

SHOW DAILY

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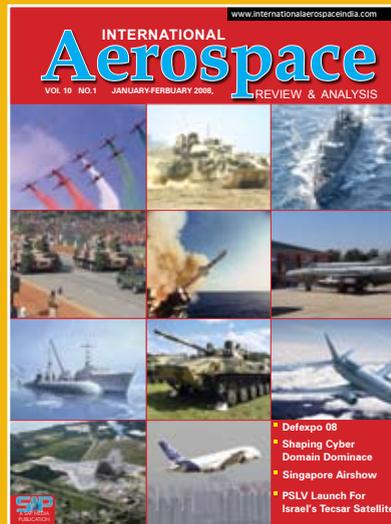
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defexpo 08



DAY ONE

SATURDAY, 16th FEBRUARY, 2008



INTERNATIONAL AEROSPACE

Record 273 global players showcase at Defexpo 2008

A record 273 defence manufacturers from 30 countries will be showcasing their varied portfolios at the Defexpo 2008 international exposition being held at New Delhi from Feb 16th to 19th.

202 domestic manufacturers will be vying for a share of the estimated Rs.155 billion that the Indian armed forces will spend over the next five years on their modernisation drive.

According to defence minister A K Antony, 'it is a matter of pride that Defexpo India has gained worldwide recognition in a short span since its maiden show in 1999. The



AK Antony
Defence Minister

vast experience of the DEO as organisers and the expertise of the CII as event manager will further propel the event towards new pinnacles of success and glory."

Spread over eight halls and 32,000 sq metres of open and

covered space, Defexpo 2008 will see the launch of a stunning 91 new products ranging from radars, to communications systems, torpedoes, anti-mine vehicles, unmanned aerial vehicles and combat clothing.

According to Secretary (defence production) Pradeep Kumar, 'Defexpo, now in its fifth edition, 'has been conceptualised to promote business activity in global land and naval systems'. He feels, 'the event allows the international defence industry to promote and showcase their products and services and also gives

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Offset Not Quite Set

There are not so quiet rumblings over India's defence offsets policy. Foreign arms majors and associated industries were hoping that clear policy guidelines would be announced at Defexpo-but the government has made it clear that clarity will only come post-April this year.

While the Defexpo was being seen as the ideal platform for the MoD to announce guidelines and changes to the current policy outlined in the Defence Procurement Policy of 2006-that is now unlikely.

DEGREE OF UNCERTAINTY

Under the offsets clause, 30 per cent of all defence deals worth over Rs.3 billion has to be reinvested in India's defence industry. With six global aerospace majors to submit by June Rs 21,000 crore worth of offsets proposals in the contract for supplying 126 Medium Multi-Role Combat Aircraft-the writing on the wall is unsettling for the moment. The offset obligation in this deal is 50 per cent.

One of the key contentions has been offset banking and technology transfer issues. While the MoD has indicated changes in the offering-there's nothing down in black and white so far.

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PM for Increased Naval Surveillance



Hon. Prime Minister Dr. Manmohan Singh
addressing the gathering

Prime Minister Dr Manmohan Singh addressed the IONS on 14th February in Vigyan Bhavan, and he spelt out the need for cooperation and surveillance in the Indian Ocean as the world's energy and trade and stability depended on this area which had vulnerable choke points. He also reminded all that the area was prone to the maximum natural disasters. The delegations after the presentation of papers over two

days retreated to Goa and then visit the Defexpo08. The invitees will mingle and mull over issues amongst each other as Mehta has suggested that the Symposium be a regular affair and a platform for consultation.

The response has been very heartening from the littoral as the Indian Ocean has gained prime importance in recent times. The Chief of Naval Staff Admiral Sureesh Mehta took the initiative early on last year as the predominant Navy in the region to plan and invite all the 31 Naval Chiefs of the Indian Ocean Region (IOR) including Pakistan, Iran, Egypt and France which is a riparian

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Record 273 global players showcase at.....

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Rao Inderjit Singh
Minister of State for
Defence Production

domestic manufacturers an opportunity to do so'.

'The Indian private sector is slowly acquiring strengths for defence

manufacturing and the defence public sector units are beginning to leverage this,' Kumar points out.

'We are also looking at exports and while these are currently only at Rs.500 crores (Rs.5 billion), we hope to see these rise as the Indian industry acquires cutting edge technology from around the world,' he says.

Welcoming the esteemed guests, exhibitors and participants, the minister of state for defence production Rao Inderjit

Singh, said, 'India is on an inexorable path of rapid economic growth, which has opened up new avenues of trade and investment. The Indian defence sector has also remained abreast with the trend liberalising defence procurement policies and by opening up to investment, joint ventures and technological tie-ups.'

And given the fast warming ties between New Delhi and Washington, it is not surprising that US companies should be making a beeline for the biennial exposition. A total of 46 American companies, the largest from any country, will be representing at the show.

They include giants like Boeing, Raytheon, Lockheed Martin, Northrop Grumman and Sikorsky besides the US defence department.

A major highlight of Defexpo 2008 will be the inclusion of 16 seminars 'to enable exhibitors



Pradeep Kumar
Secretary Defence
Production

make technology or product specific presentations to Indian defence establishments, R&D institutions, defence public sector undertakings, ordnance factories and to Indian industry',

which include telecom and IT companies,' Kumar points out.

The fourth India Defence Industry Summit is also being held during the event.

Meanwhile Britain is having a great presence at the Defexpo 2008 with 20 companies participating in the exhibition. The companies are demonstrating its industrial capabilities and technology to potential customers and partners in India and the wider region.

In addition, a British Army

demonstration area will showcase a range of equipment covering peacekeeping, border security and explosive ordnance disposal activities.

BAE Systems and Rolls Royce are among the major British companies participating at Defexpo 2008. The India-Britain defence co-operation goes back many years and there are currently many products of British origin in service with the Indian armed forces.

'With the support of the two governments, Indian and British companies are increasingly working together on a range of key equipment programmes from aircraft to electrical components,' a British High Commission statement said. These joint ventures and other collaborative activities are aimed at meeting the equipment requirements of India, UK and other countries.



PM for Increased Naval Surveillance

From Page 01

Indian Ocean state to a unique maiden initiative to address Maritime Issues in the Indian Ocean. Former Indian Chiefs of Naval Staff including Admiral Vishnu Bhagwat are special invitees presented papers and expressed their views on regional maritime concerns, ULCLOS and the way ahead for cooperation.

This maiden Symposium with the theme "Contemporary Transnational Challenges International Maritime Connectivities", aims to increase maritime co-operation among participating navies/ maritime agencies by providing a forum for discussion of maritime issues, both global and regional, and in the process generate a flow of information and opinion between naval professionals leading to common understanding and possible agreements on the way ahead. The guidelines provided in the Indian Maritime Doctrine issued by the Indian Navy lays emphasis on cooperation in the Indian Ocean for stability and security in the region.

The IOR extends from 20

degree East longitude to 147 degree East longitude and covers 73.6 million sq Kilometres. This region is the third largest water body on this planet and constitutes 20 per cent of the world's oceanic area. The importance of this region and its impact on the global maritime scenario can not be underscored for the world's trade and energy needs that transit the sea lanes and choke points of Lombok, Malacca, Bab El Mandab and Hormuz. As a part of its contribution towards consolidating the growing recognition of the importance of the Indian Ocean Region (IOR), the Indian Navy has taken the initiative and proposed setting-up of an inclusive and consultative regional forum, to be known as the Indian Ocean Naval Symposium (IONS).

Thirty-three countries (including India) have been identified as littoral nation states of the IOR. Navies and maritime security organizations (in respect of countries who do not have any formal Navy) of



these nation states shall form part of this Naval Symposium. The Symposium is also being widely attended by various think-tanks of the Ministry of Defence and the Ministry of External Affairs. The IN has offered to host the secretariat of the symposium.

The principal objectives envisaged for the IONS have been defined as follows:-

(a) To promote a shared understanding of the maritime issues facing the littoral states of the Indian Ocean and the formulation of a common set of strategies designed to enhance regional maritime security.

(b) To strengthen the capability of all littoral nation-states of

the Indian Ocean to address present and anticipated challenges to maritime security and stability.

(c) To establish and promote a variety of trans-national, maritime, cooperative-mechanisms designed to mitigate maritime security-concerns amongst nation-states of the Indian Ocean.

(d) To develop interoperability in terms of doctrines, procedures, organisational and logistic systems and operational processes, so as to promote the provision of speedy, responsive, and effective Humanitarian Assistance and Disaster-Relief (HADR) throughout the region.

-Ranjit B Rai

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Offset Not Quite Set

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POSTURE OF ASSURANCE

In an effort to boost confidence among the arms majors, however, an 'India Regional Offset Conference' was organized by the Confederation of Indian Industry (CII) along with the Defence Manufacturer's Association of UK (DMA) and the Global Offset and Counter trade Association (GOCA), just days ahead of Defexpo India 2008, in New Delhi. Representatives of the world's largest defence companies from 19 countries attended the conference.

India's offset policy for purchases of military hardware will boost the country's buying power to upgrade technology, improve infrastructure and make it part of the international defence supply system, the seminar was told. "India's offset policy will help equip our armed forces with sophisticated technology and strengthen the technology base of the Indian defence industry," Rao Inderjit Singh, Minister of State for Defence production, said.

Even as foreign delegates seemed to find the lack of policy clarity not very encouraging-the government was frank in indicating that positive steps were being taken and nothing should be read between the lines-or the lack of them. Optimists felt that the signs were at least pointing in the right direction.

And the right talk at least seems to be coming across. Addressing media persons ahead of Defexpo, Defence Production Secretary, Pradeep Kumar, has already said that proposed changes in the Defence Procurement Policy will be based on suggestions from companies which have or are obliged to meet offset obligations. Asked whether the government wanted to take steps to legalise arms agents and frame rules in the revised DPP, Kumar urged 'Please wait till April.'

On the delay in registering private industries as Rakshya Udyog Ratna to qualify them for defence offsets, he said the idea was opposed by defence public sector unions but consultation process was on.

Ultimately, whatever the changes being worked in, they will have to be approved from the highest offices in the government.

CIVILIAN OFFSET POLICY

Back at the offset conference, R. Gopalan, Additional Secretary, Department of Commerce, Ministry of Commerce and Industry, Government of India, also spoke about a civilian offset policy. He pointed out that more than 100 countries use counter trade, and it is a practical approach that will provide access to sophisticated technology, investment, and joint ventures. The World Trade organization (WTO) does not ban offsets, as long as there is no dumping, and it does not reduce competitiveness. He also warned that offset may increase the cost of procurement, and therefore there could be provision for exclusion of certain purchases.

The Indian offset policy is a simple policy with a liberal outlook, simple to understand and operate, according to Satyajet Rajan, Chairman, Defence Offset Facilitation Agency and Joint Secretary, Ministry of Defence, Government of India.

MUCH TO LEARN

It is an integral part of the defence procurement procedures announced in 2005 and revised in 2006. A "modest 30 per cent offset" and adequate freedom to choose the Indian partner, ensures 'market forces have a rightful place'. Offsets could also be fulfilled through FDI and technology transfer, and he expressed the view that technology transfer in research and development would provide a much needed fillip to the industry. He pointed out, however, that only one offset contract had been signed so far, and India had a great deal to learn.

An India Offset Infrastructure Fund was suggested by Ravi Parthasarathy, Executive Chairman, and Infrastructure easing and Financial Services Limited. Considering 'India's deep requirement for infrastructure, at about \$300-500 million", he suggested that con-



L to R: Rao Inderjit Singh, Minister of State for Defence Production; Lt. Gen S S Mehta, Director General, CII and Mr. Satish Kaura, Chairman of the CII Manufacturing Council and Chairman of the Samtel Group of Companies at CII Meeting on 'India Regional Offset Conference'.

tribution to such a fund could be accepted as mitigation of indirect offset liability.

One of the aims of the conference was to enable participants to increase their awareness of the practicalities of pursuing the MoD's business through offset fulfillment and the opportunities upcoming in the civil offset field.

LEVERAGING BUYING POWER

Don Brown, Chairman of the Asian Committee, Global Offset and Countertrade Association, mentioned the potential of offset policies, and also said that anti-trust and competition laws needed to be stringently followed.

In his opening remarks, Satish Kaura, Chairman of the CII Manufacturing Council, and Chairman of the Samtel Group of Companies, said that the culture of innovation had led to India's recent economic growth. This had been displayed particularly in the services sector. With the policy framework in place for entry of the private sector in offset, India can now leverage its buying power to upgrade technology through technology transfer.

Another advantage of offsets is that it will help the small and medium enterprises (SMEs) enter the sophisticated defence industry. He also called for a National Offset policy for

civilian industries. This could also be an opportunity, he said, and industry could learn and become part of the global defence supply chain.

In an interesting parallel of Malaysia's experience with offset policy, Dr Kogila Balakrishnan of that country's Ministry of Defence, said that in many ways India's ground reality was similar to that of Malaysia which had been in the offset business for 18 years now. She said Malaysia's industrial masterplan and its science and technology needs were carefully studied and factored into the offset policy which was developed. Emphasis was made on technological development. The bottomline in the policy's making was ultimately geared toward what the needs of Malaysia were, above all other concerns.

In his concluding remarks on India's offset practices, Lt Gen SS Mehta, Director General CII, said that we need to think of how we can position ourselves so that we become a manufacturing and technology power as well as an economic power, and offsets in the public and private sector had opened up new avenues of possibilities. But, he said, the definition of 'dual use' is important so that it does not become a roadblock. India, he said, could be a global manufacturing hub as well as a part of the global supply chain.

-Amitabh Joshi

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Shaping India's Air and Space Power In the 21st Century

The Air Power India 08 conference opened with a bang ahead of the 5th edition of the Defexpo on the 13th of this month. The first day of the conference was presided by *Admiral (Rtd) Walter F. Doran, President, Raytheon Asia* highlighting the importance of air dominance today.

The conference was inaugurated by India's highly decorated and only 5-star chief of the *Indian Air Force Marshal Arjan Singh*, who remarked that there has been tremendous innovation and progress in the field of aviation and the importance to integrate the Air Force, Army and the Navy to reduce casualties as well as the operational costs.

"Although the world has not witnessed any major wars after the World War II, countries continue to prepare for the same." The Marshal opined that some of the immediate global threats concerning forces today included insurgency and terrorism, which needed to be dealt swiftly and smartly. However he voiced that air power can only play a minimal role in the manner of conveyance in these situations.

"Whatever the medium, one thing is for sure that the primary objective should be to reduce the number of civilian casualties," he stated. Closing the inaugural speech Singh mentioned that the participation of the delegates proves the importance as well as its emergence of India as an economic power win the global arena. *Air Chief Marshal Fali Homi Major* voiced similar sentiments while addressing the delegates stating that this gathering was an unmistakable and inherent importance of India as a global player in the future. "It is undeniable that Asia is the new arena and global engine due to its economic importance, which means that India's interest have surpassed its boundaries."



Marshal Arjan Singh

Hence air power capability has become increasingly important and the fact that the IAF is a strategic, professional, powerful and proven force that should in any given circumstances be able to protect and punish the enemy he added.

F.H. Major stated that the IAF was on the threshold of transformation, which included a 3-pronged approach to

preserve, upgrade and acquire new and latest technologies into the future. "We need a collaborator and participative approach to facilitate mutual growth in the coming years. The future lies in building and nurturing the country's air power on all the resources surrounding it and our choices today will determine the future."

Air Vice-Marshal Professor R A Mason spoke about the scenarios of future wars and the important roles that air power might play, disputing the Marshal's opening remarks earlier. He mentioned that although the battleground of the future was uncertain, there was always an opportunity to identify them.

Some of the identifiable factors that might play an important role in the future that

"We need a collaborator and participative approach to facilitate mutual growth in the coming years. The future lies in building and nurturing the country's air power on all the resources surrounding it and our choices today will determine the future." - Air Chief Marshal F H Major

include regional cooperation, dispute amongst armed forces, the remainder of media as a weapon of war and the dominance of air power in wars.

He elucidated that just because the world had not witnessed a war since the past 50 years does not mean that they might not in the next 50 years. But he was quick to inform that the wars of the future might not be same as the past due to intervention and asymmetric responses, humanitarian considerations



Air-Chief Marshal Fali-Homi-Major

and political considerations. According to Mason air power will play a very important role at both, low as well as the higher end of the spectrum. Speaking about insurgency at the lower level as well as the higher level he mentioned, "Insurgents in any country will not have the financial base and industrial support to launch a powerful air attack, but the role of the air power will be similar in both situations of delivering surveillance, reconnaissance, precise attack, fire support and denial of sanctuary as well as concentration."

In conclusion Mason voiced that future warfare was uncertain but air power provided flexible options across the spectrum of operations while containing the enemy.

-Bhavya Desai

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Shift in US geo-political Scene Russia, China Alliance on Cards

If experts are to be believed then recent developments show that Russia and China are well on its way to forming an alliance to fulfill the latter's raw material requirement. This comes hot on the heels of the volatile economic situation between the US and China relationship.

Dr. Phillipa Malmgren, President, The Canonbury Group, who has also served as an advisor on international economic issues to George W. Bush during his presidential campaign, spoke about the geo-political situation between the US-China-Russia relationships on the sidelines of the Defexpo 2008.

She said that the shift in the US political leadership has led to the breakage of geo-political ties in recent times since the new government opines that the current situation in China is leading to a reduction in job opportunities in the US.

While on the other hand the vast economic manpower at China's disposal has resulted in a rise of manpower inflation. This surge in the country's all-round activities has increased China reserves, which are now



being estimated at around US\$ 1.5 trillion dollars. With the vast amount of reserves and a wide spectrum of opportunities, China has also recently revised its earlier plan of building 40 airports to 90 new airports in the country.

To add to China's woes, the recent development in the Indo-US relationship with the latter offering state-of-the-art military and aviation technology has created a lot of unrest amongst the top political brass in China.

It is believed that the trouble started brewing only recently with the anticipation that a change in government

will reduce bi-lateral trade between both China as well as India. While China has continued to maintain its secrecy on its activities with the recent blanking out the US satellite with its surveillance over the North Korea activities as well as the denial of providing access to Hong Kong through China.

Malmgren in her address also spoke briefly about the recent concerns as well as debate at the G7 summit as well as Economic Forum about the use of the Sovereign Fund. According to her the recent activities in the geo-political environment have placed increased importance on the investment on satellite guidance and surveillance systems. "Satellite Guidance Systems are going to be a priority in Air Power dominance in the future. This means that upgrading the air power capabilities of every nation will be important in the years to come."

On the other hand the US seems to be having its hands full with the reports that Russia has already commenced its Cold War activities in recent

times. With Associated Press reporting that the Russian bomber last week flew over the Nimitz twice, at a low altitude of about 2,000 feet, while another bomber circled about 58 miles out is an indication of its activities.

Apparently, the bombers got about 500 miles out from the Nimitz strike group -- which included the Pearl Harbour-based destroyer USS Chafee. Four F/A-18 Hornet fighters were launched from the Nimitz, which intercepted the Russian bombers about 50 miles south of the Nimitz.

The reports suggest that at least two Hornets trailed one of the bombers as it came in low over the Nimitz twice, while one or two of the other U.S. fighters followed the second bomber as it circled nearby.

This is the first time Russian Tu-95s, known as Bears, have flown over or interacted with a U.S. carrier since 2004. It is clear that Russia has revived its Cold War activities of long-range patrols by placing strategic bombers over the Atlantic, Pacific and Arctic oceans last August.

-Bhavya Desai

Phalcon Deal Under Probe?

India's Phalcon deal with Israel has hit turbulent weather before the flight touches down.

