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SP'S

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GOA BECKONS THE DEFENCE WORLD

India is the biggest arms importer and India is in an aggressive mode to become an indigenous defence equipment producer, though it is still in the nascent stage

By **R. CHANDRAKANTH**

After eight successful editions at the Pragati Maidan, New Delhi, Defexpo 2016 has found a new venue – Goa, a land known for its beaches, fun and frolic. For four days, part of South Goa (Naqueri Quitol in Quepem Taluka) will be transformed into a fortress where arms and armament and other defence equipment manufacturers will give direction to India's defence industry which is just opening up to the world.

The ninth edition of Defexpo, to be held from March 28 to 31, is being done at the behest of the Minister of Defence, Manohar Parrikar who hails from Goa and is intended to create a defence industrial base over there. That appears to be a long shot. However, the biennial Land, Naval and Internal Homeland Security Systems Exhibition is clearly steering the path of steady growth and has been receiving overwhelming and unprecedented international response with each edition.

Efforts are on at Goa to make the venue conducive for such a mega event. Unlike Pragati Maidan which offered a 50-hectre complex in the heart of Delhi, with more than 61,290 square feet of covered exhibition area in 16 display halls, as well as 1,07,00 feet of open display area, the venue in Goa has to be transformed from scratch. The Goa Government has only offered empty land, on which the Defence Exhibition Organisation (DEO) intends to set up large tented structures for the duration of the show. That reportedly has not dampened the enthusiasm of exhibitors who number almost 900 from 44 countries.

The previous edition had recorded an unprecedented growth in foreign as well as domestic companies participation over its previous editions. An impressive 232 foreign companies from 32 countries participated in the show along with 15 country pavilions. With a growth of 12.64 per cent in terms of space booking. Defexpo 2014 provided a platform to all the exhibitors to display their latest technologies and products and an opportunity to explore/tap the market and business potential for mutual benefits. The 2016 figures are expected to surpass, considering that Indian defence industry continues to garner worldwide interest for two reasons – India is not just the biggest arms importer but also is in an aggressive mode to become an indigenous defence equipment producer, though it is still in the nascent stage.

INDIA TOP IMPORTER OF ARMS

India tops the world in arms imports, according to the Stockholm International Peace Research Institute (SIPRI) in 2011-15 period. Six of the top 10 largest arms importers in the five-year period are in Asia and Oceania: India (14 per cent of global arms imports), China (4.7 per cent), Australia (3.6 per cent), Pakistan (3.3 per cent), Vietnam (2.9 per cent) and South Korea (2.6 per cent). In 2015, Saudi Arabia's arms imports topped the world as the Middle East country has been buying aircraft and other weapons on an unprecedented scale. "China continues to expand its military capabilities with imported and domestically produced weapons,'" said Siemon Wezeman, Senior Researcher with the SIPRI Arms and Military Expenditure Programme. 'Neighbouring states such as India, Vietnam and Japan are also significantly strengthening their military forces.' India merely extended its top run from 2006-2010 period. The top five exporters in the period were US, Russia, China, France and Germany. As regards India, Israel plays a key role both in exports to India as well in partnerships.

'MAKE IN INDIA' GIVES DEFENCE INDUSTRY IMPETUS

With the NDA Government going aggressive on the 'Make in India' campaign, there is increased interest in India's defence programmes as the government is kind of laying the red carpet to foreign original equipment manufacturers. The Prime Minister Narendra Modi has made it clear that the government would encourage not only domestic production but also cater to the export markets.

The government has been engaging with other governments in many strategic areas. With the United States, the world's largest arms exporter, India has extended its military and security ties, even while Russia and Israel are important defence equipment providers. Narendra Modi has, with recent agreements with President Barack Obama, signalled a renewed interest in defence cooperation. The Prime Minister while taking on a greater role in the region, nevertheless is keeping India's firepower at a high level, considering that India has to contend with two contentious neighbours – China and Pakistan – besides, the issues of internal security which have cross-border implications.

ENGAGING GOVERNMENTS

If one looks at the Prime Minister's strategy, he has been playing his cards carefully. Defence acquisitions are not happening in one basket as in the earlier years where the erstwhile Soviet Union held sway. India is buying from the US, from France (36 Rafale fighter aircraft), from UK (BAE Systems howitzer guns), from Israel (a host of defence equipment including UAVs), from Japan and so on. In 2014, India decided to buy Israeli anti-tank guided missiles and launchers and revive the joint development of a long-range missile. The $659 million of Israeli arms purchases since Prime Minister Modi took power is more than the Israel's total military exports to India in the prior three years.

The writing is on the wall. India is going to predominantly take the route of joint ventures, while it will give precedence to imports that cannot be done away with. Whatever, the world defence industry has to keep its antenna up when it comes to marketing in India as the defence sector is becoming so so dynamic. •

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Ministry of Commerce 'facilitator' of 'Make in India' initiatives

The Narendra Modi-led government is going aggressive on several initiatives and top of them all is the 'Make in India' plan. All the ministries are working in that direction, more so the Ministry of Commerce and Industry which is key to the push that is required for not just self-reliance in several sectors but also to give it an export momentum.

In response to questions from **Jayant Baranwal**, Editor-in-Chief of ***SP's ShowNews,*** the 'Make in India'/ Invest India team at the respective offices, on behalf of the **Minister of Commerce and Industry, Nirmala Sitharaman**, has outlined the 'Make in India' plans in the aerospace and defence sectors, the sectors that are going to give a massive thrust to development. The team on behalf of the Minister has responded to **SP's** specific questions. Excerpts:

***SP's ShowNews* (SP's): When you say 'Make in India' what exactly is the destination – (a) to get foreign OEMs to manufacture the military platforms in India for Indian market and (b) to get foreign OEMs to manufacture for the overseas markets?**
Ministry: The main objective of the 'Make in India' campaign is to transform India into a global design and manufacturing hub. The products manufactured in India can be used for domestic consumption and can be exported as well.

SP's: What all incentives the foreign OEMs are supposed to get under the campaign?
Ministry: As per the extant Defence Procurement Procedure 2013, foreign direct investment (FDI) in joint ventures with Indian enterprises is considered as an eligible avenue for discharge of offset obligations in India.

SP's: In view of creating a solid India-based industrial complex, what all steps are being taken?
Ministry: The government has taken the following initiatives in order to build an indigenous defence manufacturing base in India:

- **Liberalisation of FDI cap in defence manufacturing.** FDI up to 49 per cent is allowed under the automatic route. FDI beyond 49 per cent is allowed under government route on a case to case basis, which is likely to result in access to modern and state-of-the-art technology in the country.
- **Issue of list of equipment requiring an industrial licence and liberalising regulations**. The detailed list can be accessed from the link pasted (http://dipp.nic.in/English/acts_rules/Press_Notes/pn3_2014.pdf)
- **Finalisation of security manual for licensed defence industry?** The security manual can be accessed from the link pasted (http://ddpmod.gov.in/showfile.php?lid=151)
- **Increase in initial validity of of industrial licence?** The initial validity of industrial licence has been extended to 15 years, which is further extendable up to 18 years for existing as well as future licences.
- **Notified strategy for export of defence products?** The detailed strategy can be accessed from the link pasted (http://ddpmod.gov.in/showfile.php?lid=174)
- **Notified list of military stores requiring No Objection Certificate from Department of Defence Production?** The detailed list can be accessed from the link pasted (http://dgft.gov.in/exim/2000/NOT/NOT13/not11513.pdf)

SP's: Will the technologies be borrowed/purchased from overseas?
Ministry: Yes, the technologies will be transferred by the foreign companies.

SP's: Will the route of transfer of technology (ToT) be used to enable fast establishment of industries offering instant delivery possibilities?
Ministry: No, transfer of technology will only enable the foreign companies to get more incentives. It will not enable faster establishment of such industries.

SP's: Research & development – it has been confined to DRDO (Defence Research and Development Organisation), in our country so far. What all is being done to expand the number of players in India?
Ministry: The government is considering providing incentives for undertaking R&D activities in India. As per the information available in public domain, the government is considering to fund private R&D for building a defence technology base in the country for which various norms will be stipulated in the Defence Procurement Procedure 2016. Moreover, the first budget of the current government had also provided for creating a ₹100-crore technology development fund to provide resources to public and private sector companies to support research and development (R&D) of defence systems.

SP's: Will the government be funding any programmes in case private sector companies are willing to work on development of certain military programmes?
Ministry: Yes. The fund is being created to support companies to invest in R&D.

SP's: How about stronger accountability within DRDO ensuring that there is less wastage of public monies, while the results do not really align with those dimensions?
Ministry: The government is taking steps to improve the performance of DRDO to transform the organisation into a hub for defence manufacturing.

