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Editorial



Bureaucracy, Governance and Speedy Decisions

There is an old British saying that the Bureaucracy is a horse a politician has to guide and ride. A bureaucrat is also expected to be neutral as far as politicians are concerned, but he has to deliver on the implementation of an elected government's decisions.

It is also expected that a politician will not harm a bureaucrat because of his political interests. But once he issues an order, as part of the government, in accordance with the laid down procedure, a bureaucrat also has to implement that.

In most countries, India included, this system of constitutional governance has worked well, except when some elected politicians have adopted aggressive, in rare cases insulting, postures to deal with the civil services. The system then suffers collapse or near paralysis.

This is what specifically happened in the Ministry of Defence (MoD) post the Bofors deal in mid-1980s. There were allegations of corruption, but VP Singh and his cronies also charged, falsely, that the Bofors was a poor quality gun. That was a lie. The persecution of some officers by him led to a kind of paralysis in the Ministry of Defence which in turn blocked the routine of the acquisition process and that in turn led to the shortage of equipment for all the three Services over the last 30 odd years.

It's not easy now for any government to make up for the shortages in one go, but with some efforts, the pace can be tweaked to set the system to the best possible speed. But a government has to ensure that the cycle of allegations, repeated by vested, vicious or ill-informed interests, those in politics and media included, should have no effect on the routine and time-bound inductions as per the law, and the procedure.

The armed forces should not be hurt.

It is the duty of an elected minister, in-charge of the Ministry of Defence, to take decisions speedily, without fear and favour; every minister actually tries to do so but also gets checked sooner or later when allegations start coming in the media. A three-star officer once told me that just when the Army was about to place the order for a particular system, allegations erupted in the media, and in the process our troops were denied that particular requirement for some time. The allegations of course were found to be lies.

I am writing this as I understand that the new Defence Minister, Mrs Nirmala Sitharaman, has taken upon herself to ask why files regarding many cases have been pending in the ministry, for long, and without decisions. She wants answers, decisions, and their implementation.

Thank You.

The Government's Make in India programme, beginning with the defence industrial sector, is a great initiative and it is sensible to bring in the private industry for parallel development. The public sector has not been able to do enough although in some cases, as in missiles and space, it has outstanding achievements to its credit.

Public, or private, there is no way to hold back what the armed forces need. Every soldier has to have the weapon which gives him the edge to deter or delete an adversary. Mrs Sitharaman knows this, and deserves full support.

Gulshan Rai Luthra

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Contents

Vol 12, Issue 11, November 2017



Talking Points 4

Appointments 6

Raytheon Improving Aviation Infrastructure in the Middle East 18

UAE Youth Eager for Careers in Cyber Security 20

BIDEC 2017 Showcases Bahrain’s Military Leadership Role in the Region 30

Guns and Rifles: Slow Pace of Artillery and Infantry Modernisation 34

IAF Lands in Force on Agra-Lucknow Expressway 46

Mission-Based Deployment important for Visibility in IOR 48

ABC Aviation 50-57

Industry 58-67

Rajnath Singh inaugurates First BIMSTEC Disaster Management Exercise 68

Territorial Army Celebrates 68th Raising Day 70

Around the World 72

Lastly 80

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Emirates Airline and the Airbus Foundation Fly Relief Goods to UN Depot in Dubai



HAMBURG, GERMANY. Emirates Airline, the Airbus Foundation and the NGO Welthungerhilfe joined forces to take emergency shelter items from Hamburg, Germany, to the United Nations Humanitarian Response Depot (UNHRD) in Dubai, UAE.

The aircraft, which is the 98th A380 to join the airline's fleet, carried 1,020 tarpaulins and ropes required for the immediate first needs alleviation after a humanitarian crisis. The goods are among the ten most needed items in immediate humanitarian aid and support 500 families. The tarpaulins and ropes can be used for replacing destroyed roofs, as temporary shelter in destroyed areas or even as water tanks.

Boeing Announces Agreements with Seven Customers for Analytics Solutions

LONDON. Boeing announced at the MRO Europe conference and exhibition new agreements with seven customers for Boeing AnalytX solutions. This brings the total amount of analytics contracts signed this year to 223.

Boeing AnalytX brings together the work of more than 800 analytics experts across Boeing's commercial, defence, and services businesses, who are focused on transforming data into actionable insights and customer capabilities, services and products. Launched in June, Boeing AnalytX helps customers make data-informed decisions to slash fuel costs, perform predictive maintenance, build smarter flight plans and crew schedules, and minimise unpredictable disruptions.

Rolls-Royce Joins Forces with Google Cloud to help make Autonomous Ships a Reality



SWEDEN. Rolls-Royce has signed a deal with Google to develop further its intelligent awareness systems which are making existing vessels safer and are essential to making autonomous ships a reality. The agreement, believed to be the first in the marine sector, was signed October 3 at the Google Cloud Summit in Sweden. It allows Rolls-Royce to use Google's Cloud Machine Learning Engine to further train the company's artificial intelligence (AI) based object classification system for detecting, identifying and tracking the objects a vessel can encounter at sea.

Pilatus PC-12 NG Continues to Lead Business Aircraft Market in Both Sales and Service



After delivering 91 units of its popular single engine turboprop PC-12 NG in 2016, Pilatus executives are optimistic that there are numerous growth opportunities around the world for it to sustain its sales leadership position. Earlier this year, in an independent survey conducted by Professional Pilot magazine, operators voted Pilatus number 1 in turboprop customer service for the 16th consecutive year.

Certification of the Rig'N Fly automatic oil Platform Approach mode for the H175

LONDON. Airbus Helicopters has received EASA certification for the Rig'N Fly (Rig Integrated GPS approaches with enhanced Flyability and safety) for its H175 super medium helicopter. Already certified for the H225, this avionics upgrade enhances the H175's offshore mission capability providing fully automatic rig approaches.

The automated mode also reinforces flight safety by allowing the crew to focus on the flight parameters and the external environment.

Rig'N Fly uses a combination of sensors (GPS, barometric altimeter, radar altimeter, weather radar, etc.) to provide enhanced flight precision and



situational awareness for automatic rig approaches. The system also includes offset approaches, which can be tailored according to weather conditions and oil rig environment for the safest, standardised approach, placing the helideck in the most easily visible position for the crew.

Saab Receives US Army Order for AT4 Systems



DEFENCE AND security company Saab has received an order from the United States (US) Army for the shoulder-launched AT4CS RS (Confined Space Reduced Sensitivity) anti-armour weapon system. The order value amounts to SEK 104 million (\$13.4 million) and delivery will take place in 2019. The AT4CS RS is a fully disposable, preloaded weapon system with a specially developed, unique shaped-charge warhead that delivers outstanding behind-armour effect inside the target. It weighs less than 8 kg and has an effective range of 20 to 300 metres.

Saab Chosen as Sub-Contractor for the Ajax Virtual Crew Turret Trainer

DEFENCE and security company Saab announced that it has been sub-contracted by Lockheed Martin UK to assemble 16 of the UK's new AJAX virtual Crew Turret Trainers. The Crew Turret Trainer is a virtual simulator designed to train the vehicle crew in the use of the turret (armaments, radios, sights etc). This opportunity represents Saab's first significant virtual simulation contract in the UK, but not its first involvement with the AJAX programme, as Saab is also on contract to design and deliver the live simulators for both the AJAX and Warrior CSP Armoured Vehicle platforms. This latest contract award comes on the heels of recent news that Lockheed Martin, in conjunction with Saab, have been awarded the Vehicle Tactical Engagement Simulation System (VTESS) contract by the US Army.

Rockwell Collins Selected to Support Avionics for US Special Operations Command



WASHINGTON. Rockwell Collins has been awarded a five-year, \$30.7 million contract by the Technology Application Contracting Office (TAKO). The contract will provide avionics repair and logistics, field service support and spares management for Rockwell Collins' Common Avionics Architecture System (CAAS), including expanded roles in field service and repair chain

management for other installed avionics. "This agreement extends our successful relationship of supporting the USSOCOM's critical mission as well as our position as a trusted source for technical expertise and logistics management," said Thierry Tosi, vice president and general manager, Service Solutions for Rockwell Collins. "We'll continue to provide critical support when and where it's needed."

Centre Appoints Dineshwar Sharma as its Representative in J&K



NEW DELHI. In a major development, the Centre has appointed Mr Dineshwar Sharma, former Director of Intelligence Bureau, as the Representative of Government of India to initiate and carry forward a dialogue with the elected representatives, various organisations and concerned individuals in the State of Jammu and Kashmir. He will initiate a sustained interaction and dialogue to understand the legitimate aspirations of the wide cross sections of society, particularly the youth in Jammu and Kashmir and communicate them to the State Government and the Centre.

Mr Dineshwar Sharma is from 1979 Batch of Kerala Cadre. During his distinguished career, he has served in J&K, Kerala, Uttar Pradesh, Nagaland and Manipur and as Additional Director and Special Director in the Intelligence Bureau in the Headquarters. He has in-depth understanding of security related matters and considerable knowledge and experience of issues relating to Jammu and Kashmir.

The move comes in the wake of various steps taken by Prime Minister Narendra Modi to address the needs of the people of Jammu and Kashmir.

Change at the top of RUAG Defence

DR MARKUS A. Zoller, CEO RUAG Defence, is set to leave RUAG at the end of October 2017 in order to pursue a new challenge outside of the company. Dr Zoller has headed RUAG Defence since 2013 and was a member of the Group Executive Board. He introduced new technologies, products and services, one of which was the Cyber Security business unit. He further expanded relations with RUAG's main customer, the Swiss Army, and improved the division's organisational effectiveness, making it fit for the future. Mr Urs Breitmeier, CEO of the RUAG Group, paid tribute to Dr Zoller's achievements: "On behalf of both the Board of Directors and myself, I would like to thank him for his valuable contribution and wish him only the very



best for the future."

His successor has yet to be decided and will be communicated in due course. Andreas Berger, Senior Vice President NEO, will head up RUAG Defence on an interim basis.

Alok Kumar Pateria appointed ADG, CISF

NEW DELHI. The Appointments Committee of the Cabinet has approved the appointment of Mr Alok Kumar Pateria, IPS as Additional Director General, CISF on deputation basis for a period up to May 31, 2020, i.e. date of his superannuation from the date of assumption of charge of the post or until further orders, whichever is earlier.



MBDA Appointments Chris Allam its UK MD



MBDA has announced the appointment of Mr Chris Allam to the role of MBDA UK Managing Director and to MBDA's Group Executive Committee, to be effective from January 1, 2018. He will replace Mr Dave Armstrong who is leaving MBDA at the end of 2017 to join BAE Systems' newly formed Air Sector as Director, Europe and International.

As Managing Director of MBDA UK, Chris will be the senior representative of MBDA in the UK and lead the top level relationships between MBDA and the UK customer and industrial community.

Chris joins MBDA from BAE Systems where he is the Managing Director Future Programmes and Services, and Engineering Director for the Military Air and Information Business.

Safran Helicopter Engines Makes Management Appointments



MR BRUNO Bellanger has been appointed Executive Vice-President, Programmes, succeeding Cyrille Poetsch who has been appointed to another position within the Safran group.

After joining Airbus as an air-ground communications systems engineer, and Eurogiciel as Project Manager, Bruno Bellanger joined Safran in 2004 as Manager of the Safran Electronics & Defense agency in Toulouse, dedicated to Airbus A380 support. In 2005 he took responsibility for the software development of the A380 and A400M lines, and in 2007, became Head of the Aircraft Information Systems program. In 2008, he was entrusted with managing the GADIRS Programme (navigation system of the A400M) and, in November 2011, was appointed Programme VP of the Avionics Division. In March 2016 Bruno became General Manager of Large Commercial Engines within Safran Aircraft Engines.

Bruno Bellanger is a graduate of École Nationale Supérieure d'Ingénieurs de Constructions Aéronautiques (ENSICA).



MR FRANÇOIS-XAVIER Foubert is appointed Executive Vice-President, Operations. He succeeds Laurent Mazoué who has been appointed to another position within the Safran group.

After working with the production and development of special batteries for Alcatel, in 2003 François Xavier Foubert joined Safran Aircraft Engines as Deputy Manager of the Châtelleraut plant, dedicated to CFM56 parts repair. In 2006 he moved to Queretaro, Mexico, to open a new CFM56 engines MRO shop. In 2010 he joined Safran Helicopter Engines as continuous improvement Manager, subsequently promoted to Integration and Repair VP. In January 2014, he was appointed

Executive Vice-President, Quality and Process Excellence.

François-Xavier Foubert is graduated from Ecole Polytechnique (1991), and École Nationale des Ponts et Chaussées (1994).



MR MATHIEU ALBERT is appointed Executive Vice-President, Quality and Process Excellence. Mathieu Albert started his career at Safran Aircraft Engines, in manufacturing activities. In 2003, he joined Safran Helicopter Engines where he took on several roles including, from 2014, worldwide responsibility for Supply Chain activities and MRO services. On 1st January 2016, Mathieu became CEO of Safran Helicopter Engines Asia and the Safran General Delegate in Singapore.