The Ministry of Defence has swung into action and asked its Defence attaché in Tel Aviv to probe allegations that kickbacks amounting to Rs 100 crores were paid to the NDA government in the \$1.1 bn Phalcon AWACS (airborne warning and control systems) deal. This was revealed in an exclusive story on TV channel, Headlines Today.

Sources say the Indian Embassy has responded, saying initial evidence points to irregularities. The man under the scanner is middleman Aharon Frankel-who is being investigated by Israeli authorities for

channelising kickbacks in the deal into India.

The MoD has asked for a detailed report on Frankel and his dealings. Reports say Israeli authorities are being approached for sharing of information.

Last month, a reputed Israeli newspaper, Haaretz, hinted at commissions being paid to an "agent" in the Phalcon deal that New Delhi signed with Israeli Aerospace Industries (IAI) in March 2004.

Reports say the agent, who was handling the marketing of IAI in Russia since the early 1990s, was instrumental in clinching a Phalcon deal with China in 1996-97. Under the exorbitant deal, in which the agent was "paid several million



dollars"; China was to get a Russian aircraft mounted with the Phalcon radar.

The deal with China was finally scrapped under US pressure, with Beijing getting \$375 million in compensation. But Israel and IAI found a new customer in the Phalcon deal, India, at four times the price, Haaretz reports. New Delhi had

been lobbying for Tel Aviv's sale of the Phalcon airborne early warning system on the back of a new-found "anti-Islamist" bond with Israel post 9/11.

Delivery of the first of the three Phalcon AWACS was slated for November, last year. It is now likely to arrive by August-September this year.

-Amitabh Joshi

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Pac-3 Missile Programme Lockheed Martin wins Contracts worth \$556 m

Lockheed Martin has announced recently that it has received contracts totaling \$556 million from the U.S. Army Aviation and Missile Command (AMCOM) for hardware and services associated with the Patriot Advanced Capability-3 (PAC-3) Missile programme.

The contracts includes the production of 148 hit-to-kill PAC-3 Missiles, 17 launcher modification kits, spares and other equipment besides programme management and engineering services. The production of all the equipment will take place at the company's manufacturing facilities in Dallas and Lufkin, TX, Chelmsford, MA, Ocala, FL, and the PAC-3 all-up round facility in Camden, AR will be delivered as per the contract by July 2010.

"The PAC-3 Missile offers combat-proven hit-to-kill lethality to protect the Warfighter," said Mike Trotsky, Vice President, Air & Missile Defense Programmes at Lockheed Martin Missiles and Fire Control. "We continue to see interest in the PAC-3 Missile Segment around the world, and Lockheed Martin remains focused on producing this vital technology for our customers, both here and abroad."

As part of these contracts, Lockheed Martin will

be producing and delivering equipment to begin upgrading all U.S. Army Patriot fire units to the current Configuration-3 capability (two PAC-3 launchers per fire unit), allowing all fire units in the Patriot fleet to be capable of firing the PAC-3 Missile. This U.S. Army initiative, called "Pure Fleet," was launched in 2006.

"The PAC-3 Missile will continue to provide theater-level defense of critical assets for years to come," said Richard McDaniel, Director, PAC-3 Programmes at Lockheed Martin Missiles and Fire Control. "PAC-3 provides our Soldiers with lethality overmatch against the ever-advancing threat on today's battlefield."

Lockheed Martin is the prime contractor on the PAC-3 Missile Segment upgrade to the Patriot air defense system. The PAC-3 Missile Segment upgrade consists of the PAC-3 Missile, a hit-to-kill interceptor, the PAC-3 Missile canisters (which each hold four PAC-3 missiles, with four canisters per launcher), a Fire Solution Computer and an Enhanced Launcher Electronics System.

The PAC-3 has the capability of increasing the Patriot system's firepower, since 16 PAC-3s load out on a single Patriot launcher, compared with four legacy Patriot PAC-2



missiles.

Currently, the Lockheed Martin-developed Aegis Weapon System, PAC-3 Missile, the Terminal High Altitude Area Defense (THAAD) Weapon System, the Medium Extended Air Defense System (MEADS) and the Multiple Kill Vehicle (MKV) utilize this technology.

The PAC-3 Missile Segment Enhancement (MSE) Missile

has also been selected as the U.S. primary interceptor for the multi-national MEADS, a model transatlantic programme for the next generation of air and missile defense. MEADS will focus on risk reduction, application of key technologies and validation of a system design incorporating the PAC-3 MSE Missile as the primary interceptor.

Elbit Subsidiary Bags \$26.5 Million Contract

Elbit Systems' U.S. subsidiary, Kollsman has been awarded a \$26.5 million delivery order under a previous Indefinite-Delivery/Indefinite-Quantity (ID/IQ) contract for Thermal Laser Spot Imagers (TLSI) with accessories and logistic support from the U.S. Marine Corps (USMC) Systems Command, based in Quantico, Virginia.

Raanan I Horowitz, CEO of Elbit Systems of America stated that, "This award demonstrates our commitment to provide cutting edge electro-optic systems to the USMC

in support of their mission readiness requirements and farther compliments our strong relations with this important customer".

The TLSI to be provided, developed jointly with its sister company Elbit Systems Electro-Optics Elop, is an enhanced version of the company's AN/PAS-22 Long Range Thermal Imager (LRTI), augmented by incorporation of a Laser Spot Tracker (LST).

The LRTI is a portable, binocular, hand-held, battery-operated thermal imager, used for long-



range observation, and is currently in service with the USMC.

TLSI will be used to identify

a laser spot that has been placed on a target as a guidance aid, which allows the laser spot to be seen in

day or night and in adverse weather conditions as well. The TLSI works in conjunction with the company's Portable Laser Designator Ranger (PLDR) which is also being supplied to the USMC.

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BAE Woos Indian Armed Forces with Land, Naval Systems

With the Indian Air Force ready to induct the BAE Systems Advanced Jet Trainers (AJT) into the IAF on the 23rd of this month, the company is now focusing on offering other products to the armed forces. **Alan Garwood, Marketing and Business Development Director, BAE Systems** spoke to *Trilok Desai* about the company's participation at the show and its products on offer. Excerpts:



Mr Alan Garwood,
Group Business Development
Director, BAE Systems

What are you displaying at the Defexpo 08 this year?

Defexpo is primarily focused on land and naval systems and as one of the largest defence company overall, we will be showing a broad range of capability from across the business, including tactical communications, land and naval gun systems, and vehicles.

However, the two largest features are:

The RG-31 Mine Protected vehicle, which is a variant of the 4x4 vehicle, which is newly in service with the US and other forces across the globe. The vehicle is all-steel, welded armour, monocoque hull that protects the crew from anti-tank mines and roadside bomb detonations. It has the capacity to carry a crew of 8-10 people and the company is supplying three of the five Mine Resistant Ambush Protected (MRAP) vehicle types that are meeting the Pentagon's current requirement for around 20,000 vehicles.

The other highlight at the show would be the M777 Light Weight 155mm Howitzer

- M777, which is the world's lightest 155mm Howitzer, weighing less than 10000 lbs (4218 kg) and now in service with the U.S. Marine Corps and U.S. Army as their next generation Medium Force weapon.

Can you tell us in detail about the JV with HAL and Wipro that was established in early 90s?

Our JV with HAL, called BAe-HAL concentrates on the IT and software engineering. This business is currently going from strength to strength and some of the clients that have included are British Airways and Sagem.

Whereas our partnership with Wipro, which is an agreement for the joint teams from both companies to work in the US, UK and India on flight and engine control systems. This also included the establishment of a Technical Development Centre in Hyderabad. While it's still early days, we are confident we will be able to secure significant business together.

With the delivery of the first 2 Hawks already done in November last year. Can you update us on the delivery schedule of the remaining jets as well as the Indian

manufactured aircraft in India?

The Hawk India programme is going very well. The first two of 24 UK built aircraft were delivered in November of last year on schedule. Further deliveries from the UK are taking place and Bangalore based production from HAL will deliver another 42 aircraft to make 66 in total. Our partnership with HAL is a strong one and has lasted for many years on programmes such as Harrier and Jaguar. Our companies respect each other's capabili-

Indian partners for manufacturing several products related to the Indian army?

We are in discussions with Indian Industry but we are not yet ready to elaborate further.

What are your future plans for India?

Defexpo is has always been an important event for BAE Systems. Our company's rapid growth in both size and capability means that this year will see be our biggest ever presence at the show, and the first as the global number one



ties and look forward to more years of close partnership.

Are you close to any deal that can probably lead to signing at the forthcoming Defexpo 08?

We do not believe we will take part in any public signing ceremonies at Defexpo.

Have you short listed the

in land systems. India has always been an important market for BAE Systems which is why we've been in India for over sixty years. We haven't just arrived so we have long term and proven industrial relationships already in place and we look forward to adding more, and in greater breadth and depth, in the future.

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Rheinmetall Sets its Sights on Indian Market

The Rheinmetall Group's decision to set up of a Regional Representative Office in India, coupled with its first-ever participation in the Defexpo trade fair in Delhi, underscores the German defence contractor's bullish view of the country as a highly significant future growth market.

In establishing a permanent presence in the India, Rheinmetall is taking a further important step in its strategy of progressive internationalization. As a leading supplier of systems and equipment for ground forces, exports now account for some 60% of Group sales, and the percentage is rising.

Gerhard Hoy, who last served as Vice President Marketing for the Air Defence activities of Rheinmetall's Swiss unit Oerlikon Contraves in Asia, has been appointed to head the new Regional

Representative Office in India. Serving as highly competent point of contact to the Indian government at its disposal and representing the entire range of Rheinmetall products and services.

Having already supplied the Indian Army with large numbers of anti-aircraft guns in the past, Oerlikon Contraves (a member of the Rheinmetall Group since 1999) is a long-standing partner of the Indian armed forces.

Generating annual sales of approximately €1.8 billion, Rheinmetall Defence is the defence technology arm of the Rheinmetall Group of Düsseldorf, Germany.

Rheinmetall Defence is instrumental in the development and production of armoured vehicles, weapons and ammunition as well as air defence products and defence electronics. And also extends



its expertise to air force and naval applications and internal security technology.

Rheinmetall intends to market in India a wide variety of high quality and superior products from Germany such as:

Rheinmetall's unrivalled L52 155mm artillery weapon system, known from the PzH 2000 SP Howitzer; Naval countermeasure systems against missile threats; Light weight high-performance medium calibre guns; Protection systems for critical infrastructure (e.g.

nuclear power plants); Active and passive vehicle protection (e.g. anti-mine systems)

Future Soldier System (state-of-the-art infantry technology); Armoured vehicles such as the versatile Yak and Gavial; Short-range cannon- and missile-supported air defence systems such as the Skyshield 35mm; Skyranger turret, mountable on lightweight platforms and Simulation systems for world-class instruction and training.

Israeli Defense Company UTG-PRI Develops Futuristic Weapon Systems



For Illustration purpose only

Israeli R&D company UTG-PRI has developed concept designs of attack spacecrafts, amphibious JSF far superior to F-35, future jets and future combat systems, submersible aircraft and missiles carrier, front-derive subs, MDS and BMDS without analogy to secure impregnable air defense of Israel against Qassam and Katyusha rockets, and Iranian and Syrian ballistic missiles threats. Same concerns defense of S. Korea against N. Korea, Taiwan against China and India against Pakistan.

It goes without saying that no current ground-based MDS or BMDS actually work, including latest US and Israeli air defense systems based on radars and ground anti-missile systems which waste 8-11 minutes to detect the target and cannot destroy it at the boost, mid-course or terminal trajectory. In particular, new Russian BMs with multiple nuclear warheads and trajectory vectoring (could be sold by Russia to Iran, Syria and Venezuela) cannot be destroyed by current ground-based missile defense (GMD),

as confirmed by leading US scientists in their April 7, 2005 letter to the Congress.

Revolutionary approach of UTG-PRI LTD to MDS is that it applies airborne censoring and aim-to-kill technology against Qassam and Katyusha rockets, enabling to destroy them within seconds at the launch course. And with regard to UTG's BMDS and enemy's BMs, they can be destroyed over enemy's territory, thus being impossible to launch, since the enemy state will annihilate itself by own nukes or chemical warheads.

UTG-PRI LTD has designed the Flying Missile Platform (FMP) to loiter as unmanned strategic bombers in enemy's stratosphere. Such systems are impossible to shoot down, since they are equipped with air-to-air missiles to protect them from ground-to-air missiles and can destroy any launched ballistic missile. Said FMP can be armed with a nuclear device, so if hit by enemy missile, the fallout from the nuclear explosion would bury

the enemy. On the other hand, FMP can loiter constantly over the Israeli or US territory, providing the impregnable air defense shield without analogy. In case of Lebanon and new means of Israeli air assault against the Hezbollah and its rocket launchers, said FMP would patrol the Lebanese airspace 24h around the clock to release its cluster bombs or air-to-ground missiles, making any involvement of the IAF fully unnecessary!

Moreover, a tandem Rocket-Scramjet System (RSS) by the company acts as a unique interceptor of jets and BMs, since it can not only intercept any BM, but can catch up with the BM and destroy it's launched multiple warheads with air-to-air missiles. It means that said RSS can outrun any BM at its terminal trajectory, since RSS is based on a triple supersonic and acceleration factor, i.e., speed of the mother rocket, the speed of the launched scramjet, with added speed of the air-to-air missiles launched by the scramjet.

pg no. 15
AD

Boeing, Tatas plan US\$ 500m Indian JV

The Boeing Company and Tata Industries Limited of India have agreed on a plan to form a joint-venture company that will initially include more than US\$500 million of defense-related aerospace component work in India for export to Boeing and its international customers.

Under the memorandum of agreement signed by Boeing and Tata, it is contemplated that the joint-venture company will be established by June 2008, and shortly thereafter will begin work building Boeing aerospace components.

Said Jim Albaugh, president and CEO of Boeing Integrated Defense Systems, "It represents another step in our commitment to India, in this case by linking the capabilities and heritages of these two companies, in order to bring real and lasting value to India's aerospace industry, while making



Boeing products more globally competitive."

It is the intent of Boeing and Tata not only to utilise existing Tata manufacturing capability, but also to develop new supply sources throughout the Indian manufacturing and engineering communities for both commercial and defense applications.

"This joint venture between Tata and Boeing is an important part of our strategy to build capabilities in defense and aerospace," said Ratan Tata, chairman of the Tata Group.

"I look forward to the joint venture becoming a world-class facility in India."

Manufacturing capabilities established within the joint-venture company would in later phases be leveraged across multiple Boeing programmes, including the Medium Multi-Role Combat Aircraft (MMRCA) competition.

In the first phase of the agreement, Boeing would potentially issue contracts for work packages to the joint-venture company involving defense-related component manufacturing on Boeing's F/A-18 Super Hornet for the U.S. Navy and Royal Australian Air Force, CH-47 Chinook and/or P-8 Maritime Patrol Aircraft. A research and development center for advanced manufacturing technologies is also

contemplated.

"Boeing is strengthening and deepening its partnerships with Indian industry through a wide range of new teaming opportunities," said Ian Thomas, president of Boeing India. "Our joint venture with Tata marks a significant milestone in our ongoing journey to build world-class aerospace and defense manufacturing capability in India."

Boeing's history in India reaches back more than 60 years, marked by success in working with airline customers, parts suppliers, research institutes and others to provide products and services. In December 2003, Boeing established a wholly owned subsidiary, Boeing International Corporation India Private Limited (BICIPL), to support the growing demands of India's aviation, aerospace and defense industries.

Advertorial

World's Second Largest Hand/General Tools Selling Company

Johnson Machineries Limited an Indian company has been the sole and national distributor of the quality class professional hand tools of "BETA Utensili" tools and other WORKSHOP Instruments for more than decade.

Our services are recognized by a wide range of industries in India like Automotive, Cement, Engineering, Steel, Construction, Textile, Papers, Shipping, Refineries, Aeronautical, Oil Companies, Defence, Railways, Nuclear Power, PSU etc.

Established in 1923, BETA Utensili, a parent Company of JML, is the second largest Hand/General tools selling company in the world and is a market leader with a reputation for excellence in manufacturing the tools. BETA Utensili has been supplying tools to the motor sport world for more than half a century. It not only manufactures quality tools with considerable care & attention but also guarantees the per-

formance of their tools which fulfills the characteristics in the fields of safety & prevention as they give lifetime warranty, to ensure the durability & quality of their product.

In BETA Utensili, a comprehensive range designed to satisfy the requirements of and provide safety to electrical installers and repairers. Insulated tools like Betamax-Maximum Performance & Beta-Quality tools for Pliers & Nippers, Betamax Screw drivers, Spanners, sockets etc. is guaranteed for highest quality and performance standards EN 60900, which means thorough checks are conducted on every single tool, including pullout resistance and flame propagation tests for the handles as well as 10.000 Volt tests.

BETA Utensili launched the C26 NewTank trolley, is the name for increased capacity, comfort and functionality. They have also broadened the tool trolley offer introducing the new

modular C40 and C40C, practical trolleys supporting three different sheet metal sectional containers and finished with shockproof ABS tops.

To further strengthen our role, we present under the promotion campaign Beta Action 2007 - a comprehensive range of professional impact wrenches made from composite material recommended for heavy duty uses, where the tool is supposed to make a difference. There is also a comprehensive range of hammers.

From the design stage to the finished product, Beta's contribution to quality is a decisive factor which fulfills their mission by i) satisfying professional users' requirements ii) To promote innovation and anticipate future trends iii) Playing the business role by protecting both the environment and man, whose wellness means the ultimate goal and efficiently achieve competitive advantage.

Beta
UTENSILI

Gli specialisti li usano quotidianamente. Per questo puoi usarli chiunque con fiducia.

Beta
UTENSILI

Fatti in Italia

From Subsonic to Hypersonic era

Better late than never. On 23 Feb 2008, Defence Minister AK Antony will welcome the Hawk 132 Advanced Jet Trainer (AJT) into the Indian Air Force (IAF), fulfilling its long-standing requirement. AJT Hawk 132 will effectively bridge the gap between the slow jet trainer, such as the Kiran and the advanced fighter aircraft currently in IAF's inventory. It was in 1982 that the need for an AJT was first articulated by the IAF and ever since had remained high on its agenda for procurement. The IAF felt that there existed a quantum difference in the skill and judgment levels required of young fighter pilots as they transited to state of the art fighters, such as the Su-30 MKI, Mirage 2000 and MiG-29.

The Hawk 132 is expected to adequately serve as an ideal for these advanced aircraft.

The Hawk 132 is a variant of the highly successful BAE Systems Hawk It incorporates an open architecture mission computer, glass cockpit and a state of the art avionics suite including a new generation Inertial

Navigation System with GPS (INGPS). It is also equipped with several Indian made components such as the communication sets, Identification Friend or Foe (IFF) system and the radio altimeter.

In addition to being an advanced jet trainer, Hawk 132 is



fully combat capable and can carry air to air missile and air to ground armament. It could also be used as a lightweight fighter.

The contract for supply of the Hawk AJT was signed between the IAF and BAE Systems in 2004. The deal envisaged a supply of 66 aircraft, 24 built in the UK and 42 license produced by HAL at Bangalore. IAF pilots and technicians were trained at BAE Systems facilities at Warton and Brough in UK. The initial four Hawk aircraft were flown from Warton to Bidar by a combined team of BAE Systems' and IAF pilots.

Bidar airfield, located in North West of Karnataka,

approximately 150 Km from Hyderabad, was chosen as the main operating base for the Hawk. This base has been a training establishment for budding fighter pilots of the IAF since 1963. To ensure the smooth induction of the Hawk, the Air Warriors under the command of Air Commodore Ramesh Rai have put the required infrastructure in place. The work services included extension of the two runways, improvement in landing facilities and creation of servicing facilities for the technology intensive Hawk aircraft.

