chris): In 2007, CAE acquired Macmet Technologies in India and became CAE India which addresses the military market. Since then, we see that India has increased its defence budgets and is acquiring new platforms and re-equipping its armed forces. Like all other armed forces, India is also looking at ways to train its armed forces and maintain readiness, and all cost-effectively. Simulation is one of the best solutions for very realistic and cost-effective training.

SP's: Could you give an update on the C-130J simulator programme?

Chris: Currently, CAE is building the C-130J simulator under subcontract with Lockheed Martin and will be delivering the simulator in the fall of this year at Hindon airbase. It will be ready for training in February 2012. We were put under contract in June 2009 and now the final integration testing programme is on at the CAE plant in Tampa Florida, US. It will be packed and shipped in October and installed at Hindon where again it would undergo testing.

PHOTOGRAPHS: CAE

SP's: Do you stipulate how long the training programme by the IAF has to be?
Chris: We do not stipulate. It is for the Indian Air Force to decide on the duration of the training programme—how much time in the classroom, in the simulator and in an aircraft. We are simulating the aircraft to the highest fidelity and the IAF tells us what needs to be simulated—it could be avionics, weapon systems, etc.

SP's: How is the joint venture with HAL progressing?
Chris: We have delivered and qualified a second cockpit for the Dhruv (civil variant) simulator at the helicopter training centre in the Hindustan Aeronautics Limited (HAL). Currently, the simulator features cockpits for two different helicopter types—Bell 412 and the Dhruv civil variant. We have two more in development, for the Eurocopter Dauphin and the Army and the Navy variants of the Dhruv.

There are a lot of opportunities on the rotary wing side as India is acquiring additional helicopters. We are looking at additional capacities with HAL for other helicopter types. Also India is acquiring the P-8I aircraft and we are looking at potential opportunities with Boeing on simulation for that. CAE is already under subcontract in the US for P-8I simulators. If the Indian Navy decides, then it will be a logical choice. India is contemplating more maritime helicopters. Two of the contenders, I believe are NH19 and S70 Seahawk. We are as such doing the NH19 naval variant for the Netherlands and Italy and we have simulators for S70 Seahawk in the US.

SP's: What about combat aircraft. Do you have any programmes?
Chris: CAE is one of the owners of Eurofighter simulation systems in Germany. CAE has had a role in developing the synthetic environment software and also the visual systems. CAE has a product called Medallion 6000 visual system that is used on the Eurofighter. Should it win the medium multirole combat aircraft (MMRCA) deal, there is potential for CAE to continue the simulation role.

SP's: Considering the Indian defence acquisitions, what kind of numbers are you looking at for various training solutions?
Chris: It is really hard to say…different militaries have different balance between synthetic and live training. We believe the future holds more for synthetic training because of the compelling financial benefits it brings and the kind of training it would do. You wouldn't go in a real aircraft and do an engine fire…safety would be compromised in live training…for those kind of reasons simulation is ideal.

The other reason is the cost effectiveness of simulation. It costs one-tenth of training as compared to flying in an aircraft for an hour. Sometimes it may be less for a light utility helicopter and over one-tenth for a combat aircraft. We see a trend globally for militaries to increase the use of synthetic training. India has started seeing the value of simulation training. At the HAL training centre, many defence personnel come for high-fidelity simulation training. We think India is a market which will adopt simulation faster than they have in the past. SP

On Civil Front

CAE and InterGlobe to launch pilot and maintenance training centre in Delhi

R.K. SINGH, RKS ASSOCIATES ON BEHALF OF INTERGLOBE, ADITYA GHOSH, PRESIDENT, INDIGO AND JEFF ROBERTS, CAE GROUP PRESIDENT, CIVIL SIMULATION PRODUCTS, TRAINING AND SERVICES

CAE and InterGlobe Enterprises Limited announced at the Paris Air Show the setting up of a joint venture training centre in Delhi by 2012 end, to provide pilot and maintenance training solutions for the Indian aviation market. The centre will be the fifth aviation training facility that CAE operates in India. CAE already trains over 1,500 crew members annually at its Bengaluru training centre.

"This partnership will provide state-of-the-art infrastructure in India for training airline personnel in one of the fastest growing aviation markets in the world," said Rahul Bhatia, Group Managing Director, InterGlobe Enterprises.

"It is estimated that India would need more than 7,000 new commercial pilots over the next seven years and our Delhi training centre will help support this growth," said Jeff Roberts, CAE Group President, Civil Simulation Products, Training and Services. "We have progressively expanded our presence in the country to provide training across the commercial aviation spectrum, from ab initio flight schools for new airline pilots to commercial aircraft type-rating training. We are doing the same for helicopter pilot training. CAE has deep and broad relationships with the leading carriers in India and the Delhi centre represents a further commitment of CAE to India.

