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DEFEXPO ARRIVES, WITH CAUTIOUS OPTIMISM



T-90 BATTLE TANK

DEFEXPO INDIA 2014 OPENS TODAY

BY SP'S SPECIAL CORRESPONDENT

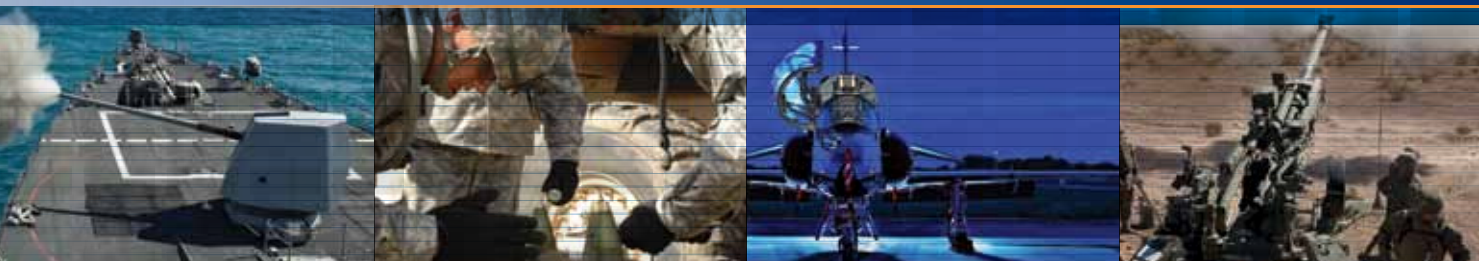
As Defexpo 2014 opens, the atmosphere in Delhi's early spring air is unmissable. In a country that has had a difficult relationship with military procurement, these are particularly testing times. It's as if the entire modernisation system, and all stakeholders concerned, have been committed to an exercise to test several parameters: patience, endurance, agility and, yes, influence. The euphemism most commonly encountered in the Indian defence contracting space over the last 12 months has been 'cautious optimism'. A raft of important contracts lie virtually ready to be signed. But a combination of disparate circumstances make these some of the most incredibly uncertain times for pretty much anything. Certainly for big-ticket defence expenditure.

But the arrival of Defexpo itself ought to be a breath of fresh air. An indication that the will to mod-

ernise is alive and well, and that international interest in the Indian defence market is as healthy as ever. This year's event has big shoes to fill: Two years ago, Defexpo 2012 recorded unprecedented growth in foreign as well as domestic participation over all of its previous editions. An impressive 232 foreign companies from 32 countries participated in the 2012 show along with 15 country pavilions. The event was attended by the largest number of official delegations with 63 delegations from 58 countries gracing the occasion. A number of international seminars and conferences were also conducted on the sidelines of the show. This year, things remain on even keel, responding to the unmissable, all-pervasive atmosphere.

Consider the following: the strongest tang in the air is political. With national elections just weeks away, the country's psychology, machinery and resources are geared towards the turbulence of transition. The air of

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political change is everywhere. The city you're reading this in has a government just over a month old, led by a party that's more than a year old. The ruling party at the Centre heads into elections fighting a tough 10-year incumbency factor and an energetic opposition, spirited forward by the BJP's prime ministerial nominee Narendra Modi. Energies big and small for political parties across the board are on electoral success. Unprecedented scrutiny of decisions big and small, especially those that concern public expenditure means that a notoriously laboured decision-making loop has become even more strained. With the model code of election conduct within sniffing distance, the modernisation limbo doesn't need to be explained.

Defexpo this year also comes in the shadow of one of the biggest controversies to hit the defence contracting space: the VVIP helicopter episode – a year long to-and-fro that ended with the Indian the Ministry of Defence's (MoD) decision to cancel the contract, making it the first contract in the history of Indian defence deals, to be scrapped midstream. The fallout of the controversy and the decision taken by the government to pull the plug on the deal is having far-reaching effects on the psyche of defence contractors the world over. Notwithstanding enduring business interests in country, the episode has forced virtually all stakeholders to pause and reassess the way business is conducted, the way they regard the Indian system, and the manner in which contracting is carried out. It would be an understatement to say it has infused a measure of anxiety. The Ministry of Defence on its part has been firm: integrity and fair play cannot be sacrificed at the altar of speedy and efficient modernisation. That said, the VVIP helicopter contract decision is still sinking into a market that already regards the Indian system, in some measure, as arbitrary, whimsical and unaccountable.

Already, international vendors are gathering intelligence on what India's next political dispensation will be like. These circumstances actually make things even more tantalising. It is sometimes difficult to comprehend, even for those who've done business in India for decades, that the political wagon is rarely unhitched from that of ground necessity. That's probably true of every country that buys more weapons than it makes itself.

If you were at the show two years ago, you couldn't have missed the buzz. The Indian economy was growing steadily, resisting the worst of a global slowdown and an ever intensifying spectrum of threats. India was regarded then as a market of limitless possibilities, a view that has been dulled somewhat in the last 24 months, but one that remains by and large on the level. Two years ago, India became the world's largest importer of weapons, a status that saw a country that traditionally imported hardware, shift gears into a realm of nimble partnerships, cross-investment and synergies with global technology houses. The India of yore, a buyer rather than a partner, is now a brave new nation with compelling indigenous capabilities and the will to perform on a competitive global stage. If the Defexpo show in 2012 came at profound time for Indian security, the edition that kicks off today brings with it an air of contemplation, introspection, course-correction and yes, that omnipresent cautious optimism.

Through the cloud of uncertainty, some facts remain undisputed. The eighth international exhibition on Land, Naval and Internal Homeland Security Systems, is the largest ever defence exposition in Asia, facilitating companies from across the world to once again come together in what is, without a doubt, still every defence firm's priority dream market. It is a chance, once again, to showcase India's emergence as an attractive destination for investment in defence and provides the best possible platform for alliances and joint ventures in the industry.

It's true. Few companies say no to Defexpo. But that was more true in 2012 than it is at this year's show. In 2012, an impressive 567 companies from 32 countries showcased weapons, munitions, specialty vehicles and advanced maritime systems for the Army, Navy and paramilitary. The major exhibiting countries participating in this year's edition of the fair include Russia, the United States, France, United Kingdom, Israel, Belgium, Germany, Italy, Japan, Republic of Korea, though most of these have shrunk their presence in terms of floor space and number of companies fielding stalls. This, at any event, is unsurprising and was mostly expected by the MoD, which in coordination with the Federation of Indian Chambers of Commerce and Industry (FICCI) has been under considerable pressure to deliver a successful show. There is no reason to believe Defexpo 2014 won't be one.

But is there business at hand? As Defexpo opens this year, there are several land and maritime deals that remain suspended in uncertainty. While there remains every hope that they will move forward, the companies concerned regard shows like Defexpo as an opportunity to further the conversation and reaffirm commitment to the Indian market. In many ways, that will be the touchstone of what this year's show is about. Sticking it out, and staying visible in what nobody disputes to be the world's toughest contracting space.

This year, the Defexpo 2014 seminar is themed 'Global Partnerships towards Joint Development and Indigenisation', both significant and timely. Like the show two years ago, Defexpo 2014 could turn

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out to be a proving ground for India's burgeoning private sector that has received its calling to pitch in for national security requirements across the spectrum for the armed forces and paramilitary forces. With evolving policies that hope to provide a competitive playing field for healthy competition, India's robust private sector is looking actively for investments and technology partnerships with proven firms. India's expansive state-owned military industrial complex, which holds most keys to self-reliance, have now been imbued with the freedom to improve, invite foreign technology and make full use of the capabilities on offer to India, a responsible and peaceful democracy. The public-private partnership model, while still in evolution, could reasonably be joined by dynamic public-private-foreign business models, harnessing the indispensable strengths of each. Each passing Defexpo has proven, when it comes down to the empirical post-show bean count, that businesses big and small profit from being here. And this profit goes well beyond the deliverables calculation that most media and trade magazines feel tempted to boil it down to.

With great attention has been paid to India's aerospace contracting (Defexpo, inevitably, has its own aerospace component, and a significant one at that), almost wholly represented in recent years by the monumental multi-billion medium multi-role combat aircraft (MMRCA) competition, India's land and maritime systems needs are no less dramatic. The Indian Army, in the midst of a deep doctrinal transformation that could change the very core of how it fights its wars, is a tough customer looking to overhaul many of its legacy systems – from specialty vehicles to infantry weapons, and from battle-field electronics to unmanned systems. The Army's future infantry soldier as a system (F-INSAS) alone provides an evolving opportunity for firms worldwide to partner with Indian industry to kit up one of the world's largest and most potent land forces. The procurement of artillery remains a pathological sticking point, though, that hopefully will see the light of day this year. A contract for ultra-light artillery guns from the US has ground to a phase of uncertainty, though there are indications now that there's reason to feel optimistic.

The Indian Navy, a spearhead in the difficult work of indigenisation, will shortly kickstart its next big procurement effort – the Project 75 India submarine project, that looks to build six conventional attack submarines within the country in tandem with the six DCNS Scorpens currently being built in Mumbai. With Indian state-owned shipyards spilling over with warship orders, and the Indian private sector pitching in efficiently, there are substantial opportunities for new surface combatants, support and specialty vessels. The Navy, which inspires several other regional maritime forces and the way they contract in turn, is also looking to overhaul its backbone communications infrastructure, network-centric systems, shore-based and shipborne sensors and weapons.

Several mechanisms that facilitate contracting remain in a state of flux. India's offsets regime has matured considerably, with ambitious new guidelines that will see billions of dollars worth of contracting money diverted back into the country in the form of direct (defence) offsets and indirect (civil aerospace, internal security, and training) offsets. The offsets policy is evolving quickly. Apart from high profile business activity, Defexpo 2014 provides a timely and valuable platform for Indian and foreign firms to hammer out partnerships that help fulfil offset requirements. Several companies have already begun the process. Several more will engage. But as noted earlier, 2014 is a whole new kettle of fish for the circumstances it throws up.

The armed forces, including the Indian Coast Guard (ICG) aren't the only customers at Defexpo 2014. Police forces and the paramilitary are significantly upgrading their capabilities, in tune with operational requirements. It is important to note the enormous opportunities for synergies that exist in the internal security space as well. From tactical unmanned systems and deep-penetration sensors, to side-shot weapons and traditional small arms, the Indian police forces and paramilitary continue to require multiple modern capabilities to take on newer more challenging tasks. With profiles changing and the commitment of internal security forces towards internal insurgencies in Central India, requirements specific to the new profile have emerged. Special protective gear, humanitarian relief equipment and survival aids will be required in substantial quantities across the armed forces and paramilitary. Those requirements will be enunciated over the four days of Defexpo 2014.

By all accounts, the air of uncertainty and anxiety will be shortlived. A robust nation with the requirements that India has can only move forward to meet its commitments. But together, it will take unusual resilience by all concerned, not least international contractors, who've shown once again that they are committed to doing business in a country they have grown to know and love. Over the next few days, there is every hope that international and domestic firms will talk, exchange ideas and come together constructively, moving beyond mere memoranda of understanding, and commit to doing real business not just for India, but armed forces across the world. In a world where India's position as a rising power, even a military one, has been unanimously recognised, the event you're at provides an excellent platform for interface in the furtherance of not just business, but relationships.

Here's hoping 2014 is a safe and successful year for you all! •

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INDIAN SUBMARINE ARM IN ENDLESS DIVE



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BY SP'S SPECIAL CORRESPONDENT

Nearly four years after the Indian Navy first scouted information to support its acquisition of six new-generation diesel-electric attack submarines as part of Project 75 India, a request for proposal (RFP) remains tantalisingly elusive. For over two years now, indications have been that the competition could begin at any time. But a combination of factors, not least a startling lack of all-round decisiveness has intensified the problem for one of India's most sensitive capability areas. 2013 has been a deeply mixed year for the Indian submarine arm, necessitating tough calls that will hopefully finally see fruit this year. The Indian Navy's top submariners will be at Defexpo this year to once again to exchange information and apprise themselves of the best in the market before the RFP goes at the latter half of this year.

If it has ever been imperative for the Indian Government to fast-track modernisation of the Indian Navy's submarine arm, it is especially so now. A combination of factors have made the last 12 months a startling indicator of how quickly decisions need to be made. Last week, the Indian Navy reportedly finalised a salvaging contract for the INS Sindhurakshak. She lies destroyed with 18 souls at the Mumbai dockyard after a horrific August 2013 accidental detonation in the forward weapons compartment, in what was India's most horrifying peacetime naval accident. The Indian Navy is now down to 13 submarines, with an availability level of no more than six at any given time. But 2013 has also had its highs. Just days before the tragedy aboard INS Sindhurakshak, India's indigenous nuclear submarine Arihant stepped out of the shadows with its pressure water reactor going critical. The ballistic missile platform will embark on sea trials just weeks from now, before entering a phase of weapons testing and then deployment on deterrent patrol.