Mathieu Albert is a graduate of Institut supérieur de mécanique de Paris (Supméca). ■

Honeywell Names Brian S. Cook Global Head of M&A



MORRIS PLAINS, NEW JERSEY. Honeywell today named Brian S. Cook as Vice President of Corporate Development and Global Head of Mergers & Acquisitions, reporting to Senior Vice President and CFO Thomas A. Szlosek. Cook succeeds Anne Madden, who was recently named as Honeywell's Senior Vice President and General Counsel. Cook has been with

Honeywell since 2001 and was named Vice President of Corporate Development in 2006. He led the execution of numerous high-value acquisitions, including Elster (\$5.1 billion), Novar plc (\$2.4 billion), Intelligrated (\$1.5 billion), Sperian Protection (\$1.4 billion), and Norcross Safety Products (\$1.2 billion). Cook also served as a Director of Corporate Finance for Honeywell. ■

From Asia Pacific to Indo Pacific

■ By Nilova Roy Chaudhury, *India Strategic*

NEW DELHI. China's assertive maneuvers to dominate the Indian Ocean and the Pacific are changing the global dynamics. India is certainly concerned as the Chinese are building their biggest naval base at Gwadar in Pakistan, just about 700 km from the Indian coast.

China has already claimed nearly the entire South China Sea, and built artificial islands with military facilities, notwithstanding opposition from all its neighbours except its military dependency of North Korea.

The US, which is the only super power with global naval and military presence, and Japan and Australia, naturally want to align forces with India. So much so that in the new emerging order, the description Asia Pacific has given way to what is now being called the Indo-Pacific in acknowledgement of India's importance in the global arena.

To recall, the US State Department under Condoleezza Rice, during the George W Bush administration, declared its policy goal "to help India become a major world power in the



21st century." Ever since, successive administrations have sought to de-hyphenate India and Pakistan but, because of Afghanistan, have not been effective in curbing the 'deep state' of army and ISI in Islamabad which has kept the region in a spiral of violence.

On October 19 however, in a seminal speech at the Centre for Strategic and International Studies (CSIS), a Washington think tank, US Secretary of State Rex Tillerson took India out of the South Asian context into the Asia Pacific arena and the much larger Indo-Pacific sphere.

Describing India and the US as "bookends of stability" on either side



of the globe, Tillerson advocated a strong “emerging Delhi-Washington strategic partnership” which has the potential to anchor the rules-based world order for the next century.

“China’s provocative actions in the South China Sea directly challenge the international law and norms that the United States and India both stand for,” Tillerson said, speaking at CSIS on “Our Relationship with India for the Next Century.”

Shortly after, but ahead of his visit to India and (very briefly) Pakistan end-October, he also said both countries were “important elements” in the US policy for stabilising South Asia, while describing China as the

destabilising force.

New Delhi hailed the speech and is appreciative of the sentiment and the proposed synergy in working with the US to meet common goals, of combating terrorism and unhindered access to security infrastructure and commerce and development and conveyed as much to Tillerson when he was in New Delhi.

However, it was clarified that India will not enter into any Indo-Pacific ‘alliance’ with the United States.

India is aware that it will have to face the regional challenges that confront it, like terrorism emanating from Pakistan, and Chinese bullying along the border, by itself, with

perhaps a little help from friends. This it demonstrated during the standoff with China at the Doklam tri-junction, with quiet support from Bhutan.

Tillerson was also informed that India would continue its ties with both Iran and North Korea, though New Delhi has just a token presence in Pyongyang. The vital importance of the Iran links became apparent when India sent its first consignment of wheat to Afghanistan via the Chabahar port end-October. India is developing the port as a critical conduit for its aid and exports to Afghanistan and further into Central Asia, bypassing Pakistan, which has



refused to allow it transit rights for goods and humanitarian supplies to Afghanistan.

While it has not keeled over with the Trump administration's calls for closer cooperation in Afghanistan, steadfastly refusing to place 'boots on the ground,' India has decided to be part of the revived 'quadrilateral' of democracies of the Indo-Pacific region along with the USA, Japan and Australia.

It is a level of the maturity and confidence it has in its own strengths that New Delhi has determined that it will take part in the first meeting of the quadrilateral, slated for later this month, but it will not be party to any overt anti-China stance.

The impact of such a group and its first meeting at the level of senior officials will primarily be in the

optics. Whatever agenda the officials decide upon, whether cooperating to keep maritime channels open or anti-piracy operations or disaster relief drills, the nuanced message will reach the intended capitals, without any overt shows of hostility, or even provocation towards Beijing and its junior allies, Islamabad and Pyongyang.

Japan mooted the revival of the quadrilateral. Just re-elected with a larger mandate for his agenda to re-shape Japan's pacifist constitution and pursue a more aggressive, self-reliant foreign and defence policy, Japanese Prime Minister Shinzo Abe has proposed the formation of the group to US President Donald Trump in Tokyo November 6.

Tokyo has emerged as New Delhi's key partner in the Indo-Pacific region.

Aiming to provide a viable alternative to Chinese President Xi Jinping's dream 'Belt and Road Initiative,' Abe and Indian Prime Minister Narendra Modi have mooted an Asia Africa Growth Corridor, which builds upon the Japanese 'Free and Open Indo-Pacific Strategy.'

This is effective acknowledgement that the erstwhile Asia Pacific region has now become the Indo-Pacific, with India as an integral part.

India's 'Act East Policy,' which revolves around the 10-member Association of South East Asian Nations (ASEAN), could synergise well with Japan's strategy to stabilise the vast Indo-Pacific region. In an unprecedented gesture, leaders of all 10 ASEAN nations would be joint chief guests at India's Republic Day celebrations on January 26, 2018.

Prime Minister Modi is headed



to the Philippines in mid-November for the East Asia Summit and the India-ASEAN annual summit. The concept of the Indo-Pacific will further crystallise in Manila, where Modi will meet Abe and a host of other leaders, including Trump.

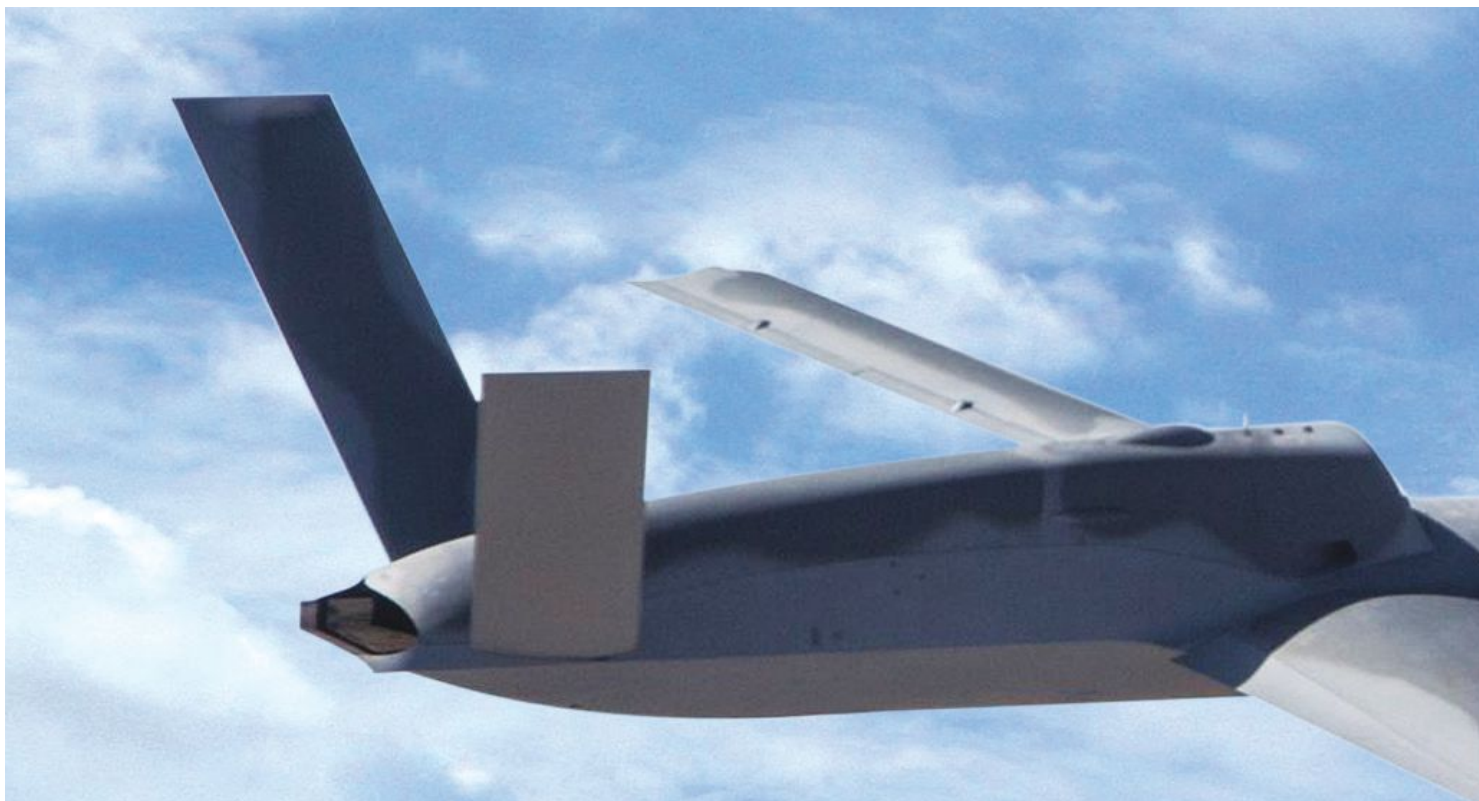
Adding Australia to the close India-Japan-US trilateral partnership will further enhance and improve the scope of security cooperation and of leverage. Australian Foreign Minister Julie Bishop has indicated her country's willingness to be part of the political-security quadrilateral dialogue. The idea is for leaders of the four countries to promote free trade and defence cooperation across a stretch of ocean from the South China Sea, across the Indian Ocean and all the way to Africa, a development Beijing will monitor very closely.



An old Chinese curse, apparently heaped upon enemies, says 'May you live in an interesting age'. This is indeed a very interesting age and, in the evolving domain of foreign and strategic policy architecture, very interesting times for India, though far removed from being cursed.

India really doesn't want hostility with its neighbours, but just as Pakistan guides the terror troubles, the assertive behavior of China all along its southern borders, be it land or waters, will dictate the fate of the region.

How meaningful the transition from Asia Pacific to Indo-Pacific is in the coming years will be determined by how calm the Chinese temperament is. ■



IAF confirms it wants Unmanned Predator Avengers

● Military Cooperation Key to Indo-US Relations

■ By Gulshan Luthra

NEW DELHI. We broke the story of India's interest in the Unmanned Predator Avengers when Prime Minister Narendra Modi first met President Barack Obama, and later when he first met President Donald Trump in the Washington.

A top official in his delegation expressed India's interest as a mention, as they in diplomacy for sending feelers, and formal notes were exchanged by the Ministry of Defence (MoD) and the Indian Air Force (IAF) through the diplomatic

missions as per the laid down procedure. India asked for the aircraft's specs and availability, and soon after the US State and Defense Departments cleared the sale of unmanned Predator Guardian for the Indian Navy for surveillance missions, IAF made another push.

There has been no official word on the request or possibility so far, but last month, on the eve of the Air Force Day on October 8, IAF Chief, Air Chief Marshal BS Dhanoa, told **India Strategic** in an interview that IAF is interested in a High Altitude Long Endurance (HALE) UAV for "Intelligence, Surveillance and Reconnaissance (ISR) role and will

consider the Predator Unmanned Combat Aerial Vehicle (UCAV) in case it is offered by the US."

He gave no details.

My question to the Chief was: *IAF is looking for a large number of armed drones, and reports from Washington have indicated that India has asked for Predator C Avengers from General Atomics. USG cleared the Indian Navy's request for 22 Sea Guardians just in time for before our Prime Minister's official visit to Washington DC. Where are we on this proposal? These aircraft are needed for long range precision strikes with no risk*



SPECIFICATIONS

GENERAL CHARACTERISTICS

- Crew: 2 (ground control)
- Length: 44 ft (13 m)
- Wingspan: 66 ft (20 m) sweep angle 17°
- Max takeoff weight: 18,200 lb (8,255 kg)
- Fuel capacity: 7,900 pounds (3,600 kg)
- Powerplant: 1×Pratt & Whitney Canada PW545B turbofan, 3,991 lbf (17.75 kN) thrust

PERFORMANCE

- Maximum speed: 460 mph (740 km/h; 400 kn)
- Cruise speed: 402 mph (647 km/h; 349 kn)
- Endurance: 18 hours
- Service ceiling: 50,000 ft (15,000 m)

ARMAMENT

- Internal weapons bay with 3,500 pounds (1,600 kg) capacity. 6 external hardpoints. 6,500 pounds (2,900 kg) payload total.
- AGM-114 Hellfire missiles
 - GBU-39 SDB – 250 lb bombs
 - GBU-12 Paveway II, GBU-38 JDAM–500 lb bombs
 - GBU-16 Paveway II, GBU-32 JDAM–1000 lb bombs
 - GBU-31 JDAM – 2000 lb bombs
 - HELLADS 150 kW directed energy weapon

AVIONICS

- Lynx Synthetic Aperture Radar
- AESA Wide-area surveillance sensor
- MS-177 multi-spectral imaging sensor

to our pilots. We understand that the Israelis are also in competition.