The first two aircraft arrived at Bidar on 12 Nov 2007 and were hailed to the Indian skies

by Air Marshal GS Chaudhry, Air Officer Commanding-in-Chief, Training Command, IAF, and Bangalore. Since then, IAF pilots and technicians have been working tirelessly to bring this aircraft to the stringent level of its operational status. Speaking to this writer, Air Commodore (ret'd) Prashant Dikshit, VM, commented: "I am glad to observe that we have at last acquired the intermediate range AJT to transit from the subsonic level of flying to the hypersonic era. This step is not merely useful but imperative to operate that fleet of the Su 30 MKI, Mirage 2000 and MIG 29, without causing any anguish".

-Colonel (ret'd) Anil Bhat, VSM

Export potential for Akash missile seen?

India hopes to get export orders for its indigenously developed all weather missile system, Akash, at the Defexpo being held in Delhi from Feb 16 to Feb 19th.

'We are confident of getting some export orders for Akash and other missile systems like Nag, radars and other products,' DRDO Chief Controller (R&D) Prahlada informs. The missile system will be exhibited along with other products developed by the DRDO at the Delhi Defence Expo, according to a senior



official of the organisation.

The Indian defence ministry recently gave DRDO a green signal to export its products.

Akash is a surface-to-air missile while Nag is an anti-tank missile. Akash has a range of about 25 km and its radar can simultaneously track up to 64 targets. About 30 countries have already approached the DRDO for detailed information about its products, procedures

for exports and the time the organisation wants to deliver the product, Prahlada said.

Actual exports may take a year to come about because of the long procedures involved including clearance from the Indian government and that of the importing country, he said. There was a huge potential to export products of Indian defence public-sector undertakings and the Delhi Defence Expo will be a good opportunity to tap it, Prahlada said.

DRDO is expecting Rs.30-billion order from the Indian defence forces for Akash, he said.

The F-16IN: Unmatched Feat

A Proven Multi Role Combat Aircraft With Unmatched, State-of-the-Art Technologies By Orville Prins, Vice President, Lockheed Martin Aeronautics



The F-16 is the most operationally proven multi role fighter available today. It continues to have proven performance with the United States Air Force (USAF) and many of the finest air forces worldwide. The F-16 has logged millions of flight hours under the full range of climatic conditions and operational environments making it the most successful multi role fighter aircraft programme in history.

The F-16, flown by 24 countries and with a record 52 follow-on buys, is without question, the world's premier, multi role combat aircraft. It has extensive combat operations experience in ten different countries with hundreds of thousands of combat sorties flown in the Balkans, Middle East, and Southwest Asia. The F-16 has been and continues to be the backbone fighter in these multi role combat operations by demonstrating unmatched safety, lethality, survivability, availability and supportability. No other aircraft manufacturer can match the F-16's combat and peacetime operational performance. Operating day and night in all environments and weather as the safest multi role fighter in U.S. Air Force history, the F-16 has more:

The most advanced and capable F-16 ever - designed specifically for India

War fighter combat experience drives the evolution and technology upgrades of the F-16 to create the most effective multi role fighter available

today. For India, the F-16IN is uniquely tailored to meet or exceed the specific Medium Multi Role Combat Aircraft (MMRCA) requirements. Having delivered over 4,300 F-16s worldwide, Lockheed Martin understands that by meeting the specific needs of each partner customer, the Company ensures that the F-16 maintains an unmatched record of programme performance and mission success.

The ability to incorporate the latest technologies into an aircraft is the key to expanding mission roles, improving combat capability and reducing operations and support (O&S) costs over the life of the aircraft. With a robust upgradation capacity and continuous technology insertion path, the

F-16IN will be readily equipped with emerging capabilities throughout its lifecycle. The F-16 is inherently designed to ensure an exceptionally long service life—the F-16IN is designed for an 8,000 hour airframe life. The technology transfer offered with the F-16IN will allow the Indian Air Force to easily maintain, upgrade and sustain the aircraft to provide proven, disciplined performance in peacekeeping and wartime operations.

Proven advanced technologies ensure long term mission effectiveness

The F-16 has the latest technologies and capabilities, including the most current avionics, weapons with stand-off and satellite guided capability, advanced AESA radar, internal electronic warfare suite, powerful high thrust engine, and full color all-glass cockpit. User-friendly cockpits and proven pilot/vehicle integration provide pilots with high situational awareness.

LOCKHEED MARTIN MEANS PARTNERSHIPS

Lockheed Martin believes in partnerships as a cornerstone of its foundation and engages in more than 300 partnerships with

businesses worldwide. Assembly lines producing the F-16 have been established successfully in five countries and more than 20 nations participate in the co-production of components for the F-16. With this unmatched experience, Lockheed Martin is able to ensure a smooth, low

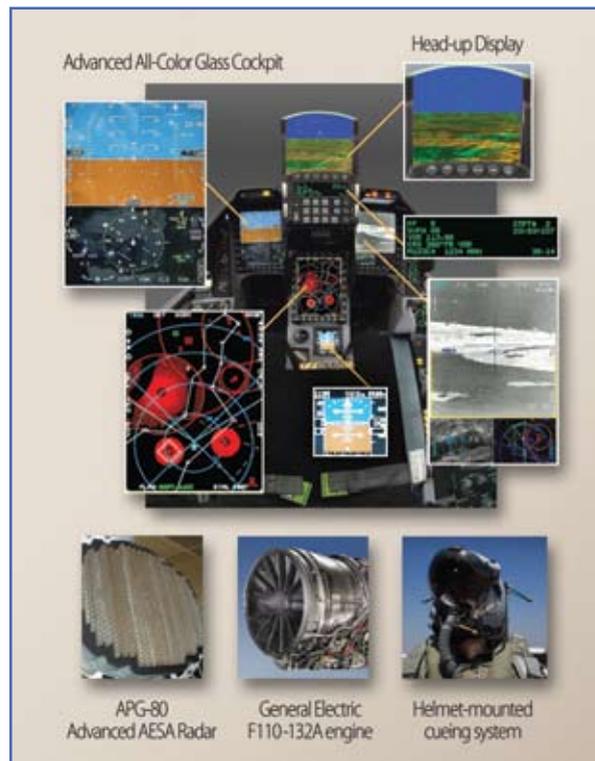
risk transition to full indigenous production of the F-16IN. Involvement in F-16 co-production has served as a major catalyst to create and energize the aerospace industry in many countries, and Lockheed Martin's proven ability to provide transfer of technology is without equal.

Lockheed Martin has a proven history of successful partnerships with nations around the world and is committed to continuing this success into the future. The worldwide marketplace is a good indicator of product value. The F-16 is the fighter of choice for 24 nations with 52 follow-on buys, including successful international licensed manufacturing of 928 aircraft. Lockheed Martin's worldwide industrial partnership success is unsurpassed by anyone and includes these accomplishments:

- Establishment of four highly successful international F-16 manufacturing lines
- Demonstrated ability to transfer advanced technology successfully
- Over \$37 billion in offsets realized by 40 countries
- Establishment of indigenous international support systems
- Joint technology development for international markets

F-16IN... NOTHING COMPARES

It's clear why no other fighter aircraft try to compare to the F-16. It is also clear as to why it is the choice of so many nations. The combat proven capabilities, low operations and support costs, and an upgradation program ensure that the aircraft will remain technologically advanced throughout its life cycle. For MMRCA, Lockheed Martin is offering a configuration tailored to meet the exacting requirements of the Indian Air Force. The Company's experience in world-wide indigenous production and partnerships ensures that that the F-16IN will be the most versatile, capable and sustainable multi role fighter for the Indian Air Force.



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AD

24,300 Aircraft Needed In The Next 20 Years

According to latest Global Market Forecast, Airbus foresees a demand for some 24,300 new passenger and freighter aircraft valued at US\$ 2.8 trillion between now and 2026. This will create an average annual delivery of some 1,215 aircraft, up from the previously forecast 1,130 average deliveries in the last GMF. 'Air transportation is definitely a growing industry contributing to economic development and generating wealth around the world,' informs Airbus Chief Operating Officer Customers John Leahy. 'We are committed to being a key player in making this industry eco-efficient by providing the most technologically advanced products and responding with a full 'life-cycle approach'.

Demand will drive the need for more fuel and eco-efficient airliners to cope with traffic growth and the need to replace older generation less efficient aircraft. By 2026, the fuel burn of the average world fleet is expected to be at three litres per 100 passenger kilometres, or what the A380 already delivered recently.

Passenger traffic is expected to grow at an average rate of 4.9 per cent per year, leading to a near threefold increase in the forecast period and will remain resilient to the cyclical effects of the industry. Part of the forecast traffic increase will be absorbed by higher load factors as well as use of bigger more productive equipment and increased frequencies. Even so, the world's airlines will more than double their passenger aircraft fleets of 100 seats or more, from some 13,300 today to some 28,550 in 2026. This increase together with a forecast replacement of close to 8,150 older aircraft means a total of nearly 23,400 new passenger aircraft worth US\$ 2.6 trillion will be needed.

Air freight is forecast to grow even faster, with freight tonne kilometres (FTKs) increasing annually by 5.8 per cent. Combined with fleet renewal, this will create demand for some 3,800 freighter deliveries. Nearly 900 of them

will be new factory built, worth US \$ 200 billion.

The greatest demand for passenger aircraft will be from the Asia-Pacific region, which will account for 31 per cent of the total world demand for aircraft. It is followed by North America (27 per cent) and Europe (24 per cent). Emerging markets are also driving traffic demand. Whilst China and India will remain the largest, some 30 additional emerging economies, including Argentina, Brazil, South Africa and Vietnam, with a combined population of almost three billion people, will grow increasingly prominent by 2026.

Airbus forecasts that populations and the number of the world's mega-cities will continue to grow, which will inevitably lead to an even greater local

need to differentiate through comfort will play a growing role. In this context, Airbus foresees a demand for some 1,700 Very Large Aircraft (VLA) seating more than 400 passengers like the A380. This is valued at US\$ 527 billion, and represents 19 per cent of total value of passenger and freighter aircraft deliveries, or seven per cent in aircraft unit terms. Of these, nearly 1,300 will be passenger aircraft or 16 per cent of the passenger market by value, with another 400 or so required for freighters able to transport over 120 tonnes of payload. By 2026, almost two thirds of all VLAs will serve today's 32 mega hub cities, with Asia-Pacific emerging as the dominant region requiring more than 700 passenger VLAs or 56 per cent of world demand. Twelve of the

aircraft. Another 2,000 larger intermediate twin aisles will be needed in the 350 and 400 seat category. Today, this segment is well served by the A330/A340 family, from the 250 seat A330-200 to the 380 seat A340-600. From 2013, the A350XWB family will cover the entire spectrum of twin aisle market requirements.

More than 16,600 aircraft or 68 per cent of all deliveries in the next 20 years will be single-aisle aircraft. Worth some US\$ 1,140 billion, this represents 40 per cent of all aircraft deliveries by value. The demand for these aircraft will be in large part from North America with 32 per cent of the deliveries, followed by Asia-Pacific (26 per cent), Europe (25 per cent) and the rest of the world 17 per cent.



concentration of demand. This trend will also result in further congestion. One major part of the solution to this growing problem will naturally be the use of larger aircraft from all categories. Seventy seven per cent of all long-haul passenger traffic already operated out of the 32 largest existing hubs cities for large point to large point flights at the end of 2006.

Growing demand for air transportation, increasingly stringent infrastructure and environmental constraints, competition on price and the

top 20 large airports for VLA operations will be located in this region.

Demand for twin-aisle aircraft (seating from 250 to 400 passengers) will continue to grow strongly with some 6,000 new passenger and freighter aircraft being delivered in the next two decades. Valued at some US\$ 1162 billion, this accounts for about 41 per cent of the total value or 25 per cent in unit terms. Demand in the 250 to 300 seater or small twin-aisle market will total more than 4,000 new

The Airbus Global Market Forecast gives a detailed analysis of world air transport developments, covering nearly 300 distinct passenger and freight traffic flows, as well as a year-by-year fleet evolution of the world's aircraft operators, through fleet analysis of nearly 700 passenger airlines and 177 freighter operators over the next 20 years. In doing so, the forecast covers aircraft demand from the regional market to the very largest aircraft available, the A380 today.

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AD

Revised RFPs for 317 Utility Copters Second Breather for Bidders

India's Cheetak and Cheeta helicopters produced under license by Hindustan Aeronautics Ltd for all the three services including the ASW version for the Indian Navy have provided yeoman and dedicated service to India's Armed Forces but a time comes when a new and more powerful and adaptable helicopter is required. HAL attempted to modify the same chopper with a more powerful engine christened the Cheetal, for the Indian Army's needs for its increased and challenging roles in Saichen and in support of the Corps, but it was not found suitable.

After calling for tenders for 197 pieces (60 import and 137 for manufacture by HAL) and short listing and a prolonged trial competition between 197 Bell 407 ARH and the Eurocopter's AS 550C3 Fennec in which the Fennec passed muster, some discrepancies and irregularities were reported and the whole order was rescinded in December 2007.

There was disappointment in the French quarters. President Nicholas Sarkozy who came to India as India's chief guest for the Republic Day Parade on 26th January obliquely referred to the subject when addressing the FICCI and CII audience and said there appeared to be lack of transparency in some deals in India, which was an obvious reference. He said this and compared French actions in the case of Arcelor take over, which he claimed was freely



discussed with Lakshmi Mittal who was sitting in the audience as a member of President Sarkozy's delegation.

A revised tender (RFPs) for 317 helicopters for the Indian Army and Air Force is under issue. Once again there will be five contenders in the fray: Eurocopter, Bell, Italy's Agusta, and Russia's Kamov and Kazan. The Bell-407 was dropped last year after the machine it sent for evaluation could not perform a three-axis vector, an essential requirement for flying in areas like the Siachen Glacier in Jammu and Kashmir. The three-axis vector enables the helicopter perform a 'U' like manoeuvre to navigate adverse weather conditions in mountainous areas. When this deficiency was pointed out to the manufacturers, the company offered to either show a video of the helicopter performing a similar manoeuvre in Canada or to fly out Indian officials to

witness it in person. In June, it emerged that the Eurocopter machine also did not meet the required parameters but certain individuals in the Indian military establishment unfairly favoured the company.

Now all eyes on this large revised \$ 1 billion order. This order will be in addition to local production of HAL Dhruv choppers, which have certain limitation of height capability and are still overcoming teething vibration problems. The Indian Army aviation has now gained experience in flying and maintaining helicopters and has taken over most transport and in house support to the Arms role, and hence the pitch for this new type of helicopters that will serve it well in the anti terrorist role it is so heavily committed.

The Bell Textron chopper holds a strong position as it is already in production for the US army as its main ARH type, has replaced the long serving OH-58 Kiowa Warriors. The Indian model is likely to be equipped with a turret mounted optronics sensors, a secure communications suite, a combined pulse Doppler GPS navigation suite, automatic direction finder, distance measuring equipment, marker beacon transponder, three axis auto hover system, plus twin 2.75 rocket pods and 20 mm gun pods. The IAF has signed for additional 80 Mi-17-

IV helicopters from Russia in a deal worth around \$660 million to be supplied by 2008, having earlier acquired 40 Mi-17 helicopters worth \$170 million. The army has plans for import of attack helicopters and IAF has plans for heavy lift helicopters.

The IAF and Army are still not completely agreed on the command and control of the attack helicopters that are funded by the Army budget but flown by the IAF pilots and some junior Army pilots. At present the IAF flies the Mi-35s and has ordered a prototype Advanced Light Attack Helicopter on HAL with seed funding from IAF, a model of which was displayed at Aero India 07. The LAH based on the ALH which is to receive the more powerful Shakti (Adriden) engine will tentatively have Nexter Guns, Belgium supplied rocket pods and be fitted out with the Nag anti tank missile.

In the words of Air Chief ACM Fali Homi Major at the helipower Seminar in new Delhi on 6th Feb, "Indigenization of design and production is a key goal for us and support to Indian firms, whether in the public or private sector, is an 'article of faith'. At the same time, the emphasis on quality must not be lost. The Dhruv and its armed version are already a reality. The Light Attack Helicopter version too, I am confident, will soon fly".

-Ranjit B Rai



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AD

Boeing To Display Varied Products

Boeing Integrated Defense Systems (IDS) looks forward to the opportunity to again showcase its rich portfolio of defense products and services to India during Defexpo 2008.

Currently on offer to India are the combat-proven F/A-18 E/F Super Hornet multi-role combat fighter, the P-8I multi-mission maritime patrol aircraft (MPA), the heavy lift CH-47F and MH-47G heavy-lift Chinook helicopters, and the combat-proven attack helicopter, the AH-64D Apache Longbow. The IDS portfolio extends to the C-17 Globemaster III strategic lift cargo plane, and C4ISR platforms and Airborne Early Warning & Control systems. IDS is also a leading provider of aerospace support systems and network-centric operations that have high relevance to India's requirements.

F/A-18 SUPER HORNET:



On March 3, Boeing will submit its bid for India's Medium Multi-Role Combat Aircraft competition. The F/A-18 Super Hornet offers India the most advanced see-all, do-all combat fighter in production today, capable of defending the nation from the Himalayas to the Indian Ocean with unmatched lethality, pilot safety and the promise of 30+ years of US Navy-funded upgrades. Besides its fire power include:

- Continuous new technology insertion (US Navy supported) will provide the Indian Air Force with advanced multi-role combat capabilities and robust capability to defend Indian airspace & coastlines for 30+ years.
- The F/A-18 offers India

latest advanced US technology (pending USG approval) – radar evasion, AESA radar, Network Centric capabilities, twin-engine safety for India's vast distances, commonality with the US Navy, the world's 4th largest air force.

- Raytheon's proven AESA radar system gives fighter pilots and aircrews the ultimate operational edge:

P-8I

Boeing IDS is in discussions with the Indian Navy to offer the P-8I, the next generation of Maritime Patrol Aircraft to India. The P-8I is the world's most advanced anti-submarine and anti-surface warfare plane, offering India the reach, speed,

technology and endurance necessary to protect 7,000 kilometers of coastline, and to extend beyond India's shores to protect crucial international shipping lanes.

CH-47 CHINOOK

- The CH-47 Chinook offers



India a powerful workhorse helicopter, as capable in supporting the Indian Army in rugged high-altitude outposts, as it will be helping build India's infrastructure and bringing life-saving relief supplies to victims of natural disasters.

- The combat-proven AH-64D Apache Longbow is the newest version of the Apache and a candidate to fulfill the attack helicopter and reconnaissance requirements of numerous armed forces worldwide.

AEW&C

- 737 AEW&C can offer India's armed forces a precise picture of the battlefield for enhanced decision-making. The 737 AEW&C expands the AWACS family to include

a high-performance, affordable system with designed-in payload, space, power, cooling and computing capacity reserves which provide substantial future growth capability

C-17

- The C-17 is the new global airlift standard with strategic capabilities. It's the airlifter of choice in the Global War on Terrorism and the airlifter of choice for humanitarian and disaster relief efforts world-wide. It's the only remaining wide-body military airlifter with an existing U.S. production line.

HARPOON

- The U.S. Navy and Boeing have extensive experience in integrating Harpoon missiles on domestic and international aircraft. Integrating Harpoon on the India Air Force Jaguar aircraft is low risk and provides the IAF with exceptional ASuW (Anti-Surface Warfare) capabilities. Harpoon Block II expands the capabilities of the Harpoon anti-ship weapon. Harpoon, the world's most successful anti-ship missile, features autonomous, all-weather, over-the-horizon capability.

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AD

'We can offer Javelin for India's Land Combat Needs': Raytheon



Mark Nicol

Having already sold its Firefinder radars to India, Raytheon is ready to offer a variety of products to the Indian Army. **Mark Nicol**, Raytheon Business Development Director spoke to **Bhavya Desai** about the potential scope of opportunity and products on offer ahead of the Defexpo. Excerpts:

Which are the products that you are offering to the Indian Army currently?