The truth is, there is a problem. Fifteen years after India's apex Cabinet Committee on Security signed on an ambitious but crucial 30-year submarine building plan to give the Indian Navy as many as 24 conventional attack submarines, it hasn't managed to build and commission a single one. The DCNS Scorpene production line at India's Mazagon Dock Ltd (MDL) in Mumbai has slipped, but is finally on track, with a first delivery slated for September 2016. The Project 75 India, as mentioned above, is yet to be put out to sea. The fact that these two lines haven't delivered a single submarine yet means the additional 12 submarines that the 30-year plan envisaged as fully indigenous designs and builds aren't even visible in the overall scheme of things.

That said, the Indian submarine arm is perhaps its most underequipped, making business propositions in the country something no shipbuilder will

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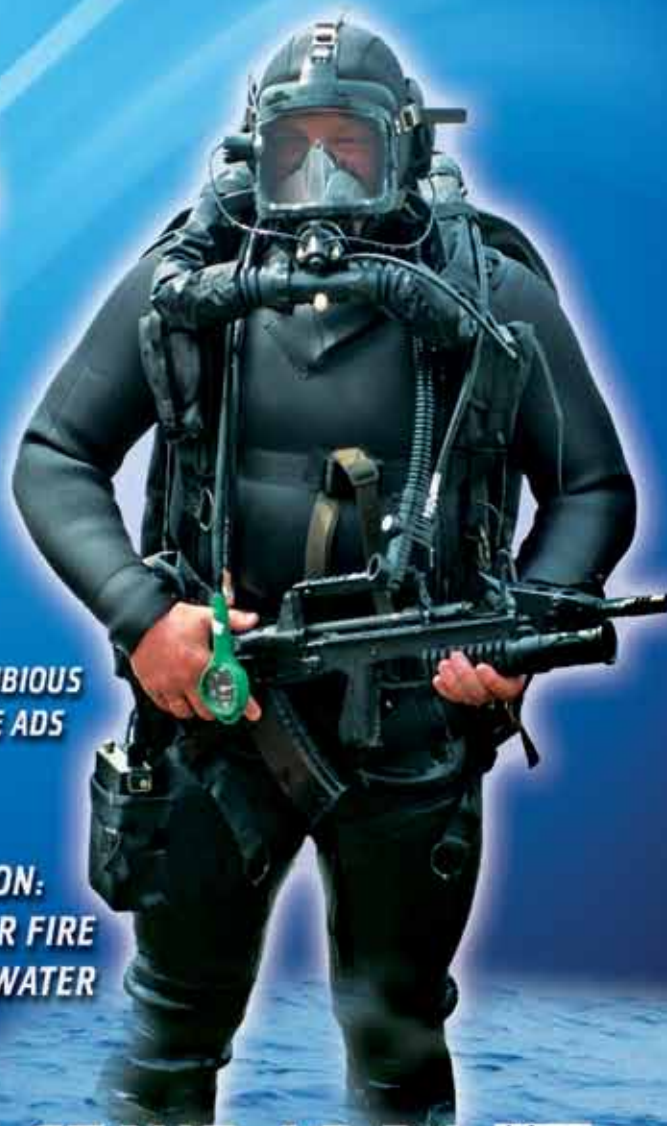
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SCORPENE SUBMARINE



ignore. From submarine platforms themselves, to combat systems, to propulsion, to weapons and countermeasures. Lessons from the Scorpene build programme will also be valuable for a far greater private sector involvement in the upcoming build line. At this year's show, several Indian private companies will showcase submarine system building capabilities. It goes all the way from major fabrications to the construction of advanced systems and everything in between. The idea, ultimately, is to synergise these various capabilities to build 12 fully indigenous submarines for India after the Project 75I. The Defence Research and Development Organisation (DRDO), currently steeped in completing the Arihant programme and delivering it to the Indian Navy, will also work on conventional and nuclear attack platforms.

"Defexpo is a very important platform for DCNS to showcase the services we can provide to our customers through genuine transfer of technology," says Bernard Buisson, Managing Director of DCNS India. "DCNS India set up a dedicated indigenisation programme as part of the transfer of technology (ToT) agreement with Indian naval shipbuilder Mazagon Dock Limited." At Defexpo, the Scorpene is presented with its SUBTICS combat system and its optional MESMA AIP section. According to DCNS, SUBTICS combines long-range capabilities in all navigation conditions with powerful weapons (torpedoes, anti-ship missiles, countermeasures, land-attack capability). As a fully-integrated system, all functions are operated from Multifunction Common Consoles and its open architecture and modularity guarantee that the system can be adapted to every type of submarines and configured according to operational requirements. The Indian Navy will be looking closely at these new capabilities on display. DCNS has also offered to build and deliver two Scorpene submarines rapidly for the Navy in France and deliver them as the Indian line begins pushing out its first submarine.

Competitors Navantia of Spain, Thyssenkrupp Marine Systems - HDW from Germany, the Rubin Design Bureau from France and others will also be present at this year's show. Delays in the competition getting off the ground haven't blunted interest, but heightened anxiety over how long more before the race actually begins. All four companies were present at last year's show, at which point they were promised that an RFP was imminent. This time around, skepticism will need to be suppressed as the government sends out a signal that an RFP is truly imminent this year.

Russia's Central Design Bureau for Marine Engineering Rubin has mounted an aggressive campaign for the Amur 1650, which it regards as a priority project for the Russian military industrial complex considering that India has shifted away from Soviet conventional submarines following the Kilo class. According to the company, which will display models of the Amur class at Defexpo this year, "Amur 1650 is the most effective modern non-nuclear submarine available today. Compared to similar boats in its class, the Amur distinguishes itself by possessing the capability to strike missile salvo attacks from all torpedo tubes against sea and fixed land targets, target detection range increased with respect to other existing sonar means due to availability of unique sonar system and a far lower noise level."

Germany hasn't forgotten its loss to France in India's Project 75, and will be looking to make up for that with the 75I programme. It has pitched the Class 214 submarine. According to the company, "It is well equipped to undertake a wide scope of missions ranging from operations in littoral waters

to ocean-going patrols. The modular weapon and sensor mix, in combination with the submarine's air-independent features, makes the HDW Class 214 predestined for anti-surface ship and anti-submarine operations, intelligence, surveillance and reconnaissance tasks, special forces operations. The HDW Class 214 design is characterised by increased underwater endurance and low detection risk using the proven fuel cell system for air-independent propulsion, increased diving depth, low revolution, permanently excited PERMASYN motor for maximum speed without transient switching noises, optimised signature management, sonar development within the ISUS 90 for increased low-frequency detection ranges (flank array), large weapon payload for a mix of torpedoes, missiles and mines, integration of torpedo countermeasures (TCM) system. Thanks to its modular design and high degree of automation, this submarine is a very cost-effective weapon system, extremely difficult to detect and thus the unbeatable solution for future-orientated navies." The Indian Navy is currently also in discussions with Germany on a possible upgrade of four HDW Class 209 submarines (Shishumar class) in service.

Spain's Navantia is still in the game too, despite a significant setback last year: the shipbuilder was forced to enlist American help to fine-tune the design after it was found that the first S-80 for the Spanish Navy was several tonnes too heavy. That said, the S-80 continues to be promising platform still under the Indian Navy's active consideration. The company will be looking to mount an intensive campaign this year to highlight the S-80's state-of-the-art technology based on OSA and extensive usage of COTS elements, its advanced passive sonar, advanced mines and obstacle detection donar (MODS), rowed array sonar including handling system (winch), periscope system with optronic sensor and optical attack periscope, electronic warfare system (Radar and COMSM), LPI radar, high level of acoustic and non-acoustic sensor integration C4I optimum information management using data LINK-22/11, internal and external integrated communication system with VLF/LF,

HF, VHF, UHF, Inmarsat and Iridium capabilities, high data rate satellite communication system (HDR SATCOM), weapon control system for torpedoes and anti-ship missiles, 6 X Positive Discharge TLTS for torpedoes, missiles and mines, acoustic sonar countermeasures and torpedo countermeasures system and low life cycle cost design. Competition will be tough.

The Indian Navy recently welcomed the INS Vikramaditya aircraft carrier into service, heralding what will hopefully be a successful year for the service. The Navy is already on a psychological high with two operational aircraft carriers, and steady inflow of surface combatants. Ahead of Navy Day on December 4 last year, Chief of the Naval Staff, Admiral D.K. Joshi said, "Our theme for this year's Navy Week, 'Indian Navy Maritime Security Through Self-Reliance', encapsulates our commitment to indigenisation in quest for strategic autonomy for the nation. We are proud of the fact that all 45 ships and submarines, which are currently on order for Indian Navy, are being constructed in India in both public as well as private shipyards." But there's no time for pause. For its area of responsibility and area of operations, the Indian Navy remains under-equipped, and is forced to make do with what it has, frequently stretching its available equipment to the limits. Each passing Defexpo only amplifies the inexorable delays in decision-making for modernisation. Hopefully 2014 will see a 'sea' change. •

Eurofighter Typhoon: 400th aircraft delivered



Aircraft 2 (IPA2) by Alenia Aermacchi at the Decimomannu Air Base in Sardinia/Italy. The Storm Shadow, manufactured by MBDA, is already in service with the Tornados of the Italian Air Force, Royal Air Force and Royal Saudi Air Force. It is a conventionally armed, stealthy, long-range stand-off precision weapon designed to neutralise high value targets. The weapon system will add the capability to strike by day or night in all-weather conditions, well-defended infrastructure targets such as port facilities, control centres, bunkers and bridges that would otherwise require several missions.

The 400th Eurofighter Typhoon has been delivered to the programme's worldwide customer base. The German Air Force took delivery of the 400th aircraft in December 2013 during a special ceremony at the Military Air Systems Center in Manching/Germany.

Alberto Gutierrez, Chief Executive Officer of Eurofighter Jagdflugzeug GmbH, said: "The delivery of the 400th Eurofighter Typhoon marks a historic milestone in Europe's largest defence programme. Now we must focus much more strongly on export campaigns in order to win new contracts and new customers for this outstanding aircraft. Right now, especially in these difficult times in the defence industry, it is more important than ever that we stand up and be counted."

The Chief Executive Officer of Airbus Defence and Space, Bernhard Gerwert, said: "As a partner in the Eurofighter consortium, we are proud that we have assembled the 400th Eurofighter and that we can hand over to the German Air Force its 112 aircraft. Our customers are fully convinced of the performance of the Eurofighter Typhoon. The most modern combat aircraft in the world will also be a significant part of the product portfolio in the new Division called "Airbus Defence and Space."

Delivery of the very first Eurofighter to the Royal Air Force in the United Kingdom took place end of 2003. The 100th Eurofighter was delivered also to the Royal Air Force in September 2006. The 200th aircraft was handed over in November 2009 to the German Air Force. The 300th aircraft was delivered to the Spanish Air Force in November 2011.

In the past 10 years the global Eurofighter fleet has demonstrated its high operational effectiveness in international missions and trainings and accumulated about 220,000 flying hours. Several developments such as the Phase 1 Enhancement, the integration of the METEOR air-to-air missile, the new electronic radar (E-Scan) and additional weaponry increase the capabilities of the Eurofighter Typhoon and secure the future of this modern combat aircraft in the next decades.

Flight Tests with Storm Shadow and Taurus missiles

Eurofighter has begun intensive flight test campaigns with the Storm Shadow and Taurus missiles. Both missiles will further increase the air-to-ground capabilities of the Eurofighter Typhoon. Laurie Hilditch, Head of Future Capability at Eurofighter GmbH, said: "These capability enhancements underline that our proven and trusted programme is well on track and that we achieve what we promise."

A major goal of the flight tests is to assess the Storm Shadow in flight and to achieve clearance for the full integration on the Eurofighter Typhoon by 2015. First tests have been undertaken on the Instrumented Production

As part of the Storm Shadow integration programme, Airbus Defence and Space has started flight testing with the Taurus missile on the Instrumented Production Aircraft 7 (IPA7). Concurrent testing of these two similar missiles optimises the Storm Shadow integration and facilitates the future airframe integration of Taurus. The missile incorporates stealth characteristics and is designed to strike targets such as bunkers and command and control facilities.

In order to further increase the operational capabilities of the combat aircraft, Eurofighter GmbH and the NATO Eurofighter and Tornado Management Agency (NETMA) signed a new Development Contract in October 2013. The package (known as Evolution Package 2) consists of a number of improvements including enhancements to the major avionics sensor such as the Radar and the Defensive Aids Sub Systems (DASS). It also includes enhancements designed to cater for the latest operational requests of customers and enhancements to the Multifunction Information and Distribution System (MIDS).

World Economic Forum 2014 in Davos: Eurofighter secured the Airspace

Eurofighter Typhoons of the Austrian Armed Forces secured the airspace during the World Economic Forum 2014 in Davos/Switzerland.

As part of what is known as "Operation Daedalus 2014", Eurofighters delivered a significant contribution to the security of this international conference in Switzerland. The World Economic Forum took place from 22nd to 25th January in the famous ski resort.

Alberto Gutierrez, Chief Executive Officer (CEO) of Eurofighter, said: "In addition to its primary task of securing the airspace in Austria on a daily basis, Eurofighter will again support the security measures for this renowned conference in Switzerland. Every day our aircraft protect the skies of our customers around the clock. Outstanding events like this one are always given special attention."