FOREIGN DIRECT INVESTMENT

SP's: As current level is 49 per cent (raised from 26 to 49), which kind of programmes may still attract beyond the limit of 49 per cent?
Ministry: As per the FDI policy, now FDI beyond 49 per cent is allowed under approval route in cases which result in access to modern and state-of-the-art technology in the country.

SP's: What has been the total of FDI till now as a result of the referred raise?
Ministry: As per the statistics published on DIPP (Department of Industrial Policy and Promotion) website, defence sector has managed to receive FDI amounting to ₹0.48 crore between September 2014 to December 2015 (i.e the time since the FDI cap was increased from 26 to 49 per cent). •

Excalibur pinpoint tool to eliminate

By **R. CHANDRAKANTH**

Excalibur is a true precision weapon, impacting at a radial miss distance of less than two meters from the target. Unlike 'near precision' guidance systems, Excalibur provides accurate first-round effects at all ranges in all-weather conditions. This weapon system also extends the reach of .39-calibre artillery to 40 km and .52-calibre artillery to more than 50 km. Excalibur's precision reduces collateral damage. It's been employed within 75 metres of supported troops.

By using Excalibur's level of precision, there is a dramatic reduction in the time, cost and logistical burden associated with other artillery munitions. The reduction includes responsiveness to potential battlefield threats. Analyses have shown that on average, it can take at least 10 conventional munitions to accomplish what one Excalibur can.

Excalibur is compatible with every howitzer with which it's been tested. This weapon is fully qualified in multiple systems, including the M777, M109 series, M198, the Archer and PzH2000. It's also compatible with the AS90, K9 and G6 howitzers.

The US Army recently awarded Raytheon a contract to extend production of Excalibur. Sweden, Canada, Australia and the Netherlands are acquiring Excalibur to address vital security interests, and several other international partners are finalising procurement plans.

Raytheon is developing a laser-guided version of the projectile, the Excalibur S. This variant incorporates a digital semi-active laser seeker, allowing it to hit moving targets and engage and strike targets without accurate location information. It also reduces the risk associated with GPS jamming.

The company is also developing a 5-inch variant, the Excalibur N5. This sea-based projectile is expected to more than double the maximum range of conventional 5-inch munitions and will provide the same accuracy as the land-based version. Excalibur is co-developed by Raytheon Company and BAE Systems Bofors. •

EXCALIBUR'S NAVAL 5-INCH VARIANT WILL OFFER LONG RANGE PRECISION FIRES TO COUNTER FAST ATTACK CRAFT AND TO PROVIDE NAVAL SURFACE FIRE SUPPORT

BEL collaborates with OEMs in high technology 'Make' programmes

BEL, in collaboration with Indian industry and selected foreign defence OEMs, is participating in high technology, complex 'Make' programmes of the Indian Army like Tactical Communication System (TCS) and Battlefield Management System (BMS). The BEL Chairman and Managing Director **S.K.Sharma** gives details of the plans.

SP's ShowNews (SP's): Could you tell us about BEL's initiatives in line with the government's 'Make in India' policy?
S.K. Sharma (Sharma): BEL has been taking several initiatives to achieve self-reliance in defence through strong thrust on: in-house R&D and indigenisation; Increased outsourcing from Indian private industries; public-private partnerships; joint ventures and capacity expansion and modernisation.

With regard to R&D, constant efforts on R&D has enabled BEL to achieve 80 per cent of its turnover from indigenous technologies. We have been investing around eight per cent of our turnover on R&D annually and are planning to increase it to 10 per cent progressively in the next three years. BEL is in the process of setting up a new Product Development & Innovation Centre for developing common subsystems and futuristic products. BEL has empanelled around 180 partners for collaborative R&D including 100 Indian private industries to further augment its R&D and product design efforts and also bridge the technology gaps. Around 120 projects have already been identified for collaborative R&D. We have also increased outsourcing from private industries and the procurement level is 8 per cent from MSMEs during 2014-15 against 4.73 per cent in 2013-14. In order to broaden the domestic vendor base, BEL added 750 new indigenous vendors during 2014-15 and has planned to add around 800 new indigenous vendors during 2015-16.

SP's: Could you give us details about BEL's partnerships and joint ventures?
Sharma: The indigenously developed surface-to-air Akash missile system is a great success story and BEL is proud to be a part of it. Barring a few electronic components, every bit of Akash has 'Made in India' tag. BEL is selected as one of the development and production agency for major 'MAKE' category projects such as Tactical Communication System (TCS) and Battlefield Management System (BMS), to be executed in partnership with Industry players. BEL formed a new joint venture with European major Thales, France, for civilian and select defence radars.

UPGRADED SCHILKA WEAPON SYSTEM

SP's: What are the company's capacity expansion and modernisation plans?
Sharma: BEL spends around ₹400 crore on expansion and modernsiation of infrastructure every year. World-class manufacturing and test facilities set up in the recent past are: Super components facility; integration test facility for weapon systems; antenna test range facility; modern production set-up for airborne applications, etc. BEL is planning to spend around ₹1,500 crore in the next three years for modernisation.

SP's: What are the new products and services for the moderniation of the armed forces?
Sharma: BEL is working in many strategic areas such as AESA based modern radars, next generation electronic warfare suites, air defence systems, TCS, BMS, passive night vision devices and multi-sensor stabilisation systems.

SP's: What is the turnover of the company and the projections?
Sharma: BEL has been making profits consistently. The company is able to meet the incremental working capital requirements and investments towards capacity expansion and modernisation from internal resources. In 2014-15, BEL achieved a turnover of ₹6,695 crore, registering a growth of 8.43 per cent with PAT of ₹1,167 crore. BEL has got a healthy order book and also good order inflow projections for the next two to three years.

SP's: What is the contribution of exports to BEL's revenues?
Sharma: BEL achieved the highest ever export sales of $57.85 million in 2014-15, registering a growth of 37.7 per cent over the previous year's export turnover of $42 million. The export sale for the year 2015-16 is expected to surpass the targeted $65 million and touch about $85 million.

Currently, the coastal surveillance systems, naval air surveillance radars, sonars, night vision devices and electronic voting machines are being promoted to South East Asian, Middle East and African countries. The long-term export plan of BEL is to reach sustained export sales to total sales turnover ratio of 10 per cent from the current level of 5.3 per cent.

SP's: What are the expansion/diversification programmes?
Sharma: The major programmes being executed during the year include Naval Surveillance Radars to Myanmar, TI Fire Control Systems to Israel, Electro Mechanical parts to GE & Siemens, among others. In the last decade, BEL has entered into several new business areas as part of diversification efforts and has resulted in substantial business. Further, efforts are on to enter into areas like Indigenous SAM systems, Airborne Radars, Image Intensifier tubes and Thermal Imaging detectors for Night Vision Devices, Inertial Navigation Systems, Electronic Ammunition Fuses, Pressurised Missile containers, Critical Infrastructure Protection, Air Traffic Management Radars, Intelligent Traffic Management Systems, Solar Power Plants and Smart City elements for future business growth.

SP's: Could you tell us about the L70 Gun upgrade programme?
Sharma: BEL had won the order for the L70 gun upgrade in a global open tender issued by the Indian Army. The upgradation is intended to eliminate few of the operational and maintenance difficulties faced in the existing L-70 Gun, which is driven by hydraulics and increase life span of the equipment.

SP's: Could you tell us about the Palasamudram facility?
Sharma: BEL is setting up a Defence Systems Integration Complex spread over 400 hectres at Palasamudram in Andhra Pradesh. It will be the largest such facility in the country once it is commissioned and BEL will expand its missile systems business and carry out manufacturing and integration for the ongoing and upcoming projects.

SP's: What is the status of some current and future projects of BEL by 2025?
Sharma: BEL, in collaboration with Indian industry and selected foreign defence OEMs, is participating in high technology, complex 'Make' programmes of the Indian Army like TCS and BMS. BEL is exploring to develop several variants of the Akash Missile System and is also evaluating potential export opportunities.

BEL is bullish on the opportunities available and keen to capitalise on these opportunities in the defence and aerospace sector. In the backdrop of increasing competition in the defence business from private industry, BEL is gearing up with strategies and action plans to maintain its technological edge and ensure future growth. •

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Transform India into innovation warehouse using advance manufacturing

By **BABA KALYANI**

I believe that 'Make in India' as a vision is the most relevant policy dictum announced by any leader since independence. The vision when implemented will unswervingly alter the paradigm and transform India into a major technology hub for production of homegrown defence systems.

Under the new framework, co-development; co-production and joint R&D on defence systems will define the new rules of the game as India becomes more and more intertwined with the multifaceted global defence supply chain, naturally far more complex when compared to the industrial world. While India has been witnessing accelerated transformation at all levels, defence manufacturing will naturally be the cornerstone driving the change since the leadership has identified defence as its core sector in the Make in India strategy.

