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EXCLUSIVE

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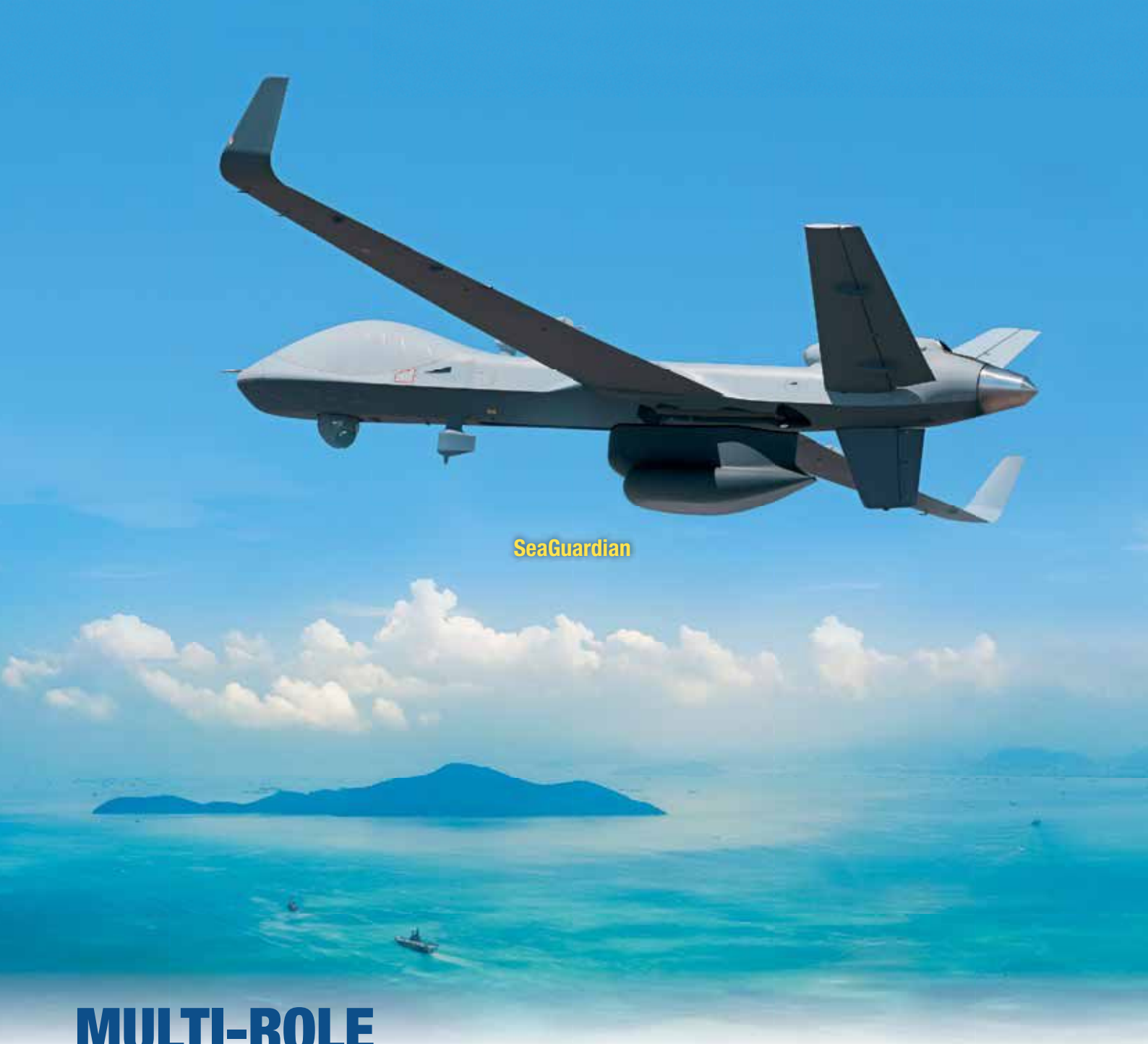

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COVER ILLUSTRATION BY
Anoop Kamath

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NEXT ISSUE: *Defexpo Special*

With the rapid growth of regional aviation in India, Regional Jets have the potential to play a major role in the future in the Indian regional aviation segment

THERE ARE INDICATIONS THAT THE EFFORTS OF THE INDIAN Air Force (IAF) to restore the badly depleted fleet of combat aircraft to the authorised level, that had run aground in the recent past, is beginning to move forward again. It is understood that the Ministry of Defence (MoD) is likely to issue a Request for Information (RFI) to selected aerospace majors across the world seeking their response to India's quest for a single or a twin-engine combat aircraft in fairly large numbers for the IAF under the Make in India programme. However, given the complexities of the Defence Procurement Procedure, this is only a preliminary step and the process may take some time to fructify. In the meantime, the IAF will wait with fingers crossed and hope that this new exercise does not meet the same fate as was the case in 2015 with the tender for 126 medium multi-role combat aircraft (MMRCA). However, the latest move by the MoD will be a repeat of the MMRCA tender floated in 2007. The need to explore options to induct combat aircraft in quick time has become urgent especially as the project to develop a fifth-generation fighter aircraft jointly with Russia, is also plagued with uncertainty.

In this issue of *SP's Aviation*, Byron Bohlman, an aviation expert, analyses the regional aviation scene in India and the issues related to profitability in operating Regional Jets. The author states that currently, carriers in India largely operate turboprops on short routes as these aircraft offer better profitability. However, on the longer routes Regional Jets have the potential to offer significantly better profitability. There is a crossover point, measured by distance, where the efficiency of a jet surpasses that of a turboprop. Longer sectors hold the key to Regional Jet's success where nonstop flights that replace hub connections can command higher yields. With the rapid growth of regional aviation in India, Regional Jets have the potential to play a major role in the future in the Indian regional aviation segment.

A major event on the global civil aviation scene in the recent past has been the Singapore Airshow 2018 held in the second week of February 2018. Even though the majority of global players in the domain of civil aviation were present at the Airshow, there were no major deals concluded. At this event, the focus of the industry appeared to be largely on components as also on maintenance, repairs and overhaul contracts. Rohit Srivastava has a detailed report on the event in this issue of *SP's Aviation*.

In an interview, Rohit Kapur, President of Business Aircraft Operators Association, explicitly catalogues the infirmities afflicting the business aviation segment of the Indian civil aviation industry and the reforms needed to make it more business-friendly and productive. The thrust for reforms must be focussed not only through changes in policy; but equally important is the need for change in perception of the vital role this segment of the Indian civil aviation industry can play in the growth of the national economy. Group Captain C.J. Weir (Retd) who has been associated with the civil aviation industry since retirement from the IAF, in an article in this issue, highlights some of the serious issues and challenges that confront present day civil aviation in India and what the concerned authorities can do to ensure better efficiency with higher standards of safety.

All this and more in this issue of *SP's Aviation*. Welcome aboard and do visit us at Wings India 2018 in Booth No. 28, Hall B.

JAYANT BARANWAL
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PHOTOGRAPH: SUKHOI

FGFA FOR THE IAF

On account of the technological, capability and price issues, the IAF was clearly unhappy with the platform and was keen that the project be called off

By AIR MARSHAL B.K. PANDEY (RETD)

INDIA'S QUEST FOR A COMBAT AIRCRAFT FROM A FOREIGN source to enable the Indian Air Force (IAF) to foray into the fifth generation, began on January 26, 2007, when President Vladimir Putin visited India as the Chief Guest at the Republic Day Parade in New Delhi. The visit, which was the first by a Russian head of state, went far beyond being merely ceremonial, as a number of agreements between India and Russia in the fields of energy, defence and space were signed. One of these was the agreement for an Indo-Russian collaboration project to develop a Fifth-Generation Fighter Aircraft (FGFA), customised to the needs of the IAF. The agreements in the domain of aerospace and defence were extremely important for the Russian aerospace and defence industry as well, because Russia was keen to remain in the number one slot in the world as supplier of military hardware to India. Besides, India was expected to spend as much as $30 billion on defence procurement in the 11th Plan period from 2007 to 2012, a potential that Russia would do everything to exploit. Besides, with the breakup of the Soviet Union and the emergence of a uni-polar world, India was no longer dependent only on Russia as the nation was free to explore other suppliers as well. This paradigm shift would have been a matter of serious concern for Russia.

The plan drawn up in the dialogue in the initial three years between India and Russia, was to develop a twin-seat version

PHOTOGRAPH: UAC

of the Russian T-50 PAK FA for the IAF. The single-seat version of this fifth-generation platform designated as the T-50 PAK FA was already under development in Russia. However, the requirement of the IAF was for a platform capable of a carrying heavier payloads and a larger radius of action. The version to be developed for the IAF was called the Perspective Multirole Fighter (PMF).The project would require an investment of $6 billion, with a work-share of 50:50 with the state-owned Hindustan Aeronautics Limited (HAL) as the Indian partner. The timeframe for development of the FGFA was estimated as 10 years. A memorandum of understanding for preliminary design work for the FGFA requiring an investment by India of $295 million, was signed In December 2010 between HAL and two Russian companies Rosoboronexport and Sukhoi. The preliminary design work phase was completed in 2013; but thereafter, there have been no progress in the project.

In December 2014, it was for the first time that the IAF apprised the Ministry of Defence (MoD) about the inadequacies in the proposed FGFA on account of which it did not consider the platform suitable for induction. The IAF evaluated the first prototype of the T-50 PAK FA and was of the view that the aircraft had a number of deficiencies that were not acceptable to the IAF. After an in depth assessment over the next couple of years, the IAF catalogued weaknesses in the FGFA. Firstly, the AL-41F1 engine that was fitted on the FGFA was somewhat under powered to meet with the performance parameters of a fifth-generation platform as also was not reliable enough. The AL-41F1 was not a power plant developed specifically for this fifth-generation platform, but was a mere upgrade of the AL-31 that powers the Su-30 MKI that was a platform of the previous generation. More importantly, the IAF felt that the platform on offer did not have the capability attributes that the IAF was looking for. Capability of its radar was inadequate as it did not provide the desired coverage and the IAF would have preferred the new platform to be fitted with an AESA radar instead. The stealth features of the airframe were badly engineered and the capability of the aircraft in this regard left considerable room for doubt. The aircraft needed to be equipped with high technology advanced sensors, better networking capability, more advanced combat avionics and super cruise capability. As listed by the IAF, in all, there were more than 40 parameters related to the features of the aircraft and its performance that required improvement and that it would be the responsibility of the Russians to do this.

The IAF also observed that contrary to the agreement, there was no transfer of technology as the Russians were reluctant to share critical design information with India. Besides, work share of HAL was much lower than that originally agreed upon at 50:50. The list of improvements required in the aircraft drawn up by the IAF was indeed large and would only serve to aggravate the steep and continuous escalation in the price. This, in all likelihood, would render the platform unaffordable price wise in the long run making it impossible for the IAF to induct this fifth-generation platform in the numbers required. The Russians were now demanding in excess of $7 billion as against the originally agreed sum of $3 billion as part of India's share in the development of the FGFA. On account of the technological, capability and price issues, the IAF was clearly unhappy with the platform and was keen that the project be called off.

Unfortunately, today, both the MoD and the HAL are not prepared to accept the IAF's viewpoint. While for the MoD, the FGFA project has become a politically sensitive as well as a prestige issue, for HAL, it was more an issue of their survival. Since the Su-30MKI project will be completed in the next few years, the Indian aerospace major is looking for another major aircraft project for its survival. Given the fact that the tender for 126 medium multi-role combat aircraft has been cancelled and other projects such as for building single engine combat aircraft in India in large numbers under the 'Make in India' programme not moving forward, HAL is keen that the FGFA project would come as a saviour and ought not to be cancelled. HAL is also of the view that the experience gained with the FGFA project will ultimately help develop the indigenous Advanced Medium Combat Aircraft (AMCA) which is still on the drawing board and currently with an uncertain future.

> **The plan drawn up in the dialogue in the initial three years between India and Russia, was to develop a twin-seat version of the Russian T-50 PAK FA for the IAF.**

Whatever may be the compulsions, political or otherwise, in the final analysis, it would not be prudent to disregard the professional assessment by the IAF to arrive at a final decision on the future of the FGFA project. SP

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CHALLENGES FOR INDIAN CIVIL AVIATION

The Indian civil aviation industry is a complex, hyper-dynamic, high-tech behemoth, where there is zero tolerance for error

By GROUP CAPTAIN C.J. WEIR (RETD)

ILLUSTRATION: ANOOP KAMATH

THE HEARTENING NEWS IS THAT IN THE NEAR FUTURE, ONE travelling by air in India will find significantly better air connectivity covering larger number of destinations and more options. There will also be an increase in the number of airlines operating each with larger fleet of aircraft. The Indian civil aviation industry is a complex, hyper-dynamic, high-tech behemoth, where there is zero tolerance for error. It has spawned, like most other industries, its own groups, clique's and power centres that at times pull in directions that have a detrimental effect on the entire industry. This article is aimed at bringing into focus some of the serious issues that confront present day civil aviation in India and to help the appropriate authority in ensuring better efficiency with higher standards of safety.

KEY ISSUES

Paramount amongst all issues is the one of air safety. In the past few years, there have been a number of fatal accidents snuffing out hundreds of innocent lives. Many of these accidents could have been avoided if as the planners, managers and regulators had a better understanding of the dynamics of the man–machine interface. The airspace in India is going to see an increase in the number of aircraft flying. Hence, flying operations, air space management, arrivals and departures at airports, must be made more efficient for safe operations.

The next most important issue is one of finance. We at times are hesitant to acknowledge that financial viability is essential for all concerned. Once this is accepted, optimisation of resources will become the normal way of life, as would competence and efficiency.

> The Ministry of Civil Aviation needs to revisit the Civil Aviation Policy to ensure that all the pillars are strengthened to keep the structure from toppling

THE PILLARS

The Government of India (GoI) is making valiant attempts at addressing the issues involved and needs the support of individuals and companies who have the knowledge, but do not carry the baggage of vested interests. The planners and decision makers have to face the harsh reality of dealing with a relatively unknown subject and with those who have the knowledge and experience, unable at times, to break the shackles of their own affiliations. Presently in India, the base of the civil aviation industry, rests on six pillars that are:

- Ministry of Civil Aviation MoCA).
- Directorate General of Civil Aviation (DGCA).
- Airport Authority of India (AAI).
- Scheduled airlines, regional airlines and non-scheduled operators.
- Flying training organisations.
- MRO organisations.

