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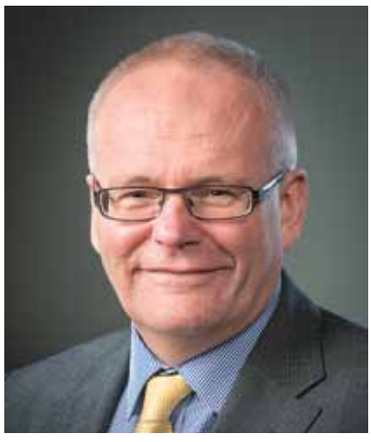

INDIA AWAITS THE BIG TAKE-OFF

BY **SP'S SPECIAL CORRESPONDENT**

TURN TO **PAGE 4**

INDIA AWAITS THE BIG TAKE-OFF

DASSAULT RAFALE

BY **SP'S SPECIAL CORRESPONDENT**

They say the passage of time brings clarity. Hindsight brings learnings. As Aero India 2015 begins, there are two parallel sentiments, each contradicting the other. The first is of hope. Fuelled by the new government's promise of quick decisions, unprecedented attention to the Indian warfighter, a focus on catapulting India beyond the buyer-seller quagmire it has languished in for integrated and advanced military systems for decades. The second is one of increasing despondence, where the now familiar unpredictability, uncertainly, systemic fog and arbitrariness simply refuse to settle. The one thing established Indian and global vendors will be looking for is clarity, for there can never be enough of it from the political leadership of a country that continues to perforce swim against the tide of globally dwindling defence budgets. The second thing stakeholders at Aero India 2015 will be looking for is a dialogue in specifics that moves beyond the impressive but so far relatively nebulous ideal of 'Make in India'. Prime Minister Narendra Modi, who breaks tradition by personally inaugurating the show this year, has made it clear on more than once occasion that national security and matters military interest and captivate him, and that no decision that ensures a stronger warfighter will be allowed to hang fire. But vendors who anxiously watch the 'Make in India' campaign play out will also be hoping that the stated touchstones of efficiency, expeditiousness don't bring with them a whimsical posture on ongoing procurement programmes. Sections of the global vendor pool perceive that they have suffered this in India in the first few months of the new government. But Aero India isn't about despondence, but the possibilities of a new hope. The one thing that the government has made clear, through stated policy and otherwise, is that aerospace manufacturing, partnerships, local sourcing of subsystems and components will be a focus area for the overall economic thrust the government needs to boost India's growth.

Willy-nilly the face of the great Indian buying machine, the Indian Air Force's (IAF) medium multi-role combat aircraft (MMRCA) programme has experienced turbulence for nearly 12 months now. France, which will have gloomily celebrated the third anniversary of India's selection of the Dassault Aviation Rafale in January 2012, for a multi-billion dollar contract, is now grappling with ironically the most crucial aspect of the programme – the 'Make in India' part. As India and France attempt hard-nosed final negotiations to beat down these unexpected late issues, the Rafale's maker has finally managed to extinguish its 'no exports yet' tag, managing to seal a deal with Egypt for 24 Rafales. The sale gives France a sliver of latitude in negotiations, and eases pressure ever so slightly on the Rafale production line, but Dassault knows that the Indian deal is make or break. The prospect of selling 126 Rafales (with 63 options, making a total of 189) to the Indian Air Force is too big a programme to let falter at this late stage. The pressure games and mindgames are now at fever pitch. With everything else answered, the only question remains: will there be a contract once the two sides exit the cloud they're in.

Aero India 2015 also serves as a reminder that key acquisitions remain tantalisingly close to contracts, but no cigar. Days ahead of the show, Boeing Defense indicated that inflationary pressures were being felt, implying that it could maintain the commercial bids for 15 CH-47F Chinook heavy-lift helicopters and 22 AH-64E Apache Longbow attack helicopters only for a limited period, sparking the notion of more delays if India doesn't make a quick decision. The fact that the IAF desperately needs both rotorcraft types makes the situation a critical one. Boeing isn't sure when a decision will be made. As Boeing India President Pratyush Kumar says, "We've done our bit. Now it's up to the government to take a decision."

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'Done our bit.' Words you'll hear often in the vendor community especially when it comes to doing business in India. But what next?

Much has happened since Aero India 2013. For starters, the 197 light reconnaissance and surveillance helicopters (RSH) for the Army and IAF, was cancelled by the new government in office, dealing a surprise blow to Airbus Helicopters (then Eurocopter) and Russia's Kamov that had been waiting virtually endlessly without clarity for a decision. The government has now kick-started the competition afresh as 'Make in India' programme, clubbed together with the naval utility helicopter programme. Airbus and Kamov, along with other vendors, are likely to announce their decisions on participation at the show starting today. Delays in the competition forced by a decision not to buy most of the helicopters from abroad (the RSH competition stipulated a 100 per cent delivery from OEM production lines), could give India's Hindustan Aeronautics Ltd (HAL) an advantage. It is speeding along with its light utility helicopter (LUH), a mock-up of which is on display at Yelahanka, to furnish an additional requirement of 184 light helicopters that will progressively go to the winner of the RSH in the event of delays. The scrapping of the RSH buy in its earlier avatar may have just pushed the reset button on timelines. The Indian Air Force's ambitious replacement programme for 56 HS-748 Avro transport aircraft has taken wing, though the MoD is still looking at how to proceed on the programme given only one response—from Airbus/Tata—came in.

Since the last Aero India, the Indian Air Force has contracted for six more Lockheed Martin C-130J Super Hercules special transports with minor modifications from the first lot. However, the C-17 Globemaster III programme remains unclear. Boeing's Long Beach production facility has closed, but the company still has an unspecified number of C-17 white-tails (built but unsold aircraft) that it plans to contract to customers on a first-come-first-served basis, based on US Government clearance. While Boeing has periodically heard of India's interest in procuring more, the company confirms it has received no formal request or message. As the largest foreign operator of C-17s, Boeing hopes India will move on the availability of white-tails to augment its 10-strong fleet based at Hindon. But again, no clarity yet. Meanwhile, with the last two of eight P-8I long-range maritime reconnaissance (LRMR) jets to be delivered this year, Boeing is looking for guidance on follow-on orders of at least four aircraft, but expected to be more. Airbus, on the other hand, awaits clarity on the sale of 6 Airbus A330 MRTT to the IAF.

Enormous opportunities exist for unmanned air systems across the board in India. Apart from continuing opportunities to procure full systems – the Indian Navy continues to be in the market for a maritime MALE system (the Indian Navy recently also announced interest in acquiring at least 50 ship-borne unmanned air systems), the Indian Army is looking for a man-portable MAV system to name just two instances — there are several co-development opportunities as well, both ab initio as well as mid-course programmes. It is virtually certain that with pressing time-lines and impatient customers, HAL and DRDO will be forced to draft in the help of experienced consultants to complete current programmes. For instance, the Rustom-2 MALE multi-role UAV, expected to make its first flight this year, is currently in a routine of taxi trials. The Indian unmanned strike air vehicle (IUSAV) is a hugely ambitious UCAV programme that is still in a project definition stage, but could provide big opportunities.

There have been strides in weapons testing and procurement activities as well. The Indian Navy remains in the search for a new medium-range anti-ship missile, while the Army continues its search for a stand-off loitering weapon. Since the last Aero India, the DRDO has successfully tested India's first loitering cruise weapon, Nirbhay. A big-ticket missile programme that has slowed down in what vendors hope is the final lap, is the VSHORADS (very short-range air defence system), currently a three-way fight between the French MBDA Mistral, Sweden's Saab RBS 70 NG and Russia's KBM new generation Igla-S. The deal could be worth $6 billion and involve the purchase of 1,000 launchers with 6,000 missiles. MBDA, which had tasted sweet success a year ago with the Indian Government handing it a €950-million deal for MICA air-to-air missiles for the IAF's upgraded Mirage 2000 multi-role fighters, the company is now eagerly awaiting the results of the competition to supply short-range IR air-to-air missiles for the IAF's Jaguars. MBDA and Israel's Rafael await a verdict on what is a toss-up between MBDA's ASRAAM and Rafael's Python-5. Israel and India finally tested their joint LR-SAM/Barak 8 missile system late in 2014, setting the stage for further testing this year.

With the first series production LCA Tejas handed over to the IAF, a new dawn on the programme has hopefully begun. The focus now shifts to the LCA MK.II for both the IAF and Indian Navy. At Aero India this year, teams from the Aeronautical Development Agency (ADA) will be scouting for partnerships on the MK.II. Several indigenous programmes including the delayed Indian multi-role helicopter (IMRH), light utility helicopter (LUH), multi-role transport aircraft (MTA) and others could throw up very serious sourcing and other opportunities for foreign and Indian vendors at every level. Another enormous opportunity is the Indian National Civil Aircraft (NCA), which by itself, could present the most profound spaces for cooperation in new technologies. A team from the National Aerospace Laboratories (NAL) is at Aero India to move forward the dialogue with engine houses and suppliers of the millions of components necessary for a civil aircraft project.

The new political dynamic brings with it, hopefully, the promise of a renewed focus on aerospace in the country. The Prime Minister's presence at Aero India this year should be seen as a commitment of that. Have a good show! •

Beechcraft Focuses on Special Mission Capabilities of King Air 350ER

Textron Aviation is showcasing special missions and commercial capabilities of Beechcraft at Aero India. The company will display a special missions-configured Beechcraft King Air 350ER.

The King Air 350ER twin turboprop is an extended-range (ER) airplane, which includes additional fuel capacity and increased capability landing gear allowing for a 2,500-nautical mile range and take-off weight of 16,500 lbs. The demonstrator aircraft that is on display at Aero India has a unique interior configuration that highlights the versatility and utility of the King Air family of aircraft with a forward club seating arrangement with four VIP chairs and two writing/work tables, and in the aft cabin is a fully functioning medical station complete with medical oxygen, vacuum and pressure, a medical cabinet and a side-facing, three-place couch for doctor/medical attendants.

Beechcraft Corporation is a subsidiary of Textron Aviation Inc. It recently flew a standard production King Air 350ER aircraft non-stop between California's Napa County Airport (KAPC) to Hawaii's Honolulu International Airport (PHNL).

"This is the first time a King Air class airplane has made the California to Hawaii leg without additional ferry fuel tanks," said Dan Keady, Vice President, Special Missions. "We've been touting the King Air 350ER's endurance, range, payload and mission flexibility and now we've demonstrated the airplane's unique deployment capabilities."

The 2,121-nautical mile flight took 8 hours 52 minutes from Napa to Honolulu. The pilots reported full fuel on departure of 5,192 pounds, cruise altitude of 28,000 feet, average winds aloft produced headwinds from 237 degrees at 33 kts, average ground speed of 240 kts and fuel at shutdown of 790 pounds.

The return flight from Honolulu to Napa covered 2,131 nm and took 8 hours 17 minutes. Fuel on departure was full at 5,192 pounds, cruise altitude was 31,000 feet then 33,000 feet for the final third of the flight, average winds aloft were 234 degrees at 15 kts, average ground speed was 257 kts and fuel at shutdown was 900 pounds.

"Winds aloft on the return flight allowed us to fly higher," Keady said. "After two-thirds of the flight at maximum range power, we pushed it up to 33,000 feet and maximum cruise power. Making these oceanic flights demonstrates that operators can go anywhere in the world without the need for installing internal ferry tanks. There are some government organisations that have rapid response requirements to be able to stage halfway around the world and be prepared to conduct operations on arrival. The King Air 350ER can do that without taking up cabin space with ferry tanks or the penalty of waiting for modifications or de-modifications."