Therefore the strategy guiding 'Make in India' should broadly entail acquiring knowledge in design and system engineering and access to technology by partnering with foreign OEMs. India is a highly innovative place centred on affordability with huge appetite to improvise ingenious solutions. Hence focus on indigenization will largely redefine the manufacturing landscape in a stressed global economic environment and India could emerge as a major defence sourcing hub but by nattily leveraging labour arbitrage for low cost high quality manufacturing.

Strategic Positioning of Make in India: As a unique initiative, Ministry of Defence for the first time formulated a Standard Operating Procedure (SOP) for Defence Export Strategy recognizing that both domestic and foreign investors will require government support to promote export of military hardware. The government announced several initiatives like setting-up web based portals to receive No Objection Certificates (NOC) for military stores, dispensed with the requirement of End User Certificate (EUC) for components, sub-systems and sub-assemblies by moving items out of Annexure 1 to ease exports.

The new draft Defence Export Strategy has tacitly recognised that long term sustainability of the defence industry in India cannot happen by catering for domestic markets alone, but by strategically positioning 'Make in India' in such a way that it not only addresses domestic demands but also caters to the global requirements which will then connect large sections of Indian homegrown defence industry including the MSMEs with the global defence supply chain.A robust defence industry coupled with potential to export military hardware will be far better equipped to modernise Indian armed forces with advanced and cost-effective weapon systems at an accelerated pace than one which solely depends on a single buyer which is the government to earn revenues.

Transform India into Most Competitive Manufacturing Destination in the World: In conclusion success of 'Make in India' will broadly be underpinned in ground-breaking effort to direct scientific and engineering talent towards innovation. While huge capability exists to design complex systems in India, steps must however be taken to incentivise research and development, remove stigma attached to failures, create functional synergy between private sector, DPSU and DRDO, expand source of funding which would then transform India into a major repository of knowledge and a competitive advanced manufacturing destination favourably impacting India's defence economy by 2025.

For India to transform into a manufacturing destination, the change will naturally be steered by companies from basic industries such as metallurgy and forging. Hence Bharat Forge Limited by virtue of its being the largest forging company in the world with in-depth knowledge in metallurgy and, engineering innovation at its heart will play a critical role to build India's hard power– essential instrument to guarantee national security. •

Baba Kalyani is the Chairman and Managing Director of Bharat Forge Limited.

HAL – A catalyst in aerospace and defence self-reliance

Defence public sector major the **Hindustan Aeronautics Limited** (HAL) is working towards becoming a technology company and is striving towards the Prime Minister's vision of 'Make in India'. The Chairman and Managing Director **T. Suvarna Raju** outlines the plans.

***SP's ShowNews* (SP's): What is the outlook for HAL in the context of the many initiatives the government has taken, including the 'Make in India' programme?**

CMD: The Government has recently increased the limit of foreign direct investment (FDI) in defence sector besides taking out several items from the list of products, requiring industrial licence. These policy initiatives of the Government coupled with the fact that European and USA market for defence have saturated, augur well for the growth of aerospace and defence sector in the country. The Indian military and civil helicopter market is a big opportunity for our company. HAL has taken steps to position itself well into this market by having products in the two- to 10-tonne category.

The development of light utility helicopter (LUH) would be very crucial to our plans as defence market capitalisation is based on timelines of this programme. Based on the current growth rate (approximately 10 to 12 per cent), it can be predicted that the industry may have 400 to 600 helicopters by 2021. HAL is targeting this segment demand by customising ALH and by making efforts for civil certification of ALH.

The fixed-wing defence market will see a lot of interest by foreign OEMs as the Indian defence and civil requirements have made it as the 5th largest market in the world. The FGFA (fifth-generation fighter aircraft) and MTA (multi-transport aircraft) programmes have the capability to catapult us into the league of technology leaders. LCA, IJT and HTT-40 are the in-house technology drivers and would provide the strategic edge to our defence forces. These platforms would have significant export potential. Hawk, Dornier and Su-30 would allow us to consistently benchmark the production facilities.

SP's: What has been the revenue growth of HAL?

CMD: HAL has recorded an all-time high turnover of ₹15,622 crore during 2014-15, registering a growth of 3.26 per cent over previous year turnover of ₹15,128 crore. The profit before tax for 2014-15 stood at ₹3,173 crore as compared to ₹3,578 crore of the previous year. The company has achieved "Excellent" MoU performance rating which is a reflection of all-round success.

SP's: What new initiatives have been taken up by HAL?

CMD: HAL has taken a range of new initiatives for preparing itself to take on the current challenges and prepare company towards a vibrant future. The Green Field facilities for manufacture of LUH and Naval Multi-role Helicopter (NMRH) are coming up in Tumkuru district in Karnataka over 250 hectres of land.

The government has mandated HAL and the National Aeronautical Laboratory (NAL) for jointly taking up design, development and manufacture of 70-100 seater regional civil aircraft through a special purpose vehicle (SPV). The teams have started working and approvals are being obtained from MoD.

SP's: Could you outline some of the R&D and other activities that are on?

CMD: The total R&D expenditure of HAL was ₹1,083.3 crore for 2013-14 and this works out to 7.2 per cent of financial turnover. Critical technologies have been identified in the area of design, manufacturing, avionics and material to support indigenisation. HAL's home grown Jaguar DARIN-III upgrade is going to further accentuate the performance of Jaguar. Mirage upgrade programme has made significant progress with the first aircraft already under test flying. We have taken proactive steps in proposing upgrade solutions for Hawk, Su-30MKI, Dornier, etc., to our customer to obviate the concerns on long term supportability. HAL is jointly working with DRDO laboratories, CSIR-NAL, CIPET, IITs and IISc towards achieving self-reliance in the aviation field harnessing the partnership strategy. MoUs have been signed towards this.

HAL is developing capabilities in the design & development of aircraft, helicopters, engines and niche technology areas like SDRs, AESA radar, aero engines, UAVs, etc either through indigenous effort or through collaborations. Regarding aero engines, HAL has taken up development projects to design and develop Aero Engines for 25 kN and 1,200 KW for fixed-wing and rotary-wing platforms respectively.

As part of Design and Development activities so far 384 flight have been completed on LCH. HAL Board has approved production of 4th technology demonstrator to expedite the process of initial operational clearance (IOC) of LCH. Regarding LUH, ground test vehicle (GTV) test was successfully carried out recently. Also, indigenously designed and developed mini-UAV had its first flight during the year. Detailed design, jig fabrication and commissioning have been completed for HAL Basic Turboprop Trainer (HTT-40) and assembly activities have been initiated. The critical design review for Mirage 2000 upgrade is also completed. Regarding Hindustan Turbo Fan Engine-25 (HTFE-25), detail design of the core engine is completed and assembly tools and required test setup/test bed is under progress. The medium thrust class engine finds wide application in military trainer aircraft, smaller regional jet and unmanned applications. •

Honeywell Aerospace: Defexpo 2016 preview

By **ARIJIT GHOSH**

As the Indian military looks to maximise assets, Honeywell Aerospace is seeing great demand both for its technology on the country's new aircraft platforms, as well as for retrofit modifications and upgrades for its existing military fleets. At this year's Defexpo show, a major focus for Honeywell Aerospace will be on presenting technologies that can help safeguard assets, lower operational costs and increase mission success.

Based on five decades of engineering experience, Honeywell supports a vast range of military capabilities and extends to more than 300 platforms. The company works with defence customers in India to provide a breadth of products and services, including integrated avionics and communications systems; propulsion and mechanical systems; conditioned-based maintenance, as well as logistics and services.

Our range of technologies also extends to ground support. With a significant proportion of India's borders located along mountainous terrain, the challenge of border security remains a critical one for the Indian military. The key challenge in protecting India's borders lies within accurate location and position tracking. This is critical to ensure troops and equipment can be moved quickly and easily to combat new threats as they arise. It is this product breadth, combined with our understanding of how to conduct business in India that enables Honeywell to support Indian military objectives now and in the future.

At this year's show, visitors to the Honeywell stand (Hall 3, Stand 3.2.1-A) can learn more about the following key technologies on show:

- Designed to provide troops with precision navigation in all conditions, Honeywell's Tactical Advanced Land Inertial Navigator (TALIN) is built with Honeywell's industry leading, high-accuracy ring laser-gyro and accelerometers for unparalleled performance. With over 15,000 TALIN systems deployed by land, air and sea on more than 60 military and commercial platforms worldwide, Honeywell's inertial systems represent a proven, battle-tested solution. Honeywell's TALIN directly addresses the increased pressure to do more with current resources, maximising mission success while reducing costs. In November 2014, Honeywell signed a landmark agreement with Tata Power SED allowing India to co-produce its first locally produced advanced navigational system, supporting the Indian government's 'Make in India' campaign.
- The LHTEC CTS800 turboshaft is the next-generation of the CTS800 turboshaft family of engines. It was developed by the Light Helicopter Turbine Engine Company (LHTEC), a 50:50 partnership between Rolls-Royce and Honeywell. The highly reliable and maintainable CTS800 principal engine design was originally developed to power the US Army's Boeing-Sikorsky RAH-66 Comanche helicopter. The CTS800 gives operators options by providing exceptionally low fuel burn in a small, lightweight, high power package.
- Keeping soldiers safe while on the battlefield is always top-of-mind. A range of our Performance Material and Technologies (PMT) solutions will also be on display at the Honeywell booth, including our ultra-strong and lightweight Spectra body armour, helmets and associated products designed to protect soldiers. All of these products reinforce the legacy Honeywell has built over the past 50 years, developing defence technologies across land, sea, air, and space for the world's militaries that safeguard assets while helping militaries effectively manage cost in the process. Honeywell has the know-how and expertise not only in delivering upgrades and improvements across a wide spectrum of defense platforms in use today but also in partnering with local Indian companies and fostering local training and talent growth.