"We have been in India for quite some time and we are here for the long haul. Outside of Canada and the US, we have a large presence in India as indicated by the 300 strong employees we have. We will expand as we go, as we witness that the airlines are adding to their capacities here. In India, every airline has commercial relationship with us and we are number one in India. The closest competition is not in India, may be Hong Kong."

The focus of the New Delhi training centre will be to provide "wet" and "dry" type-rating, recurrent, conversion and jet indoctrination training for commercial aircraft pilots. Programmes will also be offered for maintenance technicians. The training centre will initially house four new CAE-built Level D full-flight simulators covering Airbus and Boeing aircraft types being operated in India and complementing CAE capabilities at its Bengaluru training centre. The Delhi training centre will be capable of expansion to eight simulator bays. •

GLENN CURTISS WAS A towering figure in American aviation at the dawn of the powered flight era. His expertise in designing and building aircraft led to the formation of the Curtiss Aeroplane and Motor Company, now part of Curtiss-Wright Corporation, which built aircraft for the US military for use in both World Wars. Curtiss was also responsible for many significant firsts in naval aviation. Born on May 21, 1878, in Hammondsport, New York, Glenn Hammond Curtiss had a strong mechanical streak as a teenager. He set up a business—designing, building and repairing bicycles. Then he moved up the ladder, adding engines to his bicycles. He also enjoyed racing them. In January 1907, he was dubbed the "Fastest Man on Earth" when he set an unofficial speed record of 219.45 kmh on a V-8 motorcycle of his own design and construction. This record remained unbroken till 1930. So light and powerful were his motorcycle engines that the balloonist Thomas Baldwin commissioned him to build an engine for his airship. This became the first powered dirigible in the USA. A Curtiss engine even powered the first US Army aircraft—the dirigible SC-1.

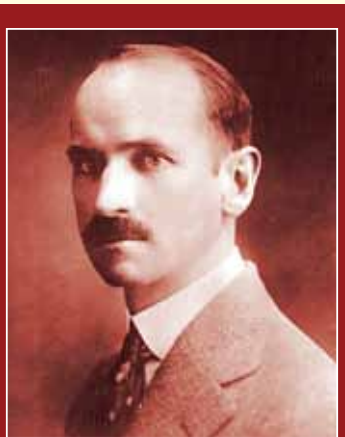
In June 1907, Glenn Curtiss had his first taste of flying aboard a dirigible and was hooked for life. Alexander Graham Bell, who called Curtiss "the greatest motor expert in the country," invited him to join his Aerial Experiment Association (AEA). Curtiss became its test pilot, undertaking many experimental flights. On July 4, 1908, he flew a distance of 5,090 feet in the first plane that he built called the 'June Bug'. This was the first pre-announced and publicly demonstrated flight of a heavier-than-air aircraft in America. For this feat, he won the Scientific American Trophy, which specified an unassisted take-off and straight flight of at least one kilometre, to be demonstrated in public. Curtiss was also awarded US pilot's licence #1 from the Aero Club of America, since the first batch of licences was issued in alphabetical order.

In August 1909, the world's first aviation rally—La Grande Semaine d'Aviation—was held at Rheims, France. Curtiss won the James Gordon Bennett Cup for completing the fastest flight over a 20-kilometre closed course. He flew at an average speed of 74.8 km/hour. In May 1910, he flew from Albany to New York City, a distance of 219 kms. It was the first long-distance flight between two major cities in the US which won him a prize offered by publisher Joseph Pulitzer. He was also given permanent possession of the Scientific American Trophy. Curtiss was alert to the possibilities of using aircraft as weapons of war. In 1910, he made a simulated bombing demonstration to naval officers at Hammondsport. Two months later, a naval officer, operating from an aircraft piloted by Curtiss, demonstrated the technique of shooting at targets on the ground. Curtiss also established a flying school at San Diego, California, to teach army and naval personnel. The original site of this facility is recognised by the US Navy as "The Birthplace of Naval Aviation". On January 18, 1911, Eugene Ely, in a Curtiss pusher biplane specially equipped with arresting hooks on its axle, landed on the cruiser USS Pennsylvania. On February 24, 1911, Curtiss made his first amphibian demonstration by taking off and alighting on both land and water. Back in Hammondsport six months later, in July 1911, Curtiss sold the US Navy their first aircraft, the A-1 Triad. The A-1, which was primarily a seaplane, was equipped with retractable wheels, also making it the first amphibian. He won the Collier Trophy for designing this marvel.