The aircraft used was the King Air 350ER Special Mission demonstrator. This aircraft's unique interior configuration highlights the versatility and utility of the King Air Family of aircraft with a four-seat executive club configuration complete with writing tables in the front cabin. Additionally, the large cabin provides ample room for the installation a fully functioning medical station complete with medical oxygen, vacuum and pressure, a medical cabinet and a side-facing, three-place couch for doctor/medical attendants to demonstrate the air ambulance configuration. •


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India is Strategic and Most Significant Partner: Rafael

Rafael is Israel's second largest defence company with 2013 sales of $2.047 billion, an order backlog of $4.3 billion and a net profit of $101 million. Rafael develops and manufactures advanced defence systems for the Israeli defence forces and the defence establishment, as well as for foreign customers around the world. In an interview with ***SP's ShowNews***, Rafael's Chairman **Itzchak Gat** speaks about Rafael technologies and the forays it is making in different parts of the world.

SP's ShowNews **(SP's): Rafael has been participating regularly in Aero India, what does Aero India mean to you?**
Itzchak Gat (Gat): For Rafael, Aero India is one of the most important events providing an outstanding opportunity to display our most advanced combat proven systems and capabilities, as well as meet our partners and users.

SP's: India and Israel share a strategic partnership, how is Rafael part of this partnership and how is it furthering this partnership?
Gat: This is absolutely right, and for Rafael, India is a strategic and most significant partner. As a global company, we not only present combat proven systems, but can also account for proven partnerships all over the globe. One of our strengths lies in our ability for technology and knowledge transfer, which allows our partners to produce and supply local systems. I would like to emphasise that we are seeking to enlarge our partnerships in India and we are negotiating with the local industry to make this happen.

SP's: India as you are aware is going aggressive on the new government's 'Make in India' initiative. Could you brief on what Rafael's plans are?
Gat: As I mentioned, Rafael has created partnerships with international leading aerospace and defence companies overseas. Offset activities and industrial cooperation have been set up with over 20 countries worldwide. Over the last decade, international business activities have been steadily expanding across the globe, with Rafael acting as either prime contractor or subcontractor, capitalising on its strengths at both system and subsystem levels.

With this legacy, we are working to establish and to increase our partnership in India and I am sure that this will occur in the coming months.

SP's: We see that many of the products and solutions you are going to showcase at Aero India have been displayed at previous Aero India. How long does it normally take in India for you to finalise a deal?
Gat: In the defence industry, if a deal does not stem from an urgent requirement, it usually takes quite a bit of time to finalise. We are not talking about commodities, we are talking about sometimes complex systems which require integration of a multitude of details. In the defence industry, we run marathons, not short sprints.... I believe one of our assets is that we always bring new systems and capabilities to Aero India, and even if they sometimes seem the same, they always include a new feature.

SP's: Rafael has been promoting Iron Dome in India, but without any success? Is the prohibitive cost one of the factors?
Gat: We never interfere with our clients' decision, but I can say with no hesitation that the Iron Dome system is an affordable, effective and innovative defence solution (CR&AM Class) for the asymmetric threats of short-range rockets, (up to 70 km), and mortars, and also serves as a VSHORAD Missile System (up to 10 km) against traditional air defence targets. Since becoming operational by the Israeli Air Force in April 2011, Iron Dome has successfully intercepted over 1,700 rockets that have been fired at Israel. During Operation Protective Edge in the summer of 2014, Iron Dome achieved a 90 per cent rate of successful interceptions. In doing so, the system saved lives and prevented serious damage to property.

The Iron Dome provides robust, yet selective defence. Its ability to discriminate between threats headed towards the defended area and those that will fall into the sea or open fields reduces costs and limits unnecessary interceptor launches. A single launcher can protect against a medium-size city.

SPIKE ER ON TIGRE

SP's: Could you give an update on the 'Spike' missiles deal with India?
Gat: We are very satisfied with the Indian Army's decision to choose the Spike as its next missile, and we are moving towards closing the contract. As we indicated earlier, we are aiming for the production of an India-made Spike missile. The Spike Family of multi-purpose, precise and tactical missiles have a range between 200 metres and 25,000 metres. The Spike Family is a multi-purpose, multi-platform electro-optic missile system with real time data link. The Spike Missiles are in use by infantry units as well as mounted on combat vehicles, attack helicopters and naval vessels. The Spike missiles are combat proven and in service in many countries, among them Italy, Germany, the Netherlands, Spain, Poland and now also in India.

SP's: Could you give a brief summary on Rafael's products in India?
Gat: There are Rafael systems being used in India, but the details should be provided by the Indian forces. I can say that Rafael offers its customers a diversified array of innovative solutions at the leading edge of global technology, from underwater systems through naval, ground, and air superiority systems to space systems. The company provides state-of-the-art armaments, innovative solutions on the technological cutting-edge from air-defence and air-to-air systems, unmanned and underwater naval systems, air-to-ground precision kits C4I, armour, air, land and sea tactical precision-guided weapon systems and many more.

SP's: At Aero India, you have mentioned that for the first time, you will be presenting the C-Dome and Spice 250. How do you see them fit in the Indian security scenario?
Gat: What we are displaying here is part of our "families" of systems which offer the users commonalty and cost effectiveness capabilities.

These two systems are very good examples for the above. The C-Dome Naval Point Defense System is designed to effectively protect combat vessels against a large set of modern threats. C-Dome handles saturation attacks by engaging multiple targets simultaneously. Reaction time is very short and enables automatic and semi-automatic engagements. C-Dome uses the combat-proven Iron Dome interceptor that has already achieved more than 1,700 successful interceptions.

The Spice 250 is the new member of the The Spice Family of Precision-Guided Monition that includes Spice-1,000 kit for 1,000 lb., and Spice-2,000 kit for 2,000 lb. •

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Rolls-Royce: 'Partnership with India – Past, Present and Future'

Rolls-Royce is a power systems company catering to aircraft, ships and land applications. Rolls-Royce is best known for aero engines that power many of the world's most advanced passenger jets, like the new Airbus A350 and the Boeing 787 Dreamliner. But, there is much more to the company than that. It also produce low–emission power systems for ships, a wide array of land vehicles: ranging from trains to combine harvesters. Here **Kishore Jayaraman**, President, Rolls-Royce India and South Asia, talks about the company's strides in India.

***SP's ShowNews* (SP's): Rolls-Royce prides itself as an innovations company and that it connects innovations to its customers. Could you give us examples of such innovations and how it has made other companies to follow suit?**

Kishore Jayaraman (Jayaraman): Rolls-Royce continues to invest in core technologies, products, people and capabilities with the aim of broadening and strengthening its product and service portfolio, improving efficiency and enhancing the environmental performance of its products. Over the past 10 years, Rolls-Royce has invested £7.9 billion in research and development. In 2013 alone, Rolls-Royce invested £1.1 billion in R&D. We continually innovate to remain competitive and most importantly, we ensure that innovation is relevant to our customers' needs.

Research and development, and innovation are crucial. They will become more so as we strive to improve the quality and performance of our power systems and services. The Trent XWB, for example, has proved to be the most efficient large civil aero engine in the world. Design and development of that engine started in 2006. In our marine business, innovation and the development of liquefied natural gas (LNG) power systems has led to the possibility of a 40 per cent reduction in a ship's CO_2 emissions and the virtual elimination of sulphur and oxides of nitrogen emissions compared with conventional, diesel-powered craft. This presents a clear environmental and commercial opportunity. These innovations have also taken years to develop.

SP's: Rolls-Royce has had a flat year in 2014 financially and expects a return to growth this year. How does it look at the beginning of the year? What would be the drivers for this return of growth for Rolls-Royce?

Jayaraman: At a global level, significant challenges and changes shaped the year 2014 at Rolls-Royce. However, we made considerable progress and continued to adapt in order to remain competitive. In the first half of 2014, the Group order book was £70.4 billion. We received a net order intake of £6.5 billion and delivered £644 million in underlying profit before tax. This is a long-term business and we remain confident in its growth trajectory. We continue to make investments to deliver the £70 billion order book and to deliver cost reduction. Our continuous investment in technology and our commitment to excellence allows us to seize opportunities that will change the present and help us face the future with confidence.

We see a huge potential in India and we will definitely leverage our strategic partnerships for pursuing future growth. As India gets ready to move on its growth path, we will continue to support the country with our powerful portfolio of products and services and the right combination of experience and advanced technologies.

SP's: What is the order book for aerospace engines like and how much does civil aircraft engines constitute of that?

Jayaraman: The civil aerospace segment is a major manufacturer of aero engines for the airliner and corporate jet markets. We haveparticular strengths in the wide-body market where Rolls-Royce has a 54 per cent share of aircraft on order. Demand for our products and services remains robust. A net order intake of £2.6 billion compares with £10.9 billion in H1 2013. The order book reduced by two per cent, due to deliveries made during H1 and cancellations, primarily by Emirates of A350s.The order book contains 2,554 Trent engines that will drive the growth in aftermarket revenue over the next decade.

Significant orders in the first half included:

- A $1.1 billion contract with All Nippon Airways to power 25 Boeing 787 Dreamliner with our Trent 1000-TEN.
- A TotalCare contract with Cathay Pacific for Trent 700 engines that power Cathay's fleet of 60 A330s in service and on order; and
- A $400 million TotalCare contract with new customer Azul Brazilian Airlines for its planned fleet of six A330s and five A350 XWBs.

SP's: Could you tell about India and the emerging markets in terms of civil aircraft engines? What is the potential and what is Rolls-Royce strategy in garnering market share?

Jayaraman: The Indian civil aviation industry is amongst the top 10 in the world with a size of around $16 billion. With a promising civil aviation market, I believe that the way forward for India is wide-body aircrafts since it could be a key solution to increase efficiency in passenger load and air traffic.

Also, with increased number of Indian carriers flying overseas and with the 49 per cent FDI in aviation coming into play, we expect a huge interest in the Trent XWB and Trent 1000, which powers the A350 and B787 respectively. As mentioned above, these wide-bodied aircrafts have the potential to increase efficiency in passenger load and air traffic in India.

Our Trent XWB is the world's most efficient aero engine, which entered into service with Qatar Airways last year. The Trent XWB is specifically designed for the aircraft and improves the aircraft efficiency by almost 25 per cent making it 16 per cent more efficient than the first-generation Trent engines. The fifth-generation of the Trent engine family, the Trent 1000 engine was selected as launch engine when the Boeing 787-8 aircraft entered service in 2011 and has been selected as launch engine when the 787-9 aircraft enters service in 2014. The Trent 1000 powered Boeing 787 Dreamliner is 20 per cent more efficient than the Boeing 767 aircraft it replaces.

With such a powerful portfolio of products, we believe that Rolls-Royce can offer India the right combination of experience and new technologies, to contribute towards building capabilities in the wide-bodied aircraft market for India.

There is renewed focus on creating better infrastructure across India. We are sure the plans will include road networks, railways, but also aviation. We think we will also see a growing business friendly environment and combined with the focus on better infrastructure, it will ultimately support a more robust civil aviation industry. This in turn will drive India's domestic as well as international travel. This means that passenger traffic in and out of India will grow at an even faster rate, which is forecasted to triple in the near future.

SP's: In India, you have a joint venture with HAL. Could you give an update on what the JV is doing, the kind of export orders it has bagged, and what is its mandate?

Jayaraman: Rolls–Royce's association with HAL is one of the longest partnerships in defence aerospace history, and is now its 60th year. We started with licensed production of Orpheus engines that powered the Kiran aircraft, progressing to co-production on the Adour family of engines.

The Hawk Advanced Jet Trainer's Adour Mk871 engine marks the latest of a long line of Rolls-Royce engines that have been produced under licence by HAL in Bengaluru, with the first locally assembled aircraft and engine handed over to the IAF in August 2008. The IAMPL facility in Bengaluru is testimony to our long-standing association with HAL.

SP's: Rolls-Royce has been embroiled in several investigations in India and elsewhere. Has this slowed down business globally and also in India?
Jayaraman: We await clarification from the authorities in India. We have made clear that we will cooperate with the regulators and have been explicit that we will not tolerate misconduct of any sort.

SP's: Could you tell us what you will be showcasing at Aero India 2015 and why?
Jayaraman: This year at Aero India 2015, we will highlight our 'Partnership with India – Past, Present and Future' by showcasing our technologically advanced and innovative products. At the booth we will feature our three innovative engines – the Adour, which powers the Hawk trainer; the Trent 700 from the Airbus A330 tanker aircraft; and the C-130J's AE2100 engine.