In addition to the technologies listed above, Honeywell will focus on systems such as our Traffic Collision Avoidance System (TCAS). Designed to help pilots avoid mid-air collisions, TCAS provides flight crews with visual awareness of the location, altitude, and the direction of travel of an aircraft within a 40-mile radius, ensuring the increased situational awareness. With India's skies becoming more congested each year, our TCAS technology will play an increasingly important role for military fleets operating in shared airspace.

Visitors can also learn more about Honeywell's Health and Usage Monitoring System (HUMS). HUMS allows for on-condition preventative helicopter maintenance, reducing mission aborts by up to 30 per cent, and is designed for rotorcraft of all sizes. This is done by monitoring irregular vibrations and providing data that can be downloaded by the on-ground maintenance crew. As a result, safety in-flight is improved and maintenance can be done when necessary, rather than having to solely rely on scheduled maintenance cycles. HUMS has a critical role to play in enabling that passengers be transported safely while simultaneously aiding Indian operators to keep an eye on maintenance costs as both military and numerous government, emergency response and commercial operators fly extensive helicopter fleets in India.

From strategic defence relationships with HAL, Indian Air Force (IAF), and the Indian Government, to relationships with local schools, universities and engineering projects, Honeywell is dedicated to supporting India's aerospace and defence industries. •

Arijit Ghosh, President, Honeywell Aerospace, India

Rockwell Collins brings 'Make in India' capabilities to Defexpo India

By **SP's CORRESPONDENT**

At this year's Defexpo, Rockwell Collins is demonstrating its strong value proposition for customers in India with commercially-based, customisable, technologically-advanced products and systems."We are fully aligned with the government's 'Make in India' policy by developing capability locally while simultaneously aligning with local strategic partners," said Sunil Raina, Managing Director, India for Rockwell Collins. "We look forward to showcasing the wide array of Rockwell Collins technologies at this year's show."

Attendees are invited to visit the Rockwell Collins exhibit in Hall 3, Stand 3.2.2-A to learn more about the company's advanced defence solutions, which include:

- Pro Line Fusion® – Integrated flight deck leveraging advanced commercial technology for military platforms
- Wideband HF communications – Transmit high-bandwidth data across any terrain and long distances
- Multi-mode Transceiver – Versatile multi-channel Software Defined Radio offering frequency coverage from 70 MHz to 6 GHz
- CNPC-1000 – Reliable, safe and secure unmanned aircraft system command and control data link for UAS operations in civil airspace
- Patrol Persistent Surveillance System – Scalable integrated sensor solution to protect from perimeter breach
- MicroGuide and Remote Secure Receiver – Ruggedized, secure handheld GPS

INTRODUCING TRUNET NETWORKED COMMUNICATIONS SOLUTION

In addition, Rockwell Collins is unveiling its TruNet™ - exportable, programmable, networked communications for enhanced situational awareness - for the first time at Defexpo. "TruNet helps forces stay connected and aware, no matter the mission, location or platform," said Raina.

TruNet gives ground and airborne forces the power to network as never before, securely and in real time. Its groundbreaking capability enables seamless interoperability. TruNet enables the secure sharing of critical data, image, voice and video communications across all domains in the battlespace. Whether forces are operating alone or with joint or coalition elements, they can stay connected and aware, no matter their mission, location or platform.

True flexibility. TruNet's Airborne, Ground and Handheld series software defined radios are small, light and powerful. And, TruNet enables developers to easily tailor the system – from a few handheld radios to a complete ground-air network – to meet customers' mission needs.

TruNet's robust and reliable radios feature multiple narrow and wideband waveforms and open architecture, as well as apps and ancillaries. This provides maximum flexibility, usability, easy integration with legacy waveforms and continuous readiness for cost-effective technology advancement.

True control. Rockwell Collins provides everything its customers need when it comes to waveforms within the TruNet solution. This includes: kits that enable programmers; assistance – as much or as little as is required; technology insertions; integration with third-party waveforms; and upgrade or maintenance of existing waveforms.

THE TRUNET OPERATIONAL DIFFERENCE

More nodes – Quadruple nodes up to 140+ per network, connecting all combat elements with high throughput and no increased latency.

Low latency – Less than 300 msec latency in a data multi-hop topology lets forces receive mission critical information sooner to make faster decisions in a quickly changing battlespace environment.

Multi-hop technology – Users can communicate beyond line of sight with TruNet's auto-hopping networks and advanced IP waveforms.

More power – TruNet quadruples the output power for a longer reach. Forces can engage the network earlier, gaining early tactical situational awareness, increasing their survivability.

THE TRUNET RADIO FAMILY

Airborne Series software defined radio – Delivers critical, high-speed ad hoc networked communications between fast movers and mobile ground forces using the same basic waveforms and features of the Ground and Handheld Series software defined radio. The RT-2036(C) and AR-2000 are US versions; the AR-1500 and AR-2500 are international versions.

Ground Series software defined radio – Adaptable to offer stateside and/or country-unique capabilities while conforming to the latest software defined radio tenets and architectures. The GR-2500 is the international version.

Handheld Series software defined radio – Tactical International Ground Radio (TIGR), fielded internationally by Thales Defense & Security Inc., supports narrowband and wideband waveforms for voice and data communications.

The TruNet solution features advanced networking waveforms, apps and ancillaries for full interoperability, along with the trusted global service you expect from Rockwell Collins. •

For more information, visit ***www.rockwellcollins.com/trunet***

BAE Systems fully aligned to India's needs

With 83,400 talented people in Australia, India, the Kingdom of Saudi Arabia, the United Kingdom and the United States, BAE Systems, a truly global company, is clear about its market strategy – building significant indigenous capability and footprint, often through mutually beneficial partnerships with investment in local businesses and sharing of skills and technologies, providing sustainable employment for local people. **Alistair Castle**, Vice President and General Manager, India, **BAE Systems**, talks about the company's strong India footprint.

***SP's ShowNews* (SP's): What is BAE Systems' strategy for India? What has been the impact on your vision for your business in India with the emphasis on 'Make in India'?**
Alister Castle (Castle): 'Make in India' is a powerful and hugely positive idea and we are fully aligned and committed to supporting its success. We take pride in being a founding partner of defence manufacturing in the country – with a track record of the Avro, Jaguars, the 'Leander class' ships, and most recently, the Hawk advanced jet trainer manufacturing programmes. The cornerstone of our strategy for India is partnerships across Indian industries, both public and private sectors, with whom we develop technology and capability and production, for India. We have significantly enhanced our offer on the Indian Government's procurement of the M777 ultra-light howitzers from the US Government and will establish a specialist Assembly, Integration & Test facility for this weapon system in India. We recently down-selected Mahindra as our business partner for this facility. This programme will integrate nearly 40 Indian companies into our global supply chain. From an investment point of view, we were a first mover amongst international companies to make a direct investment in local manufacturing in partnership with Indian industry, and going forward too, we remain enthusiastic about such opportunities.

SP's: The Hawk has been in service in the Air Force in large numbers and the Indian Navy has also inducted it. What are your plans for the platform going forward?
Castle: India is the largest operator of the Hawk advanced jet trainer with 123 aircraft ordered to date. Of these, 99 are made in India at the production line we helped establish in Bengaluru working closely with the Indian Ministry of Defence and HAL. It is no wonder then that the Hawk advanced jet trainer manufacturing programme is a flagship for BAE Systems in India, and together with HAL, we believe there is substantial scope in our partnership.These discussions got off to a good start with a five-year contract worth GBP 18.5 million to provide HAL a comprehensive package comprising Ground Support Equipment, Spares, Support and Training for the Hawk. This is in support of HAL's plans to establish a dedicated Repair & Overhaul facility for the aircraft in advance of a major servicing milestone anticipated in 2016. We have also qualified Indian suppliers working with HAL into our Hawk Global Supply Chain.