At the present time, we are not officially offering any land combat products to the Indian Army. We are in discussions about responding to RFPs that could involve our TOW (Tube-launched, Optically-tracked, Wire-guided) and Javelin Weapon Systems.

Can you give us the current update on the 12 Firefinders that the Indian Army had procured from Raytheon?

The Indian government is looking to expand on its Firefinder radar programme. Having previously bought 12 radars that are deployed in various locations in India, the government is now considering procuring additional radars as well as a \$20 million mini-depot to support the programme.

Javelin to the Indian Army as well. Can you tell something about the status on the same? Has the Army shown interest in the product?

Javelin is the premier one man-portable and employable fire-and-forget medium-range missile system in the world. Designed to take the fight to the enemy, the compact, light-weight Javelin is ideally suited for one-soldier operation in all environments. We believe Javelin is an excellent solution for the Indian Army and we stand ready if the Indian government chooses Javelin for its land combat needs.

Besides the U.S. government, what other countries are using the Javelin?

U.S. Army and Marine Corps, Australia, New Zealand, United Kingdom, Saudi Arabia, Kuwait and Jordan.



Javelin Missile system

TOW as well?

TOW 2 (Tube-launched, Optically-tracked, Wire-guided) Weapon System, with the multi-mission TOW 2A, TOW 2B, TOW 2B Aero, and TOW Bunker Buster missiles, is the premier long-range precision antiarmor/antifortification/ anti-amphibious landing weapon system throughout the world

today. TOW is in service in over 40 international armed forces and integrated on over 15,000 ground, vehicle, and helicopter platforms worldwide. TOW is also the preferred heavy assault weapon system for NATO, Coalition, United Nations, and Peace-keeping Operations worldwide.

Raytheon is offering the

Can you tell us about the

BAE, Mahindra JV on mine protected vehicles

BAE Systems and Mahindra Defence are likely to jointly develop an Indian mine protected vehicle based on BAE Systems' highly successful RG-31 mine protected vehicle. BAE Systems has already supplied 165 mine protected vehicles known as Casper to the Indian Army since 1999. This year's 5th defence and naval exhibition (DEFEXPO), will see the display of a BAE Systems RG-31 on the Mahindra defence stand.

Nearly 600 RG-31s are in service with the U.S., Canada,



and other forces, including the United Nations. Under the U.S. Department of Defense's Mine Resistant Ambush Protected (MRAP) programme, 624

RG-31s have been ordered.

According to Mike Mendoza, BAE Systems' managing director India, 'Mahindra is an enormously capable world class company with the skills to become a strong partner for BAE Systems on the development of a mine protected vehicle for India.'

Says Brigadier Khutub Hai, Chief Executive of Mahindra Defence Systems, 'Mahindra

Defence Systems is in the business of providing vehicle protection to defence forces,' and our cooperation with BAE Systems, who are leaders in this field, for joint production of mine protected vehicles, is a strategic fit for our vehicle armouring business.'

With a modular interior layout the vehicle can be configured as an APC, command vehicle, ambulance, surveillance vehicle and for many other uses. In standard APC configuration, this air-conditioned vehicle carries a crew of 8 to 10.

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The Indian Missile Story



missile is also undergoing final trials and can be launched from a modified BMP-1 tracked armoured vehicle called NAMICA or a T-72 chassis. The missile incorporates a passive seeker with infra-red charge-coupled will also jointly develop with the DRDL. A 6km range version helicopter-launched laser beam-riding variant of the Nag, based on target acquisition/engagement technologies originally developed by BAE Systems and Zeiss Optronics for the now-cancelled TRIGAT-MR anti-armour missile is also being pursued. The air-launched, missile, will be used to arm the Light Combat helicopter, under development at the

Hindustan Aeronautics Ltd. starting 2011.

MoD and the DRDO, have also negotiated and extended the licensed-production for

After over 50 firing trials spanning a 19 year design and development period and incurring a cost of Rs 3 billion the Defence Research and Development Organisation (DRDO) R&D efforts to operationalise and supply the Trishul short-range (9km) surface-to-air missile SHORADS (Short Range Air Defence System) have failed.

The Trishul is now being treated as a technology experience for the scientists and some trials are still planned but the exercise has not been in vain. DRDO's Hyderabad based Defence Research & Development Laboratory (DRDL) has since teamed up with IAI/Rafael of Israel to co-develop the long range Barak NG for the Navy and efforts to rope in MBDA for co-developing three variants of a new generation, 12km-range vertically launched low-level, quick-reaction missile (LLQRM)

system were also pursued.

Originally meant to be inducted into service by all three armed forces, the Trishul - essentially was a reverse-engineered clone of the Russian OSA-AK the three-beam missile guidance system but since it suffered several technological setbacks the Navy went in for nine Barak systems from IAI/Rafael with the EL/M 2248 radar. The missile with 9km range has been in the news for some purported 'kick backs', but this has not deterred the much needed acquisition. The Navy's experience has been good as the system was even transferred to INS Ganga for trials and to other ships and has been treated as a portable system. The Navy's other equivalent fixed AA system the Shtil on the Krivack Talwar class has been found too big and cumbersome to maintain.

From experience gained during the development of

Trishul, DRDO's Electronics & Radar Development Establishment (LRDE) has developed the 35 km Akash triple SAM system and demonstrated it in repeated trials to the Indian Air Force, who are inducting the system for operational trials. The Akash has also been offered to the Army. Concurrently the target acquisition radar, a modified variant of the S band, and three-dimensional 150km-range Central Acquisition Radar CAR that the LRDE originally developed in cooperation with a Polish collaboration has been proved and DRDO has received orders.

The Astra air-to-air combat missile also under development for over 15 years by the DRDL would closely resemble MBDA's Mica-EM air-to-air missile in both looks and performance, and will be equipped with an active radar seeker. DRDL being overall systems integrator BDL will be the production agency.

The indigenous Nag (Snake) 4km-range anti tank



MBDA developed Milan 3R 3km range anti tank missiles by Hyderabad based Bharat Dynamics Ltd. BDL has commenced series-production of the wire-guided anti-armour missile. The Indian Army is reported will acquire some 2,000 Milan ER launchers equipped with the new generation MILIS optronic target acquisition/engagement system from Safran of France and up to 8,000 wire-guided missiles.

-Ranjit B Rai



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'We seek to build strong and lasting relations with India': Lockheed Martin



Ambassador Douglas A. Hartwick

The defence major Lockheed Martin opened its subsidiary in India on January 10th of this year. The establishment of the In-

dian subsidiary also marked a change in the Indian leadership of the organisation. Ambassador Douglas A Hartwick took over as the chief executive of Lockheed Martin India Pvt. Ltd. Hartwick, who had served as Assistant US Trade Representative for South Asia, during his diplomatic career, has served twice in India - 1986-90 and 1994-97 and visited India on several occasions in his capacity as assistant USTR over the past two years, bringing with him "huge experience and understanding" of the country.

In an exclusive interview to *International Aerospace Show Daily*, **Ambassador Hartwick** said that he will seek to building "strong and lasting relationships" with Indian government and industry and ensuring that Lockheed Martin establishes a "deep and lasting role" in supporting Indian services and government agencies and increasing India's global partnerships and presence in world markets. Excerpts:

The first deal of Lockheed Martin for C-130 deal is now through that took place immediately after you took over. What do you feel about this and what are your future plans?

Lockheed Martin approaches the Indian market with a solid commitment and a dedicated in-country presence. On January 8, 2008, we announced the opening of our India subsidiary, Lockheed Martin India Pvt. Ltd. The Indian subsidiary will represent the interests of all the operating systems of Lockheed Martin in India. The establishment of the

Indian subsidiary by Lockheed Martin is another step towards emphasizing the long-term commitment of the company towards the Indian market and industry.

Lockheed Martin's goal as a business is to help nations achieve their most important objectives in defense, security and the delivery of vital public services. That is our commitment to India.

Regarding the C-130J, the governments of India and the United States signed a Letter of Offer and Acceptance on January 31, 2008. Only one aircraft possesses the unique mix of agility and performance to consistently operate at very high operations tempos efficiently and reliably. Whether it's being used for weather reconnaissance, equipment resupply via airland and airdrop, air-to-air or ground refueling, coastal surveillance, or humanitarian relief, the C-130J Super Hercules is the solution to meet the worldwide need for airlift with multimission capability.

The C-130J is the world's most advanced transport, combining heavy-lift capability with advanced cockpit avionics and a fully-integrated digital weapon system.

The C-130J's sophisticated positioning system can deliver 20 tons of cargo to a precise 10-foot-by-10-foot navigation location. The C-130J is versatile for missions in peacetime and during conflict. Widely used for special missions as well as humanitarian relief, the C-130J was a welcome sight bringing relief supplies to those impacted by the Tsunami of 2004.

Able to operate in extreme climatic conditions and land on unimproved runways, the C-130J can deliver large amounts of supplies and personnel to regions where normal airfield operations have been disrupted. With its short, austere landing strip capability, C-130Js are often the first aircraft to start the relief process.

For MMRC deal, F-16 is the older generation aircraft compared to Eurofighter. How do you expect to fulfill the requirements of the Indian Armed forces for 30 to 40 years?

F-16IN will be tailored to fully meet the Indian Air Force's requirements expressed in the RFP. The F-16 is the most operationally proven multi role fighter available today. It continues to have proven performance with the United States Air Force (USAF) and many of the finest air forces worldwide. The F-16 has logged millions of flight hours under the full range of climatic conditions and operational environments making it the most successful multi role fighter aircraft programme in history.

The worldwide marketplace is a good judge of product value. The F-16 is the fighter of choice for 24 nations.

War fighter combat experience drives the evolution and technology upgrades of the F-16 to create the most effective multi role fighter available today. For India, the F-16IN is uniquely tailored to meet or exceed the specific Medium Multi Role Combat Aircraft (MMRCA) requirements. Having delivered over 4,300 F-16s worldwide, Lockheed Martin understands that by meeting the specific needs of each partner customer, the Company ensures that the F-16 maintains an unmatched record of programme performance and mission success.

The ability to incorporate the latest technologies into an aircraft is the key to expanding mission roles, improving combat capability and reducing operations and support (O&S) costs over the life of the aircraft. The F-16 is inherently designed to ensure an exceptionally long service life—the F-16IN is designed for an 8,000 hour airframe life. The technology transfer offered with the F-16IN will allow the Indian Air Force to easily

maintain, upgrade and sustain the aircraft to provide proven, disciplined performance in peacekeeping and wartime operations.

As Lockheed Martin is widely known as a aerospace and defence company, do you have any other products/services to offer to the Indian armed forces?

While Lockheed Martin is recognised the world over for its fighter aircraft and aerospace achievements, the company, in fact, is arguably the world's largest and most successful systems integrator. Systems integration is a critically important technology area for military planners worldwide, the heart of "net-centric operations". Net-centric operations link various systems together to increase the benefit of those systems that otherwise operate independently.

As a premier systems integrator, Lockheed Martin is a leader in providing navies worldwide with advanced technologies and platforms. One such system is the MH-60R Multi-Mission Helicopter.

The MH-60R, developed jointly by Lockheed Martin and the Sikorsky Aircraft Company, is currently operational with the U.S. Navy in a variety of critical roles including: Undersea and anti-surface warfare; anti-ship surveillance and targeting; search and rescue; surveillance; and communications relay.

As the world's most advanced anti-submarine and anti-surface warfare platform, the MH-60R is a strategic asset that gives fleets interoperability with U.S. forces. The MH-60R's superior mission systems can counter increasingly sophisticated threats. The MH-60R's all-new airframe and integrated mission system gives pilots, aircrew and battle group commanders a tremendous new weapons system against emerging sub-surface and surface threats in both the shallow littoral and open ocean

environments.

Another important naval asset in protecting coastal waters is the P-3C Maritime Patrol Aircraft. Setting the standard for maritime patrol aircraft, the P-3C is both a military asset and an asset in the fight against terrorism. Proven in the field, the P-3C is also an excellent value in procurement and life-cycle costs.

Also in Naval systems, Lockheed Martin's Aegis Weapon System is the world's premier naval surface defense system. It seamlessly integrates the SPY-1 radar, the MK 41 Vertical Launching System, SM-2, ESSM and SM-3 missiles, as well as its command and control system.

Aegis is battle-proven against the full range of threats, from the water's surface to the exoatmosphere.

Lockheed Martin also offers the battle proven Patriot Advanced Capability (PAC-3) Missile, the world's most advanced, capable and powerful terminal air defense missile. This is a 'hit to kill' missile that

can defeat the entire range of threats: tactical ballistic missiles carrying weapons of mass destruction, cruise missiles, and aircraft.

Defeating enemy armour is a key differentiator on the battlefield. Lockheed Martin's Direct Attack Guided Rocket [DAGR™], a weapon developed with company funding, is designed to defeat targets in urban operations, while minimising collateral damage. DAGR is a 2.75-inch guided rocket system that is fully compatible with the fielded and combat-proven HELLFIRE II® missile.

Hellfire defeats advanced armour and urban point targets in the presence of severe electro-optical countermeasures, with minimal collateral damage. Hellfire is versatile and adaptable. Hellfire's three warheads and Smart launcher, as well as its range from 500 metres to 8,000 metres, gives the system wide utility on the battlefield.

How are you prepared to meet the offset obligation in-

case of you being preferred for MMRC aircraft?

Lockheed Martin has a long and distinguished record in industrial participation in the defense and aerospace sector. Lockheed Martin recognises great opportunities to add value to its product lines by working with Indian industry to create "win-win" industrial cooperation projects.

We have discussed with Indian companies about how we could work with them on potential Indian defense programmes - including co-production and offset -- in addition to opportunities to jointly improve our global competitiveness.

Any other information is welcome Lockheed Martin joined the leading Indian information technology company, Wipro Technologies, to build the Network Centric Operations Centre in Gurgaon. This modeling and simulation lab known as Ambar Jyoti will develop and demonstrate emerging net-centric capabilities that are applied to current, real-world

problems.

Lockheed Martin will connect Ambar Jyoti to other such similar centers across the globe so that an increased number of more complex, real-time, real-world demonstrations can take place in this Indian facility.

Another recent initiative, is the India Innovation Growth Programme. This extraordinary project is designed to accelerate the launch of early-stage Indian technologies into the global marketplace. This is a business incubation programme that advises companies with new technologies, often start-ups, on how to bring their products to market as quickly as possible. Partnered with the Federation of Indian Chambers of Commerce and Industries [FICCI] and the IC2 Institute at the University of Texas in Austin the program has received an overwhelming response from innovators, inventors, scientists, and researchers working across diverse sectors of the economy. 

BrahMos 2 Project on Cards

India has embarked on the design and development of project BrahMos-2, hypersonic missiles. According to Dr A. Sivathanu Pillai, Chief Executive Officer (CEO) of BrahMos Aerospace, the project launched jointly with Russia, under BrahMos, will see more than 20 Russian institutes and industry and a bigger number of Indian industry participating in the mission. The hypersonic missiles will fly at Mach 5-7 speeds (one Mach is equivalent to velocity of sound or 330 metres per second), informs Pillai.

The project will be of five-year duration and joint teams from both India and Russia have started working on designing different versions of the missiles. The supersonic BrahMos missile developed with speeds of Mach 2.8 has already got orders from the Indian Navy and Army. Both the Indian and the Russian Government have assured adequate funding and support, informs Pillai.

Production facilities are being geared up to meet the orders from India as well as future exports, assures Dr Pillai.

BrahMos missile is now available for launch from multiple platforms which include ship to ship, land to ship and land to land. Further, the submarine version is ready but the platform (submarine) is still not ready. Similar is the case with the Air Force platform. However, efforts are on to use the TU 142, a reconnaissance aircraft with the Navy for trials soon. Ultimately, this version would be integrated with the Sukhoi SU 32 aircraft, says BrahMos project chief.



Dr Pillai received the 16th Dr Y. Nayudamma Award recently. In his annual lecture, Dr Pillai said, the country had to focus on emerging as a globally-competitive, technology power. It had the manpower and wherewithal to do so in the near future. Giving an example of the contribution of Dr Nayudamma, he said in leather technology, the country had emerged as a major global power with export of \$2.5 billion. However, China has over-

taken us with \$4 billion and that too by getting help from Indian technology. We should strive to get back the leadership by increasing exports to \$7 billion by 2010, he adds.

Dr Pillai feels that the near future would see the convergence of info-bio nano technologies. Luckily, India has the potential, but needs a concerted and big mission projects to be at the forefront of these technologies, which will shape our future. 

IAF to Acquire 24 Attack Helicopters

The Indian Air Force (IAF) is set to acquire 24 new attack helicopters and 12 heavy lift helicopters to replace and augment its Soviet-era fleets. According to Air Chief Marshal (ACM) Fali Homi Major, a global Request for Proposals (RFP) for 24 state-of-the-art attack helicopters was around the corner. So was an RFP for 12 heavy lift helicopters to replace the old 20-tonne Mi 26 helicopters.

The Mi 17 multi-role helicopters and Mi 35 Soviet-era attack helicopters would be upgraded, and a parallel plan was underway to renew assets in the next 10 years as part of the air force's overall perspective plan. A plan to acquire 80 newer Mi 17 1Vs is already under implementation, the Air Chief informs.

There was an urgent need for the replacement of the IAF's fleet of half-a-dozen Mi 26 heavy lift helicopters while the Mi 35 attack helicopters are being upgraded in systems to extend their useful life for some more time, informs the IAF chief. According to Major the IAF was 'actively pursuing a comprehensive plan to upgrade its helicopter fleet by upgrading older machines and inducting new ones.' 'Within the next 10 years though, there would be a transformation of the helicopter fleet,' the air chief assured while at the same time pointed out that newer machines with state-of-the-art glass cockpits, mid-flight refueling capability and night operations were needed to meet the contemporary and future requirements.

Agreeing that the acquisition process had suffered after 1990, he said it was high time

that new helicopters and systems were inducted to match the emerging strategic scenario as well as requirements for mobility of troops, men and material even during a natural calamity.

Noting the development of some indigenous capability by HAL-produced aircraft, particularly the Dhruv Advanced Light Helicopter (ALH), he feels: 'A number of procurement schemes are being progressed and we will, in future, have a mix of indigenous and imported aircraft to meet our operational requirements, which includes heavy and medium-lift and utility helicopters. These helicopters will be inducted in a phase manner during the next two 5-year plans.'

While refusing to indicate any preference, saying that the aircraft and systems are procured in accordance with the Air Staff Requirements (ASRs) in a transparent and thorough process, and that 'whosoever makes them, he says interested suppliers will be invited to participate in the tenders.'

As for the attack helicopters, Boeing have already made known its offer to sell its latest version of the Apache AH 64 to India. In fact, Boeing had invited a group of defence analysts from India, at its aircraft and helicopter manufacturing facilities to showcase its sophistication in military products.

Boeing Vice President Chris Chadwick has said that the company was offering both the Apache Block III as well as Chinook CH 47 heavy lift in the 20-tonne category to the Indian Air Force (IAF). The Block III version would be available to the US forces in 2011, and if India chose it, the same will be offered to the Indian Air Force as well.

Indications are that the EADS Euro copter has also offered its Tiger attack helicopter with latest technologies to India, both for the Army and Air Force. However at present, the attack helicopter role is vested with the IAF. 'Today, we want the best, with digital net-centric connectivity as well as on-

board sensors and weapons, so that we can use them for long, while periodically upgrading their systems or parts.'

It may be noted that Commercial-off-the-shelf (COTS) parts with modular, replaceable designs are now standard in aircraft and helicopters. For sophisticated machines though, they have to be ordered - or outsourced - from other manufacturers.