Rolls-Royce has been present in India for the past eight decades and contributes to the development and modernisation of Indian armed forces. We believe that Aero India is a perfect platform for us to showcase our capabilities and also network with our customers, partners, etc. We look forward to bolstering our business opportunities in international aviation and defence sector this year at the show.

SP's: India has vast pool of engineering talent. How is Rolls-Royce strategised to utilise the talent pool? Are you tying up with academic institutions, R&D centres, etc.?
Jayaraman: There is high demand and competition for good talent across all industry sectors that are dependent on innovation and creative thinking. And the aerospace industry is no different. While India is home to a million engineering graduates every year, it is the industry readiness of this vast talent pool that will play a key role in achieving the vision of creating a scalable and sustainable aerospace ecosystem in India.

Rolls-Royce currently employs 1,000 engineers in the country through outsourced agreements with QuEST and TCS in Bengaluru. We further intend to leverage the capability built up in the last decade in the two supplier engineering centres in India for our programmes. Our strategic suppliers have visibility on the level of skills and complexity of work they intend to execute in the future and they have robust in-house capability development plans governed by Rolls-Royce. •

BAE Systems Aligned with 'Make in India' Initiative

BAE Systems is a global provider of defence and security products to shape support services that meet the changing needs of customers. From sophisticated cyber services and military support, to mission critical electronic systems and protection equipment, BAE Systems aim to be at the forefront of defence technology and science. In an interview, **Chris Boardman**, Managing Director, Military Air & Information, BAE Systems, spells out the plans in India to ***SP's ShowNews***.

***SP's ShowNews* (SPs): What are your views on the Indian military aviation market?**
Chris Boardman (Boardman): India is always a dynamic military in aviation market with all three armed forces looking to expand and modernise their fleets and capabilities. We have been privileged to have a long-standing legacy with the armed forces. More recently, we have had the privilege to work closely with the Indian Government and Hindustan Aeronautics Limited (HAL) to establish a production line in Bengaluru for the Hawk advanced jet trainer, and are enthused about building upon this.

SP's: Given the 'Make in India' push, what is your strategy for India? How does BAE systems plan to grow its business in this new environment?
Boardman: We are very encouraged by Prime Minister Modi's call to 'Make in India'. We were amongst first movers amongst international aerospace and defence companies to make a direct investment in local manufacturing in partnership with Indian industry. Our strategy has been firmly anchored in partnering with Indian industry by sharing technology and capability and there are several such opportunities we are pursuing aligned with the 'Make in India' platform.

SP's: Going forward, which platforms would you consider offering to 'Make-in-India' programme?
Boardman: India is a key international market for BAE Systems and we are committed to invest in and grow our footprint and our partnerships, both manufacturing and technology-based, across our capabilities in aerospace, defence and security. As technology partners in the Tactical Communications Systems programme primed by Bharat Electronics Limited, and in the future in the Future Infantry Combat Vehicle programme, our experience in partnering with the Indian industry in indigenous design, development and production positions us well to address the range of opportunities the market offers.

SP's: Can you tell us a little about the future developments planned on the Hawk?
Boardman: We are continually listening to feedback from our customers and are developing the training system, airframe and performance to meet their requirements. One such forum is the Hawk User Group, a gathering of all its operators around the world, and we were delighted to hold it in India in 2013 with excellent engagement and results. Moreover, the investments we are making in developing the training system can benefit existing and potential new Hawk customers, keeping Hawk at the forefront of advanced jet training for years to come.

Hawk is the world's most successful advanced jet training aircraft. Almost 1,000 aircraft have been sold to customers around the world and Hawk is currently being manufactured for the Royal Saudi Air Force, Royal Omani Air Force, the Indian Air Force and Indian Navy.

We are investing in the way we support our Hawk customers and working to ensure that Hawk is affordable and attractive to current and potential new customers.

SP's: How are you progressing on the Batch 3 requirement of the Indian Air Force for 20 Hawks for its aerobatics team?
Boardman: We have commenced contract negotiations with HAL on a potential order to supply products and services for the manufacture of 20 Hawk aircraft in support of the Indian Air Force's requirement for its prestigious aerobatic team. We are incredibly proud of our long association with the Red Arrows, the Royal Air Force Aerobatic Team, who inspire audiences across the globe with their incredible flying displays. Together with HAL, we are looking forward to giving the Indian Air Force's display team a fantastic aircraft.

SP's: What is your opinion on the Indian industrial base in military aviation and aerospace sector? What are your plans for the Indian supply chain?
Boardman: We are impressed by the capabilities in the Indian industrial base specially the MSME sector and are continuously seeking opportunities to integrate them into our global supply chain. We have made good progress on this, also in partnership with HAL and our work will continue.

SP's: What is your position vis-à-vis the MMRCA? What other prospects are you currently pursuing for Eurofighter Typhoon?
Boardman: The Eurofighter Typhoon consortium and the related European Governments fully respect India's procurement process.We are confident that we can meet the requirements of the Government of India and we are ready to re-engage any time should it invites us. We would be pleased to develop a long-lasting partnership with industrial companies in India for the benefit of both sides.

Eurofighter Typhoon is the world's most advanced new generation swing-role combat aircraft available on the market. It also has the flexibility for future development, meeting the changing needs of the world's modern air forces. Working with our Eurofighter Typhoon partners we are in discussion with a number of countries across the Middle East and in Malaysia to ensure they are kept up-to-date on Typhoon's latest capabilities.

SP's: How is BAeHAL, your joint venture with HAL, performing?
Boardman: BAeHAL, our engineering services joint venture company with HAL, is an important demonstration of our shared commitment to investing in in-country capabilities. Over the years, BAeHAL has progressed well and built up a strong portfolio of clients such Airbus, Rolls-Royce, British Airways and HAL itself. Very recently, the company won a prestigious contract to support for Aeronautical Development Establishment (ADE) in the structural design optimisation of the medium altitude long endurance (MALE) UAV. Concurrently, it is delivering technical publications to Hawk advanced jet trainer customers around the world. Last year, the company received a prestigious contract from British Airways to manage the airline's business intelligence backbone. BAeHAL is strategic to our continued development of the Indian market.

SP's: BAE Systems has been very active in its corporate social responsibility agenda in India. What has been the impact at the grassroots level?
Boardman: Responsible business is part of our company's DNA and embedded within our strategy. In India, we have focused our investment and efforts on leaning in to the efforts of the government and the development sector in improving key human development index parameters and achieving the Millennium Development Goals.

Therefore, our community investment programme in partnership with Smile Foundation has a special emphasis on the girl child and on socially and economically weaker sections of the society. Spread across seven rural and urban locations in six states in India, it has now commenced its third year of operations. Through the partnership on education, we comprehensively support the primary education needs of 1,100 underprivileged children. The programme has already successfully mainstreamed over 300 students. We chose Bengaluru for the health care programme as it is the home of Hawk and I am pleased to share that it has delivered primary health care services to the doorsteps of nearly 30,000 underprivileged people in the city. •

stronger together

Our ideas, like our technologies, take flight over India every day.

More than 40 years ago, Honeywell began its investment in India with a vision to strengthen both our presence in India and our strategic relationships with Indian industry. Today, our commitment to India continues, with thousands of employees focused on delivering new technologies that reduce lifecycle costs while improving safety and efficiency. Working with the government, we continue to deliver innovative new products, services and technologies that make aviation safer, smarter and more energy efficient – for today and for the future.

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Boeing Accelerates Engagement with India's Aerospace Sector


CHINOOK HELICOPTER

BY **SP'S CORRESPONDENT**

Boeing has underscored its commitment to strengthen strategic partnerships with customers, the government, industry and academia aimed to support India's expanding aerospace industry.

"With India poised to become the fastest growing, among large economies in the world, Boeing is proud to be a reliable partner for sustaining this projected growth," said Pratyush Kumar, President Boeing India. "We are focusing our efforts to support the Prime Minister's 'Make in India' initiative by developing a competitive supplier base in country that is fully integrated into Boeing's global supply chain, and we are skilling the front-line workforce to become capable of supporting aerospace-grade manufacturing."

2014 marked a year of growth and consolidation for Boeing in India. Boeing completed deliveries of all 10 C-17Globemaster III airlifters and has completed the contract, which was signed in June 2011. Six P-8I maritime surveillance and anti-submarine warfare aircraft were delivered in the last two years with two additional aircraft deliveries due in 2015 to complete the contract for eight P-8Is, which was signed in January 2009. Boeing also delivered training and support services to the Indian Air Force and Indian Navy to ensure high mission-readiness of both aircraft fleets.

"India is a top-priority market for Boeing and we are committed to working closely with the defence ministry, armed forces and industry to meet India's defence and security needs," said Dennis Swanson, Vice President, Boeing Defense, Space & Security in India. "We see tremendous potential for partnerships with the Indian defence sector where Boeing has already started to play a role in the modernisation effort of the Indian armed forces. We look forward to strengthening these partnerships in the future."

In 2014, Boeing delivered seven 787 Dreamliners and eight 737-800s and collaborated with the Airports Authority of India on its Total Airspace and Airport Modelling (TAAM) operations and training solutions.

"We are proud of our long history and partnership with India and to be a part of its growing aerospace industry," said Dinesh Keskar, Senior Vice President, Asia Pacific and India Sales, Boeing Commercial Airplanes. "Boeing's new, fuel-efficient airplanes such as the 737 MAX, 787 Dreamliner and 777X will bring innovation to the market and unbeatable fuel-efficiencies, helping airlines in India to prosper."

Boeing and its industry partners also celebrated many firsts – the completion of the first floor beam by TAL Manufacturing Solutions' (TAL) for the 787-9 Dreamliner, Dynamatics' delivery of the first set of aft pylon and cargo ramp assemblies for the Chinook helicopter and contract with Rossell on the wire harness. These accomplishments and the work by Boeing's other strategic suppliers demonstrate Boeing's commitment to 'Make in India,' and indicate the growing ability of capable and competitive Indian companies to become part of the global aerospace supply chain and make Boeing even more competitive around the world.

Boeing has been active in India for 75 years with its commercial airplanes providing the mainstay of India's civil aviation sector, and its military aircraft playing an important role in the modernisation and mission-readiness of India's defence forces. Boeing is focused on delivering value to its Indian customers with its advanced technologies and performance driven aircraft underpinned by life-cycle support services. Boeing is also committed to creating sustainable value in the Indian aerospace sector – developing local suppliers, pursuing business partnerships and shaping research and technical collaborations with Indian companies and institutions. •

Boeing to Capitalise on India's 'Sunrise Market'

SP's: You mention India is a Sunrise market; what do you mean by it?
Pratyush: 'Sunrise' is a traditional definition. We are looking forward to every project and we see growth.

SP's: Is it only perception or is it for real?
Pratyush: The projections and the numbers are pointing towards a significant growth. With the current economic growth and recent trends, we see more and more companies entering the field, there are Tatas, Mahindras, Dynamatics and a few more scaling very rapidly. It is indeed a reality to call India a 'Sunrise Market'.

SP's: Is 'Make in India' for India only or for the world?
Pratyush: It is both. If we make only for India, the business will be very challenging and we will be catering to a small market. It is important for the suppliers to be competent for the global market. We are making for India for sure and making for the world is very necessary for partnership from a global perspective. We do what makes the most business sense.

SP's: What is priority for you in India, civil or military?
Pratyush: There are lot of synergies. We have same suppliers for both. Our approach in India is to have integrated supply management.

SP's: What size of offset obligations is fulfilled till now?
Pratyush: We have met all the offset milestones. Contractual numbers can be gained from the Ministry of Defence. •

PRATYUSH KUMAR, PRESIDENT BOEING INDIA AND DENNIS SWANSON, VICE PRESIDENT, BOEING DEFENSE SPACE & SECURITY IN INDIA AT A PRESS BRIEFING IN NEW DELHI

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Modernising Indian Airports with Honeywell Technologies

As India's civil aviation sector works towards its potential, there are major investments in infrastructure happening. One of them is airport infrastructure to make aircraft movement seamlessly smooth, safe and efficient. Honeywell Aerospace is in the forefront of such development. Here **Arijit Ghosh**, President, Honeywell Aerospace India, talks about various solutions that Honeywell has on offer for India.