The Curtiss Aeroplane and Motor Company was the largest aircraft manufacturer in the world during World War I. When it went public in 1916, it became the world's largest aviation company. During World War I, it produced 10,000 aircraft. When the US Army Air Corps requested the development of a simple, easy to fly and easy to maintain two-seat trainer, Curtiss responded to the challenge by creating the JN-4 Jenny for the Army, and the N-9 seaplane version for the Navy. This emerged as one of the most famous products of the Curtiss Company and thousands were sold in the United States, Canada and Britain. As a result of the successes of the pioneers of the US aviation industry, the Curtiss-Wright Corporation was formed by the merger of 12 Wright and Curtiss affiliated companies on July 5, 1929. It still exists.

Glenn Curtiss's immense contribution to aviation, like that of many other pilots of the period, tends to be overshadowed by the legend of the Wright Brothers. However, he will be specially remembered as the father of naval aviation and the founder of the American aircraft industry. He died on July 23, 1930, of complications from an appendectomy. SP

—Group Captain (Retd) Joseph Noronha, Goa



GLENN CURTISS
(1878 - 1930)

Glenn Curtiss's immense contribution to aviation, like that of many other pilots of the period, tends to be overshadowed by the legend of the Wright Brothers. However, he will be specially remembered as the father of naval aviation and the founder of the American aircraft industry.

MILITARY

Asia-Pacific

Qatar flying high

The first of four C-130J Super Hercules for the Qatar Emiri Air Force took to the skies over the Lockheed Martin facility in Marietta. This is Qatar's first experience with C-130s, so the package provided by Lockheed Martin is a complete solution including four aircraft, training of aircrew and maintenance technicians, spares, ground support and test equipment, servicing carts, cargo pallets and a team of technical specialists who will be based in Qatar during an initial support period.

Boeing to build 10 C-17 airlifters for IAF

Boeing has announced that India's Ministry of Defence has signed an agreement with the US Government to acquire 10 Boeing C-17 Globemaster III airlifters. The FMS was approved by the US Congress in May 2010 and makes India the C-17's largest international customer. According to the agreement, India will take delivery of its C-17s in 2013 and 2014.

Boeing will support India's C-17 fleet through the C-17 Globemaster III Sustainment Partnership, a proven multinational performance-based logistics programme. The GSP "virtual fleet" arrangement ensures mission readiness by providing all C-17 customers, with varied fleet sizes, access to an extensive support network for worldwide parts availability and economies of scale when purchasing materials.

Northrop's navigation equipment

Northrop Grumman Corporation's Europe-based air traffic management subsidiary, Northrop Grumman Park Air Systems is providing a range of navigation equipment including instrument landing systems (ILS) and Doppler VHF omni-directional range systems (DVOR) for air bases in India as part of the IAF's Modernisation of Air Field Infrastructure (MAFI) project.

Under the contract awarded by the Tata Power Company Limited, Strategic Electronics Division (Tata Power SED), Northrop Grumman will supply 30 NORMARC 7000 ILS and 31 NORMARC DVOR systems with deliveries to be completed in 42 months. This is the first phase of the MAFI India project.

Americas

Second hypersonic flight ends prematurely

The X-51A Waverider flew its second test flight at the Point Mugu Naval Air Test Range over the Pacific Ocean bringing significant hypersonic research data despite a less-than-successful flight. The hypersonic aircraft was successfully boosted to just over Mach 5 and the scramjet engine lit, but failed to transition to full power. The vehicle continued in a controlled flight orientation until it flew into the ocean within the test range. The telemetry data is being analysed. Boeing and Pratt & Whitney Rocketdyne built four X-51A flight test vehicles with the programme goal of reaching Mach 6 in hypersonic flight. The next flight is tentatively scheduled for this fall.

FINAL ASSEMBLY OF P-8I AIRCRAFT

Boeing has begun final assembly of the Indian Navy's first P-8I long-range maritime reconnaissance aircraft at the company's Renton factory. The P-8I, based on the Boeing Next-Generation 737 commercial airplane, is a variant of the P-8A Poseidon that Boeing is developing for the US Navy. The start of assembly work follows delivery of the plane's fuselage from teammate Spirit AeroSystems on May 29. Boeing workers have begun installing systems, wires and other small parts onto the fuselage. The P-8I's engines and wings will be installed later this summer.

