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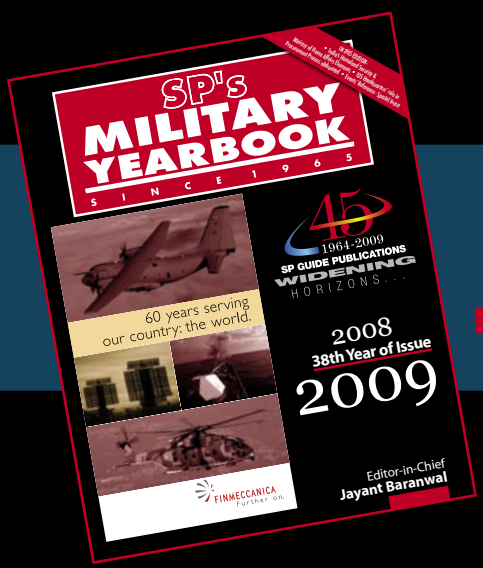
- Events' Reference - Special Insert



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Muted cheer mingled with mulish misgivings as the classic Le Bourget event this year celebrated its 100th birthday under the shadow of the global economic downturn.

Cover Photo:
The Airbus Military's CN-235 was among the aircraft displayed at 2009 Paris Air Show.

Photo Credit: SP Guide Publications

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INSTRUMENTS FOR PROFESSIONALS™

While Paris hosted the world's biggest aerospace event at the Le Bourget Exhibition Centre, back home, haunted by its past follies, Air India grappled with a script gone horribly wrong

If ever there is an aviation crisis in India that could assume the proportions of a national catastrophe, this is it. That Air India was beset by problems and buckling under mounting losses was no secret and elicited at most placatory noises—after all, in these troubled times, which airline can wager on a healthy bottom line. That the rot has sunk in so deep as to threaten its very survival came as a stinging blow. Almost without warning, the media was abuzz with damning revelations of gross mismanagement, misadventures and, shockingly, misappropriation. While the government was generous in responding to the airline's petition for a bailout, the rider was loud and clear: slim down and buckle up.

Civil Aviation Minister Praful Patel was blunt: "The Prime Minister has said the entire weight of the government is behind Air India. It is a national carrier and it is our pride. But there is a condition: AI must put its best foot forward." And who better than Ratan Tata to assist in the onerous task of scripting a turnaround for the behemoth that was the brainchild of J.R.D. Tata. Evidently, the government is cracking the whip to goad the airline into a more brisk, business-like pace.

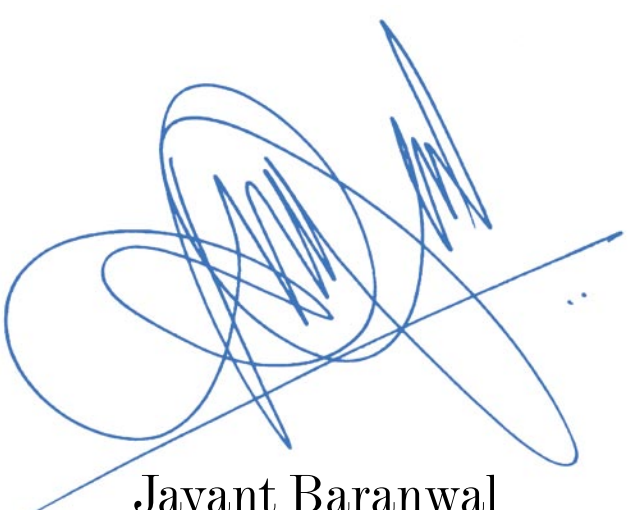
Talking of pace, SP's European Correspondent Alan Peaford draws focus on the 2009 Paris Air Show—and the rather sluggish tide of orders compared to the sales fest of two years ago—even as Chief Special Correspondent Sangeeta Saxena, part of the team from SP's at the event, captured sound bites from industry bigwigs. Don't miss the delightful account from NASA's Public Outreach Manager Derek Wang on the organisation's relentless drive to make the Moon habitable for humans. "We are hoping that in the next 40 years humans will be living in space and there will definitely be a sustaining human presence on the Moon," says Wang.

Flying to the Moon remains a distant dream. For now, corporate aviation suffers the brunt of the current economic downturn and fights a widespread misperception that business jets are mere luxury trappings for 'corporate fat cats'. We discuss why 'no plane' equals 'no gain'. Regional aviation in India, on the other hand, is engaged in a perpetual struggle against infrastructure constraints, administrative apathy and lack of a cohesive business model.

Moving on to military matters, airlifters are the news with the Indian Air Force having ordered C-130J Super Hercules aircraft even as the race to secure India's Medium Multi-Role Combat Aircraft deal hots up.

Change, as always, is the only constant.

WE FLEW INTO PARIS:
EDITOR-IN-CHIEF JAYANT BARANWAL (SECOND FROM RIGHT) WITH THE TEAM FROM SP'S AT THE LE BOURGET EXHIBITION CENTRE, HALL 3, STAND BC 38



Jayant Baranwal
Publisher & Editor-in-Chief

DREAMLINER DELAYED

Boeing recently announced that the first flight of the 787 Dreamliner would have to be postponed due to a need to reinforce an area within the side-of-body section of the aircraft. Preliminary analysis indicated that flight test could proceed this month as planned. However, after further testing and consideration of possible modified flight test plans, the decision was made late last week that first flight should instead be postponed until productive flight testing could occur. First flight and first delivery will be rescheduled following the final determination of the required modification and testing plan. It will be several weeks before the new schedule is available.

VIEWS

First passenger aircraft in the world made largely of composites, the Boeing 787 Dreamliner is much lighter than a metal aircraft of equivalent dimensions and is expected to be the most fuel-efficient in the world. Conceived in the late 1990s as a replacement for the Boeing 767, its maiden flight was originally scheduled for mid-2007. However, hurdles pertaining primarily to production derailed the event, which has now been postponed for the fifth time. Ironically, the inaugural flight was scheduled to coincide with the recently concluded 2009 Paris Air Show.

Repeated postponement of the test flight has tarnished the otherwise impeccable track record of the company, sent stock values plummeting and raised serious concerns among customers and shareholders alike. Reeling under the impact of slowdown in orders in the wake of the global economic downturn, recurrent troubles with the Dreamliner could seriously impinge on the credibility of the company. Moreover, the delay is agonising for customer airlines waiting eagerly for the Dreamliner to replace their fuel guzzling aircraft.

ILLUSTRATION: MAMTA

The latest hiccup was triggered by a disconcerting discovery of weakness at the wing-fuselage joint—a flaw that could have the potential to cause disintegration of the airframe should the airplane be subjected to high stress conditions in flight. During tests on the ground, it was discovered that the stress levels recorded at the wing joints were higher than predicted by the computer models. The airframe is fabricated on the basis of data generated through simulation models. The root of the problem may, therefore, lie either in the design or the manufacturing process, or worse still, in the software. In view of the recent disaster with the Air France Airbus 330 over the Atlantic, Boeing could ill-afford to ignore the problem. Hence, the decision to postpone the test flight is undoubtedly a sound one. Remedial action would involve reinforcement to strengthen the wing joints with attendant cost and time overrun as also weight penalty.

Displaying unflagging optimism, top company executives play down the problem as "localised structural reinforcement and is quite manageable". Such imponderables, they argue, are often encountered in programmes related to the development of new aircraft. Boeing has been rolling out at hectic pace large number of other models such as the 737, 747, 757, 767 and 777 and has never faulted on delivery schedule. To that extent, the 787 programme is an aberration. But unlike the other models which have been built on well established processes, in the case of the 787, the manufacturing process is different—far more complex, ambitious and technologically challenging on account of the extensive use of carbon fibre.

Delays often trigger blame-games, and the Dreamliner programme is no exception. While the management holds the labour unions responsible for the malaise, citing their penchant for frequent strikes, the latter attribute the problem to flaws in decision-making by the top brass. Apparently, in an effort to cut cost, the management has distributed work involving new technology to companies across the globe, thereby enhancing diversity and complexity of the supply chain. Also, vendors undertaking outsourced work are perhaps not able to match the experience and competence levels of the OEM. Consequently, the learning curve also extends farther, requiring Boeing to employ a large workforce just to monitor quality standards and compliance by vendors spread across the globe. Boeing will evidently need to muster all resources at its command to ensure that the Dreamliner project progresses beyond the realms of a dream. SP

— Air Marshal (Retd) B.K. Pandey

CAUSE NOT CLEAR

In the early hours of June 1, an Air France Flight en route to Paris from Brazil crashed into the Atlantic Ocean, killing all 228 people onboard. A month later, officials of France's Bureau d'Enquêtes et d'Analyses (BEA) say they still don't know what caused Airbus Flight AF447 to plunge into the ocean barely hours after it had taken off from Rio de Janeiro. BEA officials are also grappling with another question: why the plane was reported missing a full seven hours after reporting its last radio contact? Alain Bouillard, the BEA official leading the probe, has confirmed search teams will continue to try and locate the recorders' audible beacons using ultra-sensitive undersea microphones until July 10, when batteries on the "pingers" will almost definitely have died.

VIEWS

Deadliest in the history of Air France, the AF447 disaster is also the first fatal crash involving the airline's aircraft since the AF4590 Concorde supersonic mishap in July 2000.

The aircraft, an Airbus A330-200, powered by two General Electric CF6-80E1 engines, was only four years old. Even though it had accumulated 19,000 hours in its short service life, it had also undergone major overhaul in April-May and was presumably in impeccable condition when it took off on May 31. The aircraft had departed from Rio's Galeao International Airport at 19:03 (22:03 UTC or GMT), with a scheduled arrival at its destination 11 hours later. The last verbal contact with the aircraft was at 01:33 UTC off Brazil's northeastern coast which indicated that the flight was progressing normally at FL 350 (35,000 ft altitude). The aircraft went out of Brazil Atlantic radar surveillance at 01:48, having crossed the equator into northern hemisphere. This was also the time when the aircraft was entering the Intertropical Convergence Zone. That things started to go wrong in rapid succession soon after was evident from the messages automatically generated by the onboard Aircraft Communication Addressing and Reporting (ACARS) maintenance system. The transcripts indicate that between 02:10 and 02:14, as many as five failure reports and 19 warnings were transmitted. The warnings included disengagement of autopilot and auto-thrust systems. The last transmission at 02:14 indicated an ominous "cabin vertical speed warning", indicating that the aircraft was being subjected to massive variations in vertical speed.

While the search for the 'Black Boxes' (Flight Data and Cockpit Voice Recorders), presumed to be lying as deep as 5 km below the ocean surface, is still on, what is baffling investigating agencies is the total lack of voice reporting by the crew in the last minutes of the flight even when the aircraft was experiencing a string of failures. Is it possible the catastrophic occurrence which caused the flight to disappear happened so suddenly that the pilots had no chance to react?

A detailed meteorological analysis of the area surrounding the flight path showed a string of mesoscale convective systems extending upward to an altitude of 51,000 ft through which the flight most likely flew for as long as 15 minutes before disaster struck. It is quite possible that the aircraft's pitot heads might have partially clogged due to the presence of rime ice at that altitude corroborated by the fact that the first message transmitted by the ACARS pertained to faulty airspeed sensors. But, notwithstanding the outcry against the less-than-adequate existing pitot heads and the need to replace these with new systems with better heating, it is hardly likely that the faulty speed indications would alone lead to such an accident.

No matter to what depths of the Atlantic the aircraft's 'Black Boxes' may be lying, the high-tech sensors-retrievers combination would ensure their eventual recovery. Satellite imagery loops from the Cooperative Institute for Meteorological Satellite Studies clearly indicate that the flight was trying to cope with a series of severe thunderstorms, with speeds of up/down drafts likely exceeding 100 mph. Two groups of aircraft debris and bodies found in the Atlantic at a distance of 35 miles to 40 miles from each other initially raised the horrific possibility of the aircraft being violently wrenched apart in flight. More recently, investigators claimed the aircraft was largely intact when it hit the water on its belly at high speed and broke up on impact. Evidently, the jury is still out on what caused arguably the worst accident in French aviation history. SP

— Air Marshal (Retd) V.K. Bhatia

ILLUSTRATION: MAMTA

AIR INDIA

Once Upon A TIME

Yesteryear's epitome of the nation's pride today lies in tatters. Air India's Maharaja suffers a plight uncannily similar to the erstwhile heads of princely states deprived of their privy purses. The situation is so desperate that apart from the inability to clear dues running into thousands of crores for services obtained, the airline is not in a position to arrange for Rs 350 crore to disburse salaries to its over 30,000 work force. The management has been pleading before the government for a Rs 15,000-crore ($3 billion) bailout package just to survive. The package requested consists of equity infusion of Rs 5,000 crore and the balance as long term loan at subsidised interest rates. The government is unlikely to oblige and the most optimistic figure could be limited to around a-third of the total package requested by Air India—that, too, tagged with stringent conditions.

Air India's fast souring fairy tale has a shocked nation glued to the unceasing flurry of damning revelations that threaten to rip apart the airline's reputation

Courting crisis with decades of neglect and apathy, the public sector undertaking has perennially been afflicted with the ills characteristic of government enterprises. In stark contrast to a profitable commercial enterprise, Air India functions as a department of the central government, adhering to a flawed business model and shoddy management policies of bureaucrats sorely lacking professional insight and experience. Overstaffed, the organisation suffers from low productivity levels, indifferent work culture, lack of accountability, rampant indiscipline and crippling corruption levels. The aircraft are poorly maintained and the cabin staff is not known for in-flight courtesies or service. 'On-time performance' is almost entirely missing from the Air India lexicon. Not surprisingly then, on the international scene, the airline ranks miserably low.

Strongly influenced by leftist philosophy and corrupted by vote bank politics, the labour environment has often held the management to ransom. Employees bask in the cozy comfort of government protection with assured hefty salaries and lavish perks minus any performance-based criterion, thereby cushioned against the pressures that hone their counterparts in private airlines. Sandwiched between the powerful labour unions on the one hand and politico-bureaucratic interference on the other, the management has adopted a *laissez faire* approach. Prickly decisions like trimming manpower and cost, or wielding the rod to boost efficiency, have been conveniently bypassed. Those in the higher echelons of management, who toe the line, prosper; the ones who do not, are sidelined or under constant threat of unceremonious removal. The airline has been a victim of exploitation by anyone and everyone with the remotest link to the corridors of power or is in a position to exercise influence on the management who are often only too willing to oblige.

Recognising the need for consolidation, the government took the rather bold step to merge Air India and Indian under the banner of the former. Two years on, the merger remains mired in conflict and litigation. Bereft of any coherent long term plan or focus, for decades the airline has been governed by the Centre through ad hoc decisions and allowed to drift aimlessly, sinking deeper into financial morass.

Reeling under the devastating impact of global economic downturn, private airlines in India have been making vigorous effort to remain viable and rein in mounting losses through restructuring and retrenchment. But inexplicably, Air India continues to expand capacity, seemingly immune to its severe loss of credibility. So grave is the situation that the airline has been unable to obtain funds from private financial institutions. The government has agreed to come to its rescue, but in return has called for a restructuring plan within 30 days. Seemingly irretrievable, the current situation cannot be tackled with cosmetic changes. Bailout by the government would only push the employees back into the comfort zone.

Arvind Jadhav, who recently took over as the Chairman, is reported to have embarked on the unenviable task to "set things right". Considering that the option of privatisation does not, for now, seem to appeal to the government, Jadhav may well be up against a wall. SP

—Air Marshal (Retd) B.K. Pandey

ILLUSTRATION: RATAN SONAL

MAHARAJA in a MESS

Over a decade of mismanagement and misadventure has taken a frightful toll on the public sector behemoth

First, the fairy tale. An Emperor is conned by swindlers into believing they have a cloth which keeps the wearer incredibly warm, but is invisible to fools. The Emperor cannot see the (non-existent) cloth, but pretends he can for fear of appearing stupid. His ministers play along. He then goes on a procession through the capital, freezing in his new "clothes"—until a small child calls the bluff: "But he has nothing on!"

It has now come to light, the Maharaja, too, has on very little. In a sad reflection of Hans Christian Andersen's oft-cited tale of trickery and foolhardiness, Air India's (AI) crumbling edifice, pockmarked by disastrous dalliances with the untenable and the illogical, have at last been exposed. Jolted by the disfigurement and distress of what was once the sole trump card of the nation's aviation industry, the government has rushed to the rescue. But not so fast. Balm in hand, this time around the administration is determined to wield the baton. So, even though Arvind Jadhav, the recently appointed Chairman and Managing Director (CMD), has sought a bailout package of Rs 15,000 crore, he may end up with only Rs 10,000 crore.

Together with a financial dole out, the government is cracking the whip to goad the airline into a more brisk, business-like pace. Latest in the slew of such measures is the probability of Ratan Tata heading an international advisory board proposed by Civil Aviation Minister Praful Patel. Comprising some of the industry's prominent figureheads from across the globe, the board will be tasked to engineer AI's turnaround. "I am working on a complete rejig," Patel told reporters. "It cannot be open ended. The government is committed... We want a strong national carrier." The irony is hard to miss. That 77 years after it was founded in 1932, it should now fall on Ratan Tata's shoulders to revive the brainchild of J.R.D. Tata. Be that as it may, the Centre is also reportedly keen to partially disinvest its stake in the carrier and reshuffle the airline's top management to make way for a new "chief operating officer, who could be an expat, to assist the CMD", besides setting a 24-month deadline to clean up the financial mess.

So acute is the cash crunch that for the first time in the history of Indian public sector undertakings, AI's parent company, the National Aviation Company of India Limited (NACIL), had had to defer payment of salaries. Unabashed, Jadhav told employees who went on a two-hour protest strike that they should be prepared for harsh decisions. "Considering the critical financial state of the airline, we should all be prepared to face the impact of harsh decisions that will be required to be taken in the coming weeks," he said.