All 15 Eurofighter Typhoon in Austria have gone through a planned upgrade programme and are equipped with performance-enhanced hardware and software. They now have the latest capability standard for what are known as "Tranche 1" variants of the aircraft.

In recent years, Eurofighters have been used for numerous large international events including securing the airspace during the Olympic Games in London in summer 2012. For the entire period of the Games the combat aircraft were on Quick Reaction Alert (QRA) duty 24 hours a day, seven days a week. Eurofighter Typhoon aircraft also controlled the airspace during the European Football Championship in Austria and in Switzerland in 2008 and during the Ski World Championship 2013 in Schladming/Styria. •

'Lockheed Martin to continue addressing Indian military requirements'

US-based Lockheed Martin has been ranked as the world's number one defence company in terms of revenues, range of high technology products and solutions and for its substantial worldwide presence. It has been able to expand its global footprint as it believes in addressing the needs of militaries, transcending political affiliations. In India, it bagged its first major military contract in 40 years with the C-130J Super Hercules programme and is consolidating on that. In an interview with **SP's ShowNews**, the Chief Executive of Lockheed Martin India, **Phil Shaw**, reiterates the company's strategy of 'supporting the Indian military'.



BY R. CHANDRAKANTH

SP's ShowNews (SP's): Will change of government in India after the upcoming general elections here impact India-US relations?

Phil Shaw (Phil): I do not think so. Indo-US relations are expanding and as far as Lockheed Martin is concerned, the company has no political affiliations but is here to support the Indian military. Over years, India-US relations have strengthened and we want to build upon that relationship. With the Indian Defence Acquisition Council approving the second tranche of C-130J Super Hercules, it demonstrates the confidence that the Indian military has in the platform and we are excited of the possibilities here.

The US Deputy Secretary for Defence, Ashton Carter, during his recent visit to India, has stated in unambiguous terms that the US offers co-development and co-production partnerships for various defence programmes. That includes the Javelin Anti-Tank Guided Missile (ATGM) and the MH-60 Romeo helicopter. Lockheed Martin along with Raytheon is offering the Javelin missile.

There are ongoing discussions between the governments and any engagement is positive. The offer made by Ashton Carter is unprecedented. The Defence Trade and Technology Initiative which lists a number of items for technology transfer demonstrates the keenness of the United States in strengthening relations with India.

SP's: Besides the C-130J programme, what is high on the agenda for Lockheed Martin in India?

Phil: Lockheed Martin is focused on three programmes right now – the C-130J; the maritime helicopter offering and the Javelin missile. The MH-60R 'Romeo' manufactured by Sikorsky Aircraft Corp and equipped with advanced mission systems and sensors by Lockheed Martin is the most capable and mature anti-submarine/anti-surface warfare helicopter. It packs a lot of punch. We have transferred technology and know-how of similar capabilities before in the United Kingdom, for the Royal Navy Merlin helicopter programme and would love to do something similar in India with a partner to develop an indigenous systems integrating capability. We are talking to both public and private

sector companies. The partnership with Tatas was established in record time and the joint venture last year delivered the C-130J Empennage. We continue this dialogue with private and public companies at Defexpo.

SP's: What is the update on the C-130J offering to the India Meteorological Department?

Phil: The discussions are continuing. The C-130J platform has multi-mission capabilities – maritime patrol, anti-submarine support, humanitarian relief as evidenced during the Uttarakhand relief operations, ability to land in high altitudes, etc. As the programme already exists here, it becomes more economical for other agencies to operate.

SP's: In the market for unmanned aerial vehicles (UAVs), the Israelis have taken a lead in India and are still aggressive. What is the market like and what kind of competitive edge do you offer?

Phil: We are looking at the Indian UAV market and we have multiple product offerings – airships, hand-held UAVs, small unmanned aircraft systems, unmanned cargo-lifting as the K-Max helicopter, etc. With recent acquisitions of CDL Systems, Chandler/May and Procerus Technologies, the offering from Lockheed Martin has expanded considerably. We are aware of the Indian requirement and we will offer our capabilities accordingly.

SP's: What are the systems Lockheed Martin produces for the US Homeland Security and are you planning to offer them to India?

Phil: Lockheed Martin has a vast portfolio of products and solutions. We have a huge number of sensors, radars, platforms, etc, which address the needs of homeland security. As a company with a wealth of experience in the defence as well as civil sectors, we are uniquely placed to perform and have considerable experience in homeland security and we have integrated such systems in 22 countries. We work with the customer and provide the 'glue' or systems integration skills to select and integrate complex solutions.. Lockheed Martin is in discussions with Indian companies to provide homeland security capabilities here.

SP's: Other than the joint venture JV with the Tatas, is any other JV in the pipeline?

Phil: We already have a partnership with Fly Wings Aviation, Mumbai, called Flight Simulator Techniques Centre (FSTC) which is based here in Gurgaon. This facility has been providing simulator training for pilots of Boeing 737 NG and Airbus 320 aircraft. Considering the growing number of aircraft here, the demand for training is high and we are also looking at different aircraft types for simulator training. We are not just looking at the airlines in India, but also in the region.

SP's: How much does India account for Lockheed Martin's revenues?

Phil: I am not in a position to answer that, but the numbers are growing. We hope to see our footprint expand here.

SP's: Is the present foreign direct investment (FDI) norm conducive for transfer of technology?

Phil: In the joint venture with Tatas we have 26 per cent equity and the programme is doing well. For higher technologies which need to be transferred we hope the FDI norms will be relaxed and we are aware that the government of India has announced that it would be looked at on a case to case basis. A relaxation to the FDI cap would provide more incentive to companies with a lot of IPR invested into the higher technologies.

SP's: What is your focus at Defexpo 2014?

Phil: While we will be showcasing some of our programmes that fit Indian requirement, the focus certainly is going to be on the C-130J programme; Javelin missile (along with Raytheon) and maritime helicopter capabilities. •

IAI introduces M-19 HD multi-sensor payload

Israel Aerospace Industries (IAI) Systems, Missiles & Space Group, Tamam Division has expanded its offerings and fielded a series of new and upgraded stabilised payloads, incorporating significant enhancements, especially high definition electro-optic and infrared sensors.

Its innovative M-19 HD is a true high-definition, compactly-designed multi-spectral, multi-sensor payload (simultaneously incorporating up to seven sensors), implemented as a single line-replacement unit (LRU). The M-19 HD enables continuous day/night monitoring in all-weather conditions and provides outstanding acquisition ranges due to its powerful sensors, high stabilisation and unique image processing capabilities.

M-19 HD reduces the operator's workload and improves situational awareness by virtue of its multi-mode automatic video tracker (AVT). It also provides accurate geo-location using its embedded IMU/GPS (inertial measurement unit/global positioning system).

IAI is also in negotiations with several customers to supply Tamam's new line of high-definition day and night stabilised optronic payloads - the 15" MOSP3000-HD and the 10" POP300D-HD. These new payloads use a 1280 x 1024 detector for the thermal camera and a 1920 x 1080 detector for the day camera. These new high-resolution sensors make Tamam's systems the optimal solution for wide area scanning and persistent awareness missions as well as for long-range surveillance and targeting applications. The new systems also include advanced video image processing and compression fea-



tures that allow the HDTV to be adapted to any downlink system.

IAI has also successfully completed deliveries of its ground target acquisition system (GTAS) to a NATO country's artillery forward observer (FO) units. GTAS uses an innovative concept in ground observation and target acquisition. GTAS can be used on the ground or on a vehicle. It is carried and operated by a single soldier and can quickly be deployed without the need for calibration and fine levelling. GTAS features remote control operation, thus enabling the operator to control the system from a distant and secure location. The system's capabilities include accurate target geo-location, automatic target tracking, versatile map capabilities, target database, media recording and playback, and connectivity to external C4I systems.

GTAS is based on Tamam's field-proven MiniPOP, integrated with a rugged lightweight tablet, a hand-held display and control, power packs, tripod and special backpack. The total system weight is 14 kg. GTAS sensors include a FLIR, Day TV, LRF (laser range finder) and optional laser pointer. The sensors are bore-sighted and packed in a hermetically sealed closure. •

IAI performs Heliborne LAHAT missile firing demonstrations



Israel Aerospace Industries (IAI) has recently successfully completed a series of impressive demonstrations of LAHAT (laser homing attack) missiles firing from helicopters.

The demonstration-firing, comprised eight highly successful launches, carried out at ranges of up to 10 km, and altitudes of 300 feet to 6,000 feet, both from moving as well as hovering helicopter - to fixed and moving targets. These scenarios included highly realistic operational scenarios, including a direct hit scored from 10 km, using the helicopter's observation capability but laser designation by a ground force.

LAHAT is an accurate lightweight missile, homing-in on a laser spot. It has a ground launch range of 8 km (10 km from helicopters) and can be supplied a variety of mission-customised warheads. The lightweight missiles and launcher do not adversely affect the helicopter's effective mission time. LAHAT missiles, sold in significant quantities to various customers, serve as precision-guided munitions, and may be launched from ships, vehicles and helicopters.

The LAHAT System can be adapted to almost all helicopter types, even the lightest ones.

The system comprises IAI's MOSP3000D observation payload with designation capabilities, a weapons control system and two quad pack missile launchers. •



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PHOTONIS: Latest Night Vision Technologies for India

PHOTONIS is a leading multinational high-technology group, with experience in manufacture, sales and innovation specializing in photo sensor imaging technologies since 1937. PHOTONIS operates internationally in the Night Vision, Industry Science Medical, Nuclear Instrumentation and Power Tubes markets. In an interview with **SP's ShowNews**, the Chief Marketing Officer of PHOTONIS France **Emmanuel Nabet** gives details about the company's presence in India and how it is developing the market here.

SP's ShowNews (SP's): What has been the experience of PHOTONIS in India? Since when has your company engaged the defence and security sector here and what are your objectives in India?

Emmanuel Nabet (Emmanuel): Since 2001, PHOTONIS France delivers to India the most used and robust XD-4 Image Intensifier Tubes. The main customers are Ordnance Factory (OFD) and Opto-Electronics Factory (OLF), located in Dehradun. The I² tubes are integrated in night vision devices manufactured by OFD and OLF to be provided to the Ministry of Home Affairs, to the Border Surveillance Forces or integrated in night driving scopes.

SP's: Is PHOTONIS looking at marketing its products individually in India or in collaboration with Indian private companies and PSUs? Has PHOTONIS signed any MoU in this regard?

Emmanuel: The public sector Bharat Electronics Limited (BEL) procured 30,634 image intensifier-based Passive Night Vision Devices (PNVDs) on a transfer of technology (ToT) basis for supplying to the armed forces. The state-of-the-art PNVDs include passive Night Vision Sight for 5.56mm INSAS Rifle and Light Machine Gun, Passive Night Vision Rocket Launcher and Passive Night Vision Binoculars. BEL Optronics Devices Limited (BELOP), a subsidiary of BEL has absorbed the critical Image Intensifier Tube technology of state-of-the-art XD4 specification from PHOTONIS France as part of this procurement.

BELOP was the obvious choice for this strategic ToT as BELOP is the only I2 Tube manufacturer in India having been established in 1990 on the behest of the Ministry of Defence with the aim to achieve a self-reliance in night vision.

SP's: Image Intensifier Tubes are an area in which PHOTONIS has been focusing. How do you rate your products on the global market? What are the "unique features" compared to its global competitions?

Emmanuel: In the highly demanding conditions of field operations, PHOTONIS tubes are the most resistant and less susceptible to burn-in due to their specific photocathode structure, ensuring the continued reliability of the output image. In case of illumination by a laser, and at the contrary of other tubes which would be totally destroyed, PHOTONIS tubes would only show a marked black spot at the impact of the laser beam, with no subsequent evolution of the mark. Consequently always offers "eyes on the target".

PHOTONIS recently introduced one of the most revolutionary advancements in night vision in the XR5 auto-gated filmless tube. In addition to improvements in image resolution and clarity as well as low-light level performance, the XR5 offers Auto-Gating, which allows for continuous operation in dynamic light conditions. XR5 is one of the most recent image intensifiers in service in NATO.

In addition to the advances made with XR5 Auto-Gating, ONYX natural black and white Night Vision Image Intensifiers are proving to be a plus in terms of image contrast and detection. ONYX is the optional black & white (B&W) vision of PHOTONIS.

PHOTONIS has been improving direct view technology solutions (based on Image Intensifier Tubes) over the years along the main axis dealing with human perception: Physiological performance (Auto-Gating and ONYX technologies), reduced size and weight (16mm-diameter intensifier tubes) and increased optronics performances (introduction of XD-4 and XR5 high performance tubes).

SP's: To which all countries has PHOTONIS marketed its Night Vision Devices?

Emmanuel: PHOTONIS Night Vision is the world leader in night vision sensor innovation for space and military applications. Directly exporting more than 80 per cent of the products to the Indian Army, French Army, UK MoD, German BAAINBw, US Army CECOM, US Navy, AREVA, NASA, EDF (French Power Generation Utility), CEA (French Nuclear Energy Commission), CNRS (French Research Center), ESA (European Space Agency) and many more, PHOTONIS is the preferred supplier of the most recent image intensifiers in

service in NATO. Moreover, the ITAR free Image Intensifier Tubes from PHOTONIS are worldwide renowned.