Boeing was selected on the basis of a global tender by the Government of India. The contract for procurement of eight P-8I aircraft, with an option for four additional aircraft, was signed on January 1, 2009. •

QuickRoundUp

AIRBUS

• GE Capital Aviation Services, the commercial aircraft leasing and financing arm of General Electric, has announced a firm order for 60 A320neo family aircraft at the 49th Paris Air Show. GECAS has selected CFM's LEAP-X engine for all 60 A320neo aircraft.

Air Lease Corporation (ALC), the Los Angeles-based aircraft leasing company, has opted to expand its single-aisle and wide-body fleet portfolio with modern, eco-efficient Airbus aircraft by signing a memorandum of understanding (MoU) at the 49th Le Bourget Air Show for 50 A320neo family aircraft including 14 options.

BOEING

• The Boeing Company has announced orders and commitments for 17 747-8 Intercontinentals. Placed by two undisclosed customers, the combined deals are valued at $5.4 billion at list prices.

Boeing and Norwegian Air Shuttle ASA, branded 'Norwegian,' have announced an order for 15 Next-Generation 737-800 airplanes at the international 2011 Paris Air Show. The order, valued at $1.2 billion at list prices, brings the total number of 737-800s Norwegian has ordered direct from Boeing to 78.

Boeing and Qatar Airways have announced an order for six Boeing 777-300ERs (extended range) airplanes at the Paris Air Show. The order is valued at $1.7 billion at list prices.

BOMBARDIER

• Bombardier Aerospace has announced that a major network carrier will be the first operator to take delivery of the first CSeries aircraft. The carrier, which has requested to remain unidentified, has signed a firm order for 10 CS100 aircraft with options for an additional six. Based on the list price for the CS100 aircraft, the firm order is valued at $616 million.

CFM

• SAS has announced that it has selected CFM International's advanced LEAP TM engine with an order to power 30 new Airbus A320neo aircraft scheduled to begin delivery in 2016. The engine order is valued

APPOINTMENTS

GENERAL DYNAMICS
General Dynamics has appointed Daniel G. Clare as the President of Jet Aviation Business Unit. Clare will report to Joseph T. Lombardo, Executive Vice President of General Dynamics' Aerospace group.

BAE SYSTEMS
BAE Systems has appointed Erin Moseley as Senior Vice President for Government Relations.

ALENIA AERONAUTICA
Alenia Aeronautica's Board of Directors has appointed Amedeo Caporaletti as the company's Chairman. Furthermore, its subsidiary Alenia Aermacchi has also appointed Amedeo Caporaletti as company's Chairman.

L-3 COMMUNICATION
L-3 Communications has promoted General (Retd) Richard A. Cody as Corporate Senior Vice President. General Cody will continue to lead L-3's Washington Operations organisation.

INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA)
The International Air Transport Association (IATA) has appointed Peter Hartman as Chairman of the IATA Board of Governors and Tony Tyler as IATA's Director General and CEO.

TEXTRON
Textron has announced that Scott A. Ernest has been named President and Chief Executive Officer of Cessna Aircraft Company, Textron's general aviation business.

EADS
EADS North America has appointed Michael Cosentino to be Senior Vice President and Head of Strategy and Development.

Micro drones
Military researchers are at work on another revolution in the development of UAVs by shrinking them in an indoor flight lab appropriately called the "microaviary," where the drones are designed to replicate the flight mechanics of moths, hawks and other inhabitants of the natural world. From blimps to bugs, an explosion in aerial drones is transforming the way US fights and thinks about its wars. The Pentagon now has some 7,000 aerial drones, compared with fewer than 50 a decade ago. Within the next decade, the US Air Force anticipates a decrease in manned aircraft but expects its number of "multirole" aerial drones like the Reaper—the ones that spy as well as strike—to nearly quadruple, to 536. Already the Air Force is training more remote pilots, 350 this year alone, than fighter and bomber pilots combined.

Europe

Eurofighter completes first phase of Meteor missile test

Eurofighter have completed a range of air-carriage trials for the MBDA Meteor 'beyond visual range air-to-air missile' (BVRAAM), which forms part of the process of integrating the missile onto the Typhoon swing-role combat aircraft. The first of a series of trials to ensure the safe separation of the missile across the flight envelope was carried out by Eurofighter Partner Company BAE Systems with Instrumented Production Aircraft IPA 1 on the Aberporth range, UK. Meteor is a ramjet powered next generation BVRAAM system with the largest No Escape Zone of any air-to-air weapon resulting in a long stand-off range and high kill probability to ensure air superiority and pilot survivability. This is being developed on behalf of France, Germany, Italy, Spain, Sweden and the UK by MBDA.