SP's: In addition to the aerospace and defence sector, are you exploring any new areas for growth in India?
Castle: India is a key international market for BAE Systems and we have an established defence and aerospace footprint in the country that spans several decades. Our strategy is to continue to work with local partners to support the Indian armed forces with our cutting-edge products and capabilities across all sectors including the intelligence domain. This is one of the fastest growing sectors and solutions for cyber security, financial crime, communications intelligence and digital transformation.

SP's: You have been a major investor in the community. What's been your experience?
Castle: India has a clearly articulated goal of improving its position on key Human Development Index parameters and achieving the Millennium Development Goals and our community investment programme in India supports this. We've just concluded a multi-year programme with Smile Foundation, a national level, not-for-profit trust in India focused on improving access to quality education and health care amongst select underserved communitiesacross eight locations in seven states. I am pleased to share that this programme set an exceptional standard of continuous beneficiary-focused performance and has delivered a healthy set of outputs and outcomes directly impacting over 51,000 beneficiaries and mainstreaming over 400 non-school going children into formal mainstream schooling. We are excited about our next phase of investment in India for which we have initiated discussions with several potential partners.

SP's : What are your views and plans for local Indian suppliers?
Castle: For us, partnerships, both manufacturing and technology-based, are vital and we are in continuous discussions to expand our current portfolio with an emphasis on MSMEs. In fact, for the M777 ultra-light howitzer FMS case, we have integrated over 40 Indian MSME companies into the $200 million offset offer. Additionally, we have developed Goa based Kineco Kaman Composites India Private Limited, a joint venture company between Kineco Group of Goa and Kaman Aerospace Group of USA, as a supplier on our industrial commitments on the Boeing P-8 Poseidon acquisition by India. Our aim is to continue to develop domestic industrial capabilities and build skills in partnership with local suppliers.•

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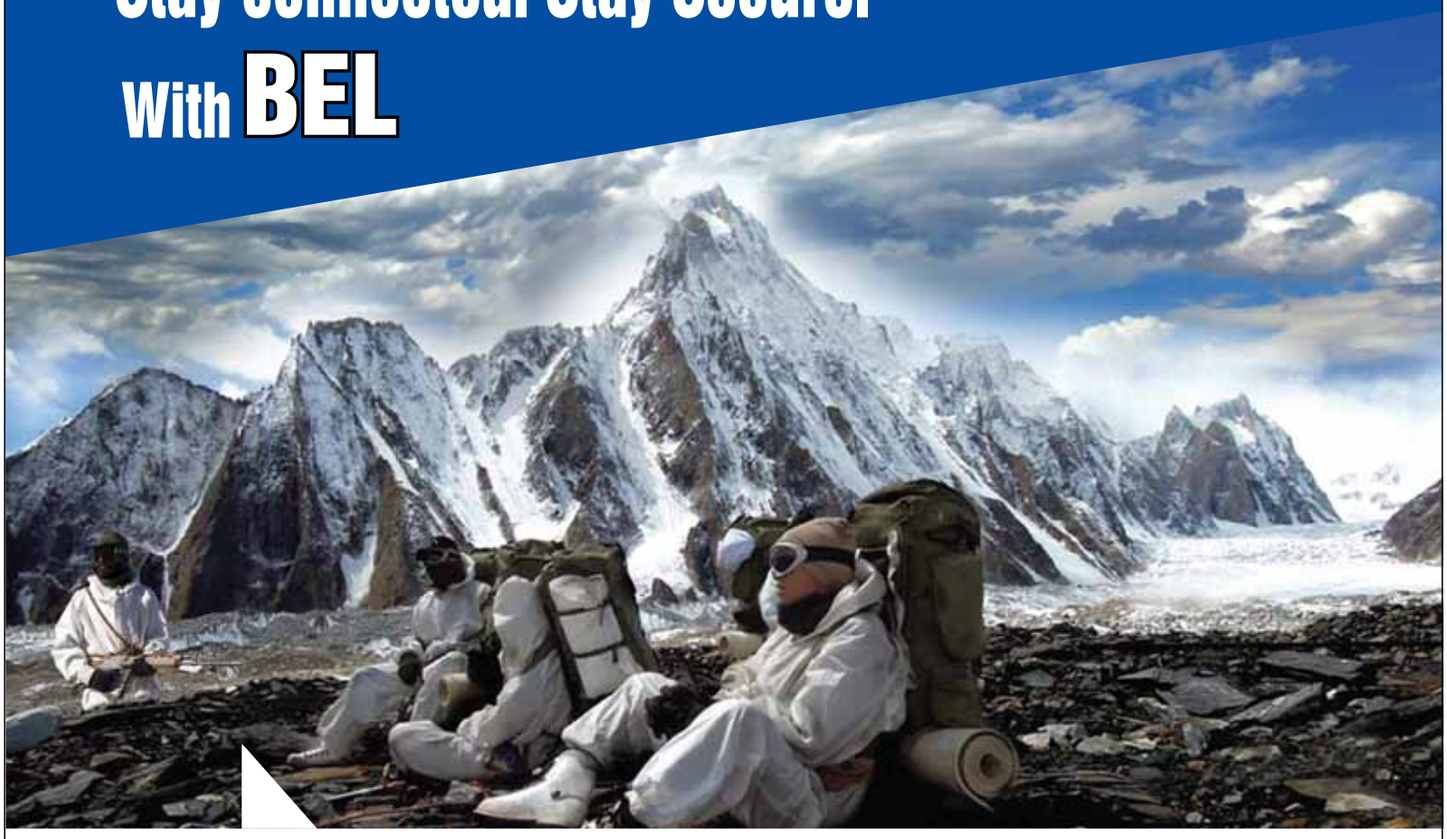

Software Defined Radio

IP Encryptor

Combat Net Radio

Secure Smart Phone

Be it Himalayan blizzards, dust storms, monsoon downpours or the salt-laden air on the high seas. Not only must Defence electronic systems be able to withstand these extremes, but also function dependably. Bharat Electronics Ltd (BEL), India's foremost Defence electronics company, designs and manufactures state-of-the-art products/systems that suit the exacting standards of the Indian armed forces. BEL offers state-of-the-art multiband and multichannel tactical radios, GSAT Terminals and other strategic and secure communication products/systems to the Defence and paramilitary forces.

Empowering the Nation's Defence Forces

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DSM Dyneema highlights next-gen body armour

By **R. CHANDRAKANTH**

DSM Dyneema is highlighting its latest range of technologies and solutions for developing next-generation body armour that offers higher ballistic and multi-threat protection at a lighter weight, with greater user comfort and mobility at Defexpo.

Based on Dyneema, the leading brand of ultra high molecular weight polyethylene (UHMWPE) fibre, DSM Dyneema is displaying amongst its broad portfolio of life protection solutions, the latest developments based on its radical innovation platform: Dyneema Force Multiplier Technology and Dyneema Anti Stab Technology which can be combined with Dyneema Soft Ballistic products for multi-threat protection.

"DSM Dyneema continues to be at the forefront of innovation that addresses current and future requirements for soldier modernisation and law enforcement programmes globally, including India. Dyneema represents the next-generation armour technology that raises the benchmark for ballistic and stab protection while making armor much lighter by up to 30 per cent, and more comfortable to wear compared to traditional solutions like aramids," said Marcio Manique, Global Business Director, Life Protection, DSM Dyneema.

TOUGHEST AND LIGHTEST MATERIAL OF CHOICE FOR BALLISTIC PROTECTION

Dyneema Force Multiplier Technology has garnered many achievements, including being used in many prestigious, high-profile soft and hard armour systems and winning multiple awards for innovation. An increasing number of top armor manufacturers globally including those in the Asia-Pacific region are using Dyneema Force Multiplier Technology in vests, inserts, helmets and extremity protection, and in hard armour for helicopters, patrol boats and land vehicles.

In body armour, Dyneema Force Multiplier Technology can reduce the weight by up to 30 per cent without sacrificing ballistic protection, while enhancing comfort and agility with fewer layers of material and increased flexibility. Used in helmets, it enables designs protecting against 9mm FMJ handgun ammunition and fragments to weigh as light as about one kg. For air, land or sea vehicles, armor made with the technology, it offers weight reductions of up to 50 per cent compared to glass and aramid armour concepts, and up to 90 per cent compared to full steel vehicle armour standalone concepts – without sacrificing ballistic protection.

Dyneema Anti Stab Technology is the latest patented anti-stab material for soft armour applications that answers the industry's need for innovative advancement in stab protection. A vest manufactured with Dyneema Anti Stab Technology provides outstanding protection against knives, blades and other sharp weapons in accordance to international standards like the UK HOSDB Body Armour Standard. It is up to 25 per cent lighter and thinner than current market solutions made with aramid without sacrificing protection and its flexibility provides greater comfort and mobility to the wearer.

In addition, it can be combined with Dyneema soft ballistic products to develop the next-generation of high performance, lightweight multi-threat protective gear that meets the specific needs of law enforcement officers who face hostile confrontations, as well as military personnel engaged in urban operations.