SP's: What are the types of image intensifiers products that PHOTONIS offers? What are their characteristics in terms of clarity and speed, latter considering fleeting targets with small detection time?

Emmanuel: *Helicopter crew:* The benefit of PHOTONIS latest Image Intensifier Tubes to Helicopter crew is the ability to fly in much safer conditions at faster speed and lower altitude by night. Pilots experience much less halo and can even land with Night Vision Devices on, while it is near to impossible with many other available Image Intensifier Tubes. The Auto-Gating feature is especially engineered for light-polluted areas and has become an indispensable feature for helicopter crews. As experienced by the French Special Forces, PHOTONIS provides them with the highest performance available.

Ground Forces: Due to the extended bandwidth of PHOTONIS Image Intensifier Tubes, Ground Forces can operate in all field conditions (desert to forest, mountain to sea) and experience the best image at night. Therefore Ground Forces are ensured of sustained battlefield superiority. PHOTONIS makes the difference by demonstrating the highest performance available.

SP's: In marketing your products in India, is PHOTONIS prepared to offer transfer of technology?

Emmanuel: PHOTONIS is already cooperating closely with Indian PSU. BELOP is well poised with the manufacturing capability of I2 tubes. BELOP showed its full capability in successful absorption of know-how and skill development in an era where the technology life cycle is getting shorter than its functional life. Higher specification tubes are generally developed through incremental improvements and produced with upgradation and augmentation of existing facilities. PHOTONIS have therefore favoured indigenous manufacture of XD 4. The year 2014 will also see through upgrades, the commencement of indigenous manufacturing of Auto-Gated XD 4 and XR5 II Tubes.

In this context, it is pertinent for the users and decision-makers in the Ministry of Defence (MoD) to determine the "best fit" as per operational requirements without unnecessarily burdening the financial resources in wake of procuring the latest products.

For example, the devices procured by the Mumbai police after the 26/11 attacks have a detection range of approx 150 metres and recognition span of approx. 100 metres. In such a scenario, the feature of Auto-Gating will be significantly advantageous for such NVDs as the operational requirement may involve a 26/11 like scenario wherein the National Security Guards (NSG) may need to engage in an anti-terror conflict in urban environment like a hotel where light levels can vary rapidly.

The absorption of image intensification technology has been a milestone in the context of Indian Night Vision, making the PSU of India amongst the five most advanced OEMs in the world of this strategic product. Successful upgrades and assimilation of technology for manufacture of higher specification I2 Tubes will not only boost the motive of self-reliance but also set benchmarks for building advance technology infrastructure and R&D capability in other strategic defence related technologies.

SP's: As part of complete night vision products, can PHOTONIS offer a monocular night vision device that can be worn on the helmet or with a headband by a foot soldier, leaving his both hands free?

Emmanuel: As the technology leader in Image Intensifier Tube, PHOTONIS does not manufacture or offer monocular night vision device. However, thanks to its highest quality, lightest weight and most compact products, PHOTONIS empowers OEMs in manufacturing and delivering the highest performing monocular night vision devices as described in the example below.

Small halo to match high quality goggles: To take full advantage of the highest performing technologies in Night Vision in full sovereignty, Indian

industry has invested in optics, moulding and set-up an ambitious business plan to produce advanced night vision equipment and provide them to Indian troops and Special Forces.

Using these high quality goggles, it became then obvious that they needed to be matched with Image Intensifier technology generating the smallest halo possible. Indeed when operating in dynamic light conditions, night vision images have a tendency to show 'halos' around the brightest spots in the scene. For example: street lights or car headlights are typically surrounded by round bright areas, disturbing the overall image quality and 'whiting out' part or the entire image. Because the smaller the halo (<1mm), the better the image quality, Indian forces can now be equipped with the most advanced Image Intensifier technology from PHOTONIS matching the high quality goggles available from the local industry.

SP's: The LYNX CMOS sensor is advertised based on full solid-state technology that besides operating by day, functions in low-light equivalent to quarter moon, and supports applications like fusing digital images by night and IR. Can you elaborate this product? Does its function get affected in conditions of low light going below quarter moon and pitch darkness? What is the platform on which the LYNX CMOS sensor is mounted?

Emmanuel: Digital View based on full solid state sensor: Although Image Intensifier tubes represent the unrivalled solution for low light level and night vision applications thanks to its low power consumption, high detection and identification capabilities, ease of deployment, small size, low life cycle and maintenance costs, Digital Technologies applied to visible light (solid state low noise CMOS, CMOS coupled to intensifier tubes) tremendously increase the range of applications, such as portable and remote applications, day/night surveillance (surveillance cameras in urban environment), perimeter protection, border control, infrastructure surveillance, and manned and unmanned vehicle protection.

Unattended sensors for remote surveillance: Taking advantage of its experience in Night Vision demanding requirements, PHOTONIS designed digital sensors operating in both day and night lighting conditions down to extreme low-light levels. These newest digital sensors are also able to achieve much lower power consumption and lower costs than usual EMCCD-based imaging systems.

The unattended sensors for remote surveillance can be fitted with auto-

matic movement detection, "wake-up" feature. They are fully passive and/or undetectable and are transmission ready.

Furthermore PHOTONIS Sensors are independent from weather conditions and can operate despite rain, wind, temperature differences, direct sun exposure or glass window protection.

Border Security Surveillance, UAV: To provide extreme low-light solutions able to deliver high-quality imaging by both Day & Night, PHOTONIS recently completed its digital imaging portfolio by developing a dedicated camera electronics around its high-performing sensors: the NOCTURN camera.

Most suitable for UAV surveillance and Border Security applications, this advanced camera has an extended bandwidth advantage compared to infrared cameras and makes it possible not only to detect and recognise, but also to identify at night for a much reduced cost than the usual association of day camera and night camera used so far to provide similar imaging range.

SP's: The MCP-PMT Photon Detector reportedly brings together two fast photonic timing devices technologies in a single sensor. What are the advantages of this fusion? What Night Vision Devices are this detector being utilised?

Emmanuel: The MCP-PMT Photon Detector is ideal for high speed and single photon detection, fluorescence, nuclear physics and other high-energy applications. MCP-PMT Photon Detectors are not offered or used in defence, security or homeland applications.

SP's: The PLANACON Photo Detector has been advertised for use in specialised medical imaging applications as well as for homeland security. Can you elaborate how and where the PLANACON Photo Detector can be optimised in homeland security?

Emmanuel: PLANACON Photo Detectors are used in homeland security and counter-terrorism applications for radiation monitoring through portable radiation meters incorporating a photomultiplier and scintillator measuring the radioactive dose received by workers or detect radioactive contamination on their gloves or clothes protecting them from exceeding a safe level. The same equipment can be used to protect the environment by monitoring levels of fallout from nuclear accidents or leaks. •

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Airbus Pitching C295 Tactical Airlifter as Avro Replacement



Airbus Defence and Space, the new division is Europe's No. 1 defence and space enterprise and the second largest space business worldwide, which generates revenues of approximately 14 billion euros per year, is on an aggressive expansion of its global footprint. Here in an interview with *SP's ShowNews*, **Ian Elliott**, Vice President, Defence Capability Marketing, Airbus Defence and Space, gives details about how the company is nurturing the Indian defence and space market.

market just what a wide and deep range of products and expertise we offer. Presenting our capabilities to the market in a more efficient manner is one of the important drivers in the restructuring and we are very keen to demonstrate that at Defexpo.

SP's: The Indian Air Force had selected the Airbus A330 MRTT to augment its fleet of in-flight refuelling aircraft. What is the present status of the tender?

Ian: The financial negotiations are in their final stages and we continue to respond to questions from the IAF and the Government as we have done throughout the competition. This has been a very long campaign and naturally we hope to see a good rate of progress in this final phase, but we understand that it is a complex acquisition and we are focused on being highly responsive to India's concerns.

SP's: What is status of the A400 M project and its customer base? In your view, is this platform suitable for India and why? Has Airbus Military offered this platform to the IAF?

Ian: We remain clear that we think the A400M will be of great interest to India in due course. Everyone who flies in aircraft is hugely impressed by it – so we are confident that we will have good grounds for discussion in India when everyone is ready. But naturally we recognise that this is a long-term aspiration and for now we are simply keeping everyone aware of its capabilities.

We are very focused on ensuring a smooth entry into service with France, Turkey and the other core nations, and we are concentrating our marketing efforts in South East Asia and the Middle East where we see the most promising near-term potential.

SP's: What is the perception of the company of market prospects in India for its products in the long term?

Ian: India is an enormously important market for us and we are absolutely committed to building our presence here over the long term. We have learned a great deal about India's defence needs in recent years and we continue to work diligently to understand future requirements and explain how we believe we can address many of them. And at the same time we are investing in India to ensure that we are a good partner in terms of, for example, research and development and industrial collaboration.

SP's: What refinements, if any, would you suggest in the Defence Procurement Procedure?

Ian: We have great respect for the Indian procurement process which has successfully handled a large volume of complex acquisitions for many years and we are very happy to work within today's guidelines and regulations as they evolve.

SP's: If you look back two to three years from now, can you please recount which all success stories you are proud of and why?

Ian: We're naturally extremely excited by our selection in the tanker contest and it will be a fantastic day when we finally see our aircraft entering service with the Indian Air Force. The aircraft is performing extremely well with other customers now and we're confident of it being a great success in India. At the same time we would love to see the Avro replacement programme move ahead so that we can start forming strong relationships at the industrial level to the great benefit of Indian aerospace. •

SP's ShowNews (SP's): What is the level of participation and product profile planned by Airbus Defence and Space in Defexpo 2014?

Ian Elliott (Ian): It is the first time that we're exhibiting at a show as Airbus Defence and Space, which is the result of combining the former Airbus Military, Cassidian and Astrium business units. So we have a considerable range of products and activities to discuss, but certainly the C295 aircraft is very important. We think it's the perfect replacement for the IAF's Avro fleet, but also for other roles in India, and as the basis for highly productive industrial collaboration.

We will be promoting the C295 tactical airlifter which the Group is proposing to address the IAF's requirement as a replacement for its Avro medium transports. It is a highly versatile aircraft proven all around the world as a tough, reliable and high-performing workhorse with outstanding life-cycle costs and excellent performance on short or unpaved runways. We have delivered 106 C295s out of 123 on order and it is in service in 14 countries.

And in terms of aircraft, we will of course also be happy to talk about the A330 MRTT (Multi-Role Tanker Transport), which India has already selected as its new aerial tanker and for which the contract is in the final stages of negotiation.

But additionally we will be highlighting a wide range of other products from the combined Airbus Defence and Space range, such as the Tanan 300 vertical take-off and landing tactical unmanned aerial system, which is particularly suited for maritime surveillance and can perform eight-hour missions. Then there are defensive systems like the Spexer 2000 coastal surveillance radar which uses the latest Active Electronically Scanned Array (AESAs) technology to detect and classify even very small sea, ground and low-flying air targets, and the MILDS AN/AAR-60 (V2) missile warning system which protects fighter aircraft against infrared-guided missiles and is in service with a number of European air forces.

We also have a series of communications products that are providing enhanced satcoms capabilities for ships and aircraft, as well as our TETRA mobile radio range, including the TH1n, which is the smallest and thinnest TETRA radio device in the world.

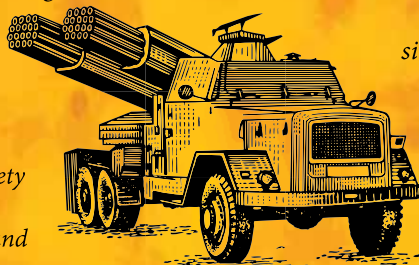
SP's: Airbus has announced its participation in Defexpo 2014 with a rebranded image. In what way will it be qualitatively different from participation in similar events in the past?

Ian: The Airbus Defence and Space brand will make it much clearer to the



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Combat Module for Armored Vehicles Upgrade

Russian infantry fighting vehicle BMP-2, being the main combat vehicle of multiple countries' land forces, was adopted for service in 1980 and used to exceed most of its foreign counterparts in terms of combat capabilities. Nowadays BMP-2 still basically meets the modern requirements. But the analysis of current state and development tendencies of weapons and fire control systems shows that BMP-2 weapon system is falling behind the modern level in a number of parameters.

The firepower of a combat vehicle is determined by its weapon system, thus, the increase of combat efficiency may be achieved by weapon system modernization. BMP-2 has a high weapon system upgrade potential. The challenge of increasing the firepower of existing BMPs providing their superiority over other modern vehicles has been successfully met by KBP Instrument Design Bureau.

The upgrade was implemented on a serially produced BMP-2 turret with 2A42 automatic cannon. The weight of add-on equipment installed does not exceed 500kg, including around 260 kg of extra ammunition: 30mm grenades and ATGM.