Eurofighter & Euroradar in Typhoon E-Scan radar
After one year of industry funding, the Eurofighter and Euroradar consortia have received renewed strong support from the Partner Nations and have agreed to continue the full scale development programme of the next generation E-Scan radar by 2015. The new CAPTOR-E radar will have AESA capability that far exceeds any other radar available today and in the foreseeable future and will be developed to satisfy the requirements of the partner nations and customers across the globe.

CIVIL AVIATION

Asia-Pacific

Seminar on "Aviation & the Environment"

As part of the centenary year celebrations of civil aviation, a seminar on "Aviation and the Environment" and "Enabling Growth" was organised in Delhi by Shell MRPL Aviation. Dr Nasim Zaidi, Secretary, Ministry of Civil Aviation inaugurated the day-long conference on June 24.

Dr Mike Farmery, Global Technical Manager, Aviation Fuels Shell Aviation gave a presentation on fuel innovation, the energy and emission challenges going ahead, options for alternate fuels and pathways. "Fuel is a jewel and we must treasure it," said he. Zaidi assured Shell officials that he will talk to

QuickRoundUp

at approximately $710 million at list price. CFM International is a 50-50 joint company between Snecma (Safran Group) and GE.

CHINA

• China Southern has become International Aero Engines' largest customer by ordering 65 Select One engines which will bring the total number of China Southern airplanes in service and on order powered by the V2500 to 177. In addition, China Southern has selected a long-term engine maintenance agreement. Deliveries for this latest order will begin in May 2012. The total value of the agreement is in excess of $750 million.

CIT GROUP

• CIT Group has signed an MoU with Airbus for 50 A320neo family aircraft. This order brings the total number of aircraft in the Airbus order book for CIT to 241.

EADS

• EADS North American Defense has been awarded a $74.39 million contract for 14 light-utility helicopters and 14 airborne-radio communication systems.

EMBRAER

• Embraer has reached a significant commercial programme milestone after concluding recent sales that pushed the number of orders for its E-Jets family of aircraft over the 1,000 mark. The achievement was announced at a press conference at the 49th Paris Air Show. The E-Jets family of aircraft comprise of four models (E170, E175, E190 and E195), with seating capacities ranging from 70-20 seats.

GECAS

• GE Capital Aviation Services (GECAS), the commercial aircraft leasing and financing arm of General Electric and European turboprop manufacturer ATR, has announced a new order for 15 ATR 72-600s, plus 15 options. The deal is valued at approximately $680 million at list prices, including options. This is a first-time ATR order for GECAS.

GECAS has announced that it has selected CFM International's advanced LEAP engine to power 60 new Airbus A320neo aircraft scheduled to begin

SHOW CALENDAR

14-17 July
EXPO AERO BRASIL
São José Dos Campos International Airport, Brazil
www.expoaerobrasil.com.br

25-31 July
EAA AIRVENTURE
Wittman Regional Airport, Oshkosh,WI, USA
www.airventure.org

11-13 August
LABACE AIR SHOW 2011
Congonhas Airport, São Paulo, Brazil
www.abag.org.br/labace2011/labace2011.htm

16-21 August
MAKS 2011
Zhukovsky, Moscow, Russia
www.aviasalon.com/en/static/page/welcome_to_MAKS_11.htm

13-16 September
DSEI - DEFENCE AND SECURITY EQUIPMENT INTERNATIONAL
ExCeL, London
United Kingdom
www.dsei.co.uk

14-15 September
BUSINESS AIRCRAFT EUROPE
Biggin Hill, UK
www.miuevents.com/bae2011

14-16 September
JET-EXPO AIR SHOW 2011
1 bld.3 Airport VNUKOVO Moscow
www.2011.jetexpo.ru

21-24 September
AVIATION EXPO CHINA 2011
China National Convention Centre, Beijing, China
www.beijingaviation.com/en/

15-18 September
CHINA HELICOPTER EXPOSITION
Tianjin Airport Industrial Park, China
www.helicopter-china-expo.com/index.php/en

27-29 September
MRO EUROPE 2011
IFEMA, Madrid, Spain
www.aviationweek.com/events/current/meu/index.htm

airports and airlines if they can test on gas to liquid (GTL) fuel with Shell Aviation.

A.K. Sharan, Joint Director, DGCA, Michael Furze, Global Risk Marketing Lead, Shell International Petroleum Company Limited, P.N. Sukul, Joint Secretary, Ministry of Civil Aviation, Kamesam Shankar, Global Engineering Manager, Aviation, Shell Aviation, V.P. Agrawal, Chairman, AAI, chaired the sessions.

Tibet Airlines takes delivery of its first A319

Tibet Airlines, a newly established Chinese airline based in Lhasa, Tibetan autonomous region of China, has taken delivery of its first Airbus A319, becoming Airbus' newest operator in China. This aircraft is the first out of three A319s, an order which was placed in May 2010.