"Dyneema is well-known in India since the 1990s as the material of choice in many defense and law enforcement programmes which require higher ballistic protection at a lighter weight. We remain highly committed to bringing new technological dimensions to support India's evolving needs for life protection with our ever-expanding portfolio of innovative Dyneema technologies and solutions," said Nicole Ng, Regional Business Manager, Asia-Pacific, DSM Dyneema. •

Rosoboronexport is ready to widen cooperation with India within the framework of the Make in India programme

JSC Rosoboronexport, a subsidiary of Rostec State Corporation, will discuss with its Indian partners joint projects for further modernisation of the Indian armed forces at the DEFEXPO India 2016 exhibition.

"India is willing to develop its own defence industry in accordance with the 'Make in India' programme. We are ready to propose new large-scale projects for implementation in the interests of all military services with the most extensive involvement of Indian businesses, of relevant technology transfers and organisation of joint and license productions. At present we are in talks on the feasibility of developing Project 75(I) submarines based on the Amur-1650 diesel-electric submarines, and on the procurement of an additional lot of Project 11356 frigates and setting up of their license production in India", – said Sergei Goreslavsky, deputy director general of JSC Rosoboronexport who heads the joint delegation of Rostec State Corporation and JSC Rosoboronexport.

At the stand one will find promotional materials on more than 200 defense items.

It is expected that foreign specialists will pay special attention to T-90MS MBT, BMP-3 IFV, Kalashnikov assault rifles of the hundredth series, ADs S-400, Pantsir-S1 and Tor-M2KM (mounted on the Indian-made TATA chassis), Amur-1650 submarine, Project 11356 frigate, Project 11711E large landing ship, Project 21301 rescue vessel, and Project 12701 Alexandrite-E mine countermeasures ship.

JSC Rosoboronexport will also market a new comprehensive project named "Integrated Security Systems" which has absorbed all Russian and global experience amassed in the design and implementation of counter-terrorist and law-enforcement support systems, and a project for the development of an automated tactical command and control system adapted to meet the requirements of the Indian armed forces. The implementation of these projects suggests wide cooperation with Indian companies. Besides, development costs can be significantly cut.

PANTSIR-S1

VERBA MAN-PORTABLE AIR DEFENCE MISSILE SYSTEM

The newest Verba man-portable air defence missile system will be shown for the first time at a foreign exhibition. It boasts enhanced combat capabilities, in comparison with its predecessors, including engagement of such small-size targets as cruise missiles and unmanned aerial vehicles.

Rosoboronexport will also explore with Indian partners issues concerning maintenance and upgrading of earlier supplied equipment. •

The Russian delegation will hold a press conference at Hall 8 (Media Centre, Conference Room) on 29 March 2016 at 11.15 AM. Journalists are welcome to attend the event.

JSC Rosoboronexport also invites all interested specialists to see presentations at Hall 8 (Media Centre, Conference Room):

"Integrated Security Systems" on 29 March 2016, 13:45 - 14:15

"Automated Tactical Command and Control System" on 30 March 2016, 11:15- 12:15.

US-2: A Force Multiplier for India

The potential for export of the US-2 aircraft to third countries under mutual agreement between India and Japan may open a multibillion-dollar market.

By **CMDE SUJEET SAMADDAR, NM (RETD)**

With the advent of modern technology in amphibian aircraft, it is only natural that the Indian Navy has now sought to reacquire this unique capability, to truly realise its 'blue water' capability.

Amphibian aircraft combine the capabilities of rapid surveillance and prompt response, whether for relief or arrest or intervention, in a single platform. Such a capability is not available on any other platform. Unlike helicopters and aircraft, amphibian aircraft can land at the location and enforce both the will and the law of the nation and thus are a platform of choice for military transportation, benign and constabulary missions of navies and possibly the Coast Guard for constabulary functions. Unlike ships, amphibian aircraft can reach the location far faster than ships can thereby preventing destruction or dumping of contraband/evidence or escalation of a precipitous incident at sea. This includes the ability of even shore-based military and political authorities to undertake a first-hand evaluation of a situation at sea which may have international ramifications if left to escalate without control. No other aerial or surface platform has such capability.

However, not all amphibian aircraft are suited for modern maritime missions. For mission effectiveness the main parameters of performance evaluation would be rough sea operations, range, payload, STOL capabilities, shallow water operations and beaching ability. Of these, rough sea operations are paramount for India. According to a study only about 60 per cent of all waves are below 1.2 metres in height, but 96 per cent of all waves likely to be encountered are below 3 metres in height. Amphibian aircraft must therefore, by design, have full operational capability to undertake maritime missions in wave heights of 3 metres as a norm. The range must be adequate to conduct missions into the Malacca Strait on the eastern seaboard and into the Gulf of Aden on the western seaboard including an ability to reach the island nations in the region should the need arise. For disaster relief operations the amphibian must have a capacity for onboard first aid, a sick bay for at least 10 patients and commensurate rescue gear. STOL features and shallow water operations must permit landing in busy waterways, possible riverine/high-altitude lake operations as well as in open oceans.

The US-2 meets and in many cases exceeds these operational requirements. With an ability to operate in sea state 5, landing take-off distances at about 300 m, transit speeds in excess of 550 kmph and a range of 4,500 km there is no other aircraft in its class. Combined with the world's only Boundary Layer Control (BLC) system on a cargo and transport aircraft, spray suppression features, marinised AE 2100 engines, glass cockpits, pressurised cabins and highly sophisticated surveillance and communication suite the US-2 stands out as a product of renowned Japanese technology. The US-2 has proven credentials of successful operations in open sea condition up to sea state 5 with wave height of 4 metres and a wind velocity of about 40 kts at a distance of about 1,200 km from mainland Japan.

The US-2 can therefore be tasked for multifarious missions such as:

- Surveillance, reconnaissance, intelligence gathering and on-spot investigation in the EEZ and on high seas.
- Long-range naval logistic and maintenance support through ferrying of specialised dockyard personnel and spares to a fleet during overseas deployment.
- Long-range and rapid visit, board, search and seizure (VBSS) operations.
- Mainland to distant island and inter island logistic support without the need of a runway.
- Long-range fleet support including crew rotation on high seas.
- Oceanic search and rescue (SAR) and casualty evacuation (CASEVAC) from ships, submarines and oil rigs.
- Monitoring, servicing and protection of offshore assets.
- Controlling of derelicts and abandoned vessels.
- Humanitarian assistance and disaster relief operations in the Indian Ocean region.
- Countering small arms, shoulder launched weapons and drugs trafficking and terrorism at sea.
- Countering illegal human migration.
- Prevention of poaching and illegal fishing.
- Prevention of toxic cargo dumping at sea and pollution control.
- Anti-piracy missions.
- Anti-terrorism.
- Support for deep sea mining activities, offshore cable laying and hydrocarbon prospecting.
- Recovery of ditched aircrew at sea of long-range aircraft of the Indian Air Force and Indian Navy such as the Su-30, AWACS, MiG-29 and the soon to be inducted Rafale.
- Direct and rapid access to the Indian outpost 'Bharati' in Antartica.

Of particular relevance to the Indian Navy, and in fact all navies that operate long-range maritime patrol aircraft (LRMR) such as the P-8I of the Indian Navy and AWACS aircraft of the IAF, or deck-based MiG-29K, or shore-based maritime interdiction aircraft such as the MiG-29 or Su-30 or the Jaguar, is in the choice of the most suitable aircraft that can conduct a near all-weather high speed rescue operation for the entire crew of a ditched aircraft. The aircraft is more easily replaceable than its highly trained aircrew. The rescue of a crew is faster and surer with amphibian aircraft than using ships or even helicopters. Such an assurance of recovery at sea builds huge confidence and markedly improves operational performance of the aircrew—capability that does not exist as of now. The same could also be true in case of submarines and ships in distress or damaged at sea. In the latest accidents involving IN Dornier and ICG Dornier, a credible SAR platform like US-2 may well have saved some crucial lives of crew. An aircraft like US-2 has the ability to fly low and fly slow with excellent endurance and unique capability to land on water. These capabilities along with a modern surveillance-cum-weather radar and various sensor suit make US-2 an ideal long-range SAR platform. A capability gap that clearly exists in the Indian armed forces aviation inventory as of now.

A partnership with Japan for the production of the US-2 is not without significance to neighbouring countries who have formed production agreements with third countries inimical to Indian interests. These objectives are achieved by the induction of the US-2 aircraft. In the future once the Japanese policies on arms export controls are further liberalised India will have first mover advantage and possibly many other defence goods such as the trainer aircraft, reconnaissance and surveillance helicopters may also begin to be sourced from Japan and built in India.