Diplomatic sources in Washington indicate that some specific numbers have been discussed, but that the US Government is yet to accord its approval to the Indian requirement. In fact, it has to be done at the highest level, by President Trump himself.

And possibly when Mr Modi meets with Mr Trump in the coming weeks, the requirement could be discussed at the highest level.

Representatives of the two Governments, including those of the US Defense and Security Cooperation Agency (DSCA), diplomatic missions, USAF and IAF are nonetheless



Dr Lall, with President Trump



considering the options.

Asked about any developments and possible timelines, Dr Vivek Lall, the distinguished aerospace expert who is now General Atomics' Chief Executive US and International Strategic Development, observed the company only fulfilled a country's requirements through the US Department of Defense. He could only say that there are discussions between the two countries involving the Predator series of aircraft but he could give neither their technical

specs or at what stage the bilateral discussions between the two governments are.

Meanwhile, reports from the US capital indicate that the Indian Navy is also now asking for armed drones.

It wants the 22 Sea Guardians that the US has agreed to sell to be converted to ISR + Attack role. The aircraft has hard points to install whatever is required, and the Navy is looking for the Hellfires which are already configured for it.

The arms bazaar is full of

competition, and the European MBDA has also jumped in the fray for arming the Sea Guardians if the Indian Navy allows it to. Legally though, the Navy would have no rights to fiddle with the machine to install something from any competition without the manufacturer's, and the US Government's, approval.

Although India asked for the Sea Guardians, got the official US approval to acquire them, it has not yet signed any agreement in this regard. Discussions though are continuing to fine-tune each other's position to a mutually acceptable level.

Notably, the Indian Air Force is substantially short of combat aircraft, and acquisition of unarmed drones for reconnaissance and attack purposes would help reduce their shortfall by bringing in new and sophisticated capabilities on board.

The US Air Force has effectively used the Predators to assess threats, locate them with precision and strike them direct. In fact, USAF has shared live footage of certain operations it conducted in Afghanistan to effectively hit buildings, vehicles and human targets as part of counter terrorism measures. One video was also shown at a seminar **India Strategic** held sometime back on Air Power and Drones. ■



Anil D Ambani, Chairman Reliance Group & Eric Trappier, Chairman & CEO, Dassault Aviation lay the foundation stone for Dhirubhai Ambani Aerospace Park. Smt Kokilaben D Ambani, Tina Ambani, Anmol Ambani also attended the ceremony.

Dassault and Reliance form Aerospace Venture

● It's about Hope and Determination

■ By Gulshan Luthra

NEW DELHI. It was in 1993 perhaps when I met Mr Dhirubhai Ambani in Dubai at a party hosted by his friend, Mr Cawas Motiwala, a distinguished and polite businessman. Mr Ambani had come there to float shares of his new venture in petrochemicals among foreigners and NRIs. He handed me a form, from Director's quota, saying

take as many as you wish. (*It was Rs 10/share, but.... Let's leave it*).

His demeanor impressed me. In a brief chat, he said Life is about Hope and Determination. It's a quotable quote I cherish.

At the Dubai Airshow'15, I had a chance to meet his younger son, Mr Anil Ambani, and recalled what his father had said. "That's the only way, and that's how we function," was his answer. He was clear then that Rafale would be a winner with at least 200 aircraft for the Indian Air

Force (IAF). He also told me that he was looking far ahead, into space.

The Government has ordered 36 only so far, but I understand IAF is ready to put in a note for another 36 as soon as the Ministry of Defence (MoD) indicates a firm decision and availability of funds. Notably, the Indian Navy is also looking for 57 twin-engine shipboard fighters, and it has to pick up either the Rafale or Boeing's new Advanced Super Hornet F/A-18E/F. The Navy has decided to go in for the General

Atomics Electromagnetic Landing System (EMALS) for which the Super Hornets are already configured.

Nonetheless, Dassault says that it is no issue as Rafale already operates from the French aircraft carrier Charles de Gaulle.

Reliance has gone ahead to form partnership with Dassault, which is obliged to meet a 50 per cent offset commitment of the Rafale deal signed in September 2016 between the two governments. It is putting in more than Euro 100 million, which happens to be the single biggest offset investment in India at a single place.

Called the Dassault Reliance Aerospace Limited (DRAL), the venture formally inaugurated its first aerospace industrial complex at Mihan in Nagpur in western India. Preliminary work has been going on at the site for some time to prepare for the big event, which will also make DRAL a member of the company's global supply chain.



The Editor with Mr Anil Ambani

Together Mr Eric Trappier, Chairman of Dassault Aviation and Mr Ambani, Chairman of Reliance Group, laid the foundation of the facility in the presence of French Minister for Armed Forces Florence

Parly and Indian Road Transport and Highways Minister Nitin Gadkari, who is also a member of Parliament from Nagpur.

Those present included Maharashtra Chief Minister Devendra Fadnavis,





French Ambassador Alexandre Ziegler and about 200 local dignitaries and smaller vendors who would supply sub-components to DRAL.

Initially, DRAL will manufacture parts for the Legacy Falcon 2000 Series of Civil Jets manufactured by Dassault Aviation, and later, when it is viable with acquisition of more Rafales by IAF, then its structural and other components. Reliance is 51 per cent, and Dassault 49 per cent in partnership. Falcon is a preferred executive aircraft, and a few fly in India also.

Ms Parly had flown to India for the event, as also to meet her counterpart here Ms Nirmala Sitharaman to pursue sale of more Rafales, submarines, guns, munitions and to explore new avenues in space cooperation as India is now unlikely anymore to use the French Ariane rockets to launch heavy Indian satellites. France has close strategic relations with India, and has promised to meet the Indian requirements on best possible terms.

DRAL is located in the Dhirubhai

Ambani Aerospace Park in Mihan SEZ adjoining Nagpur International Airport.

One key agreement, and apparently a requirement for the venture's is the training the venture will impart thousands of skilled workers for assembly and integration of components. The plan is to encourage the creation of some 200 MSMEs in the region.

Speaking on the occasion, Mr Trappier said: "This Foundation Stone laying demonstrates Dassault's firm commitment to implementing Prime Minister Modi's "Make in India" programme. It gives the 65 year-long strong association of Dassault-Aviation in India a new momentum and the will of future manufacturing developments."

France was the first country in the 1960s to sell Caravelle jets to the erstwhile Indian Airlines, which used to operate from the Safdarjang Aerodrome those days. France was also then the first to offer assistance in space to India, and some engineers from ISRO were trained by it in French institutions.

(But they had understandably to learn French first).

Welcoming the joint venture, Mr Ambani stated: "The Reliance Dassault partnership will bring high levels of Technology Transfer. It will make India a major supplier into the global aviation supply chain. It will be the endeavour of both Dassault and Reliance to fully support Prime Minister Modi's "Make in India" and "Skill India" policies and to accelerate India's pursuit of self sufficiency in the aerospace sector."

Neither side spoke of space, or beyond Rafale. But going by the cooperation India has had with France, and the encouragement the government is now giving to the private industry, Mr Ambani's dreams are not beyond reality.

He attends all the defence shows everywhere in the world, is reported to have built some bridges of cooperation in the Gulf, particularly in the UAE, and looks like he will follow his father's words with Hope and Determination. ■



Raytheon Improving Aviation Infrastructure in the Middle East

■ **By David Ray**

BOSTON. Raytheon is working in partnership with Middle Eastern transportation authorities to enhance the aviation ecosystem – both digitally and physically. Today, Raytheon helps manage 60 percent of the world’s air traffic, including providing automation systems at the Dubai International Airport and en-route radars in the Kingdom of Saudi Arabia.

Raytheon’s objective in the Middle East is to help drive air traffic volume, efficiency and safety by enhancing the existing infrastructure with new, innovative technologies. New air traffic

management solutions can help Middle Eastern governments monitor the increased flow of air traffic throughout the region, resulting in a direct increase in safe and secure airspace capacity. The increased traffic volume and resulting revenue opportunities can help fund infrastructure improvement initiatives and contribute to non-oil global domestic product growth.

As we look at the region, one technology that we think will make a real impact is Space Based Augmentation System, or SBAS. This GPS-augmenting capability will help deliver increased airspace access through an integrated, single air traffic control system that

uses a proven network of capabilities, including satellite-based augmentation, ground radar, and air-to-ground satellite-based communication.

In addition to enhancing air traffic volume, efficiency and safety, airport security is also critical to the success of the region’s air travel. As an expert in airport physical and digital security, Raytheon can work with local partners to develop and deploy screening, monitoring, and perimeter security. On the digital front, Raytheon is an expert in cyber security solutions for critical infrastructure, such as aviation.

Raytheon is also working with Middle Eastern countries to train personnel in



the areas of cyber defense, baggage screening, security administration, and security vulnerability assessments. The ultimate goal is to enhance safety while also reducing life-cycle costs through automation and improved system performance.

A critical piece to enhancing the aviation infrastructure in the Middle East is establishing local partnerships. Raytheon understands the importance of working with local experts in all areas of air traffic management and security to help bring next-generation capabilities that will benefit the entire region.

– The author is Vice President, Strategy and Business Development, Raytheon Intelligence, Information and Services.

Raytheon Immersive Design Center wins Aviation Week 2017 Programme Excellence Award

IMMERSIVE DESIGN CENTER HONORED IN SPECIAL PROJECTS CATEGORY



TUCSON, ARIZ. Raytheon Company received Aviation Week magazine’s 2017 Programme Excellence award in the Special Projects category for its Immersive Design Center, which features the CAVE virtual environment.

Raytheon’s CAVE allows cross-functional teams of design and manufacturing experts to immerse themselves in virtual reality environments, reducing cycle times and costs for customers.

Raytheon’s CAVE allows cross-functional teams of design and manufacturing experts to immerse themselves in virtual reality environments. Teams can collaborate on risk and cost reduction solutions for design challenges using 3-D versions of structures and parts that can be manipulated in real time. Raytheon has located CAVEs at several of its sites, and has significantly reduced design cycle times and cost through the use of the advanced systems.

The Programme Excellence awards honor global aerospace and defense programmes and projects, their leaders and their teams for going beyond meeting requirements to exemplify the best in value creation, leadership, adapting to complexity and executing with excellence. “Our Immersive Design Center has transformed the way we design and manufacture,” said Allen Couture, Raytheon Missile Systems Operations vice president. “We are maturing our designs earlier in the process, allowing us to reduce cost and risk to programmes.”

Developed in 2004, the Aviation Week Programme Excellence Awards were created in response to repeated concerns about the complexity and difficulty associated with managing and leading the aerospace and defense programmes that are the foundation of the industry. ■

Majority of UAE Youth Eager to Pursue Careers

RAYTHEON, FORCEPOINT & NCSA POLL: EMIRATI YOUTH LEAD GLOBAL PEERS



ABU DHABI, UAE. Young adults in the UAE are considerably more likely to choose a career in cybersecurity than their peers elsewhere in the world, according to a new survey commissioned by Raytheon, Forcepoint and the U.S. National Cyber Security Alliance (NCSA). The survey also discovered that the UAE has been successful in

engaging most youth to try activities that would let them test their interest and aptitude for cybersecurity careers.

For the report, "Securing Our Future: Cybersecurity and the Millennial Workforce," Raytheon and Forcepoint, in partnership with NCSA, surveyed 3,359 young adults aged 18 to 26 from nine countries across four continents. The annual survey demonstrated young Emiratis consider

parents increasingly influential figures for career advice and are confident that their parents would know how to guide them to pursue a career in cybersecurity and educate them on staying safe online. In addition, young Emiratis hold values that support a strong cybersecurity posture for their nation, saying they think cybersecurity issues are important and offering to serve in national security roles.

in Cyber Security, Survey Reveals

IN AWARENESS AND ACTION TO ADDRESS CYBERSECURITY ISSUES



mentoring programs in the field

- 96 percent of Emirati youth are confident or very confident that their parents could effectively guide them to pursue cybersecurity careers, compared with 79 percent in the region and 57 percent globally

- 74 percent of respondents said a parent was the first person to talk about the importance of cybersecurity in their lives, up from 50 per cent in 2016

- 70 percent of those who said they were more likely to choose a career in cybersecurity believe in the importance of a more secure internet, compared with 65 percent in the region and 52 percent globally

- When asked what types of organizations respondents would protect if they were a cybersecurity

the importance of equipping young Emiratis with the tools and skills to keep up with modern day opportunities and challenges," said Shahzad Zafar, Cybersecurity Director, Raytheon International Inc. "The survey demonstrates the enhanced efforts the UAE has put in place to build the next generation of cyber defenders and safeguard its cyber future."