- The possibility of KORNET ATGM launch in an elevated mode almost excludes the possibility of detecting the missile by the enemy.
- Laser guidance mode of the ATGM with orientation of the missile within the laser beam provides for high jamming-immunity against all types of active jamming, since the jammer cannot be behind the ICV and send the same encoded messages.
- To overcome systems of targets' active protection and to provide for guaranteed engagement of crucial targets salvo launch of 2 ATGMs riding on one laser beam is provided.
- Effective firing range of a 30-mm projectile was increased from 1100-1400m up to 1800-2000m.
- air defense firing effectiveness increases significantly: kill probability by automatic gun when firing against "helicopter" and "low-flying attacking aircraft"-type target increases dramatically and its value approaches that of specialized gun and missile air defense systems of closed ranges with much lesser expenditure of ammunition.
- Effective engaging of enemy's personnel at ranges up to 2100, including



UPGRADED BMP-2



UPGRADED BMP-2

The results of upgrade of BMP-2 with new B05Ya01 combat module are as followed:

- due to introduction of day/night FCS the system provides accurate firing with all types of weapons, including guided, at moving and stationary targets, round-the-clock engagement of all types of targets from stationary position, on the move and afloat at the range up to 4000m with automatic cannon, up to 2100m with automatic grenade launcher, up to 5500m with 9M133-1 ATGM. Besides, 9M133M-2 ATGM with tandem shaped-charge warhead and 9M133FM ATGM with HE warhead and 9M133FM-3 ATGM with HE warhead and proximity fuse, recently designed by KBP, allow firing at range up to 8km;
- Kornet-E ATGM penetration capability, increased up to 1100-1300mm, allows reliable engagement of modern advanced tanks fitted with add-on ERA. Due to stand-off range targets engagement capability the upgraded BMP-2 are sure to prevail in combat with enemy tanks and IFVs.
- Installation on two stabilized launchers of BMP-2 ICV of four ready-to-launch guided missiles significantly increase fire rate when firing ATGMs. This excludes the necessity to reload the guided missile launcher during the combat;
- Implementation of TV-IR-auto target tracker enables to increase the accuracy of target tracking 3-6 fold in comparison with manual tracking. Automatic target tracker adds the FCS a qualitatively new feature, implementing the "fire-and-forget" principle when firing a guided missile. At the same time the missile cost is significantly lower than that of a missile with a seeker which fulfils the function of the auto-tracker.

that behind the accidents of ground and in trenches due to the implementation of low ballistics armaments (AG-30M automatic grenade launcher) with new GPD-30 rounds.

- The opportunities of CV commander increase due to installation of night vision panoramic sight with technical view, implemented on ICVs for the first time. This allows to increase the stream of targets detected by the CV by 2.5 times, increase TD accuracy for the gunner by 10 times and to fully backup his tasks as well as to carry out engagement of aerial targets in automatic mode.

BMP-2 upgrade meets the requirements towards future infantry combat vehicle for the nearest 20-30 years, and upgraded BMP-3 ICV can be successfully used till year 2030-2040.

The carried out upgrade features a systematic approach and leads not simply to enhancement of separate technical specifications of the system, but has enabled to create a vehicle with qualitatively new feature, which can successfully compete with foreign counterparts on the weapon market.

Combat module is also meant for BMP-1 upgrade of (after the chassis is upgraded to up to the level of BMP-2), BMP-3, BMD-3 airborne combat vehicle, BTR-90 APC and has passed the trials on their chassis.

KBP carries out the lot production of upgraded BMP-2 combat compartment. •

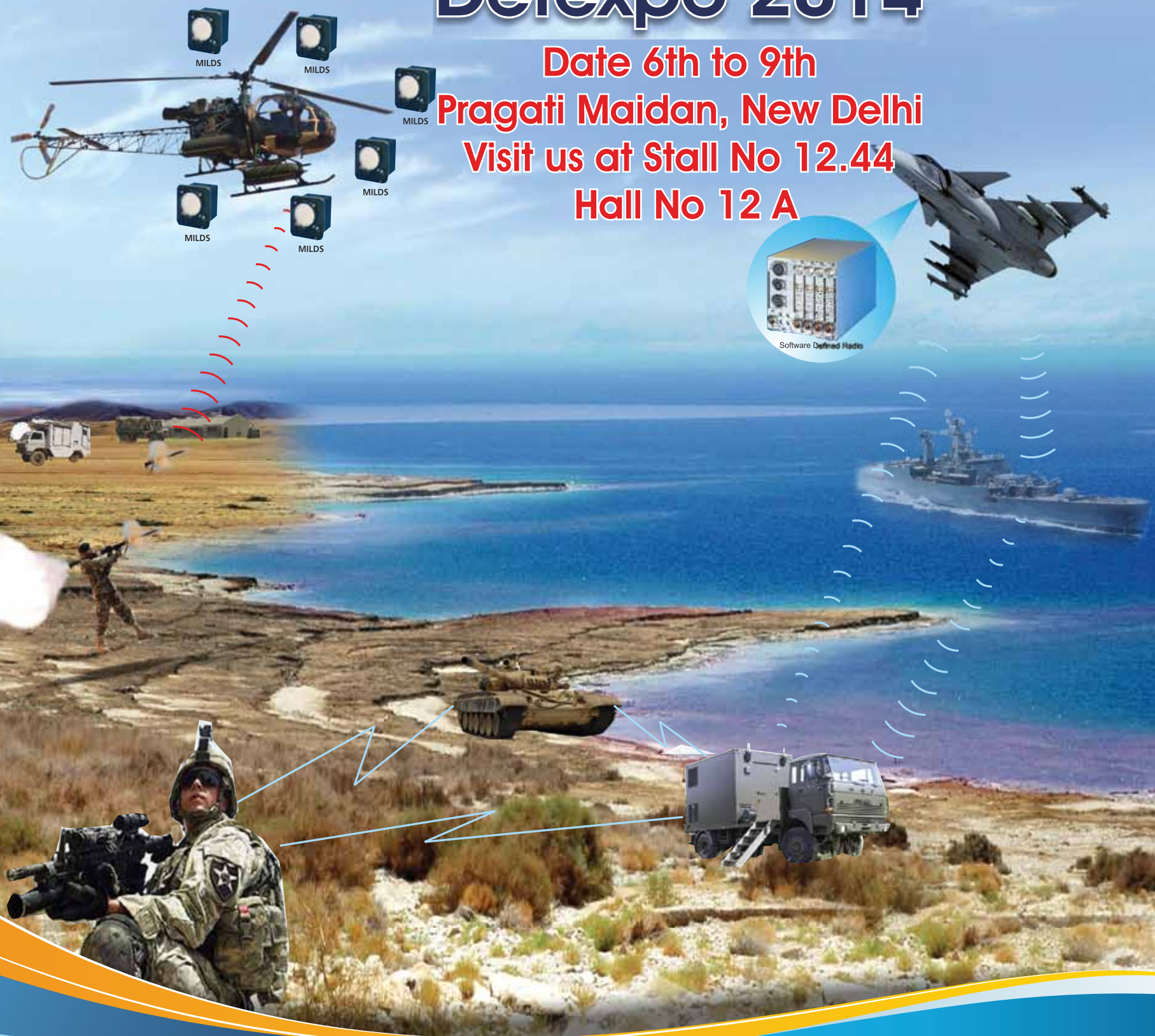
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India is a Strategic Market for Rafael: Yedida Yaari

Rafael Advanced Defense Systems Limited develops and produces state-of-the-art defence systems for the Israel Defense Forces (IDF) and Israel's defence system. The company provides innovative solutions on the technological cutting edge from underwater, naval, land and air through space systems. Here in an interview with *SP's ShowNews*, the CEO Rafael, **Yedida Yaari** spells out the roadmap of Rafael.

SP's ShowNews (SP's): As the second largest defence company in Israel, what percentage of your revenues are accounted from within country sales?

Yedida Yaari (Yaari): In 2012, 47 per cent of Rafael's sales were domestic. Over the years, Rafael has developed systems for every branch of the IDF. These systems are based on control of a wide range of technologies and extensive familiarity with the operative needs of the IDF. Rafael's products strengthen the Israel Defence Forces (IDF) qualitative edge, and most systems have been battlefield proven.

SP's: Of your international sales, which region/markets are you focusing on and why?

Yaari: Rafael offers a diverse and unique variety of cutting-edge solutions that can be tailored to a wide spectrum of our customer's operational requirements. Various global developments that have taken place in recent years have naturally affected our marketing strategy and focus, and have also strengthened our position as a provider of 'system of systems', comprehensive solutions that can be easily adapted to users' legacy systems. Such, for example, is the growing challenge of maintaining homeland security and dealing with domestic and cross-border threats in various regions around the world. One of the most challenging threats is attacks on critical assets and strategic infrastructure. Many countries, all over the world, are faced with this growing threat.

Rafael's solutions have been instrumental in combat performance around the world, serving the US, NATO, Europe, Asian, Australian and other forces. These include our vehicle armour, which has saved thousands of lives in combat in Iraq and Afghanistan, our Spike missiles, which have been sold to more than 20 countries, having delivered more than 21,000 missiles and fired more than 3,000 in tests and in combat. Rafael's airborne Litening navigation and attack pod has had remarkable success by a number of air forces who have noted its central role in peace-keeping and combat missions over the skies of places like Afghanistan and Libya. Rafael is one of the leading air-to-air and missile defence system houses in the world. Rafael's combat-proven aerial missiles include the Python-5 and Derby missiles, considered today the most advanced air-to-air missiles. These missiles have an air defence application – SPYDER – which provides excellent protection of valuable assets, as well as first-class defence for forces located in the combat area. SPYDER missiles have full commonality with the air-to-air missile version.

In 2014 we also plan to continue making substantial investment in R&D and capitalise on our proven operational success in the areas of air defence, active protection for armoured vehicles, critical asset protection and more. One of our main goals is to continue working with our local partners and provide tailor-made, end-to-end solutions, based on solutions already developed, and other solutions we are currently working on. One of our strategies is to position ourselves as a vendor of complete systems, rather than separate individual products, all the while adapting our solutions to customer's legacy systems.

SP's: Could you outline your presence in India and what promise does India hold for Rafael?

Yaari: India is a strategic market for Rafael. We are constantly seeking new partnerships and joint ventures with Indian companies for cooperation that will help drive forward our mutual ability to address local needs and operational requirements. We are engaged in joint ventures and partnerships with local Indian industries and are in constant search to expand our activities in the country, in cooperation with the DRDO, in order to better address local needs and requirements. Over the years, Rafael has established subsidiaries in different countries that play an important role in Rafael's M&A strategy and marketing activities around the world. We plan to continue making substantial investment in R&D and capitalise on our proven operational success in the areas of air defence, active protection for armoured vehicles, critical asset protection and more. This cooperation has proven to be productive and has had a substantial contribution to the development of advanced technologies that have played a significant role in securing the military advantage that both countries in dealing with a wide variety of threats that they face.

SP's: What are the main products and solutions you think will fit India's defence requirements and what competitive edge do you hold?

Yaari: Our strategy has for a long time called for development of precise, proportionate and discriminate systems that allow forces to carry out missions effectively, efficiently and economically. Systems such as Spike, Trophy, Iron Dome, and David's Sling, which recently completed its first full system interception test successfully, are just a few examples of such breakthroughs. Laser applications and CIED capabilities will also serve a main role in any futuristic combat scenario. Rafael is a growing company and is expected to continue to grow and to provide its customers in Israel and in other countries with systems that can address the challenges of the various battle arenas they are engaged in.

Rafael offers a full range of air defence systems to ensure efficient responses against all types of airborne threats, including aircraft, helicopters, short- to long-range missiles and rockets. Rafael air defence solutions meet the requirements of the army, air force and navy. The systems can be integrated, coordinated and operated by tri-forces to provide comprehensive interoperability and interchangeability.

Rafael's exceptional capabilities are a result of more than 65 years of development efforts by outstanding people and by a culture of striving-without-compromise to meet the company's commitment to customers in Israel and abroad.

SP's: What do you think about the offset policy in India and how are you working on this requirement?

Yaari: We are constantly seeking new opportunities for cooperation and partnerships with industries in India. Such initiatives will provide an added value both to the Indian companies, as well as to the various branches of the Indian military. At the same time, we are constantly evaluating different ways of meeting local offset requirements that have been set by the Indian authorities. •





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ShinMaywa's US-2 Top on India's Agenda

Media reports indicate that India and Japan are discussing signing an Inter-Governmental Agreement (IGA) to cooperate on ShinMaywa's offering of utility seaplane- mark II (US-2), similar to the IGA it has entered with Russia to co-develop a fifth-generation fighter. An IGA recognises the strategic importance of a procurement programme, and takes it out of the purview of the restrictive Defence Procurement Procedure.

India and Japan formed a Joint Working Group to explore modality for the cooperation on the US-2 amphibian aircraft. **Kanji Ishimaru**, the Managing Director of ShinMaywa Industries India Pvt Ltd and Director ShinMaywa Industries Ltd, Japan, said that the US-2 is a unique aircraft and the only 'in-service' open sea capable amphibian aircraft with state-of-the-art equipment.



SP's ShowNews (SP's): Could you update on the proposal for requirement of an amphibious aircraft for the Indian Navy?