The US-2 will also be permitted to be exported to third countries under mutual agreement. It is evident that the collaboration on the US-2 between India and Japan is at the international level of immense diplomatic and strategic import, whilst at the domestic level the downstream benefits are across the military, technological, economic and social sectors.

From a technology perspective the final assembly, integration and delivery of the aircraft from a manufacturing facility in India will leapfrog India to amongst the few nations in the world with the ability to build sophisticated amphibian aircraft. This is the first time ever that any country has offered to develop an aeronautics industry in the private sector in India through a well targeted partnership and therefore the US-2 collaboration programme is completely aligned with Prime Minister Modi's 'Make in India' for the world initiative.

The operational, technological, economic and social benefits of this Japan-India collaboration on the US-2 is indeed a force multiplier for India and its armed forces. •

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Alpha Design Technologies – leap forward

By **R. CHANDRAKANTH**

Alpha Design Technologies Private Limited (ADTL) which started as a three-man company in 2004 has grown from strength to strength under the dynamic leadership of Colonel H.S. Shankar (Retd). There is no looking back and the company which has a strength of 825 personnel (with 621 engineers in the age bracket of 22 to 29 years, most of them in R&D) is totally synced into the 'Make in India' initiative and is way ahead in the programme. And there is no stopping.

COL H.S. SHANKAR (RETD)

It has two factories at Bangalore, one at Hyderabad and with its Integration/Installation/Marketing Centre at Delhi, Alpha is in the forefront of defence equipment R&D, manufacture and supply to defence forces and para-military forces. ADTL has excellent technology partnership with various DRDO Labs, DPSUs and OEMs from abroad.

STRONG R&D BASE

Alpha has a large number of its own in-house, exotic, R&D projects (self-funded!) such as missile RF seekers, SDR, SDR-based radio relays, tactical access switch, ULSB Mk III, SATCOM equipment and other co-developed projects such as IFF, missile launch detection systems (MILDS), inertial navigation systems, thermal imager based (cooled and uncooled) sights – both as hand-held and rifle/carbine mounted, thermal imager based tank fire control systems (manufactured as part of offsets), laser target designators, missile launch detection systems and simulators are some of the key success stories – which has resulted in the high growth of the company. The new product lines are with large sized UAVs, EW subunits, Su-30 airframes, Radomes for AWACS, etc.

With the Government of India's thrust of 'Make in India' getting into focus more and more, ADTL is poised for further giant leap forward in the near future.

Colonel Shankar states: "There will always be cynics who can find fault with anything. I am one who finds good in everything, particularly when the going is good for our company, Alpha Design Technologies Private Limited (ADTL) and Indian defence private sector MSMEs."

Colonel Shankar adds: "Take our case, we started in 2004 as a three-man company with sales of ₹30,000 in the first year. After 12 years, we are 825 strong and have notched up a sales ₹362 crore sales turnover and with an order book close to ₹1,406.93 crore for the next three to four years!."

Success is due to 24x7, 365 days a year hard work, strong R&D base and effective collaboration with DRDO, PSUs and well-known partners from abroad, he states and adds that with the success story, ADTL is focusing on giving a major thrust to skill development.

WORKING WITH EDUCATIONAL INSTITUTIONS

It is already working with various colleges/technical institutions in conducting three credit courses on Defence Technologies and also becoming the supporting industry to provide firm platform for the budding defence R&D and production engineers to take up specific projects, mentored by experienced top echelon of ADTL. ADTL also funds the entrepreneurs to develop critical technologies in ADTL's R&D labs and successful units get joint IP rights between entrepreneurs and ADTL. This is true 'Start-up India' to ensure success of 'Make in India'.

SUPPORT SOUGHT FOR MSMES

Col.onel Shankar states that however, to make India's defence manufacturing sector more robust, following areas are to be given more priority:

R&D:

- Quick allocation of R&D funding for various projects, both by the Ministry of Defence and Directorate General of Science and Technology.
- For the above, both should set goals for spending, say, at least ₹100 crore per year to start and reach ₹500 crore per year by the year 2020.
- Process and procedure for selection of projects should be quick and transparent.

Manufacture:

- ***Offsets:*** The main purpose of Offsets enunciated by MoD is to develop modern defence manufacturing infrastructure. These facilities, it is claimed, already exists in various DPSUs and major private sector industries, such as Tatas, L&T, M&M, Bharat Forge, etc, hence they may not require Offset orders to develop their facilities. However, MSMEs – where 'core' technologies actually exists – need to improve the manufacturing infra structure. Hence Offset policy of the MoD should really be reserved for MSMEs with the intention of 'Micro' industries to become 'Small', 'Small' to become 'Medium' and 'Medium' to become 'Large' industries in the next four to five year period of time.
- ***Quality:*** There is a need to improve quality processes, standards in MSMEs, including availability of ESS facilities to be established at central location either by the MoD or the Ministry of MSME.

Funding: All banks ask for collateral guarantees (such as land, buildings, etc.) from MSMEs to sanction fund and non-fund based limits. This is not a problem for large-scale private sector units or DPSUs. However, MSMEs cannot provide it (other than CEO's/Directors private houses which do not fetch large amount, either!!). Government of India should issue suitable guidelines to banks to accept corporate/institutional guarantees for providing (at low rate of interest) loans, fund and non-fund based limits. •

Colt offers innovative solutions

Colt has always answered the challenges and needs of our customers with innovative, best value, equipment design solutions. As the premier small arms industry leader, Colt's Manufacturing Company has provided elite military forces and law enforcement agencies throughout the world with one of the finest battlefield weapon systems ever designed.

CM902-16

Offering all echelons of warfighters increased capabilities exemplified by our CM902-CSS platform, which developed to meet the standards of the US Army's 7.62 x 51mm Semi-Automatic Compact Sniper System (CSASS) Program. Featuring Ambidextrous Fire Controls and Monolithic Upper Receiver. When combined with Colt's proprietary Conversion Kit, the CSASS is capable of receiving new and legacy Colt 5.56 x 45mm NATO, 7.62 x 3 9mm and .300 Blackout Upper Receivers on its stock Lower Receiver. Colt has also developed a fully automatic Service Rifle based upon the same platform, the CM902-16. This Rifle contains the same features that make the CSASS such a versatile weapon, with an added Dual Position Gas Block, allowing as the press of a button, to fire sonic and subsonic ammunition. Colt's products continue to exemplify the terms modular, dependable, and innovative as we continue to manufacture weapon systems to meet the diversity of joint requirements in today's multi-security threat level battlefields. •

Astra Microwave Products Ltd.

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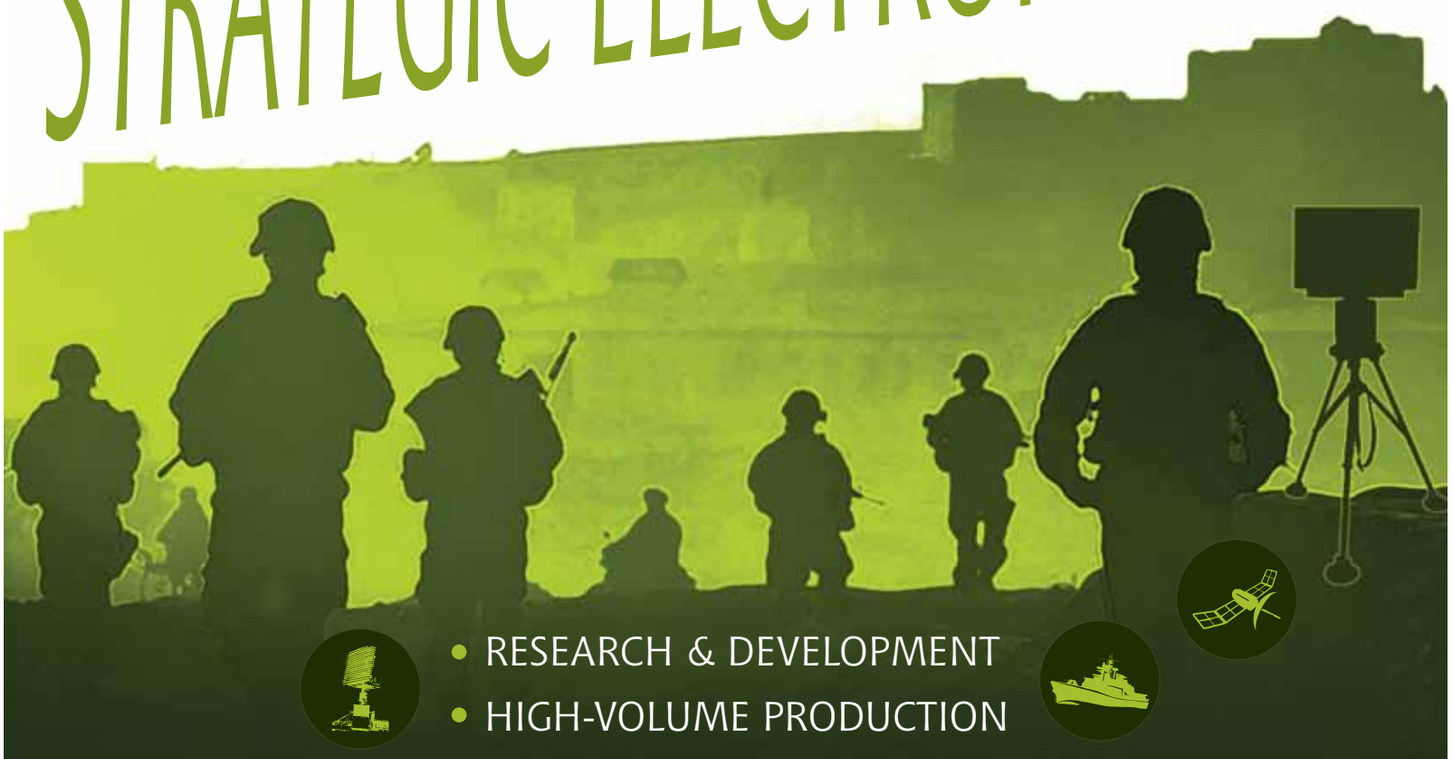