Apparently, Prime Minister Manmohan Singh is not entirely averse to a bailout package—but he has unremittingly spelt out the conditions: slim down and buck up. Evidently, that's easier said than done. Here's why. Addressing the Lok Sabha, the Civil Aviation Minister recently affirmed: "The airline has been facing a financial crunch for the past few years. The borrowings of Air India have risen steeply from Rs 6,550 crore in November 2007 to Rs 15,241 crore in June this year." The grapevine has it that AI could at present be losing as much as Rs 15 crore ($3 million) a day—without the slightest indication of the slide downhill losing momentum. Unbelievable, but if true, the airline is staring down an abyss.

A major threat that could send it toppling over is the airline's mammoth staff strength—an astounding 31,000. And that's only the salaried employees. Add the manpower

ILLUSTRATION: RATAN SONAL

of outfits to which the airline outsources a significant chunk of its operations, and the figure can touch a mind-boggling 50,000 and counting. Not surprisingly, the national carrier also flaunts an employee-aircraft ratio that's well over 200, against the international norm of less than 80. Further, the workforce coagulates to form powerful labour unions, such as the Air Corporation Employees' Union, Aviation Industry Employees' Guild and Indian Aviation Technicians Association. The lethal concoction of multitudinous heads and formidable muscle power serves to encourage a poor work culture, callous indifference and utter inefficiency.

Astonishingly, the same workforce enjoys pay, perks and emoluments that can put a capitalist organisation to shame. Translated into simpler terms, AI's reported monthly wage bill of Rs 350 crore, or Rs 4,200 crore annually, puts the average salary of its employees at over Rs 10 lakh per annum; that too, when 71 per cent of the workforce make no direct contribution to aircraft operation or maintenance. Worse, succumbing to a myopic decision, the cash-starved airline ordered 111 new aircraft at a whopping cost of nearly Rs 50,000 crore. Admittedly, at the time of placing the order NACIL might not have anticipated the global economic crunch, but what is baffling is that even now the airline apparently has no immediate plans to reschedule acquisitions. In contrast, private airlines have wasted no time in shelving expansion plans in favour of planned capacity reduction, and have even postponed taking delivery of new aircraft.

Of the 111 new aircraft on order, a large number (nearly half) have already arrived, with deliveries scheduled to be completed by 2014. The only exception, and mercifully so, is the delayed Dreamliner 787 by Boeing. "It was not at all sensible to place an order for so many aircraft. There is no budgetary provision for this and the money will have to be raised through international loans," observed Sanat Kaul, a former member of the AI board. "A new fleet cannot automatically resuscitate the national carrier and there are no hopes of return on this investment." Continued delivery of new aircraft not only aggravates the problems of over capacity, but also magnifies debt servicing. Already AI has spent more than Rs 20,000 crore on new acquisitions and another Rs 25,000 crore to Rs 30,000 crore will be spent in the coming three to four years. The resulting annual capital repayment and interest alone may exceed the airline's annual turnover—financially, a most untenable situation.

"I AM WORKING ON A COMPLETE REJIG... THE PRIME MINISTER HAS SAID THE ENTIRE WEIGHT OF THE GOVERNMENT IS BEHIND AIR INDIA. IT IS A NATIONALCARRIER ANDIT IS OUR PRIDE. BUT THERE IS A CONDITION:AI MUST PUT ITS BEST FOOT FORWARD.
—PRAFUL PATEL, CIVIL AVIATION MINISTER

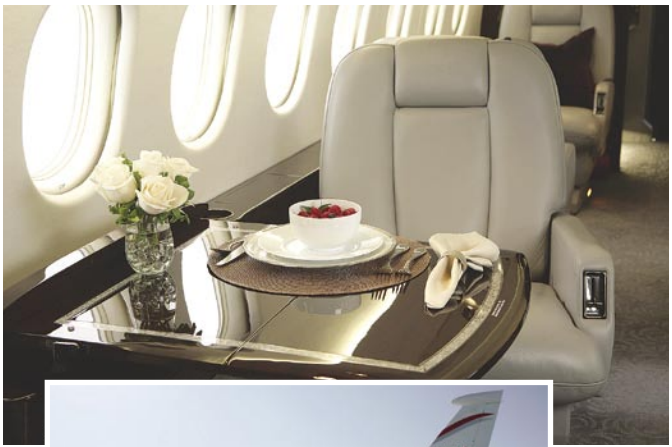
"CONSIDERING THE CRITICAL FINANCIAL STATE OF THE AIRLINE, WE SHOULD ALL BE PREPARED TO FACE THE IMPACT OF HARSH DECISIONS THAT WILL BE REQUIRED TO BE TAKEN IN THE COMING WEEKS.
—ARVIND JADHAV, CHAIRMAN AND MANAGING DIRECTOR, AIR INDIA

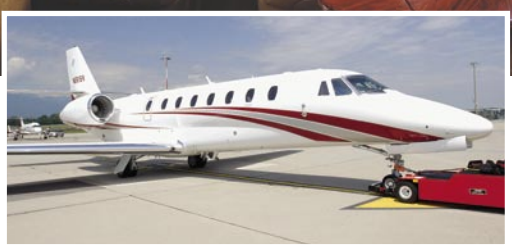
One prescription that went horribly wrong was the ill-conceived and shoddily executed merger of the erstwhile domestic/regional carrier, Indian Airlines, and the international carrier, Air India under the NACIL umbrella. The move was to have generated a net benefit of Rs 600 crore, apart from creating a world class airline, serving both domestic and international routes with one code. The optimism has proved to be misplaced and rather premature. Grappling with innumerable hurdles, while the two airlines had earlier individually posted modest profits, post-merger, the losses have sky-rocketed. In an interview to a leading national daily, KPMG's aviation analyst Mark Martin had pointed out, "Integrating the top management first, and lower management and operations later in a sequenced manner was bound to fail. The top-down approach was a disaster. Actually, the integration should have begun at the grassroots level."

Unarguably, over a decade of mismanagement, misappropriation and misadventure has taken a frightful toll on the public sector behemoth. Liberal bilateral agreements with foreign carriers, disastrous aircraft leasing policy, undue largesse for people in power and position, termination of flights on profitable routes to inexplicably help private competitors even while continuing flights on non-profitable routes, are but a few factors that scripted its downfall. So much so, industry experts insist a permanent solution lies in complete privatisation alone. "AI has sunk deeper and deeper into crisis," says Kapil Kaul, chief of Centre for Asia Pacific Aviation (CAPA) India. "If it (privatisation) is delayed, there may be no value left even if you want to privatise."

For now, however, the government is set on its course to haul up the airline from the current morass. "The Prime Minister has said that the entire weight of the government is behind Air India," the Civil Aviation Minister recently assured. "It is a national carrier and it is our pride. But there is a condition: Air India must put its best foot forward." Here's hoping the Maharaja will regain his grandeur—for all to see. SP

—By Air Marshal (Retd) V.K. Bhatia, with inputs from Arundhati Das and Sangeeta Saxena





MUCH COVETED: BUSINESS JETS HAVE SUDDENLY DEVELOPED AN IMAGE PROBLEM. EVERYBODY NEVERTHELESS WANTS THE CONVENIENCE, COMFORT, SPEED AND EFFICIENCY ONLY THEY CAN DELIVER.

No Plane No Gain

While the US battles negative public perception, now would be the most judicious time to buy a business jet. SP's **European correspondent Alan Peaford** enumerates why.

PHOTOGRAPHS: SP GUIDE PUBNS/ RESPECTIVE OEMS/ A PEAFORD

Plummeting sales of private jets has virtually paralysed the world of business aviation, in particular its largest market, the US. The industry took a hammering last November when leaders of America's automakers at a Senate hearing admitted they had flown in company business jets to appeal for a government bailout. No matter that their journey from Detroit could not have been made commercially in the same timeframe, nor could the executives have conducted highly confidential meetings or planned presentations if crammed into the economy section of an airliner. The perception of 'corporate fat cats' abusing their privileges has stuck in the minds of the American people, effectively bringing the growth of private jet ownership to a grinding halt.

Forever envied, business jets have suddenly developed an image problem. Everybody nevertheless wants the convenience, comfort, speed and efficiency only they can deliver. Unarguably, desire for what a business jet can bring to the working and personal life of corporate and government leadership has been the driving force behind the industry. It has fuelled record growth in sales over the past many years and pushed the boundaries of what was for long a predominantly American activity to encompass the rest of the world.

Aspiring to a business jet is a good thing. But the actions

of a few mavericks in the heartland of corporate America have converted it into a much derided object of excess. This new attitude in Washington and the American media has frightened soundly managed, profitable companies who use their airplanes to extend and grow their business, but are now worried they will be put in the same category as those abusing their company assets and shareholder wealth. Business jet flying hours are way down and profitable companies are worrying about new airplanes they have on order. Even in Asia and the Middle East, the effect has been a slowdown. The global economies are down, but the impact on business aviation is much greater than the figures warrant.

SUPPORT SHOULD BE EXTENDED TO THOSE BUSINESSES WITH THE GOOD JUDGEMENT AND COURAGE TO USE BUSINESS AVIATION TO... FORGE A PATH TOWARD AN ECONOMIC UPTURN.
—JACK PELTON, CHAIRMAN, PRESIDENT AND CEO, CESSNA

THE ONLY LIMITING FACTOR IS YOUR IMAGINATION... CHARTER COMPANIES ARE FINDING MARKETS FOR FAST CONVERSIONS FROM EXECUTIVE TRANSPORTATION TO... SMALL CORPORATE SHUTTLES.
—MIKE CREED, VP–SALES, PROJECT PHOENIX

'TIME THE OTHER SIDE OF THE STORY IS TOLD'

To combat the misperception of business jets as wasteful, the industry, led by America's General Aviation Manufacturers Association and the National Business Aviation Association, has launched a programme titled 'No Plane No Gain'. Initially aimed at US politicians, American media and other opinion leaders, the educational drive has spread around the globe.

Examples being cited in the US, with probably the most sophisticated aviation network in the world, apply around the globe. For instance, most Americans weren't aware that scheduled airlines serve only about 500 airports across the whole of continental US—and that number is shrinking everyday as airlines contract their routes to cut costs and maximise efficiency. Worse, more than two-thirds of all flights operate to fewer than 30 airports. In other words, thousands of cities have no air service at all, except for general aviation.

Across the emerging economies of India, China and Africa there are far fewer airports and far fewer airlines servicing direct city-to-city routes. "Of course, it is easy if your business takes you from Mumbai to Delhi. But what if you need to visit three or four regional manufacturing centres in different cities? If you use a business jet, you can do it in one or two days. With scheduled airlines, you need to plan for a week away," says Dubai-based business consultant Ketan Shah. When a city doesn't have a scheduled air service, its businesses lose access to markets and suppliers. Community growth slows because it's just that much harder to reach a town without air service.

"We think it's time the other side of the story be told, and that support be given to those businesses with the good judgement and courage to use business aviation to not just help their businesses survive the current financial crisis, but more quickly forge a path toward an economic upturn," said Cessna Chairman, President and CEO Jack Pelton. "Today, we are demanding business leaders and managers work at their absolute peak to turn their companies, and our economy, around," Pelton said. "Business aviation provides the means to do just that. A business aircraft is a tool of industry, and one that should see its highest and best use during times of fiscal crisis. Anyone who has ever seen managers board a business aircraft at dawn and return well after dark, having visited multiple cities and attended countless meetings in one day, can attest to the fact that business aviation allows companies to get the most out of every minute of every day—exactly what is needed to work our way toward economic recovery."

Pelton pointed out that the reality of business aviation is that some 85 per cent of aircraft used by businesses are used by small or medium-sized companies, and that the large majority of the passengers are middle managers and technicians. The aircraft, for the most part, are single and twin-engine propeller and turboprop aircraft or small or medium-sized jets. "The reality of business aviation is a far cry from the misconception of CEOs flying in large luxurious airplanes," Pelton said. "Most of these aircraft are fairly spartan, designed for business, with a cabin about the size of a minivan or SUV interior."

Hawker Beechcraft has been making the point to its government that general aviation contributes more than $150 billion (Rs 7,19,300 crore) annually to the US economy and is one of the few remaining American industries that maintains a positive balance of trade with nearly 40 per cent of the country's total 2007 production of $12 billion (Rs 57,545 crore) worth of aircraft exported.

'NOW, GET AN AIRCRAFT QUICKER'

'No Plane No Gain' is also calling attention to the humanitarian and medevac missions that only general or business aviation can provide. Where would organ transplant be without a general aviation airplane to move the recovered organ within the very short time necessary for a chance of life-saving success? Abu Dhabi's Royal Jet now has Boeing Business Jets and large Gulfstreams available as flying hospitals. "This is the great thing about a business aircraft," said Mike Creed, the Vice President Sales of Project Phoenix, the converted Canadair regional jet specialist operating out of Dubai. "The only limiting factor

is your imagination. A business jet is ideal for entrepreneurs because they can use their aircraft as tools. Charter companies are finding markets for fast conversions from executive transportation to being able to transport their urgent packages, or small corporate shuttles to move employees to remote locations."

Even as the US hurts, opportunities to buy are mushrooming. Ray Jones, head of International Sales for Bombardier Aerospace, says there is more interest coming from India, China and the other emerging economies. "Of course, there have been cancellations and so there are aircraft on the production line that can be moved forward. This means people can get aircraft quicker. There are also deals to be done," he says. Pete Bunce, President of the General Aviation Manufacturers Association, says business jet operators can fight back against the negative perception of business aviation, citing JP Morgan as an example. The troubled financial services giant defended its order for two Gulfstream G650s by steadfastly arguing that the jets would help it compete globally and promising not to take delivery until it had repaid federal bailout funds. The media initially latched onto the story but backed off when JP Morgan took a stand. "They did it right," Bunce said. What this recession has done is halt the investment in research and development and, in turn, the introduction of new models to the market. First, Cessna put its super midsize Columbus on hold. This was followed weeks later by Dassault deciding its Super Midsize would also go back to the drawing board.

While sales have faltered in the US, Asia and the Middle East are continuing to buck the trend, proving this is the time to buy. Aircraft, like the super large Project Phoenix, are dropping in price from $20 million (Rs 96 crore) to $18 million (Rs 86 crore)—the value stays the same when it adds

FLY IN, FLY OUT: PRIVATE JETS ALLOW MANAGERS TO ATTEND, SAY, THREE MEETINGS IN THREE CITIES IN ONE DAY

productivity to an organisation's management.

'EXECUTIVE JETS DO SAVE ON TIME, MONEY'

Patrick Gordon is an advisor to the royal family in Abu Dhabi and says, "Productivity is a critically important factor in determining the success of virtually all profit generating organisations. It's also important in determining the true value of individual personnel and/or employees, at all levels, within any organisation. Basic math shows that an employee who spends half-an-hour getting to his site on a helicopter is much more valuable than the comparable employee who spends half-a-day of non-productive time on a boat or in a bus getting to the same site. Put 11 to 12 other employees on that same helicopter and the time/cost savings has even greater significance.

"So, how about executive jets? Does the same concept of employee time savings still apply? In fact, it does, and with a little bit of math it becomes more apparent that executive jets do save on time and money." Time does equal money and an executive jet is, in reality, a time saving machine.

Jet manufacturers remain quietly optimistic the boom will return. While media focus is on the Fortune 500 companies, it is actually the owners of SMEs that make the greatest use of the 45,000 private aircraft used by businesses, their managers and owners around the world. Private jets let managers keep working with secure phones and computers and allow them to attend, say, three meetings in three cities in one day.

With fewer airports available for commercial traffic than 10 years ago, with lengthening security queues and delays at crowded airfields the development of new mid-size jets with cabins for up to 10 passengers, and super light jets for six, it should not be long before the demand for new aircraft once again exceeds supply. SP

Promises to Keep

SURVIVING THE ODDS: THE ALL-BUSINESS-CLASS MODEL HAS SPELT SUCCESS FOR PARAMOUNT AIRWAYS; THE BOMBARDIER CRJ (RIGHT) SERIES IS A FRONTRUNNER AMONG REGIONAL JETS

Will regional airlines ever thrive in India? Yes, provided airport infrastructure is improved and a unique business model introduced. Group Captain (Retd) Joseph Noronha studies the strengths and shortfalls of the current scenario.

August will mark two years since a new regional airline policy was introduced in India. Against the current woeful backdrop, it is incredible that between 2004 and 2007, the market grew at a scorching pace—a staggering 120 per cent. The launch of low-fare carriers had significantly expanded the domestic market and transformed the industry almost beyond recognition. However, most of the traffic was concentrated between the metros and emerging mini-metros, such as Ahmedabad and Pune, leaving tier-2 and tier-3 cities to fight over the crumbs. Several players saw an untapped market in smaller cities and applied for short-distance operations, prompting the Civil Aviation Ministry to encourage new regional airlines, to fill the gaps and bring in much-needed competition. The stage was set for a deluge of applications for grant of permits.

Two years on, the ground situation has turned grim. Of the several companies that had procured regional airline licences, only two—MDLR Airlines and Jagson Airlines—actually commenced operations. Jagson Airlines has since converted from a scheduled regional airline to a non-scheduled operator, leaving MDLR as the sole player. Why did a prospect that seemed so promising practically fizzle out in such a short period?

POLICY PLANNING

According to Directorate General of Civil Aviation guidelines, a regional airline is a scheduled airline that operates primarily in a designated region. The country has been divided into four regions for the purpose. The guidelines specify one metro airport in each region except for the south where Bangalore, Chennai and Hyderabad are co-designated. A regional airline can begin with just one aircraft, but should operate with three aircraft within one year and five aircraft by the end of two years.