Kanji Ishimaru (Ishimaru): Since the request for information (RFI) was issued and we responded, ShinMaywa has commenced the process of intraocular pressure (IOP) surveillance to finalise our potential IOP partner. We have also had many meetings with Government of India officials, Indian Navy, Indian Air Force and the Indian Coast Guard. Our experience has been very good till now and there is clearly a very good appreciation of the US-2 unique capabilities and how usefully it can conduct a variety of difficult missions. The US-2 features of military certification for sustained operations in Sea State 5, shortest take-off and landing distances, very long-range operations, good payload and high transit speeds are unmatched in the world. Combine this with Japanese technology, customer support and quality standards, we know that the US-2 is second to none.

SP's: Subsequent to the visit of the Indian Prime Minister Dr. Manmohan Singh last year to Japan, a Joint Working Group was set up to work out modalities for induction of the amphibious aircraft. Could you indicate the progress made by the group?

Ishimaru: The JWG has been established and preliminary meeting of the subcommittee was held in November 2013. Therefore, we expect that the progress of JWG would be discussed as part of the agenda during the next summit meeting. ShinMaywa Japan is also part of the JWG.

SP's: What kind of transfer of technology (ToT) are you envisaging to accomplish with this contract? Would it help build the Indian aviation industry and bring in capabilities that the nation does not have as yet?

Ishimaru: The Indian aviation private sector doesn't have enough capability and experience at the present moment in aircraft manufacturing. So we have to really partner with Indian industry to build the required capability, develop the right skill sets, imbibe highest quality and work ethics and provide mentoring to our IOP to become a world-class company. Especially, for an aircraft as complicated as the US-2, it might take us a little while and the process has to be gradual but we are fully confident that if we have a chance we can help

to transform the Indian aircraft industry just as Suzuki did to the automobile sector. We are also looking at maintenance, repair and overhaul for the aircraft in India, foreign direct investment and sourcing from a large number of small and medium enterprises (SMEs) and in addition, we also have an extremely interesting plan towards creating an impact towards genuine capability building in the country in aeronautical engineering. Discussions are on with certain institutions regarding the same. Our plans are not 'one-off sale' but we are completely committed to partner with India for a long-term high-technology relationship.

SP's: Could you highlight some of the features of US-2i and how it fits the requirement of the Indian Navy?

Ishimaru: The modern amphibious aircraft is a veritable force multiplier since they fulfil a multitude of missions in a single platform. Unlike helicopters and aircraft, amphibious aircraft can land at the location and enforce both the will and the law of the country and thus are a platform of choice for all benign and constabulary missions of navies. The US-2 is a unique aircraft and the only 'in-service' open sea capable amphibian aircraft with state-of-the-art equipment, very rough sea operations and riverine/lake landing capability, short take-off and landing features, long endurance and extended radius of operations with large payload capacity. With such unique features, we consider the US-2 to be the most effective platform to carry out benign missions such as search and rescue, CASEVAC, humanitarian relief and disaster management, and 'constabulary' missions such as extended exclusive economic zone surveillance and maritime domain awareness missions of the Indian Navy to maintain effective and economic good order at sea. In addition, the US-2 is extremely useful for strengthening the safety and security of sea lines of communication, long-range fleet support and island/offshore assets (both overseas and coastal) support functions. These missions when combined in a single multi-modal platform such as the US-2 can achieve for India a resounding success in public diplomacy and in earning the precious goodwill of nations of the Indian Ocean region commensurate with its identity as a responsible rising power. •

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Elbit Systems Range of Cutting Edge Solutions for Future Battlefield



Elbit Systems is a world leading provider of innovative, cutting-edge, battle-proven solutions for all sectors of the defence market. At Booth 11.24A it is showcasing core technologies in various fields of its activities: unmanned aircraft solutions (UAS), helicopters solutions, intelligence, military communications systems and radios, future soldier solutions and solutions for armoured fighting vehicles.

As a leading provider of high performance turnkey of unmanned aircraft systems (UAS) solutions including advanced air vehicles, ground control stations and intelligence management centres, Elbit Systems focus is on Hermes 900, the next-generation medium altitude long endurance (MALE) UAS featuring multi-mission, multi-payload capabilities with class leading payload carrying capacity.

In the maritime configuration, the Hermes 900's payloads' suite includes maritime surveillance radar, AIS, electro-optical multi-sensor payload and electronic surveillance systems, up to 350 kg. It has the endurance to cover vast ocean areas, and has redundant LOS and satellite communications links and radio relay, enabling the operator to 'talk through' to vessels at sea. The aerodynamic efficiency of the Hermes 900 enables frequent changes in flight profiles, enabling visual identification of vessels at sea in addition to the ISAR capability provided by the radar. Satellite communication enables it to fly to mission areas at extended ranges as far as 1,000 nautical miles from shore.

Recognising the extraordinary challenge of monitoring the Indian exclusive economic zones (EEZs) and vast shoreline, Elbit Systems has teamed with Windward Ltd. – in order to offer a unique solution to the India. MarInt, Windward's proprietary satellite-based maritime analytics system is capable of covering any area of interest, delivering insightful maritime domain awareness with diverse applications such as EEZ monitoring, illegal fishery monitoring, regional traffic analysis and port traffic management.

For the first time in Defexpo, the company is presenting in real-size the Hermes 450 which is the backbone of the Israel Defense Forces' UAS fleet. It is a high performance, deployable, mature, reliable, high capacity, long endurance, multi-payload multi-role tactical UAS. It is also presenting the Hermes 90— an expeditionary high performance, low cost, tactical UAS, affordable and runway independent, ideal for manoeuvring forces, combining the performance of a tactical UAS with the robustness and mobility of mini-UAS to provide forces with high end sensor capabilities.

Designed to meet the full range of UAS tactical and strategic mission requirements, SIGINT Payloads for UAS include: EMERALD (AES-210), SkyFix and SKYJAM

In the field of Military Communications Systems and Radios, Elbit Systems' C4I software solutions for the infantry, together with decades of com-

munications experience accumulated by Tadiran Communications, offers extensive, battle-proven expertise for the most intense combat scenarios.

The Dominator-Light Dismounted (LD) is a soldier centric solution, based on the vast experience accumulated by the Dominator IICS solution, geared specifically for the tactical dismounted infantry soldier and Special Forces. Enabling full situational awareness via network-integrated information systems, this unique solution provides superior mobility due to its reduced size, weight and power (SWaP). The extremely lightweight Dominator-LD is the ultimate command and control solution for the individual soldier level.

Dominator-LD is comprised of Elbit Systems' RAPTOR rugged, all-in-one wearable computing unit, the TORC2H –D command and control application and the highly advanced Tadiran PNR-1000A, a compact, lightweight, personal network radio. An add-on capability for a comprehensive on-the-move situational awareness picture is the JS Eyepiece hand-held display unit. The new solution includes a load cartridge system for the fighting soldier, designed based on years of experience and lessons learned in fielding digital soldier systems in operational environments.

As a part of the Dominator-Light Dismounted solution, will be presented advanced electro-optic systems, as the CORAL-CR; hand-held 3-5 µm FPA thermal imaging camera with continuous optical zoom and the addition of an integral digital compass, GPS receiver

and a laser rangefinder.

Elbit Systems Land and C4I is a pioneer in combat vehicle integrated systems and a supplier of over 7,000 systems and subsystems for new main battle tanks (MBTs), light armoured vehicles and upgrade programmes worldwide.

One of the solutions for armoured fighting vehicles that is on display is EoShield — a vehicle IR countermeasures system that provides "soft protection" against anti-tank ground missiles. The system provides a 360-degree protection shield for a wide variety of ground platforms.

Elbit System-Kinetics will showcase the auxiliary power unit (APU) for MBTs and AFVs, which improves the crew's performance and safety by reducing fatigue and minimizing exposure to noise, heat and vibrations, as well as air-conditioning (A/C) Systems – light weight, compact A/C, offers digital control and communication connectivity to external control systems, with modularly designed to eliminate the need for designated configurations.

In the field of Electronic and Information Warfare as well as intelligence and C3 systems, a world leader for over four decades, Elbit Systems EW and SIGINT Elisra is presenting for the first time in Defexpo the miniature reactive jammer (MRJ), a new EW system that jams, remote controlled improvised explosive devices (RCIEDs) activated against armoured and VIP vehicles. The system, operates in high frequency ranges, is suitable for protection of any vehicular platform.

With its comprehensive airborne systems capabilities, the company can provide a single sensor or an entire cockpit avionic suite. As far as Helicopter solutions, Elbit Systems offers its unique MUSIC (multi-spectral IR countermeasures) family — DIRCM (directed IR countermeasures) solutions for protecting aircraft against heat seeking ground to air missiles. MUSIC's family of solutions provides aircraft with optimum protection against MANPADs. The heart of MUSIC is an innovative laser technology, which causes the system to emit a narrow laser beam towards an approaching missile, jamming its guidance system.

Unified self-protection suite for fighter aircraft includes the most advanced multi-spectral DAS and ESM capabilities in a single LRU, delivering the highest DF accuracy, identification, and location of received signals, with very high probability of intercept (POI) and enabling swift response.

Brightnite is a lightweight compact, cost-effective sensor, enables a new level of operational flight. It maximizes the ability to fly undetected, in all night and low-visibility conditions. Brightnite transmits high-resolution video to the helmet-mounted display (HMD), allowing the pilot to fly in a head-up, eyes-on position. •

Modernisation is BAE Systems' Mantra

World's lightest 155mm 39-calibre towed howitzer and fully automated 127mm 54-calibre naval gun system on show

BAE Systems' participation is anchored in a single mantra – the Company's continued commitment to partner with the Government in its journey of military modernisation through technology and capability sharing with the domestic defence industrial base.

The company's showcase this year is a broad span of State-of-the-art capabilities in towed and self-propelled artillery and its fire control systems, naval gun systems, ammunition, military communications systems, geospatial exploitation products, wheeled and light armoured vehicles, and helmet mounted displays.

Center stage in the BAE Systems stand are the M777 ultra-light field howitzer and Mk45 Naval Gun System. The company has been supporting discussions between the Governments of India and the United States for a potential foreign military sale (FMS) of this revolutionary howitzer that is highly portable by land, sea and air and features a minimal logistical footprint alongside maximum reliability. The Mk45 is the most compact 5-inch (127mm) fully automated naval gun in the world with a successful and proven track record of service in the naval fleets of Australia, Denmark, Greece, New Zealand, Spain, Thailand and Turkey and is co-produced indigenously in South Korea and Japan.

The stand has on display the Archer 155mm FH 77 BW L52 self-propelled field howitzer that can operate autonomously in tandem with today's command and control systems. Adding firepower will be the LEMUR remotely-controlled weapon systems (RCWS) and electro-optical sight for land and sea application. A wide range of munitions is on display including 120mm Tk HESH L31A7 and 120mm Tk charge propelling L3A2 amongst others.

The Hawk 132 advanced jet trainer (AJT), of which India is the largest operator with 123 aircraft ordered to date by the Indian Air Force (106) and the Indian Navy (17), is on show. The Indian Navy recently inducted the first batch of Hawk Advanced Jet Trainers, becoming the third naval operator of the Hawk along with the US Navy and the Royal Navy. BAeHAL, the engineering and business solutions services joint venture with the Hindustan Aeronautics Limited.



Also on-stand is the new Q-Warrior helmet-mounted display (HMD) for the dismounted soldier and Q-Sight HMD for the new-age pilot, both providing mission-critical situational awareness. Adding muscle will be the Striker helmet for both fixed- and rotary-wing platforms. The display of the RG32 LTV and RG34 exhibits underlines BAE Systems' flagship capabilities and technology in light armoured vehicles for potential partnerships with the Indian industry. Expert demonstration of Geospatial Exploitation Products (GXP) is another highlight. •

BAE Systems appoints John Brosnan as Managing Director of India operations



BAE Systems has named John Brosnan Managing Director of the Company's India operations with effect from January 2014. Dean McCumiskey who has successfully completed his tenure leading the company's India presence will be taking on a new assignment within BAE Systems. Further, Mark Simpkins has been appointed Vice President & General Manager for India and will lead the Company's business development activities in the country. •



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HAL to Focus also on Civil, UAV Programmes

Defence public sector undertaking (DPSU), Hindustan Aeronautics Limited (HAL), is on the threshold of expanding its businesses majorly, considering the opportunities that exist not just in the defence sector but also civilian programmes. The year which went by has been fruitful, while the company reiterates its commitment to enhancing its performance. The company registered a sales turnover of ₹14,324 crore in 2012-13 with profit before tax of ₹3,497 crore, a growth of 5 per cent. Herewith are the excerpts of the interview with the Chairman and Managing Director, **R.K.Tyagi**.



SP's ShowNews (SP's): HAL registered some remarkable achievements in 2013. What is the outlook for 2014?

R.K.Tyagi (Tyagi): The focus for 2014 will be on application of learnings from the initiatives that were undertaken in 2013. Standing by the core spirit of customer focus and commitment, HAL would like to continuously improve its service levels for customers. Given the challenging economic conditions, innovation will be an essential ingredient for anything and everything that HAL does.