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Elbit Systems' Hermes 900: Most Advanced UAS

- The newest and most advanced UAS has been selected by the Swiss Federal Department of Defence, Civil Protection and Sport
- Unique plug and play payload bay, enabling multiple payload options for multiple missions
- Established partnerships with leading Indian companies and is determined to establish a strong leadership position for Hermes 900 in India

By **R. CHANDRAKANTH**

Following the changes in policies in India due to the 'Make in India' programme, the regulatory environment is now more open to cooperation. And cooperation is part of Elbit Systems' DNA. As a high technology company Elbit Systems' vision is to achieve operational excellence in its target markets, India being one of them. We see the 'Make in India' programme as a unique opportunity to contribute to making India a global manufacturing centre.

Elbit Systems' business philosophy encourages partnerships with local industries and the utilisation of regional capabilities. The company has already established partnerships with a number of leading Indian companies, including the Hindustan Aeronautics Limited (HAL), Bharat Electronics and Bharat Forge and it takes pride in these cooperations.

Offering a unique combination of capabilities, a strong local presence, extensive investment in R&D and emphasis on increased productivity, Elbit Systems is determined to establish a strong leadership position in the Indian market in each of its core businesses. Operating as a multi-domestic organization, it focuses its efforts both globally and locally (GloCal) in order to more effectively meet the needs of its customers.

MULTI-MISSION HERMES 900

The newest and most advanced UAS, Hermes 900 is a next-generation multi-mission, multi-payload medium altitude long endurance (MALE) UAS. The Hermes 900 UAS has been selected by the Israeli Defense Forces (IDF), Switzerland, Brazil, Chile and additional undisclosed customers and is the most suited solution for any type of persistent ISR, area dominance, ground support, and maritime patrol mission. Designed for minimal maintenance, Hermes 900 is not only a highly mission effective system but also a system with lower life-cycle costs.

LONGER ENDURANCE

Hermes 900 is a natural extension of the successful Hermes 450, which has a track record of over 5,00,000 accumulated flight hours. Among the key capabilities offered by the Hermes 900 are longer endurance, flight altitude of 30,000 ft. and a large payload capacity (up to 350 kg). A unique 2.5 metre long internal payload bay is provided, capable of accommodating up to 250 kg and allowing quick modular payload installation and replacement, as well as additional payload installation capacity including four hard points under the wings. The UAS includes innovative avionics and electronic systems, a low noise engine, as well as solutions that can be offered for sense and avoid capabilities and safe integration of the UAS into the relevant air space.

Hermes 900 was developed in accordance with STANAG 4671 to the highest standards of safety and airworthiness. To facilitate capabilities to operate in adverse weather a suite of payloads is available as well as payloads such as SAR/GMTI capable of operating in cloud conditions.

The advanced Hermes 900 systems' architecture separates safety critical flight systems from mission systems providing much greater flexibility and cost/optimisation in integration of new, even customer indigenous, payloads. The modular internal payload bay is also an important enabler for easy and modular payload integration and installation.

EXHAUSTIVE FEATURES, VARIETY OF MISSIONS

Hermes 900 system provides rich and versatile multi-payload configurations offering unique cutting edge sensors and systems with flexible and modular installation. The following payloads and sensors are offered to accomplish a wide variety of missions:

- Digital EO/IR/Laser payload – DCoMPASS
- SAR/GMTI & MPR Radar
- SIGINT payloads: Skyfix COMINT/DF; Skyfix-G COMINT GSM system; SKYJAM communication jamming system; AES 210 V/V2 ESM (ELINT) system; additional EW systems
- Stand off Long Range EO/IR/Laser system - AMPS
- Electro-optic Mapping and Survey/Scanning system – LASSO
- Wide Area Persistent System (WAPS)
- Other payloads
- Customer designated payloads

Hermes 900 also offers an advanced satellite communication data link and is operated from Elbit Systems' Universal Ground Control Station (UGCS), enabling advanced mission management, highly autonomous and mission effective operation and automatic take-off and landing capability common to all the UAS in the Hermes family.

THE ADVANTAGES OF USING SATCOM

SATCOM is extremely important for a UAS in the Hermes 900's category as it provides significantly enhanced mission flexibility. Leveraging SATCOM and Hermes 900's long endurance, the system can perform missions at very long distances from the operating base constituting a 'long arm' capability. In addition, the UAS can take-off from a launch and recovery site in the-atre and be controlled from a mission station positioned remotely and conveniently in the user's home facilities thousands of miles away. Another significant advantage of SATCOM is the ability to fly at very low altitudes, without the limitation of line of sight obstruction caused by topography, as there is no need for line of sight between the UAS and its ground control station. In order to implement this capability, Elbit Systems uses a cutting-edge SATCOM system that combines highly advanced technologies, increasing band width efficiency and assuring maximum cost effectiveness for its customers.

The Universal Ground Control Stations (UGCS) is capable of controlling multiple types of UAS, our UGCS incorporate functionality derived from decades of UAS operations in Israel and support all mission phases from mission planning and preflight checks, through mission execution, debrief and training. Elbit Systems' UGCS is especially designed for maximal flexibility in incorporating various payload types, data links and even other types of UAS. The UGCS is capable of concurrently controlling two parallel UAS missions using two Ground Data Terminals (GDTs). Each basic mission is fully controlled by a single operator. Hermes ground control station's operation is highly autonomous and implements an advanced, proven, and ergonomic Human Machine Interface design. The high level of system autonomy enables the operator to focus on mission execution rather than on flying the air vehicle. For example, the same operator can control both the air vehicle and the EO/IR/Laser payload including slaving the air vehicle to the payload ('fly-by-camera'). The UGCS is capable of disseminating data and video via WAN to remote HQ and/or other networked entities and can be integrated into the customer's C4I infrastructure. Supporting maritime patrol applications is an embedded maritime command and control capability.

Hermes 900 broadens the Elbit Systems' UAS portfolio, which offers its customers a variety of mission capabilities, from mini-UAS, through tactical UAS, and up to higher chains of command for ground, naval and air forces. The operational experience accumulated by the Hermes systems for the Israeli Defense Forces and other leading armies worldwide, as well as the ongoing improvements based on its operational track record, have maintained this UAS family's leadership in performance, reliability, variety of mission-oriented payloads and more. •

HAL: The Force Behind the Forces

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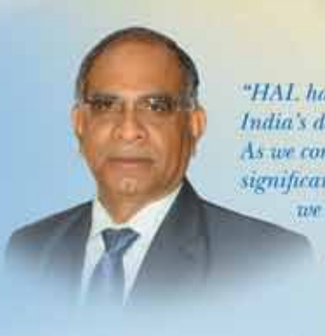

"HAL has made sterling contributions to India's defence and aerospace programs since the forties. As we complete 75 years and embark on another significant journey towards new frontiers, we resolve to take HAL to greater heights."

T Suvarna Raju, CMD

Seventy five years ago, Seth Walchand Hirachand, a visionary industrialist, dreamt of India having its own dynamic industry in aerospace and defence. Soon an aircraft company took birth in Bangalore in 1940 thanks to the support provided by the then Government of Mysore.

With humble beginnings in manufacturing and overhauling of American aircraft, Hindustan Aeronautics Limited (HAL) has come a long way with 20 production divisions and 10 R&D centers spread across India employing over 31,000 people. The Company has made strides from overhaul and licence manufacturing to indigenous design and development of aircraft, helicopters, accessories and aerospace systems. HAL has produced nearly 3,900 aircraft and 4,550 aero-engines till date.

Last 75 years, HAL did go through various trials and tribulations. Today, it is truly a force behind India's Defence Forces, poised to surge ahead with confidence and attain greater heights in the coming years.

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