Raytheon has delivered a series of activities to students at Khalifa University of Science & Technology under Raytheon's global Cyber Academy, which debuted in the UAE in 2016 including cyber skills workshop and thought leadership lectures. This is part of Raytheon's commitment to partner with leading education institutions and its commitment to developing cyber capacity and an

The annual survey demonstrated young Emiratis consider parents increasingly **influential figures for career advice and are confident that their parents would know how to guide them to pursue a career in cybersecurity and educate them on staying safe online**

professional, 81 percent of UAE youth chose the government, and 79 percent selected the military

The survey, independently conducted by Zogby Analytics, an internationally renowned opinion research firm, aimed to identify the root causes of the cyber talent gap as part of a shared, long-term commitment to building a robust talent pipeline and provide insights into improving cybersecurity across the globe at multiple levels, including individual, organizational, national and global security.

"The UAE has long recognized

effective talent pipeline for Emirati youth.

Dr. Tod Laursen, Interim President of Khalifa University of Science and Technology added: "We highly value cybersecurity as a subject to prepare young people to navigate through today's environment of threats and capitalize on opportunities in the field by providing a solid cyber-related curriculum. The results of Raytheon's survey underline the progress being made and we are confident that we will see more and more young Emiratis pursue promising careers in cybersecurity." ■

The survey found that:

- 67 percent of Emiratis surveyed reported they are more likely than a year ago to consider a job in cybersecurity, compared with 48 percent regionally and 39 percent globally

- 64 percent of Emirati youth have participated in or sought out cybersecurity job fairs, and 60 percent have participated in or sought out



DUBAI AIRSHOW 2017 REACHING FOR NEW HORIZONS

■ By Niha Luthra

DUBAI. Dubai is about glamour, excellence and heights, be it malls, buildings, even parks or whatever. The Dubai Airshow is no exception, and I have seen it grow ever since I was a child and it was first held in 1989 on a major scale by Fairs & Exhibition of London. I lived in this beautiful city then. In fact one evening, a day before the show opened in 1991, I was on a drive by the airport with my elder brother Nitin, then 14, who suddenly shouted: Stealth plane. The F-117 was steadily gliding towards the runway and even though it was the darker side of twilight, a keen eye as that

of my brother, who was then just 14, could discern it.

One doesn't have to be a pilot to have some interest in aviation; it can be a passion even for the passengers. Particularly children, and I can say my entire family is child-like when it comes to aircraft and aerospace.

As usual, every edition of the Dubai Airshow is better than the previous one. This is what the organizers have promised, and I'm sure, as a witness to some of them over the years, the Dubai Airshow 2017 is indeed going to be so.

Being held November 12-16, it is going to be the biggest in the Middle East, and certainly not far behind in comparison to the others in Europe. The

show is very important in every aspect as the six Arab Gulf states are among the biggest spenders on defence, military and civil aviation included, and there has been tension in this strategic oil-rich region particularly after the Iran Iraq war in the 1980s, and later the Iraqi invasion of Kuwait and the resulting 1991 war to liberate this important member of the six-nation Gulf Cooperation Council (GCC) alliance.

The Gulf countries also became independent only in the 1970s, and thanks to the requirement for safeguarding their oil wealth, and stability in their neighbourhood, their demands for modern weapons and newer defence capabilities will always be high. Obviously,



the Dubai Airshow, initiated in 1986 but held on a big scale from 1989 onwards, has played and will continue to play a big role. There were 200 exhibitors and 25 aircraft in 1989, and more than 1100 exhibitors and 163 aircraft in 2015.

There were some showstoppers during the various events: In 1991, Lockheed Martin's stealth plane F 117 Nighthawk and Boeing Apache combat helicopter made their first appearance here after conducting many successful strikes against the Iraqi forces in the First Gulf War.

In 1989, the Soviet/ Russian Su 27 drew wide eyed attention with its cobra maneuvers and top UAE Air Force officers were seen boarding the plane just after the show was over.

Virtually every modern combat jet from the Boeing F/A 18 Super Hornet, which also conducted day and night strikes in the 1991 and 2003 Gulf Wars, to Lockheed Martin's F 16, European



consortium's Eurofighter and the French Rafale have taken part in the show. So have the trainers like the BAE Systems Hawk and Alenia Aermacchi M 346 which have given successful demonstrations here resulting in sales.

It's been the same story with helicopters, and civil aircraft, unmanned systems and space. There are cutting edge technologies like 3D printing for aircraft, and as for space, the UAE has announced plans to send an unmanned mission to Mars in 2021, the 50th anniversary of the country's formation.

In fact, the UAE has already invested

more than USD 5 billion in space venture, and there are aerospace industries supplying structures to both the Boeing and Airbus. Emirates began its operations with two Airbus A 300 leased from PIA in 1985, and ever since, has been among its biggest customers. Naturally, the huge A 380, the biggest double-decker jumbo yet, made its Middle East debut at the Dubai Airshow in 2005.

It's been the same story with every aircraft every since, and Boeing's 747 , 767s, 777 and 787 have all made fruitful flying displays here. Dubai in fact became the first hub in the region with Emirates



launching good onboard passenger care and international flights East and West to ferry passengers say from Singapore and Australia to Europe and the US and vice versa. Dubai is in the middle of the world time zones, and it has appropriately

utilized that facility for international travel and its own economy, which is largely based on duty free sales, tourism and conference facilities.

Even business jets record good sales turnover here. An impressive sight at the

Dubai Airshow'15 was the static display of UAE-made Yabhon Unmanned aircraft, both propeller and jet powered. It should have been tested in Russia as per reports from Moscow but I am not aware of the results. Meanwhile though, according to reports from Washington, UAE has purchased five Predator XP UAS from the US; and all have been delivered. The XP variant is for surveillance and according to earlier reports published by India Strategic, is configured for some specific Emirati requirements.

Asked about the details, Dr Vivek Lall, Chief Executive US and International Strategic Development, General Atomics, said the company executes its unmanned aircraft orders in accordance with US Government policies, "and that's all I can comment."

Obviously, there is a great demand for unmanned systems in and around the region, specifically because of their long loitering time, precision engagement capability and of course, because there is no human pilot onboard.

The Dubai Airshow is one of those superb expos that the Dubai Government holds throughout the year. The edition this time hopefully may throw some surprises!

Ahlan Wa Sahlan. Welcome. ■

DUBAI AIRSHOW FLYING DISPLAY

IMPRESSIVE AIRCRAFT TO TAKE TO THE SKIES IN DUBAI



DUBAI. The Dubai Airshow has announced the first round of aircraft expected to demonstrate their abilities in the flying display when the event takes place from 12-16 November at DWC, Dubai Airshow Site.

Aerobatic displays this year will include PLAAF August 1st Air Demonstration Team from China performing in J10As and the Russian Knights in Sukhoi SU30Ms in addition to the UAE's Al Fursan flying their Aermacchi MB-339NATs.

Of particular interest this year will be the Calidus Bader 250 – making its introduction at the Dubai Airshow 2017, the aircraft is manufactured in the UAE. Also appearing for the first time will be the Sukhoi SU35 while other aircraft flying include the Airbus A350 and a Beriev BE200 ES demonstrating its firefighting ability.

The flying display will also feature helicopters, including the TAI T129



attack helicopter performing for the first time at the Dubai Airshow, plus Motor Sich Mil 2 and Mil 8 models. A large number of military aircraft will also be demonstrating their prowess, with a US Airforce F16, UAE Mirage 2000, French Airforce Dassault Rafale and a Taqnia AN132.

"The flying display at the Dubai Airshow is always a popular feature

with exhibitors and visitors alike," say Michele van Akelijen, Managing Director of show organisers Tarsus F&E LLC FZE Middle East. "2017 will of course be no exception."

The Dubai Airshow will take place 12-16 November at the DWC, Dubai Airshow Site, with the flying display underway from 2:00pm – 5:00pm each day of the show.



Bahrain Buys 16 Latest F-16 Combat Aircraft

By Sujay Mehdudia in Bahrain and Gulshan Luthra in New Delhi

MANAMA (BAHRAIN). Bahrain is buying 16 latest variants of Lockheed Martin F-16 Medium Multi Role Combat Aircraft (MMRCAs) as part of a \$3.8 billion deal which also includes upgrade of the Royal Bahraini Air Force's existing fleet of some 20-plus older F-16 jets.

The Government-to-Government deal was announced October 17 on the second day of the three-day Bahrain International Defence Exhibition and Conference (BIDEC'17) by Royal Bahraini Air Force (RBAF) Commander Maj Gen

Shaikh Hamad bin Abdulla Al Khalifa. It includes an option for three more aircraft at the same price.

The new aircraft is designated F-16 Block 70, the same variant which is being offered to India for indigenous production under the Government's Make in India programme. Lockheed Martin has promised to shift its factory from Forth Worth in Texas to India if the Indian Air Force (IAF) selects it, and then make India the hub for its production and supply chain.

The aircraft for Bahrain are to be delivered from 2021 onwards, should

be made in the US only, and will have the latest Active Electronically Scanned Array (AESA) combat radar, conformal fuel tanks for longer range, and some new sensors. It should also be capable of firing Boeing's Joint Direct Attack Munitions (JDAM). Details have not been disclosed.

Every country decides its own requirements, but still, while there should be some differences in details regarding onboard sensors, the Block 70, being the latest variant will be mostly common to India, Bahrain and any other country which buys it in



RBAF Commander Major General Shaikh Hamad bin Abdulla Al Khalifa

the coming years. It will be the most advanced version to date of the F-16, a 4th generation aircraft made for

about 40 years but with everything new except its aerodynamic design and shell.

Company officials told India Strategic (www.indiastrategic.in) that the new variant will have the most formidable of the contemporary weapon systems, and share a few technologies from the F-35, Lockheed Martin's 5th generation combat jet being made for the US Air Force, Navy and Marines, and several countries.

Notably, Lockheed Martin, the manufacturer, had offered F-16s for the Indian Air Force's Medium Multi Role Combat Aircraft (MMRCA) competition in 2007 to match IAF's specifications. It was not selected in that but the company is back in the fray to sell 114 of what it now calls F-16 Block 70 under the Indian Government's Make in India programme, stipulating acquisition of 18 combat jets in flyaway condition and the rest to be progressively made in India in collaboration with the Tata Group.

Sweden's Saab Gripen is the only aircraft in competition for IAF, and a Request for Information (RFI) on what capabilities and technologies they are offering is just about to be issued to



Bahrain Center for Strategic and International Studies and Energy (DERASAT) Chairman and Middle East Military Alliances and Coalitions Chairman Shaikh Abdulla bin Ahmed Al Khalifa

**Lockheed Martin
Executive Vice
President Richard
Ambrose**



Studies (DERASAT) – the state run think tank – and BIDECE's Official Spokesman, and Richard Ambrose, Executive Vice President of Lockheed Martin Company, attended the press conference where India Strategic (www.indiastrategic.in) was also present at the invitation of the Bahraini Government.

Mr Ambrose affirmed that Bahrain is the first country in the region to sign such a deal with the company, highlighting the great developments witnessed by RBAF, and that the new aircraft will be the most modern in the region.

So far, the distinction of having the most modern F-16 has been held by the UAE Air Force, whose 60 F-16 Block 60 aircraft acquired in 2004 were the first to integrate an AESA combat radar, developed and built by war-tech giant Northrop Grumman.

As some details of the deal are yet to be filled in, company officials say that Lockheed Martin "would continue to support the government-to-government

the two companies.

As for the Bahraini deal, RBAF would have factored its own requirements and appropriate modifications. But the platform being the same, there are bound to be many similarities between the onboard technologies of what is being offered to Bahrain and what is being offered India.

Details will differ though, and accordingly, so will their capabilities. IAF is likely to ask for the passive Infra red Combat Search and Track (IRST), a system mentioned in the 2007 MMRCA tender. AESA has a much longer range, but being active, indicates the presence of its own aircraft also in the vicinity.

Bahrain was the first country in the Gulf region to buy about 20 F-16s in 1990 and an additional 10 in 2000. It has been wanting more F-16s, but the US State Department cleared their sale only in September this year after some five years of wait. RBAF pilots have combat experience, first in the 1991 Kuwait Liberation War against Iraq

Bahrain was accused of human rights violations and the Obama administration had declined to accede to the BRAF



request. President Donald Trump cleared it in September 2017, and in diplomatic terms, Bahraini leaders have literally heaved a sigh of relief now with the removal of the restrictions.

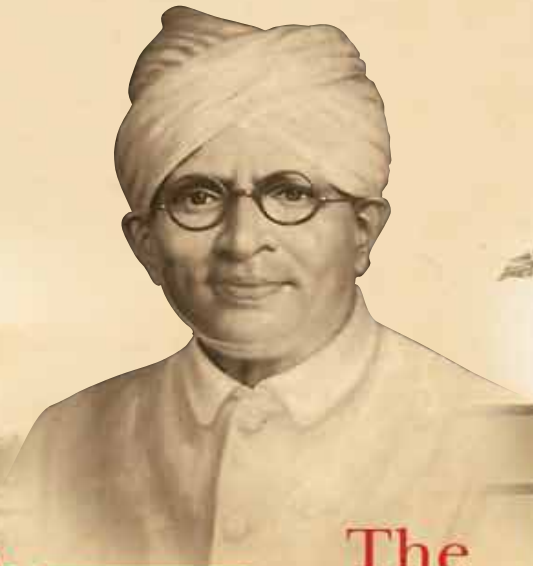
Shaikh Hamad stated that the new, and upgraded F-16s, would contribute effectively to developing the Royal Bahraini Air Force with powerful, new technologies.