The policy stipulates that for aircraft of a take-off weight of up to 40,000 kg, the paid-up capital needs to be just Rs 12 crore for three aircraft. Two additional planes would require total capital of Rs 20 crore. Earlier, aiming to encourage smaller aircraft such as the Bombardier CRJ series, Embraers and ATRs, landing and parking charges were waived for airliners that carry up to 80 passengers. Similarly, aircraft of weight up to 40,000 kg are supplied aviation turbine fuel (ATF) at sales tax of just 4 per cent throughout the country. The regional airline policy, however, does not bar a carrier from using larger aircraft; airlines with a good track record may even apply for national status later.

In December 2007, Star Aviation was among the first to be granted a permit as a regional airline (south) and operations were expected to commence in April 2008. However, the launch date was steadily postponed, mainly because of delay in purchasing aircraft. The latest projection is July this year, but the company has obtained an extension of

PHOTOGRAPHS: WWW.JETPHOTOS.NET AND WWW.BOMBARDIER.COM

its licence until end-December. ZAV Airways was granted a licence in February 2008 as a regional airline (east) and planned to operate from April 2008. However, its licence is due to lapse in August this year without any tangible signs of operations commencing. King Air seems somewhat better placed—since its licence as a regional carrier (north) was granted in January this year, it has till July 2010 to begin, by which time the current slowdown should be well and truly over. Many other carriers either shelved plans or deferred commencement as fuel prices peaked last year and the plight of existing airlines imposed caution on the prospective aspirants to regional aviation.

MDLR is the only regional airline that appears to have attained critical mass. Based in Gurgaon, it now flies between Delhi and perhaps a dozen tier-2 and tier-3 cities, including Chandigarh, Goa, Ranchi and Lucknow. The low-fare airline plans to add another 12 destinations in northern India to its network this year. There are reports that MDLR Airlines could align with a low-cost carrier on specific routes in north India for the purpose of route rationalisation or interline arrangement. Interlining is the facility for passengers to fly different legs of a journey, on two or more airlines, on a single ticket.

Paramount Airways is sometimes mistaken for a regional airline. But even without the benefits granted to regional airlines it enjoys considerable success thanks to its Embraer 170 aircraft and unique all-business-class model. It probably finds it easier to achieve profitable load factors on the Embraer than it might have with the A320 or B737.

UNLEASHING REGIONAL POTENTIAL

After decades of neglect, many of India's airports are suddenly being forced to operate well above design capacity. Potential carriers intending to launch flights to smaller cities find the facilities primitive to say the least. Some airports do not even have a proper runway that can safely take aircraft of 40,000 kg. Several smaller airports are Indian Air Force (IAF) stations additionally designated to accommodate civil flights. These come with their own riders, like flight timing restrictions, priority to IAF flights and so on.

Metros themselves are sometimes reluctant to permit extra flights from regional carriers. This leaves regional airlines with little option but to operate between the smaller cities, where demand may be limited and even small aircraft forced to operate with low load factors. Airport infrastructure limitations also increase costs because carriers are unable to schedule quick turnarounds, resulting in reduced aircraft utilisation. The ongoing programme to upgrade 35 non-metro airports, when completed in three to four years, should remove a major irritant to regional airline operations.

Another current area of weakness is the limited investment that has taken place in infrastructure for air traffic management. This too results in expensive aircraft holding patterns, indirect flight paths and sub-optimal use of runways. It is no coincidence that in May MDLR Airlines was at the bottom of the punctuality list with a 49.3 per cent on-time record. Then there are competitive pressures. Regional airlines are at inherent disadvantage vis-à-vis national carriers. National airlines have first-mover advantage. They enjoy all the concessions that regional airlines do if they fly smaller aircraft, plus the additional benefit of flying anywhere in the country. Many national carriers already have strong regional operations. Air India has 20 regional aircraft in its 154-aircraft fleet, while Jet Airways has 21 in its 111-aircraft fleet. Nearly half of Kingfisher's domestic fleet of 71 aircraft consists of ATRs. Most passengers given the choice between a national airline and a regional carrier flying the same route would probably choose the former.

ADOPT & ADAPT

The US model is often cited as one that Indian regional airlines could emulate. However, the American national and regional airlines function in cooperation on different routes, complementing each other, rather than in competition on the same routes. The best way to make the Indian system work would be to remove the overlap between routes assigned to national and regional carriers. Experts feel that the US hub-and-spoke model may not work in India unless route dispersal guidelines, that require national airlines to fly at least 10 per cent of capacity deployed on peak routes to non-peak routes, are scrapped.

> Experts feel the US hub-and-spoke model may not work in India unless route dispersal guidelines are scrapped

Airline route dispersal has scarcely improved connectivity. Instead, it pitches national airlines in direct competition with regional airlines, and has been at least partly responsible for uneconomical operation. Many passengers also prefer direct flights to save on time and money. Experts also believe that the capital requirements laid down in the regional airline policy are too low. Only airlines that can invest Rs 150 crore to Rs 200 crore can possibly hope to survive the bruising battles for the Indian skies. Also the principle of economy of scale will work only if an airline has at least 15 aircraft. This was a lesson that emerged from the sad experience of the 1990s when numerous small airlines were launched, then sank without a trace.

Lastly, airlines across the globe are going low-cost. Six years after trashing the low-cost model, even Jet and Kingfisher are betting on it for survival. Regional airlines can only hope to succeed by adopting a low-cost operating philosophy. The concept of small, regional airlines efficiently ferrying passengers at low-cost is workable provided airport infrastructure is improved and the regional airline policy is tweaked to avoid unnecessary route overlap. For those brave enough to set up new regional airlines, a unique business model is important—to differentiate themselves from other carriers. Retaining focus helps, as does a culture of making difficult decisions without delay. SP

COVER STORY

EASTING ASTING

Muted cheer mingled with mulish misgivings as the classic Le Bourget event this year celebrated its 100th birthday under the shadow of the global economic downturn. ALAN PEAFORD reports from the French capital.

PHOTOGRAPHS: OEMS, SP GUIDE PUBNS & ALAN PEAFORD

JUNE 15 TO 21, THE AUDACITY OF HOPE TOOK CENTRE STAGE AT THE PARIS AIR SHOW with industry players and pundits celebrating the event's centenary year at the Le Bourget Exhibition Centre. French Prime Minister Francois Fillon, accompanied by Defence Minister Herve Morin, officially launched the exhibition, held this year under a cloud of dismal financial prospects, shadows of the Air France crash and pelting rain. There was no denying the sombre mood and niggling sense of gloom, but organisers of the biggest aerospace event in the global calendar appeared unfazed, deftly parrying queries about the conspicuous absence of some big names, lacklustre orders and fears of a low turnout. A week later, when the curtains came down after the spectacular celebrations culminated in dramatic historical fly-pasts, the sigh of relief was palpable.

THE GIANT AMONG MEN: BELYING THE DIFFICULT TIMES, THE 100TH EDITION OF PARIS AIR SHOW THROBBED WITH EXCITEMENT. SEEN HERE IS THE C-17 LOOMING OVER THE CROWD AT LE BOURGET.

'WE'RE BOUNCING OFF THE BOTTOM'

Among the major players, Airbus and Boeing may have endured their worst ever Paris Air Show for a generation so far as sales were concerned, but both were unanimous in their belief that the light at the end of the tunnel was in sight. "It feels like we're bouncing off the bottom," said Scott Carson, Boeing's Chief Executive Officer (CEO), Commercial Airplanes. "It feels to us like the middle of next year is when we will see growth return to the industry." Airbus CEO Tom Enders agreed. "We think orders will pick up again next year." Both airframers have effectively written off 2009 with Carson saying the industry faces "a different year" to the boom times during each of the 12 months that preceded it, while Enders points out it is "obvious" that orders will come down dramatically from the 900 it booked in 2008.

At the beginning of 2009, Airbus executives jokingly gazed into a crystal ball to forecast around 300 orders for the year. However, with just 32 firm orders secured to the end of May, it concedes it has much ground to make up and Chief Operating Officer, Customers John Leahy appears to now be regretting that prediction. "I'm getting new glasses," he concedes.

However it was Airbus who took the lion's share of the airliner orders at a show which, although a pale reflection of the sales fest of two years ago, nevertheless saw some significant deals. The industry's final tally of just over 200 airliners, worth $13.5 billion (Rs 64,695 crore) at list prices, was a figure many sceptics would have seen as wildly unrealistic given the state of the market at the start of 2009. Airbus sold 110 aircraft worth around $10 billion (Rs 47,868 crore)—a far cry from the 425 orders worth $62 billion (Rs 2,97,230 crore), plus another 303 commitments, it had racked up two years ago.

Undaunted, the duo stressed on their big backlogs, and the fact that demand for new deliveries has so far remained strong. Enders pointed out that Airbus's order backlog of 3,500 aircraft gives it seven years of production at an annual rate of 500 deliveries. "This is why we are fairly relaxed about the order

STOP Press

As the Paris Air Show marked the dawn of its second century, Germany's Schiebel performed the aerial display's first-ever flight by an unmanned aircraft. The commercially branded Camcopter helicopter, which is designated the S-100 for military roles, ushered in a new era for the blossoming cadre of unmanned air systems populating—and previously confined—to the show's static display and exhibit halls. The Camcopter has been operating in a number of countries, including initial customer UAE, since 2005.

intake this year." Boeing's backlog is at a similar level, which Carson values at $265 billion (Rs 12,70,595 crore). "The value of the backlog built over the last three to four years is going to be realised this year in delivery of that backlog, not the generation of it," he said.

The determination displayed by both Boeing and Airbus to keep production rates constant was a talking point among the 2,000 exhibiting companies. Last year, Airbus delivered a record 483 aircraft and, though it has arrested its ramp-up, is on course to deliver a similar number this year. "The whole supply chain depends on us," says Enders. "When we talk about high production rates we should not forget that the best support we can give our suppliers is to have a relatively high, stable, delivery stream."

DREAMLINER DELAYS

Boeing was tight-lipped about progress on the 787—not surprising, given the programme delay announced just a few days after the show ended. That all was not well spilled out in the open with Qatar Airways CEO Akbar Al Baker stirring up a storm at Le Bourget when he blasted Boeing executives during a briefing over his airline's order of 24 Airbus A320s, including the conversion of four existing options. The company, he said, was taking too long to resolve unspecific "issues". and warned the airline would "walk away" from its 60-strong 787 contract if the problems are not quickly ironed out. "We have some serious issues with Boeing and if they do not play ball with us they will be in for a very, very serious surprise," Al Baker said, without specifying about the nature of the issues. The airline's 30 firm 787-8 orders (plus 30 options) were originally due for delivery from mid-2010. However, the production crisis has pushed back all customers' deliveries by at least two years, which would indicate that Qatar's first aircraft is not due to arrive until around 2013.

Qatar Airways also hit the headlines with the launch of an on-demand charter division, Qatar Executive, which will operate two Bombardier Challenger 605s and a single 300.

ORDERS WILL PICK UP AGAIN NEXT YEAR... BUT IT IS OBVIOUS ORDERS WILL COME DOWN DRAMATICALLY FROM THE 900 BOOKED IN 2008.
—TOM ENDERS, CHIEF EXECUTIVE OFFICER, AIRBUS

STAR ATTRACTIONS: IRRESPECTIVE OF MARKET SCENARIO, A380 STOLE THE LIMELIGHT; (LEFT) ENGINE THAT POWERS THE A380

PHOTOGRAPHS: DASSAULT AVIATION - S. RANDE

IT FEELS TO US LIKE THE MIDDLE OF NEXT YEAR IS WHEN WE WILL SEE **GROWTH RETURN TO THE INDUSTRY.**
—SCOTT CARSON, CHIEF EXECUTIVE OFFICER–COMMERCIAL AIRPLANES, BOEING

The service will be aimed at government officials, businessmen, bankers and politicians.

REGIONAL JETS

Key among the regional announcements was more than $1 billion (Rs 4,785 crore) of sales for Sukhoi's Superjet 100, including 30 to Hungarian carrier Malev. The Russian narrow-body made its European show debut and gave an impressive display each day of the event.

PowerJet's SaM146 turbofans roared past the crowds having clocked up more than 100 hours in flight, including time on the Ilyushin Il-76 and a total of 3,800 hours of operation. Eight engines are being used for testing which is due to lead to EASA certification in November and Russian approval soon afterwards.

THE ENGINE MAKERS

At the top of the supply chain are the engine makers and they were creating the most positive waves at the show. Air show attendees flocked to the General Electric exhibit for the official unveiling of the GEnx engine. The anticipation was widespread—and the response overwhelmingly enthusiastic—as GE took the wraps off a massive, gleaming model of the GEnx engines that will power Boeing 787 and 747-8. The global impact of the new engine became apparent with a deal announced at the show that will see Abu Dhabi Aircraft Technologies (ADAT) become the world's first maintenance, repair and overhaul (MRO) provider for the new engines.

The move is part of a plan by ADAT parent and state-owned investment house Mubadala to establish Abu Dhabi as a global MRO hub. This in turn fits into a wider strategy to attract high-tech investment and build a domestic aerospace sector in the United Arab Emirates (UAE). On the eve of the show, Mubadala subsidiary Abu Dhabi Airports announced plans to establish an aerospace cluster at the airport in Abu Dhabi's second city Al Ain, anchored by a factory designing and manufacturing composite components for Airbus and other manufacturers. Several European companies have signed up to open premises at the site. But the relationship and involvement with GE propelled the industry move to a different level. Mubadala signed a strategic partnership with the US engine-maker last year, which included co-operation on commercial finance, training and clean energy research and development.

Mubadala Aerospace head Homaid Al Shemmari says the relationship could develop into the Abu Dhabi company building original equipment (OE) components for GE Aviation. "We are interested in the energy and technology industries. We are hoping we can solidify and deliver on this partnership to open further OE opportunities," he says. Al Shemmari says all Mubadala's global investments are linked to bringing technology back to the Emirates, where it wants to diversify the economy from its reliance on oil and provide engineering and managerial careers for its school-leavers and graduates.

MILITARY: SPOTLIGHT ON INDIA

LIGHT UTILITY HELICOPTERS

Eurocopter said it would provide the AS550 C3 Fennec military helicopter for the trials in India's light utility helicopter (LUH) competition, instead of the AS350 civilian helicopter tested in an earlier tender that was subsequently scrapped. The company had an AS550 with its weapons on display at

PHOTOGRAPH: DASSAULT AVIATION - S. RANDE

VISUAL TREAT: AN IN-FLIGHT DEMONSTRATION OF ALENIA AERONAUTICA'S C-27J; (RIGHT) BOMBARDIER AIRCRAFT ON DISPLAY

NEWS SNIPPETS

Sukhoi, MiG form a team
For the first time, Russian jet manufacturers Sukhoi and MiG took part in the Paris Air Show as a team. "We are aimed at sustainable growth, and Sukhoi and MiG will market together as one unit called Military Aviation," Mikhail Pogosyan, Director General of MiG, is reported to have said. "We're working on commonality and integration between Sukhoi and MiG. It is important to integrate both companies in order to be a success in the market."

Astrium communication link for Irish soldiers
Astrium Services has been selected by the Irish Department of Defence to deliver end-to-end welfare satellite communication services to its troops deployed overseas in Chad across three camps. It will provide Internet access for Irish soldiers to stay in touch with their families and friends around the world at any time. The Irish troops will also have access by telephone to a free English speaking customer support desk open 24x7.

Airbus wins commitments worth $12.9 bn
Airbus announced commitments for 127 aircraft valued at around $12.9 billion (Rs 61,960 crore). These commitments include firm orders for 58 aircraft worth almost $6.4 billion (Rs 30,740 crore), plus MoUs for a further 69 aircraft totalling $6.5 billion (Rs 31,220 crore).

AirAsia X orders the A350 XWB
AirAsia X, the long haul low cost affiliate of Malaysia's AirAsia Group, has placed a firm order with Airbus for 10 A350 XWB aircraft. The airline will use the aircraft to link its Asian hub in Kuala Lumpur with destinations worldwide, especially in Europe and Australia. AirAsia X has selected the A350-900 variant for its fleet, which will be configured to seat more than 400 passengers.

Eurocopter, NRC Canada join hands
Eurocopter and the National Research Council Canada (NRC) have signed a 10-year agreement to work together to develop innovative research, development and technology solutions for the aerospace industry.

CAE wins series of C-130 contracts
CAE announced it has been awarded a series of contracts from prime contractor Lockheed Martin and an undisclosed customer to design and manufacture four C-130 simulators and several training devices for military customers around the world.

Etihad selects Engine Alliance GP7200 engines
UAE's Etihad Airways has selected Engine Alliance GP7200 engines to power its 10 new firm Airbus A380 aircraft. The Abu Dhabi-based airline has also signed a multi-year long-term Fleet Management Agreement with the Engine Alliance for MRO of its firm GP7200 engine fleet. Total value of the deal is more than $1.3 billion (Rs 6,251.5 crore).

P&W bags Air China order
Air China has selected International Aero Engines (IAE) V2500 engines to power a new fleet of Airbus A320-family aircraft with deliveries starting in April 2010. The contract is valued at more than $233 million (Rs 1,120 crore) to Pratt & Whitney, including a long-term IAE aftermarket agreement.

Sarkozy keen on new European rocket launcher
French President Nicolas Sarkozy has called for a Europe-wide effort to design a new-generation rocket launcher to replace the Ariane-5. Sarkozy was visiting the Paris Air Show, where the most visible landmark was an Ariane mock-up soaring above the crowds. Sarkozy stressed "the necessity to prepare a new generation of launchers" ready to succeed the Ariane-5 in 2020-2025. He said he hoped for a decision by 2011. •

POWER PLAY: RAFALE B TAKES PART IN A DEMONSTRATION

PHOTOGRAPH: DASSAULT AVIATION - S. RANDE

Paris and Norbert Ducrot, Eurocopter's Senior Vice-President for Sales and Customer Relations in Asia Pacific, said the flight tests for India's LUH competition could be begin shortly. "This time, we have a military version of the Fennec that is ready to go on trial in India. We are waiting for the instructions and we expect the process to begin shortly. We do not know when a contract will be awarded but we are sure that we have the best product for India," he adds. Industry sources say the company is favoured to get the contract given that Bell chose not to offer its 407 this time.