***SP's ShowNews* (SP's): With aircraft movement having increased and further deployments due, the airspace is no doubt getting congested, causing snags, 'near misses', runway incursions, etc. How is Honeywell addressing such issues?**

Arijit Ghosh (Ghosh): The Airports Authority of India (AAI) estimates that aircraft movements, passengers and freight at all Indian airports are expected to grow at a rate of 4.2 per cent, 5.3 per cent and 5 per cent, respectively, for the next five years. With passenger numbers expected to reach 540 million annually by 2025, there are a number of challenges that occur with managing congestion; not least the need to continue ensuring the highest level of passenger safety and comfort while building a sustainable infrastructure that supports the ever-growing passenger demand.

Honeywell Aerospace's work at Chennai International Airport, in partnership with the AAI, is one example of how we are helping to create solutions that ease flying congestion in India. Honeywell's SmartPath Ground-Based Augmentation System (GBAS) is the only FAA-certified GBAS. This system increases airspace capacity and ATC flexibility by providing the aircraft with augmented and highly accurate satellite navigation data to help it land. The system increases airport capacity, decreases air traffic noise and reduces weather-related delays. It also offers substantial maintenance savings compared with older instrument landing systems (ILS) that are commonly used today, as it requires less costly calibration and on-airfield hardware.

SP's: India has embarked upon modernising airports, both big and small. Could you explain how Honeywell could help in modernising regional or no-frills airports? We should keep fund constraints in mind while thinking about next-gen solutions for smaller airports.

Ghosh: With India investing heavily in airport infrastructure in the next few years, Honeywell is committed to supporting modernisation projects to ensure efficiencies are available to meet evolving needs now and in the future. Honeywell has a range of technologies that cover all areas of airport – terminals, airside and landside. Honeywell's technologies for airport terminals improve the passenger experience and increase efficiency. Honeywell's systems can intelligently manage ambient temperature and lighting, for example, to ensure passengers are comfortable while in the terminal building, while at the same time reducing energy consumption. Safety and security is also extremely important, and Honeywell's wide range of CCTV, zonal fire management systems and access control technologies ensure that regardless of airport size, passengers can be kept safe with some of the most advanced systems on the market. For airside operations, Honeywell's advanced control systems for airfield lighting and docking systems help deliver safe and efficient airside operations.

Honeywell has been part of India's airport modernisation programme with its technologies delivered to airports like New Delhi Terminal 3, Hyderabad, Mumbai, Chennai and Kolkata to name just a few. Honeywell has achieved many firsts in the country too, like the CAT-IIIB airfield lighting system at New Delhi Airport Runway 11-29.

SP's: What are the advantages of Honeywell's Next Generation ATM systems? Could you quantify them in terms of fuel savings, etc?

Ghosh: The future air traffic management (ATM) systems will rely on a large number of different technologies at every stage of flight, all of which must work in harmony to improve efficiency and ease congestion. The extent to which countries and their airlines and airports adopt and integrate these systems will determine the level of efficiency gains so it is very hard to quantify precisely the improvement in efficiency that India's commercial operators will see in the future.

That said there are a number of systems available; either directly related to ATM or that offer indirect traffic management benefits, which could have a tangible benefit on operations today. One example is our SmartTraffic TCAS (Traffic Collision Avoidance System. SmartTraffic uses Automatic Dependent Surveillance-Broadcast (ADS-B) to enable the aircraft to communicate with those that surround it. This enables aircraft to fly closer together, even in oceanic airspace where ground radar cannot cover. By using SmartTraffic ATC could approve altitude change requests faster and enable aircraft to fly more efficiently, allowing operators to save as much as $1,00,000 per aircraft per year.

Our SmartPath GBAS can deliver considerable benefits too. As well as increasing landing assurance to reduce costly delays and diversions, the maintenance savings it offers over ILS are considerable. Honeywell calculations show that depending on the operational profile at the airport, GBAS can offer up to $4,00,000 in annual maintenance savings alone.

SP's: What is the Honeywell differentiator in ATM systems?

Ghosh: It is vital that every stage of the flight is enhanced in order to improve ATM and reduce congestion. Honeywell technology portfolio spans the entire flight, from the moment a passenger arrives in the airport car park, to the moment they pick up their bags at their destination. Our solutions address the needs of all key stakeholders in the ecosystem, which are government bodies, air navigation service providers; airport operators, airlines and passengers, and we deliver these in markets all over the world. Consequently we understand how each stage of flight interacts with each other, which in turn helps us better understand each individual stakeholder's challenges regarding capacity and efficiency.

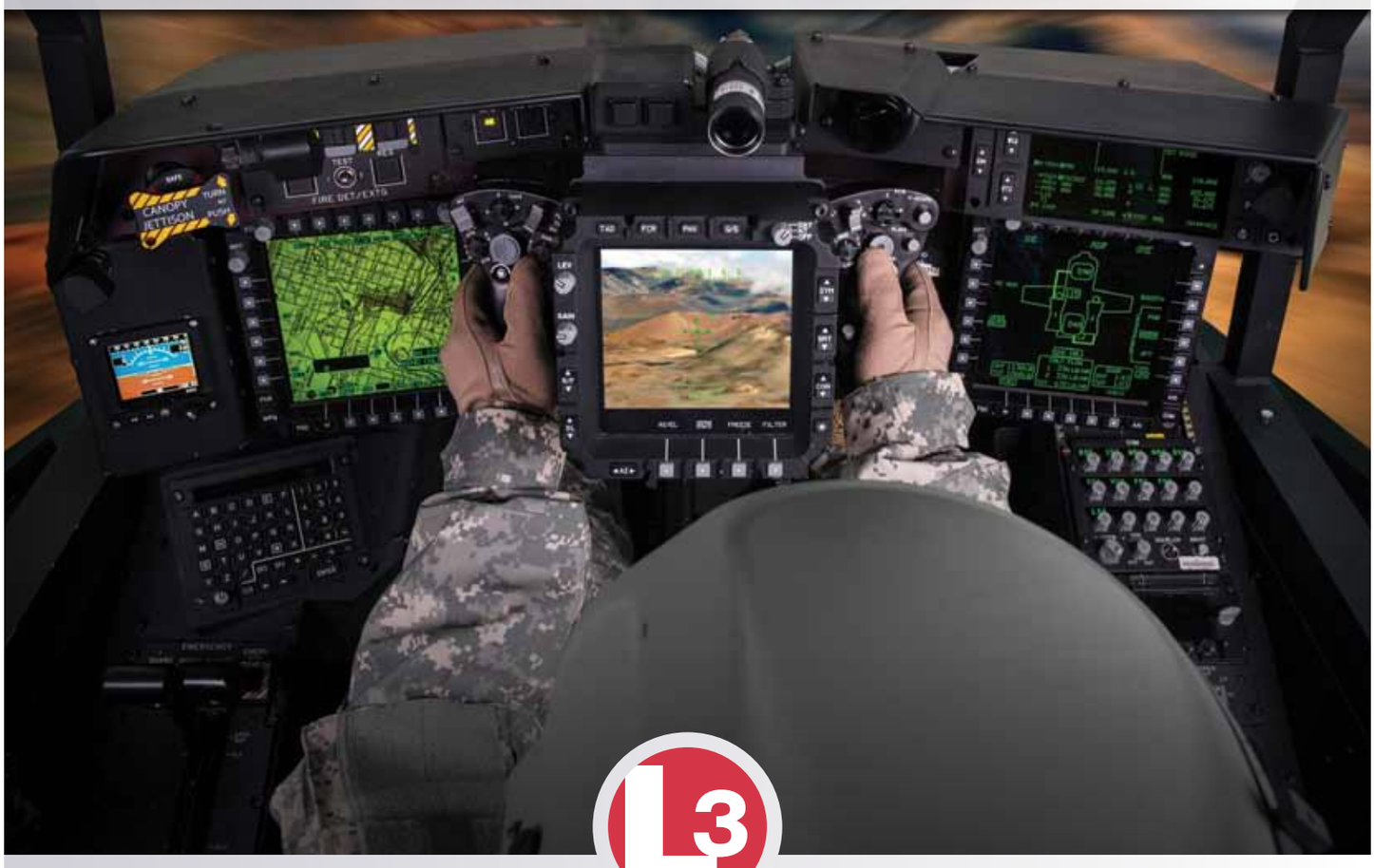
SP's: India is now in the 'Make in India' mode. What is the strategy of Honeywell to help develop products and solutions here?

Ghosh: One of Honeywell Aerospace's key partners in India is the Hindustan Aeronautics Limited (HAL). Beginning over 40 years ago, Honeywell collaborated with HAL to manufacture the Honeywell TPE331 turboprop engine, which was the first fully manufactured engine in India. The engine powers the Dornier 228 aircraft, which is operated by the Indian Navy and Coast Guard. Our partnership has now expanded to include other technologies for indigenous HAL platforms, such as the advanced light utility helicopter and light combat aircraft.

Announced in 2014, Honeywell and Tata Power SED will collaborate on the co-production of Honeywell's TALIN inertial land navigation technology to offer the Indian armed forces a new choice for locally produced, inertial navigation. The combination of our technical expertise and Tata Power SED's ability to offer quality local engineering will deliver a high performance, locally produced precision navigation option for India's military for the first time.

Partnerships like ours with HAL and Tata Power SED are critical to the success of the 'Make in India' movement. With the government's efforts to secure additional foreign investment into the country, Indian companies can gain access to the technology, skills and international markets required for sustainable defence growth. •

AS DIVERSE AS AVIATION ITSELF.



Displays

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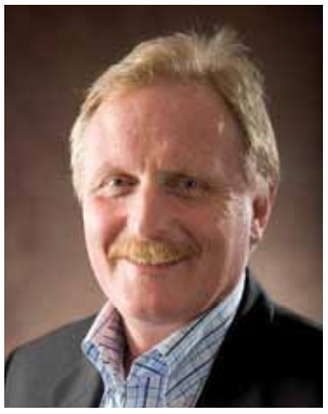

Rockwell Collins Co-developing Indigenous Flight Simulator

Rockwell Collins is among the top companies in the realm of training products for the aerospace sector. It provides world's leading aerospace and defence companies to rely on Rockwell for smart communications and aviation electronics. In an interview **Jim Walker**, Vice President, talks about the company's road map.

***SP's ShowNews* (SP's): Rockwell Collins is known for avionics and communications. What does your company do in the simulation and training sector?**
Jim Walker (Walker): We develop comprehensive training products and solutions, including needs assessments, planning, development and ongoing reinforcement that integrate real-worldneeds with virtual-world solutions tospan the entire training continuum.

SP's: How is Rockwell Collins providing simulation and training solutions to the Indian market?
Walker: We recently signed a strategic alliance memorandum of understanding with Zen Technologies to co-develop and build indigenous flight simulators for the Indian market.
As part of this partnership our intent is to do the following:

- Address the flight simulation defence market in India with Zen being the face to the Indian market.
- Leverage Zen's technical expertise to design and build simulator components in country.
- Rockwell Collins will transfer world-class technology to Zen.
- Zen will offer in-country maintenance and after sales support.

At Aero India, Rockwell Collins and Zen Technologies will be demonstrating a helicopter simulator jointly developed by both partners in Zen Technologies booth, Hall C, booth C2.7.

KC390 FLIGHTDECK

SP's: What simulation and training systems are you currently offering globally?
Walker: Examples of our advanced training products and systems include:

- Transportable Black Hawk Operations Simulator (T-BOS): IT is a high-fidelity, self-sufficient simulator, offering an immersive environment that provides aircrew training for UH-60 A/L and UH-60M helicopters.
- EP image generators enable a range of products aligned to differing price points and capability requirements, all offering the capabilities of second-generation EP2 (environment processor) real-time software.
- CORE simulation architecture – an open solution providing comprehensive development, integration and test environments for aircraft, avionics and training systems.
- Radar simulation systems — combine physics-based radar modeling and integration with image-generation technology to provide effective training across the full range of ground and airborne radar types.
- RealFires JTAC and JFO training system — a high-fidelity, scalable training solution that was designed by joint terminal attack controllers (JTACs), enabling joint fires operators (JFOs) to train for certification and requalification.