Dr Shaikh Abdulla bin Ahmed Al Khalifa, Chairman of the Board of Trustees of the Bahrain Centre for Strategic, International and Energy

talks between the US and the Kingdom of Bahrain."

BIDECE 2017 is being held under the auspices of His Majesty King Hamad bin Isa Al Khalifa, the Supreme Commander and the deal apparently has the necessary approvals.

The F-16 is the largest selling military aircraft in the world, and although its aerodynamic frame was designed some 40 years ago, everything inside from a nut and bolt to engines and avionics are contemporary, and of cutting edge technologies, company officials say. ■



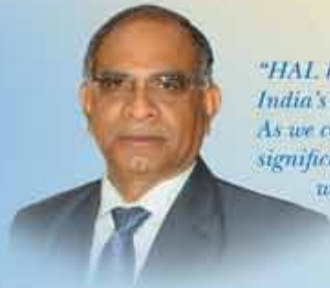
एच.ए.एल. की परम्परा

The HAL Legacy



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

With humble beginnings in manufacturing and overhauling of American aircraft, Hindustan Aeronautics Limited (HAL) has come a long way with 20 production divisions and 10 R&D centers spread across India employing over 31,000 people. The Company has made strides from



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

T. Suvarna Raju, CMD



overhaul and licence manufacturing to indigenous design and development of aircraft, helicopters, accessories and aerospace systems. HAL has produced nearly 3,900 aircraft and 4,550 aero-engines till date.



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



BIDEC 2017 Showcases Bahrain's Military Leadership Role in the Region



■ By **Sujay Mehduia**

MANAMA (BAHRAIN). If the attempt was to show Bahrain in the leadership role in the region and project it as a gateway to the Middle East, then the first Bahrain International Defence Exhibition and Conference – 2017 can be termed as successful in this direction. Not only it has reaffirmed Kingdom's standing in the Gulf region but has also managed position it as an attractive investment destination especially for the military needs of the Gulf and the Asian region.

The exhibition, first of its kind which focused on sea, land and air military prowess of the different companies invested in the region, also gave an opportunity to the

coalition partners to redraw their strategy in the region about counter terrorism. The meeting of Bahrain Centre for Strategic and International Studies and Energy

(DERASAT) and Middle East Military Alliances and Coalitions (MEMAC) on the sidelines of the conference brought together delegates with military background from Saudi



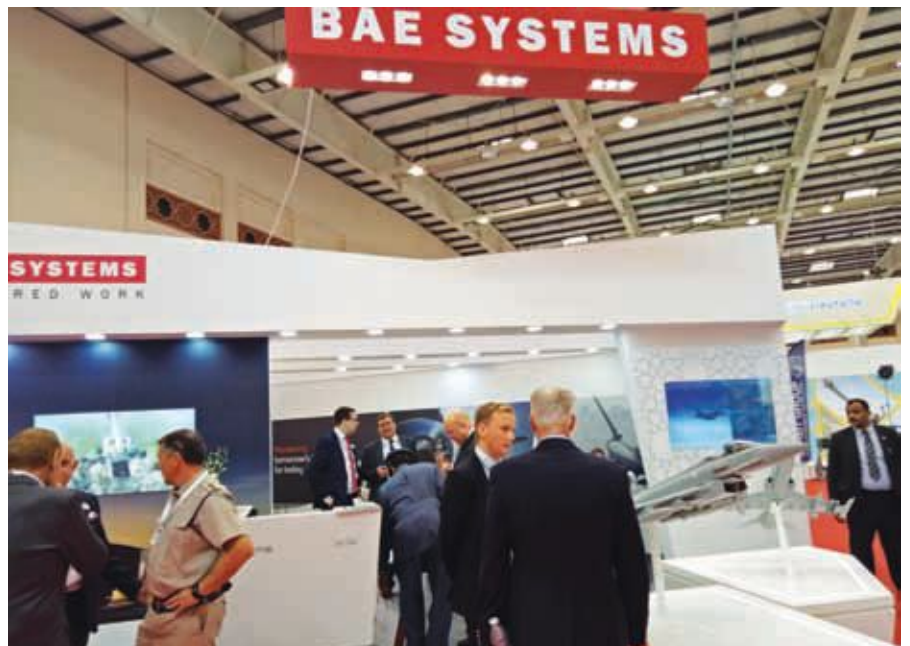


Arabia, Malaysia, UAE, USA, UK, Cyprus, Turkey, Greece and Pakistan.

Held under the patronage of King Hamad bin Isa Al Khalifa, the Supreme Commander the three-day event also witnessed a major deal signing between Bahrain Defence Forces (BDF) and US company Lockheed Martin for supply of 16 new technology and state of the art F16s.

BAE Systems, Bell Helicopters (Textron), Thales, Leonardo, Pegasus and Cambli to name a few, were among the other participants.

The entire top line leadership of the Kingdom of Bahrain had left no stone unturned to make the first BIDEDEC 2017 a big success. Brigadier Sheikh Nasser bin Hamad Al Khalifa termed hosting of such a major event in Bahrain as reflecting the aspirations of the wise leadership of the country and demonstrated Bahrain's competitive advantage as



a forum for cultures and civilizations and a place of dialogue and peace. "Bahrain's hosting of such a big international event for the first

time is a classic example of how successful the exhibition industry has become in the country. This will give the Kingdom of Bahrain



a foothold on the international map in this vital investment and promotional field with the aim to achieve excellence and produce creative ideas."

He said what the world is witnessing today is the result of successive events that cast a shadow over regional and international security, highlighting the necessity of military alliances to confront existing challenges and coordinate efforts to make the world a secure place to live.

"It is our responsibility now to play a role in facilitating strategic partnerships and alliances in our common fight against terrorism in the world."

The exhibition was inaugurated by the Royal Guard Commander and Chairman of the High Organising Committee of the Bahrain International Defence Exhibition and Conference (BIDEC), Brigadier-General Sheikh Nasser bin Hamad Al Khalifa on October 16. The three-day exhibition was kicked off in the presence of the Royal Guard's Special Force Commander,



Major Sheikh Khalid bin Hamad Al Khalifa, many military officials and visiting Chiefs of Staff.

The defence-expo and conference was organised by Bahrain Defence Force (BDF) and the Middle East Military Alliances and Coalitions (MEMAC) in cooperation with the

Bahrain Centre for Strategic and International Studies and Energy (DERASAT).

Apart from this, a major counter terrorism conference was also held by the Bahrain Centre for Strategic and International Studies and Energy (DERASAT) and Middle East

Military Alliances and Coalitions (MEMAC) under the leadership of Shaikh Abdulla bin Ahmed Al Khalifa.

The Islamic Coalition, as it is referred to, made no bones of the fact that it was clearly aiming at threats from Iran and Qatar who were playing a big role in supporting terror activities in the region which was threatening peace and stability.

"The region has been targeted by many threats, such as Iran's nuclear weapons development, supporting terrorist groups, meddling in other's affairs and disturbing the peace. Qatar chose to be within the same strategies and plans of Iran. Hence, the role of the military coalitions and alliances in the region is crucial," he said.

Bahrain Defence Force Commander-in-Chief Field Marshal Shaikh Khalifa bin Ahmed Al Khalifa was the chief guest at the opening session of MEMAC. It highlighted the importance of military alliances, and their role in fighting against extremist terrorist organizations such as "Daesh", "Hezbollah" and "Houthis" that threaten global security and stability.

The MEMAC Conference was organized in conjunction with the Islamic Military Alliance to Fight Terrorism and the Arab Coalition in Yemen. There were participants from major international military alliances such as NATO, UN Peacekeeping Operations and international officials and representatives of global think tanks.

Officials told India Strategic at the conference that Bahrain was looking at peace, security and stability in the region, and that BIDEAC was one of the many initiatives the Kingdom was taking. The international conference addressed two main aspects: the strategic political perspective of military alliances and the military operational perspective. ■



GUNS AND RIFLES: Slow Pace of Artillery and Infantry Modernisation

■ By Brig Gurmeet Kanwal (Retd)

NEW DELHI. The Indian Army is deployed in large numbers in border management and internal security duties even as it trains to meet the threat of a two-front war. There is concern about the persistent and worrisome delays in the replacement of many obsolescent weapons and equipment and the army's qualitative modernisation to meet future challenges.

The tanks and ICVs of the mechanised forces in the plains are still partly night blind and the capability to launch offensive operations in the mountains continues to remain inadequate to deter a future conflict. Although there are reports now on the army going in for sophisticated firearms for the



(Left) Indian soldiers carrying shells near a Bofors FH-77B 155mm artillery gun; Dhanush Gun

combat units of the infantry and some guns for the artillery, it is still too little and simply inadequate.

Artillery firepower, which will pave the way for the infantry to win future battles, needs to be upgraded by an order of magnitude – particularly in the mountains, if military aims are to be achieved during a future conflict. The capacity to launch precision strikes on hard targets with ground-based firepower delivery means is much short of the volumes that will be required. Air defence capabilities are grossly inadequate and army aviation squadrons are still equipped with obsolete light helicopters.

The modernisation plans of India’s cutting edge infantry battalions, which are aimed at enhancing their capability for surveillance and target acquisition at night and boosting their firepower for precise

retaliation both in conventional conflict and against infiltrating columns and terrorists holed up in built-up areas, are stuck in a bureaucratic quagmire. The army also needs to upgrade its rudimentary C4I2SR system and graduate quickly to network centrality to synergise the employment of its combat potential.

In fact, the artillery and infantry modernisation plans stand out for being neglected over more than 20 years. If at all these are moving forward, it is at a snail’s pace.

UPGRADING ARTILLERY FIREPOWER

Modernisation of the artillery has been stagnating after the acquisition of Bofors in the 1980s despite the lessons learnt during the 1999 Kargil conflict, in which sustained artillery firepower had undeniably paved the way for victory. Approximately 400 pieces of the 155 mm/39-calibre FH-77B Bofors howitzer were acquired, over 25 years ago. Though India paid for the designs, the guns were never manufactured locally as allegations over bribes, and poor quality, brought down a government and literally introduced paralysis in the Ministry of Defence (MoD).

The artillery is now equipped with obsolescent weapons and equipment like the 105 mm Indian Field Gun (IFG), the 122 mm Howitzer, the 130 mm Catapult self-propelled (SP) gun and the 120



mm mortars. The artillery requires large quantities of PGMs (Precision-Guided Munitions) for the destruction of hard targets such as tanks and bunkers and a potent real-time reconnaissance, surveillance and target acquisition (RSTA) capability. And, in view of their performance in Afghanistan and Iraq, the time has come to add UCAVs (Unmanned Combat Aerial Vehicles) armed with PGMs to the artillery's arsenal. Only then will it be possible to achieve future military aims and objectives, including the large-scale destruction of the adversary's war machinery.

Under the army's Field Artillery Rationalisation Plan (FARP) formulated in 1999, the Regiment of Artillery had decided to standardise the calibre of its guns at 155 mm so as to be able to engage targets deep inside enemy lines and to reduce the logistics trail through commonality of ammunition. The artillery plans to acquire a total of 2,820 guns of

7.62 mm light machine guns; The M777 Howitzer is much lighter than other Howitzers

all types to replace obsolescent guns and to equip the new regiments that will form part of 17 Corps, the Mountain Strike Corps now under raising. The modernisation plan had been stymied by the blacklisting of some firms in the fray.

New acquisitions have begun to now move forward. The DAC has accorded approval for the acquisition of 145 pieces of 155 mm/39-calibre M777 howitzer, which has a range of 24 km and weighs 4,000 kg. This weapon system, manufactured by the US-based MNC BAE Systems, will equip seven regiments in the mountains. The proposed acquisition will be through the Foreign Military Sales (FMS) route in a government-to-government deal worth USD 750 million. It will take a few years before all the guns are delivered. This gun will get inter-sector mobility when the C-47 Chinook medium lift helicopter is introduced into service. Also, plans are to use indigenous Ordnance Factory Board (OFB)-made munitions on this gun, for which trials are on.

Several Indian companies are known to be interested in the indigenous design and development of modern artillery systems in conjunction with overseas partners. Indigenous efforts to manufacture 155 mm howitzers include that by OFB to produce a 45-calibre 155 mm howitzer called Dhanush. Bofors had given full Transfer of technology (ToT) and this gun has evolved from that. In the process though, it has matured into an indigenous design during development. The gun has a maximum range of 38 km.

The Defence Acquisition Council (DAC) has approved OFB's proposal to manufacture 416 pieces of 155 mm/45-calibre Dhanush howitzers



provided the prototypes successfully meet the army's GSQR in user trials. The gun is reported to have faced some glitches during technical and user trials, including a bore premature. When these are resolved, 18 pieces are expected to be handed over to the army in 2018 for the exploitation phase.