India requires 197 military LUHs, of which, 133 are for the army and 64 for the air force. It hopes deliveries will begin by the end-2010 after a year-long evaluation, although this is expected to slip. The contract could be worth up to $750 million (Rs 3,590 crore), and the companies must reinvest 30 per cent in India under the country's offsets policy. State-owned Hindustan Aeronautics Limited (HAL) has been asked to develop and manufacture another 187 LUHs, and the company could either do this on its own or with the help of a foreign partner.

STOP Press

Rolls-Royce revealed during the show that it has installed and tested its Adour 821 engine in a Sepecat Jaguar strike aircraft in support of a potential upgrade for the IAF. "The installation went smoothly and required no airframe changes," was announced by the company, which ground-ran the propulsion system at up to full reheat using an ex-UK Royal Air Force example. "We believe we have proved that the Adour 821 meets all IAF performance requirements at the lowest risk," said Martin Fausset, Managing Director of Rolls-Royce Defence Aerospace.

ATTACK HELICOPTERS

Delhi aims to completely revamp its military helicopter fleets by 2020. As part of that plan, the AgustaWestland A129, Bell AH-1Z Cobra, Boeing AH-64D Apache Longbow, Eurocopter Tiger, Kamov Ka-52 and Mil Mi-28 are in the contest for a 22-unit attack helicopter requirement. Anti-submarine warfare

PHOTOGRAPH: DASSAULT AVIATION - A. BOISSAYE

ROLL CAMERA: (CLOCKWISE FROM TOP LEFT) THE US NAVY'S GRUMMAN E2C HAWKEYE; THE BLUECOPTER INCORPORATES EURCOPTER'S GREEN TECHNOLOGY; FULL SCALE MODEL OF AN ADVANCED UAV FROM EADS DEFENSE & SECURITY; THE EADS STALL; THE DASSAULT NEURON MOCK UP

and naval reconnaissance helicopters are also sought. India has also ordered 80 Mil Mi-17-V5 transport helicopters, and continues to induct the HAL's Dhruv advanced light helicopter.

BOEING CONNECTION

Boeing IDS President Jim Albaugh said he believes India would emerge as one of its key export markets for the company's military products in the coming years due to the country's huge armed forces modernisation programme. The company made a breakthrough earlier this year when it signed the contract for eight P-8 Poseidon long-range maritime patrol aircraft worth $2.1 billion (Rs 10,050 crore). Its F/A-18E/F fighter is also in contention in India's medium multi-role combat aircraft competition, in which the country is seeking 126 fighters that could be worth nearly $12 billion (Rs 57,435 crore). The CH-47F Chinook heavylift helicopters and AH-64D Apache attack helicopters are also in the running to meet existing requirements, even as Delhi has issued a request for information for tactical transport aircraft for which Boeing is offering the C-17. India's Chief of the Air Staff Air Chief Marshal P.V. Naik said deliveries would begin three years after a contract. The aircraft will replace some of the force's 20 Ilyushin Il-76 heavylift aircraft.

C-17: SALES & DELIVERIES

Jean Chamberlin, Vice-President for Global Mobility Systems at Boeing, says the company hopes to conclude negotiations with the UAE in 2009 and complete the deliveries of all four C-17s it has ordered by the end of 2010. The NATO Strategic Airlift Capability, which has ordered four aircraft, will receive its first C-17 at Papa, Hungary on July 27. The rest will follow soon after.

On potential customers weaned from the delays to the Airbus A400M, she says there have been informal chats with those who had wanted to take delivery of the aircraft in 2009 or 2010 and, therefore, face a capability gap. "These are informal conversations with potential customers, but there have been no discussions on quantity. There is no request for information or proposals before Boeing."

The C-17 is now in use with the air forces of Australia, Canada, UK and the US. Qatar has ordered two, and other potential customers include Kuwait, Oman, Saudi Arabia, Japan, the Netherlands and Singapore.

THE CHINA FACTOR

The Chinese were in action, too, promoting the Hongdu Aviation Industry L-15 advanced jet trainer, pushing both the base version and a light attack variant to foreign customers. The company had an aircraft model and a simulator that potential customers could use at its stand, and company officials were

SP's Exclusive

SPACE TALK

Derek Wang
Public Outreach Manager,
Exploration Systems, NASA

'Facilities for humans to live on the Moon'

***SP's Aviation* (SP's): In the near future, which is the mission NASA considers most important?**
Derek Wang (DW): Out of all the programmes, lunar mission is more feasible. Space shuttle is retiring next year. Aries I is the rocket on Orion vehicle. Initial operating capabilities will be through till 2015. Service of the station and bringing the crew back will be done by 2016.

SP's: Delineate NASA's main goal.
DW: We are looking to build technologies whereby we can conduct more missions to the Moon. We want to create a lunar outpost. We want to create fa cilities for humans to live there. Pre-fabricated habitat models, assembling of multi-purpose habitat for health care, communication and living quarters is also being considered.

SP's: What are your future aims for space technology and development?
DW: We are hoping to achieve zero error and establish no disturbance communication links to satellites and good navigation facilities with all our spatial installations.

SP's: How does NASA interpret the effects of the Moon's environment on humans?
DW: We have plans to apply technologies and research in setting up lunar surface. Space stations have been our testing grounds for human existence in space, in micro gravity or zero gravity situations.

SP's: What are your plans for creating habitation on the Moon?
DW: Going to the Moon involves risks and challenges. We are hoping to create commercial opportunities. We are looking for global partnerships in habitat, surface mobility, communication, navigation and scientific research.

SP's: Does NASA strategise in isolation?
DW: We have discussed with 13 different countries about a global exploration strategy for future space exploration also pertaining to the Moon.

SP's: Apart from the Moon, what are NASA's other spatial work areas?
DW: Apart from the moon, Mars is our major research area. We are not ready to send a man mission to mars at present, but cannot negate a possibility in the future. For the other planets, there are going to be satellites and robotic missions.

SP's: When can we expect man to be on the Moon?
DW: We are hoping that in the next 40 years humans will be living in space and there will definitely be a sustaining human presence on the Moon.

SP's: How will you manage zero gravity on the Moon?
DW: To manage gravity will be one of the challenges. We are doing research on humans to check effects of zero gravity on bone density, blood flow, oxygen levels, water levels and hormonal balance. Psychological effects of micro gravity are also being monitored.

SP's: Would a gym be functional on the Moon? What types of illnesses can one expect?
DW: For all you know, a floating gym could be invented and special exercises devised! Effects of exercise on the human body, such as how much and the type of exercise that will be needed, is also being researched. Identification of different types of diseases which can be contracted in space is also being researched upon.

SP's: Once the Moon gets inhabited, what type of food will be available?
DW: We at NASA are trying to understand what type of food can be cooked and how to procure the ingredients in lunar conditions.

SP's: For how long would man be able to stay on the Moon at one stretch?
DW: For about four to six months, somebody would actually stay in the lunar surface. It would depend on resources available.

SP's: What is the status of the Lunar Reconnaissance Orbiter (LRO)?
DW: The LRO has just got launched. It will provide us with the best ever mapping of the surface of the Moon. Aboard it is a lunar crater observation sensing satellite. Its impact on the Moon will send forth a plume of rocks and water. It will research all the debris and LRO will also take pictures of it.

SP's: Outline NASA's initiatives to create awareness about space among the younger generation.
DW: We try to connect with the younger audiences by using exhibits and communication products. We use Twitter, My Space, Facebook and other social media. We have specifically targeted learning curriculum and supply to the educational systems. We also sponsor some students through formal educational institutions.

SP's: Is NASA an isolated body with just US interests in mind?
DW: NASA works with space agencies of other countries like India, Japan, Israel and many more. It promotes research and technology collaborations.

SP's: Does NASA believe in sharing its knowledge?
DW: We have international meetings to share information with other countries.

SP's: What is NASA doing to avoid Columbia like disasters?
DW: We are working on increasing safety and reliability of a rocket launch, and its re-entry into the (Earth's) atmosphere.

SP's: What is NASA's one point agenda?
DW: NASA is a unique organisation of very intelligent people and excitement of space will continue. We look forward to making space habitable and educational. ■

—By Sangeeta Saxena in Paris

interacting with air force officers from several countries. Officials from Hongdu and its parent company China Aviation Industry declined to comment, but African countries, such as Namibia and the Democratic Republic of Congo, are among those believed to be interested in the L-15.

Hongdu has three prototypes of the twin-seat aircraft and a final configuration with the Ivchenko-Progress AL-222K-25F engine could be ready in 2010. Yet another version fitted with an afterburner is expected to be primed in 2011 and a light attack version is being studied as well.

FRESH INITIATIVES

A familiar air frame was seen at the show in a new guise as L3 Communications and Hawker Beechcraft came together

SEEN & SEALED: PRATT & WHITNEY PRESIDENT OF MILITARY ENGINES TOM FARMER AND PRESIDENT OF KALE AERO OSMAN OKYAY SHAKE HANDS ON AN MOU; (LEFT) PRATT & WHITNEY'S NEW F135 ENGINE EXPLORATION INTERACTIVE DISPLAY

QUOTE UNQUOTE

Ladislav Simek
Vice President, Strategy and Strategic Programs, Aero Vodochody

'India is a very important alliance'

"We do not have a defined strategy for Asian markets. We evaluate our opportunities case to case. Our eyes are on the South Asian markets. We are striving very much in India and hope something will happen soon. As of now, we have no office in India.

As we do not have a final product, there are no sales to the Indian defence industry. We are seeking for territories all over the world. Supply chains are integrated and we are open to partnerships. Spares will never be sparse and we have an active strategy for keeping their supply continuous.

For landing gears, we are thinking of a strategic partnership with Indian government for supply to the production units of the Indian public sectors. India is a very important alliance and we anticipate both our countries to have more industrial liaison with each other."

—As told to Sangeeta Saxena in Paris

with an unique option that it believes will meet a worldwide market for 225 intelligence, surveillance and reconnaissance (ISR) aircraft valued at $3.8 billion (Rs 18,190 crore) over the coming decade. The duo's solution—an off-the-shelf Beechcraft King Air 350ER (extended range) modified with sensors, self-protection, data collection and, potentially, weaponry—is an offshoot of their current collaboration for the US Air Force (USAF).

Under the $1 billion (Rs 4,785 crore) ongoing programme, the two will equip 37 of the aircraft with ISR equipment for military missions. Eight aircraft have been delivered to date and the USAF last week began using the platform from the Balad air base in Iraq. "It's performing very well," says Terry Harrell, Vice-President for Special Mission Programmes at Hawker Beechcraft.

Based on the successful collaboration, L-3 and Hawker Beechcraft now see a burgeoning market for the platform

FLYING MACHINES: (BELOW, LEFT TO RIGHT) THE EUROFIGHTER, THE F-18 AND THE F-16

QUOTE UNQUOTE

Michael C. Henchy
Vice President, Space and Airborne Systems, Raytheon

'Over 100 Raytheon sensors launched'

***SP's Aviation* (SP's): Where does Raytheon stand in the international market for airborne systems?**
Michael C. Henchy (MH): Raytheon Space and Airborne Systems (SAS) is a leader in designing and developing advanced, integrated systems for crucial missions. For decades, we've supported military and civil customers with focused, forward-looking technology, and today we are playing an increasing role in mission systems integration.

SP's: Does maintenance and supply of spares figure in the sales of such systems?
MH: Our ability to understand and anticipate needs, and develop the right systems to meet them, has made us a valued long-term partner. Customers worldwide depend on us to provide best-value solutions, flawless system performance and the full lifecycle support that assures mission success.

SP's: What are the key areas and products SAS delivers?
MH: Key SAS capabilities include airborne radars and processors, electro optic/infrared sensors, electronic warfare and precision guidance systems, active electronically scanned array radars, space and missile defence technology and intelligence, surveillance and reconnaissance systems

SP's: Where does India figure in your look East policy?
MH: Right at the top.

SP's: Which Indian defence deals are you involved with?
MH: Some plans are in the pipeline and we would like to talk of it after confirmation.

SP's: Are the US and UK your main markets?
MH: No, we supply to more than 40 countries. But these two are definitely very important clients. We are the prime contractor and major supplier to the UK Ministry of Defence, and have developed strong capabilities in mission systems integration in defence, national security and commercial markets. Raytheon Systems Limited also designs, develops and manufactures a range of high technology electronic systems and software at its facilities in England, Scotland, Wales and Northern Ireland.

SP's: Are your systems limited to integration in certain platforms only?
MH: We can integrate in any platform. The Raytheon advanced combat radar is the latest addition to its family of radar products, which includes the APG-79 and APG-63, now flying with the US Navy F/A-18E/F and US Air Force F-15 aircraft, respectively. We have a series of weapon systems which we supply to the US government.

SP's: Where does Raytheon stand in space technology development?
MH: Raytheon is the largest provider of space sensors, with a 40-year history of successful space missions.

SP's: What are your current key space programmes?
MH: Current programmes include Risk Reduction for the Alternate Infrared Satellite System, which calls for SAS to design and build a large-focal-plane-array sensor payload capable of full-Earth imaging from a geosynchronous missile warning satellite. Another programme is Space Tracking & Surveillance System Block 6, which will include two Raytheon infrared sensor suites: a wide-view acquisition refractive sensor for boost phase detection and a narrow view sensor that tracks delivery vehicles through the middle of their trajectories in space.

SP's: How many of Raytheon space products have been a part of launches?
MH: To date, more than 100 SAS sensors have been launched, with weights ranging from 2.1 kg to 377 kg. These sensors have performed for more than 450 instrument years in space, with more than 400 years infrared experience on-orbit. Every military sensor launched has greatly exceeded its required on-orbit lifetime, with 100 per cent successful turn-on after launch.

SP's: Describe the Airborne Stand-Off Radar (ASTOR).
MH: ASTOR is a sophisticated air-to-ground surveillance system that provides 24-hour, all-weather actionable intelligence. It has been deployed twice to Afghanistan in support of coalition forces.

SP's: What is the reliability rate of your products?
MH: Full 100 per cent and 96 per cent success rate, with 4 per cent failures detected at our level. The client gets a cent per cent successful product.

SP's: How customer committed is Raytheon?
MH: Again, 100 per cent. We feel a commitment to our customer. It is not a business transaction. We are giving them means to secure their country.

SP's: Have Raytheon employees suffered fatal casualties during trials of any products?
MH: Never. We would not be in business if that was the case. ■

—By Sangeeta Saxena in Paris

for paramilitary service, with an estimated 75 of the aircraft needed in the US over the next decade for counter insurgency, border patrol, anti-piracy, drug interdiction, law enforcement and other special missions. The aircraft, priced at $8 million (Rs 38.5 crore) for the basic aircraft and $5 million to $10 million (Rs 24 crore to Rs 48 crore) for the L-3 mission equipment, depending on the requirement, can be missionised in about three months, says Harrell.

Overall revenue per aircraft is to be split roughly 60 per cent for L-3 and 40 per cent for Hawker Beechcraft, officials say. Modifications are likely to include an EO/IR turret on the bottom of the fuselage, a Ku-band satcom dome at the top of the fuselage and self-protection system. Inside the aircraft are two operator stations. Hawker Beechcraft engineers are evaluating adding hard points to each of the King Air's wings for holding fuel tanks, sensor pods or light attack weapons. Harrell says the full external load would be 450 kg (1,000 lb). Powered by the Pratt & Whitney Canada PT6-60A, the King Air family numbers more than 6,000 in 94 countries, with more than 40 million flight hours logged.

SUKHOI KEEN ON RAISING AFTER-SALES QUALITY

Sukhoi confirmed it is still working on a prototype of its Fifth Generation PAK-FA advanced tactical frontline fighter, but

QUOTE UNQUOTE

Steven R. Loranger
Chairman, President and CEO, ITT Corporation

'Modernising ATC vital for business'

Modernisation of the air traffic management systems around the globe is of vital importance to business and commerce, the flying public and even the environment.

Skies across the world are becoming increasingly overcrowded. In Europe, flights are expected to increase between 70 and 120 per cent above 2007 levels by the year 2030. In the US, 50 per cent passenger growth is expected over the next decade.

We all know that existing air traffic management systems will be unable to keep up with the dramatic, global increase in flights and passengers. Inefficiencies are already causing billions of dollars in losses related to delays, complicating flight routes and increasing fuel consumption, all of which result in higher operating cost for airlines, higher ticket prices for passengers, as well as unnecessary increases in greenhouse gas emissions.

As the CEO of a company that has been ingrained in the aviation and defence industries for more than 50 years—from our broad portfolio of innovative defence technologies to our work designing and installing the ground infrastructure for ADS-B—it is a real pleasure to be here.

At ITT, our success is achieved by helping our customers address vital human needs. And addressing the challenges posed by increasingly overcrowded skies is exactly what all of us are gathered here to do today.

—As told to Sangeeta Saxena in Paris

INDIAN FOOTPRINT

Indian participation at the Paris Air Show 2009 was limited to a few exhibits by Hindustan Aeronautics Limited (HAL). Unfortunately, there were no flight demonstrations by any Indian aircraft at the event—perhaps a fallout of the financial crunch triggered by the global economic recession. Every year since 2003, Indian aircraft have featured in flight demonstrations at the Paris Air Show. This year, however, the indigenously developed advanced light helicopter Dhruv which has been a regular was missing from the scene.