The aircraft will operate at the highest airports in the world such as Ali Kunsha, Tibet, which is above 14,000 ft, and fly required navigation performance-authorisation required (RNP-AR) procedures from Beijing and Chengdu to Lhasa and other regional routes. RNP-AR procedures represent the most modern navigation technique, allowing the aircraft to fly precisely along a predefined route using onboard navigation systems and the GPS-based Global Navigation Satellite System (GNSS). RNP-AR is especially important for operators, who have their base at a high altitude airport. Tibet Airlines has selected Quo Vadis as its strategic partner for its RNP-AR operations.

Boeing values India market for 1,320 new airplanes
Boeing forecasts a $150 billion market for 1,320 new passenger airplanes in India over the next 20 years as the economy aims for double-digit growth, stimulating strong demand for new and replacement airplanes. Boeing India President Dinesh Keskar shared the forecast on July 5 with Boeing's outlook for India's commercial airplane market through 2030. "Robust growth with new economic prosperity amongst a massive Indian population, discretionary incomes, business progress and access to airports will increase airplane demand," Keskar said. "In 2011, the economy continues to do well. Indian air carriers are becoming profitable and we expect the GDP to maintain its upward trend in the long-term. As a result, both the air travel and air cargo markets will grow." Keskar also said that airline revenue and yields were up, but high inflation and volatile fuel prices will play a pivotal role in the health of the industry.

INDUSTRY

Americas

First US made Phenom 100 is on its way
Embraer Executive Jets facility in Melbourne, Florida, welcomed the fuselage and wing parts of the first Phenom 100 entry level jet to be assembled in the United States on June 10. The arrival of the fuselage confirms that the company remains on target for the production of the first Embraer aircraft scheduled to be delivered to its customer before the end of 2011.

Europe

SuperJet International order with Blue Panorama
SuperJet International, a joint venture between Alenia Aeronautica and Sukhoi Holding, signed an order with the Italian Blue Panorama Airlines for the purchase of 12 Sukhoi Superjet 100 (SSJ100) aircraft. Based on the list price, the agreement has an estimated value of $370 million. The deliveries of these SSJ100/95B aircraft will start at the end of 2012. The aircraft interiors will be provided by the Italian

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delivery in 2016. The engine order is valued at $1.4 billion at list price.

INDONESIA

• Garuda Indonesia has signed an MoU with Airbus for the purchase of 25 A320 Family aircraft, making the airline a new customer for the Airbus single-aisle product line.

ITT SYSTEMS

• ITT Systems Corporation has been awarded a $49 million contract for the ALQ-211(v)9 Pod which includes 18 pods, 4 pod shells, 2 antenna coupler sets, 2 lab test benches and data. This contract is a FMS requirement for Pakistan.

MITSUBISHI

• Mitsubishi Aircraft Corporation has announced that it has signed an MoU with Hong Kong-based aircraft lease and maintenance company, ANI Group Holdings Ltd for an order for five next-generation Mitsubishi Regional Jet aircraft.

NORWAY

• The Norwegian Parliament has unanimously approved the funding of four Lockheed Martin F-35 Lightning II training jets to begin fulfilling Norway's future air-combat capability requirements. These fifth-generation fighters will bridge the gap between Norway's aging F-16s currently in service, and due to be phased out by 2023. The jets will be delivered to a US-based international training centre in 2016.

PRATT & WHITNEY

• Pratt & Whitney and International Lease Finance Corporation have signed a definitive agreement concerning engines for up to 100 Airbus A320neo family aircraft as part of an order announced in early March. The agreement includes 120 firm PurePower PW1100G engines for 60 aircraft and options for up to 80 engines on an additional 40 aircraft with deliveries which may occur as early as 2015.

RAYTHEON

• Raytheon has received a $1.7 billion direct commercial sales contract to upgrade Saudi Arabia's Patriot Air and Missile Defense System to the latest Configuration-3. The award includes ground-system hardware,

design group Pininfarina. The Blue Panorama SSJ100 fleet will be also supported by SuperJet International with tailored after-sales solutions beginning with the first delivery.