According to Air Marshal Ashok Goel, strategic affairs analyst, in a large country like India helicopters are one of the most vital systems. 'Their flights have to be stationed at various places to give the armed forces reach and mobility to counter a threat or help the people in a natural disaster.'

The helicopters are required not only for ferrying onboard and under-slung military equipment but also for deployment in natural disasters as has been observed during calamities like tsunamis and snowstorms in the recent years.



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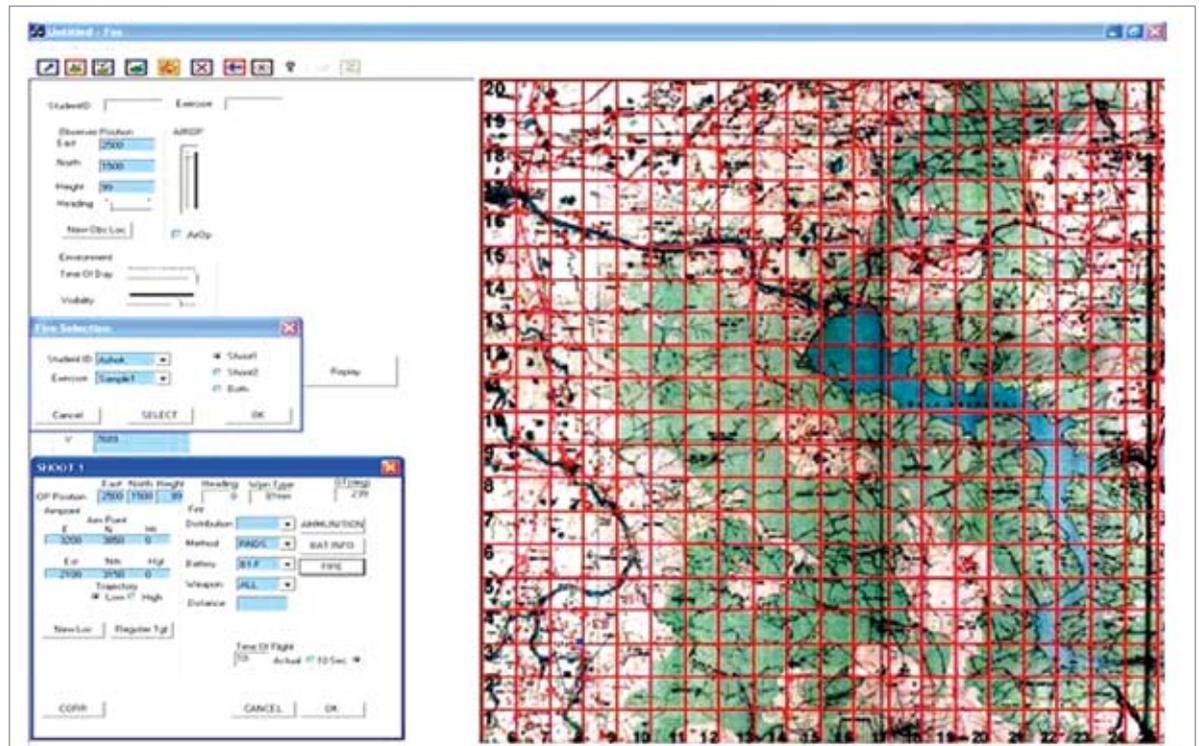
BEL to Display State-of-the-art Repertoire at the DEFEXPO 2008

Navratna Defence PSU Bharat Electronics Limited (BEL) will be displaying its wide range equipment and systems at the show, which include Communication equipment, Command and Control Systems, Radars and Sonars, Night Vision & Opto Electronics products, Tank Electronics, Simulators and Electronic Warfare Systems.

BEL will also showcase its contract manufacturing and offset capabilities in electronic assemblies, precision mechanical components / assemblies, Shelters, GPS modules as well as electronic assembly facilities, mechanical assembly facilities, brazing facility and software capabilities.

The company's defence communication equipment on display at the show will include encryptors, HF radio, secure fax, UHF / VHF base stations, V/UHF radio, VHF / UHF hand-held radios, VHF transceiver, Combat Net Radio, secure telephone, briefcase satellite terminal, Unit Level Switch Board, tactical communication system and integrated secure communication system.

While BEL's ship-borne, airborne and land-based Electronic Warfare Systems and Avionics on display will include Radar Warning Receiver,



Function Selection Display Unit, Radio Altitude Switch, Pylon Interface Box, Cockpit Modules, indigenised units of Radar Warning Receiver, Rotmens lens for multi-beam jamming and phased array antenna for multi-beam jamming.

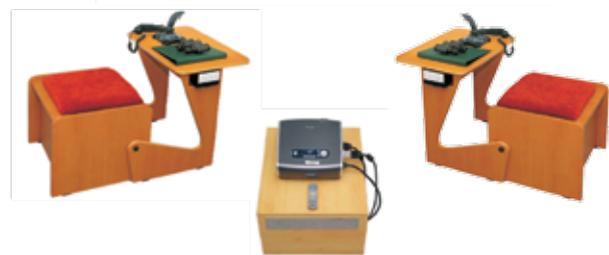
The display will also include the Battle Field Surveillance Radar - Short Range (BFSR-SR) and Compact & Lightweight Interrogation Friend or Foe Radar.

Models of other radars - Surveillance Radar Element (SRE), 3D Medium Range Central Acquisition Radar, Reporter Radar, Indra Mk II, Battery Level Radar (BLR), Weapon Locating Radar (WLR) and Flycatcher Radar, will be on display. BEL will also showcase details of Schilka Upgrade and Akash.

The Ship-borne systems on display will include the Down Mast Navigational Radar, Doppler Weather Radar, sonars, ATM based Integrated Ship-borne Data Network (AISDN) and Com-

posite Communication System. The Network Centric Systems on display will include Integrated Air Command and Control System (IACCS), Artillery Combat Command Control

System (ACCCS), Battle Field Surveillance System and Battle Field Management System. Tank Electronics systems on display will be Advanced Land Navigation System



INSTRUCTOR STATION



MPC STATION

MPC STATION

FRONTISPIECE

81MM MORTAR SIMULATOR



(ALNS), Integrated Fire Detection & Suppression System, Laser Range Finder for AERV, Tank Harness System, L 70 / Zu 23 Gun Upgrades and Tank Upgrade.

Opto Electronics and Night Vision Products on display will be Night Vision Goggles, Monocular, Night Vision Binoculars, Night Weapon Sights, Integrated Observation Equipment, Hand Held Thermal Imager - both cooled and uncooled versions, Nirbhay for Mortar Fire Control, Spotter Scope, Hand Held and Binocular

Eyesafe Laser Range Finders (LRF), LRF for Air Defence, Laser Designator cum Range Finder, Gap Measuring Device, batteries, Image Intensifier Tubes and power supplies for Image Intensifier Tubes.

Training Simulators on display will be 81 mm Mortar Training Simulator, Forward Observer Training Simulator, Driving Simulators and Crew & Gunnery Simulators.

Some of BEL's components and general products on display will be Set Top Box, Assymetrical Digital Subscriber Line Modem, Simputers, Electronic Voting Machines, Travelling Wave Tubes, Ku band



receivers, microwave components, solar battery charger, solar home lighting and street lighting systems, solar lantern, X-band rotary joint, X-ray baggage inspection system, explosive detector, video surveillance, access control system, biometric system, door frame detector and composite data recorder.

BEL will also display some of the turnkey system solutions it has provided like the country-wide police network (POLNET), EDUSAT, convergent billing project for MTNL and Andhra Pradesh statewide network (APNET).

Advertorial

Motor Sich JSC Offers New Engine For Indian Helicopters

About 700 the TV3-117 aero-engines manufactured in Ukraine at the Motor Sich JSC enterprise are in operation in the Republic of India in the MI-24, MI-25, MI-35, MI-8MTV, MI-142, and Ka-29 helicopters. Motor Sich JSC carries out permanently works for further increasing reliability and service life of these engines and designing their new modifications to meet requirements of customers.

In September 2007 Motor Sich accomplished works for creation and certification of the new TV3-117VMA-SBM1V engine exposed at DEFEXPO-2008. Parameters of this engine are complying with modern technical requirements, and it has Type Certificate No. ST 267-AMD, issued by the Aviation Register of the Interstate Aviation Committee on 5 September 2007. The engine is designed on the bases of the TV3-117VMA-SBMV, serially-manufactured-and-certified turbo-shaft engine, using its core engine and free turbine. While designing the helicopter engine the best technical ideas are used, and intended to provide higher parameters and service life obtained from the prototype

engine. Application of the TV3-117VMA-SBM1V engine compressor turbine excluded use of the cover disks in the new engine, used in the family of the NV3-117 engines and having the restricted service life.

Thanks to this the TV3-117VMA-SBM1V engine is given recently TBO (Time between overhaul) of 3.000 hours/cycles before the first overhaul, and the assigned service life of 9.000 hours/cycles. In the future we are planning to increase TBO up to 4000 hours/cycles and the assigned service life up to 12.000 hours/cycles. The weight-dimension characteristic and connecting sizes of the TV3-117VMA-SBM1V engine are the same as those of the engines operated on the "MI" and "Ka" helicopters. The previously manufactured engines of the TV3-117 family can be transformed into a design profile of the TV3-117VMA-SBM1V engine during overhaul at the Motor Sich factory.

The automatic control system (ACS) of the engines differs slightly from that, which is used in the TV3-117 engine family, and there is no necessity to do some change in the helicopter's systems.

Depending on a type of the helicopter, in which the TV3-117VMA-SBM1V engine is installed the ACS allows to tune take-off power within limit of 2,000 hp (up to ambient temperature of +51°) and 2,500 hp (up to ambient temperature of +31°), the contingency power being 2,800 hp for all tuning choices of the ACS.

The TV3-117VMA-SBM1V engine new modification with the updated ACS (FADEC) is under developing for projects of the new helicopters. Using this type of ACS will lead to further improvement of the engine's parameters.

Higher technical characteristics to support take-off power against ambient temperature, altitude start-up, designed for the TV3-117VMA-SBM1V engine, were proved while carrying out tests in the FGUP thermo-vacuum chamber of the Baranov Central Aviation Engine Institute, where engine demonstrated stable start-ups, up to altitude of 6,000 m and steady-state operation at 9,000 m.

In so doing the installation of the TV3-117VMA-SBM1V engine in helicopter with minor expenditures will provide essential improvement of technical parameters of the new and

operated helicopters, especially in operation under high land and hot climate conditions typical for the Republic of India, and increase pay-load and improve reliability to finish missions while one of the engines is shut down.

The helicopters with the TV3-117VMA-SBM1V engines will give an excellent opportunity to be used in the high land areas of India and fulfill various special tasks.

SUCH ARGUMENTS AS:

- numerous quantity of engines of the TV3-117VMA-SBM1V engine family, and long time positive experience of their operation,
- availability of well equipped and arranged service structure of maintenance of these engines, including the repair depot at the city of Chandigarh multiplied by high operational parameters of the engine, and readiness of Motor Sich for co-operation with HAL in creation of the TV3-117VMA-SBM1V engine modification adapted to operation in the 10 ton payload helicopter developed by HAL, give good chances of such an Indian-Ukrainian engine to be the most reasonable choice for the new Indian multipurpose helicopter.

Coast Guard to Sail Newer Seas

The Indian Coast Guard completed 31 glorious years of service to the nation on Feb. 1, 2008. Youngest of the four armed forces, the Coast Guard has grown from strength to strength since its formative years. The organisation that started with just two frigates, Kuthar and Kirpan and five patrol boats leased from the Indian Navy, has grown into a competent and capable force comprising 76 ships including small crafts and 45 aircraft.

The force is mandated with the task of protecting the formidable Indian 7,500 kilometres long coastline, as well as marine wealth and vast ocean resources in the enormous Exclusive Economic Zone of 2.013 million square kilometres. The motto of the force is 'Vayam Rakshamah', which means 'We Protect'.

Headquartered at New Delhi it has three Coast Guard Regions. These are Coast Guard Region West, with Regional Headquarters at Mumbai, Coast Guard Region East, with Regional Headquarters at Chennai and Coast Guard Region Andaman & Nicobar Islands, with Regional Headquarters at Port Blair.

The dedicated efforts of the Coast Guard have resulted in saving 4,049 lives at sea to date, out of which 185 lives were saved in 2007 - that translates to a life being saved every second day. Since its inception, the Coast Guard has apprehended 9,220 foreign fishermen along with 925 fishing vessels for violating the Maritime Zones of India Act.

The repatriation of these fishermen back to their countries of origin is a responsibility that also rests on the Coast Guard. 254 personnel have been repatriated to the countries of their origin in the year gone by.

The Coast Guard has vigorously pursued its charter for the preservation of marine life. Every year, Operation "Olivia" is conducted to prevent the poaching of the endangered Oliver Ridley turtles along the Orissa coast. The Coast Guard has till date seized 315 boats along with 500 crew involved in poaching this protected species. The force also coordinates the National Oil Spill Disaster Contingency Plan. Efforts are underway to make the ports and oil handling agencies self reliant in providing response to oil spills of up to 700 Tons i.e Tier 1 capability. This would leave the Coast Guard to tackle major oil spills even in the deep sea with specialised vessels.

The Coast Guard is also assisting the coastal States in setting up Marine Police Stations and training the police personnel under the Coastal Security Scheme. To date 862 police personnel have been trained and Marine Police stations set up in 41 locations.

The emerging security situation in the backdrop of global terrorism calls for the Coast Guard to be at the highest state of vigil. To counter this new challenge, it has stepped up aerial and surface surveil-



lance to safeguard assets against subversive threats from the sea. Recently, a naval defence Boat T-60 and the Coast Guard ship Razia Sultana have been deployed in the Palk Bay in the wake of intelligence reports that the LTTE could be sending fresh cadres into Tamil Nadu.

Speed boats have been asked to intensify patrolling along the Indian coastline, and helicopters have also been pressed into service. The deployed vessels have been fitted with radars and 30 MM Medak guns and 12.7mm guns. The ships were also expected to prevent Indian fishermen from entering Lankan waters.

With future plans to explore and exploit the ocean bed up to 200 kilometres, that is the limit of India's EEZ, Indian Coast Guard will need more vessels and aircraft-both fixed and rotary wing. For covering this additional area and to prevent gunrunning, smuggling and human trafficking, as also terror attacks from the sea, the Coast Guard is reportedly eyeing an ambitious ramping up of its assets to 217 ships and 74 aircraft in the next five years.

'We are hoping to induct these assets during the 11th Five-Year Plan period (2007-12),' Director General, Indian

Coast Guard, Vice Admiral Rustom Contractor told exporters on the eve of the 31st anniversary of India's youngest armed force. Of the new ships, some 70 would be 'bigger vessels' like advanced off-shore patrol vessels and the others of a wide variety like interceptor boats and inshore patrol vessels. 'We are also looking at six multi-mission maritime patrol aircraft and twin-engine helicopters,' the ICG chief said of the force that started with just two frigates and five patrol boats taken on lease from the Indian Navy and today operates 76 ships and 45 aircraft. The expansion had become necessary as 'changes in the maritime environment have necessitated the Indian Coast Guard to evolve and take on additional responsibilities', informs Contractor. 'We are also the focal point in India under the Regional Agreement on Combating Piracy and Armed Robbery against Ships in Asia (ReCAAPP - involving 16 countries of the region) that has seen piracy in the Strait of Malacca reducing 30 per cent in the past few years,' Contractor feels. 'We have also signed agreements with Japan and South Korea to gain from the established practices of the two major coast guards in the region,' he adds. Japan is one country which, years before

the Tsunami of December 2004, had acknowledged the Indian Coast Guard as a very effective force in not only fulfilling its national aims, but also one whose presence in the Indian Ocean region is a deterrence and begun a process of joint cooperation. As such, some of the requirement of more vessels will come from India's private and government shipyards, whereas the rest will be procured from the world market.

-Col (retd) Anil Bhat, VSM



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AD

Ferrari of the Skies

That's the way AgustaWestland views its helicopters. With an accent on design and technical prowess, the company is also eyeing the Indian market in its expanding global plans. It's quietly waiting on the sidelines as it sees itself among the top contenders for India's huge defence tender for 317 helicopters in the offing. And its selling point is a trendiness which it says is unmatched by other manufacturers.

GENERATION NEXT

"Shape, performance, comfort, high cruise speeds and state-of-the-art safety features", says Roberto Farnese, describing the core of his products' appeal. As for the Indian market, Farnese believes it will be riding alongside the global trend-that of rapidly increasing demand for choppers. However, the pride of place for the company is in its avowed transmission system-the heart of the helicopter. The other feather in AgustaWestland's cap, he says, is the best full-flight simulator in the industry. "Our training facilities are of the highest standards", says Farnese.

Among its primary products are the AW 119 Ke, AW 109 Power, Grand, AW 109 LUH, AW 129, Super Lynx 300, AB 412, AW 139, AW 149, BA 609, Apache AH MK I, NH 90, AW 101 and the US 101.

Vergiate in Italy is where final assembly of the AW109 Power, Grand and AW139 helicopters is located and Sesto Calende is the home of

the AgustaWestland 'Training Academy'.

THE INDIAN CONNECTION

With New Delhi set to float a huge One-billion-dollar plus tender for light helicopters, combining the needs of both the Army and the IAF, AgustaWestland now finds itself vying for the big catch alongside other frontrunners Bell (US), Eurocopter (France, Germany & Spain) and Kamov (Russia).

"AgustaWestland is expecting to emerge as a sure partner for India", says Capt K V Kunnikrishnan, GM of India operations. "We will present light attack combat helicopters at the Defexpo 2008". The defence exhibition is being seen by experts as the final grand showcasing for the helicopter bid contenders. "We have a global presence and our products range from small single-engine to three-engine 15-tonne helicopters. The joint venture NH-90 and BA-609 military models have proved huge success stories", says Kunnikrishnan.

Take a look at its light attack AW 109 LUH. The baseline LUH is a light twin engine helicopter in the 3000 kg class. Its prolific armament capabilities include a rocket launcher, twin machine gun pod, machine gun pod (20 mm) anti-tank missiles and air-to-air missiles (Stinger or Mistral).

AIRBORNE BLOCKBUSTER

The company received a boost over two months ago, when the Italian Army's Aviation Unit took delivery of the joint venture NH



90 multi-purpose helicopter late in December, 2007. The Italian Army has ordered 60 NH 90 TTH helicopters which will replace older models currently operated by the service in various utility roles. The new twin engine NH90s aim to give the Italian Army a quantum leap in operational capability.

The NH90 TTH version is designed for tactical transport of personnel (16 to 20 troops) and material. Additional applications include medical evacuation (12 stretchers), special operations and airborne command post.

GROWING MARKET

The company will also be upbeat about India's growing private charter market, which is expanding at 40% per year. Also among customers are various state governments. "Our first helicopter was used by the Rajasthan government. The A 109 has been used or exclusive VIP transport. The J&K and Jharkhand governments are also using our choppers and we're now delivering to Andhra Pradesh", said Kunnikrishnan. The AW119 is in demand and the AW 139 is the most popular in India, he added.

AgustaWestland is the world leader in the corporate helicopter market and plays a leading role in the Italian market as well.

BIT OF HISTORY

AgustaWestland was created by the forging of two big helicopter companies in the formative days of aviation manufacturing in the early 20th century. Agusta and Westland first collaborated in the 1960s, when Westland started license production of the Agusta AB47G, better known as the "Sioux". Starting in 1964, Westland built 250 of these small helicopters. The relationship between Agusta and Westland matured over 20 years through a tie-up on the development and production of the 16-ton multi-role EH101.