HAL will be diversifying into civil aviation in the coming year as government has mandated it to lead civil aircraft development in the country. Further in line with HAL's diversification strategy, an action plan for a special purpose vehicle (SPV) for civil aircraft; maintenance, repair and overhaul; starting airport operations at Nasik/Bengaluru; civil helicopters and UAVs have been developed and these plans will be taken forward. These will be very important revenue streams in times to come. HAL will dedicate the year 2014 as the year of ICQ (integrity, customer focus and quality).

SP's: Could you outline some of the major achievements of HAL in 2013?

Tyagi: There have been several major achievements. The most important was on December 20, 2013, when the Defence Minister A.K. Antony handed over the "Release to Service Documents" of our very own indigenous light combat aircraft (LCA)-Tejas to the Chief of Air Staff Air Chief Marshal N.A.K. Browne. This event has paved way for entry of Tejas into operational service of defence forces. HAL has worked with others to see that this dream for India comes true. With this feat India joins the elite club of very few nations to have this kind of defence capability and HAL now sets in the manufacturing mode for Tejas. Earlier in November, the Indian Navy inducted the first fleet of Hawk aircraft manufactured by HAL.

SP's: The advanced light helicopter (ALH) Dhruv has had some spectacular operational successes. Could you highlight some of them?

Tyagi: We achieved a landmark when on October 18, 2013, HAL-built Dhruv, advanced light helicopter, completed 1,00,000 hours of flying.

Importantly, it performed effectively in dropping paratroopers and evacuating stranded people during the Operation Raahat in the aftermath of flash floods in Uttarakhand. Dhruv helicopters pressed into service by the Indian Army and the Indian Air Force proved their mettle in carrying out rescue and relief operations in some of the most inaccessible areas. The indigenised pride – Dhruv helped relief workers to provide food and medicines to remote parts of Uttarakhand.

On December 14 last, the Indian Navy handed over a Dhruv helicopter to Maldives. Prior to this two Dhruv helicopters played an important role in

Nepal in smooth conduct of elections there.

SP's: What has been HAL's contribution in the Mars Mission programme of the Indian Space Research Organisation (ISRO)?

Tyagi: HAL is proud to have contributed to this mission as well as to other important missions by manufacturing all the satellite structures launched till date by ISRO.

SP's: Has the R&D spend gone up in HAL?

Tyagi: R&D remained under focus during the year 2013. HAL filed 225 patents and established Chairs at Indian Institutes of Technology at Kanpur, Roorkee and Chennai. As an important strategic move 10 R&D centres of the company were brought under the ambit of the Committee of Institutional Network (COIN). We have also decided to create an R&D corpus fund by earmarking one-tenth of the annual profits for taking up advanced and applied research in the aerospace domain.

SP's: Which are the key projects that HAL is now focusing on?

Tyagi: The company has chalked out effective action plans for its projects HTT40, FGFA, MTA, MMRC, UAVs and 25 KN aeroengine.

SP's: There has been some criticism on timely deliveries and customer satisfaction. What measures have been taken to correct them?

Tyagi: The company's focus is on quality, customer satisfaction, timely deliveries and indigenisation. The year 2013-14 is now specially dedicated for enhanced quality.

HAL has initiated vendor meet, signed a memorandum of understanding with Transparency International, and is strengthening vendor base, employee survey and competency mapping and sector skill council in aerospace and aviation sector. A batch of 285 management trainees joined HAL family. Keeping in line with the highest standards of speed, transparency and governance, the results of the recruitment were declared within 45 hours of personal interview (98,000 plus aspirants took the written test).

SP's: HAL has won several awards in 2013. Could you list some of them?

Tyagi: The Department of Public Enterprises (DPE) granted "Excellent" rating to HAL for its performance during 2012-13. Also during the year, HAL has bagged the "SCOPE Award for Excellence and Outstanding Contribution to the Public Sector Management – Institutional Category-I for 2011-12" and the "IEI Industry Excellence Award 2013" of the Indian Institute of Engineers. Apart from this, HAL also bagged various other awards during the year for its outstanding performance in various areas. •

DSM Dyneema launches Dyneema Force Multiplier Technology for life protection

Revolutionary solution for soft and hard ballistic armor enables manufacturers to meet current and future India defence demands for enhanced protection and coverage while minimising weight

DSM Dyneema, the manufacturer of ultra high molecular weight polyethylene (UHMwPE) fiber, branded as Dyneema, and world leader in life protection materials and high performance fibers, introduced its new innovation platform Dyneema Force Multiplier Technology to the Indian market at Defexpo 2014. This new breakthrough innovation platform delivers products for use in soft and hard ballistic armor addresses increasing demands in India's defence sector, including requirements for a higher level of protection and expanded protection area, as well as the adoption of the National Institute of Justice (NIJ).06 standard – which are intensifying the need to reduce the weight of protective gear.

Built on DSM Dyneema's Radical Innovation platform, Dyneema Force Multiplier Technology delivers products with a unique combination of exceptional ballistic performance and the lightest weight and lowest profile of any ballistic material currently on the market. Depending on the protection level required for the armor application, it can provide up to 30 per cent weight reduction.

"With growing requirements for uncompromising ballistic protection and armor weight reduction in soldier modernisation programs worldwide, including India, the industry is looking towards new material technologies that can deliver significant improvements," said Shitij Chabba, Global Segment Director, Life Protection. "Our new Dyneema Force Multiplier Technology can help India meet its defence needs by enabling manufacturers to create innovative next-generation designs, increase protection without adding weight or bulk, and optimise usability. We strongly believe that this advanced innovation platform will define future standards in life protection, including soldier modernisation."

MEETING INDIA'S NEED FOR LIGHTER LIFE PROTECTION

Several important factors are contributing to the need for lightweight life protection solutions. First, increased levels of ballistic protection against stronger threats such as the 7.62 x 39mm AK47 Kirkee and 7.62 x 51mm SLR ammunitions call for significantly higher levels of protection that traditionally add weight. Second, the industry is looking towards more/extended protection coverage for the body which can also add weight and even impede movement. Finally, as India shifts to the NIJ.06 standard for protective vests, compliance can lead to less flexible designs as well.

Dyneema Force Multiplier Technology, provides top ballistic performance combined with light weight and flexibility for enhanced comfort and agility for both military and law enforcement personnel. Also, it provides greater range, agility and capacity for vehicles, while providing extreme protection.

"The introduction of Dyneema Force Multiplier Technology will enhance India's defence sector with a new innovative dimension to meet their current and future requirements, and set new ballistic protection standards for the Indian defence market," said Nicole Ng, Marketing Manager, Life Protection, Asia Pacific.

DSM Dyneema's new Asia Pacific Technical Center in Singapore is well positioned to support needs of customers in India for lightweight, high-performance composite armor solutions with Dyneema. The centre offers extensive ballistic testing capability for evaluating and validating the performance of personal and vehicle armor concepts and applications made with Dyneema.

DSM Dyneema is at Booth number 11.17.1 •

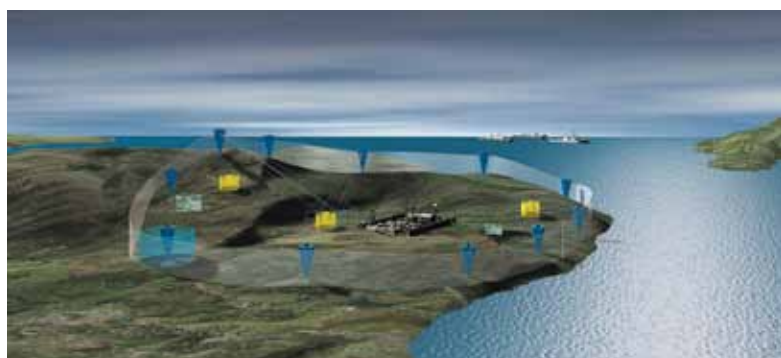


**Colt M4 Commando®
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Model R0943**

Enhanced firepower, maneuverability and rapid response play a major role in modern warfare. Colt's M4 Commando® CQB Carbine Model R0943 was designed to the exacting specifications of the Indian Army. It is the weapon of choice when the exploitation of firepower capability in confined spaces is required and where lightweight mobility, speed and violence of action rule. With its 9.9" barrel, the M4 Commando® CQB Carbine Model R0943 can be comfortably carried, yet instantly deliver the type of firepower required to outmatch combatants in a wide range of combat missions. Its one-piece upper receiver provides a true free-floating barrel for increased precision and flexibility when using electro-optical and optical aiming devices. For more information, contact the Colt International Sales Team at +1-860-244-1392. Alternate configurations available upon request.

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Future Watch: Automated Area Surveillance from Rockwell Collins



Rockwell Collins Patrol Persistent Surveillance System delivers reliable, flexible and cost-effective real-time imaging, acoustic and seismic over-watch for fixed and irregular locations.

Today, the responsibility of providing surveillance for a fixed facility or a remote field base is more challenging than ever. Traditional foot patrols are often too dangerous and fixed cameras are ill fitted for remote locations.

A safer, more capable solution has been demonstrated by Rockwell Collins' new-generation Patrol Persistent Surveillance System (PPSS).

As Rockwell Collins' Manager, Government Systems Sales, Australia, Sonny Foster explained, "The automated surveillance capabilities of the PPSS gives a single operator the ability to monitor an entire parameter 24/365 in any weather," he said.

The PPSS is made up of a meshed network of wireless, low-cost ground acoustic sensors and video cameras. Once positioned, each battery-operated Unattended Ground Sensor (UGS) will autonomously monitor for sound and vibration along the set parameter line.

"Sensors and cameras can be easily added to meet the needs of an irregular area," Foster said. "The network automatically recognises the new sen-

sors, so there is no need for manual system reconfiguration."

As a security precaution, should an intruder remove a UGS unit it will send an alert, while its built-in GPS will allow the operator to track its movement.

THE TREES HAVE EYES

One of the key differentiators found in the Rockwell Collins PPSS is the integration of day/night cameras and laser range finders mounted on pan/tilt heads.

When a UGS picks up movement, it has very sophisticated algorithms that are clever enough to tell the difference between people walking and animals," Foster said. "Should it determine the threat is real, the unit instantly sends a signal to the operator and to the nearest camera directing it to slew towards that target.

"The operator can then zoom in on the target with a higher-resolution camera for instant identification and verification," he said. "This capability enables a quicker response to the immediate threat and greatly reduces instances of false alerts.

"With the available long-range capability, the camera can cover up to 100-square kilometres, giving the operator an excellent view of the situation," he added. "The operator also has the benefit of using the system's information fusion display to record the video and integrate it with maps and other critical data regarding the intruder's activities."

FLEXIBILITY IS THE MOST EFFECTIVE SURVEILLANCE TOOL

While the Patrol Persistent Surveillance System is undeniably capable, Foster said that one of its key benefits is its flexibility.

"With budgets as tight as they are, our customers really appreciate that this one system can be reconfigured to monitor individual entry ways or entire parameter areas just by adding additional sensors and cameras," Foster said. "The PPSS is a completely scalable and flexible solution delivering cost-effective perimeter surveillance at any location."

That cost-effectiveness and flexibility are two more reasons why the Australian Defence Force recently selected the Rockwell Collins PPSS. •

Boeing Showcases Advanced Products and Services

Boeing is showcasing a range of industry-leading aerospace and defence capabilities and the broad line-up of defence products and services are designed to meet India's security requirements.

"Our presence in India goes back over seven decades," said Pratyush Kumar, President Boeing India. "Today, we are proud that our products and services are contributing to India in a positive way, bringing modernisation and mission-readiness to its defence forces. We are here for the long-term to strengthen all aspects of the country's aerospace capabilities, well into the future."

Boeing's is featuring defence products and services of interest to India, including large-scale models, interactive displays, a mobile console for the P-8I maritime reconnaissance and anti-submarine warfare aircraft and a virtual mission board. Product models include the C-17 Globemaster III strategic airlifter, P-8I, AH-64D Apache attack helicopter, CH-47F Chinook heavy-lift transport helicopter, V-22 Osprey tiltrotor aircraft and unmanned aerial vehicles such as the ScanEagle.

Boeing is also demonstrating services and support capabilities through presentations and discussions on life cycle support tools, training, performance-based logistics, planning and forecasting and spare part management.

"India is an important 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 for India. "We look forward to highlighting the breadth and depth of our defence capabilities for the India market and meeting with customers and partners during the show." •

Tata in Defence

Tata companies have been associated with the Indian defence sector for over 60 years. With a strategic focus of increasing indigenous production through development and transfer of technology, they have achieved global quality and cost benchmarks for exports. For instance, their new aerospace and missile systems facilities in Hyderabad as well as their significant contributions to India's Integrated Guided Missile Development Programme through work on the Akash launchers for the Army and the Air Force and the Pinaka Rocket Launcher.

The group has partnered with the defence forces in the areas of weapon systems, command and control, and network-centric warfare including naval combat, air defence tactical communication, battlefield management systems and trusted compute platforms.

With its expertise in technology and project management and the effective utilisation of its wide range of competencies, the Tata group is well positioned to enter into virtually any area where the Ministry of Defence (MoD) wishes to build private sector capabilities. The group has increased its footprint in integrating and supplying systems of strategic importance in areas of mobility solutions, aerospace, missiles, radars, network-centric warfare enablers, electronic warfare systems, manned and unmanned platforms – land, aerial, marine and submarine, survivability and composite materials, integration of C4I (command, control, communications, computers, and intelligence), command and control systems for air defence and naval combat, battlefield transparency systems, information assurance and homeland security systems.