A quick look at the 'pillars' will highlight some of the more pertinent issues that need to be addressed.

ANALYSIS

MoCA. In India, the organisation structure for control of civil aviation flows from the MoCA, GoI. The MoCA needs to revisit the Civil Aviation Policy to ensure that all the pillars are strengthened to keep the structure from toppling. The focus should be to organise and examine each of the 'pillars' in the context of the 'key Issues' of air safety and finance. Each of these pillars needs to be closely examined to assess and ensure that they can perform their tasks so that a conducive atmosphere is created for the anticipated growth of the sector. At the end of the day, it is the right of the citizens of India to be given a world class aviation sector which is recognised as an 'engine of growth'. There is also a need for those associated with aviation to shed the "Free lunch Culture" to a 'Value for Money' approach. The aviation sector is growing in India and the MoCA must ensure that all the 'Pillars' are competent to play their role to ensure that the many issues that fuel growth, are addressed. To achieve this, it is strongly recommended that the MoCA form an 'independent' core team to work directly under it to review the Civil Aviation Policy. This team or advisory group, can be made up of retired personnel from the Indian Air Force (IAF) who are recognised experts in aviation, experienced individuals General Aviation and the Airlines. It is imperative that a conducive environment be created and this can be done if a holistic approach is adopted free of vested interests. This advisory group could also be entrusted with the task of coordination and policy implementation.

DGCA. The DGCA is the regulator empowered to ensure compliance with rules as also facilitate and promote civil aviation. This is a crucial mandate and the DGCA plays a vital role in every aspect of a company operating an aeroplane. The Federal Aviation Administration (FAA) of the United States (US) had downgraded India's aviation safety ranking to Category 2 and after 14 months the ranking was restored to Category 1.The implications of the downgrade were serious and the aviation industry is still not out of the woods. This is a bitter pill to swallow for any self-respecting person associated with Indian Civil Aviation. Some positive steps have been taken to improve the general appearance of the offices in Delhi, Mumbai, Kolkata and Chennai, which was required, but this is only cosmetic. We need to improve substantially and we need to start the introspection from the top. To match the growth in the Indian aviation sector, it must be ensured that the Regulator is competent to deal with all the issues that comprise this complex activity. Both the key issues of air safety and financial viability can be addressed only by the regulator if it has a clear insight into the different 'pillars' that it is going to regulate. It becomes important then to examine the functioning of the DGCA and to suggest measures to enhance its efficiency. An area that needs serious attention is the issue of manning. Personnel manning key posts must have the right qualifications and hands-on experience to deal with specialist issues. It needs to be understood that aviation and its many branches are all very specialised fields. Therefore, ONLY specialist personnel with the right qualifications and relevant experience must occupy key posts. The other area where the DGCA needs to enhance is its capability as a 'Facilitator'. Therefore, the DGCA must increase its footprint as a guide and mentor of the aviation sector in addition to its role of being a regulator.

AAI. The AAI is an autonomous body tasked with providing airfield infrastructure, airspace management and rescue. The AAI functions under the MoCA, however, due its 'autonomy' there is a tendency to work in isolation. Not enough attention is paid to airspace management, enroute and at terminal areas. The safe absorption of higher traffic density will be achieved

when we move from manual (procedural) control to real-time radar control in the entire spectrum of an aircraft's flight. AAI's focus, unfortunately, has been on improving mostly the airport terminal buildings and not in procurement of equipment which will enhance operational efficiency. A large quantum of funds has been spent on airport buildings without any study done on passenger flows and demand/ supply issues. This skewed prioritisation of allocation of scarce resources has led to neglect of critical areas. To cater to the projected expansion in density of air traffic, the ground environment in terms of radar coverage from departure to arrival, must be put in place. Procurement of route and terminal radars, non-precision and precision approach aids must be given top priority. It is then that the environment will be created which will allow a larger number of aircraft to operate in a given area at any given point in time with the desired levels of safety.

AWAITING ITS TURN: IF CHALLENGES ARE TAKEN CARE OF, INDIA'S CIVIL AVIATION WILL SEE PHENOMENAL GROWTH

The Airlines. Airlines in India operate in a free market, competitive environment where there is, at times, a curtailment of choices. The top level managements of the Airlines need to understand the various complexities of operating in India. Choice of top executives has traditionally been restricted to foreign nationals. A large number of them have under-performed mainly due to a lack of understanding of the nuances of this diverse region. Indian executives have now been exposed to global trends and have the benefit of decades of experience and must become the choice of the promoters. The airlines need to wean themselves away from foreign aircrew as well. This can only be done if the promoters take this issue seriously. Crew training and their progression must form an important ingredient in the daily task of the management to ensure that Indian crew are trained to move up the professional ladder. The Airlines must also be required to show the appropriate authority their business plans, funding and reserves of funds before approval is given. At the moment this is being done to some degree, however, both the airline and the approving authority need to give more attention to this. This issue is highlighted with the collapse of some airlines and more starkly with fresh start-ups shutting down within months of commencing operations. The airlines now need to capitalise on the robust growth in passenger traffic, new sectors and international routes. Ticket pricing needs a fresh look with the concept of dynamic ticket prices examined and seen against fixed prices based on break even costs per seat kilometre. The concept of 'Low Cost"'must be seen against 'Value for Money'. The aviation sector has been done serious long term damage by some airlines resorting to selling the pipe dream of freebies. Most of those airlines have had to fold up suffering major financial losses. This pitfall must be avoided and all airlines need to convince the authorities that for long term sustainable operations, there can be no 'free lunches' and therefore, realistic fixed ticket prices with no surge pricing, may be the route to go. The Indian air traveler wants quality service and does not mind paying the right price for it. The airlines also need to train their staff to be more passenger conscious. It would not be difficult for the air traveler to understand that safe, regular and quality service will mean cost and it needs to be paid for.

Flying Training Organisations (FTO). Presently, pilots in India are trained all over the globe. Pilots trained in the US have to fly 1,500 hours before they can join any airline there. However, if they come to India, they can join an airline immediately after completing their training. Only the pilots trained in India are monitored by the DGCA, pilots trained abroad are not and some rush through pilot training in as little as six months!!! These anomalies need to be remedied, if you train in the US then follow their system in its totality. The FTO's in India need to constantly keep improving the training with emphasis also placed on flight instructors with high standards who can ensure that the 'Right Stuff' qualifies from their institutes.

Maintenance Repair and Overhaul (MRO). MRO facilities are wide ranging and cover a large variety of maintenance activities. Considering the number of aircraft operating and the ones on order, the demand for routine and line servicing will be large. An overview is required to be taken to provide these facilities and probably the route to go is the public-private partnership (PPP) model as government stakes will bring along many benefits. It must be kept in mind that these are projects with huge investments and over long periods of time. By having government partnership, off-set clauses, transfer of technology, job creation and many more core issues can be addressed in one broad sweep.

CONCLUSION

The aviation sector is ready to leap. The GoI has shown keen intent and recognised the potential. What is required now is for the MoCA to identify and form an advisory group which will revisit the Civil Aviation Policy, identify key activities and most importantly monitor and oversee implementation. The focus should be the interplay between the 'pillars' wherein all progress and grow together, moving towards a common goal. This activity is vital to ensure all agencies pull in the right direction avoiding the pitfall of narrow-minded partisanship. Strict government regulation is required to ensure that no foreign national works in India. We create as many facilities within the country as possible and if those are available domestically the law prohibits going abroad. SP

> **Only the pilots trained in India are monitored by the DGCA, pilots trained abroad are not and some rush through pilot training in as little as six months!!!**

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REGIONAL JETS IN INDIA
HEADED FOR EXTINCTION OR REBIRTH?

ILLUSTRATION: ANOOP KAMATH

Don't think of Regional Jets as extinct birds. Instead, think of them as rising like a phoenix.

By **BYRON BOHLMAN**

THE LIST OF AIRLINES THAT ONCE FLEW REGIONAL JETS – Paramount Airways, Air Costa - and some that never got off the ground or are struggling to take off - Star Aviation and Flyeasy – seems to be growing.

Given the double-digit annual jump in passenger enplanements, why hasn't the regional jet revolution landed in India? It transformed air travel in North America and Europe, and has a strong foothold in China, the three biggest air travel markets in the world. Even Brazil and the African continent are home to a sizable fleet of 70 to 100-seat regional jets. Yet in India, a country poised to become the globe's fourth largest air travel market in the next decade, you have to ask "where are all the regional jets?"

A DISAPPEARING SPECIES

Look hard and you'll find fewer than 10 RJs – 50-seat Embraer RJs at Hornbill Airlines and Bombardier CRJs at SpiceJet – compared to more than 500 single-aisle commercial jets registered to Indian airlines. RJs account for fewer than 2 per cent of the national fleet. That low percentage contrasts with more than 25 per cent share in the North American and European markets, both of which have huge secondary and tertiary cities, much like India.

FORMULA FOR SUCCESS

With fewer seats and flights on shorter sectors, RJs don't generate the same volume of available seat kilometers as larger, single-aisle jets. Even though an RJ's trip cost is lower than that of a bigger jet, amortising the lower trip cost over fewer seats produces a higher cost per available seat. One way to reduce that number is to increase daily utilisation.

An RJ must work hard to produce a sufficient number of flight hours for the operating economics to be attractive. This is characteristic of markets in which low-fare, low cost airlines dominate and ticket prices are chronically low, like India's. RJs flying from dawn to dusk face the added stress of more take offs and landings that are associated with deployment on short-distance routes. High-cycle operations negatively impact maintenance costs.

There is often little slack built into a regional jet's flight schedule. Throughout the day, RJs must land, be serviced, unload and load passengers, and depart for the next flight in as few as 30 minutes. In regions with mature RJ operations, it's common to find an RJ in the air 10 hours per day, 3,400 hours per year. Aircraft reliability is essential to maintain schedule integrity.

INDIA'S ULTRA-LOW DOMESTIC FARES

Prior to the near collapse of the domestic airline industry at the end of the last decade, local airfares were declining in a frenzy of new competition across the country. The result was the lowest revenue per passenger kilometre among Asian countries with domestic services. India ranked at the bottom, below Japan, China, Thailand, Indonesia, Australia and the Philippines.

Even after regrouping following airline bankruptcies and consolidation, Indian yields are still far below those of other Asian nations. New competition, massive orders for new 150-seat airplanes, and aggressive posturing by LCCs continue to put pressure on domestic ticket prices.

Ultra-low fares in key markets often influence fare levels in secondary and tertiary markets. Even though short-distance routes characteristically have high yields, that premium can be undermined if LCCs enter a nearby market and divert traffic originating in RJ cities to their network hubs. Regional airlines usually must match LCC fare discounts in order to retain that originating traffic.

BREAKS FOR REGIONAL AIRLINES

Recent reforms to landing fees for regional aircraft, a reduction in the aviation turbine tax, the elimination of a minimum fleet size for start-up carriers, and the Regional Connectivity Scheme (RCS) have gone a long way to entice airlines to open routes with lower demand. But those efforts still haven't encouraged carriers to add RJs to their fleets.

ARE TURBOPROPS THE ANSWER?

IndiGo's order for 50 ATR72s sent a clear message that turboprops may be more sustainable than RJs, particularly after Air Costa, with its fleet of Embraer E-Jets, suspended operations last year. With their lower unit costs, high cruise speed, lighter structural weight and lower fuel burn that RJs, turboprops are a compelling solution to India's low-fare environment.

Both IndiGo, with its ATR 72s and SpiceJet, with its Q400s, have tapped into new demand in secondary markets. The carriers are deploying those 70- to 78-seat aircraft on short-haul routes with the right combination of capacity and frequency that likely makes their economics better than an RJ, especially should the price of jet fuel start to creep up.

> But if the forecast for growth in passenger enplanements for the next decade proves accurate, long-distance RJ flying may become more attractive.

IS THERE A FUTURE FOR RJS?

There is a crossover point, measured by distance, where the efficiency of a jet surpasses that of a turboprop. Longer sectors hold the key to the RJ's success where nonstop flights that replace hub connections can command higher yields.

For now, turboprops are helping to grow domestic networks by feeding traffic and tapping into the growing demand to and from secondary markets. But if the forecast for growth in passenger enplanements for the next decade proves accurate, long-distance RJ flying may become more attractive.

Today's RJs have come a long way from the small, cramped, limited-range aircraft of earlier generations. Flying nonstop from the north all the way to south or across the breadth of the country is more comfortable and more economical with an RJ. Advances in engine technology have lowered fuel burn and other improvements, some RJ manufacturers claim, have made the operating cost of their new airplanes competitive with larger single-aisle jets.

It's an intriguing prospect – smaller capacity RJs, nonstop flights that bypass hubs, higher yields, lower unit costs – that may just mean that RJs will once again find their place in Indian skies.

Don't think of them as extinct birds. Instead, think of them rising, like a phoenix. SP

POTENTIAL OF UAVS IN CIVIL AVIATION

Initially inducted exclusively for military use, the potential of UAVs are now being exploited in the domain of civil aviation as well

By ZORAWAR SINGH JAISWAL

UNMANNED AERIAL VEHICLES (UAV) BEING EXTREMELY versatile flying machines, have recently elicited keen interest from different stakeholders. On the one hand, while UAVs that are low-cost and versatile platforms offering a variety of aerial applications, on the other its inconspicuousness can easily be exploited by unscrupulous elements and prove to be serious threat to the society. Hence, there is a need to not only develop applications for the UAV, but credible safeguards against its malicious use as well.

A UAV is a machine that is flown by a pilot who is located on ground. Since no human is on board, it reduces the size of this flying machine, enables higher payloads to be carried, dispenses with the need for long airstrips and minimises the need for trained manpower.

UAVs are of multiple types. The inventory of available UAVs ranges from small hand-launched machines to large, long endurance machines that require a runway for operations. UAVs can carry multiple payloads such as cameras of all types, ion-based/sensitive sensors, radio relay equipment, pylons for delivery of lights stores etc. The range of applications of UAVs depends on the sensor/pod mounts and the imagination of the user. Initially inducted exclusively for military use, the potential of UAVs are now being exploited in the domain of civil aviation as well. Some of the roles of the UAVs in civil aviation are enumerated in the succeeding paragraphs.