SP's: What is next for Rockwell Collins simulation and training systems?
Walker: Our Advanced Technology Centre is expanding our expertise in Live Virtual Constructive across a variety of training technologies. Our goal is to integrate numerous technologies to enable true live connectivity among virtual and constructive participants. •

Airbus to Invest in New Partners

Indian companies, both public and private, are an integral part of Airbus Group's global supply chain. Overall, Airbus procurement from India has tripled in the last three years and was over $350 million in 2013. Giving further details of how Airbus is going to further invest in India is **Yves Guillaume,** Airbus Group President in India.

***SP's ShowNews* (SP's): How are you planning to support the 'Make in India' initiative?**
Yves Guillaume (Guillaume): We have a rich history in India and have proved ourselves to be a reliable partner. As the country continues to grow and the government seeks to catalyse the local aerospace and defence industry through the 'Make in India' initiative, Airbus Group stands ready to leverage its existing partnerships and invest in new ones to meet India's expectations. Our proposal to build the C295 with Tata to replace the Avro and our JV with Larsen & Toubro for manufacturing radar, avionics, electronic warfare and mobile systems for military applications show our commitment.

Let me give you another example of how we have helped countries acquire skills in defence and aerospace. In Australia, where Airbus Helicopters won the contract for 22 attack helicopters, 18 of them were assembled locally by an Australian company, Airbus Group Australia Pacific (AGAP), that acquired enough technologies and programme management expertise to further assemble transport helicopters and upgrade military aircraft, including production of 43 out of the 47 NH90 acquired in another major order. AGAP is now one of the leading national aerospace and defence companies with about 1,300 employees.

SP's: On the defence side, what do you looking forward to in 2015?
Guillaume: As you know, we have already been selected by India to supply six A330 MRTT air-to-air refuellers. I think both sides now really need to finalise the contract. We are also hoping that the Indian Government will progress the Avro replacement programme for which we have submitted a joint bid with Tata. We are offering the modern C295 medium military transport aircraft. Majority of the aircraft will be manufactured and assembled by Tata in India with significant benefits for the local supply chain.

On the helicopters side, there are a number of campaigns where we hope to make progress. The AS550 C3e Fennec is foreseen for Indian Army's and Air Force's reconnaissance and surveillance helicopter campaign. As you know the tender was cancelled for the third time and has been re-started under the 'Buy & Make (Indian)' category. Then there is the AS565 MBe Panther which fits the requirements of India's naval utility helicopter programme which envisages acquisition of around 100 units. In addition, the EC725, fitted with the relevant weaponry and sensor suites, can perfectly meet the Indian Navy's 120+ naval multi-role helicopter (NMRH) programme requirements.

C295

SP's: How significant do you hold the decision to increase foreign direct investment (FDI) in defence to 49 per cent?

Guillaume: The increase in the FDI cap in defence from 26 per cent to 49 per cent is a forward looking step. However, management control, and not the exact FDI threshold, is the key issue. It would be much easier for us to transfer cutting-edge technologies to a joint venture in India in which we have management control. Plus if we control the JV, we can be assured of the quality of the products manufactured and will be willing to market them globally through our extensive networks.

SP's: Your bid with Tata for the Avro replacement has ended up in a single vendor situation. Now what?

Guillaume: We have submitted our proposal and now we are simply waiting for the Ministry of Defence to decide on how to proceed. We understand that, following the change of administration and Defence Minister, this may take a little longer than expected.

SP's: How important are Indian suppliers for your global supply chain?

Guillaume: Indian companies, both public and private, are an integral part of Airbus Group's global supply chain. We have over 30 local suppliers and more than 5,000 jobs have been generated by us across this supplier network. The top three commodities that we source from India are engineering and IT services, aerostructures and detail parts and systems. To give you some examples, HAL produces half of all A320 forward passenger doors while Dynamatic Technologies, a global tier-1 supplier, provides flap track beams for the A320 and A330 Family aircraft. Tata Advanced Materials Limited, in partnership with Sprit Aerostructures, is producing composite parts for the A350 XWB programmes. In addition, Aequs supplies several detail parts. Companies such as Infosys, Tech Mahindra, Tata, HCL, Geometrics and Wipro also provide information system and engineering services. Overall, our procurement from India has tripled in the last three years and was over $350 million in 2013.

SP's: What are you showcasing at Aero India?

Guillaume: On display at our pavilion – OD8 – in front of Hall C, are scale models of the world's most spacious passenger aircraft A380 and the fuel-efficient A320neo. Also on exhibition are models of the A330 MRTT mid-air refueller which has been selected by the Indian Air Force (IAF) and the C295 medium military transport aircraft which has been offered to India, in partnership with Tata, for the Avro replacement programme. Two 'Made in India' products – High Accuracy Air Pressure Measurement System and Structurally Integrated Antenna – are also part of the display line up.

On the helicopters' side, a model of the EC725 is on exhibition. The EC725, fitted with the relevant weaponry and sensor suites, can perfectly meet the Indian Navy's 120+ NMRH programme requirements and the Indian Army's 150+ tactical transport helicopters' fleet expansion plan. In addition, there are models of the AS550 C3e Fennec and the AS565 MBe Panther. The Fennec is foreseen for the Indian Army's and Air Force's reconnaissance and surveillance helicopter campaign whereas the AS565 MBe Panther fits the requirements of India's naval utility helicopter programme. Model of the civil, single-engine EC130 T2 is also being showcased. •

Safran's Main Mission 'Advantage India'

Safran is the leading supplier of aircraft engines, landing gear and carbon brakes for airlines operating in India and neighbouring countries, and plays a full-fledged role in the development of air transport in the country. Safran activities have quickly evolved to include strong local partnerships with Indian aviation industry based on joint developments, production and support licences for airplane, helicopter and rocket engines landing gear, navigation systems, as well as the associated support services.

Today, Safran has four facilities dedicated to products and services for fixed and rotary-wing aircraft:

- Safran Engineering Services India (SESI) in Bengaluru provides end-to-end engineering services to global and local customers. It embodies Safran's proven expertise in aerostructures, electrical and mechanical systems, electronics and software.
- Snecma HAL Aerospace Pvt. Ltd. (SHAe) is an equal joint venture between Snecma and Hindustan Aeronautics Ltd. (HAL), created in 2005. It manufactures high-tech components for CFM56 aircraft engines in Bengaluru.
- CFM Training Centre close to Hyderabad airport provides maintenance training for ground crews from airlines operating CFM56 engines. It can provide training for up to 500 maintenance technicians and engineers a year. It also offers training to engineers from helicopter operators using Arriel engines manufactured by Turbomeca.
- Turbomeca India Engines Pvt. Ltd, Safran's helicopter engine support centre in Bengaluru, provides support services for its own engines to its Indian customers. Its main partners are HAL and Pawan Hans Helicopters Ltd. Turbomeca is the first helicopter engine supplier to HAL.
- Snecma (Safran) and Max Aerospace signed an agreement last year, to create a joint venture called Max Aero Engines Private Limited (MAEPL), which will offer aircraft engine maintenance, repair and overhaul (MRO) services for M53 engines in India.

Safran provides multiple solutions for the Indian aerospace sector: Over 700 CFM56/Leap engines sold to almost all major Indian airlines; more than 1,400 Indian military airplanes and helicopters are powered and/or equipped by Safran; nearly 700 inertial navigation systems have been supplied by Sagem for Indian armed forces; and Messier-Bugatti-Dowty holds a 100 per cent share of the domestic market for wheels and carbon brakes on A320 and B787.

A TRUSTED PARTNER TO INDIAN DEFENCE INDUSTRY

Safran has been a supplier to the Indian armed forces since the 1950s, providing engines and/or equipment for combat aircraft, including Jaguar, Mirage 2000 fighters fleets, Hawk trainers, HAL Dhruv, Cheetah, etc. In early 2012, the consortium "Rafale International" (Snecma, a Safran company, is one of the three key partners in the consortium) started exclusive negotiations with the Indian Government to supply 126 Rafale multi-role fighters equipped with several Safran technologies including the engine, landing gear, wiring, inertial navigation system. Safran, through its company Sagem, also provides a wide range of avionics (inertial navigation systems, flight control systems and autopilots) and optronics systems for a number of combat platforms including aircrafts, submarines, artillery systems and tanks. Almost the entire Indian Air Force fleet is equipped with Sigma 95N navigation systems as a result of a long-standing partnership with HAL. Significantly, this navigation system has also been selected for the first prototypes of the MALE drone being developed by India. The New Delhi-based subsidiary Sagem Services India Pvt. Ltd. provides maintenance and customer support for these systems and equipment.

EQUIPPING THE INDIAN ARMED FORCES WITH A SPECTRUM OF TECHNOLOGY

Safran has provided aircraft technology for most of the Indian armed forced airplanes and helicopters like Jaguar, Mirage 2000, Su-30, Hawk, MiG-29K, Cheetah helicopter and its variants. The Dhruv helicopter and its variants are powered by the 'Shakti' engine which was jointly made by Turbomeca (Safran) and HAL. Sigma 30 Inertial Navigation System has been designed for artillery applications. The Sigma 40 Navigation System is used on Indian naval vessels. Sagem is a leading producer of FADEC (Full Authority Digital Engine Control) systems, a critical component in aircraft like the Rafale, the A320 and B737.

ADVANCING BIOMETRIC SECURITY IN INDIA

Morpho (Safran) makes Trace and detection equipment and is a leader in biometric technology and identity management and identification systems like (AFIS) automated fingerprint identification systems and face recognition solutions. Safran also operates the largest smartcard manufacturing facility in Asia which produces more than one million smartcards per day for a variety of applications. About 80 per cent of all Morpho's smart cards are produced in India. A leader in biometric technology, Morpho (Safran) is one of the key partners in India's Aadhaar project under the Unique Identification Authority of India (UIDAI).

MAIN MISSION: ADVANTAGE INDIA

Safran has been working closely with India to ensure the protection of both people and infrastructures, by providing ultra-modern, foolproof security solutions, especially for air travel, defence, law enforcement and commercial establishments. With the new government and budget that focuses on need for significant investment in the defence sector and investment, including from the Indian private sector, deserves encouragement.

The 12 per cent boost in the budget spending has opened the defence industry to foreign investment in a way like never before. Safran India is also widening its horizon to mark the recently launched 'Make in India' campaign by the Prime Minister of India, Narendra Modi. Stronger onus on engineering and R&T will be the way forward for Safran India. The recent signing of collaborations with the Foundation for Innovation & Technology Transfer (IIT, Delhi) and Society for Innovation & Development (IISC Bangalore) will help Safran to initiate research and development in the field of advanced avionics systems for the development of next-generation aerospace technologies in India. India's growth is at the heart of Safran's strategy and it continues to strengthen its presence in India, working hand in hand with its local partners to shape the future of India's aerospace, defence and security industries. Safran's main mission is 'Advantage India'. •

हिन्दुस्तान एरोनाटिक्स लिमिटेड

HINDUSTAN AERONAUTICS LIMITED

एचएएल 75 वर्षों का भरोसा

PIONEERS IN AEROSPACE DRIVEN BY TECHNOLOGY

Adding Value to the Indian Economy Through Production Within India

Ruag has outstanding technological capabilities on the ground, in the air and in space. Today about 8,000 committed and skilled staff at the production locations in Switzerland, Germany, Sweden, France, Austria, Hungary, Australia and the United States are driving forward the technologies of tomorrow. In India, Ruag Aviation, makers of Dornier 228 new generation aircraft, have joined hands with the Tata Group to bring to India the best of technologies. In an interview with ***SP's ShowNews***, **Thomas K. Schilliger**, General Manager Dornier 228 and Military Aviation Germany and **Martin Buehlmann**, Vice President Supply Chain Management, Ruag Aviation, talks about the company's plan for India providing full life-cycle support for the Dornier 228.