This was the platform which enabled the two Companies to seal integration when Finmeccanica S.p.A. of Italy and GKN plc of the UK signed the agreement for the formation of a 50:50 joint venture company named AgustaWestland in 2001. In December, 2004 Finmeccanica acquired GKN's 50 per cent stake in AgustaWestland.

AIR FORCE ONE

AgustaWestland opened offices in Philadelphia in 2005, and won a contract to build the new presidential helicopter Marine One over the U.S. manufacturer Sikorsky Aircraft. News is that the IAF is closely looking at the US 101 model for ferrying of the country's VVIPs by next year.

By Amitabh Joshi



Defence Majors Vying Robust Indian Arms Market

Defence majors continue to woo India, which imported military hardware and software worth a staggering \$25 billion since the 1999 Kargil conflict.

With a war chest to spend another \$30 billion or almost Rs 120,000 crore on arms imports by 2012 by India, countries as well as global armament companies continue to jostle with each other to grab big pieces of the lucrative action.

According to a defence ministry official "Around 40 per cent of these are international companies." All the big players in the global arms bazaar, ranging from the American Boeing and Israeli Aerospace Industries to the European Aeronautic Defence and Space Company and the Russian Rosoboronexport State Corporation, are showcasing their wares. Moreover, India is looking to leverage big defence deals to further its own geopolitical objectives.

Big armament players, of course, are falling over each other to come to India, with



several even setting up India offices in recent times, since there are rich pickings to be made. For instance take the military aviation sector. The first leg of the 'mother of all defence deals', the \$10.4 billion project to acquire 126 multi-role combat fighters for IAF,

will conclude in first week of March, with six foreign aviation majors submitting their technical and commercial bids.

The Army, in turn, is going in for artillery modernisation worth almost Rs 12,000 crore. This includes 140 ultra-light howitzers for around Rs 2,900 crore, 400 155mm towed guns for Rs 4,000 crore and 180 155mm wheeled self-propelled guns for Rs 4,700 crore.

That's not all. India is also looking for more radars, missiles, spy drones, precision-guided munitions and the like. All this frenzy of activity, of course, also provides scope for a lot of bloodletting.

India is also hunting for 317 'light' helicopters for IAF and Army in a project worth over \$2.5 billion, which like the fighter project will involve indigenous production with transfer of technology as well.

"The combined global tender for the helicopters is being issued," defence minister A K Antony said. The Navy, in



turn, has already launched commercial negotiations to acquire eight Boeing P-8i long-range maritime reconnaissance aircraft with anti-submarine warfare capabilities for around \$2 billion.

Even the Coast Guard is now looking for 'multi-mission' maritime aircraft. "We want six for surveillance and search-and-rescue operations," Coast Guard director-general Vice-Admiral Rusi Contractor said.

The plans in other areas are equally big. Navy chief Admiral Sureesh Mehta said the global tender for the second line of six submarines — after the mammoth Rs 18,798 crore French Scorpene submarine project now underway at Mazagon Docks — will be issued in 2008-2009. 



Indian Ballistic Missile to go on trial next Year



go on an attack mode despite having the capability to hit targets at 3,000 km and beyond with Agni-III and its upcoming variants,' informed Saraswat.

The advanced BMD is at a design stage and will go on trial in 2009-2010. With all the elements of the system such as the long-range tracking radar, the

multi-function fire control radar, the very intelligent and potent mission control centre for deciding the launching of the interceptor, the BMD will be able to detect IRBMs and ICBMs of any country and destroy on target.

'The first anti-missile defence system, which was successfully test-fired Dec 6, 2007 from the integrated test range in coastal Orissa, demonstrated our capability to intercept targets at 45 to 50 km (exo-atmospheric) as well as at 15 to 20 km (endo-atmospheric) altitudes and disintegrating

them.' With this capability, we have protective missile cover in the western region and north-eastern region,' Saraswat said.

India is surrounded by countries in and around the region possessing various ballistic missiles that could be fired from any direction.

The tracking and fire control radars were developed by state-run DRDO in collaboration with Israel and France. With the development and production being taken up concurrently, the Electronics and Radar Development Establishment (LRDE) in Bangalore has been commissioned to roll out more radars for short, medium and long range use in association with the private sector.

'LRDE has a full-fledged facility at Kolar to assemble and calibrate the radars required by the defence forces,' Saraswat said.

Under the integrated guided missile programme, DRDO plans to test fire Agni-IV intermediate range missile in mid-2009. It will be able to hit targets in the range of 5,000-6,000 km.

'As the fourth country in the world to have capability for designing and developing attacking and defensive (anti) missiles from short to long range, our technology is home grown and self-reliant in spite of the missile technology control regime (MTCR) and denial of dual-use technologies by the developed countries due to sanctions,' Saraswat added.

India will have an indigenous ballistic missile defence system to intercept and destroy intermediate ballistic missiles (IRBMs) and inter-continental ballistic missiles (ICBMs) by 2010.

'We are developing a robust anti-missile defence system that will have high-speed interceptions for engaging ballistic missiles in the 5,000 km class and above. We have recently demonstrated the capability to handle such targets up to 2,000 to 2,500 km,' Defence Research and Development

Organisation (DRDO) chief controller V.K. Saraswat told reporters on the sidelines of the 95th Indian Science Congress.

With an advanced integrated ballistic missile defence (BMD) system India joins the exclusive club of Israel, Russia and the US in developing and possessing the technology to attack and defend itself from any adversary in the region or beyond.

'With our avowed policy of 'no-first use' with respect to nuclear weapons, we may not

Genesis EW's Breakthrough Solutions

Genesis EW Ltd. - specialists in software solutions for the EW industry, is demonstrating the GenCOM Suite at Defexpo 2008 event. GenCOM Suite is a leading-edge decision support platform, granting fast and comprehensive insight into the electromagnetic battlefield. Incorporating cutting-edge technologies to process and analyze intercepted Signal

Intelligence (SIGINT) data, GenCOM Suite automatically generates a sophisticated and accurate situational awareness picture.

Genesis EW has combined data fusion with innovative algorithms to produce a multi-layered build-up reflecting the geo-spectral, communicational and tactical status of the battlefield with its breakthrough development of the GenCOM

Suite.

The situational awareness picture is displayed on a friendly, highly customizable user interface. GenCOM Suite additionally functions as an advanced simulation platform, providing complex electromagnetic arena simulation which is used for operator training, system components testing and integration support.

GenCOM Suite is com-

posed of stand-alone commercial-off-the-shelf (COTS) products, offering maximum built-in flexibility and the best fit to the client's needs. GenCOM is fully compatible with a broad range of sensor inputs, and data can be output either to a central database or to GenCOM's components.

GenCOM Suite will be demonstrated daily at the Israeli Pavilion, Hall 11.

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March Into History Series

The Battle of Kursk



It was the mother of all battles. The Battle of Kursk (or Kursk Campaign, July 4, 1943 – July 20, 1943), also called Operation Zitadelle by the German Army (Operation Citadel in English), was a major defensive battle strategy on the Soviets' part in the Eastern Theater during World War II.

It was a monumental military operation, but it will always be remembered as the largest clash of armour during the Second World War. Hitler needed a victory to consolidate his eastern push and the vast area around the city Kursk provided the stage for the deadly drama. Aware of Hitler's intentions, the Soviets constructed a huge multi-layered line of defence-laying mine fields and putting in place huge numbers of reserve forces.

MASSIVE BUILD-UP

It was an astounding build

up ahead of the fight with armour and troop concentrations by both sides reaching unprecedented proportions. The Russians got together 1,300,000 men, 3,600 tanks, 20,000 artillery pieces, and 2,400 aircraft. The Germans, no less formidable, had a force of 900,000 men, 2,700 tanks and 2000 aircraft.

The campaign, which included the famous sub-battle at Prokhorovka, remains the largest armoured engagement of all time, and included the most costly single day of aerial warfare in history.

While the Germans saw the Battle of Kursk as Operation Zitadelle only; the Soviets saw Zitadelle as the defensive phase of the battle, followed by Operation Kutuzov and Operation Polkovodets Rummyantsev as an offensive phase.

A TURNING POINT

The key turning point of the campaign was that while the Germans planned and initiated an offensive strike, the well-planned Soviet defence not only managed to frustrate their ambitions but also enabled the Soviets to follow up the successful defence with counteroffensives and exhausted the German abilities in the theater, thereby seizing the initiative for the remainder of the war.

The pattern of the war up until this point had been one of German offensive success. Blitzkrieg had worked against all opposing armies, including the Soviets'. None had succeeded in stopping a German breakthrough. The German delay in launching their offensive gave the Soviets four months in which to prepare, and with every passing day they turned the area into one of the most heavily defended points on earth.

Soviet minefields and artillery were again successful in delaying the German attack and inflicting losses. The ability of dug-in Red Army units to delay the Germans was vital to allow their own reserves to be brought up into threatened sectors. Over 90,000 additional mines were laid during the battle by small mobile groups of engineers, generally working at night immediately in front of



the expected German attack areas.

Kursk further demonstrated that the conflict in the East contained the largest scale of warfare in history, in terms of manpower involved.

DEFENCE BECOMES OFFENCE

So well designed was the Soviet defensive planning, that when entering the archetypical counterattack phase, the Soviets were able to attack along four separate axes of advance, and execute a planned stop at a phase line. They superbly avoided the pitfalls of overextending during the counterattack and earning this battle's deserved place as a model campaign in war college curricula.

But that glory came at a horrific cost. The total number of losses for the whole offensive was put at 100,000 men killed or wounded. The Soviet casualty figures were not released until the end of the communist era. They were recorded at 250,000 killed and 600,000 wounded. They also lost half of their tank strength.

-Amitabh Joshi

China Absent From DEFEXPO, Pakistan not Invited

In the midst of the growing India-China bonhomie, Beijing has inexplicably decided to stay away from DEFEXPO-2008 international military exposition that opened at the Indian capital, New Delhi.

Pakistan, however, was not invited to the four-day event at which a record 273 defence manufacturers from 30 countries - and 202 from India - are showcasing their varied portfolios.

Secretary (Defence Production) Pradeep Kumar

informed cryptically, 'Yes, I can confirm that China has not accepted our invitation, while in the case of Pakistan, they were not invited,' he added, without giving any reasons. Officials here were not surprised at China's decision to stay away.' Obviously, the Chinese do not view India as a market as they sell varied equipment to Pakistan and India would thus be wary of doing business with them,' according to official sources. At the same time, sources expected some diplomats and defence officers from

the Chinese embassy here to visit the exposition.

The Chinese decision would also not impact on the growing military ties between the two Asian giants. The two armies had last month conducted their first-ever joint drill in China and are scheduled to conduct another in India later this year.

Chinese military officers also expected to witness the 'Brazen Chariot' war game to be jointly conducted by the Indian Army and the Indian Air Force at the Pokhran range in Rajasthan's Thar Desert next

month.

Spread over eight halls and 32,000 sq metres of open and covered space, DEFEXPO-2008 will see the launch of a staggering 91 new products ranging from radars, to communications systems, torpedoes, anti-mine vehicles, unmanned aerial vehicles and combat clothing.

And given the fast warming ties between New Delhi and Washington, it is not surprising that US companies should be making a beeline for the biennial exposition.

New Surface-to-Surface Missile in the Offing?

Two successful interceptor missile tests carried out by Indian scientists as part of the country's ballistic missile defence programme in the first week of December last year has led to development of a new surface-to-surface missile that could be possibly named as 'Ashvin'.

The endo-atmospheric interceptor missile AAD, the missile used to engage the approaching 'enemy' missile at a height of around 15 kms from the surface of the earth, could be used as a surface-to-surface missile in the days ahead. The AAD, which is 7.5 mts long and has a solid rocket propeller with siliconised carbon jet vanes, has a range of over 150 kms and could achieve a maximum velocity of 1400 m/s.

The USP of this missile is its high precision INS system, faster on board computer with advanced technologies like RF seeker, agility and the capability to launch the missile in any direction in autonomous mode.

The December tests have validated that the AAD could also be used as an Extended Range Surface-to-Air Missile, besides being used as a ballistic missile interceptor.

Dr V K Saraswat, who is the team leader of the ballistic



defence programme, was also involved with the development of the India's first surface-to-surface missile Prithvi I and Prithvi II (Dhanush).

According to Dr. Saraswat, "The AAD could be used to target aircraft", adding that its successful launch has opened up a 'new era' with the development of supersonic interceptor missiles that can be used for defence against Cruise missiles".

He was of the opinion that the AAD part of the missile defence programme is completely independent from surface-to-surface missile programme and that it is purely a spin off of the entire project.

Prithvi I is India's first indigenously developed tactical surface-to-surface short-range ballistic missile (SRBM) developed under the Integrated Guided Missile Devel-

opment Programme and has already been inducted into the Army.

The single stage liquid-fuelled Prithvi I with maximum warhead mounting capability of 1000 kg has a range of 150 km. It has an accuracy of 10-50 metres, while the AAD is precise to 0.5 mts.

Prithvi II (Dhanush) is the Air Force version of 250 kms range and capacity to carry a payload of 500kg, while Prithvi III is the naval version of 350 km range with a payload of 500 kgs.

Defending the idea of having a ballistic defence programme, Dr. Saraswat feels that threat of ballistic missile exists along with the proliferation of these threats, and added since India has a no first use policy; it becomes inevitable to protect the country from any future missile attack." The programme shows the defensive position of the country and not an offensive position," he added. 

RUSSIAN DEFENCE EXPORT

The Rosoboronexport State Corporation is the sole state intermediary agency for Russia's military exports/imports. It delivers a complete range of defence-related products for all military, paramilitary and special services, as well as dual- and civil-purpose technologies. The corporate strategy is focused on building and developing long-lasting partnerships under the tenets: "Efficiency. Reliability. Quality".

EFFICIENCY
RELIABILITY
QUALITY



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C-130J Acquisition Will Ameliorate IAF Tasks



In due course the IAF could increase the order as the C-130 is one of the world's most proven machines and operated by several countries. Canada has just placed an order. In the aviation strike in Australia the fleet of C-130s had come to the rescue.

The letter of acceptance (LoA) issued by MoD's procurement wing to Lockheed stipulates the supply of six aircraft, infrastructure, spares and spare engines. Many companies like Honeywell, Rolls Royce and others which supply engines and parts stipulated in the contract would benefit. According to the aircraft's manufacturers, Lockheed Martin, the C-130J is equipped with low probability of intercept radar, advanced self-defence systems and enhanced situational awareness from the head-up displays and moving maps. It is meant for demanding special operations and combat search and rescue missions. The Indian Army is converting some of its Para Battalions in to Special Forces and are being kitted up accordingly.

The contract for troop transport aircraft is not subject to the strict offset clause put in place for all defence import deals worth over Rs.300 crore, as it is government to government FMS deal but it is understood Lockheed has decided to pro-

vide sub-contracts and make investments worth about \$ 300 million, the details of which are still to be worked out as all defence direct off sets have not been successfully attempted. Hence details of how the supplier will go about fulfilling the offsets are to be negotiated, though it is reported Mahindra and Bharat Electronics Ltd have been approached for absorbing some off sets. The state trading corporation (STC) is handling the large Boeing and Airbus offsets and all eyes are on the National Aviation Company of India (NACIL) for the large multi billion dollar order on Boeing and Airbus for 112 aircraft which has a combination of direct and indirect offsets in aviation, and 'Vanilla' offsets in other industries to the tune of \$ 2.5 billion.

C-130J, C-130M, A400M... IL-76? The CC-130s are used in a wide variety of roles, from tactical transport to aerial refueling and even search and rescue. The Canadian Forces do not own any other aircraft in a similar class, which makes replacement essential. EADS tried to remain in the running with its Airbus A400M, and other alternatives were proposed, but the specific requirements set by Canada's Department of National Defense (DND) tended to exclude alternatives.

-Ranjit B Rai

On 31st January the MOD announced that after prolonged deliberations a confirmed order had finally been issued for the acquisition of 6 C-130J Hercules transport aircraft for a sum of around \$ 1 billion, the largest order bagged by the US military industrial complex so far. The aircraft is manufactured by Lockheed and the deal is a government to government deal through the foreign military sales (FMS). The IAF has truly been stretched as it has to airlift up to 25000 tons per year and most of its transport aircraft and helicopters operate in extreme envelopes of weather and at times parachute stores to

Siachen at 17,000 feet and in drop Zones deep into the Solto-ro snow capped reservoirs. The calls for transport assistance by the Army and at times to assist civilian evacuations have also increased. In the present IAF inventory of 26 IL-76s of which 2 are dedicated to the aviation research centre (ARC) of RAW, the IL-76 which is a basic long range transporter can carry a 30 tonner load. The other transporter the AN -32 can carry a 6 tonne load so a gap exists, when the Army has a need for 10 to 12 tonnes load including a lift of 6 tanks. The C-130J is the latest model with a special six bladed propeller for fuel efficiency and will bridge that gap.

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Scorpene Subs to carry SM39 Exocet Missiles



On 6th of October, 2005 the Indian Navy sighed with relief as their persistent efforts to build submarines in India came alive again after the HDW deal, which saw two submarines being successfully built by the Mazagon Docks Ltd, India and further operations halted in the early 90s due to irregularities which were never proved. The Scorpene deal with involvement of the French DCN, Thales and the Spanish Navantia companies under the banner of Armaris was signed by the French Ambassador Dominique Girard and Indian MOD's Additional Secretary D Banerjee for the first 6 submarines in a \$ 3 billion contract in New Delhi on that day, in the presence of the Chief of Naval Staff Admiral Arun Prakash. This was the largest contract the Navy had signed and the progress of the project is reported to be satisfactory at Mazagon Docks Ltd and the first boat will be delivered in 2011 and one every year thereafter.

The prices of the submarines include an escalation clause which complicated technology transfer agreement.

The Indian Navy was in need of a land and ship attack missile in its next class of submarines, and only the French option was available with the SM 39 Exocet at that time, the project was mooted. Pakistan Navy had earlier acquired the Exocets in their Agosta class of submarines and on the French supplied Altantiques, while the PN P3C Orions are capable of launching the Harpoons. The first two Scorpenes will be assembled in India with complete systems, CIC, sonars, EW and

associated kits from France in a plug and play mode. UDS International will supply the Subtics combat system and Thales the sensors, electronic warfare systems and communications. Thereafter the deal provides for the transfer of technology to India for 4 submarines to be built under license. The compact 1500 ton boats based on the French nuclear submarine design will be armed with the SM 39 Exocet MBDA anti-ship and land attack missiles.

The Scorpene's six 21inch torpedo tubes will be capable of firing SM-39 Exocet anti-ship missiles, which have a range in excess of 50km. Each boat can

carry 18 torpedoes or missiles or combination. The Subtics combat management system with up to six multifunction common consoles and a centrally situated tactical table, is collocated with the platform-control facilities. The combat management system is composed of a command and tactical data handling system, a weapon control system and an integrated suite of acoustic sensors with an interface to a set of Air Surface Detection sensors and to the Integrated Navigation System with GPS for targeting.

ABOUT THE EXOCET MISSILE

The Exocet is a French-built anti-ship missile whose various versions can be launched from surface vessels, submarines, and aircraft have a good track record in action. Several hundred were fired in combat during the 1980s. The name comes from a French word for 'Flying Fish'. The Exocet has been manufactured in a number of versions,

The Exocet is a French-built anti-ship missile whose various versions can be launched from surface vessels, submarines, and aircraft have a good track record in action. Several hundred were fired in combat during the 1980s. The name comes from a French word for 'Flying Fish'.