The acquisition of 814 truck-mounted self-propelled (SP) guns has also been approved by the DAC and will be undertaken under the 'buy and make in India' category with ToT. While the first 100 guns will be imported, the remaining 714 will be manufactured in India. The total project cost is estimated to be around Rs 16,000 crore.

Bharat Forge (partner Elbit of Israel), Tata Power SED (Denel, South Africa) and L&T (Nexter, France) are likely to bid for this contract when the RfP is issued.. Trials for 180 pieces of 155 mm/52-calibre tracked SP guns for desert terrain have been completed successfully and negotiations are in progress to award the contract to K-9 Thunder, a JV between L&T and Samsung of South Korea. Also, 180 pieces of 130 mm M-46 Russian guns have been upgraded to 155mm/45-caliber with kits supplied by Soltam of Israel. The maximum range of the gun has gone up from 27.5 to 39 km. India can exercise an option to upgrade another 250 to 300 guns in future as a 'buy and make Indian' project.

The single largest artillery acquisition will be of 1,580 pieces of towed 155 mm/52-calibre guns over a period of 12 to 15 years. Of these, 400 guns are to be imported and the remaining 1,180 produced in India ToT. Over the last eight to 10 years, several RfPs that were floated for this project were cancelled allegedly due to the corrupt practices followed by some companies. New tenders were floated for these 155 mm/52-calibre long-range guns for the plains and trials are reported to have been completed. The two contenders are joint ventures (JVs) between Bharat Forge and Elbit and L&T and Nexter of France.

The Defence Research and Development Organisation (DRDO) has embarked on its own venture to design and develop a 155 mm/52-calibre Advanced Towed Artillery Gun System (ATAGS) in partnership with Bharat Forge and Tata Power SED, both private sector companies. While Bharat Forge will manufacture the gun, Tata Power SED will provide the electronics. Efforts are also underway to mount a 130 mm gun on an Arjun tank chassis as a replacement for the Catapult, which had a 130 mm gun on a Vijayanta tank chassis. 155 mm ammunition is now being manufactured indigenously, but some fuses are still being acquired from abroad.

Progress on the multi-barrel rocket launcher



Indian New Small Arms System (INSAS) is a family of infantry arms consisting of an assault rifle and a light machine gun (LMG)

front has been better than that in the acquisition of tube artillery. A contract for the acquisition of three regiments of the 12-tube, 300 mm Smerch multi-barrel rocket launcher (MBRL) system with 90 km range was signed with Russia's Rosoboronexport in early-2006. Each artillery division now has a regiment of this potent weapon system. Three regiments of the indigenously designed 214 mm Pinaka multi-barrel rocket system, manufactured jointly by the Tatas and L&T, have also been inducted into service. While the Pinaka has a range of 37 km at present, the Mark 2 version of the rocket will have a range of 60 km.

Although Pinaka was tested in the Kargil War, both these rocket systems are not suitable for employment in mountainous terrain.

The BrahMos supersonic cruise missile (Mach 2.8 to 3.0), jointly developed with Russia, has tremendous precision strike capability, very high kill energy and maximum range of 290 km. It was first inducted into the army in July 2007.

The number of BrahMos regiments has since gone up to three. A 4th regiment to be inducted will have 'steep dive' capability for the mountains. These terrain hugging missiles are virtually immune to counter measures due to their high speed and very low radar cross section.

India should consider exporting the BrahMos missile system to achieve foreign policy objectives; for example to Vietnam.

The Grad BM-21 MBRL regiments, which have been in service for almost three decades, are being given extended range rockets that have a maximum range of 40 km. These four missile and rocket launcher weapon systems will together provide a major boost to the artillery's ability to destroy key targets at long ranges. However, a surface-to-surface missile



**DRDO'S
Battlefield
Surveillance
Radar – Short
Range
(BFSR – SR)**

(SSM) with a range of 500-600 km, which can be fired from the plains to destroy targets higher in the mountains.

SHARPENING THE CUTTING EDGE: MODERNISING THE INFANTRY

The army has initiated a project to equip all its infantry battalions with a system that had for long been called the Future Infantry Soldier as a System (F-INSAS). The new system will be a force multiplier and will include a modular weapon with a thermal imaging sight, a new assault rifle with an UBGL that will replace the INSAS rifle, a Laser range finder, a combat helmet equipped with a head-up display and communications head set, a smart vest with a body monitoring system, a backpack with integrated GPS and radio and protective footwear.

The new combat system is expected to be built indigenously with Commercially Off the Shelf (COTS) imported components. It resembles the US Army Land Warrior system and is expected to cost over Rs 25,000 crore to equip over 350 infantry battalions. Plans also include the acquisition of hand-held battlefield surveillance radars (BFSRs), and hand-held thermal imaging devices (HHTIs) for observation at night. Stand-alone infrared, seismic and acoustic sensors need to be acquired in large

numbers to enable infantrymen to dominate the Line of Control (LoC) with Pakistan and detect infiltration of its terrorists.

The army also requires more than 350,000 new bullet-proof jackets but only 50,000 have been ordered so far. The army had requisitioned the jackets almost ten years ago.

Surprisingly, the army's plans to replace the basic weapon of an infantryman, a fault-free modern assault rifle, are still hanging fire.

The army's 10-year hunt for new assault rifles as a replacement for the malfunctioning 5.56 mm INSAS rifle has seen little progress.

It has been reported that the army planned to import 65,678 larger calibre 7.62 mm rifles that are more lethal, with another 120,000 to be made in India. But then, there have been many cancellations of ongoing acquisitions in recent years due to glitches in the procurement process, including the acquisition of 65,678 assault rifles and 44,600 carbines, in 2015 and 2016, respectively.

It was reported in August 2017 that the MoD had retracted the RfP for the acquisition of 44,000 7.62 mm light machine guns (LMGs) as "it had become a single-vendor situation with only the Israeli Weapons Industries (IWI) left in the fray after protracted trials from December 2015 to February 2017." Approximately 4,400 LMGs were to be imported; the rest were to be manufactured in India with ToT. All of these acquisitions were cancelled after a long-drawn tendering process and protracted trials.

The projects will be delayed by at least five to seven years. The army needs to procure approximately 800,000 assault rifles at a cost of about Rs 16,000 crore for its 450 infantry and Rashtriya Rifles (RR) battalions (each battalion has a strength of 800 personnel).

Army Chief General Bipin Rawat has been quoted as saying that he had decided to import only 250,000 state-of-the-art 7.62mm assault rifles for troops directly engaged in combat roles, and for whom it would be the "primary weapon."

There are budget constraints. An imported rifle would cost around Rs 200,000, and an Indian-made, one-fourth of that.

To enable the army to fight and win in an era of strategic uncertainty, the government must give a major boost to the army's modernisation drive. It requires substantially higher budgetary support than what has been forthcoming over the last decade, and the Government somehow has to find funds.

– The author is Distinguished Fellow, Institute for Defence Studies and Analyses (IDSA) and former Director, Centre for Land Warfare Studies (CLAWS), New Delhi.

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Indian Air Force Celebrates 85th Anniversary

Commending the Air Force Day Parade October 8 for their impressive turnout, precise and well-coordinated drill movements and spirited demonstration which truly reflected the sense of pride, professionalism and discipline of the Indian Air Force (IAF), Chief of the Air Staff, Air Chief Marshal BS Dhanoa exhorted the air warriors to continue to serve the nation with honour and dignity in the highest traditions of the IAF to live up to its motto 'Touch the Sky with Glory'. Major excerpts of the CAS' address are given below:-

" ON THE 85th Anniversary of the Indian Air Force, I extend my warm greetings and welcome you all to this Air Force Day parade. At the outset, I commend all the air warriors on Parade for an outstanding performance and my congratulations to all the award winners for their exemplary achievement.

The IAF can look back with justified pride and satisfaction at its achievements over the last 85 years. Beginning with a single flight of Wapiti aircraft in 1932 we now stand transformed into a modern, battle hardened Air Force with strategic reach. I am extremely happy to commend all the air warriors for maintaining operational preparedness of a very high order.

Today, as we commemorate the 85th anniversary of the Indian Air Force, we face the tragic loss of an iconic member of our Air Force family, Marshal of the Air Force Arjan Singh. He was principled in life, magnanimous in victory and a thorough professional. Indian Air Force salutes the legacy of the Marshal.

While we are proud of our past and the good work of our predecessors, we will not deviate from our primary



▲ Chief of the Air Staff, Air Chief Marshal BS Dhanoa addressing the media at Air Force Station Hindon in Ghaziabad

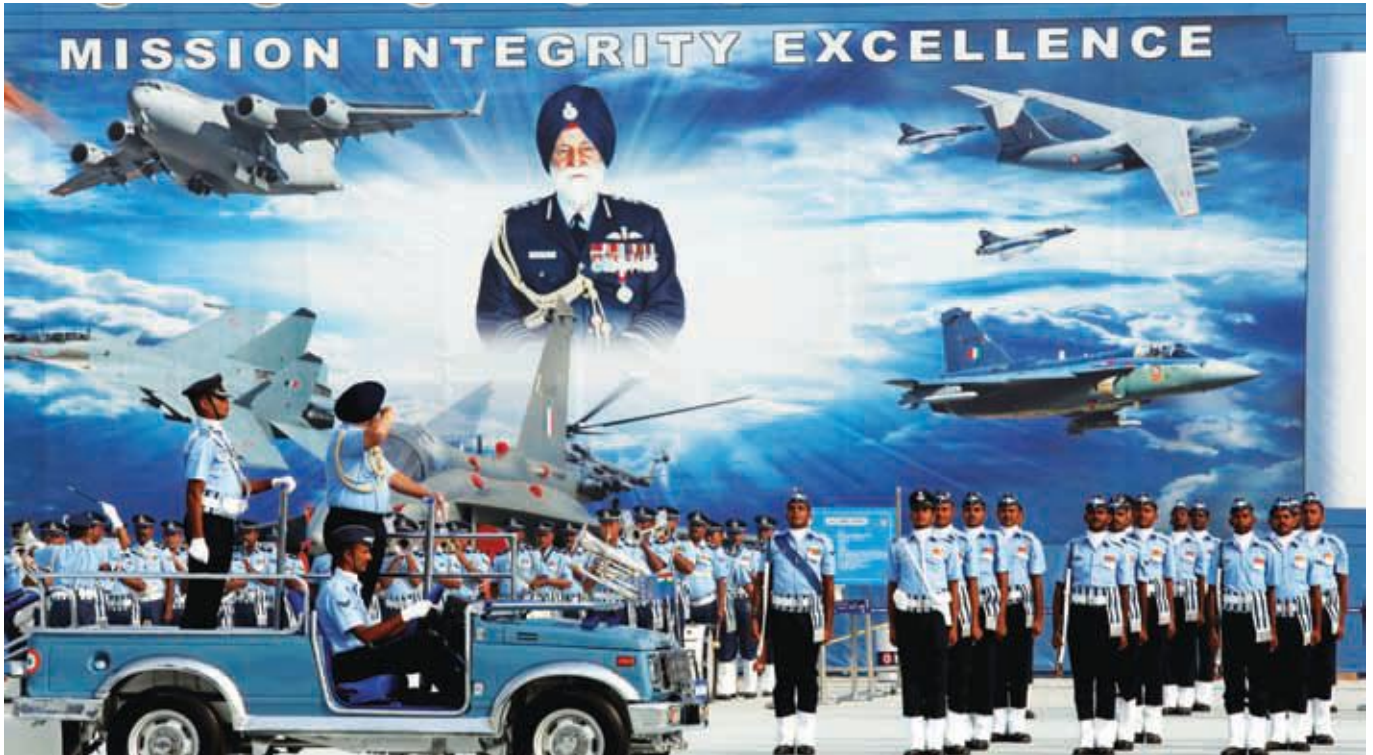




▲ The famous 'Synchronous' Rifle Drill Team of the IAF going through its paces

▼ A Panoramic view of the Parade Ground





▲ Chief of the Air Staff, Air Chief Marshal BS Dhanoa inspecting the parade

▶ The 'Nishaan Toli' marching past



▼ The Rifle Drill Team in another intricate manoeuvre





▲ Su-30 MKI performing the 'Vertical Charlie' manoeuvre streaming IR flares

▼ Parade marching past in 'Review Order'



focus and that is to build and maintain effective Air Power for the present and the future. It is the duty of each one of us to remain combat worthy, whether on ground or in the air and also maintain our combat systems operational for any contingency at a short notice.

We are in the process of acquiring new combat systems, upgrading and modernising our existing inventory of aircraft and weapon systems with an aim to equip them with the latest avionics and technology so that they remain contemporary.

To augment the strength of fighter fleet several steps have been initiated. The Mid-Life Upgradation of Mirage-2000, MiG-29, and Jaguar fleet is already under way. Acquisition of 36 Rafale aircraft in the next few years and early decision on indigenous 'Make in India' fighter aircraft project would greatly enhance our operational capability in the near term. Induction of the potent Apache Attack Helicopters and Chinook Heavy Lift Helicopters would further enhance our capabilities. We have added Six C-130J aircraft to our existing inventory and further augmented our transport fleet and Special Operations Capability. These have been positioned at Air Force Station Arjan Singh, the station named in honour of the Marshal.