***SP's ShowNews* (SP's): How does the Tata Group fit into this scheme of things?**
Ruag: The two companies of the commercially operated Tata Group—TTL and TASL—already have a very successful track record in the aviation industry, mainly with respect to aerostructures. Due to their reliability and experience in the industry, they are ideal partners to support our supply chain. RUAG procures aerostructural shipsets from the Tata Group.

SP's: What kind of special missions can the aircraft undertake which are unique to this aircraft?
Ruag: The Dornier 228-212NG is best suited for maritime policing and special missions; particularly maritime patrol, border patrol, pollution surveillance, anti-piracy patrol, search and rescue coordination. The unique ability for the Dornier 228-212NG to undertake such a range of operations is due to the combination of its key functions: first and foremost, its wide speed range, fast cruising speed allowing it to reach areas to be observed rapidly, then low loitering / observation speed to detect small moving targets over water, mountains and dessert; secondly, the outstanding endurance of more than 8 hourson station duty time, with relaxing room for the crew. Overall, the Dornier 228-212NG is highly adaptable and allows the integration any type of sensors in the spacious rectangular and unpressurised fuselage with ease. With a state-of-the-art glass cockpit installed with sensors and the mission crew in the cabin to be able to prepare fast decisions, all in all combined with operational availability, highest reliability, a fuel saving, environmental-friendly engine and the life-cycle support RUAG guarantees.

SP's: One key important aspect of aviation is low operational costs. Could you give specific examples of how this has been brought down for the benefit of military customers?
Ruag: From the start, the Dornier 228 was designed to save cost for the operators. This aspect has been incorporated in the design of the most modern and efficient wing in its class of aircraft. Furthermore, quick configuration change ability of the cabin, such as to adapt the aircraft for the next flight from cargo; to transport of forces; to patrol missions, in other words the versatility of the Dornier 228-212NG provides a wide spectrum of operation possibilities with only one type of aircraft in the fleet. The newer sensors integrated in the Dornier 228-212NG combined with the high stamina in the air can adequately replace uneconomical, older and larger aircraft, thus significantly reducing the operational cost for its operators.

SP's: What is RUAG Aviation showcasing at Aero India and specific reasons for showcasing the same?
Ruag: We present the Dornier 228-212NG – its capabilities and benefits—to the Indian aviation world, which includes civil operators, aviation authorities as well as Air Force, Navy and Coast Guard.

SP's: As RUAG Aviation has partnerships in India, already reflecting the Prime Minister's 'Make in India' vision, how does RUAG plan to enhance this further?
Ruag: RUAG Aviation has already signed MoUs with TASL Hyderabad for the manufacture of the shipsets for the structure of Dornier 228-212NG aircraft, along with TTL Pune for digitisation and TAL Nagpur for manufacturing Airbus parts.

SP's: Where does India fit in the supply chain management for RUAG Aviation? How much (percentage wise) of military aviation products/services are sourced from India?
Ruag: Since the Dornier 228-212NG is an EASA certified aircraft, it can be operated by airlines and military or paramilitary divisions. Therefore, the sourcing of civil and military aerostructures from India are of equal importance. The percentage of the green aircraft (the aircraft before the specific additions are built-in) sourced from India is around 20 per cent.

SP's: Could you talk about your presence in Asia? Which are the other markets you are focusing on in the region?
Ruag: We are serving the worldwide market with the Dornier 228-212NG focused on maritime patrol/policing demand of the governments and NGOs. We are presently building up and enforcing our presence in Asia with partners in preparation for the future and to ensure we provide our best services to our customers. The Asian market in particular shows an upcoming demand of special mission aircraft for maritime patrol, border patrol, pollution control and to protect the exclusive economic zone. In parallel, there is a demand for replacement of the older, uneconomical and un-environmentally-friendly aircraft in favour of smaller and more cost-efficient aircraft in the size category of the Dornier 228-212NG. •

CIVIL AVIATION IN GUJARAT
SURGING AHEAD

GUJSAIL and the Civil Aviation Department provide single window clearance for all proposals under state government preview related to the Civil Aviation Sector in Gujarat.

M.R.O. IN AHMEDABAD

GUJSAIL has established a General Aviation M.R.O. in Ahmedabad that undertakes maintenance, repairs, overhauls and checks of several makes of business jets, rotary wing and turbo prop aircraft. The M.R.O. has its own dedicated hangar.

INTRA-STATE CONNECTIVITY

The Government of Gujarat has awarded a contract to operate regional air services between various cities in Gujarat. The intra-state connectivity will enable fast and efficient movement of people between urban centres and industrial areas in Gujarat.

GUJSAIL

Gateway to Aviation in Gujarat

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Nr. University Ground, Vastrapur,
Ahmedabad-380 052, Gujarat
Ph.No.: 079-27911955 | Fax No.: 079-2791935
Website: www.gujsail.org | Email: ceo@gujsail.org

Excellence to the Power of 2

Embraer E-Jets E2 is setting benchmarks in regional aviation, offering operators/passengers an enriching flying experience

MOCK-UP OF EMBRAER E-JETS E2 BUSINESS CLASS

BY **R. CHANDRAKANTH FROM SINGAPORE**

It the Farnborough AirShow 2014, I missed out on the debut cabin mock-up of Embraer's new E-Jets E2, but was lucky to catch up with Embraer's peek into the future at Singapore. The cabin mock-up is on a worldwide tour of Farnborough, Zhuhai Airshow, Singapore, Sydney before it arrives for the Paris Air Show in June 2015. It has been getting 'wows' wherever it has gone so far. A walkthrough the cabin mock-up is an ethereal experience. With dim and efficient lighting, the welcome into the aircraft is awesome. The first stop is the 'welcome galley' where a fairly large welcome screen digitally displays flight information and has a cabin management system which is not only pleasing to the eye, but also goes on to make life easier for the cabin crew. This is an optional feature for operators, but the guess is its attractiveness and efficiency will come up trumps. Besides, it has enormous potential of becoming additional revenue source as companies can display advertising or reinforce their brand.

BUSINESS CLASS, A CLASS APART

The second stop is the Business Class. The seating configuration is different giving passengers a certain amount of exclusivity. In Business Class, Embraer is showcasing a staggered-seat solution that provides exceptional leg room and introduces a new standard of comfort on a single-aisle jet that is traditionally offered only on much larger aircraft. For in-flight entertainment, Embraer has 14-inch monitor option which it plans to integrate into the seat. The E2 cabin will have options for Wi-Fi Internet connectivity and individual screens for in-flight entertainment, among other amenities.

Andre Stein, Director, Industry Analysis & Product Strategy, Embraer, explained the aircraft interior features which have new individual control panels for lights and air-conditioning (the Passenger Service Unit—PSU) designed to enhance the concept of 'personal space', with more ergonomic and intuitive controls that were inspired by the automotive industry.

The third stop is the Economy Class. The 18.3-inch width seats are among the widest offered in the industry and will be of the slim type, providing greater leg room for passengers. The overhead bins will be about 40 per cent larger than those of current generation E-Jets, allowing every passenger to take one typical airline carry-on bag onboard. In addition, the bins will accommodate bags with IATA maximum recommended size (56 cm x 45 cm x 25 cm). The best part is that it goes in a wheels first position. One other aspect that Embraer has given attention to is access to loading the baggage in the cabins. There is a kind of foothold wherein a passenger not tall enough can get on to it and load the baggage himself or herself without waiting for any help.

Embraer developed the aircraft cabin design jointly with the UK design studio PriestmanGoode. In Economy Class, the E2s will maintain Embraer's trademark two plus two seating which eliminates the unpopular middle seat.

MINIMUM TOUCH POINTS

The fourth stop was the galley and the toilet where touch points make use of lavatory efficiently without wastage of water. The toilets are disabled-friendly. In the galleys, Embraer has used wood-like flooring to give it a distinctive look, but will have to wait for approvals on safety with this optional feature.

To be attractive to leasing companies, Embraer has developed a modular construction approach for the new interior. The modularity concept is built around standard parts and structures, such as common overhead luggage bin parts for all classes. Modularity means airlines and leasing companies benefit from faster reconfiguration, fewer parts and simplified maintenance.

DESIGN-DRIVEN

Paul Priestman, designer and co-founding director of PriestmanGoode, recalled his association with Embraer, designing the Embraer 190 and Lineage 1000. "The E2 is the latest we are working on. Design is not just about aesthetics. We design to make things better." The entire concept is functionality with a high-quality feel. PriestmanGoode has worked on the interior of nine different airlines – Thai Airways, Malaysia Airways, Korean Air, United Airlines, TAM, South African Airways, Air France, Lufthansa and Swiss Air. •

Dassault Falcon 8X Takes to Skies

Ultra-long range trijet on track for service entry in second half of 2016.

Dassault Aviation on February 6 announced that the company's new flagship, the ultra-long range Falcon 8X, successfully completed its first flight a little more than one month after rollout.

With test pilots Eric Gérard and Hervé Laverne at the controls, aircraft 8X s/n 01 lifted off from Dassault Aviation's Mérignac plant near Bordeaux at 02:00 p.m.. The aircraft levelled off at 5,000 ft (1,500 metres) and raised its landing gear before beginning flight handling manoeuvres and system tests at 15,000 ft (4,500 metres). It later climbed to FL400 (12,000 metres) accelerating to Mach 0.80. The aircraft subsequently descended to 5,000 ft for approach and landing at 03:45 p.m.

"Throughout the flight, the Falcon 8X demonstrated excellent handling qualities, the hallmark of all Dassault Aviation aircraft," said Gérard. "We reached each of the performance objectives set for the first mission and, in a few cases, surpassed target goals. I am confident that the remainder of the flight test programme will proceed just as smoothly and feel extremely honoured to fly such a handsome and well-engineered aircraft."

"Today we reached a key milestone in the Falcon 8X programme, and are right on target for mid-2016 certification and second half 2016 deliveries," said Dassault Aviation Chairman/CEO Eric Trappier. "The new Falcon has been well received in the marketplace and already shows every sign of being a commercial and technical success. This early achievement reflects Dassault Aviation's half century of experience in the business aviation industry. Dassault Aviation's state-of-the-art military aircraft know-how enables us to design and build business jets that combine exceptional reliability, flight handling and technical capabilities with unmatched cabin comfort and operating economics. I congratulate the pilots, engineers, technicians and line workers, both at Dassault Aviation and at our numerous industrial partners and subcontractors facilities for their contributions in getting the 8X off to such a great start."

Falcon 8X s/n 02 and 03 are scheduled to take to the air in the coming months. Each will take part in the flight test programme that is expected to last around 500 flight hours. Serial number three will leave mid-year for the Dassault Aviation completion facility in Little Rock, Arkansas, where it will be fitted with a complete interior and undergo a stringent system test campaign.

FALCON AT BENGALURU

Dassault Aviation will display this year two very long-range triple Falcon 7X, that flies non-stop up to 14 passengers from India to London City Airport, and a wide-body twin Falcon 2000LXS, the most popular cabin in the industry. At the show Dassault will also pitch for the reputable Falcon 900LX, the entry-level Falcon 2000S, the very new Falcon 5X offering the widest and highest cabin in the industry, and the new Falcon 8X which has more cabin space and more range than the superb and efficient Falcon 7X. •

HAL Showcases LCH, LCA, LUH and Rudra

BY **SP'S SPECIAL CORRESPONDENT**

The Hindustan Aeronautics Limited's (HAL) indigenous products will enthral visitors with their flying and static display during the 10th edition of Aero India. HAL's light combat helicopter (LCH) and light combat aircraft (LCA) Tejas will be flying to display their versatility.

HAL would also be showcasing its technical competence built over the years. The display is themed around "Evolution of HAL as a Centre of Excellence in Aviation R&D and Technology over 75 Years of its Existence".