AW159 makes its first Paris Air Show appearance

AgustaWeestland's first production AW159 helicopter made its first appearance at the recently concluded Paris Air Show. Sixty-two AW159s have been ordered by the UK Ministry of Defence for the Army and Royal Navy to fulfil both over land and maritime missions with a common platform. The AW159, while building on the pedigree of the current Lynx, is a new six-tonne multi-role military helicopter featuring a new marinised air frame, all new avionics, new mission sensors and new generation weapon systems. The AW159 programme has achieved several major milestones so far in 2011 and continues on time and on budget ready to deliver the first aircraft to the UK Ministry of Defence at the end of 2011. The first production aircraft performed its maiden flight on April 20, 2011 at AgustaWestland's Yeovil facility and a further six production aircraft are now undergoing final assembly on a new state-of-the-art assembly line.

Airbus Military and Israel Aerospace on C295 AEW&C

Airbus Military and Israel Aerospace Industries (IAI) are combining forces to jointly develop and market a new version of the Airbus Military C-295 platform fitted with an airborne early warning and control (AEW&C) system produced by ELTA Systems, an IAI subsidiary. The primary sensor of the AEW&C will be the IAI/ELTA fourth generation active electronically scanned array radar with integrated IFF. A MoU was signed at the Paris Air Show. With this agreement, Airbus Military will expand its mission capability to the AEW&C sector, while ELTA will be expanding its AEW&C fleet to include a turboprop platform. The C-295 AEW&C has been designed to provide high quality 360-degee surveillance, creating in real-time an integrated air and maritime situation picture and electronic order of battle.

AgustaWestland unveils AW189 helicopter

AgustaWestland has unveiled the AW189, a new generation affordable multi-purpose twin-engine eight-tonne class helicopter designed in response to the growing market demand for higher payload, longer range and higher productivity. The AW189 complements the modern range of AgustaWestland commercial helicopters and will be certified in 2013 and enter service in early 2014. The AW189 is being developed to perform a wide range of roles including offshore transport, search and rescue, passenger transport and a variety of para-public missions.

SPACE

Americas

Lockheed's satellite command & control system

Lockheed Martin announced that the Multi-Mission Satellite Operations Center Ground System Architecture recently extended its mission capability to Schriever Air Force Base with the launch of a new Air Force Operationally Responsive Space mission satellite (ORS-1). The ORS mission will be deployed by the 1st Space Operations Squadron, a component of the 50th Space Wing at Schriever. The architecture was developed by Lockheed Martin and the Air Force's Space and Missile Systems Center Space Development and Test Directorate to allow the Air Force to operate different types of satellites

P&W Rocketdyne J-2X engine for NASA

Pratt & Whitney Rocketdyne has completed assembly of the first J-2X upper-stage engine for NASA's next era of human spaceflight. The J-2X is a highly efficient and versatile rocket engine with characteristics to power the upper stage of a heavy-lift launch vehicle. Fueled by liquid hydrogen and liquid oxygen, the J-2X engine will generate 2,94,000 pounds of thrust to propel a spacecraft into low-Earth orbit.

Europe

European Space Agency & Thales Alenia Space deal

On June 21, the European Space Agency (ESA) and Thales Alenia Space signed an agreement for the production of the atmospheric reentry demonstrator intermediate experimental vehicle (IXV) and its ground segment. The IXV project aims to develop an autonomous European atmospheric re-entry system, offering excellent aerodynamic performance due to its lifting body shape, along with a high-performance control system based on propulsion vectoring and aerodynamic surfaces, and advanced thermal protection systems for atmospheric re-entry.

The IXV project passed its system critical design review (CDR) in May and this agreement prepares the start of the final development and integration phase. Thales Alenia Space is responsible for the design, development and integration of the IXV vehicle, leading a consortium from European industry, research centres and universities. The IXV vehicle will be delivered to ESA in 2013, for a launch by the Vega rocket. •

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a full training package and support equipment upgrades.

ROLLS-ROYCE

• Rolls-Royce has concluded a contract worth up to $2.2 billion at engine list prices, with TAM Airlines of Brazil, to provide Trent XWB engines for Airbus A350-XWB aircraft. The order includes a 12-year agreement for TotalCare long-term services support. More than 1,100 Trent XWB engines have been sold to 36 customers, with current orders extending beyond 2020.

SAAB

• Defence and security company Saab has received an order from the Swedish Defence Material Administration (FMV) regarding development of the existing Gripen material system 39 (edition 19). The order amount is 152 million SEK (about $23.67 million).The order consists of development work in Gripen C/D, for example enhanced function of the navigation system. The work will begin in 2011 and shall be completed in the first quarter of 2013.

SUKHOI

• Sukhoi Civil Aircraft Company and Indonesian regional carrier PT Sky Aviation have signed the Heads of Agreement (HOA) for the delivery of 12 Sukhoi Superjet 100/95B aircraft at the Paris Air Show. The order is valued at $379.2 million at list prices.