ILLUSTRATION: ANOOP KAMATH

AERIAL PHOTOGRAPHY AND SURVEILLANCE

Aerial photography is the most popular use of the UAV. One can mount calibrated infrared, ultraviolet, thermal or normal visible light spectrum cameras. The better the resolution of the camera, the clearer will be the image even on magnification. Such cameras will enable the device to fly higher and thus acquire a broader swath of the surface area under scan. This will reduce the cost of acquisition of photographs of large tracts of land and also eliminate multiple missions. In the event infrared cameras are used, dependence on expensive satellite imagery for crop yield estimation can be mitigated. A satellite usually has a fixed window of timeline to overfly a given area. However, as a UAV can be flown at will, it bestows considerable flexibility to the user. UAVs can be employed to quickly estimate crop damage due to natural disasters and design schemes to compensate affected farmers to prevent penury caused suicides.

Survey of India has already switched over from manual methods of survey to use of UAVs mounted with calibrated cameras. All that is required now is to update existing maps for reduced crop/forest cover, advancing civilisation and change of course of rivers. A picture of the desired area taken from a UAV duly scaled, is used to update the old map. The UAV is the fastest way of getting topographical data of new areas.

Recently film makers too have taken to using camera mounted UAVs as the platform

that provides a vertical or a slant visage of the subject being filmed. This brings a totally new experience to the viewer. It has introduced an element of thrill in movies that are shot near steep fort walls. UAV-based filming eliminates the risk of crew and equipment falling over walls, thus, reducing the cost of photography and the associated insurance premiums.

UAVs can also be deployed to photograph areas along alignments where a new road or rail track is to be built. This data can be used by the concerned agencies to evaluate economic feasibility and work out costs. Contractors can prepare technical and financial bids based on the UAV imagery.

The vertical takeoff and landing capability of small UAVs enable them to be deployed in open shaft mines. The miners use explosives to loosen the earth to look for the desired minerals. This is where these versatile UAVs come in. The UAV can be flown to locate the best spot where the explosive needs to be planted to loosen the maximum earth. The UAV should then be used to see the best way to move in cranes and dumpers to extract the minerals after the blast. This will save time, money and also minimise the risk to human lives, thus increasing profitability of mining operations.

Contractors can use UAVs to acquire images of areas where they wish to start construction projects. This will enable them to estimate costs pragmatically and schedule their work to prevent cost and time overruns by keeping check on progress. Contractors can check with UAVs as to whether their onsite staff is working or not. The UAVs with suitable cameras can also check for onsite pilferages, other loss generating actions and safeguarding of assets by day and night surveillance of the areas of interest. It will be an excellent idea to carry out surveillance using UAVs over gated communities where security is paramount.

CARGO DELIVERY

Delivery of small size cargo including time-sensitive emergency medical supplies between hospitals such as implants or organs, can be done using UAVs. The UAV can fly along the shortest route to reduce delivery time, eliminate delays due to road congestion and accidents.

RADIO LINK

Radio shadow areas between transmitting stations can be covered by deploying UAVs having radio rebroadcast equipment. This will be particularly effective over wilderness, remote areas where either a plane has crashed or where a disaster has struck. The range of existing transmitters too can be enhanced by temporarily deploying such equipment mounted on a UAV.

DISASTER MANAGEMENT

When disaster strikes, usually all means of access, sustenance and recovery are devastated. It is a known fact that the maximum lives can be saved in the initial hours after a disaster. This is where UAVs can be really effective in restoring communication, assessing damage by sending photographs of the affected areas and flying in small succor and emergency supplies apart from establishing temporary links with the struggling areas as disaster relief forces rush in.

HARBOUR MANAGEMENT

Harbor management is a tricky aspect. This is so because unlike an Air Traffic Control tower that only has to keep alert and monitor aircraft flying in and out of the designated funnel so created, a harbour has boats and ships coming in at all times and from all directions. As a result, it is quite common to learn that small boats and trawlers keep colliding with each other. This problem can be mitigated to quite an extent if the Captain of the Port or the Harbour Master is provided with live feed obtained from the loitering UAVs both at day and at night. This will be very useful in foggy conditions if thermal cameras are mounted on UAVs. It will prevent loss of assets, lives and blockage of the limited harbour channels by preventing accidents.

REGULATORY ISSUES

A UAV can also be exploited by unscrupulous elements to cause damage to the society. Hence, there is a need to regulate the acquisition and usage of UAVs through a regulatory framework without crippling this asset.The policy framework can be the same as for private jets promulgated by Directorate General of Civil Aviation (DGCA) for the metro cities, sensitive installations and vulnerable areas such as airports, etc. For Tier-II and -III cities, rules need to be framed based on the damage potential an unscrupulous elent can command with a UAV. The nodal agency for this will be DGCA in consultation with the Indian Air Force base in the area. Where no air base exists, the nearest base of the Indian Army would have to be involved. For hinterland areas in the, the police would have to be involved.

> In disaster management, UAVs can be effective in restoring communication, assessing damage in the affected areas and flying in small succor and emergency supplies

A ceiling height should also be laid down, above which the UAVs should not be allowed to fly to avoid conflict with civil air traffic. This can be achieved by installing mechanical governors on the UAV flying consoles. The embedded programmes on board the UAVs that connect the operational command with the mechanical propellers too can be written is such a way that height restrictions can be imposed as default restrictions. Where the threat to commercial aircraft does not exist, such restrictions can be waived or specific permission be taken from the DGCA.

Air safety can also be ensured by the DGCA certifying the maximum all up weight and pylon configuration for each category of UAV that is acquired in India. Accordingly, vulnerable loads can be specifically defined to minimide accident-related collateral damage.

Air Traffic Management can be ensured by assigning specific flight paths between popular destinations and UAV density at any given time by the regional DGCA or the Airport Authority of India office. Evolution of flying protocols and promulgations will be done by involving all stakeholders. The public too be encouraged to report near-miss and hazardous operations by UAVs to enhance public safety. Any carelessness or violation of the laid down norms should be dealt with severely.

Each UAV acquired or built in India, should have a unique etched number, duly registered and traceable to its owner. The flyers entitled to handle the UAV should have formal training and each flight plan should be recorded online with the DGCA for forensic accountability. The UAV is an agile piece of airborne equipment, but its low-cost and easy availability should be monitored to prevent misuse. SP

PHOTOGRAPH: R. KAPUR

EXCLUSIVE

BAOA PRESIDENT ROHIT KAPUR SAYS IT HOW HE SEES IT

Importing foreign pilots to DIAL's big brother role, seaplanes and more, the third-time chief of the association gets candid about aviation with **Arpita Kala** of ***SP's Aviation***

Colonel Nathan R. Jessup (Jessup): You want answers?
Daniel Kaffee (Kaffee): I want the truth!
Jessup: You can't handle the truth!

REMEMBER THIS HEATED JACK NICHOLSON-TOM CRUISE exchange from the movie *A Few Good Men* (1992)? Well, if you need some cold-hard facts about general aviation in your face, meet Rohit Kapur, the President of Business Aircraft Operators Association (BAOA). Even finance minister Arun Jaitley couldn't dodge Kapur's truth-attack in the form of an open letter written in 2015 that began with "One more year for the hype of the Union Budget and one more year of disappointment for the Aviation Industry! So what's new?"

Fast-forward three years and things are more or less the same. He says, "There is nothing to speak about the budget as long as we are concerned, honestly. They are not treating us (business aviation sector) in any way, not motherly, not step-motherly, not fatherly...I mean there wasn't even a mention about us in the budget. So, it doesn't matter. It's disappointing, but then this budget is focused on a different segment of the society, so we aren't surprised."

SP's Aviation **(SP's): Has your open letter to Arun Jaitley in 2015 brought any changes?**

Kapur: That open letter to Mr Jaitley was something that came to my mind one fine day. I was thinking 'How do I approach him... can I go meet him? He'll probably not give me an appointment' and then I wrote the open letter, I am given to understand that he did read it.

We understand that government policies don't change overnight, it takes time. So, our job is to raise awareness for the government and tell them what our peeve points are. Ministry of Finance (MoF) has their internal compulsions. So, even if they hear and understand us, it's not every time that they can act on it. After all, we are considered the body that represents the issues of the ultra-high net-worth people, who use and own planes. There is a mindset that these are the people who can be taxed and you can take more money from them.

Our own requirements also change over time. Today ATF (aviation turbine fuel) is not a big pain-point, I think now we would like the ministry to address the infrastructure. All airports are full to capacity, they have overshot what they were designed for and the collateral damage of this has been general aviation. The airlines get first priority in terms of parking slots, landing etc and we get relegated in the background because we're not considered a public service.

SP's: What about the infrastructure plans for the RCS schemes?

Kapur: RCS is a great initiative, don't get me wrong, but it's meant for a particular segment and the government is catering to them. Business or corporate aviation is not about the hawai chappal people with all due respect, because they are not the people who travel in our aircraft. Our jets are used by business leaders, politicians and even for religious tourism, air ambulance, so it's not really the need of a common man. RCS will do well but whether it will trickle down to grow our industry vis-à-vis infrastructure remains a big question mark. I am not so optimistic because it is not set up for the kind of audience we cater to.

SP's: So, the posh tag associated with BA is not a stigma?

Kapur: It is an absolute stigma and we are trying for years to get the perception of the government right.

SP's: But you did say that BA caters to a luxurious clientele...

Kapur: Luxurious clientele is a word that can be used loosely. We would like to say that business aviation is a tool for economic development, used by business leaders of the country. These people travel to the interiors of the country to their factories, plants that are not easily connected by commercial air or train or road. Forget the domestically, a lot of Indian companies have gone global and they have to travel to these places where they have projects going which aren't easily accessible. So, BA is actually an enhancer to give flexibility to our business leaders in terms of their time management and you know, time is money. And, if they manage their time better, they will add to the productivity of the country. This is how we want the government to look at BA.

SP's: Tell us about the issues that BAOA has been successful in resolving since its inception?

Learn why savvy owners are turning to operating leases.

An operating lease is a popular financing tool that can provide you with the benefits of a private aircraft without the traditional risks of aircraft ownership. There are several different options, but in each case you do not take ownership of the aircraft, but have the full use of it as if you did. Plus instead of a large down payment, you put down a more modest security deposit and return the aircraft at the end of the lease term to Global Jet Capital.

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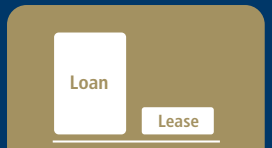
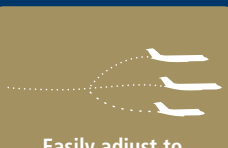


Allocation of Capital


Lower Residual Value Risk


Predictable Costs

Off Balance Sheet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Contact Simon Davies at +**1 (561) 235-1410** or email him at **sdavies@globaljetcapital.com**.
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GLOBAL JET CAPITAL

Kapur: We've had a fair amount of successes, not as many as we wanted but a considerable amount. The biggest will be that we have consolidated the industry as one voice. Besides that, we have taken several issues with the government and had them look at us favourably like the time for landing permits for foreign registered aircrafts used to be 7 days but we have gone down to 3 days, the Extended diversion time operations (EDTO) used to be 60 minutes and is now 90 minutes, and the YA number has been done away with.

We now have a standing committee with members from BAOA which works with the Directorate General of Civil Aviation (DGCA). Our issues are now being monitored at the Ministry of Civil Aviation level and we have a meeting with them every three months to update them on what's going on. So, we have more access now, which wasn't the case before. As far I see, operational issues are short-term...they will get resolved but infrastructure issues are long term and are looming large with no quick action from the government. We still need to iron out a lot of issues on GST, so we are also preparing a report to take it to the GST council.

SP's: With majority of the airports congested, do you think private business jet airports are a feasible idea?

Kapur: I think it's a welcome step, we have been talking about FBOs for a long time in this country. In fact, it's delayed...we were hoping they would have come up by now but with the whole new plan in place... it may take another one and a half or two years. My only caution here is that I know there are 2 of them (Bird ExecuJet and Indmar) therefore, it's not a monopolistic situation, however, the way the tenders have been set up with DIAL (Delhi International Airport Limited) in control, it's actually going to be so. The way the arrangements have been done with DIAL, there are a whole lot of extra charges that the users of the jets will get burdened with and they will have no choice but use either A or B (either of the two FBOs), which will be priced almost the same with DIAL as the big brother telling them what to do.

SP's: So what will be the remedy?

Kapur: Let the free market decide...I think DIAL should get out of the picture. Let them compete with each other fairly to get the business so that at least the users are not burdened. DIAL is in a situation where they just want to maximise their own profits, even though they have 2 concessioners, it still might be monopolistic. It's not really a fair competition.

SP's: Do you think politicians, who use private jets while canvassing for elections, become more considerate towards BA?

Kapur: Ministers have been using private planes to canvass for centuries. It's not that the previous regime didn't use private jets, I just think there are more forward-looking people now. Mr Sinha (Minister of State for Civil Aviation, Jayant Sinha) has global exposure, he sees how business aviation is handled in other countries. I think they are those people who want to make a difference. Civil Aviation Secretary Rajiv Nayan Choubey is a very positive person. I would say, he's one of the brightest and most effective secretary I have seen in civil aviation over years. I think the team is good in the ministry.

> "Business or corporate aviation is not about the hawai chappal people with all due respect, because they are not the people who travel in our aircraft"

SP's: What can be done to solve the qualitative pilot shortage issue?

Kanpur: There is a pilot shortage and it will only get worse. DGCA needs to allow the usage of foreign crew a little more liberally. Today it is a difficult process, it takes six months actually to get one pilot and when he comes in, he is allowed to fly for only the company he's come in for. We got to start thinking out of the box and becoming more flexible. Let's face it, there is a shortage of skilled manpower and we need global expertise to help us out. We have to obviously work on building our own manpower skills but the problem is that in the past, aviation has had intense highs and lows. The training of manpower in aviation has a gestation period. Last time when the boom happened, a large number of people went for training, when they returned it had become a bust and they were left sitting with no jobs for five years with huge loans for the training on their heads. So, people are scared to invest this amount of money in a cyclical industry.

SP's: What's your take on seaplane travel?

Kapur: Seaplanes are the buzzword today ever since the Prime Minister hopped into one. I think it's a great option for a country like us...we have a number of waterways and a huge coastline. For it to really take off, we need to get our regulations sorted.