The new Chairman of HAL, T. Suvarna Raju said: "We believe that government's vision of 'Make in India' will be a game changer in aerospace & defence and HAL is proud to be contributing towards India's defence preparedness since the early 1950s."

HAL's indoor pavilion is spread over an area of over 1,200 sq metres. "Visitors can experience a feel of the Hawk advanced jet trainer cockpit on a full-scale cockpit simulator. We will have an upgraded cockpit mock-up to showcase the cockpit functionalities for a variety of platforms. Our growing partnership in India's space programme would also be showcased where visitors will have a feel of the Martian surface on Earth," added Raju.

Advanced light helicopter-weapon system integration (ALH-WSI) Rudra, ALH Skid Utility, LCH and the first series production light combat aircraft (SP1) is on static display. The full-scale model of light utility helicopter (LUH) designed and developed by HAL would also be on display. This utility platform is a single-engine multi-purpose helicopter in the three-tonne class and is designed to perform various roles like policing, urban surveillance, medical ambulance, etc.

HAL's focus would be to showcase itself as a single window solution provider for its platforms across rotary- and fixed-wing business segments. In this aeroshow HAL would also project itself as the company actively pursuing development and production of UAVs through collaborations with defence laboratories, academia, and its own design.

LIGHT COMBAT HELICOPTER

HAL is in the process of transforming itself as a technology company and some of the salient technologies that would be on display include 25 KN engines suited for five-tonne class that would suit for future jets, glimpses of digital manufacturing of LUH, 3D printing technology, automatic flight control systems, smart radios and upgraded avionics for various platforms. In addition, HAL will be having several business meets with its key partners and other interested parties from different parts of the world. •

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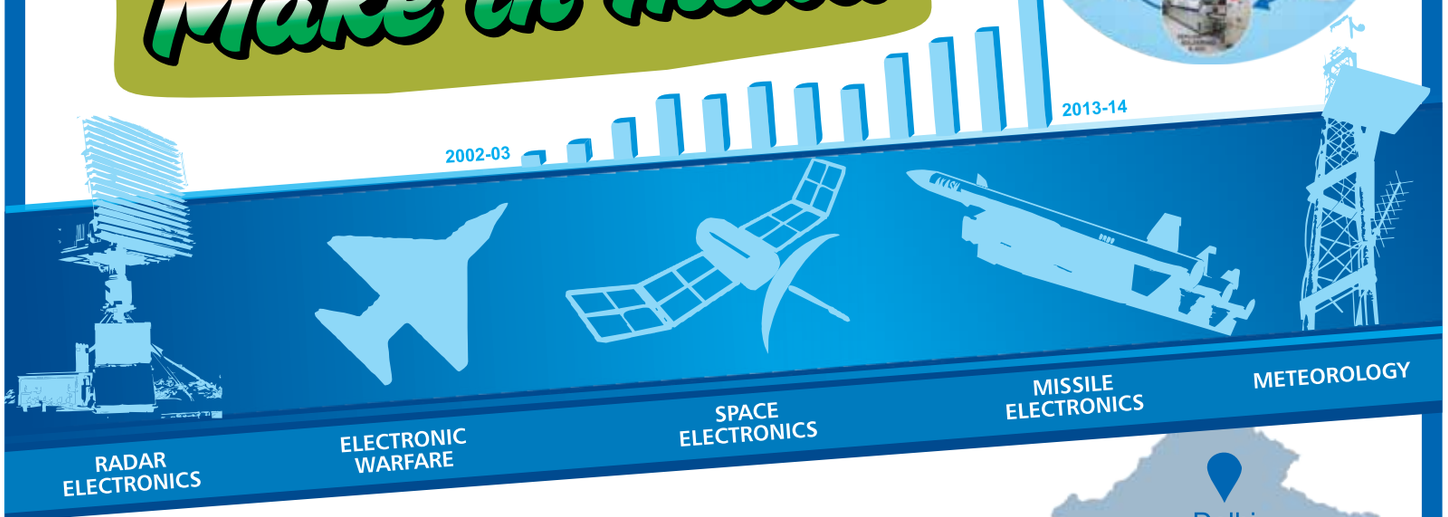
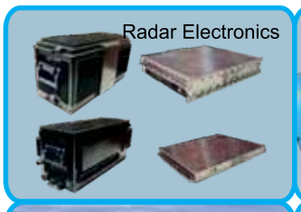
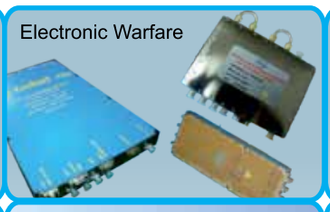
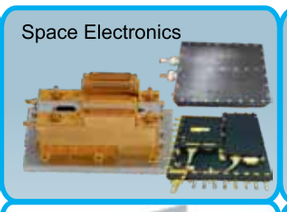


- Incorporated in 1991
- Went public in 1993
- Expertise in RF, microwave and digital electronics
- Business models followed are BTS & BTP
- In-house infrastructure for functional and environmental testing
- ISO 9001:2008, AS9100 Rev.C certified
- $91 million turnover in FY 2013-14







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IAI's Holistic Approach for Countering Cyber Threat Challenges

An ever-growing reliance upon cyberspace places governments, military and commercial businesses exposed to cyber fraud and sabotage. Emerging cyber threats, which are aimed against nation states, critical infrastructures, enterprises and private citizens, create an inherent asymmetry between attackers and defenders. The attackers – cyber criminals, insurgents and hacktivists – benefit from the ease of concealing and disguising identities within cyberspace, widespread availability of data encryption capabilities and the proliferation of cyber-attack capabilities, whereas the defenders are forced to detect advanced, low-signal threats which, even after being detected, are seldom able to track their origin, and as such the defenders are unable to retaliate against the assailant.

Skilled hackers, terror organisations and states are currently developing sophisticated cyber attacks, implementing different aggressor techniques and methods, which together form well-orchestrated attacks in order to achieve their desired security breaches. These highly invested targeted threats or APT (advanced persistent threats) are built to exploit the organisation vulnerabilities and stealthily prepare for malicious execution of a "kill chain" at the right moment.

CYBER INTELLIGENCE

It is now more and more evident that an efficient cyber methodology has to be able to combine early warning capabilities with active defence tools. It is essential to detect and track the threats as early as possible – raising the need for sophisticated cyber intelligence capabilities as an essential part of a nation's cyber defence concept.

Israel Aerospace Industries (IAI) has accumulated more than six decades of expertise in innovative technological defense and Intelligence systems. IAI's rich legacy in defence situation rooms, signal intelligence, communication and electronic warfare (EW) enables it to master and confront cyber challenges as a modern EW – applying advanced algorithms and tools to identify, and generate cyber situational awareness, allowing to detect and mitigate sophisticated cyber attacks.

In order to meet the ever-growing cyber challenges, IAI has designed a holistic approach, incorporating cyber intelligence, cyber forensics and cyber security capabilities into a single unified framework. This approach allows an effective and efficient utilization of resources, creates a comprehensive cyber intelligence and defence picture, and provides cyberspace intervention as needed. The framework is designed as an open, modular, flexible and hierarchical system: subsets and elements of the framework can be implemented as stand-alone components and/or integrated with other, indigenous or third-party systems.

As part of its innovative approach, IAI has established cyber centres of excellence, researching complex challenges in cyberspace and developing prototypes of advanced and innovative cyber solutions. These prototypes are then productised by IAI's experienced scientists, engineers and security professionals, into customer-grade products and solutions, coupled with the appropriate standard operating procedures (SOPs). IAI's global network of maintenance and assistance ensures that all the proper training and support is provided to the customer.

IAI is investing a lot of effort into aiding customers with their capability build-up in the areas of cyber intelligence, defence and forensics. To that effect, IAI has developed a Cyber Range & Cyber Forensics Lab, combining best of breed commercial off-the-shelf (COTS) capabilities with novel statistical capabilities, as well as cyber forensics, operations research and impact analysis models.

IAI concluded year 2014 with cyber-solutions contracts totaling several millions of dollars. Two significant contracts were signed with strategic, defence, foreign customers.

IAI has defined cyber as a strategic domain and one of the company's core areas of activity. IAI develops advanced cyber solutions for intelligence, protection, monitoring identification and accessibility. These sophisticated capabilities are made possible by unique technologies developed by IAI's research, development and excellence centres. The company is offering to its customers numerous channels and dimensions for handling the various, constantly evolving cyber threats.

"The cyber arena requires reliable, strong and experienced solutions' provider in order to allow appropriate, constant managing. We've harnessed the best minds and technologies to create a new approach, enabling our customers for optimal management of today's and tomorrow's cyber challenges," said Esti Peshin, Director of Cyber Programs at IAI. •

Rafale: Combat Proven

The Rafale has successfully been engaged in combat operations in Afghanistan, Libya, Mali, the Central African Republic and Iraq

Conceived as an evolutive, powerful, versatile and easy to maintain combat aircraft, the Dassault Aviation Rafale omnirole fighter has earned many plaudits for its ability to conduct combat operations in difficult conditions, far from its support infrastructure. Now firmly in service with the French Air Force and the French Naval Aviation, the Rafale has successfully been engaged in combat operations in Afghanistan, Libya, Mali, the Central African Republic and Iraq.

INHERENT FLEXIBILITY

Taking advantage of the Rafale's inherent operational flexibility, French aviators and sailors have conducted, from three continents, an extremely large range of combat missions in all sorts of weather conditions. Libya was a typical example: on the very first day of the operation against forces loyal to Colonel Gaddafi, French Air Force Rafales achieved air-superiority, struck ground targets, carried out reconnaissance missions and helped determine the enemy's electronic order of battle. For the next seven months, French Air Force and French Navy Rafales remained at the forefront of the NATO effort, logging thousands of flying hours in combat with a mission dispatch rate close to 100 per cent.

In Libya, Rafales employed a wide range of weapons against a large quantity of armoured vehicles, artillery pieces, mortar emplacements and hardened targets such as aircraft shelters, command posts, ammunition dumps and radar centres: Scalp stealth cruise missiles, GBU-12 Paveway II laser-guided bombs, Hammer (highly agile, modular munition extended range) stand-off precision weapons, and even their 30mm 30M791 internal cannon.

FORWARD DEPLOYED RAFALES

The French Air Force has an extremely long experience of fast jets operations from austere forward operating bases, in Africa and further afield. With the successive retirements of the Jaguar and of the Mirage F1, the Rafale is now taking a major role in Africa: a detachment of Rafales is now permanently based in N'Djamena, the capital of Chad. From there, they cover two theatres of operations simultaneously and routinely carry out missions over Mali, Niger and Chad in the North, and the Central African Republic in the South where French forces are engaged in peacekeeping missions.

In the Middle East, a squadron of French Air Force Rafales has been stationed at Al Dhafra airbase, in the United Arab Emirates, since 2011. From Al Dhafra, they conduct missions over Iraq as part of a wide coalition.

EASE OF MAINTENANCE

Since its first engagement in Afghanistan, the Rafale has been deployed to numerous bare forward bases where it has always been maintained by small teams of technicians. Thanks to the Rafale's advanced maintenance concept, the detachments' logistical footprint is very low, diminishing the need for strategic airlift assets. Once on the theatre of operations, the Rafale proves both very reliable and easy to support and maintain, a decisive advantage for the French Air Force which always tries to deploy a limited number of airframes to keep operational costs under strict control. Experience in Afghanistan, Chad, and the UAE has showed that sand, dust and extreme heat do not have any adverse effect on Rafale performance or maintenance procedures.

In combat, the Rafale has proved to be an affordable and dependable military asset which can carry out – with deadly accuracy – an incredibly wide range of missions, from show of force passes to kinetic attacks at stand-off distances. •

Pilatus PC-12 NG - the World's Greatest Single Engine Turboprop

As aerospace companies globally display their newest and best at the marquee event—Aero India 2015 at Bengaluru, Pilatus occupies pride of place in the single engine aircraft category with their next generation aircraft - the PC-12 NG. The latest upgrade of the popular PC-12 has exciting new features to make the 2014-15 PC-12 NG the best PC-12 to date.