DCNS to set up Indian Subsidiary

DCNS is a company on the move. Way back in 2003, the Group changed its legal status from government administration to stand-alone company or, more specifically, a State-owned commercial enterprise under private law. In this exemplary transformation, DCNS reorganised key activities (purchasing, human resources, project management, etc.) on commercial lines to become a highly successful industrial Group. To meet the growing demand for integrated naval services from countries further afield, DCNS offers its services as a naval prime contractor and warship support provider by drawing on its own resources in development, marketing, production and partnering. Says **Laurent Videau**, delegate-India & Thailand in an exclusive chat with *International Aerospace*, 'Our financial results are there for all to see. In 2006 DCNS generated revenues of €2.7 billion and held firm orders worth €8.2 billion. Our healthy operating income of €213 million is the result of continuing efforts to cut costs and improve our industrial and management processes. Excerpts of the interview:

What is the progress on the Scorpene deal; would you like to highlight the current status of it?

The programme to provide India

with six Scorpene submarines was signed on 6 October 2005 as part of a broad technology transfer agreement. The programme is on track. The initial preparatory phase undertaken by DCNS is approaching completion and will shortly enable Mazagon Dock Limited to launch the production phase. The components to be produced by DCNS are also on track. For instance, the aft bulkhead for the first submarine was accepted by the Indian customer's representative in France after it passed its Factory Acceptance Test last summer.

In a few months' time, DCNS plans to set up an Indian subsidiary. The main aim is to ensure the success of the current Scorpene contract. DCNS India will offer products and services, including project follow-up. It will also help to optimise the organisation of the Scorpene programme and smoothe the associated technology transfer by supervising the local production under licence of systems, subsystems and components.

What is the size of the deal and do you think you are working on schedule to deliver on time?

The Scorpene contract provides for the construction under licence of six submarines, associated technology transfers, supply of hull elements

and combat systems and the secondment of technical advisors while the first two boats are being built. The first cut for the first submarine took place at Mazagon Dock Limited's Mumbai shipyard in December 2006. The first boat is scheduled for delivery in 2012 with the other five to follow at a rate of one per year.

Are there any further offer you expect to materialise with the Navy from your company? If so, explain?

We are awaiting an RFP for 6 additional submarines in the next few months. We are also hoping to participate to an RFP soon to be issued for additional frigates within the frame of the P17A project. We are also interested to be involved for the LPD project under definition.

What is the current status of the worldwide order book of Scorpene and how many of them have been delivered by now?

The Scorpene is a conventional submarine (i.e. diesel-electric propulsion) designed for anti-submarine and anti-surface warfare. DCNS has delivered two Scorpene to Chile and is currently building two more for Malaysia.

How has been Asia-Pacific region for DCN group against stiff competition from others?

DCNS has had discussions with various countries in the Asia-Pacific region, but no programmes have been announced other than those with India and Malaysia.

What about DCNS's future role?:

DCNS aims to make its know-how in through-life support (TLS) and naval services available to friendly navies. In December 2005, the DCNS group set up DCNS Far East in Singapore to guarantee the operational availability of the Republic of Singapore Navy's Formidable-class frigates produced under a technology transfer programme. Similarly, DCNS will set up a joint venture with a Malaysian naval shipyard to maintain the two Scorpene submarines on order for the Malaysian Navy. Fully aware of what it takes to guarantee the success of its customers' projects, DCNS plans to set up a subsidiary in India to ensure that submarine production proceeds smoothly. In all probability, DCNS will also set up a joint venture with local partners.

- Trilok Desai

including:

MM38(surface-launched); AM39(air-launched); SM39(submarine-launched); and MM40(surface-launched).

The 670 kg Exocet is a solid propellant missile designed to hit large warships and is guided inertially in mid-flight, and turns on its active radar during its flight at

a pre determined range called 'Gate' to find and hit its target by a lock on. The submarine-launched version places the missile and a booster motor in the launch capsule. The newer

MM40 version (MM40 block 3) has an improved range of 180 km, through the use of a turbojet engine. 

-Ranjit B Rai

Rosoboronservice (India) Crosses Rs.100 cr Threshold

The initiative taken by Russia's defense equipment canalising agency Rosoboronexport and seven eminent designs and manufacturing corporations to promote an Indo-Russian joint venture, is coming of age. Created after the approval by the President of the Russian Federation and by an issue of a special governmental decree, the JV is growing rapidly to become a world-class repair and logistics service provider.

The order book of Rosoboronservice (India) Ltd crossed the Rs.100 crore threshold last week. This service centre's charter includes repair, maintenance and trials / testing of equipment, documentation support, supply of spare parts, assemblies and replacement equipments besides providing Training and Specialists Services. The services provided by ROS (I) are backed and certified by the respective OEM's in all respects. The contributions

made by ROS (I) during the last two years have been noteworthy and have received appreciation from its Indian naval customers.

The warehouse and repair facility of ROS (I) is the first of its type, to be created anywhere in the world for supporting Russian Military Products at the Customers' door step and its infrastructure in Mumbai is now a reality. It has recently acquired 15,000 square feet of fully built up property in Trans

Thane Creek (TTC) Industrial Area in Rabale, Navi Mumbai, for converting a major part of it into a warehouse for storing spare parts for sale to the Indian Armed Forces, whilst the rest is to be used for repair workshops. The management of ROS (I) and Rosoboronexport supported by FS-MTC are preparing to make presentations at the MOD of India aimed at extending the service portfolio to all three wings of the Indian Armed Forces. 

Eurofighter Typhoon – Partner of Choice for India

With the race for the MMRCA programme heating up, *International Aerospace Show Daily* caught up with Bernhard Gerwert, CEO, Military Air Systems, EADS Defence & Security ahead of the show.

As the competition for the Medium Multi-Role Combat Aircraft (MMRCA) in India is in full swing, Eurofighter is working overtime to prepare a robust and attractive answer to India's Request for Proposal (RFP) says Gerwert.

Speaking about some of the elements of the RFP like the transfer of technology, license production and industrial cooperation Gerwert said that we are fully committed to offer India not only a modern

their strong support to win this important competition. In addition, the partner nations are prepared to intensify their political relations with India and support its economic and industrial development. "The four industrial partners with broad experiences in international cooperation will also join their forces in order to develop a close and long-lasting partnership between the Indian and European industry."

Currently the consortium



combat aircraft with impressive operational capabilities but also several political, industrial and technological advantages.

He elucidated that all the four Eurofighter partners including the four Governments in Germany, United Kingdom, Spain and Italy will provide

has already delivered more than 140 aircraft with a positive feedback from all Air Forces. "Since the aircraft's entry into service in the spring of 2004, its order book has increased to more than 700 aircraft from six nations including Austria and Saudi Arabia as first export

customers. Countries such as Greece, Turkey, Switzerland, Japan, Bulgaria and Romania have also shown strong interest and India is most welcomed to join the Eurofighter family not only as an important customer but as a real partner."

According to Gerwert one of the most impressive features that the Eurofighter Typhoon offers is its multi- and swing-role capability, which provides military commanders with enormous flexibility. This means that the aircraft can fly either air-to-air missions or air-to-ground missions or both missions at the same time – a characteristic that is second to none in the ongoing MMRCA competition and qualifies the Eurofighter Typhoon as the major operationally capable candidate.

When asked about the

weapons payload capability of the aircraft Gerwert responds that the Eurofighter is always capable of carrying six air-to-air missiles plus additional air-to-surface weapons such as Paveway II or GBU-10/-16, or external fuel tanks on seven further hard points.

"Thanks to these unique air-to-air and air-to-ground capabilities, the Eurofighter Typhoon has proven itself as an awesome operational weapon system, which combines advanced technology with world-class performance. The Eurofighter Typhoon provides highest levels of mission effectiveness for all scenarios and a broad range of mission flexibility. In addition, its air-to-air refuelling capability extends mission duration and range," he concluded.

Russia To Promote Its Air Defence, Radar Systems

Russia is showcasing many of its air defence and radar intelligence systems. Specialists and visitors will see the S-300PMU2 Favourit mobile multi-channel long-range air defense missile system, which is considerably better than its closest foreign equivalent, the US-made Patriot PAC-3 (Patriot Advanced Capability-3) system, a spokesman of

Rosoboronexport, the state-controlled arms exporter, said.

The Russian stall at the four-day event also features "Favorit", a highly effective counter to cruise and ballistic missiles with a range of up to 1,100 km.

The Russian stand also provides information about the medium- and shorter-range air defense systems Buk-M1-2, Buk-M2E and Tor-M1, the

formidable Tunguska-M1 gun/missile system for low-level air defense, and the Igla air defense missile system.

Rosoboronexport specialists will explain visitors about the programmes to modernise the ZU-23, Pechora, Osa-AKM and Strela-10M air defense systems, the expert said.

Experts will be also able to inspect the technical

characteristics of the Mil and Kamov helicopters, including the Mi-35 Hind, Mi-35P and Mi-35M attack transport helicopters, the Mi-17-1B Hip attack transport helicopter, the Mi-28NE Night Hunter attack helicopter, the Ka-29 Helix-B deck-based helicopter, and the Ka-31 radar picket naval helicopter fitted with the E-801M Oko (Eye) airborne electronic warfare radar.

South African 40mm Grenade Launchers to be Built in India

Rippel Effect Weapons Systems (Pty) Limited recently joined hands with an Indian company to manufacture its innovative 40mm handheld grenade launchers here, it was announced at Defexpo event in New Delhi this week.

Currently, India is one of 20 countries operating the 40mm multi-shot grenade launchers (MSGs). The JV company, MGL Systems India, will soon start to manufacture the

weapon in its factory in Uttar Pradesh, for the local market and for other clients in the region.

“The MSGL weapon systems are 100% suited to India’s FINSAS (Future Infantry Soldier as a System),” explained Charl Saayman, Marketing Executive of Rippel Effect.

“With India’s defence manufacturing legislation now amended to allow foreign companies to partner directly with local ones, it made sense for Rippel Effect

to join forces with the local industry to build the MSGL here,” said BS Bath, Deputy General Manager of MGL Systems India.

“We see our involve-

ment in India as very much in the spirit of IBSA (the India-Brazil-South Africa cooperation initiative),” said Saayman.

“Similar to our joint venture with India, Rippel Effect signed a technology transfer agreement with the Brazilian firm, Imbel, for the manufacture of the Rippel Effect products in that country.”

Rippel Effect is showing its handheld 40mm multi-shot grenade launchers at DEFEXPO. The launcher has been designed and qualified the launchers and the sighting systems on show, according to the latest NATO standards and specifications.

According to Saayman the company has ensured



that the qualification of its two new weapons and advanced sighting systems was done according to qualification standards set at the UK Ministry of Defence’s Ordnance Safety Group. The Council for Industrial and Scientific Research, a government owned research body in South Africa, independently verified the qualification process. Rippel Effect has registered patents on its new weapon systems, the truly innovative sights and the extended range grenade.



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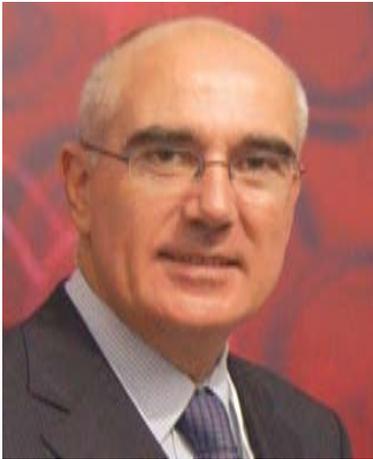
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EADS India: Developing New Partnerships

The aerospace power is angling for a bigger share of the Indian market by dramatically increasing its on-the-ground operations. **Yves Guillaume, CEO, EADS India**, in an exclusive to **International Aerospace SHOW DAILY** elaborates the targets of the European Aerospace Company. Excerpts of the interview:



Yves Guillaume

What will be your goals at the forthcoming Defexpo?

We regard Defexpo 2008 as an excellent opportunity to invite our current and future customers and talk with them about our products and capabilities. We also look at this exhibition as a perfect occasion to develop new possibilities for partnerships with Indian companies and to expand our existing network with suppliers for cooperation in new programmes.

Are you looking for partnerships with Indian companies?

Yes, we intend to do this very strongly. EADS and its predecessor companies has always been a reliable partner and our partnership approach has assured our participation in the development of the Indian industry. We are represented by EADS India Private Ltd. here in New Delhi in order to intensify our business activities. EADS has always looked at Indian companies and research institutes not only as customers but as real partners in order to establish long-lasting partnerships for the benefit of both sides.

Can you give us a concrete example for a partnership here in India?

Our business unit defence electronics is, already engaged in a partnership with the Defence Research and Development Organisation (DRDO) and DARE, a research institute based in Bangalore, to jointly develop a Missile Approach Warning System for all kinds of platforms.

Could you explain the concept of the "soldier of the future" called Warrior 21?

The Defence & Security division is developing Warrior 21 for soldier modernisation requirements. This integrated solution for future infantry soldiers is fitting the Indian Army requirement and will be demonstrated during Defexpo2008 to all visitors. Warrior 21 provides infantry men and commanders with updated and complete situational awareness in complex missions. This can be realised through links with and interpretations into command and control and communications systems as well as various ground-, air- and sea-based vehicles, sensors and effectors.

Do you offer unmanned aerial vehicles (UAVs) to the army as well?

In addition to manned combat aircraft such as the Eurofighter Typhoon, EADS also manufactures UVAs for armed forces. In India, we have successfully demonstrated our light tactical UVA called Tracker to the army. This UVA is dedicated to surveillance and intelligence missions. It is capable of gathering, in day and night conditions, close range high resolution images with secured real-time processing. 



Indian Navy, Coast Guard's Well Defined Roles

The Indian Navy (IN) with a total of 129 ships including 15 submarines manned by 60,000 strong uniformed force and equal number of civilians that man dockyards, armament and stores depots is a versatile and flexible instrument of national power, which can be used independently or in consonance with other instruments to achieve the country's security objectives and protect national interests.

The Government and the nation now appreciate that the Indian Navy (IN) has to become a versatile and flexible instrument of national power, which can be used independently or in consonance with other instruments to achieve the country's security objectives and protect national interests. India's economy has done well and there is no looking back even if there are set backs as a synergy has set in. The roles of the Navy have been defined in IN BR 8 Indian Maritime Doctrine, and CNS Admiral Sureesh Mehta in his Navy Day briefing on 3rd December, 2007 indicated it is being reissued to include some salient roles in the early 21st Century. A summary of these is tabled.

Military Role: This includes defence of the mainland, India's maritime assets and shipping, interdiction of the enemy's maritime forces, sea control, sea denial (to the enemy), blockading the enemy's

ports and harbours. The Navy has also acquired ability to strike targets in land with missiles and when the MiG-29K are inducted. The role includes the naval manoeuvre which was conducted in the Kargil war with Indian Fleets combined off Karachi in readiness to blockade Pakistan. A forward Doctrine is proposed with a TRIAD and CNS Sureesh Mehta announced the ATV will be ready in 2008/9 and one Akula will assist in training from Russia.

Diplomatic Role: This includes showing the Flag, assistance during disaster and force deterrence. 'Foreign Cooperation' is the manifestation of Navy's diplomatic role and a full branch under the ACNS (Foreign Cooperation and Intelligence) has been formed. The IN's role in its neighbouring countries in the Tsunami and evacuation from Lebanon in 2006 Hezbollah Israel war are examples of its enhanced capacity. IN aims at building capacity and enhancing capability amongst all the littorals of the Indian Ocean Region. It has given up a numbers based Navy as 167 ships by 2017 set earlier will not be achievable. The Navy now speaks of capacity based Navy. A Con-



ference cum Grouping called IONS Indian Ocean Naval Symposium on 15th and 16th Feb 2008 in New Delhi is being formed and 30 littoral Navy Chiefs are expected to attend from 14th February 08 and to attend Defexpo08 from 16th.

Constabulary Role: This role includes anti poaching, anti smuggling, surveillance of the coast, anti terrorism and anti piracy, with a powerful Coast Guard which has over 40 aircraft and 50 ships. CG has 5 OPVs, 3 IPV's on order at Goa Shipyard, 3 3000 ton Pollution Control Vessels of Rolls Royce design at ABG Surat and one is to commission soon. The ship was delayed due to rain floods when engine room got flooded. 14 ALH Helicopters and Nishant

Indian DRDO UAVs on order for coastal surveillance.

Benign Role: The Navy's benign tasks are those such as humanitarian aid, disaster relief, Search and Rescue (SAR), ordnance disposal, pollution control, diving assistance, salvage operations, hydrographic support to the littoral etc. The role is termed as benign because violence has no part to play in its execution, nor is the potential to apply force a necessary requisite for undertaking the operations.

It is with these roles in mind that the government has sanctioned 39 ship orders and a second line of submarine construction is to be selected; Navy's MCMV selection is in process.

-Ranjit Rai

BAE Systems Launch ECLIPSE™ Military Gear

India— BAE Systems has introduced the ECLIPSE™ Performance Military Gear in the market. Created by experienced military personnel, ECLIPSE™ combines existing and emerging technologies with evolutionary designs and materials to form lightweight, versatile products for combat use. The ECLIPSE product line includes load carriage, helmets, soft and hard body

armor, aircrew survivability systems, and other related equipage items.

"ECLIPSE™ Performance Military Gear is built upon BAE Systems' reputation as a premier developer in individual equipment," said Sean Martin, vice president, sales and business development of Individual Equipment, for BAE Systems.

BAE Systems' individual equipment group has almost

four decades in entrepreneurship, innovations, and acquisitions in military equipage for the individual. To create and build upon the ECLIPSE line, BAE Systems implements a user response system to identify the most important elements military men and women look for in individual equipment, such as weight and durability. The response system keeps the company in-tune with con-

tinuously changing equipment needs on the front line and sets the criteria for future products.

The ECLIPSE™ Performance Military Gear product display includes an array of helmet styles and accessories, load carriage systems, apparel, and body armour. ECLIPSE gear will be produced in Jessup, Pennsylvania with support from 11 additional facilities within the United States.

Flight Into History Series

The B-29 Superfortress

It was a fighter bomber like no other and it changed the face of war aviation forever. Many experts opine that the B-29 Superfortress bomber was more intricate to develop than even the atomic bomb.

The U.S. heavy bomber used in World War II. It was the type of airplane that was used to firebomb Tokyo and other Japanese cities and that dropped atomic bombs on Hiroshima and Nagasaki, Japan, on Aug. 6 and 9, 1945, respectively.

HIGH TURNING POINT

The Superfortress was designed to meet Army Air Corps specifications written in January 1940 and was then modified to provide heavier armament and bomb load. The Boeing B-29 Superfortress was a four-engine heavy bomber propeller aircraft flown by the United States Military in World War II and Korean War and by other nations afterwards. The name "Superfortress" was derived from its well-known predecessor, the B-17 Flying Fortress.

The B-29 was one of the largest aircraft to see service during World War II. It was one of the most advanced bombers of its time, featuring innovations such as a pressurized cabin, a central fire-control system, and remote-controlled machine gun turrets. It was

designed as a high-altitude daytime bomber, but flew more low-altitude nighttime incendiary bombing missions.

It was the primary aircraft in the U.S. firebombing campaign against Japan in the final months of World War II, and B-29s carried the atomic bombs that destroyed Hiroshima and Nagasaki.

Unlike many other bombers, the B-29 remained in service long after the war ended, a few being employed as flying television transmitters for Stravision. The type was finally retired in the early 1960s, with 3,960 aircraft excluding the Tu-4, having been built between 1943 and 1946.

The airframe was further developed into the B-50 for the USAF, and the Soviet Union developed a virtual carbon copy Tupolev Tu-4 which was reverse engineered from confiscated B-29 bombers.

A COMPLEX TASK

Manufacturing the B-29 was a complex task. It involved four main assembly factories: two Boeing plants at Renton, Washington and Wichita, Kansas, a Bell plant at Marietta Georgia ("Bell-Atlanta"), and a Martin plant at Omaha, Nebraska ("Martin-Omaha").