TAIWAN

• TransAsia Airways of Taiwan has announced that it has placed a firm order with Airbus for six A321neo aircraft. The new aircraft will enable the airline to respond to strong growth on regional services, especially on direct routes between Taiwan and mainland China. TransAsia will announce an engine selection for the new aircraft in the near future.

THAILAND

• Thai Airways International Public Company Limited (THAI) has announced at a press conference the acquisition plan for new aircraft for the year 2011-17. The THAI Board has approved the purchase of 15 aircraft, costing about THB 49.5 billion and the operating lease of 22 aircraft costing about THB 69.1billion.

F-35 OFFER

THE MULTI-BILLION DOLLAR DEALS concluded at the Paris Air Show in June this year involving hundreds of airliners sent spirits soaring amongst the leading global aerospace majors. However, there was a flurry of excitement in some quarters when Michael Rein, Director Communications, Lockheed Martin's F35 programme disclosed to the media that his company was prepared to offer the F-35 joint strike fighter for the $11 billion (Rs 50,000 crore) 126 medium multi-role combat aircraft (MMRCA) tender for the Indian Air Force (IAF) subject to clearance by the US government.

The offer of F-35 to India is nothing new as in response to a tender by the Indian Ministry of Defence in November last year for up to 40 aircraft, Lockheed Martin was contemplating offer of the F-35C, the carrier based version. While nothing further has been heard of the offer to the Indian Navy; the implications and connotations of the offer of the F-35 for the MMRCA tender warrants scrutiny. The initial reaction which was not unexpected is that perhaps the offer comes a bit too late as the MMRCA deal is close to finalisation and entry of another aircraft into the race at this stage would not be practicable. A move by the government in favour of entry of the F-35 into the MMRCA tendering process at this stage would not stand scrutiny in any court of law. Also, given the deluge of financial scams, the Indian Government could well be confronted with yet another accusation of financial irregularity and subversion of the tendering process either to serve vested interests or under pressure by the US Government. The ensuing controversy that would inevitably acquire strong political overtones could even jeopardise the MMRCA contract itself.

Objectively speaking, the F-35 is a fifth generation aircraft under development whereas the contenders in the MMRCA race were all of vintage earlier than fifth generation. Besides as per the request for proposal (RFP), the contending aircraft "must be in operational service", a condition the F-35 does not fulfil. Also, the F-35 being considerably more expensive as compared with the two European combat aircraft shortlisted, the capital outlay would consequently be much higher than the currently estimated $11 billion seriously impinging on affordability. Besides, Hindustan Aeronautics Limited (HAL) has already entered into partnership with Sukhoi of Russia for the development of the two seat version of the T50 for the IAF, designated as Indo-Russian fifth generation fighter aircraft (FGFA). The T50 is already in an advanced stage of its developmental test flight programme in Russia. Sizeable funds have already been invested by the Indian Government and more committed. If at all, the F-35 could compete with the FGFA which would be manufactured by HAL and is expected to be inducted into the IAF before the end of the current decade.

The US must treat India as an equal partner on the world stage and not merely a lucrative market for weapon systems and outdated technologies

While prima facie the Lockheed proposal appears untenable, the offer needs to be seen in the context of the fact that the US Senate Armed Services Committee has sought a report from the US Department of Defense on the ''desirability and feasibility" of the proposed sale of the F-35 to India. So far, the approach of the US Government towards strengthening strategic partnership with India has not been focussed, imaginative nor consistently coherent. This was evident in the US participation in the MMRCA tender fielding old technology. However, the support of the US government for the sale to India of the F-35 by Lockheed reflects a clear shift in the perception of the growing stature of India on the global scene. It is also symbolic of attempt by the US to reinvigorate the security relationship with India which is an indispensable part of the strategic partnership between the two nations. Towards this end, the American Congress now views long-term collaboration for the development of major weapon systems as an effective way to stabilise the relationship that is frequently buffeted by deeply entrenched legacy of the past on both sides. While the proactive approach by the US government will undoubtedly serve her national interests, the offer of the F-35 will also open new windows of opportunity for the Indian aerospace industry that has so far been heavily dependent on Russian technology. Even after six decades of association with the Russia, the Indian aerospace industry has not progressed beyond licensed manufacture and self-reliance remains a far cry. Collaboration with the US aerospace industry through the F-35 proposal may provide the breakthrough that the Indian aerospace industry badly needs to leapfrog to a new level of technology.

In the final analysis, for meaningful collaboration in the field of defence cooperation, the US must treat India as an equal partner on the world stage and not merely a lucrative market for weapon systems and outdated technologies. SP

— Air Marshal (Retd) B.K. Pandey

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