I'm just going to divert a bit, why do you think the helicopter industry has been stagnant in this country for years? The same 300 helicopters are in use for the last 10 years...when BAOA was formed in 2011, we predicted that their number would increase to 800. Today, instead of 300 we are at 270 helicopters. So, you see that the growth hasn't happened for the simple reason that the regulator looks at these kind of products – seaplanes and helicopters, like they consider Airbus 320s and Boeing 737s. If you regulate it the same way, your ease of operation won't be the same.

Today in India, helicopters are only used to carry passengers from A to B, religious pilgrimage and certain areas for air ambulance. Meanwhile worldwide, helicopters are used for emergency medical services, they can land in the middle of a road and take a patient. They are used for power-line cleaning, controlling traffic, aerial photography etc...now all these roles are not being encouraged by the Indian regulator...they are over-regulating.

SP's: What do you think is the reason?

Kapur: I think it's just the mindset...just a very commercial airliner mindset of the people sitting in DGCA. When they think of aviation, they only think of Indigo, Air India, Vistara and SpiceJet, and not beyond that. But they are slowly changing. BAOA has been working closely with the DGCA and everyday is a fight. We are trying to make them understand that our issues are different, treat us differently because we are not an airline.

Sometimes they agree and in others they say 'If an Airbus 320 can do it, why can't you?' So, this mindset needs to change and my fear is that if their mindset doesn't change, seaplanes will go the same way. They are definitely not commercial airlines, they will be used for mainly commuting, making them more akin to general aviation. And for regulations...you don't have to reinvent the wheel, just look at the global practices and follow them. SP

MMRCA 2.0!

Reportedly, India is planning to come up with another Request for Information (RFI) to acquire modern multi-role combat aircraft for the Indian Air Force

By ROHIT SRIVASTAVA

THE INDIAN QUEST FOR REPLENISHING ITS DEPLETING COMBAT aircraft numbers is a saga of missed opportunities and bad planning. In 2007, the Indian Air Force (IAF) came up with a tender for 126 medium multi-role combat aircraft (MMRCA) which saw enthusiastic participation from some of the world's leading fighter manufacturers and was called 'mother of all deals'. The Indian leadership, both political and bureaucratic, planned to achieve many objectives from this deal.

They thought this deal, anticipated to be worth over $10 billion, will get India strategic relationship with Western power and the much-needed technology for self reliance in combat aircraft manufacturing. By inserting the offset clause, India planned to reduce the out flow of money from the national economy. All seemed perfect; but everything collapsed, forcing India to buy mere 36 aircraft for about Euro 7.86 billion in 2016, after a decade of floating the tender.

Reportedly, India is planning to come up with another Request for Information (RFI) to acquire modern multi-role combat aircraft for the IAF. If the RFI follows the standard procurement procedure, the finalisation of the deal will take not less than six years and additional 10 years to finish deliveries. In 2016, the IAF initiated a process to acquire around 100 single-engine combat aircraft which saw response from Swedish Saab offering Gripen E and American Lockheed Martin (LM) offering F-16 block 70. But the process which appeared to solve the problem in minimum time with substantial cost saving as both the contenders offered to manufacture the aircraft in India with significant technology transfer, did not go further as the government failed to put aside the demands for including twin-engine fighters in the requirement.

Now, it appears that the things have come back to where they were in 2007. If and when the RFI comes, most probably the contenders will be none other than the MMRCA bidders, barring one or two new entrant such as LM's F-35 and the Russian Su-35; at this point of time (notwithstanding some of the reports and sentiments indicate that India is showing interest in F-35).

The 2007 tender saw Boeing's F/A-18 Super Hornet, LM's F-16 Fighting Falcon, Swedish Saab's Gripen, Russian MiG-35, European EuroFighter Typhoon and French Dassault's Rafale which ultimately won the competition. Since 2007, the IAF's need for aircraft has skyrocketed to over 300 and in the coming decade, more aircraft will be phased out. The numbers required can reach 350.

PROBABLE CONTENDERS

F/A-18 Super Hornet

The Boeing's carrier-launched Super Hornet is considered as an all-weather fighter and attack aircraft. The twin-engine F/A-18 E/F, based on F/A -18 C/D, is a mid-wing, multi-mission tactical aircraft first rolled out in 1995 and entered service with the US Navy in 1999. On February 20, 2018, after a gap of 20 months, the first Super Hornet rolled out of the production line. The aircraft is expected to remain in service till 2030s.

F-16 Fighting Falcon

Considered as one of the most capable and combat experi-

F/A-18 SUPER HORNET

Empty Weight	F/A-18E: 32,100 lb (14,552 kg)
Max Takeoff Weight	66,000 lb (29,937 kg)
Thrust	Each engine up to 17,000 lbs
Carrier Bringback Payload	F/A-18E: 9,900 lb (4,491 kg) F/A-18F: 9,000 lb (4,082 kg)
Speed	Mach 1.6

SOURCE: http://www.boeing.com/defense/fa-18-super-hornet/

PHOTOGRAPH: US NAVY

enced fourth-generation multi-role fighter, the single-engine, F-16 Fighting Falcon is operational with 28 Air Forces across the world. Since, its introduction in the United States Air Force in 1979, the aircraft has seen multiple upgrades. In last four decades, more than 4,500 F-16s have been delivered to various Air Forces, latest F-16V configuration is expected to keep the aircraft relevant to current and future aerial combats.

Rafale

Winner of the MMRCA competition, Dassault's Rafale, developed for the French Air force and Navy to replace seven types of

F-16 FIGHTING FALCON

Length	49.3 ft / 15.027 m
Height	16.7 ft / 5.090 m
Speed	1,500 mph (Mach 2+)
Wingspan	31.0 ft / 9.449 m
Empty weight	20,300 lb / 9,207 kg
Engine thrust class	29,000 lb / 13,000 kg
Maximum TOGW	48,000 lb / 21,772 kg
Design load factor	9 g

SOURCE: https://lockheedmartin.com/us/products/f16.html?_ga=2.44295396.1723953368.1519451749-557114774.1519451749

RAFALE

Max. thrust	2 x 7.5 t
Limit load factors	–3.2 g / +9 g
Max. speed	M = 1.8 / 750 knots
Approach speed	less than 120 knots
Landing ground run	450 m (1,500 ft) without drag-chute
Service ceiling	50,000 ft
Overall empty weight	10 t (22,000 lbs) class
Max. take-off weight	24.5 t (54,000 lbs)
Fuel	
Internal	4.7 t (10,300 lbs)
External	up to 6.7 t (14,700 lbs)
External load	9.5 t (21,000 lbs)

SOURCE: https://www.dassault-aviation.com/en/defense/rafale/specifications-and-performance-data/

GRIPEN

Length over all	15.2 meters
Width over all	8.6 meters
Maximum takeoff weight	16500 kg
Max thrust	98 kN
Hardpoints	10
Maximum speed	Mach 2 (Supercruise)
Combat turnaround air-to-air	10 minutes

SOURCE: https://saab.com/air/gripen-fighter-system/gripen/gripen/the-fighter/gripen-e-series/gripen-e/

PHOTOGRAPHS: LOCKHEED MARTIN, DASSAULT AVIATION, SAAB

EUROFIGHTER TYPHOON

Max Speed	Mach 2.0
Thrust	90kN from each of the two EUROJET EJ200 turbofans
Length	15.96m
Max Altitude	Above 55,000ft
Wingspan	10.95m

SOURCE: https://www.eurofighter.com/the-aircraft

MIG-29K

Length, m	17,3
Wing span, m*	11,99
Height, m	4,4
Take-off weight, kg	
– standard	18 550
– maximum	24 500
Maximum flight speed, km/h	
– near ground	1400
– at high altitude	2200
Service ceiling, m	17 500
Maximum G-load	8
Ferry range, km	
– without drop tanks	2000
– with 3 drop tanks	3000
– with 3 drop tanks & one in-flight refueling	5500
Engines	RD-33MK
Take-off thrust, kgf	2x9000

SOURCE: http://www.migavia.ru/index.php/en/production/new-unified-family-of-the-fighters/mig-29k-mig-29kub

PHOTOGRAPHS: EUROFIGHTER, MIG

aircraft, is considered as an omnirole aircraft. India has already ordered for 36 Rafales for over seven billion Euros.

Gripen

The Swedish Gripen E, latest version of the aircraft, is a single-engine multi-role, fully NATO-interoperable, especially designed for 'future Network Centric Warfare (NCW) environment.' Currently, the Gripen is operational with Swedish, Czech, Hungarian, South African and Thai Air Forces. Brazil has also placed orders for 36 of these aircraft.

Eurofighter Typhoon

The Eurofighter Typhoon, in service with seven air forces, came second in the MMRCA competition. The swing-role fighter, equally capable of air-to-air and air-to-ground, first entered service in 2003. Till date, more than 500 aircraft have been delivered to various countries.

MiG-35

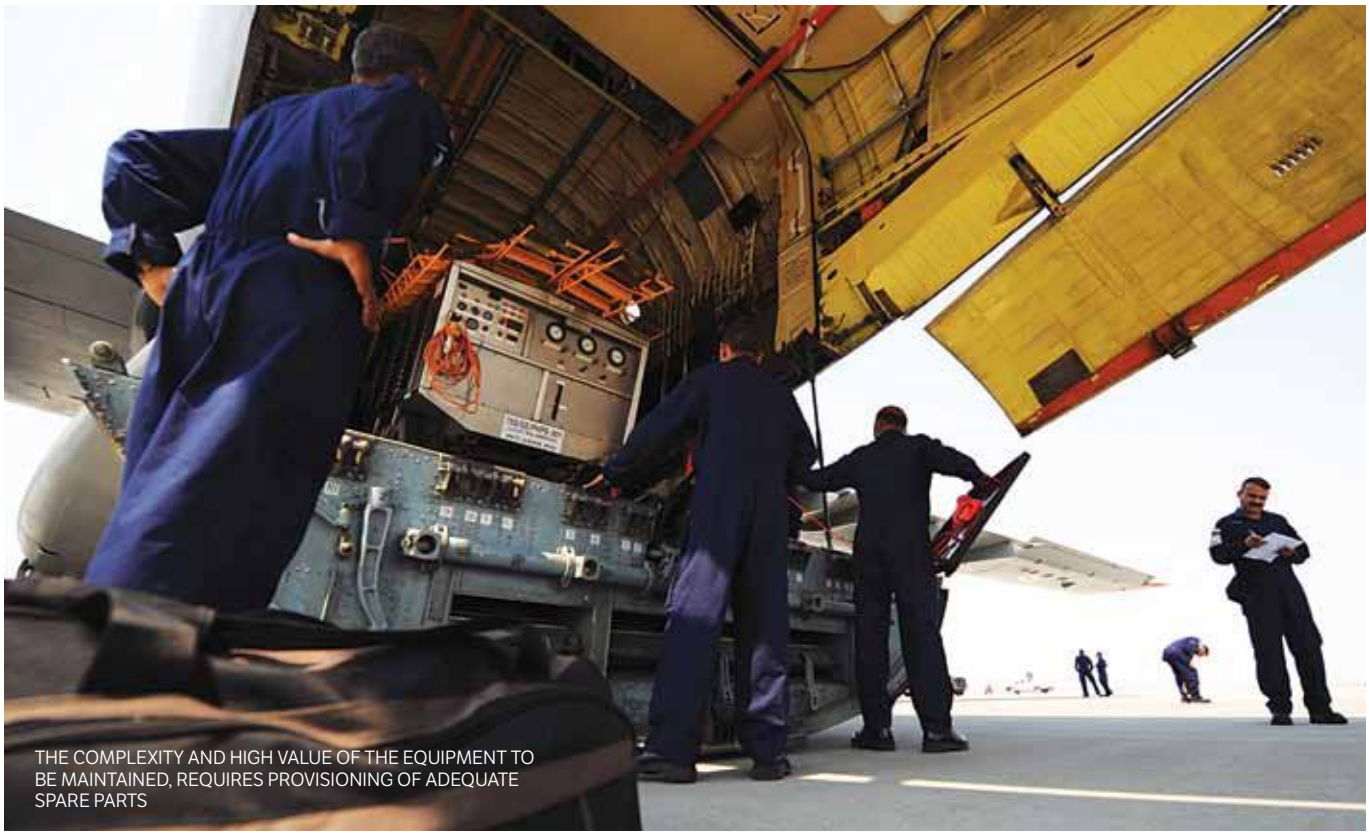
An advanced version of the MiG-29K/KUB fighters, the MiG-35 is equipped with the latest avionics and sensors, making it capable of handling fourth-generation advanced fighters. If demanded by customer, it can be powered by vectored RD-33MK engines and its cost of flying 'is almost 2.5 times lower than that of the MiG-29 fighter.'

Russia can also offer their latest Su-35 fighter which is considered as an advanced version of Su-30. Recently, China has deployed its Su-35 on the South China Sea. It is claimed to have the capability to counter fifth-generation fighters. Russia has also deployed its Su-35s in Syria in air dominance role against American fighters.

Finally, what will happen if US offers its fifth-generation F-35 stealth fighter? With its fifth-generation capabilities and falling prices, the F-35 will completely change the dynamics of the competitive tender. SP

EDITOR-IN-CHIEF'S TAKE

- **We need to seriously look at the horrific scenario of dwindling number of squadrons and must react to this unacceptable factor;**
- **We must look at the value for money factors while considering and rather reconsidering repeat of MMRCA scenario;**
- **Do we really need to remain complacent accepting the compromised level of capabilities or should we firmly demand "the latest and the best" for our most deserving air force? We must come clear on this;**
- **No step should be taken as an adhoc solution. We must now take long-term based, well measured and calculated steps to meet the requirements and to fill these gaps;**
- **We must keep in mind that our joint programme FGFA with Russia is also appearing to be reaching nowhere; in fact, it appears to be on the verge of being called off clearly hurting our ambition of having our own 5th generation fighter (a view point on the same appears on page 3 in this issue by an Air Marshal).**



THE COMPLEXITY AND HIGH VALUE OF THE EQUIPMENT TO BE MAINTAINED, REQUIRES PROVISIONING OF ADEQUATE SPARE PARTS

LINKING REVENUE WITH DESIRED SERVICEABILITY OF IAF FIGHTERS

Aviation maintenance operations require planning solutions that support "conditional" repair or "as required" planning capabilities as well as multiple demand and supply streams to optimise inventory assets

By AIR MARSHAL SUKHCHAIN SINGH (RETD)

PHOTOGRAPHS: IAF

THE ISSUE OF AIRCRAFT AVAILABILITY HAS BEEN A PROBLEM for the Indian Air Force (IAF) for many years. However, it has come to prominence in recent years largely because of the intense pressures on the defence budget. The decreasing allocation in real terms for revenue expenditure, requires the utmost efficiency from the IAF to offset the dwindling numbers of operational squadrons and delays in the new aircraft inductions. From the perspective of the Ministry of Defence (MoD), while the demand for higher allocations is genuine, the IAF must be fully geared up to utilise the available resources in a time-bound manner. There is hardly any merit in asking for more resources while the present capacity to utilise the available resources,

particularly those under the capital head, is constrained. The defence establishment must, therefore, look inward and find lasting solutions to procurement impediments.