India was represented by Minister of State for Defence M.M. Pallam Raju, who met with the French Defence Minister, Herve Morin, and senior officials of leading international defence companies. FICCI and CII had thinner delegations this time, but did make their presence felt. Chief of the Indian Air Force Air Chief Marshal P.V. Naik was a keen visitor to the Indian representations and collaborations at the air show.

Representing the civil aviation sector in India, Paramount Airways, one of the country's leading domestic premium airlines, signed a memorandum of understanding to buy 10 A321 aircraft, with an option for an additional 10. With the new aircraft, Paramount Airways will launch international services from south India. Also present was Samtel, showcasing the flight control unit (FCU), the first product to be developed by the Samtel-Thales Avionics Pvt Ltd joint venture. An FCU displays piloting and navigation aid data as well as system and warning parameters to the aircraft's captain and first officer. "We are looking at orders in the region of 20,000 FCUs over the next 10 years. It's a long term project," an enthusiastic Puneet Kaura, Executive Director of Samtel Display Systems, told *SP's Aviation* after the flight control display was unveiled.

Sikorsky Aircraft Corp. expressed enthusiasm over the agreement inked in Hyderabad with the Tata Group for the manufacture of S-92 helicopter cabins, slated for delivery in late 2010. "India's aerospace market is poised for significant growth, and we are thrilled to have the opportunities to support that growth and tap into the capabilities of India's highly skilled aerospace workforce," said Sikorsky President Jeffrey Pino. Tata Sons Chairman Ratan Tata said the agreement is a first step for India to become "a global hub for aerospace manufacturing".

Meanwhile, Israel Aerospace Industries (IAI) is alleged to have entered into a contract with India to supply a HAROP Loitering Munition system. Although the company refused to confirm the "foreign client", the contract is estimated to be worth over $100 million (Rs 478 crore). If true, this could the latest in the growing pile of tie-ups IAI has established with the Indian government.

Eurocopter, on the other hand, announced the signing of a contract worth 7 million Euro (Rs 47 crore) for three AS350 B3 Ecureuils with Pawan Hans, India's leading helicopter operator. Pawan Hans currently operates 27 Dauphin helicopters—the largest Dauphin fleet in the world. Promoting its helicopters to prospective international customers in Paris, HAL expressed hopes of securing more orders from South America, Africa and Asia in the coming years as part of its plan to develop an export market for its products. No favourable results were announced. •

—By Sangeeta Saxena in Paris

the schedule for its flight-test programme remains unconfirmed, despite earlier indications that the aircraft would fly in 2009. Director General Mikhail Pogosyan said the company is creating a prototype and preparing for the start of trials, and that internal discussions regarding the prototype are under way. Beyond that, any communication on the programme awaits the outcome of trials.

Though reticent on the specifics of the PAK-FA programme, Pogosyan is confident of success in the Indian fighter contest, in which the MiG-35 has been entered. The MiG aircraft has "a good chance of winning", he says. It has already completed flight tests with the Indian Air Force (IAF). Of its existing contract with Malaysia for MiG-29K fighters, Pogosyan said the six aircraft it is due to deliver to the nation will arrive by the end of 2009.

Sukhoi is "keen on raising the quality" of after-sales service. "We really need it," admits Pogosyan, citing both the military and commercial segments. Sukhoi has accordingly focused efforts on integration of its logistics and support services, as well as closer co-operation between Sukhoi and MiG, with joint development of future products likely. Le Bourget, says Pogosyan, is "not a place where you conclude contracts for military aircraft". SP

BEST BET: THE F-16IN SUPER VIPER'S EWS IS BUILT ON UNMATCHED COMBAT EXPERIENCE

EWS: SURVIVABILITY ASSURED

The digital, multi-spectral, re-programmable advanced internal Electronic Warfare System of the F-16IN Super Viper is all about **WINNING**

"All warfare is based on deception."

—**Sun Tzu** in *The Art of War*, a Chinese military treatise

By **Orville Prins**
Vice President, Business Development, Lockheed Martin, India

In modern air warfare, fighter combat is a high speed, three-dimensional chess game with multiple players and little time to calculate your next move. Sophisticated weapon systems operating sensors across the frequency spectrum populate the game. Providing information on what is a threat, and what is not—hiding you, shielding you, defending you—is the Electronic Warfare System (EWS). It alerts you to the threat, keeps it in check, and guides your next move. In modern air combat, you cannot win without it.

The digital, multi-spectral, re-programmable advanced internal EWS of the F-16IN Super Viper is all about winning. From electronic intelligence gathering, to ensuring safe penetration of an air defence system, fending off threats during weapon delivery, providing a safe egress, and post-mission electronic order of battle assessment, the F-16IN EWS is custom designed to meet and exceed the Medium Multi-Role Combat Aircraft (MMRCA) requirements of the Indian Air Force. It is the ultimate in fighter electronic warfare, ensuring success in every phase of the mission.

PHOTOGRAPHS: LOCKHEED MARTIN/ SP GUIDE PUBNS

E-WARFARE TO THE FORE

Deceit, disruption and destruction have always been a part of war. Systems that strengthen, support and protect forces have been used and improved throughout time. Electronic warfare is one facet of war that takes these activities to the extreme, and it has an interesting history. A naval operation during World War I may have been the first use of electronic warfare when the British used coastal radio direction finders to monitor the movement of the German fleet prior to the Battle of Jutland. In World War II, the role of electronic warfare became crucial to many large-scale operations. It was then that electronic warfare evolved to incorporate all three—"measures", "counter-measures" and "counter counter-measures".

Electronic warfare became an essential part of air combat during the Vietnam War. Measures were taken to counter the lethal radar-guided surface-to-air missile systems. EW systems for fighters were developed to find and attack surface-to-air missile sites. For self-protection, specialised pods with EW systems in them were mounted under the wings of some fighters. Bombers such as the B-52 Stratofortress used powerful internal EW systems to confuse the enemy radars and missiles. Electronic warfare during this era provided many lessons to both air defence systems and self-protection systems. Throughout the Cold War, advances in radar guided missiles presented an ever-increasing threat to air combat operations. The means to counter the evolving threat became essential to mission success in the modern battlespace.

THE RADAR JAMMER

As the threat to the fighter evolved, fighter EW systems became more sophisticated. Detecting and alerting the pilot to the presence of radars and missile guidance signals, the Radar Warning Receiver (RWR) first used crystal radio receivers and then evolved from heterodyne systems to the digital, channelised systems of today. The companion to the fighter RWR, the radar "jammer", has become an essential EW system component.

At first, jammers were used to simply "blind" enemy radars. As air defence radars and defence networks became more sophisticated, "deception techniques" were developed to deceive enemy radars. As these measures were used, air defence systems developed a counter counter-measure, "home on jam", which is the capability of radars and missile guidance systems to used the jammer signal as a beacon and lock onto it.

Aircraft jammer technology subsequently evolved counter-counter-measures, such as subtle deceptive jamming techniques, to prevent counter-countermeasure circuitry in the air defence systems from using or defeating the jamming signal. As the power of the threat radar signals increased, the power required for overriding that signal also increased, and the fighter jammer design turned to miniature tubes and microwave power modules for increased signal strength. The modern jammer design can broadcast powerful signals to "blind" threatening radars, and develop subtle counter signals to deceive radars and missile guidance systems.

ATTACK & CONFUSE

The EW suite of the F-16IN works in concert with reduced radar, infrared (IR) and visual signatures to deny the enemy the ability to detect the Super Viper or aim accurately or shoot or accurately guide missiles. The F-16IN EWS attacks and confuses a large part of the enemy's "kill chain"—from detection to engagement—and it covers the entire spectrum of possible threats. The data from the EWS, combined with data from other sensors and aircraft, intuitively formats on the three large-screen, full colour displays in the F-16IN cockpit. The goal of the F-16IN EWS is to enhance situation awareness and survivability during any encounter with a threat.

The capability of the F-16IN EWS begins even before the mission is planned. Data on the enemy threat disposition, the location of his defences, the types of defence system he uses, is loaded into the automated mission planning system. Combined with other indigenous intelligence information, this data is used to form an Electronic Order of Battle (EOB). The F-16IN Mission Planning System ensures the availability of this EOB to all mission planners, pilots, and intelligence specialists. Every mission planned will have the most recent EOB developed, but things rarely occur exactly as planned in the modern battlespace. For this reason, every F-16IN is also conducting electronic surveillance of the battlespace.

Whether flying a combat air patrol mission inside friendly airspace, or on a low altitude strike mission deep inside hostile territory, the EWS of every F-16IN flying is working behind the scenes to detect new emissions of interest and record data on them for analysis after the mission. As the Super Viper EW system is providing advanced self-protection, detected threats are documented, including threats that probably could not be detected from dedicated surveillance aircraft flying inside friendly airspace. In peacetime, as the F-16IN intercepts and escorts aircraft that have strayed off course, the emissions are recorded. It is the ultimate in Net-centric electronic surveillance: distributed real time detection and signal measurement.

CUSTOM DESIGNED

Dominating the modern battlespace are sophisticated weapon systems operating across the frequency spectrum. These systems and their associated sensors create the signals that the fighters of today and tomorrow must detect, identify, avoid, deceive, or defeat. Mission success depends on a pilot and weapon system prepared for the threats he knows he may encounter, and protected against the threats he did not know he would encounter.

The mission success of the MMRCA fighter will depend on an EWS that can see clearly in the crowded electromagnetic spectrum of the modern battlespace. Lockheed Martin has experience integrating complex EW systems in a variety of aircraft, from wide body surveillance jets to the next generation of fighters. With a combat proven track record, Lockheed Martin has designed an advanced and adaptable EW system for the F-16IN that meets or exceeds all MMRCA requirements.

Custom designed for reliable operation in the multi-spectral battlespace of today and tomorrow, F-16IN Super Viper's all-digital, multi-spectral, re-programmable EWS is built on unmatched combat experience—the type of system a pilot expects of the ultimate Fourth Generation fighter. SP

The author is a graduate of the Naval Fighter Weapons School (Topgun) and the USAF Adversary Tactics Instructor School, and has flown more than 3,000 hours in 14 different tactical aircraft. In addition to his corporate experience, his military assignments include Project Test Pilot, Operations, Weapons and Air Combat Training, Logistics and Administration, Quality Assurance and Maintenance.

SPACE NO PROBLEM: AIRCREW MEMBERS LOAD AN M777 A2 HOWITZER ONTO A C-130J HERCULES AT BAGRAM AIRFIELD IN AFGHANISTAN

Room FOR MANOEUVRE

Airlift or action—the very design of the military transport aircraft lends itself to multi-role capability

"I put the sweat of my life into this thing. I've my reputation all rolled up into it and I've stated several times that if it is a failure, I'll probably leave this country and never come back. And I mean it."
—**Howard Hughes** at the Senate Hearing in 1947 on airworthiness of the H-4 Hercules flying boat, then the biggest aircraft in the world designed to carry up to 750 fully-equipped troops across the Atlantic to a maximum range of 4,800 km

PHOTOGRAPHS: WWW.AF.MIL AND SP GUIDE PUBNS

By **Air Marshal (Retd) V.K. Bhatia**

None of the al Qaeda belligerents would have known in their dying moments as to what had smashed into their vehicle with the force of an arty shell, rending men and machine into smithereens. The attack came in the dead of night in a remote corner of Afghanistan as part of the US-led Operation Enduring Freedom. Admittedly, the weapons of destruction were arty shells, but these were fired neither by ground artillery units nor by armed unmanned aerial vehicles or even fighters, but airborne howitzers—to be precise, the US military air transporter C-130 Hercules.

Originally assigned to airlift troops and cargo, the carrier had been heavily modified for the airborne artillery role. Developed in two variants, AC-130H Spectre and AC-130U Spooky, used solely by the US Air Force (USAF), the Hercules gunships incorporate side-firing weapons integrated with so-

MASSIVE SIZE, MULTIPLE ROLES: AN-225 MRIYA (LEFT) WAS THE BIGGEST STRATEGIC AIRLIFTER; THE CAVERNOUS HOLD OF A MILITARY TRANSPORT AIRCRAFT (BELOW) CAN BE MODIFIED FOR MULTIFARIOUS TASKS

phisticated sensors, navigation and fire control systems.

WONDER WORKHORSE

From the word go, the very design of the military transport aircraft lent itself to multi-role capability. The cavernous hold of the aircraft could be easily modified to do multifarious air transportation tasks, such as carrying men and material or air dropping paratroops and all kinds of cargo. These aircraft have also been used for casualty evacuation, as command posts and even in the role of makeshift bombers.

Military transport aircraft are generally clubbed into three categories: strategic, tactical and strategic/tactical airlifters. Strategic airlift involves cargo aircraft to transport material, weaponry or personnel over long inter-theatre or inter-continental distances. Strategic airlifters include Lockheed's C-141 and C-5 Galaxy and Antonov's An-124 Ruslan and An-225 Mriya behemoths. On the other hand, tactical airlifters—like the C-130 Hercules and Transall C-160, and their lighter siblings, the C-27 Spartan and An-32—move supplies within a given theatre of operations. Yet another breed of aircraft perform a mix of strategic and tactical roles. The US marvel C-17 Globemaster III and the Russian IL-76 fall in this category (*see table*).

Strategic airlifters

With a sizeable fleet of C-5 Galaxy aircraft, the US has by far the greatest strategic airlift capacity of any nation in the world. Incidentally, the Galaxy is so huge that the volume of unusable space in its tail assembly (aft of the ramp) is larger than a C-130's entire cargo space. The Soviets also produced some massive strategic airlifters, notably the An-124 Ruslan, which at 150 tonnes carrying capacity could even outperform the US Galaxy in terms of payload capability. But the biggest and most formidable aircraft ever designed in this category was the six-engined monster An-225 Mriya (Dream) built by the Antonov Design Bureau. It was designed to carry piggyback the Soviet 'Buran' space shuttle (very similar to the US space shuttle) from the factory to Baikanour space station. After the collapse of the Soviet Union and cancellation of the Buran space programme, the lone fully built An-225 was resurrected in its new avatar as part of Antonov Airlines fleet for airlifting outsized and heavy loads such as locomotives, generators and bulldozers. The venture has been so successful that the second airframe has been pulled out of the mothballed storage and being built up to join the company's fleet by 2010.

Strategic/tactical airlifters

With the much awaited EADS' A400M and Antonov's An-70 turboprops still under development, the currently operational platforms under this category belong to the turbojets variety namely, the US Boeing C-17 Globemaster III and the comparatively older Ilyushin IL-76 from Russian Federation. Out of the two, C-17 with its better load carrying capacity and its ability to provide rapid airlift of troops and cargo to main as well as forward operating bases anywhere in the world gives it a much truer strategic/tactical airlift capability. The C-17 has not only been able to comprehensively replace the C-141 Starlifter of the USAF but has also proved to be more than capable of sharing the tasks normally performed by the C-5 Galaxy fleet. It has the ability to rapidly deploy a combat unit to a battle area and sustain it with ongoing supplies. The C-17's multi-role performance includes tactical airlift, medical evacuation and airdrop missions. Apart from the USAF which is the main C-17 operator it is also operated by the United Kingdom, Australia and Canada. It is also being acquired by the NATO, Qatar and UAE whilst the Indian Air Force has reportedly evinced interest in it.

Tactical multi-role medium airlifters

At present, Lockheed's C-130 Hercules appears to be the only aircraft that can truly claim to be a tactical and multi-role medium airlifter. With over 40 models and variants, in service with more than 50 nations, the C-130 is the only military aircraft to remain in continuous production for more than 50 years with its original customer. A thoroughbred with unparalleled versatility, the C-130 has been used with great success in innumerable conventional and non-conventional roles.

Capable of take offs and landings from unprepared runways, the C-130 was originally designed as a troop carrier and cargo transport aircraft. But the versatile airframe found uses in a variety of other roles, including as a gunship for airborne assault, search and rescue, scientific research support, weather reconnaissance, aerial refuelling, maritime patrol and aerial firefighting. The C-130 holds the record for

MILITARY AIR TRANSPORTS

	Aircraft	Manufacturer	Power Plants	Max T/O Wt (Tonnes)	Max Payload (Tonnes)	Service Ceiling (m)	Range (Km)
Strategic Super Heavy Airlifters							
1	C-5 Galaxy	Lockheed (US)	4 X General Electric TF 39-GE-IC high bypass 190 kN each	381	122.47	10,400	4,400 with 100 tonnes of payload
2	An-225 Mriya (Dream)	Antonov (Russia)	6X ZMKB Progress D-18 turbofans 229.5 kN each	600	250	11,000	4,000 with max payload
3	An-124 Ruslan	Antonov (Russia)	4 X Ivchenko Progress D-18T turbofans 229.5 kN each	405	150	12,000	5,400
Strategic/Tactical Heavy Airlifters							
Jets							
1	C-17 Globemaster III	Boeing (US)	4 X Pratt Whitney F117-PW-100 turbofans 180kN each	265	77	13,716	4,482
2	IL-76	Ilyushin (Ex-USSR)	4 X Soloviev D-30KP Turbofans 118 kN each	157	45–47	13,000	3,650 with max payload
Turboprops							
3	A 400 M (under development)	Airbus Military (European Comp)	4 X Europrop International TP 400-D6 Turboprop 11,000 hp each	141	37	11,300	3,300 max payload
4	An-70 (under development)	Antonov (Ukraine + Russia)	4 X Progress D-27 Propfans 14,000 hp each	145	47	12,000	3,000-plus with max payload
Tactical Multi-Role Medium Airlifters							
1	C-130J (-30) (Latest version) Operational	Lockheed Martin (US)	4 X Rolls-Royce AE 2100 D3 turboprops 4,600 each	80	19–20	8,615	5,000-plus
Tactical Light Medium Airlifters							
1	C-27J Spartan	Alenia (GMAS) Italy	2 x Rolls-Royce AE2100-D2A Turboprop 4,600 hp each	30.5	11.5	9,144	1,852 at full load
2	C-295 M	EADS	2 X Pratt & Whitney PW 127 turboprop 2,645 hp each	23	7–9	-	5,630 max Ferry range
3.	An-32	Antonov (Ukraine) Initially built for the Indian Air Force	2 X ZMKB Progress AI-20DM Turboprops 5, 112 hp each	27	7.5	9,500	2,500 at full load

ABOARD THE C-130J

A first person account by SP's Chief Special Correspondent Sangeeta Saxena from the 2009 Paris Air Show

It was a flight with a difference. Waking to a clear sky on June 18 after three days of laden clouds, I head for Lockheed Martin chalet at Le Bourget, venue of the 2009 Paris Air Show. Bundled into a tourist bus together with 14 other journalists and the press in-charge of Lockheed Martin, Peter Simmons, we reach the departure lounge only to be ushered into waiting cabs that ferry us across to the aircraft. Stepping out, the realisation hits that the giant I am about to board is not just any C-130J, but one deployed by the US Air Force (USAF). As if there was need for any further validation, a beaming USAF official extends a warm greeting at the rear entrance of the aircraft—yes, you enter and exit from the tail of the aircraft. Recognising the only Indian in the motley group of scribes, he graciously makes a mention about the Indian Air Force.