Thousands of subcontractors were involved in the project. Because of its highly advanced design, challenging



requirements, and immense pressure for production, development was deeply troubled.

On 18 February 1943, the second prototype crashed during testing due to an engine fire that spread to the wing, killing the entire ten man crew and twenty others in the Frye meat packing plant just north of Boeing Field.

Changes to the production craft came so often and so fast that in early 1944, B-29s would leave the production lines and fly directly to modification depots for extensive rebuilds to incorporate the latest changes.

AN AIRCRAFT LIKE NO OTHER

In wartime, the B-29 was capable of flight up to 40,000 feet, at speeds of up to 350 mph (true airspeed). This was its best defense, for fighters of that day could barely get that high, and few could catch it, even if they were already up there and waiting. Only the heaviest of anti-aircraft weapons could reach it, and as Axis forces did not have proximity fuzes, hitting the aircraft was next to impossible.

The crew enjoyed, for the first time in a bomber, full pressurized comfort. This first-ever cabin pressure system for an Allied production bomber was developed for the B-29 by Garrett AiResearch Manufacturing Co. The nose and the cockpit were pressurized, but the designers

were faced with deciding whether to have bomb bays that were not pressurized, between fore and aft pressurized sections, or a fully pressurized fuselage with the need to de-pressurize to drop their loads.

The decision was taken to have a long tunnel over the two bomb bays so that crews could crawl back and forth between the fore and aft sections, with both areas and the tunnel pressurized.

LAUNCHED FROM INDIA

The initial plan, implemented at the direction of President Franklin D. Roosevelt as a promise to China and called Operation Matterhorn, was to use B-29s to attack Japan from four forward bases in southern China, with five main bases in India, and to attack other targets in the region from China and India as needed.

This was an extremely costly scheme, as there was no overland connection available between India and China, and all the supplies had to be flown over the Himalayas. B-29s started to arrive in India in early April 1944. The first B-29 flight to airfields in China (over the Himalayas, or "The Hump") took place on 24 April 1944. The first B-29 combat mission was flown on 5 June 1944, with 77 out of 98 B-29s launched from India bombing the railroad shops in Bangkok.



30 IAF Bases to get US\$1.5 bn Upgrade



India, which is planning a \$1.5 billion upgrade for its 30 military airports and their air traffic control systems, issued a request for bids in January, a senior Indian Defence Ministry official said.

The Indian Air Force is also buying air defense gear, a senior service official said. He gave no details about the

equipment sought but said the Air Force is likely to spend more than US\$1 billion on the equipment.

Invited to bid on the project's first phase were France's Thales, the USA's Lockheed Martin, Germany's Siemens, Italy's Celex, Britain's Terma, and India's Tata Power and Mumbai-based NELCO. That

phase will include the supply, installation, testing and integration of equipment subsystems.

The effort is part of India's plan to increase troops' mobility in conformity with the latest military doctrine, which stipulates that future wars will be fast, lethal and shorter.

Last month, the Indian government approved the purchase of six U.S. C-130J airlifters to speedily move troops.

The airfields include Adampur, AFA, Agra, Ambala, Bagdogra, Bareilly, Bhatinda, Bhuj, Bidar, Chabua, Chandigarh, Gorakhpur, Gwalior, Halwara, Hasimara, Hindon, Jaisalmer, Jamnagar, Jodhpur, Jorhat, KKD, Nal, Naliya, Pathankot, Pune, Sirsa, Suratgarh, Tezpur, Uttarlai and Yelahanka.

Bidders must include offsets worth 30 per cent of their bid, and must agree to complete

the work within 3 years of contract signature. One airfield will become a model airbase and test bed, the official said. Each airfield must receive new lighting, automated air traffic control management system, instrument landing system, distance measuring equipment and a Doppler very-high-frequency omni-range navigation system that works up to 15,000 feet. The winning bidder must also supply six mobile airfield lighting systems to fill in when airfield lights fail, one mobile air traffic control system, and facilities to train people to run and fix the systems.

The automated air traffic control system must operate around the clock, 365 days a year, with lights that have a minimum life of 15 years and operate from zero to 50 degrees Celsius. All equipment should be able to operate on AC power from 160 volts to 260 volts.



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A US M109 A6 Paladin self-propelled Howitzer

It's time to take a look at some of the weapons which have made a mark in the artillery arena. In the area of artillery, Self-propelled artillery vehicles are a way of giving mobility to big guns. Within the term are covered Self-propelled guns (or howitzers) and rocket artillery. They are high mobility vehicles, usually based on caterpillar track carrying either a large howitzer or other field gun or alternatively a mortar or some form of rocket or missile launcher. They are usually used for long-range indirect bombardment support on the battlefield.

THE M 109 A6 HOWITZER

The M109 is an American-made self-propelled 155 mm howitzer, first introduced in the early 1960s. It has been continually upgraded and improved to today's current version, the M109A6 "Paladin" which is only used by the US Army.

The US still maintains a number of M109A5's in its forces. The M109 family is the most prevalent western indirect-fire support weapon of maneuver brigades of armored and mechanized infantry divisions.

Modern self-propelled artillery vehicles may superficially resemble tanks, but they are generally lightly armoured, too lightly to survive in direct-fire combat. However, they protect their crews against shrapnel and small arms and are therefore usually included as armoured fighting vehicles. Many are equipped with machine guns for defense against enemy infantry.

The British Army replaced its M109s with the AS-90. Several European armies

have or are currently replacing older M109s with the German PzH2000 which significantly outperforms it in many aspects.

With the cancellation of the Crusader Program in the US, the Paladin will remain the principal self-propelled howitzer of the United States for a few more years, until the NLOS-C from the U.S. Army's Future Combat Systems program comes online in 2008-2010.

THE PANZERHAUBITZE 2000

Abbreviated PzH 2000, this howitzer is a German 155mm self-propelled howitzer developed by Krauss-Maffei Wegmann (KMW) and Rheinmetall for the German Army.

The PzH 2000 is one of the most powerful conventional artillery systems currently deployed. It is particularly notable for a very high rate of fire; in burst mode it can fire three rounds in 9 seconds, ten rounds in 56 seconds, and can fire between 10 and 13 rounds per minute continuously, depending on barrel heating.

The replenishment of shells is automated. Two operators can load 60 shells and propelling charges in less than 12 minutes. PzH 2000 has also been selected by the armies of Italy, The Netherlands and Greece, and more orders are probable as many NATO forces look to upgrade.

The key advantage of self-propelled over towed artillery



Starstreak missile on display

is that it can be brought into action much faster. Before the towed artillery can be used, it has to stop, unlimber and set up the guns. To move position, the guns must be limbered up again and brought - usually towed - to the new location. By comparison self-propelled artillery can stop at a chosen location and begin firing almost immediately, then quickly move on to a new position. This ability is very useful in a mobile conflict and particularly on the advance.

Conversely, towed artillery was and remains cheaper to build and maintain. It is also lighter and can be taken to places that self-propelled guns cannot reach, so despite the advantages of the self-propelled artillery, towed guns remain in the arsenals of modern armies.



M2 Browning machine gun

THE M2 MACHINE GUN

The Browning .50 Caliber Machine Gun is a heavy machine gun designed towards the end of World War I by John Browning. It was nicknamed Ma Deuce by US troops or simply called "fifty-cal." in reference to its caliber. The design has had many specific designations; the official designation for the current infantry type is Browning Machine Gun, Cal. 50, M2, HB, Flexible. It is effective against infantry, unarmored or lightly-armored vehicles and boats, light fortifications, and low-flying aircraft.

The Browning .50 machine gun has been used extensively as a vehicle weapon and for aircraft armament by the United States from the 1920s to the present day. It was heavily used during World War II, the Korean War, the Vietnam War, as well as during operations in Iraq in the 1990s and 2000s. It is the primary heavy machine gun of NATO countries, and has been used by many other

countries. It is still in use today, with only a few modern improvements. It was very similar in design to the smaller Browning Model 1919 machine gun.

The M2 has a maximum range of 7.4 kilometers when using the M2 ball ammunition, with a maximum effective range of 1.8 kilometre when fired from the M3 tripod. In its ground-portable, crew-served role, the gun itself weighs in at a hefty 38 kilos, and the assembled M3 tripod another 20 kilos.

STARSTREAK

In heavy use by the South African Army, this is a British short range surface-to-air missile manufactured by Thales Air Defence Limited (originally Shorts Missile Systems), in Belfast. It is also known as Starstreak HVM where HVM

stands for "High Velocity Missile".

After launch the missile accelerates to approximately Mach 3.5, at which point it launches three laser beam riding submunitions. The use of three submunitions increases the likelihood of a successful hit on the target. Starstreak has been in service with the British Army since 1997.

The Starstreak missile is transported in a sealed launch tube. This tube is attached to an aiming unit for firing. The operator tracks the target using the aiming units' optically stabilized sight. The process of tracking the target allowing the aiming unit to compute the right trajectory to bring the missile together with the target. The operator can indicate wind direction to the unit, and in the case of a long range target provide super elevation. When the initial tracking is complete, the operator fires the missile by pressing a button. 

-A.Joshi

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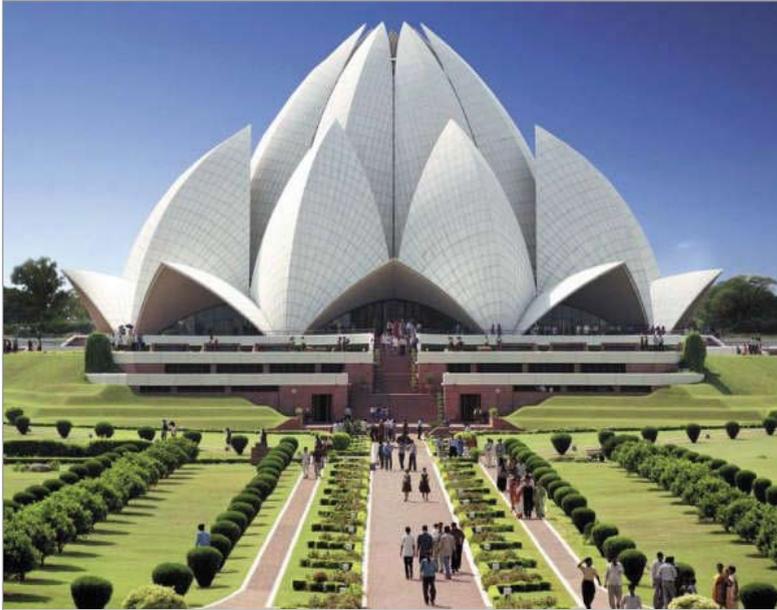
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Capital Corner



So, what do you do when you've got a few hours on hand and the vast expanse of Delhi is at your doorstep-away from the hustle and bustle of business? Well, here are a few tips:

SIGHTS & SOUNDS

The Lotus Temple: It's a spectacular and colourful sight. Visited by more than 4 million people annually, it receives more visitors than the Taj Mahal. It is the main temple of the Bahai's in Delhi. Located 13 km south-east of the city centre you will find the building shaped as a lotus flower. It looks quite spectacular. It was constructed in 1986. It is open to all faiths and is an ideal place for meditation and obtaining peace and tranquility.

India Gate: Straight down the road from Rashtrapati Bhavan along a magnificent view and totally unhampered drive is India Gate which is primarily a memorial to the Unknown Soldier. Designed by Lutyens, the 42 metre high structure is a war memorial in honour of the soldiers who died during the Second World War. The imposing structure from where stretch massive lush green lawns has an eternal flame (Amar Jawan Jyoti) to honour the memory of the unknown soldiers. A popular picnic spot, one can see hordes of people moving about the area and on the lawns.

Safdarjang Tomb: The garden tomb was built in 1753-54 soon after Safdarjang died. It is red and brown sandstone with double storied towers in the corners and is one of the last examples of Mughal architecture.

Railway Museum: Located in the south of Delhi close to the diplomatic area of Chanakya-puri it traces, through exhibits, the 140 year-old history of the Indian Railways. The museum, established in 1977, and spread over a ten acre area, is the first of its kind in India. The highlights include the Fairy Queen of 1885 the oldest working steam locomotive, the luxury salon of the Prince of Wales and the salon of the Maharaja of Mysore. Timings Summer 0830 to 1130 and 1600 to 1730 hours, Winter: 0900 to 1730 hours. It is closed on Mondays.

The Red Fort: The Red Fort is one of the most impressive sights in Delhi. The old Mughal construction is absolutely worth a visit. It was built in red sandstone by the Mughal Emperor Shah Jahan in 1648. The monument is located along the river Yamuna as an irregular octagon. The main entrance is the Lahori Gate, a former royal market. There are a lot of interesting buildings inside the Fort like the Rang Mahal (the water cooled apartments for the royal

ladies (or the Diwan-E-Aam for public audiences. There is also a Red Fort Museum.

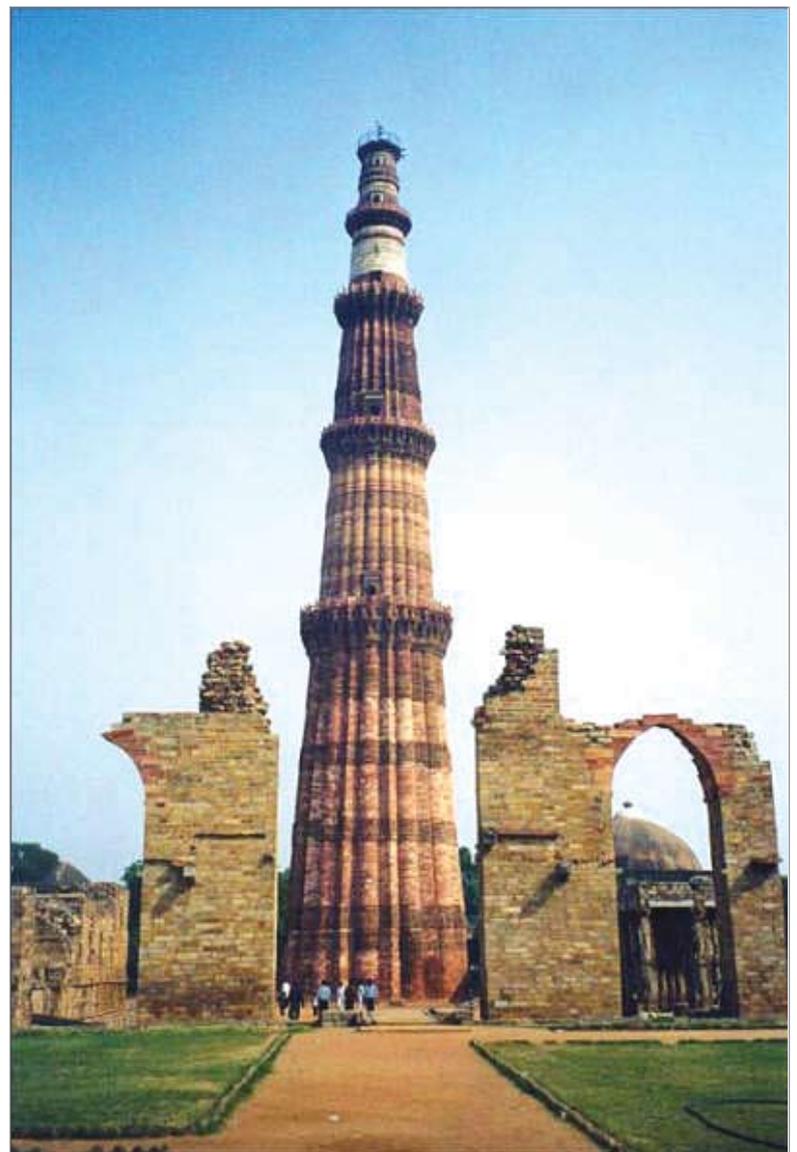
The Qutab Minar: The Qutab Minar is a tall Mosque tower. The tower is 72.5 metres high. In front of the imposing structure is an iron pillar believed to have been built in the 5th century A.D. Its uniqueness lies in the fact that it has not caught rust ever since it was built. Tourists are not permitted to climb the tower.

Lodhi Gardens: This is a nice park. In this garden you can find the tombs of Sayyid and Lodi rulers. There are also some other tombs. If you come early in the morning or in the evening you can witness large number of locals walking or running. Rather nice place to just stroll in and take in the sun and the green. Speaking

of greens, and deeper hues, if you're palate is ready for some juicy thrills, then get ready for some succulent fare.

EATING HOTSPOTS

Bukhara: Housed in the ITC Maurya Sheraton & Towers in southwest Delhi, Bukhara has Flintstones-style decor, with stone walls and mock log-top tables. You can watch chefs at work in the kitchen, where meat and vegetables are skewered on kebab spears. Good choices include the murg tandoori (a whole chicken marinated in yogurt, malt vinegar, ginger, garlic, lemon juice, chili, turmeric, and garam masala); the tandoori pomfret, a whole flatfish from the Indian Ocean roasted with spices; and bharvan kulcha, baked bread stuffed with cottage cheese. In deference to the restaurant's northwest-frontier theme, there



is no cutlery, nor finger bowls: Diners are expected to tear their chicken apart with their bare hands, with only an apron for protection.

The Spice Route: Located at Imperial hotel, Janpath. This is a restaurant, hand-painted by temple artists flown in from Kerala, resembles a temple (or at least an Indiana Jones movie). You'll feast like a king on the eclectic Asian dishes served here, with their Thai, Vietnamese, Malaysian, and other influences. The irachi stew of lamb and potato in coconut milk, served with rice-flour pancakes, is delicious. Wash it down with a glass of

most extensive wine lists in the city.

Karims Jama Masjid: Hidden away down a narrow passage, this renowned institution has been trading since 1913 and still serves the best grilled meat in town, the chicken tikka being a particular favourite. The restaurant specializes in Mughlai-style food. The Mughals invaded India in the sixteenth century, and their rich, intricate cuisine uses lots of milk, cream, spices, dried fruit and nuts. Karim's is also famous for its brain curry, which is quite a heady (excuse the pun) delicacy for the adventurous.

NIGHT FEVER
For the more daring-a night



spiced pineapple rasam with fresh curry leaves. For dessert, the Sagu Sagu (Thai rice pudding with cardamom, pandan, cinnamon, and sugar) is extraordinary.

Threesixty: Located in Oberoi Hotel-Currently one of the hottest culinary scenes in Delhi, this depot of dining for the deep-pocketed, whose name might be taken to suggest a menu that is all over the place, boasts a world cuisine—primarily Mediterranean- and Japanese-influenced—the allure of which, to a culture finally coming around to the concept of calorie counting, is its lightness. Food historians, take note that this is where Indians discovered sushi, among whose offerings the Royal Nilgiri platter seems to be an early favourite. A favourite, too, and another reason Threesixty°—based in the Oberoi is so popular with the be-seen-or-be-sari crowd, is one of the

life in Delhi does exist-contrary to folklore. Among the nightclubs and discs you can check out Float(Park Royal Hotel) , Djinns(Hyatt Regency), Dublin(Maurya Sheraton), Lizard Lounge(South Extension-II) or the Elevate at Noida.

PARTING SHOT

Want to swing another way instead? Well, golf is also on the menu. Firstly, in a recreational event the Defexpo-2008 will also organise the Defexpo India - Golf Tournament on Sunday, 17 February 2008 at the Army Golf Course. And of course there's the Delhi Golf Club-an 18-hole par 72 championship course. Dotted with historical monuments-it's a must see.

And if nothing else-if you fancy a real rub-then you can check out any of Delhi's numerous spas at its main hotels. A traditional Indian Ayurveda massage may just be what the doctor ordered.



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TYPHOON Research and Production Enterprise JSC	
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TSNIITOCHMASH (Central Scientific-Research Institute of Precise Mechanical Engineering)	
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