In the regime of aviation, the complexity and high value of the equipment that is to be maintained, requires provisioning of spare parts. As aircraft availability is fundamental to air operations, low availability of spare parts will result in compromised operational capability and impose additional costs of expediting and failure recovery. Frequently, the required "time to repair" will be measured in hours rather than days – which will mean that spare parts inventories will have to be kept in several locations to minimise transportation time to the point of use, creating complex multi-echelon networks.

However, levels of spare parts availability has to be balanced by the need to keep inventory levels to a minimum. Sophisticated methods for determining Target Stocking Levels at each location, driven by desired levels of availability, cost constraints and by location is of course, a complex task. It is important to evaluate what the results will be in advance of putting the controlling inventory management configuration parameters into place. In some cases, the manufacturing life cycle may have finished before the service life cycle has even begun and planners may be faced with the need to calculate an "all time buy" quantity or to rely on repair or aftermarket parts distributors.

Aviation maintenance operations require planning solutions that support "conditional" repair or "as required" planning capabilities as well as multiple demand and supply streams to optimise inventory assets and throughput. Internal demand for Line Replaceable Units (LRUs), Shop Replaceable Units (SRUs), Sub-Shop Replaceable Units (SSRUs), components and consumables are dependent on 'as required' rates for a given system, which may vary by demand or customer environment.

The spares procurement in the IAF is based on the model of consumption pattern corrected by the forecast factor which depends on the projected utilisation of the war platform. The maximum potential of storage is defined by the stocks in hand plus those under contract and those indented. This potential cannot exceed five or three years holding depending on foreign or Indian vendors. This review of procurement is done annually and processed for contract through the delegated financial powers of the Air Officer-in-Charge Maintenance (AOM) at Air Headquarters or the MoD. If these reviews are not converted to contracts every year, it will adversely affect the sustainability of the fleet.

There is a serious contention on the spares so projected vis-a-vis the revenue budgetary allocations and one is forced to undertake some sort of prioritisation resulting in sub-optimal acceptance of the spares package which will affect the sustainability figures. Fleetwise revenue spending versus serviceability achieved on a year-on-year basis, should have been the yardstick to measure the efficacy of the procurement process. This has not been the model followed resulting in insurmountable unserviceability and nearly all the fleet of the IAF have been stuck at serviceability figures of about 60 per cent. This issue needs to be viewed with the spending versus outcomes in a modern IAF.

There are two models which need serious consideration by the IAF. These are, firstly changing the IAF provisioning system internally to make the sparing solution linked to cost of this solution with the achievable or desired serviceability of the war platform. Secondly, to look at the external vendors who can assure a desired serviceability of the platform by taking responsibility obviously at a cost on models based on Performance-Based Logistics (PBL). Both these are quantifiable and traceable models to assure sustainability, but, need deeper analysis internally to assess the needs for different fleets.

> To meet the objectives of PBL, both government and Industry must agree on business practices that provide the greatest value for all parties

AIRCRAFT SUSTAINABILITY SPARING MATHEMATICAL SOLUTIONS

Equipment and supply chain managers are often required to estimate the parts they will need to sustain a system. Such systems are typically composed of major components namely structural elements, engines, electronics, communications, power, hydraulics, etc., which, in turn, are composed of a multitude of different parts. When failures occur, those components must be repaired or replaced with a spare part before the system can resume operation. Managers must walk a fine line between buying too few spare parts and having their systems sit idle or buying too many parts and wasting valuable resources.

Multi-Echelon Technique for Recoverable Item Control (METRIC) Inventory Optimisation is a set of algorithms that calculates supply requirements to support a desired availability target or service level across a network of repair locations. These targets are either called out by maintenance contracts or internally determined. METRIC can apply service level targets specified as aircraft availability fill rates, allowable backorders and their rates, etc. Fleet availability, the probability that an aircraft is airworthy at any point in time, is a common optimisation criterion. METRIC calculates the target stocking levels and fill rates required to achieve the desired fleet availability or part fill rate target. With METRIC, overall supply and repair costs are minimised.

This is a mathematical approach to determining the optimal spares mix for a system by directly relating investment in spare parts to system readiness. It provides the best way to retune inventory investments, minimising costs without sacrificing the mission or maximising system availability for a given budget constraint. The system approach to sizing spares inventories has been adopted, in varying degrees, by each of the US military services and has been of official policy of the Department ofr Defence since 1985. The Aircraft Sustainability Model followed in the US is an example of this approach.

PERFORMANCE-BASED LOGISTICS (PBL)

The defence services face numerous challenges—data rights, obsolescence, frequent software upgrades, multiple configurations and many more. Airlines and governments the world over are improving their efficiency through better management of spare parts inventory, using a collection of practices that reduce the size and cost of spare parts inventory and shift more of the risk to outside parties. Operators are turning to outside providers of aftermarket services for material management programmes that promise to handle repair and maintenance of major components, including provision of spares with guarantees for parts availability. Traditionally and for the foreseeable future, the MoD and the IAF do prefer sustainment to

be completed in-house or by local, indigenous industry. They look to the original equipment manufacturers to work with local industry in order to establish maintenance capabilities to quickly support the fleets in-country rather than relying on international sources that could delay availability for an aircraft due to complex and time-taking import and export procedures.

The goal of both acquisition and sustainment is to gain the most efficient and effective performance of the system for its entire life. In doing so, it is important to realise that acquisition and sustainment are not separate, but are simultaneous and integrative issues that require analysis and synthesis throughout the product life cycle.

FLEET AVAILABILITY, THE PROBABILITY THAT AN AIRCRAFT IS AIRWORTHY AT ANY POINT IN TIME, IS A COMMON OPTIMISATION CRITERION

PBL is the purchase of support as an integrated, affordable, performance package designed to optimise system readiness and meet performance goals for a weapon system through long-term support arrangements with clear lines of authority and responsibility. Application of PBL may be at the system, sub- system or major assembly level depending on the circumstances and appropriate business case analysis.

The essence of PBL is buying performance, instead of the traditional approach of buying individual parts or repair actions. PBL support strategies integrate responsibility for system support in one or more Product Support Integrators (PSI), that manage sources of support, public and private, in meeting the negotiated performance outcomes.

A major challenge for conversion to a PBL environment is to adopt business practices more common in commercial organisations. To meet the objectives of PBL, both government and industry must agree on business practices that provide the greatest value for all parties.

PRIVATE SECTOR PARTICIPATION IN PBL

It is very important to have a meticulous process to deal with the entire supply chain in support of the war platform. PBL can be at sub-assemblies only or entire mission systems.It is therefore important that all mechanisms are well placed so the PSI can manage all the suppliers and parts as well as the logistic processes.

In this context, it is crucial to have an integrated IT infrastructure to support the PSI. The more complex a PBL is, the more relevant the IT infrastructure becomes. Companies such as SAP have developed cutting-edge solutions to successfully support the implementation of PBL in the aerospace and defence market. When a PSI chooses its IT infrastructure, it is important to consider the level of accountability that it will provide when it comes to on-time delivery, meantime between failure (MTBF), meantime between removal (MTBR), production lead time (PLT) and Inventory Turnover Rate (ITR). By having the right tools in place, the PSI will be able to share the results with the service and also have full visibility of what is necessary to achieve performance targets. The ASM model based on METRIC and similar models need to be tailored for the Indian environment which will be required for the PBL contractor.

In the past 15 years, several international defence companies have been repositioning themselves as service providers rather than pure equipment suppliers. Additionally, they have been involved more in operating defence capabilities, which has proved to be highly effective allowing the military to better understand the functionalities of weapon systems.

A first consideration is whether or not PBL support will have financial benefits for the contractor. Support services, especially performance based strategies, are increasingly becoming part of the value proposition of defence companies bidding for defence programmes. However, PBL is a long-term commitment that requires contractors to balance risks and reward through vigorous financial analysis. Secondly, as part of the bid to increase awareness of PBL in the MoD, contractors must clarify the results and expectations as also build a case for public-private cooperation.

Finally, it is important for the private sector to understand the dynamics of different markets in order to better leverage the use of PBL. Moving forward, the institutionalisation of Public Private Partnership should be encouraged in order to facilitate the understanding between the military and the manufacturers when it comes to service support to achieve performance. In order to be successful in implementing PBL, such benchmarking and improvement processes need to become routine for an organisation rather than ad-hoc actions.

Under the C-17 Globemaster III Sustainment Partnership with the US Air Force, Boeing is responsible for all C-17 sustainment activities. Boeing also partners with three US-based C-17 Air Logistics Centres. Boeing performs supply support management for more than 95 per cent of the C-17's repairable parts. Exceeding contract requirements with a 92 percent issue effectiveness rate for assigned repairable items, PBL has been helping the C-17 achieve the highest readiness of any airlifter and has generated cost savings.

> It is important for the private sector to understand the dynamics of different markets in order to better leverage the use of PBL

It is important to note that, although the fundamental concept of buying performance outcomes is common to each PBL arrangement, the strategy for any specific PBL programme must be tailored to the operational and support requirements of the end item. While similar in concept, the application of PBL for a tactical fighter aircraft may be very different from a PBL strategy for an Army ground combat system. There is no one-size-fits-all approach to PBL. Similarly, there is no template regarding sources of support in PBL strategies. SP

KID OF THE FORCES, SHOOJIT SIRCAR, RE-LIVES HIS CHILDHOOD MEMORIES

From riding elephants to being an ace sportsman, the Vicky Donor and Piku director shares what life was like in the Indian Air Force camp

By ARPITA KALA

PHOTOGRAPH: SHOOJIT SIRCAR / FACEBOOK

ACE DIRECTOR SHOOJIT SIRCAR IS THE FLAVOUR OF THE INDIAN cinema at the moment with his latest releases *Piku* (2015) and *Pink* (2016) giving the audience a slice of real life on reel. But, his childhood experiences of staying in Indian Air Force (IAF) camps in Hasimara by the river Teesta and Barrackpore in North Kolkata seem to be no less than a hit movie script.

LIFE IN A CANTONMENT

With his father serving in the IAF, young Sircar had an array of amusements at his disposal in the cantonment such as riding trained elephants at the wildlife sanctuary in Harsimara. However, not all was fun and games, as all defence progeny know very well. It has been reported that Sircar and his family, had to take underground shelter like many others during the 1971 war.

Yet, when asked about his childhood growing up with an IAF background, the director-producer says, "My childhood was very normal. I never paid attention to studies because I was very much into sports. Even my parents were cool about it and used to let me play. Sports have many advantages and if you let a child play all the time then he can remain stress-free. Though, I would not deny that my parents didn't compare me with other children but my case was not that severe as compared to today's times." Schooled in Kendriya Vidyalaya in Andrews Gunj, Delhi and Barrackpore, Kolkata, Sircar's special memory has to do with exams, of course!

He told us, "I had some dreaded examination memories. I used to take maximum exam pressure because I was a poor student. I also feared result days because I knew I would get bad scores and my dad would get really mad at me."

DEFENCE STRONG, OFFENCE NONE

Shoojit may have shared some of his experiences in movies such as *Yahaan* (2005) and *Madras Cafe* (2013) but is in no mood to call it quits over the genre just yet. In response to our question if he would make more films inspired by the defence forces, pat came the reply,"The armed forces are doing their job and I have full respect for the kind of risks they take. I will definitely make a film on the Indian Air Force or Army."

But when asked about his take on the issues surrounding the release of *Aiyaary*, the new defence drama starring Manoj Bajpai and Sidharth Malhotra, Sircar spoke from his own experience. He says, "I really don't know what the issue is all about but I can tell you about my film. In *Madras Cafe,* Army and politics were involved but I didn't go through that much pressure at that time as compared to the films now. I didn't take any help from the Indian Army for the film I had made. We are a democratic country but whenever somebody makes a film it is always so that somebody or the other will surely protest. Just like they have every right to protest, we also have right to make a film and we have government bodies to decide what's wrong and right." SP

> "The armed forces are doing their job and I have full respect for the kind of risks they take. I will definitely make a film on the Indian Air Force or Army," says Shoojit Sircar

COMPONENTS CALLED THE SHOTS

Without any big ticket aircraft deal, the industry focused more on components, maintenance, repairs and overhauls contracts

By ROHIT SRIVASTAVA

ONE OF THE LEADING AIRSHOWS IN THE WORLD, THE Singapore Airshow 2018, held at the Changi exhibition centre from February 6-11, was high on component and service contracts but low on aircraft deals. The show saw the debut of What's Next @ Singapore Air show which gave opportunity to nearly 70 start-ups from nine countries, including China, India, Israel, Japan, Malaysia, Russia, Singapore, United Kingdom and the United States, to showcase their latest innovations, interact and pitch their 'business ideas and offerings to potential investors, accelerators and corporate partners.'

The highlight of the static display at the show was the Lockheed Martin's fifth generation F-35B Lightning II, the world's first supersonic short takeoff/vertical landing (STOVL) stealth aircraft. Also, Gulfstream G500 and G600 aircraft made their Asia debut.

The Managing Director of Experia Events, organisers of Singapore Airshow, Leck Chet Lam, said, "By focusing on both vital aviation-centric technologies like avionics and connected aircraft, predictive maintenance and additive manufacturing, as well as innovations in the areas of cyber security and autonomous technology, the Singapore Airshow will empower stakeholders to effectively harness the vast potential of technology innovation to shape the industry's future."