Inside, following a series of briefings and a guided tour of the aircraft by Lockheed Martin's Communications Manager Peter Simmons, we were arrayed on what looked like benches facing each other. Adjusting our individual ear phones, we focus on the terminal before each one of us to follow the flight technically as is being instructed by the navigator. So intent are we that only when the pilot's voice interacting with the control towers carries across do we realise that the door is shut and the aircraft ready for take off. Barely a minute into taxiing and take-off roll on the runway, and we are airborne—perfectly smooth, superbly sanguine.

If the beginning was stupendous, what followed was stupefying. Tripping into the cockpit, I stare fascinated at the controls even as the dazzling blue expanse of the sky ahead and the stunning vista unraveled below vie for my attention. The C-130J is a comprehensive update of the venerable Lockheed C-130 Hercules, with new engines, flight deck, and other systems. The J model is fitted with new Rolls-Royce AE 2100 D3 turboprops with Dowty R391[2] composite scimitar propellers, digital avionics (including Head-Up Displays for each pilot) and reduced crew requirements (two pilots, one load master, and one crew chief—no navigator or flight engineer). The model also features improved manoeuvrability and handling, besides shorter runaway needs for taking off and landing. The new turboprop engines with six blades are vital to the C-130J's improved performance, explains the USAF official. The aircraft can also be configured with the "enhanced cargo handling system".

Back on our seats and wondering what's next in store, we gasp in unison as the rear door swings open. Thankfully, we are not about to crash, but only receive a briefing on how commandoes strapped with parachutes leap out of the aircraft during operations and how supplies are flung below to victims of natural calamities or stranded troops. All the while, the terminals beam figures and configurations pertaining to every little manoeuvre and movement of the aircraft, the very same information that is being transmitted to the pilot.

Too soon, the designated one hour draws to a close. The aircraft lands as effortlessly as it took off, the door opens and we troop out into the sunshine. ●

the largest and heaviest aircraft to land on an aircraft carrier. While the C-130 is involved in cargo and resupply operations on a daily basis, it has been a part of some notable offensive operations. The combat versions include the AC-130 gunships and MC-130 Combat Talon which carries and deploys the largest conventional bombs in the world such as the BLU-82 'Daisy Cutter' and its successor, the GBU-43/B Massive Ordnance Air Blast. Little wonder then that the C-130 which first flew as a prototype on August 23, 1954 was also performing 55 years later at the recently concluded Paris Air Show in its latest avatar, the C-130J Super Hercules.

Tactical light medium airlifters

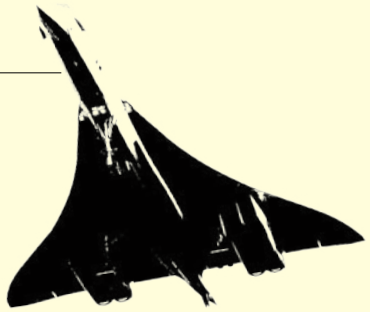
Aircraft with around 10-tonne payload capacity would normally fall in the category of light medium airlifters. The Alenia C-27J Spartan, a derivative of the company's G.222, with a maximum payload of 11.5 tonnes would be a good example of this category of aircraft. It has the engines and systems of the latest C-130J Super Hercules and was selected against stiff competition from Raytheon and EADS North America's C-295 as the Joint Cargo Aircraft for the US military. Many other nations have also placed orders for the C-27 aircraft in differing numbers.

INDIA'S SHOPPING CART

The Indian Air Force (IAF) primarily uses the current fleets of IL-76 aircraft for strategic/tactical heavy airlift tasks and the An-32s as its main light-medium transport aircraft. However, the present inventory does not match the requirements arising out of its vision of a transformed force. The IAF has placed an order for six C-130J Super Hercules aircraft for operations deploying Special Forces but this will not fill the vacuum in its medium airlift capability created more than a decade ago due to the retirement of the older An-12 fleet.

To meet its enhanced mission requirements emerging due to the rapidly changing geo-political, strategic and economic scenarios, the IAF transport fleets need both quantitative and qualitative augmentation. The IAF may be seriously considering acquisition of additional general purpose C-130J medium airlifters to plug the existing capability gap in this category. Also, it could consider acquisition of state-of-the-art C-17 Globemaster III aircraft on offer to enhance its strategic/tactical capability, which is at present limited to a small number of IL-76 aircraft.

Apparently experiencing difficulties in maintaining the IL-76s and their derivatives, the IAF has reportedly already decided to acquire the A330 Multi-Role Tanker Transport to augment its in-flight refueling capabilities. Similarly, if the Indo-Russian joint venture to produce the 10-tonne payload medium transport aircraft does not take-off, the IAF could look at the C-27 Spartan types of aircraft from the West to eventually replace its An-32 fleet. SP



Supersonic Sound Hits Barrier

Around the 1960s, when environmental concerns also emerged, the supersonic transport was seen as particularly offensive due to its sonic boom and the potential for its engine exhaust to damage the ozone layer. Within a decade or so, SSTs were sidelined.

By **Group Captain (Retd) Joseph Noronha, Goa**

"You can be in London at 10 o'clock and in New York at 10 o'clock. I have never found another way of being in two places at once."
— Sir David Frost, aboard the Concorde

Dawn of the commercial jet age in 1952 sparked off a worldwide craze for speed. Passengers flocked to the airlines by the thousands, marvelling at how quickly they could be conveyed to their destinations—and then wondering if their journey time could be reduced even further. The jets of the 1960s, however, always came up against the "sound barrier" that prevented them from zooming any faster. But aviation experts felt it was only a matter of time before the barrier would be decisively breached. After all it had become routine for military jets to fly at twice the speed of sound, so why not airliners?

On August 21, 1961, a Douglas DC-8 did cross the threshold during a flight to collect data on a new design for the wing. Reaching Mach 1.012 (1,062 km/h), while in a controlled dive through 41,000 ft (12,497 m), the DC-8 became the first airliner to 'go supersonic'—albeit for a few seconds.

THE RACE HOTS UP

The battle to build a true supersonic commercial jet began in earnest. First off the blocks were the Europeans. In November 1962, Britain and France signed the Anglo-French Supersonic Aircraft agreement which would eventually lead to development of the world's first supersonic airliner, christened Concorde. This set alarm bells ringing in Washington. Would Concorde replace all other long range designs? Would American stalwarts, like Boeing, Lockheed and Douglas Aircraft, that were virtually supreme in world airliner sales, now be outmanoeuvred by the Europeans?

In June 1963, President John F. Kennedy announced government support for design and development of an American supersonic transport (SST). The following year, tests began over Oklahoma City to see how the public would react to being subjected to a daily dose of sonic booms. But on March 24, 1971, the US Congress voted to end further funding for the SST, also called the Boeing 2707. Though over $1 billion of taxpayers' money had been spent on the ambitious project, not a single plane was ever built. Concerns about the SST's enormous cost and vocal public protests about sonic booms led to its ignominious demise.

Meanwhile, as happened so many times during the Cold War, the other major player, the Soviet Union was feverishly at work behind the scenes, quietly determined to win the race. It did so, to a limited extent. In December 1968, the Soviet Tupolev Tu-144 became the first supersonic transport aircraft to take to the air. It breached the sound barrier on June 15, 1969, and 10 days later became the first commercial transport to exceed Mach two. The plane's close resemblance to Concorde led to allegations (never proven) that its design was obtained via industrial espionage.

Derisively nicknamed 'Concordski' by the western media and initially limited to freight service, it never entered extended production—just 16 were manufactured—and did not fare well operationally due to a variety of reasons. It was hampered by high fuel requirements, which restricted its range, and suffered from severe stability problems. In a public display at the Paris Air Show on June 3, 1973, a Tu-144 entered an uncontrolled downward manoeuvre. Attempting to pull out of the dive, it broke up and crashed, destroying 15 houses and killing all six crew on board, besides eight people on the ground.

On November 1, 1977, an Aeroflot Tu-144 flew from Moscow to Alma-Ata in Kazakhstan, marking its first passenger flight. However, a Tu-144D experienced an in-flight failure dur-

PHOTOGRAPHS: WWW.AVSIM.COM AND WWW.WIKIPEDIA.ORG

"There is no excuse for an airplane unless it will fly fast!"
— Roscoe Turner

ing a pre-delivery test, and crash landed with crew fatalities on May 23, 1978. After notching up just 55 scheduled flights over seven months, the last passenger flight of the Tu-144 took place on June 1, 1978.

CONCORDE SUPREME

FRONTRUNNERS: TU-144 WAS THE FIRST SUPERSONIC TRANSPORT AIRCRAFT WHILE THE CONCORDE (RIGHT) WAS THE FIRST SUPERSONIC AIRLINER

What of the world's only successful supersonic airliner? Working together, the British and French built Concorde, a high-performance passenger jet. Concorde was a four-engine, ogival, delta-winged aircraft. It was the first airliner to have an analogue fly-by-wire flight control system. Its distinctive drooping nose was a compromise between a streamlined design, to increase aerodynamic efficiency, and the need for adequate pilot view during taxi, take-off, and landing. It had an average cruise speed of Mach 2.02 (approximately 2,140 km/h) with a maximum cruise altitude of 60,000 ft (18,300 m). Concorde first went supersonic on October 1, 1970.

Following a long development period lasting nearly 15 years and after swallowing huge sums of government money, Concorde entered commercial service simultaneously with Air France and British Airways on January 21, 1976. It soon became evident that operational restrictions would be placed on the aircraft, forcing pilots to slow to subsonic speeds over land. This limited its access mainly to coastal cities. The hullabaloo over SSTs in America resulted in New York banning the plane outright, thus depriving Concorde of the lucrative London-New York route, and crippling its economic prospects. The ban was later rescinded.

Other countries, such as India and Malaysia, ruled out Concorde supersonic over-flights due to sonic boom concerns. Consequently, on many routes it had to cruise much of the time at inefficient subsonic speeds. When unfettered, Concorde's operational performance was truly amazing. It took just 3 hours 47 minutes to fly over 4,000 nautical miles (7,400 km) from Miami to London, with 70 passengers on board. It was even able to outrace the rotation of the earth. On westbound journeys, therefore, it was possible to arrive at a local time earlier than the local time at which the flight had departed. British Airways profitably used the slogan: "Arrive before you leave".

Just 20 Concordes were built, six for development and 14 for commercial service. On July 25, 2000, an Air France Concorde crashed during take off in Gonesse, France, killing all 109 passengers and crew, and four people on the ground. Investigations suggested the accident was probably caused by a thin metal strip on the runway, which blew a tyre, which in turn ruptured the airliner's fuel tanks. It was Concorde's only fatal incident. In June 2003, Air France retired its last Concorde and British Airways followed suit in October 2003. Concorde's final flight was on November 26, 2003.

TWO NEGATIVES DON'T MAKE A POSITIVE

There are no SSTs in commercial service today. Why did such a promising concept not succeed? A supersonic aircraft is subject to great stresses and temperatures and needs a heavier structure to minimise flexing. It also requires a stronger and heavier structure because the fuselage must be pressurised to a greater differential than subsonic aircraft, which do not operate at the high altitudes necessary for supersonic flight. Consequently, the empty weight per seat of Concorde was more than three times that of a Boeing 747. Both Concorde and the Boeing 747 used approximately the same amount of fuel to cover the same distance, but the 747 could carry more than four times as many passengers.

Concorde just did not make economic sense. Yet another major problem was the high noise levels. Airlines potentially value faster aircraft, because they can perform more flights per day, which allows for higher return on investment. However, Concorde's high noise levels around airports and time zone issues meant that only a single return trip could be made per day. Since SSTs emit sonic booms at supersonic speeds, and are not usually particularly efficient at subsonic speeds, this limits the routes that the airliners can be used on, drastically reducing its attractiveness for most airlines.

Around the 1960s, when environmental concerns also emerged, the SST was seen as particularly offensive due to its sonic boom and the potential for its engine exhaust to damage the ozone layer.

ANOTHER CONCORDE?

Within a decade or so, SSTs were sidelined. When first conceived, these were intended to compete with long-range airliners of about 100 passenger capacity, such as the Boeing 707. However, with newer aircraft like the Boeing 747 carrying four times that number, the speed and fuel advantages of the SST concept were completely negated. Subsonic airliners also improved as Boeing finally faced tough competition from a European grouping, Airbus Industrie, which was formally established in December 1970. Boeing was a formidable company, but Airbus developed a reputation for innovation and for responding to customer needs.

Over the years, despite numerous plans and projects, no supersonic airliner has ever taken the place of Concorde. The only civilian project that appears likely to fructify in the next decade or so is the Aerion supersonic business jet, scheduled to enter service in 2015. For now, manufacturers seem content with improving their subsonic offerings, making them larger and more technologically advanced. The twin pressures of high fuel prices and green concerns mean that the sound barrier, which was briefly crossed, will probably remain unchallenged by the airline industry for some more time. SP

(To be concluded.)

JOSEPH MICHEL AND JACQUES ÉTIENNE MONTGOLFIER were two of a family of 16 children. Joseph was born on August 26, 1740 and Jacques on January 6, 1745, both in Annonay, France. The duo grew up to become prominent inventors who demonstrated the first practical hot-air balloon, an important milestone in the history of aeronautics. Joseph was a stereotypical inventor—a maverick and an impractical dreamer. Jacques was more pragmatic and trained as an architect.

The idea of ballooning first came to Joseph as he stared at a fire. Watching the smoke and gas spewing sparks high into the sky, the idea dawned that if only he could capture this unique gas inside an enclosed lightweight bag, the bag would rise from the ground. After preliminary trials, the brothers made their first major flight on December 14, 1782. When they held a flame near the opening at the bottom of the bag (called a *balon*) it expanded and floated up and away, out of control. The Montgolfiers believed they had discovered a new gas, which they called 'Montgolfier gas', which was lighter than air. In fact, the gas was air itself, which became more buoyant as it was heated. On June 4, 1783, the Montgolfier brothers launched a newly constructed craft at Annonay in front of a group of dignitaries. The globular balloon was of sackcloth with three thin layers of paper inside. It was held together by 1,800 buttons, with a reinforcing fishnet of cord covering the outside. It flew for 10 minutes, over a distance of 2 km, and reached an estimated altitude of 1.6 km to 2 km. Word of this amazing feat quickly reached Paris.

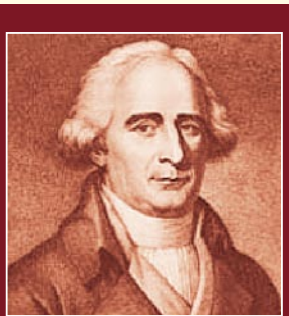
Next was human flight. In collaboration with the successful wallpaper manufacturer, Jean-Baptiste Réveillon, Jacques constructed a 1,060 cubic metre balloon of taffeta, coated with a varnish of alum (which has fireproofing properties). It was painted sky blue and had golden flourishes and signs of the zodiac. Some suggested launching a criminal in it, but the prudent inventors preferred animals. On September 19, 1783, the Aerostat Réveillon went aloft with the first creatures: a sheep, a duck and a rooster. The physiology of the sheep was believed to be similar to that of a human being. While the duck was expected to be unharmed, the rooster was included to see if it would suffer any ill effects at higher altitudes. This demonstration was performed at the royal palace in Versailles, before King Louis XVI, Queen Marie Antoinette and a mammoth crowd, estimated at around 130,000. The flight lasted approximately eight minutes and covered 3.2 km. The craft brought its occupants safely back to earth, unfazed by their unique experience.

To carry humans, a larger balloon was needed. The brothers began constructing a 1,700 cubic metre contraption, 23 m tall and 14 m in diameter. It was first tested in tethered flights carrying aloft Jean-François Pilâtre de Rozier, a young physician. On November 21, 1783, the first free flight by human beings was made by Pilâtre de Rozier, together with an army officer, the Marquis d'Arlandes. The balloon was equipped with a fire-basket, which the two men supplied with fuel to keep the air in the canopy hot. The aeronauts remained airborne for 25 minutes, probably reaching a maximum height of 450 m, before landing on the western outskirts, around 8.5 km away from Paris.