WHY THE PC-12 NG IS THE WORLD'S GREATEST SINGLE

The Pilatus PC-12 is one of the most popular turbine-powered aircraft today, having been in operation round the globe in a number of roles – executive transport, cargo, air ambulance, airline, and government special mission applications. Last year being the 20th anniversary of the aircraft's certification, the company launched the upgraded version – the 2014 PC-12 NG which has all the hallmarks of outstanding versatility, performance, and operational flexibility, but incorporates new technology and a host of added features.

The new features added in 2014 PC-12 NG includes six new BMW Designworks USA executive interior options, a new electric landing gear system, external LED lighting, a wireless Connected Flight Deck™ system, and a Wi-Fi passenger entertainment system.

The response to the PC-12 NG as a business aircraft has been unprecedented and the showcase at Aero India 2015 is expected to give it an additional boost. The turboprop has short runway performance and is approved to land on any kind of runway. Business visitors to the airshow are bound to also appreciate that the PC-12 NG is more efficient than its jet counterparts burning up to 40 per cent less fuel per hour. That means less cost and less carbon footprint without sacrificing comfort.

The global demand for the PC-12 NG remains very strong even as Pilatus completed the 1,300th delivery last year. And this number continues to grow exponentially with approximately 65 to 100 PC-12 NG aircraft being added annually. The company is committed to continue to innovate with new features and capabilities for the PC-12, as they foresee immense future potential in this market segment.

INTERESTING FACTOID & ENDORSEMENT OF PC-12 NG

Mid last year, Amelia Earhart, namesake of the famous aviatrix circumnavigated the globe to become the youngest female to fly around the world in a single engine aircraft. Earhart, along with co-pilot Shane Jordan, selected the Pilatus PC-12 NG as their aircraft of choice for that arduous journey. Earhart stated, "The PC-12 NG was the perfect aircraft in which to complete this flight. Its renown, reliability and performance removed much of the inherent risk associated with a flight of this nature. And, its large cabin gave us plenty of room to stretch out and stay alert on the very long flight legs. I am delighted to report that the aircraft performed flawlessly throughout our entire 16-day journey. Over the total 24,300 miles, we did not incur a single issue to interrupt our flight plan." •

BEL's Array of Defence Solutions

Bharat Electronics Limited (BEL) is engaged in manufacture and supply of electronic products primarily to defence services. BEL's segments are radars, military communication, naval systems, weapon systems, electronic warfare, avionics, C4I Systems, electro-optics, tank electronics, gun upgrades, etc. The company is aggressive in its expansion and giving details of its forays is the Chairman and Managing Director **S.K. Sharma**.

***SP's ShowNews* (SP's): Could you give us an overview of the new products BEL unveiled in the past one year?**
S.K. Sharma (Sharma): Some of the important new products introduced by BEL in the past one year are – Bharani, a low level lightweight radar; Hull-mounted sonar (detecting subsurface targets in sea); New electronic voting machine (EVM); Voter verifiable paper audit trail, a printing attachment to the EVM; and radio for LIC EW system, a direction finding subsystem of low intensity conflict electronic warfare.

SP's: Share your thoughts on network-centric warfare (NCW) systems developed indigenously for the Indian defence forces.
Sharma: BEL has been designing and developing various NCW systems for the last 10 years. BEL has invested significant time and effort in understanding the operational requirements (ORs) of NCW systems of the armed forces (users) and converting these ORs into specifications and realising solutions. BEL recently inaugurated a Software Development Centre at Bengaluru to house about 500 software engineers specialising in various net-centric technologies and projects for the armed forces.

IACCS: Integrated Air Command and Control System (IACCS) is an automated air defence command and control system for controlling and monitoring of air operations by Indian Air Force over an IP based wide area network. This C4I (Command, Computer, Control, Communication and Intelligence) system offers seamless air operations across AOR (Area of Responsibility) for the entire air space of the country.

ADC&RS: Air Defence Control and Reporting System (ADC&RS) is a tactical command, control, communication and intelligence (TAC C3I) network for Army Air Defence to detect hostile targets far off from the assets of national interest and neutralise them through optimal weapon assignment. The programme is being developed and implemented in a phased manner. The technologies involved in this programme are multi-sensor tracking, point to multi-point VHF/HF communication and real time GIS.

SP's: BEL has just completed firing trials of Akash Air Defence system. What's the road map now for the project?
Sharma: The Akash Air Defence system has been designed to defend and protect the nation's assets from penetrating aerial attacks. It is meant for defending vulnerable areas / points against medium range targets penetrating from low, medium and high altitudes. It is supposed to protect against air threats like aircrafts, helicopters, UAVs, remotely piloted vehicles (RPV) and cruise missiles.

BEL integrates the overall system and manufactures all major systems such as the 3D Surveillance Radar Sensor, Group Control Centre (GCC) and Multi-function Phased Array Radar. The missiles are manufactured by Bharat Dynamics Limited (BDL) and the launchers are manufactured jointly by L&T and Tata.

The Akash missile can fly at supersonic speed. At the latest firing trials, the systems were tested successfully under extreme flight condition of near boundary, high altitude and multi-target / multi-missile scenario. The flight trials were carried out on unmanned aerial target Banshee jet and para-flares. The targets were repeatedly destroyed by the Akash Missile System. This is the last in the series of flight trials carried out on the production version of the Akash Air Defence System for the Indian Air Force to validate complete intercept envelope of the Air Defence System.This programme has two variants – one for Indian Air Force and the other for Indian Army. Both systems are currently under production. BEL is expecting more orders for Akash Missile Systems.

SP's: What is the size, scope and cost of the upgrade project of the Schilka air defence system?
Sharma: BEL handed over the first Upgraded Schilka Weapon System to the Indian Army in November 2014. Schilka Upgrade is an all-weather, self-propelled, tracked, low-level Air Defence Weapon System. It involves upgradation from analog Radar system to state-of-the-art Search-cum-Track Digital Radar with electro-optical fire control system. Also, Main Engine, Auxiliary Engine, Integrated Fire Detection and Suppression System, NBC (nuclear, biological and chemical) filter and communication system have been upgraded, providing drastic improvements in operational performance, accuracies, power consumption and Mean Time Between Failures (MTBF). The system can engage enemy aircraft during day or night and in all-weather conditions. 48 numbers of Schilka Weapon Systems are to be upgraded by BEL as per the contract.

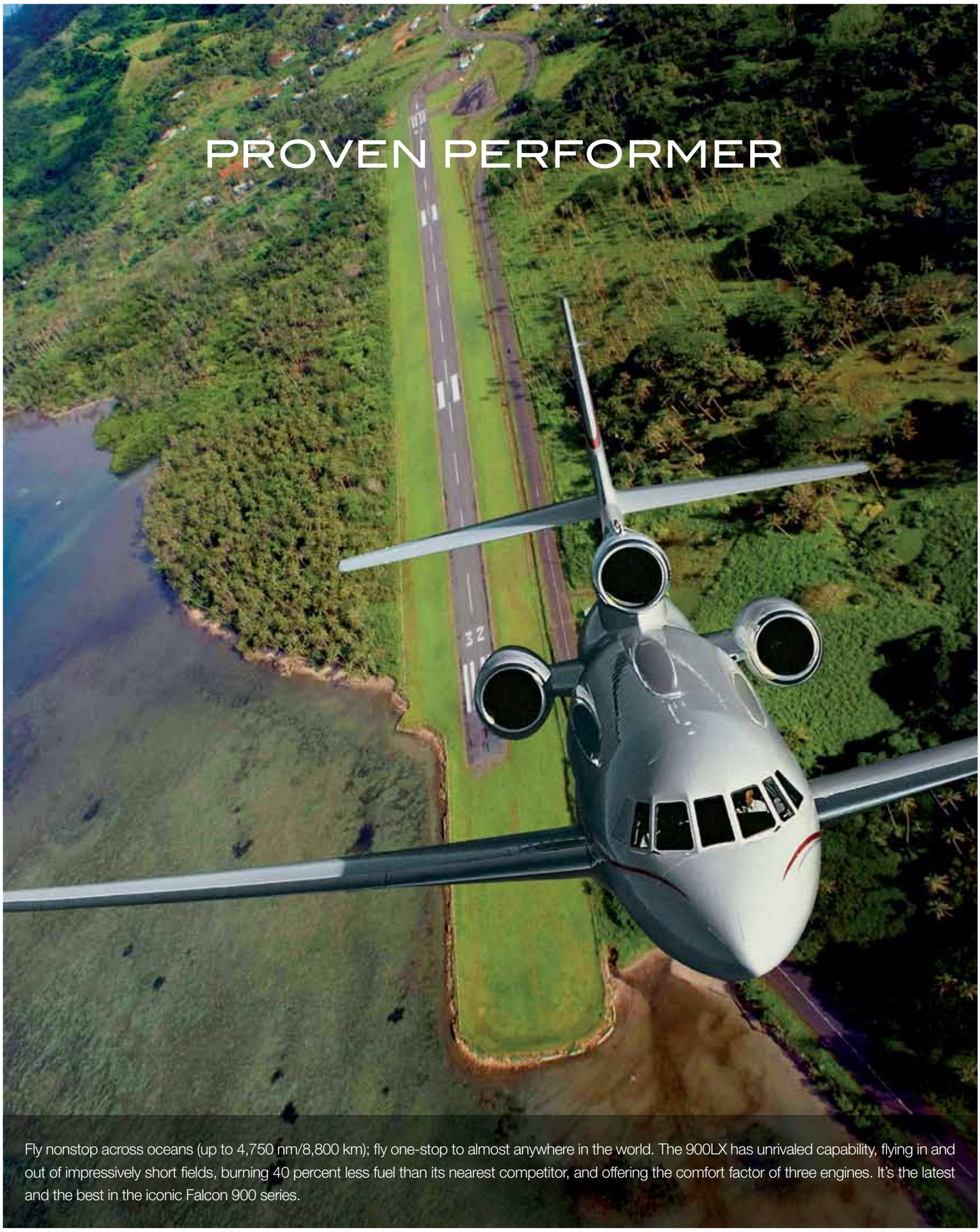
SP's: Could you tell us what BEL is doing for LCA?
Sharma: BEL has supplied Radar Warning Receivers (RWRs) for the LCA – for both the Air Force and Navy versions. BEL is also associated with DRDO for development of new version of EW suite with Digital RWR and Active Phased Array based Jammer system for LCA Mk II. BEL has also supplied Avionics grade LRUs for the LCA programme like DFCC (Digital Flight Control Computer), Air Data Computer and Weapon Control systems like Stores Interface Box (SIB) and Pylon Interface Box (PIB), Head-up Display and Night flying LRUs.

SP's: What's the update on building ATAS/ ACTAS systems?
Sharma: BEL is in discussion with OEMs for co-production of ATAS Systems for the Indian Navy. A broad understanding on the work share has been arrived. BEL is also partnering with DRDO for developing indigenous version of ATAS system and necessary manufacturing facilities have been set up in our Bengaluru plant for assembly, integration and testing.

SP's: What is going to be BEL's role as the Engineering and Life Support Agency (ELSA) for the IAF's Airborne Early Warning and Control System (AEW&CS) project?
Sharma: BEL as an ELSA for AEW&CS programme of Centre for Airborne Systems (CABS) will be responsible for integration of mission systems on the ground rig and in the aircraft and also to provide support for the mission systems. BEL will also be responsible for preparation and updation of engineering and technical documentation.

SP's: Could you discuss some of BEL's other major orders?
Sharma: **Radars:** We have on order a wide range of 3D Radars in mobile, Static, Ship-borne and Light weight Transportable configurations which are deployed for surveillance and air defence role on land, sea and coastal zones. We also manufacture multifunction active/passive phased array radars as the major component of weapon systems for surveillance, tracking, missile guidance and fire control applications as well as for anti-aircraft weapons.

Naval Gun Fire Control System: It is a Gun Fire Control System for the Navy and consists of X Band radar, laser range finder, thermal imager, CCD sensors, servo system and weapon control modules (WCM) for control of 76mm and AK630 guns. •



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