Around 1,062 companies from 50 countries showcased their products and innovations to around 50,000 trade visitors, 10 per cent more than last edition, and 287 VIP delegations. The organisers claimed that "over 70 per cent of exhibitors have committed to returning to the Singapore Airshow 2020." It attracted nearly 80,000 visitors during the public days that were

PHOTOGRAPH: ASDS MEDIA

treated to the flying display by the Republic of Singapore Air Force (RSAF)'s aerobatics team, "comprising of an F-15SG with a special livery to commemorate RSAF's 50th anniversary, along with two F-16Cs fighter jets." The Royal Thai Air Force (RTAF)'s JAS-39 C/D Gripen made its first appearance at the show.

SINGAPORE AIRLINE-ROLLS-ROYCE SIGNS $1.7 BILLION CONTRACT FOR TRENT ENGINE

Singapore Airlines signed a $1.7 billion contract with Rolls-Royce for supply of Trent 1000 engines for 19 Boeing 787 Dreamliner aircraft. It also includes engine support service through the Rolls-Royce's flagship TotalCare®.

"The signing comes as the airline prepares for the entry into service of its first 787-10 aircraft powered by the latest version of the Trent 1000, the Trent 1000 TEN (Thrust, Efficiency, New Technology). A full-size Trent 1000, which is on display at the Rolls-Royce stand and has been a great attraction for visitors, provided the backdrop for the signing," Rolls-Royce said in a statement.

In 2013, SIA Group had ordered for Trent 1000 engines for 50 aircraft.

GULFSTREAM G500 AND G600 MAKE ASIA DEBUT

The show saw the Asia debut of the flight-test aircraft of Gulfstream G500 and G600 which were part of the company's static display. "Customers based in the Asia-Pacific region require aircraft that have the range, speed and payload capacity to travel easily between world business centers. Each aircraft we're showcasing in Singapore, including the G500 and G600, is at the top of its class. We're excited to have the G500 and G600 in Asia, so customers can explore their exquisite interiors, unparalleled comfort and superior craftsmanship," said Mark Burns, President, Gulfstream.

There are more than 330 Gulfstream aircraft in service in the Asia-Pacific region, out of which, 280 of them are large-cabin.

"Following impressive regional growth since 2012, we have continued to invest in and grow our customer product support network which now includes Gulfstream Beijing, our service center; two additional Gulfstream-authorised service centers; four Gulfstream-authorised warranty facilities; and 10 field service representatives," said Derek Zimmerman, President, Gulfstream Product Support.

LEAP ENGINE ON TRACK TO REACH ONE-MILLION FLIGHT HOURS

Speaking on the success of LEAP engine, Gaël Méheust, President and CEO of CFM International, "The fleet is on track to reach the one-million flight hour milestone after less than two years of service, which is unprecedented for a new engine. Most importantly, though, is the fact that our customers are very, very pleased with all that the engine is delivering – fuel efficiency, reliability, and industry-leading utilisation level of 96 percent of available days flown."

LEAP gives 15 per cent fuel efficiency along with reduction in CO2 emissions and reductions in engine noise. Since, the first commercial flight in August 2016, CFM International's advanced LEAP engine has logged over 600,000 flight hours. Around 210 LEAP-1A and LEAP-1B-powered aircraft are operational with 33 airlines across the globe which has logged more than 610,000 flight hours in 290,000 flight cycles.

BOEING WILL BEGIN DELIVERY OF 737 MAX 10 IN 2020

Boeing has firmed up the configuration of its 737 MAX 10 aircraft, company made the announcement during the show. The fuselage of the aircraft is 66 inches longer than the MAX 9 and will carry 230 passengers. It is expected to save around five per cent in trip cost in comparison to its rivals.

"The steps we've taken to reach this point ensure the MAX 10 will be the most efficient and profitable single-aisle airplane the market has ever seen. We're working closely with our airline customers to deliver on the performance and efficiency benefits we've promised," said Randy Tinseth, vice president of Marketing, Boeing Commercial Airplanes.

The aircraft was launched at the Paris Air Show, 2017 and Boeing has received 416 orders from 18 customers worldwide. The deliveries are expected begin in 2020.

BOEING GETS SERVICES ORDER WORTH A BILLION DOLLARS

Boeing, during the show, announced receiving services orders worth nearly one billion dollars which includes demand for spare parts, modifications, training and its aviation solution software Boeing Analytx. "Boeing is serious about helping customers optimise the performance of their fleets and reduce operational costs throughout the lifecycle. Predicted growth for aerospace services in the Asia Pacific brings opportunities to partner with local industry to understand the region's greatest needs, invest in new capabilities to meet those needs, and then bring them to market quickly," said Stan Deal, President and CEO of Boeing Global Services.

> Singapore Airshow is important to the world's fighter manufacturers as Asia imports 24 per cent of the world's combat aircraft

EMBRAER DEFENSE TO DELIVER 6 KC-390 TO SKYTECH

Embraer Defense & Security signed a Letter of Intent(LoI) with military aviation service provider SkyTech for six new multi-mission KC-390 transport aircraft. They also agreed to jointly explore opportunities in the area of training and services.

"We have been following the KC-390 program since its inception and believe that it will be a game-changer in the medium-sized airlift category as well as a multi-role platform", said Paulo Mirpuri, President of SkyTech.

Speaking on the LoI, Jackson Schneider, President and CEO of Embraer Defense & Security, said, "Embraer is keen to have SkyTech as a strategic partner for some of our own planned projects, where we see them adding value and enhancements by providing various ongoing solutions to our own defense customer base."

The KC-390, a tactical transport aircraft, can carry upto 26 tons of cargo under all kinds of operational environments and can also land at unprepared runways.

EMBRAER EXPECTS OVER 3,000 AIRCRAFT DELIVERIES IN ASIA-PACIFIC

In a market forecast released during the show, Embraer Commercial Aviation estimates deliveries of 3,010 new aircraft of upto 150-seats to the airlines in the Asia-Pacific region over next two decades. The worldwide estimation for the segment is over 10,550 aircraft in next 20 years.

On the market forecast, César Pereira, Vice-President for Asia-Pacific, Embraer Commercial Aviation, said, "The ongoing over-capacity and intense competition in the region has prevented airlines from delivering higher profits. In this regard, the E-Jets E2 can help airlines to open new markets at the lowest possible risk, complement larger fleet types to maximise profit, and achieve sustainable growth with higher profitability."

"We continue to identify to airlines opportunities in markets that are currently underserved or not served at all. With the E2's, we can offer great operational flexibility, broaden the network reach to Tier-II and -III cities, adding frequency to build competitive advantage and access to more airports without any limitations," he added.

SIA ENGINEERING AND GE AVIATION TO FORM JV

SIA Engineering Company Limited (SIAEC) and GE Aviation (GE) will join hands to form an engine overhaul joint venture based in Singapore. GE will hold 51 per cent of the stake in the collaboration and rest will be with SIAEC.

On the JV, Png Kim Chiang, Chief Executive Officer of SIAEC, said, "SIAEC is pleased to partner with GE to create a state-of-the-art facility in Singapore, which is strategic to broadening our capabilities on next generation aircraft. The joint venture will leverage on the joint strengths of GE's technical knowhow and SIAEC's MRO experience, to offer high quality and competitive maintenance solutions for GE engines."

"This partnership with SIAEC is a fitting extension of our growing relationship. The new joint venture will ensure our GE90 and GE9X operators have access to high-quality maintenance, repair and overhaul capabilities," said Jean M. Lydon-Rodgers, President and Chief Executive Officer of GE Aviation Services.

PAPUA NEW GUINEA RENEWS 'SMART AIRPORTS' CONTRACT WITH ROCKWELL COLLINS

To accommodate the new security requirements and initiatives of the International Air Transport Association (IATA), the National Airports Corporation (NAC) of Papua New Guinea has renewed its contract with Rockwell Collins' ARINC Airport Solutions for its Port Moresby Jacksons International Airport – country's main airport. The East Asian country has 22 airports under NAC and it plans to convert 15 of them into smart airports by 2030.

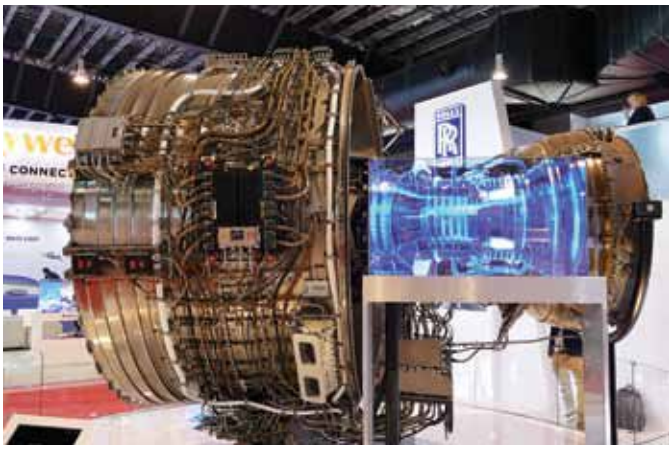
"The latest version of vMUSE will optimise business operations by providing the NAC with data analytics to monitor what's working and what needs further attention," said Yun Chong, global head of sales, Airport Systems for Rockwell Collins. "We are honored to be a part of NAC's smart airports mission and value our collaborative relationship in customising a solution for POM."

Managing Director and Chief Executive Officer of the NAC Richard Yopo said, "Our work with Rockwell Collins dates back five years. We are confident that with the deployment of these solutions, we will be able to improve the passenger experience, streamline the passenger reconciliation processes and strengthen security at the airport."

ASIA–PACIFIC HAS POTENTIAL FOR 750 TURBOPROPS – ATR

Global leader in turboprop aircraft, ATR anticipates huge demand for the company's aircraft in the Asia-Pacific region. Company foresees demand for around 750 turboprops airplanes in next 20 years in the region. This does not include China.

Asia-Pacific is ATR's largest market globally accounting for over one third of the global fleet. As of today, there are nearly 1,200 ATRs around the world, of which some 420 are in Asia-Pacific.



(TOP) ROLLS-ROYCE TRENT 1000 ENGINE; (MIDDLE) GULFSTREAM G600 MADE ITS ASIA DEBUT IN SINGAPORE AIRSHOW; (ABOVE) BOEING 737 MAX 10.

"Asia-Pacific is a fast-developing region of the world with strong economies, but there is a real need for greater air connectivity in the region to further drive economic growth. ATR are the best aircraft for developing new air routes and new markets. In 2017, our aircraft created 70 new routes in Asia Pacific alone, thus bringing regional connectivity to new places and expanding business opportunities for regional carriers," said ATR CEO Christian Scherer.

PHOTOGRAPHS: ROLLS-ROYCE, GULFSTREAM, BOEING

(TOP) JOHN SLATTERY WITH THE PROFIT HUNTER;
(MIDDLE) BOMBARDIER Q400 ON STATIC DISPLAY;
(ABOVE) AIRBUS A350-1000 ON STATIC DISPLAY

PHOTOGRAPHS: EMBRAER, ASDS MEDIA

PIPER TO SELL 152 AIRCRAFT TO CHINA

Piper Aircraft, manufacturer of trainer and general purpose turboprop aircraft, signed a contract worth $74 million with Chinese Fan-Mei Aviation Technologies for 152 aircraft with follow on order of another 50 aircrafts. This is company's biggest-ever order for trainer aircraft. The deal includes 100 Archers, 50 Seminoles and one each of the Seneca and M350 aircraft.

The delivery for the order is expected to commence next month with the first aircraft going to the Fanmei Flight School in Sichuan province.

AIRBUS EXPLORING MILITARY NEO

Airbus is looking into a possibility to introduce a military version of the A320neo aircraft capable of military missions like intelligence, surveillance and reconnaissance; maritime patrol and communications. Company believes that the efficiency of these engines will increase the capability of the military aircraft. Airbus expects the conversion of the aircraft to neo will take around eight months. Company is discussing its possibility with armed forces of various Asia-Pacific nations.

AIRBUS COMPLETES FIRST FLIGHT DEMONSTRATION OF PARCEL DELIVERY DRONE 'SKYWAYS'

Airbus, on February 8, successfully completed the first demonstration flight of its parcel delivery drone 'Skyways' at the National University of Singapore (NUS). Airbus Helicopters' Skyways "took off from its dedicated maintenance centre and landed on the roof of a specially designed parcel station where a parcel was automatically loaded via a robotic arm."

In February 2016, Civil Aviation Authority of Singapore (CAAS) launched an experimental project to develop an unmanned air delivery system. In April 2017, Singapore Post (SingPost) became the local logistic partner to the project.

"Today's flight demonstration paves the way positively to our local trial service launch in the coming months. It is the result of a very strong partnership among the stakeholders involved, especially the close guidance and confidence from the CAAS," said Alain Flourens, Airbus Helicopters' Executive Vice President of Engineering and Chief Technical Officer.

Giving SingPost perspective, Alex Tan, Group Chief Information Officer, said, "The trial service that is taking off later this year will be an important step forward for SingPost in our efforts to develop solutions for the future logistics needs of Singapore and other cities of the world."

This project seeks to develop an economically viable unmanned aerial parcel delivery system for dense urban environment.

PUTTING THE ASIAN FIGHTER MARKET IN PERSPECTIVE

Singapore Airshow is important to the world's fighter manufacturers as Asia imports 24 per cent of the world's combat aircraft exports by value which is second-largest import fighter market in the world, after the Middle East. Over the past 10 years, a total of 561 jets worth $39.1 billion in 2018 dollars were exported by the world's fighter manufacturers, excluding Russian and Chinese designs. Of these, 128 aircraft worth $9.2 billion went to Asian countries, including Australia.

The Asian fighter market is also growing at a strong pace; the region's fighter order backlog is considerably larger than the historical market. Almost 200 Lockheed Martin F-35s are on order for Australia, Japan and South Korea, with Singapore likely to join the F-35 club in the next 10 years. More Korea Aerospace Industries T-50/FA-50s are on the way for Thailand, with more likely for the Philippines. Regional demand for major upgrade packages, such as the South Korean, Singaporean and Taiwanese F-16 enhancement programmes, mean further work for Western fighter primes.