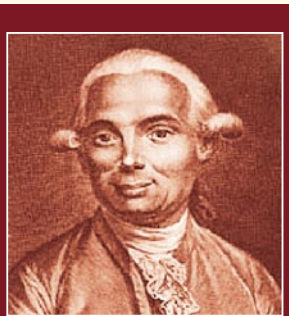
Feted across the world, the siblings were honoured by the French Académie des Sciences. However, their fame was short-lived. On June 15, 1785, Pilâtre de Rozier perished when his balloon exploded, thus becoming the first aviation victim. Also, Henry Cavendish had discovered hydrogen in 1766, and the French physicist, Jacques Charles, had begun perfecting a hydrogen balloon, which soon eclipsed the Montgolfiers' hot-air balloon. Hydrogen was the predominant gas in balloon technology for the next 180 years till explosions began to take a high toll and it was replaced by helium, an inert gas.

Jacques died on August 2, 1799 and Joseph on June 26, 1810. The Montgolfiers achieved the very first significant step: November 21, 1783 is generally accepted as the date when human aviation was born. Strangely, the Montgolfier brothers never once ventured to experience first-hand the thrill of going up in one of their balloons. SP

—Group Captain (Retd) Joseph Noronha, Goa



JOSEPH MICHEL MONTGOLFIER (1740–1810)



JACQUES ÉTIENNE MONTGOLFIER (1745–1799)

On September 19, 1783, the Aerostat Réveillon built by the Montgolfiers flew with the first creatures: a sheep, a duck and a rooster. Next, for humans, the brothers constructed a 1,700 cubic metre contraption, 23 m tall and 14 m in diameter. On November 21, 1783, Jean-François Pilâtre de Rozier and Marquis d'Arlandes went aloft with the balloon—the first free flight by human beings.

'Fractional Ownership is a FAILED Model in India'

CAPTAIN KARAN SINGH, President, Business Aviation Association for India, spoke to SP's Chief Special Correspondent **Sangeeta Saxena** on the potentials and pitfalls in India's business aviation environment

***SP's Aviation* (SP's): Describe the business aviation environment in India.**
Captain Karan Singh (KS): There is a tremendous slowdown in the aviation sector currently, which follows the economic slowdown very closely. Orders are not getting fulfilled. But as an industry, we are bullish about general aviation. It will continue to grow.

SP's: What are the debilitating issues?
KS: There are three major issues—infrastructure, manpower and regulations.

SP's: What are the missing infrastructure requirements?
KS: Alternate airports in big cities are required. Hangars and parking have always been issues in business aviation. Smaller cities need airports, only then can business aviation penetrate all the markets in semi-urban areas. Heliports, which are very much the need of the industry, seem to be a remote possibility. Feasibility study of helicopter services in the National Capital Region has got shelved probably due to the existence of no flying zones. Mumbai has a fixed base operator, but it is under litigation; let's hope it gets operational soon. We are woefully inadequate.

SP's: Does India need an Act like the General Aviation Revitalisation Act 1994 of the US?
KS: Yes, we do. But it is still far fetched in India. Recognition to business aviation as an industry in itself is the priority.

SP's: This year witnessed major layoffs in the aviation sector. Does it mean there is a surplus of manpower?
KS: No, there is a huge shortage of skilled manpower. We have a surplus of people who are not needed. They lack the required number of flying hours, have come with licences from foreign countries and do not fit the bill. Those who perfectly suit the requirement are very less and always in demand.

SP's: What is the approach of the regulators towards the sector?
KS: It is a fragmented approach with too much of bureaucracy.

SP's: In India, is fractional ownership synonymous with private ownership?
KS: No. It is a failed model in India. Even abroad it has not been very successful, whatever the pundits might say.

SP's: What is the prospects for air charter companies in the prevailing environment of economic turmoil?
KS: Things are not as bad for the charter companies. But yes, it is a double-edged sword.

SP's: Given that private ownership is taxed heavily, which are the taxes you feel ought to be reconsidered by the government?
KS: Import duty on business aircraft is very short sighted. Service tax on charter services seems odd. Aviation turbine fuel excise duty also needs to be looked into.

SP's: Compare India's business aviation sector to its counterpart in the West.
KS: Business aviation in the West is an old concept. But in India, it's still nascent.

SP's: Enumerate some bureaucratic hurdles in India.
KS: First is the cumbersome process of acquiring an aircraft—it takes between three and nine months. Secondly, the RBI regulations to move money create a headache. Clearances for pilots pose the third biggest problem. Fourth is the import of the aircraft.

SP's: Any shortcomings in the business aviation industry?
KS: Shortcomings yes, but not because of the industry. These are due to slow infrastructure growth and less expansion in the rural and semi-urban areas, which can give potential business.

SP's: What is the role of BAAI in trying to improve the business aviation environment in India?
KS: We are not for complaints, we are for action. It is the only association recognised internationally. It looks into the problems of the sector and liaises with the government authorities. The Directorate General of Civil Aviation has welcomed the association and the Joint Secretary has been very appreciative of the fact that there is such a body. The aim of the association is to achieve efficiency and promote growth in the industry.

SP's: How do you do that?
KS: We organise seminars and workshops to educate operators. We have made a data bank of each and every aircraft which comes into the country and follow its progress and action. We also request members of the association to give their professional inputs. SP

PHOTOGRAPH: SP GUIDE PUBNS

MILITARY

Asia-Pacific

India seeks 10 Boeing C-17s
India is looking to acquire at least 10 Boeing C-17 strategic/tactical transport aircraft to boost airlift capabilities. According to a statement from Boeing, Delhi issued a request for information to the US Air Force (USAF) in February enquiring about the cost of owning and operating a fleet of the aircraft. Any contract will be through the US government's foreign military sales mechanism. "The USAF is handling this, but we understand that India needs 10 aircraft. Delivery timelines are not clear at this stage," says Jean Chamberlin, Vice President for Global Mobility Systems at Boeing. She was unable to say when a contract would be signed. Air Chief Marshal P.V. Naik, Chief of the Indian Air Force (IAF), told Indian media deliveries would begin three years after the contract is finalised. The aircraft will replace some of the 20 Ilyushin Il-76.

MMRCA trials to select IAF's new combat jet begin in July
The IAF is set to begin from July flight trials of the six US and European aircraft, including the French Dassault Rafale and the Swedish Gripen, for India's Medium Multi Role Combat Aircraft (MMRCA) competition ahead of finalising its choice for a combat jet. Although the IAF planned to finish the trials by March in the world's most hotly contested aircraft deals this century yet, these could actually go on till August next year as some of the manufacturers will reportedly send their aircraft to India only around September. Thus, the hot weather trials due to be held in Jaisalmer in Indian desert conditions would be completed not in July 2009 but in July 2010.

Trials to procure 197 LUHs
India is planning to carry out field trials to procure 197 Light Utility Helicopters (LUH) for the army and the air force in August. "Five vendors are expected to come up with their helicopters for the competition," Indian Defence Ministry officials said. The five contenders include the Russian Kazan and Mil, American Sikorsky, Italian Finmeccanica and Eurocopter. The contract, worth around $3 billion (Rs 14,525 crore), is one of the few defence contracts where the vendors are required to fulfill around 50 per cent offset obligations. Of the 197 helicopters, 133 will be given to the army and the rest would go to the IAF. These will help the two services to replace their aging fleet of over 350 Cheetah and Chetak helicopters.

Raytheon's MCU to be integrated on Jaguar
Raytheon Company has started integrating its Munitions Control Unit (MCU) on the Jaguar fighter aircraft. The MCU is a plug-and-play system that enables integration of modern weapons on legacy aircraft with minimal modifications to aircraft wiring and no changes to the flight and stores management software. "Once the MCU is integrated on an aircraft, aircrews can employ the Joint Standoff Weapon, Maverick missile, Paveway precision-guided munition and AIM-9M Sidewinder air-to-air missile using the aircraft's existing weapon management system," said Harry Schulte, Raytheon Missile Systems Vice President of Air Warfare Systems. "Warfighters can have this capability for a fraction of what it costs to integrate one weapon by traditional means." Raytheon began integrating MCU on the Jaguar in the second quarter of 2009 and plans to finish the work in less than 24 months. MCU is currently integrated on the F-16 Fighting Falcon.

Focus on critical and high technology areas: Antony
Indian Defence Minister A.K. Antony has asked top scientists of the Defence Research and Development Organisation (DRDO) to desist from taking up too many projects and thereby lose focus; instead, concentrate on high technology and critical areas to help the country achieve self-reliance in strategic fields. Addressing the DRDO Research Council, Antony asked the scientists to set a 10-year goal of achieving indigenisation of 70 per cent from the current level of 30 per cent in the manufacture of defence products. "Over dependence on foreign suppliers is not conducive to national security in critical times," he stressed. The Defence Minister favoured involvement of public sector units as well as private players for the transformation and paradigmatic change of the country's defence industry. He also asked scientists to promote interaction and build synergy with the services for greater success and acceptance of the products by the forces, urging them to give special attention to quality and timely delivery.

IAF to take part in solar eclipse tests
The IAF will join the scientific community in carrying out tests and filming the solar eclipse on July 22 by flying a fighter jet and a transport aircraft. A Mirage-2000 fighter jet and an An-32 medium lift transport aircraft would be flown by IAF pilots to assist scientists from Vigyan Prasar, an autonomous body of the Department of Science and Technology, which will carry out the tests. "While the Mirage would fly out from Gwalior, the An-32 will fly from either Bagdogra in West Bengal or Patna in Bihar. The aircraft will fly to Agra, when the experiments and the filming of the total solar eclipse will be carried out," an IAF spokesperson said. Scientists from Noida-based Vigyan Prasar, Udaipur-based Solar Observatory and Bangalore-based Indian Institute of Astrophysics would participate in the experiments. This year's total solar eclipse will be the last for this generation, as the next would happen 80 years later. The eclipse will be visible in parts of India from Gujarat's Gulf of Cambay in the west to Arunachal Pradesh in the east.

Turkey's aerospace centre to modernise Pakistan F-16s
Turkish Aerospace Industries (TAI) has entered into a contract to modernise F-16s of the Pakistan Air Force (PAF). Under the programme, a total of 42 F-16s will be upgraded at TAI's facilities in 46 months, starting from October 2010, at a cost of around $75 million

QuickRoundUp

AIRBUS

• The next commercial Airbus A330-200 aircraft arrived at Brisbane airport for conversion into a multi role tanker transport for use by the Royal Australian Air Force. This aircraft is being acquired under Project Air 5402 in which five air-to-air refuelling aircraft are being purchased from Spanish company EADS CASA (now known as Airbus Military).

BRAZILIAN AIR FORCE

• The Sub-directorate for Development and Programmes of the Brazilian Air Force's Department of Science and Aerospace Technology has received the initial offer from the Spanish company EADS CASA for the acquisition of four new C-105 Amazonas transport aircraft (CASA C-295) and four SC-105s, the search and rescue variant.

BOEING

• Boeing completed another milestone in the assembly of its first 747-8 Freighter by joining the wing to the fuselage. Workers attached the 40-foot fuselage section to the centre wing box in the final assembly bay at the factory in Everett, Wash. The wing and centre section are now being prepared for final body join.

• Boeing has shipped a GPS IIF satellite to Cape Canaveral Air Force Station in Florida to conduct a series of key tests for the US Air Force's next-generation satellite navigation system. Space Vehicle 2 (SV-2) is undergoing ground testing to prepare for the launch of SV-1, the first of 12 GPS IIF satellites.

• The Boeing Company has completed its acquisition of eXMeritus Inc. that provides hardware and software to federal government and law enforcement organisations for sharing information securely across classified and unclassified networks and systems. eXMeritus will operate within Boeing Integrated Defense Systems' Network and Space Systems unit.

• The AH-64D Apache Block III prototype helicopter has successfully demonstrated Level IV unmanned aircraft system (UAS) connectivity during a flight test over the Arizona desert. At this level, the Apache crew is able to fully control the navigation of an assigned UAS. The capability provides enhanced situational awareness.

DEFENCE BUDGET 2009-10 | IAF GETS BIGGER SHARE FOR CAPITAL EXPENDITURE

Presenting India's Budget for 2009-10 on July 6, Finance Minister Pranab Mukherjee put to rest apprehensions in the defence industry of a possible cutback by ensuring the total allocation for defence remains the same as was declared in the Interim Budget, Rs 1,41,703 crore ($28 billion). At 2.35 per cent of the GDP and an increase of 34 per cent over 2008-09, in real terms, the increase works out to 23 per cent over the revised estimates of 2008-09. This includes Rs 54,824 crore for capital expenditure as against Rs 41,000 crore in the revised estimates for 2008-09.

As in past years, on the revenue side, the Indian Army has received the major chunk amounting to Rs 58,648 crore, while the Indian Navy's been allocated Rs 8,322 crore and Indian Air Force Rs 14,318 crore. However, in the case of capital expenditure, Rs 20,000 crore has been set aside for the air force, against Rs 17,767.95 crore for the army and Rs 11,873.73 crore for the navy. For the air force, the increase works out to Rs 1,109 crore over the revised estimates of Rs 12,199 crore for the closing fiscal against an original allocation of Rs 10,855 crore.

The larger capital allocation is probably to cater for the ongoing AWACS programme and other acquisitions, such as the C-130J. •

(Rs 364 crore). An MoU was signed between TAI and PAF in September 2006 in Karachi. TAI completed the F-16 modernisation programme for the Royal Jordanian Air Force with the delivery of the last aircraft in April.

IAF contingent off to Congo on UN peace mission

The Tricolour and India emblazoned on their blue uniforms, 285 IAF air warriors swapped their regular grey 'side caps' with the distinct 'blue beret' worn by UN peacekeepers worldwide to join the Indian UN Peace Keeping Mission that left for the Democratic Republic of Congo (DRC) on June 20. Led by Group Captain Manavendra Singh, the Indian Aviation Contingent-II was flagged off from Palam by Air Officer-in-Charge Maintenance, Air Marshal K.M. Rama Sundara. The contingent will operate six Mi-17 utility helicopters and four Mi-35 attack helicopters from Bukavu, in eastern DRC.

Su-30 aircraft inducted at Air Force Station Tezpur

The Su-30 aircraft was formally inducted at Air Force Station Tezpur in a ceremony presided over by the Air Officer Commanding-in-Chief, Eastern Air Command, Air Marshal S.K. Bhan. Constructed by the British Royal Indian Air Force in 1942, the Tezpur airfield lies between Bhutan, Tibet, China, Myanmar and Bangladesh. The first aircraft to fly from this base were Vampires and Toofanis. Civil air operations, discontinued in 2007, are set to resume.

IAF adventure activity enters operational realm

Adventure activities in the IAF are both enduring and challenging. For some accomplished mountaineers in the IAF, it has been mostly a way of life. But when four ace mountaineers from IAF's adventure cell were summoned for a special mission, the task was truly unheralded—locate and retrieve the cockpit voice recorder and flight data recorder, popularly known as the 'black box', of the ill-fated An-32 that crashed on June 9 near Menchuka in Arunachal Pradesh. Led by Squadron Leader Namit Rawat, the quartet successfully accomplished the mission on June 16.

Kyrgyz Parliament approves Manas Air Base agreement

The Kyrgyz Parliament has ratified an agreement with the US to extend Washington's access to Manas Air Base, a key logistics hub that supplies troops in Afghanistan. Confirming the development, Pentagon spokesperson Bryan Whitman said the agreement must now go to Kyrgyz President Kurmanbek Bakiev for signature. The agreement provides for a transit centre at Manas International Airport, operated by the US, to provide logistical support to coalition forces in Afghanistan. About 15,000 troops and 500 tonnes of cargo move through the base every month. It is learnt that the US agreed to pay $60 million (Rs 290 crore) a year to use the base, up from $17.4 million (Rs 84 crore) under the previous arrangement.

Americas

Highlights of US National Defence Authorisation Bill

The US Senate Armed Services Committee has completed its markup of the National Defence Authorisation Bill for 2010. The bill authorises funding for the Department of Defense and the national security programmes of the Department of Energy. Highlights relevant to USAF are:

- Provides $1.75 billion (Rs 8,480 crore) for the purchase of seven F-22A aircraft
- Provides an additional $560 million (Rs 2,715 crore) to buy 18 F/A-18E/F aircraft and authorises the full request for 22 EA-18G aircraft
- Provides $438.9 million (Rs 2,128 crore) to continue development of the F-136 Joint Strike Fighter alternate engine
- Reduces $209.5 million (Rs 1,015.5 crore) for C-130 avionics modernisation programme
- Terminates the Multiple Kill Vehicle programme
- Terminates the Kinetic Energy Interceptor programme
- Cancels the second Airborne Laser (ABL), and refocuses the ABL programme as a technology research effort

Northrop Grumman, USAF unveil GenNext Hawk UAV

Northrop Grumman Corporation and the USAF have unveiled the next generation

QuickRoundUp

BOMBARDIER AEROSPACE

• Porter Airlines of Toronto has placed a firm order for two Q400 NextGen turboprop airliners.

DANISH DEFENCE

• The Danish Defence agreement for 2010 to 2014 has been concluded between the government, the Danish People's Party, the Social Democrats, the Social-Liberal Party and the Socialist People's Party. The pact sets the frame for development of the Danish national defence for the coming five years and underlines the need to procure new fighter aircraft, selection of which will take place this year.

ELBIT SYSTEMS

• Elbit Systems Ltd will supply the Israeli Ministry of Transportation with the C-MUSIC system (commercial multi-spectral infrared countermeasures). Elbit Systems Electro-optics El-Op Ltd is to be installed aboard a variety of commercial aircraft owned by Israeli commercial airlines.

EGYPT

• VH-3A Sea King helicopter, presented by former President Richard Nixon to Egypt's President Anwar Sadat in 1974, has been redelivered to the Egyptian government after being completely rebuilt and outfitted with new engines, a heavier-duty transmission, a new, non-folding aft fuselage, a new, non-folding main rotor head and a new, executive-level interior.