Our Air Defence Network has also been further bolstered by the induction of modern sensors and weapon systems including the latest SPYDER Low Level Quick Reaction Missiles and their integration with the Integrated Air Command and Control System (IACCS). We are progressively nearing our goal of establishing a robust Network Centric Operation capability.

There is no doubt that to attain true strategic autonomy, we need to focus on the indigenous manufacturing of aircraft, radars, missiles and other aviation equipment. I would like to put on record that the IAF is fully committed towards indigenous development of high technology military hardware in consonance with the 'Make in India' initiative of the Hon'ble Prime Minister. Recently, we have inducted and operationalised the indigenously built Tejas Light Combat Aircraft in July 2016 and the Airborne Early Warning & Control (AEW&C) aircraft in February this year. We will further augment these two fleets in the coming years. The induction of Advance Light Helicopter, Akash Surface-to-Air Guided Weapon, Air-to-Air Astra Missile, IACCS and Air Defence Radars are some of the other success stories of our indigenisation effort.

Notwithstanding the pace of ongoing acquisitions, modernisation, indigenisation efforts and our desire for peace, we are prepared to fight at a short notice, should the need arise.

The Indian Air Force remains firm in its belief that Joint Planning and Operations are the way ahead for which core competence of each Service must be synergised

to generate the desired effect and capability. I wish to assure the Army, Navy and other security agencies that we will continue to deliver joint capability in any future national contingency.

Our professional prowess and our ability to sustain operational readiness for a prolonged period has been reflected in the numerous exercises that we have conducted within our country or 'participated in' bi-lateral, multi-lateral with other nations. These exercises have demonstrated our growing strategic reach and helped us get exposure on the capabilities of other nations which in turn have enabled us to further hone our operational skills.

It is my firm belief that while equipment is important, ultimately it is our human resource that will convert this potential into actual capability. An important priority area for us is to empower and prepare our air warriors for the Air Force of tomorrow, an Air Force which is going to be extremely technology intensive.

While we train our men and women hard, as leaders of men, we need to invest time and effort in nurturing, grooming, mentoring and training our subordinates at all levels. I am confident that each one of you will take on this important task as your sacred responsibility and in this manner contribute effectively to the future growth of the IAF.

Indian Air Force is grateful for the Nation's trust, confidence and support. On behalf of all the air warriors, I would like to express my gratitude to the Ministry of Defence as also the Government of India for their support to our modernisation plans. I take this opportunity to assure the Nation of our sacred resolve in defending the sovereignty of our skies and safeguarding our national interests.

Jai Hind. ■

Surya Kirans taking off in batches of three for the air display



The 'Sarangs' in Line Astern



A trio of fighters breaking off for the Trishul manoeuvre



The mighty C-17 Globemaster III being escorted by a pair of 'trailing' Su-30 MKIs



'Perfection Personified'. The Surya Kiran 9-aircraft Formation Aerobatic Team in action



Flag-bearing Mi-17 V5s in an aerial salute to the Reviewing Officer



A member of the dare devil Akash Ganga with the Team's Flag



Sky Divers forming the 'National' colours in the air

IAF Lands in Force on Agra-Lucknow Expressway



NEW DELHI. On October 24, the Indian Air Force (IAF) carried out major landing operations on the Lucknow-Agra Expressway, about 60 km west of Lucknow. The series of landings took place close to Bangarmau in Unnao District of Uttar Pradesh, where a 3 km stretch was specially prepared for such operations. The landing operations commenced at around 1015 hrs and continued till about 1200 hrs. A total of sixteen aircraft participated in the operation which comprised IAF's frontline Air Superiority Fighters including the Sukhoi-30, Mirage-2000 and Jaguar fighter aircraft. These aircraft took off from Bareilly, Gwalior and Gorakhpur, respectively. In addition, the IAF carried out drills in which Garud Commandos were inserted and extricated for ground operations, by the C-130J Super Hercules transport aircraft which took off from Hindan airbase.

A team of Senior IAF Officials headed by Senior Air Staff Officer (SASO), Air Marshal AS Butola of HQ CAC,

Allahabad were present to oversee the operations. While the operations were conducted under the aegis of HQ CAC, Air Force Station Bakshi Ka Talab Station Commander, Gp Capt J Soares and his team, were responsible for the overall control and coordination of the exercise.

On site arrangements were made for a Mobile Air Traffic Control, Radar Control, Meteorological Facility, Aerospace Safety and Security Control. In addition, to deal with any situation, crash, firefighting, rescue and medical teams were positioned. IAF sought assistance from State Government authorities for temporary closure of the expressway and other matters like crowd control, etc. A large number of police personnel were stationed along the stretch to ensure smooth conduct of operations.

The exercise commenced with an impressive short landing by a C-130J which on its landing roll itself started off loading the Garud Commandos and their vehicles in a manoeuvre called Combat ERO (Engine Running Offload). Immediately on disembarking from the C-130J, the Commandos took up position on either side of the airstrip to cordon it off for fighter operations. This was followed by two sets of three Mirages each, five Su-30 MKIs and three Jaguars. All 14 fighter aircraft carried





in highway landing operations for insertion and extrication of Garud Special Forces. While the operations on October 24 required the closure of the portion of the expressway for road traffic, through the excellent support of the UP State Government and UPEIDA, once the planned works are completed, such road traffic closure will not be required in future. Two diversion roads on either side of the 'selected' airstrip are near completion. In addition, wire fencing on both sides is also being undertaken to keep the airstrip clear of stray animals. Two parking areas for aircraft at both ends of the airstrip are also nearing completion.

Several countries like Germany, Sweden, South Korea, Taiwan, Finland, Switzerland, Poland, Singapore,

out a roller (touch and go) manoeuvre on the expressway. The C-130J then returned for another short landing to extricate the Garud Commandos.

Over the past few years, IAF has been increasing its efforts to utilise certain straight stretches of National Highways for emergency landings. Such highway stretches are planned to be used in emergencies, if an active airport is not available for some reason. These operations increase the flexibility in the use of Air Power. In addition, use of transport aircraft for quick insertion of forces for Human Assistance and



Disaster Relief into civil area and Special Forces in case of contingencies has been validated.

IAF had already carried out landings by fighter aircraft for the first time on the Yamuna expressway on May 21, 2015. The present stretch of Agra – Lucknow expressway was earlier activated for the first time for IAF operations in November 2016 in which six fighter aircraft of the IAF landed on the expressway. However, in this particular exercise, IAF included the Jaguar fighter aircraft for the first time. Also for the first time, IAF's C-130J transport aircraft participated

Czechoslovakia, Pakistan, etc. have dedicated stretches on their highways and expressways for aircraft to land and take off in emergencies or war like events.

This operation has majorly boosted IAF's capability to undertake unhindered operations even during non-availability of standard runways. It has demonstrated the expert flying skills of its fighter and transport aircrew, and the capability of its ground crew in activating such expressway airstrips on short notice. Such activations of highway stretches all across India are planned to be practiced regularly by the IAF in future. ■



New Mission-Based Deployment Concept to Result in Greater Presence and Visibility in IOR: Admiral Sunil Lanba

NEW DELHI. The four-day Naval Commanders' Conference concluded on October 27 where the senior leadership of the Indian Navy (IN) reviewed major operations, training and administrative activities undertaken in the last six months.

During the Conference, Defence Minister Nirmala Sitharaman addressed and interacted with the Naval Commanders, which was also attended by senior MoD officials. While reviewing the combat readiness of the Navy, pace of modernisation and progress of various acquisition and infrastructure related cases, She complimented the Navy for maintaining a high operational tempo, ensuring the maritime security of the country and sustained efforts in support of the 'Make in India' and 'Digital India' initiatives of the Government. Mrs Sitharaman brought out that it was a matter of pride that all 34 warships presently under construction were being built indigenously. She also complimented the Navy on the successful conduct of tri-lateral exercise 'MALABAR 17' and informed the Commanders that during the recently concluded

Defence Minister Nirmala Sitharaman with Navy Chief Admiral Sunil Lanba during the Naval Commanders' Conference at Sena Bhawan in New Delhi



ADMM Plus, keen interest was evinced by various ASEAN nations in exercising with the Indian Navy, which spoke highly of the IN's professional standing and competence.

Chairing the conference, Admiral Sunil Lanba, the CNS, addressed the Naval Commanders and stressed focus on four key areas; 'Combat Capability and Role- Worthiness', 'Ensuring Primacy of Core Professional Tasks', 'Develop a Motivated, Trained and Committed Team' and 'Increase Familiarity and Comfort in IN's Maritime Areas of Interest'. The CNS shared his views on the current security scenario and emphasised the need for the IN to remain outcome oriented in all endeavours, both at sea and ashore.

The Commanders also had an opportunity to interact with the Chiefs of the Indian Army and IAF. The Service Chiefs brought out the complexities in current security situation where the spectrum of threats ranged from possible conventional conflict to inimical actions by state and non-state sponsored terrorists/elements and natural disasters and calamities. The Service Chiefs elaborated their vision and the path being charted by the respective Services towards operational readiness and actions in progress towards improving tri-Service cooperation.

Mr Amitabh Kant, CEO, Niti Aayog also interacted with the Commanders and gave his perspective on 'Make in India' with specific reference to building a vibrant defence industrial base, which would be pivotal in spurring the



manufacturing sector growth and make India an export oriented economy.

As part of the annual theme, the Commanders brainstormed to fine tune the execution of 'mission based deployment' involving ships, aircraft and submarines beyond the immediate neighbourhood for providing sustained presence in the IOR. Critical enablers such as refits/maintenance philosophy, op-logistics and HR measures for sustained operational effectiveness were also discussed in detail. Approval of a new Transition cycle for ships from Maintenance periods to Operational Deployments that allowed for a focused and gradual transition of ships from periods of maintenance layoffs to full scale operations was one of the milestones achieved

during the conference. The Commanders resolved to focus efforts on the Navy's ability to deploy and sustain in tandem with the new Mission-based deployment concept, which would result in greater presence and visibility in IOR.

In his closing address, the CNS emphasised the need to optimise efforts, exploit the potential of each and every personnel, encourage innovative thinking and harness available technology. The CNS urged the Commanders to put in concerted efforts to realise the 'way ahead' arrived at during the deliberations on various agenda points and exhorted the Commanders to keep an unwavering focus on combat readiness at all times. ■

Clockwise from top: Mrs Sitharaman posing for a group photograph during the Naval Commanders' Conference; Mrs Sitharaman being received by the CNS, Admiral Sunil Lanba and Mrs Sitharaman being introduced to the senior leadership of the Navy by the CNS.

Mid-Air Encounter Over Arabian Sea

■ By Captain GM David

AVIATION HAS its fair share of spills and thrills. It is amazing how much can be cramped into a span of 60 seconds. I thought I would share an encounter I had with a B-52 while flying a B747-400 from Mumbai to Paris. I am sharing this event because it reinforces the effect of following Standard Operating Procedures (SOPs) and the value of Simulator Training. This is my account of the event.

Now read on.....

INCIDENT

We had got airborne from Mumbai at dawn just as the sun was beginning to lighten the Eastern horizon. The load was 470 persons on board including infants and crew. The co pilot had been sent back for rest in the bunk, since he had become a new Dad and we urged

him to take the first slot to sleep. We are a three man crew comprising of two Commanders and one First Officer, so that at any time there would one Commander at the controls when one went back to rest. My Second Commander was seated on my right. It was an hour or so after takeoff and we were approaching the Bombay- Muscat Flight Information Region (FIR) where Mumbai Radio hands us over to Muscat Radio. We were over the Arabian Sea, with water below us as far as you could see in any direction. The sun was competing in speed with us and winning in the race, having an overtake of almost our ground speed of 500 knots. We were not under positive Radar Control being too far out sea. We were in High Frequency (HF RT) contact with Mumbai and were about to change over to Muscat Radio.

My Second Commander (Capt Rajul Bhagatwala) who was on watch, suddenly alerted, "Reciprocal Traffic, 20 miles range, same level." We both went into full alert. I peered into my Screen

and sure enough there was this traffic heading towards us as indicated by the Traffic Collision Avoidance System (TCAS). The intruder was about 20 miles away, almost head on and closing in real fast. I called for the second commander to put on all the Ac lights and see if he could establish visual contact. I said I was going head down to monitor the 'Intruder' and take appropriate avoiding action when commanded by the TCAS computer. At a combined crossing speed of over 1,000 knots we were just 60 seconds from impact. The tricky thing here is to sit down and do nothing till the TCAS computer commands you to do so. No doubt the two TCAS computers, mine and the intruder's were busy 'Talking' to each other to decide who would be the controlling TCAS of the two and what the escape manoeuvre should be. I peered up and I could see a Qantas A340 just above me going in the same direction and 2,000 feet above. He had been there ahead of me since level out and I was overtaking him since my cruise speed was 0.86M while he was doing only 0.78M. I got my first warning from the TCAS, "Traffic, Traffic". Now the tricky part is to not take any evasive action till the computer tells you to, and that happens in a case like this, about 30 seconds from impact. So you sit like a moth attracted to a flame, unmoving. I had already called out for

no action till RA (Resolution Advisory) and then follow the TCAS command. Sure enough like the book, it came at around 8 miles and, 30 seconds from impact. "Descend Descend", was the call. I disconnected the Auto Pilot and Auto Throttle and gently followed the computer command into a descent. At 4 miles, "CONTACT" was the call from the right seat. "It has eight engines and all are smoking black." I looked up as I had achieved safe separation and I saw him flash by 1 O'clock to 7 O'clock all eight engines spewing black smoke. "B-52" I called out. Our vertical separation



as we crossed was 400 feet on the TCAS. It was just the 'Boys' going back to Diego Garcia after having bombed the Tora Bora hills in East Afghanistan on a round trip. He must have had us on his Mil radar but turned on his civil TCAS only around 20 miles to warn us on TCAS. His computer must be programmed to make the other guy take avoiding action as far as possible. He was at the wrong height for his track which was 160 deg or so and we were on a track of 330 deg, hence the conflict of flight paths. But that is the advantage of being the only Super Power in the World.