With the Asia-Pacific market showing no signs of abating, both on the commercial aircraft and fighter aircraft requirements in the future, Singapore Air show seems to have a prosperous future as the favourite meeting ground for the buyers and the sellers. SP

JUAN TRIPPE
(1899-1981)

Trippe's visionary move was to persuade Boeing to build the Boeing 747 "Jumbo Jet", a new generation wide-body airliner that was much larger than the Boeing 707

BEGINNING IN THE EARLY 1930S, PAN AMERICAN WORLD Airways, better known as Pan Am, dominated the international aviation scene for about four decades. "America's airline to the world" was the first to fly across the Pacific and the Atlantic Oceans, the first to feature American-built passenger jets and the first to order the Boeing 747. It also introduced around-the-world air service in 1947 and pioneered low-cost tourist seats in 1952 at a time when the entire industry was still of the "flying is for the well-heeled" mindset. And the man who was practically synonymous with Pan Am was Juan Trippe. Trippe started small, using a hired Fairchild FC-2 single-engine float-plane on a lone 90-mile route between Key West, Florida and Havana, Cuba in 1927. He made use of every advance in the design and capability of commercial aircraft and built his airline practically singlehanded. By the time he left Pan Am in 1968, it was a truly global carrier extending over 80,000 miles and linking the United States (US) with 85 countries.

Juan Terry Trippe was born in Sea Bright, New Jersey, on June 27, 1899. Although he was of European descent, he was commonly mistaken for a Hispanic because of his first name. He joined flight training with the US Navy when America entered World War I in 1917. However, soon after he completed training in June 1918, the War ended. But his brief flying stint made him realise the enormous potential of this new mode of travel. He managed to persuade some of his wealthy friends to join or finance him and formed the Aviation Corporation of America in June 1927, to offer air services into the Caribbean. He also managed to rope in Charles Lindbergh for a nationwide goodwill tour and later as pilot for survey flights over new routes in South America. After its modest launch on October 28, 1927, the airline that would later be known as Pan Am rapidly expanded. Its fleet of Boeing 314 Clipper long-range flying boats linked a large number of destinations across both the Pacific and the Atlantic oceans. Delivering mail and passengers, the Clippers gained a well-deserved reputation for dependability, excellence and elegant travel. The US government also awarded Pan Am practically every foreign airmail route for which it bid, thanks to Trippe's diplomatic skills and his close association with Charles Lindbergh.

Juan Trippe soon saw the folly and injustice of restricting air travel to the elite. He said, "The true objective is to bring to the life of the average man those things which were once the privilege of the fortunate few," and took it as a personal mission to bring aviation services within the means of the common citizen everywhere. When World War II ended, he introduced a "tourist class" from New York to London, cutting the round-trip fare by more than half to $275. But this put him on the wrong side of the International Air Transport Association (IATA) and attracted fierce opposition from the entrenched carriers who saw nothing wrong in fixing fares and fixing them high. Trippe stuck to his guns and a few years later most airlines began to introduce tourist class on their planes.

Trippe was highly impressed when the first commercial jets appeared on the scene and placed a sizeable order for Boeing 707 and Douglas DC-8 airliners. Pan Am's first scheduled jet service was on October 26, 1958. Its Boeing 707 "Clipper America" linked New York and Paris, taking half the time and carrying twice as many passengers as the propeller-driven Boeing 377 Stratocruiser it replaced. Pan Am was consequently able to fly more passengers and lower its fares. The journey also became far more comfortable since the jet could fly at altitudes largely free of the stormy Atlantic weather.

Another of Trippe's visionary moves was to persuade Boeing to build the Boeing 747 "Jumbo Jet", a new generation wide-body airliner that was much larger than the Boeing 707. Pan Am played a key role in influencing the design of the new airliner and was its launch customer.

Juan Trippe made Pan Am one of the most influential and important American carriers ever. But his talents were not restricted to aviation. He was also one of the first to identify the symbiotic link between the airline and the hotel industry. Through Pan Am he set up and developed the InterContinental Group Hotel Company which grew into a chain of 222 hotels worldwide by 1996. He left Pan Am in 1968 and the carrier's slide began soon thereafter due to overexpansion of routes and too many Boeing 747s ordered. The oil price shocks and consequent economic recession of the 1970s, didn't help. Trippe died after suffering a stroke on April 3, 1981. The iconic airline he started went into bankruptcy and ceased operations in December 1992. SP

— JOSEPH NORONHA

MILITARY

ASIA PACIFIC

ANTI-SUBMARINE WARFARE (ASW) AIRCRAFT FOR SOUTH KOREA

South Korea's acquisition agency, Defence Acquisition Programme Administration (DAPA), has decided to purchase additional ASW aircraft from an undisclosed foreign supplier. While the statement also failed to mention how many aircraft would be purchased, their cost or expected delivery, it is known that the South Korean Navy wants to add six more ASW aircraft to its existing fleet of 16 P-3C and P-3CK Orions already in service. A contract is expected to be signed in the second half of 2018. Boeing's P-8 Poseidon and Saab's Swordfish, are reportedly among the candidates.

CHINA INDUCTS J-20 INTO PLAAF

On February 9, 2018, China commissioned its first stealth fighter aircraft in People's Liberation Army Air Force (PLAAF), reports Chinese state-run news agency Xinhua. This makes China the second nation after the United States to have a homemade stealth fighter. This is a big development as China can now field its stealth fighter in the Indo-Pacific region against the US and Japanese stealth F-35. Quoting a spokesperson of the PLAAF, the agency reported that the J-20 will comprehensively improve Chinese Air Force's combat capabilities. Exercise Red Sword 2017 conducted recently by the PLAAF in Tibet, saw the first operational deployment of this aircraft. Reportedly, the air superiority aircraft is expected to join the 9th Brigade of the PLAAF which is deployed facing South China. The J-20 is expected to fly together with Russian made PLAAF's Su-35 fighters, which were ordered by China in 2015. China paid $2 billion for 24 Su-35 and the aircraft were delivered by Russia by 2017. The J-20 is a fourth–generation fighter jet.

AMERICAS

NEW WEAPON SYSTEM FOR SIKORSKY S-70M AND S-70I BLACK HAWK

Lockheed Martin has announced that a new comprehensive weapon system designed for the Sikorsky S-70M and S-70i Black Hawk helicopters has received military standards qualifications. In development since 2011, the system is capable of being integrated into existing avionics and provides Black Hawk pilots with the ability to traverse rapidly between forward firing guns, rocket pods and laser-designated air-to-ground missile launchers onto static or moving targets with high accuracy.

BELL'S V-280 JOINT MULTI-ROLE TILTROTOR

Bell Helicopter's Air Vehicle Concept Demonstrator aircraft, funded under the Joint Multi-Role Technology Demonstration (JMRTD) programme, was flown for the first time by an Army pilot on February 7, 2018. The JMR TD is an Army science and technology effort designed to develop, expand and demonstrate new capabilities in vertical lift technology. The US Army Aviation and Missile Research, Development and Engineering Centre (AMRDEC) leads the JMR TD effort. It is a precursor to the Department of Defence Future Vertical Lift programme.

LOCKHEED MARTIN DELIVERS 400TH C-130J

Lockheed Martin reached a major milestone with the delivery of its 400th C-130J Super Hercules aircraft on February 9, 2018. This Super Hercules is an MC-130J Commando II Special Operations aircraft that is assigned to the US Air Force's Special Operations Command (AFSOC). This platform is the current production model of the legendary C-130 Hercules aircraft, with operators in 17 nations. To date, the global fleet of C-130Js has surpassed 1.7 million flight hours supporting almost any mission requirement, any time, any place.

QUICKROUNDUP

AGNI II

On February 22, 2018, India test-fired its medium-range, nuclear-capable Agni II missile from an island off the coast of Eastern state of Odisha. The two-stage Agni II missile, with a strike range of over 2,000km, was test-fired by the Strategic Forces Command.

AIRBUS

As part of its flight test campaign demonstrating the long range A320 variants, Airbus' new A321LR (Long-Range) took off from Le Bourget Airport in Paris on its first transatlantic flight, bound for New York. The A321LR has the longest range of any single-aisle commercial aircraft today and is capable of flying 7,400km non-stop.

Airbus has delivered the world's first A350-1000 wide-body airliner to launch customer Qatar Airways at a delivery event in Toulouse, France. The aircraft is the first of 37 A350-1000s ordered by the carrier and is the first ever Airbus aircraft fitted with the revolutionary new Q-suite seats, offering the first ever double bed in business class. It can carry 44 additional passengers and has a maximum range of almost 15,000km.

An Airbus spokeswoman said on February 9, 2018 that China's Sichuan Airlines has signed a deal with Airbus to buy ten A350-900 wide-body jets worth over $3 billion at list prices. CAAC News, which is affiliated to the Civil Aviation Administration of China, earlier reported that the deal was the largest ever placed by Sichuan Airlines, whose parent is China Southern Airlines.

AIRBUS DEFENCE

Airbus Defence is finally getting serious about commercial derivatives and is offering the A320neo for maritime patrol, airborne early warning, etc. This will pose a challenge for Boeing's 737NG derivatives such as the P-8 and the Boeing 737 AEW&C.

BAE SYSTEMS

BAE Systems has been selected by Lockheed Martin to modernise head-up displays (HUD) on F-16 aircraft for the UAE Armed Forces, replacing the fleet's analogue system with advanced digital technology. The HUD, which sits directly in a pilot's line of sight, is a see-through display that presents real-time, flight-critical information without obstructing his or her view of the outside world.

BOEING

Boeing will upgrade the Japan Air Self-Defense Force's Airborne Warning and Control System (AWACS) aircraft under a $60.9 million US Air Force contract announced by the Pentagon. The agreement will see Boeing provide mission computing upgrade installation and checkout of four Japanese E-767 aircraft and associated ground systems. Work is expected to be completed by December 2022.

CHINA

China's Defence Ministry has stated that the Chinese

QUICKROUNDUP

military has successfully completed another test of a ground-based midcourse anti-missile intercept system. The test, which was conducted within China's borders, had reached its expected goals, and was defensive and not aimed at any country. Anti-missile system tests have been ongoing since 2010.

ELBIT SYSTEMS

Elbit Systems of America, LLC has announced that its joint venture with Rockwell Collins ESA Vision Systems, LLC (RCEVS) will incorporate the Joint Helmet Mounted Cueing System II (JHMCS II) helmet-mounted display into Republic of Korea Air Force (ROKAF) F-16 aircraft. The ROKAF version of the JHMCS II helmet provides pilots with enhanced situational awareness during day and night missions with immediate and accurate visor-projected display of friendly, threat and unknown targets.

EMIRATES AND AIRBUS

Emirates and Airbus firmed up an earlier MoU and signed a contract for 20 additional A380 airliners with a further 16 options to be confirmed at a later date. The total agreement for 36 aircraft is valued at $16 billion based on latest list prices. Deliveries are to start as early as 2020.

INDIAN AIR FORCE (IAF)

The IAF has committed to ordering an initial batch of 15 Saras Mk 2 twin-turboprop aircraft, which it will use for liaison as well as maritime patrol and other support missions. The design and development of the aircraft is being done by CSIR-National Aerospace Laboratories. Hindustan Aeronautics Limited has been identified as the production agency for the military version of Saras, while the production of civil version will be given to identified private industries.

INDONESIA

Russia's Interfax news agency has reported that Indonesia has finally inked contracts for the purchase of 11 Su-35 fighter aircraft. The agreement comes after two years of negotiations and will involve Jakarta supplying goods such as rubber and palm oil to help fund part of the acquisition and it is believed Moscow will also provide a loan.

KUWAIT

The State Department has made a determination approving a possible FMS to Kuwait of King Air 350ER Intelligence, Surveillance, and Reconnaissance aircraft for an estimated cost of $259 million. The Defence Security Cooperation Agency delivered the required certification notifying Congress of this possible sale on February 21, 2018.

LOCKHEED MARTIN

On February 16, 2018, Lockheed Martin was awarded a $13.9 million US Navy contract modification to supply initial spares for F-35 deliveries to Israel. The agreement

APPOINTMENTS

AIRBUS

Airbus has appointed Bruno Even as the Chief Executive Officer (CEO) of Airbus Helicopters, effective April 1, 2018.

BOEING

Boeing has appointed Jeff Shockey as Vice President of Global Sales and Marketing for its Defence, Space & Security unit, effective immediately.

ROLLS-ROYCE

Rolls-Royce has announced the following appointments:

- Chris Cholerton has been appointed as President – Civil Aerospace.
- Tom Bell, appointed as President – Defence

SAFRAN AIRCRAFT ENGINES

Safran Aircraft Engines has announced the following appointments in its Corporate Management Team:

- François Bastin as Vice President, Commercial Engines Division, replacing Cédric Goubet.
- Sébastien Imbourg as Vice President, CFM Programmes at Safran Aircraft Engines and also Executive Vice President of CFM International, replacing François Bastin.

CIVIL AVIATION

ASIA PACIFIC

POTENTIAL FOR TURBOPROPS IN ASIA-PACIFIC: ATR

Global leader in turboprop aircraft, ATR anticipates huge demand for the company's aircraft in the Asia-Pacific region. The company foresees demand for around 750 turboprops aircraft in next 20 years in the region. This does not include China. According to a company, "Asia Pacific is ATR's largest market globally accounting for over one third of the global fleet. As of today, there are nearly 1,200 ATRs around the world, of which some 420 are in Asia-Pacific."

AMERICAS

BOEING 737 MAX 9 AWARDED FAA CERTIFICATION

Boeing 737 MAX-9 airliner has received an amended type certificate (ATC) from the US Federal Aviation Administration (FAA), officially certifying the airplane for commercial service. The 737 MAX family is designed to offer customers exceptional performance, with lower per-seat costs and an extended range that is opening up new destinations in the single-aisle market. The 737 MAX incorporates the latest CFM International LEAP-1B engines, Advanced Technology Winglets, Boeing Sky Interior, large flight deck displays and other features to deliver the highest efficiency, reliability and passenger comfort in the single-aisle market.

NEW ADS-B OUT CERTIFICATION BY ROCKWELL COLLINS

Rockwell Collins' ADS-B Out Part 23 approved model list supplemental type certificate (AML-STC) has received approval by the Federal Aviation Administration (FAA). This path includes the latest transponder variant to help aircraft owners meet the rapidly approaching mandate. This certification covers 32 unique aircraft models from Textron Aviation and M7 Aerospace. Certification for Part 25 aircraft models is underway and should be completed in a few months. Validations for both certifications are planned with the European Aviation Safety Agency (EASA), Transport Canada and Mexico's Directorate General of Civil Aeronautics (DGCA).