FINNISH DEFENCE FORCES

• The Finnish Army Material Command and Kongsberg have formally signed an agreement for the NASAMS II air defence system for the Finnish Defence Forces. The NASAMS II system made by Kongsberg/Raytheon will be Finland's new medium-range air defence missile system and deliveries will be completed by 2014.

ISRAEL AEROSPACE INDUSTRIES

• IAI has delivered the first batch of upgraded Kfir fighter jets to the Colombian Air Force. In late 2007, IAI was awarded a multi-year contract to upgrade the existing Colombian Air Force Kfir jets and to supply additional jets. The Kfir is a multi-role, all-weather combat jet.

APPOINTMENTS

INDIAN AIR FORCE

Effective July 1—on retirement of the previous incumbent, Air Marshal P.P. Rajkumar—Air Marshal G.S. Kochar has been elevated from SASO's post in Central Air Command to take over as Air Officer Commanding-in-Chief. His post has been filled up by Air Marshal S. Varthaman from Air HQ, on promotion.

HINDUSTAN AERONAUTICS LIMITED

R. Srinivasan has been appointed Managing Director, Helicopter Complex, Hindustan Aeronautics Limited (HAL). The new position has been created to bring all helicopter design, development and manufacturing activities under one umbrella. Srinivasan will concurrently head five critical divisions of HAL.

AIRPORTS ECONOMIC REGULATORY AUTHORITY

India's Civil Aviation Ministry has appointed Y.S. Bhave Chairperson, Airports Economic Regulatory Authority, on June 25. The appointment will be for a period of five years or till the age of 65 years or until further orders, whichever is earlier. Bhave was working as Secretary, Department of Consumer Affairs, Ministry of Consumer Affairs, Food and Public Distribution before taking over the present assignment.

SINGAPORE AIRPORT AUTHORITY

Lee Hsien Yang, the younger brother of Prime Minister Lee Hsien Loong, has been appointed Chairman of the newly-structured Civil Aviation Authority of Singapore (CAAS). The appointment was made by Singapore's Transport Minister following the corporatisation of Changi airport and the restructuring of CAAS from July 1.

BAE SYSTEMS USA

With the stepping down of Walt Havenstein from the post, General (Retd) Anthony (Tony) Zinni ex-US Marine Corps has been appointed Chairman of the BAE Systems, Inc. Board.

of high-flying unmanned aircraft, the RQ-4 Block 40 Global Hawk, at the company's Palmdale manufacturing facility in California. Carrying an advanced, all-weather multi-platform radar technology insertion program (MP-RTIP) sensor, the Block 40 aircraft will provide game-changing situational awareness for the warfighters with its unprecedented capability to detect, track and identify stationary and moving targets. Use of the MP-RTIP sensor makes it the first time the active electronic scanned array (AESA) technology has been used on a high-altitude unmanned aircraft.

Osprey shortfalls prompt call to halt production

House Oversight and Government Reform Committee Chairman Edolphus "Ed" Towns has called for a halt for the production of the V-22 Osprey after going through a committee hearing, titled "The Future of the V-22 Osprey: Costs, Capabilities and Challenges". After hearing witness testimony from individuals with extensive knowledge of the V-22 Osprey and reviewing the GAO report, Chairman Towns stated, "It's time to put the Osprey out of its misery." Salient aspects of his closing "What we have heard today convinces me that the dream of a viable high-speed, long-range, tilt-rotor aircraft has not been realised," Chairman Towns said. "The list of what the Osprey can't do is longer than the list of what it can do."

CIVIL AVIATION

Asia-Pacific

DGCA drive to meet US FAA's safety directions

The Indian Directorate General of Civil Aviation (DGCA) has met all but one of the 19 deficiencies pointed out by the Federal Aviation Administration (FAA) in flight safety issues and surveillance to prevent its downgrading by the US aviation regulator. The FAA, a team of which is expected to visit India in the next few weeks, would carry out a final audit inspection, review and validate the progress DGCA has made on various safety issues connected with flight operations, airworthiness, enforcement and surveillance. An official spokesperson said the only outstanding deficiency is the one concerned with the amendment of the 1937 Aircraft Rules, for which the Civil Aviation Ministry has sent a draft notification to the Union Law Ministry for approval. The DGCA is inducting about 600 technical staff to spruce up its safety standards on par with international norms.

Air India may become a low-fare carrier

The Maharaja will have to transform into a commoner. Shedding its full-service carrier status, the airline is reportedly preparing to turn low-fare on most domestic routes. On June 22, Prime Minister Manmohan Singh spent over 90 minutes with bigwigs of the Ministry of Civil Aviation to discuss the cash-strapped airline's woes and its demands for a bailout from the government. While he is learnt to have promised support to the national carrier, it was made abundantly clear that any bailout will come if—and only if—Air India is able to shed its flab, become competitive and completely transform itself. Such "radical restructuring" could require Air India to transform into a low fare airline on almost all domestic routes except a few niche metro sectors where full service airlines get some business. In the current economic downturn, only low-cost carriers have seen good load factors.

INDUSTRY

Asia-Pacific

Tata inks deal with Sirkorsky to manufacture S-92 cabin

The Tata Group has signed a deal with Sikorsky Aircraft Corporation to manufacture

QuickRoundUp

ORBITAL SCIENCES CORPORATION

• The MEASAT-3a satellite, which is based on Orbital Sciences Corporation's STAR-2 platform, has been successfully launched into orbit. The MEASAT-3a satellite is the fourth communications spacecraft in MEASAT's in-orbit fleet.

RAYTHEON

• Raytheon Co. has been awarded a contract for 35 Multi-Spectral Targeting Systems Model A (MTS-A), 25 MTS-B Pre-Production Units, including one retrofit gyro and one retrofit imager, and associated MTS-A/B shop replaceable unit spares and containers to support the Predator, Reaper Program.

NATO

• Overseas ground and flight testing on a NATO Airborne Warning and Control System recently demonstrated that a prototype waveform designed to improve the performance of IFF did not interfere with European civilian air traffic control. The prototype, referred to as the Mode 5-capable UPX 40, would replace the current Mode 4 capability and has been designed specifically to interfere less with US and international civil air traffic control functions.

NORTHROP GRUMMAN

• Northrop Grumman Corporation has delivered the first of two Space Tracking and Surveillance System demonstration satellites to the US Air Force's Cape Canaveral Air Station for launch preparation.

• Northrop Grumman Corporation's new Beyond-Line-of-Sight communications capability is priceless for troops on the ground as per the feed back received from personnel of the 116th Air Control Wing, which fly the US Air Force's E-8C Joint Surveillance Target Attack Radar System.

• The GPS Advanced Control Segment (OCX) team has submitted its proposal to the US Air Force for the OCX Phase B contract. GPS is fully embedded into US military operations, US commercial practices and civilian uses.

QANTAS

• Qantas has reportedly reached an agreement with Boeing to defer the

SHOW CALENDAR

22 July – 23 July
UV EUROPE 2009 UNMANNED VEHICLES CONFERENCE & EXHIBITION
Celtic Manor Hotel, Newport, Wales, United Kingdom
URL: *www.shephard.co.uk/events*

13 August – 15 August
LATIN AMERICAN BUSINESS AVIATION ASSOCIATION CONFERENCE & EXHIBITION
São Paulo, Brazil
URL: *www.labace.aero*

24 August – 25 August
AIR LAUNCHED WEAPONS
TBC, Washington, D.C., USA
URL: *www.idga.org/us/Air-LaunchedWeapons*

4 September – 6 September
AVIATION AND WOMEN IN EUROPE
Hotel Lucrezia Borgia, Ferrara, Italy
URL: *www.aweu.org*

8 September – 10 September
ASIAN BUSINESS AVIATION & ASIAN AEROSPACE
AsiaWorld Expo, Hong Kong
Info: *www.asianaerospace.com*

10 September
NBAA BUSINESS AVIATION REGIONAL FORUM
Ribeiro Corporate Hangar, Henderson Executive Airport, Las Vegas
URL: *www.nbaa.org*

22 September – 24 September
HELITECH
Imperial War Museum, Duxford, Cambridge, United Kingdom
URL: *www.helitech.co.uk*

23 September – 26 September
AVIATION EXPO 2009
China International Exhibition Center, Beijing, China
URL: *www.cpexhibition.com/aviation*

28 September – 30 September
UNMANNED SYSTEMS SUMMIT 2009
TBC, Washington DC, USA
URL: *www.unmannedsystem-sevent.com*

FORTY YEARS OF APOLLO XI

Four decades have passed since two American astronauts took the small step for mankind but a giant leap for humanity. The destination was the enigmatic celestial body, Earth's immediate neighbour, the Moon, and the two men were Neil Armstrong and Edwin Aldrin. On July 20, while the world celebrates 40 years of landing on the Moon, India takes pride in her own successful foray—ISRO's Chandrayan's perfect landing on its surface.

Apollo XI astronauts Neil Armstrong, Michael Collins and Edwin Aldrin were launched July 16, 1969 from Cape Kennedy, Florida, on a flight to the Moon. Subsequently, Armstrong and Aldrin became the first men in history to walk on the Moon's surface, 66 years after the first powered flight by the Wright Brothers. Neil Armstrong, the first man to step on the moon, deployed the US flag on the lunar surface on July 20, 1969 during the Apollo 11 lunar landing mission. While astronauts Armstrong and Aldrin descended in the lunar module, the 'Eagle', to explore the Sea of Tranquility region of the Moon, astronaut Michael Collins, command module pilot, remained with the Command and Service Modules "Columbia" in the lunar orbit.

On July 24, 1969, President Richard M. Nixon and the Apollo XI astronauts exchanged "A-OK signs" through the window of the Mobile Quarantine Facility aboard the USS Hornet. The Apollo XI was hoisted aboard the USS Hornet, the prime recovery vessel for the returning space craft. Same day at 12:50 pm EDT, Armstrong, Collins and Aldrin Jr splashed down into the Pacific Ocean, 900 miles southwest of Hawaii, marking the successful completion of their lunar landing mission and culminating years of exclusive training and decades of scientific experimentation. •

—By Sangeeta Saxena

cabins for the US company's S-92 helicopter in India. The pact between Tata Group subsidiary Tata Advanced Systems Ltd (TASL) and Sikorsky, a United Technologies Corporation subsidiary, envisages delivery of the first cabin by late 2010. The cabins would roll out from a new Greenfield facility at Hyderabad.

New MRO facilities planned in Bangalore by HAL, TIMCO

Hindustan Aeronautics Limited (HAL) and TIMCO Aviation Services, an independent aircraft maintenance provider based in North America, will set up state-of-the-art airframe maintenance, repair and overhaul (MRO) facilities at HAL's Bangalore airport and manufacturing complex. HAL and TIMCO had entered into a joint venture in April.

Europe

Ukrainian firm to upgrade 100 An-32s of the IAF

India has signed a deal with a Ukraine firm to modernise its 100 medium lift An-32 cargo aircraft. The contract was signed between Ukraine's Ukrspetsexport and India. •

QuickRoundUp

delivery of 15 B787-8s by four years and cancel orders for 15 B787-9s scheduled for delivery in 2014/2015.

ROYAL NETHERLANDS AIR FORCE

• The first of two C-130 Hercules transport aircraft that are being refurbished and modernised for the Royal Netherlands Air Force has successfully made its first flight. Both aircraft are to be shortly delivered to the air force.

SNECMA

• Snecma and Volvo Aero have agreed on the basic principles of a five-year partnership in the field of space propulsion. The agreement involves the series production of 37 nozzles and the same number of turbines, which will be manufactured by Volvo Aero from the end of 2009 until mid-2014.

SUKHOI

• SuperJet International and Hungarian national carrier Malev have signed a Letter of Intent (LOI) at the Paris Air Show, for the purchase of thirty Sukhoi Superjet 100 aircraft in the 98 seats configuration. The agreement has a potential value of up to $1 billion (around €710 million). The first aircraft will join Malev fleet starting from 2011 at the rate of six aircraft per year.

US AIR FORCE

• A-10 maintenance personnel from the 124th Wing are in the early stages of a new "assembly line" maintenance concept that may serve as a model for how US Air Force aircraft maintenance is performed in the future. It is projected to save thousands of man hours and millions of dollars over the next year by installing up to 12 modifications at one time via time compliance technical orders. The A-10 Thunderbolt II is in the midst of a series of upgrades as part of the precision engagement modifications.

VANDENBERG AIR FORCE BASE

• Vandenberg Air Force Base has launched an unarmed Minuteman III intercontinental ballistic missile configured with a National Nuclear Security Administration test assembly. The launch was an operational test to verify the weapon system's reliability and accuracy.

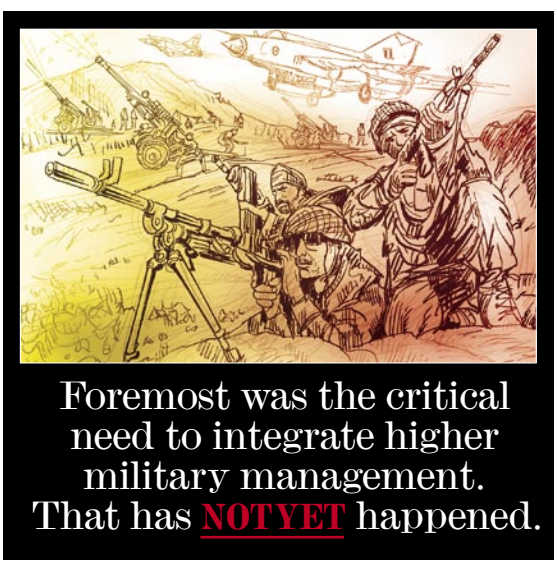
REMEMBER Kargil

Celebrated as Kargil Diwas, July 26 this year marks the 10th anniversary of India's last military clash with the country's western neighbour. To people like me, who had a grandstand view, Kargil operations will continue to be a saga of heroism by India's foot soldiers and air warriors. The jawans and young officers of the Indian Army will recall the harsh and unforgiving environment in which they fought hand-to-hand with an entrenched enemy, losing many of their team members. The air warriors will remember the rarefied atmosphere in which they manoeuvred their aircraft, with precision and skill, to strike at fortified enemy positions, while Stinger missiles flashed past. And many senior officers will recollect the difficulties in planning and co-ordinating joint operations in unfamiliar terrain with sparse intelligence inputs.

India's politicians and decision-makers, mired in the perplexing maze of caste and religion-based vote politics, very often seem apologetic and embarrassed about the country's military victories. Kargil Diwas will see the usual bureaucratically ritualised functions and, perhaps, only the military will celebrate the occasion with a sense of pride. Kargil and its aftermath provided India with an opportunity to clean up its muddled security environment and create a more secure and safer country. But we procrastinated till the terror attack on Mumbai. Now, the government has woken up and efforts are on to tighten our porous and perforated security envelope.

In the area of military modernisation, progress has been sporadic and the gap between India and its likely adversaries has widened. China has pulled away, with a focussed approach to capability creation and power projection. Pakistan, by a series of deft diplomatic moves, has become the beneficiary of military largesse, both from China and the US. The post-Kargil recommendations of the Group of Ministers has not yet been fully implemented, due to differences between the army, navy and air force, and the unwillingness of the political class to enact necessary and binding legislation. Each service charts its own course, and a 'grand plan' is yet to be enunciated. Budgetary allocations are made in purely bureaucratic manner based on 'precedent', and not necessarily in consonance with national security imperatives. Weapon acquisition is individual service based and inter-operability considerations are not accorded priority. One of the most important lessons of Kargil was the critical need for integration of higher military management and mission-based capability creation. That has not yet happened.

Communications is yet another area of concern. I still remember the difficulty we had in communicating with our army counterparts in Corps HQ, though both were based in Srinagar. Today, the army and the air force are creating their own operational communication networks with interfaces to plug into each other's network. Whether these will work in a Net-centric warfare environment remains unknown. A Defence Communication Network had been planned, but remains incomplete. Intelligence sharing also has to be an ongoing affair, and joint planning for exercises and operations must become the norm.



Foremost was the critical need to integrate higher military management. That has NOTYET happened.

Perhaps one is being overcritical and pessimistic. Writing in the March issue of *Defence Watch*, Group Captain Kaiser Tufail, the Director of Operations in the Pakistan Air Force during the Kargil war, stated: "While the Indians had been surprised by the infiltration in Kargil, the IAF (Indian Air Force) mobilised and reacted rapidly as the Indian Army took time to position itself. Later, when the Indian Army had entrenched itself, the IAF supplemented and filled in where the artillery could not be positioned in force." Clearly, the army-air joint operations had a synergetic effect in evicting the intruders. The security apparatus and the military have to energise the process that began post-Kargil and focus on making the Indian state strong, so that sacrifices made by our jawans, air warriors and lives lost by our citizens in terror attacks, do not go in vain. SP

— Air Marshal (Retd) N. Menon, Bangalore

As Air Officer Commanding J&K, the author was directly responsible for air operations at the field level in the Kargil war.

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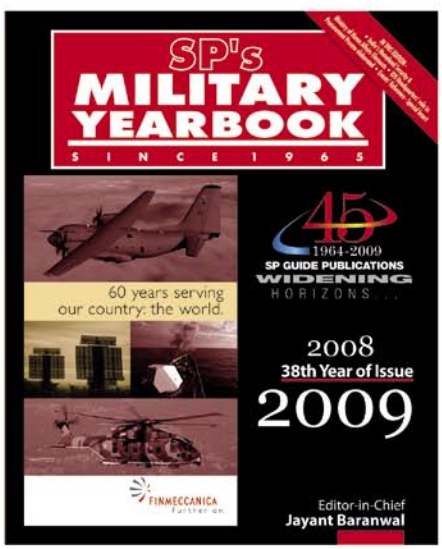

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