The Tata group's aim is to help build India's industrial base in defence in a manner that is complementary and integrated with the efforts of the Defence Research and Development Organisation (DRDO), Defence PSUs and Ordnance Factories, and addresses the objective of becoming a Lead Systems Integrator. •

First Indigenous 155/52 cal Gun from Kalyani Group

The Indian Gun Programme (IGP), one of Kalyani Group's star projects in the defence sector, is its key initiative in the field of artillery gun systems. Being developed under the aegis of Kalyani Strategic Systems Ltd, a group company of the Kalyani Group, it is the first indigenous 155/52 cal gun being developed in the country. Its uniqueness lies in the fact that it is hundred per cent designed and developed in-house, including the complete ordnance and carriage, which by itself is a big accomplishment for the Indian defence market.

As an end-to-end solution provider of artillery systems, Kalyani Group has developed this gun system by creating a synergy between its rich experience in the manufacturing and engineering domain and its thrust for innovation and excellence in all its endeavours.

Kalyani Group has provided a gun which not only meets the current required specifications, but is also futuristic in outlook and use. This will ensure that the solution remains valid and in service for a very long time, thereby proving to be cost and effort effective.

The Kalyani Group, led by their illustrious leader Baba Kalyani, takes pride in being at the forefront of globalising India and in making 'Made in India' a global brand in manufacturing industry. The endeavour now is to make the same true in the realm of artillery solutions through this ambitious Indian gun programme. •



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BEL is well positioned to address the upcoming defence and security business opportunities: S.K. Sharma

Established to meet the specialised electronic needs of the Indian defence services, the Bharat Electronics Limited has grown into a multi-product, multi-technology, multi-unit company servicing the needs of customers in diverse fields in India and abroad. During 2012-13, BEL recorded a turnover of ₹6,103 crore and the company has kept pace with technological advancement. Here in an interview with **SP's ShowNews**, the Chairman and Managing Director of BEL, **S.K.Sharma**, explains how the company is diversifying and consolidating.

SP's ShowNews (SP's): BEL has crossed the ₹6,000-crore turnover milestone. With the opening up of the defence sector and armed forces modernisation, what is the turnover target BEL is looking at by 2020?

Sharma: With private participation gaining momentum in defence business and increasing competition, BEL is facing several challenges requiring excellence in all areas of business including R&D, marketing, supply chain management, modernisation, project execution and talent development.

Also, with the enhanced thrust of the Government on indigenisation, BEL is looking at deeper engagement with DRDO and innovative ways to address the market requirements through suitable models like collaborative R&D with technology companies, PPP, Joint ventures and consortia.

BEL is well positioned to address the upcoming defence and security business opportunities and also will diversify into select non-defence areas. Based on the addressable business opportunity and projects in the pipeline we are aiming to achieve ₹10,000 crore sales turnover in about four years' time. A longer-term estimate would be much dependent on some of the large programmes taking shape and the proposed modernisation drive of the armed forces.

SP's: Which segments of the company will be the major revenue drivers in the years to come?

Sharma: The major business opportunities for growth will be in Weapon Systems, Next Generation AESA-based Radars, Electronic Warfare, Network Centric Systems, Electro-Optics and Offsets.

SP's: The export turnover of BEL decreased in 2012-13 from the previous year. What are the reasons for this and what is the trend for 2013-14?

Sharma: The decline in export sales during the year 2012-13 was mainly due to two reasons. One, the Low Level Transportable Radar (LLTR) energy system planned under offset programme was later considered as domestic sales and two, some of the products and systems planned for order acquisition and despatch did not materialise during that year.

BEL's export target for the year 2013-14 is \$40 million up 20 per cent from last year and we are making all efforts to achieve this target.

SP's: What is the size of the defence electronics market in India and how is BEL placed in the market?

Sharma: The production of strategic electronics in the country has been growing steadily to keep pace with the demand and has increased from ₹5,700 crore in 2007-08 to ₹9,000 crore (estimated) in 2012-13 and is projected to cross ₹10,000 crore during the current year.

The share of BEL in the Strategic Electronics sector for the year 2012-13 was about 57 per cent and is expected to increase in the coming years.

SP's: How much of it (defence electronics market) comes from indigenous sourcing?

Sharma: As per the report of the Working Group on Defence Equipment for the Twelfth Five Year Plan, on an average, indigenous outsourcing of DPSUs has been about 25 per cent of their turnover.

In the case of BEL, the indigenous content as a percentage of value of production for the year 2012-13 is about 60 per cent.

SP's: Could you indicate how BEL has benefited from offset obligations?



Sharma: Offsets have opened a new business opportunity for BEL. The offset business has been a learning experience for handling international contracts and streamlining of internal processes. It has also helped in the upgradation of our infrastructure to cater to the requirements of OEMs. It has enabled industrial cooperation for newer technologies with global OEMs; helped in forging new partnerships and in synergising internal quality system initiatives to meet the customer's requirements. It has also resulted in capability enhancement for avionics products/systems and an opportunity for new product development.

SP's: What is the progress on the joint venture with Thales on development of radars?

Sharma: Approval from the Foreign Investment Promotion Board (FIPB) for Foreign Direct Investment (FDI) by Thales and the Government's approval for the formation of the JVC have been obtained. The registration and incorporation of the Joint Venture Company is under way. We hope to establish the JVC in about six months' time.

SP's: Could you give an update on Akash Weapon system and the Battlefield Surveillance System (BSS), as to when they will be inducted?

Sharma: BEL is executing the Akash Weapon System orders from the Indian Air Force. Supply of the initial systems has been completed. These systems are progressively being inducted.

BEL is supplying Radars, Control Centres, Simulators and other support systems as well as carrying out the System Integration as part of its work-share of the Akash Weapon System for Army. User evaluation as per trial directives is in progress. Firing trials are scheduled in due course.

Operational requirements and functional aspects of Battlefield Surveillance System have been identified in association with the user. Application software development is under progress as per the stage-wise schedule. The first off production versions (Plains and Desert) is planned to be fielded during the year 2014-15.

SP's: BEL is expanding its non-defence business. How much does it account for in the total turnover presently? What kind of synergies has been developed between defence and non-defence businesses?

Sharma: Presently, the non-defence business accounts for 15 to 20 per cent of the total turnover of the company. In 2012-13, 15 per cent of BEL's turnover registered from non-defence businesses like Tablet PC, e-Census, Biometrics generation for National Population Register, Electronic Voting Machines and components for power switching, solar and medical electronics.

Leveraging its capabilities and strengths in the defence business, BEL is pursuing new business opportunities allied to its core business.

A separate group has been formed in the Bengaluru factory to address the Homeland Security (HLS) market. Products like X-Ray Baggage Inspection System (X-BIS), Under Carriage Vehicle Inspection System (UCVIS) and Video Analytic Software Modules which are required for HLS applications, have been developed in-house.

An integrated Security solution test bed is being established at our Bengaluru and Ghaziabad factories to showcase our capabilities. BEL has successfully executed a Campus Surveillance project for IAF in Bengaluru. BEL has also expressed its interest to participate in many HLS projects for Government/defence establishments. •

Atlas Elektronik Supplies Sonars to Thai Frigates

Atlas Elektronik GmbH has been commissioned by the Korean yard Dae-woo Shipbuilding & Marine Engineering (DSME) with the supply and integration of a bow sonar (ASO) as well as a low-frequency active towed array sonar (ACTAS) for a new frigate of the Royal Thai Navy. Delivery of the systems is planned to take place early in 2016.

Together, the two systems offer active and passive sonars for the detection, tracking and classification of underwater vehicles, such as submarines, torpedoes and unmanned underwater vehicles (UUV). In addition, these sonars are able to detect and classify small speedboats, divers or floating obstacles, e.g. containers or tethered mines.

The ASO bow sonar operates in the frequency range between 6 and 9 kHz and provides a surveillance radius of up to 15 kilometres around the ship. This makes it most suitable for the self-protection of the ship. The towed array sonar ACTAS operates in the low-frequency range from about 2 kHz and permits observation of the sea space at ranges considerably above 60 kilometres, depending on the propagation conditions of the water. This gives the sonar an operational range that by far exceeds that of radars and the weapons range of submarines. The system is therefore not only ideal for hunting submarines but also for the wide-area reconnaissance of surface combatants.

Both sonar systems represent state-of-the-art from Atlas Elektronik and, besides newly developed signal processing methods, offer a unified hardware design with the corresponding simplifications in servicing and support. •



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Nexter Systems New 6 x 6, TITUS

Nexter Systems, a European leader of land defence, recently unveiled its brand new armoured wheeled vehicle: TITUS, the versatile armoured vehicle of the 21st century. Continuing a famous long lineage of innovating systems, including Leclerc MBT, VBCI and CAESAR, all combat proven in many theatres of operation, Nexter Systems combined the best of its experience and technology in TITUS.

Through its unrivaled level of modularity based on combat missions kits, operational environment kits and a wide family of variants, TITUS is able to fulfill the full range of missions from Infantry transport to combat missions, combat support and combat service support functions, in any kind of type of commitments likely to occur in a hybrid conflict.

TITUS offers an exceptional mobility. Protection is also at the core of TITUS conception. The vehicle is wrapped up with a last generation modular armoured skin, providing a ballistic level 2 to level 4, mines level 4a and 4b, and IEDs blasts up to 150 kg, increased by the original Nexter SAFEPRO design. Furthermore, to allow the crew of two or three and the full strength squad up to 12 to last a long time on the ground, an important effort of human integration has been done by Nexter.

Firepower has not been neglected since TITUS can be equipped with any kind of remote control weapon station from 7.62mm to 20mm, and 40mm grenade launchers as well, depending on the level of threats and type of missions. TITUS is fully integrated within the C4I network through last generation vetronics. Nexter Battlefield Management System FINDERS provides a situational awareness, enhanced by a perimetric camera system, and reconnaissance robot (NERVA LG), allowing a safe dismounting. •



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Colt M4 Commando Built to Suit Indian Army's Specific Requirement

Colt Defense LLC, one of the world's leading designers, developers, and manufacturers of rifles and carbines, has recently unveiled its latest innovation in short barrel rifles. The Colt M4 Commando CQB carbine model R0943 was designed to the exacting specifications of the Indian Army and is Colt's entry in the Ministry of Defence's CQB Carbine Programme.

Based on Colt's M4 monolithic upper family of carbines (the advanced colt carbine monolithic receiver system, or ACC-M), this new M4 variant features an integrated Picatinny rail system which affords operators the ultimate in zero retention and increased precision and flexibility when swapping electro-optical and optical aiming devices, as well as other accessories, to suit the demands of dynamic engagement scenarios. In addition, ACC-M family provides a true free-floating barrel for enhanced accuracy.

Featuring a highly-maneuvrable 9.9" barrel, the M4 R0943 can be comfortably carried by a variety of soldier body-types and in a variety of environments, yet instantly deliver the type of firepower required to outmatch combatants in a wide range of combat missions. The one-piece upper receiver's locking front sight post helps not only with accidental front sight collapse due to contact with obstacles in a close quarters environment, but it also can be folded away to eliminate co-witnessing with after-market optics.

Enhanced firepower, manoeuvrability and rapid response play a major role in modern warfare. The Colt M4 Commando CQB carbine model R0943 is the weapon of choice when the exploitation of firepower capability in confined spaces is required and where lightweight mobility, speed and violence of action rule. •



Cochin Shipyard Delivers Third FPV to Indian Coast Guard



2010. ICGS Abhinav was delivered on January 13 2014. The first two ships were commissioned on December 13 and 31, 2013.

The FPV is a small vessel in terms of size compared to the large vessels that CSL has built, but it is very complex and extremely challenging to build. The ships with a length of 50 metres are designed to achieve speeds of 33 knots. The ship is extremely weight sensitive and CSL had to go in for weight reduction measures like making the superstructure of aluminium.

It is for the first time that Cochin Shipyard has undertaken fabrication of aluminium structures on such a scale. This was challenging but the CSL welding technologists and workers have mastered the techniques required to produce extremely high quality aluminium welds. It is a measure of the outstanding professionalism of the shipyard that weight control on this ship was exercised right through the build process and the difference between the design weight and actual weight was only about 2 tonnes, ie., a difference of less than one per cent. This has ensured that the designed speed was achieved on her very first outing at sea.

It also has a secondary role of providing communication link and escort convoys during hostilities and wartime. This ship propelled by water jets and powered by three main engines, each of capacity – 2,720 KW is built to the dual classification requirements of ABS and IRS.

Apart from the 20 FPVs for the ICG, the yard is also constructing the most prestigious warship of the nation, an indigenous aircraft carrier and two off-shore support vessels for International owners. •

Cochin Shipyard recently delivered 'Abhinav', the third of the fast patrol vessels (FPV) to the Indian Coast Guard. The contract for the construction of the 20 FPVs for the Indian Coast Guard was signed in October



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