INDUSTRY

ASIA-PACIFIC

LICENCE MANUFACTURE OF ALH-CIVIL UNDER TOT

As a major boost to defence manufacturing and Government's 'Make in India' initiative, Hindustan Aeronautics Limited (HAL) has offered the indigenous 'Advanced Light Helicopter-Dhruv' (civil version) for manufacturing to potential Indian private companies through Trans-

SHOW CALENDAR

26 February–1 March
HAI HELI-EXPO
Las Vegas Convention Center, Las Vegas, NV, USA
http://heliexpo.rotor.org

8–11 March
WINGS INDIA 2018
Begumpet Airport, Hyderabad, India
www.wings-india.in

26–29 March
NBAA: INTERNATIONAL OPERATORS CONFERENCE
Las Vegas, NV, USA
www.nbaa.org/events/ioc/2018

11–14 April
DEFEXPO INDIA 2018
Arulmigu Nithyakalyana Perumal Temple, Thiruvidanthai, Thiruporur Taluk, Kancheepuram, East Coast Road, Chennai, Tamil Nadu, India
www.defexpoindia.in

fer of Technology (TOT). Accordingly, the Company has invited Expression of Interest for identification of Indian Partner. "Considering the increasing need of helicopters in civil operations of the country, this will be a mega deal from HAL which is the OEM and Licensor", says T Suvarna Raju, CMD, HAL.

MAHINDRA AEROSPACE AND VIKING AIR FORM STRATEGIC ALLIANCE

Mahindra Aerospace has signed a Memorandum of Understanding (MoU) with Canada's Viking Air to "leverage their unique and complementary resources" to form a strategic alliance to exploit the upcoming business opportunities in India's regional aviation sector. The two companies will "support each other's non-competing aircraft business to boost market penetration in identified territories." The MoU was signed during the visit of Canadian Prime Minister Justin Trudeau to India.

LEONARDO EXPANDS PRESENCE IN BANGLADESH

Leonardo is expanding its share of the growing Bangladeshi helicopter market with the announcement, during Singapore Air Show, of the upcoming delivery of five helicopters to Bashundhara Airways, comprising three AW109 Trekkers and two AW119Kx. The helicopters will be used for EMS, utility, law-enforcement, surveillance, VIP, corporate & passenger transport and are all scheduled to be delivered before the end of 2018, bringing Leonardo's market share above 30 percent.

PRATT & WHITNEY'S MANUFACTURING FACILITY IN SINGAPORE

Pratt & Whitney, a division of United Technologies Corporation, has announced an important increase in production at its first advanced manufacturing facility in Singapore in order to help Pratt & Whitney's 2018 ramp-up of production. This facility is operated by P&W NGPF Manufacturing Company Singapore Pvt Ltd, a joint venture with Hanwha Techwin Company Ltd. This increase in production supports the recent announcement by Singapore's Economic Development Board to achieve $3 billion in manufacturing net output by 2020 for the country's aerospace industry. Pratt & Whitney's Asia Pacific operations are also located in China, India and New Zealand.

AMERICAS

BELL HELICOPTERS FOR VIETNAM

Bell Helicopter, a Textron Inc company, has signed a purchase agreement with both Vietnam Helicopter Corporation and its subsidiary, Northern Vietnam Helicopter Company (VNH North), for two Bell 505 Jet Ranger X helicopters. "As the first Bell commercial helicopter sale in Vietnam, we are pleased that Vietnam Helicopter Corporation and VNH North have chosen the Bell 505 for their operations in Vietnam and beyond," said Sameer Rehman, Managing Director of Bell Helicopter Asia-Pacific. "The Bell 505 incorporates the latest advancements in safety and aviation technology while providing best-in-class value. We look forward to working closely and supporting both Vietnam Helicopter Corporation and VNH North as they expand their business to new territories and customers." ●

QUICKROUNDUP

tasks Lockheed with the procurement of initial air vehicle spares to include endurance spares packages to coincide with F-35 air vehicle deliveries to Tel Aviv. Work is scheduled to be completed by December 2021.

RUSSIA

On February 12, 2018, Russian newspaper Krasnaya Zvezda reported that the Russian military had test-fired an upgraded air defence missile at the firing range Sary-Shagan in Kazakhstan. The new upgraded air defence missile is capable of intercepting single and multiple strikes, including the new generation intercontinental ballistic missiles.

For the first time in the recent history of Russia, pilots of the Naval Air Arm have practiced in-flight refuelling on Su-30SM aircraft. During the training, the Su-30SM and Su-24M aircraft took off from the Naval Aviation Combat Training Centre located in Yeisk. Fighters and bombers, piloted by naval flight crew, carried out more than 100 contacts with Il-78 airplane tankers.

SOUTH KOREA

It has been reported that South Korea's Defence Acquisition Programme Administration (DAPA) has approved $53 million for the purchase of an undisclosed number of PAC-3 Missile Segment Enhancement (MSE) interceptors. The contract is expected to be made in the second half of the year for the delivery after 2020. The PAC-3 MSE uses a two-pulse solid rocket motor that increases altitude and range to defend against evolving threats.

THALES

The Logistic Support Command of the Army (MALE) of Spain and the German Procurement Agency have just awarded Thales for a batch of respectively 1,000 and 10,000 70mm/2.75" rockets to complete the weapon systems of their Tiger HAD-E and their UH Tiger helicopters. Deliveries are expected shortly. The Spanish Army Aviation has selected Thales's rockets to complete the weapon system of the Tiger HAD-E and the German Armed Forces have chosen Thales's practice rockets to increase the training of the UH Tiger units.

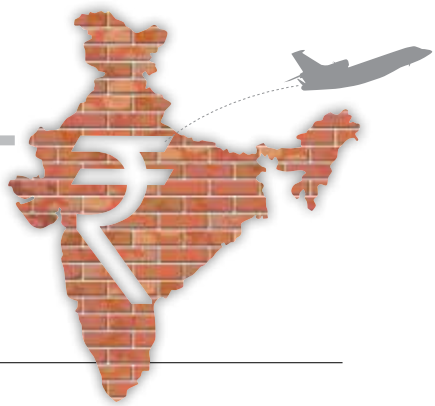
UK MOD

A $365.4 million FMS agreement with the US Government to support RAF C-17 heavy-lift transport aircraft into the next decade has been signed by the UK's Ministry of Defence to provide support for the RAF's fleet of eight C-17A Globemaster III aircraft.

US

The US State Department has made a determination approving a possible FMS to Sweden of Patriot Configuration-3+ Modernised Fire Units for an estimated cost of $3.2 billion. The Defence Security Cooperation Agency delivered the required certification notifying Congress of this possible sale on February 20, 2018.

REFORM BA TO BOOST NATIONAL ECONOMY



The government needs to radically reform its policies for business aviation to prosper. Till then, this segment will not make any meaningful contribution to the nation's economy.

By **AIR MARSHAL B.K. PANDEY (RETD)**

THE INDIAN CIVIL AVIATION INDUSTRY APPEARS TO HAVE embarked on a growth trajectory. As per assessments by international agencies, the Indian civil aviation industry has the potential to emerge as the largest in the world by 2030 from its present global ranking at number three. This unprecedented growth of the Indian civil aviation industry can be attributed primarily to the growth of the Indian airline industry, its largest component, which has received a major impetus for growth in the wake of the new National Civil Aviation Policy (NCAP) unveiled in June 2016 by the NDA Government. A major focus of the NCAP is regional aviation which holds the potential for the next phase of growth of the Indian airline industry and in turn the Indian civil aviation industry as a whole. In pursuit of this objective, the Ministry of Civil Aviation has launched the Regional Connectivity Scheme which is moving forward slowly but surely.

While the growth of the Indian civil industry has been laudable, the same has not been the case with business aviation, which undoubtedly is an important segment of the industry with immense potential to further fuel its growth. The NCAP is certainly a positive step for the Indian civil aviation industry. The policy covers every segment of the Indian civil aviation industry, but has left out business aviation. When compared to the Indian airline industry, business aviation in India continues to remain much below its potential. In sharp contrast to the annual rate of growth of the Indian airline industry which last year was around 17 percent, the business aviation segment in India has registered a growth rate of mere two percent over the last five years.

In India, conditions are indeed favourable for the growth of business aviation. The location of the India between the Middle East and Far East, both regions endowed with prosperity, is strategically significant and important from the point of view of trade and business and in turn for the health and well being of the national economy. As the growth of business aviation is intimately connected to economic growth, there is no doubt that with the growth of the Indian economy, in the long term, there will be increasing demand for business jets. All major business enterprises and high net-worth individuals would like to acquire business jets for business-related travel to save on time and enhance efficiency of their business enterprise. Besides, the number of charter companies operating business jets to serve business houses, who do not own dedicated aircraft, will only grow in size and numbers to service the growing demand for exclusive air travel from the Indian business community. Business jets that have traditionally been regarded as luxury and were associated with the super rich, have now actually become an effective tool to enhance efficiency of business management and productivity of business houses. In other words, business aviation is no longer "elitist" or a corporate status symbol, but has the attributes and potential to play a critical role in the growth of business in the country and in turn contribute to the growth of the national economy. The contribution of business aviation to the national economy however, is yet to be fully understood.

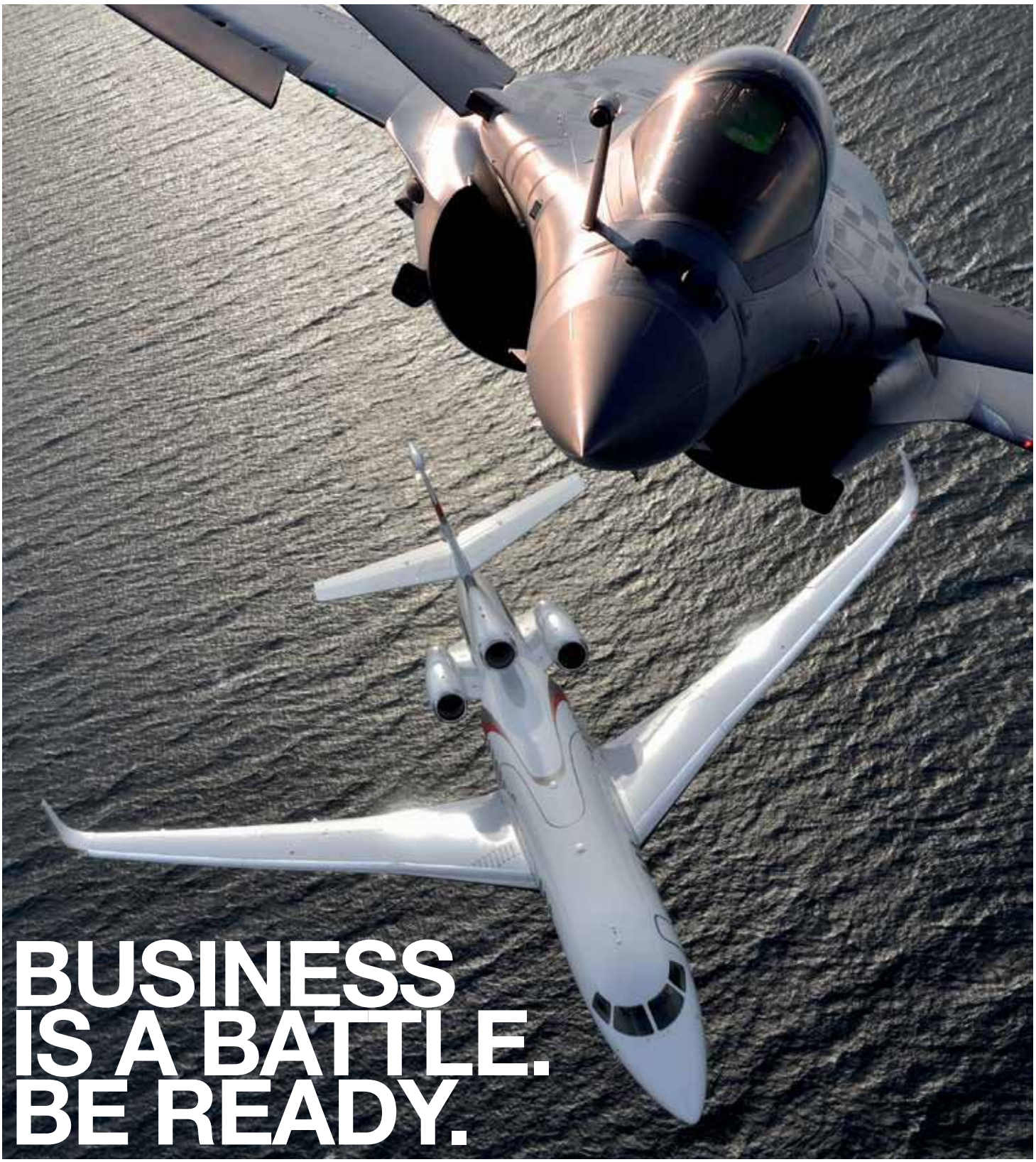
The problems afflicting the business aviation segment of the Indian civil aviation industry are many. First of all, the procedure to import a business jet is extremely complex and tedious requiring clearance from multiple agencies. It can take more than a year to obtain all the sanctions and bring the aircraft into the country, complete the registration process and obtain the license to commence operations. In addition, the duty on import of aircraft is around 25 per cent of the value of the platform. The high rate of import duty is indeed a dampener for the growth of the segment. In fact, the taxation structure for business aviation is killing as there are duties for aircraft and spares that are not charged from aircraft in the airline industry.

There is pathetic lack of infrastructure as the six metro airports are heavily congested where space is at a premium. There is little or no space for accommodating transiting business jets that have to fly to smaller airports for overnight parking. Most of these airports do not have facilities for operations by night and lack hangars for parking of aircraft. In fact, there is not a single airport in India that has exclusive infrastructure for business and general aviation aircraft.

Business aviation aircraft get a lower priority compared to airlines because of the heavy traffic of scheduled flights at metro airports. Delays in takeoff and landing clearances may defeat the purpose of investments in business jets whose owners are treated on a par with commercial airlines. All compliances, in terms of documentation and clearances required for operating business jets are the same as for airline operators. There is a crying need for review of the existing regulatory and operational framework.

Unless and until, the government take steps to introduce radical reforms in business aviation for it to prosper, this segment will not be able to make any meaningful contribution to the economic prosperity of the nation. SP

ILLUSTRATION: ANOOP KAMATH



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