Back in the cabin they had just finished the Breakfast Service and were serving Tea and coffee when we had this RA. I called to find out the cabin status. The In Flight Supervisor came up to the flight deck and said that no one had felt a thing and not a drop of tea or coffee had been spilled. I am not saying this to give myself a pat on the back for smooth flying, but to emphasise that when the Breaking News screams, "250 passengers had a miraculous escape when two aircraft had a near miss", it is over-sensationalising a controlled situation, though such a situation should not have happened. In closing, the TCAS gives you a command

which needs a max of 2g to respond. So there is no panic, only self discipline required. You can't fool a pilot though. There were two pilots below in the cabin traveling as passengers who immediately felt the Auto Pilot going off, felt a few degrees of bank come on and the Jumbo descending. They came up to the cockpit a few minutes later to ask if the Auto Pilot had tripped.

LESSONS LEARNED

- Similar TCAS drills are part of Routine training for all of us. If it works in the Simulator, it will work 100 per cent in real threat situations.
- SOPs for such events are laid down and if followed meticulously, it works.
- Knowledge of the aircraft systems involved, coupled with the SOPs provides the required margin of safety and clear cut decision making
- No sense of fear or apprehension, since you know what to do. No confusion whatsoever.

In this situation, both Capt Bhagatwalla and I were crystal clear on what to do.

There was no fear or panic. Voices were cool, calm and collected. There was no sense of fear what so ever, only the supreme confidence of what action was required. All these drills had been done a hundred times on the Simulator. If it had worked there it would work now, and, it did. In closing I leave this message for you, we survived that day only because the SOPs and Simulator training had assured us that if followed we would survive. It gave us the confidence to do so. We did it and survived; so will you.

Though I have always had a healthy respect for a B-52 since then and I sure do not want to get closer than that in the air.

EDITOR'S NOTE. This is a first-hand experience of an Air India Boeing 747-400 pilot who had a harrowing experience of a near mid air with an USAF B-52 Stratofortress Bomber over the Arabian Sea. Captain G M David, an ex-IAF fighter pilot of repute, was one of the most qualified and experienced Jumbo captains Air India ever produced. The incident took place when he was operating a packed Air India Boeing 747 flight from Bombay (now Mumbai) to Paris.

Boeing Business Jets Continues to Lead Business Jet Market

BBJ booked 14 sales over the last year, valued at



LAS VEGAS. Boeing Business Jets announced October 9 at the National Business Aviation Conference and Exhibition at Las Vegas, it booked 14 new orders in the last year.

The orders include one 737, four BBJs, three BBJ MAXs, one BBJ 787-8, two BBJ 777-300ERs and three BBJ 747-8s.

“It has been a really strong year for us at Boeing Business Jets,” said Greg Laxton, Head of Boeing Business Jets. “Our customers are seeing the value our products provide across

Ultra-Large

\$2.7 billion

our entire portfolio, from the current generation BBJ, to the future BBJ MAX, all the way up to the BBJ 747-8.”

Boeing Business Jets also unveiled a new interior design concept for the BBJ MAX 7. Created by renowned Paris based design firm, Alberto Pinto, it features a design customised to the BBJ MAX 7’s spacious interior.

“At BBJ, we are always innovating our products and that includes the cabin interior,” said Laxton.

“What really sets Boeing Business Jets apart from our competition is that we offer our customers incredible range and incredible cabin space.

Our customers can take advantage of multiple living areas, a full bedroom and full size bathrooms and the new design beautifully highlights these advantages.”

Boeing Business Jets offers a complete portfolio of ultra-large-cabin, long-range airplanes perfectly suited for Government and Head of State operations.

The product line includes the BBJ MAX family,— high-performance derivatives of the commercially successful 737 MAX airplane family— as well as Boeing twin-aisle airplanes including the 777, 747-8 and 787 Dreamliner.

Boeing Rolls Out Singapore Airlines’ First 787-10 Dreamliner



NORTH CHARLESTON, SOUTH CAROLINA. Boeing has rolled out the first 787-10 Dreamliner built for Singapore Airlines at its Final Assembly facility in North Charleston, South Carolina.

The airplane will now undergo the painting of the airline’s livery and begin its system checks, fueling, and engine runs. Singapore Airlines is due to take delivery of its first 787-10 in the first half of 2018 and will be operated on the airline’s medium-haul routes.

Singapore Airlines is the launch customer of the 787-10 and currently has 30 airplanes on firm order. The airline also signed a letter of intent in February to purchase 19 additional 787-10s.

“Boeing is excited to have finished final assembly of the first 787-10 Dreamliner for Singapore Airlines,” said Dinesh Keskar, senior vice president, Asia Pacific & India Sales, Boeing Commercial Airplanes. “With its unprecedented efficiency, greater capacity and the Dreamliner’s known preferred passenger experience, the 787-10 will be an important part of the airline’s future fleet.”

As an 18-foot (5.5-m) stretch of the 787-9, the 787-10 will deliver the 787 family’s preferred passenger experience and long range with 25 per cent better fuel per seat and emissions than the airplanes it will replace.

The 787 Dreamliner family offers a modern, optimised and efficient airplane family in every market segment. Since entering service in 2011, the 787 family has flown more than 190 million people on more than 560 unique routes around the world, saving an estimated 18 billion pounds of fuel.





Airbus' "BLADE" laminar flow wing demonstrator makes first flight

TOULOUSE, FRANCE. Airbus' A340 laminar-flow "BLADE" test demonstrator aircraft (A340-300 MSN001), also dubbed 'Flight Lab', has made its successful three hours plus maiden flight from Tarbes aerodrome in Southern France to Toulouse for the EU-sponsored Clean Sky "Blade" project.

The BLADE project – which stands for "Breakthrough Laminar Aircraft Demonstrator in Europe" – is tasked with assessing the feasibility of introducing the technology for commercial aviation. It aims to improve aviation's ecological footprint, bringing with it a 50 per cent reduction of wing friction and up to five per cent lower CO2 emission. Airbus' A340 Flight Lab is the first test aircraft in the world to combine a transonic laminar wing profile with a true internal primary structure.

On the outside the aircraft is fitted with two representative transonic laminar outer-wings, while inside the cabin a highly complex specialist flight-test-instrumentation (FTI) station has been installed. The

extensive modifications to the A340-300 test-bed aircraft took place during the course of a 16-month working party in Tarbes, with the support of numerous industrial partners across Europe.first-flight marks the kick-off of the Blade flight-test campaign to explore the wing's characteristics in flight.

"We began by opening the flight envelope to check that the aircraft was handling correctly," explains Airbus Flight-Test Engineer, Philippe Seve, who was on board the flight. "We achieved our objective to fly at the design Mach number, at a reasonable altitude and check everything was fine. We also checked that the FTI was working as expected, to identify further fine-tuning for the next flights."

On the wings, there are hundreds of points to measure the waviness of the surface to help Airbus' engineers ascertain its influence on the laminarity – which is the first time that Airbus has used such a testing method on an aircraft. Other 'firsts' are the use of infrared cameras inside the pod to measure wing temperature and the acoustic



generator which measures the influence of acoustics on laminarity. In addition, there is also an innovative reflectometry system, which measures overall deformation in real-time during flight.

A key goal of Blade is to be able to measure the tolerances and imperfections which can be present and still sustain laminarity. To this end, Airbus will simulate every type of imperfection in a controlled manner, so that at the end of the campaign the tolerances for building a laminar wing will be fully known. The flight Lab will perform around 150 flight hours in the coming months.

Jeppesen and Air Malta Agree to Navigation, Charting and Electronic Flight Bag Service Contract



ENGLEWOOD, Colo. Boeing through its subsidiary Jeppesen, announced September 27 a three-year service renewal agreement with Air Malta to provide Jeppesen's industry-leading FliteDeck Pro electronic flight bag (EFB) services on iPad, in addition to digital charting data and NavData global navigation services for the airline.

The use of FliteDeck Pro will deliver enhanced operating capabilities for Air Malta, including the use of Smart Notes, which analyse chronological and geospatial flight data to present key data points for pilots automatically, without the need for manual interaction. Another new capability, Tailored Enroute, will allow Air Malta to depict Jeppesen's data-driven enroute data, supplemented with their own operationally-specific information, to provide a complete enroute navigation picture.

"Our relationship with Air Malta provides mutually beneficial information sharing, and we are proud to continue this process through our new agreement," said Margarita Jiménez Vidal, Flight Operations sales director, Boeing Global Services.

Jeppesen NavData is developed from a comprehensive aviation database, which is composed of more than one million records. To ensure accuracy, Jeppesen flight information analysts edit and verify approximately 150,000 database transactions generated from worldwide aviation data source documents during every 28-day revision cycle.

Sikorsky Presents Winged-S Rescue Award to Bristow S-92 Helicopter Crew



LONDON. Sikorsky, a Lockheed Martin company presented Bristow Helicopters Limited with the Sikorsky Winged-S Rescue Award in recognition of a recent life-saving mission in the North Atlantic. The award was accepted during the 2017 Defence and Security Equipment International exhibition, September 12. Bristow Helicopters currently operates S-92 helicopters on behalf of the UK Maritime and Coastguard Agency (MCA) for the critical mission of search and rescue (SAR), following the award of the 10-year UK SAR contract by the Department for Transport in March 2013. Since April 2015, an estimated 4,500 search and rescue missions have been executed, many utilising the UK SAR S-92 helicopters.

In May 2017, a Bristow crew operating an S-92 helicopter out of the HM Coastguard Prestwick SAR base rescued 22-year-old Matthew Bryce who was stranded at sea for 32 hours. Bryce ventured out from the west coast of Scotland to enjoy a day of surfing on a Sunday morning, later causing concern to his family when he did not return. Authorities were alerted the following day, and after an extensive multi-agency air and sea search lasting several hours, Bryce was found by the crew of the Prestwick S-92, call sign "Rescue 999" drifting off the coast of Northern Ireland. During a mission lasting over six hours, the crew of Rescue 999 hoisted Bryce from the sea that Monday evening. He was safely transported to a Belfast hospital and later recovered.

Beginning in 1950, the Winged-S Rescue Award Programme honours those who perform rescues flying a Sikorsky helicopter. Through this award, Sikorsky acknowledges the humanitarian efforts of pilots and crew members who put themselves in harm's way to save others, fulfilling Igor Sikorsky's vision of the helicopter. Since 2004, Sikorsky has delivered more than 275 S-92 helicopters, predominantly to operators serving the worldwide offshore oil and gas industry, and for civil search and rescue operations. Eleven nations fly the S-92 helicopter for their head of state missions. In May 2014, Sikorsky was selected to build the next US Presidential Helicopter Fleet, the world's most advanced executive transport helicopter, using the S-92 platform. ■

First A330neo Successfully Completes Maiden Flight



THE A330neo's maiden flight confirmed Airbus' widebody jetliner leadership, bringing together new-generation technology and high operational efficiency that builds on the in-service experience of its A330 and A350 XWB aircraft families.

Departing from Toulouse-Montaudou Airport in southwestern France, the no. 1 A330neo was put through its paces during a four hour and 13 minute airborne evaluation. The milestone takeoff and landing were witnessed by an audience of invited airline executives, industry suppliers, air transport officials, national authorities, the news media and Airbus employees.

Both A330-800 and A330-900

are powered by Rolls-Royce's latest Trent 7000 turbofan powerplants, and incorporate high-span wings featuring 3D-optimised aerodynamics, new onboard systems, a connected cockpit, and the "Airspace by Airbus" cabin interior.

By offering the A330neo along with its next-generation A350 XWB, Airbus has created a world-leading widebody airliner product line that accommodates 257 to 366 seats – sharing a high degree of commonality for airline operators, while providing unmatched comfort and a superior in-flight ambience for passengers.

Entry of A 330-900neo and the smaller A 330-800 for airline service is planned for mid-2018 and 2019, respectively. ■

Honeywell Engine Receives Certification for Cessna Citation Longitude



PHOENIX. Honeywell's HTF7700L, the latest model in the HTF7000 family of engines, has now been certified by the Federal Aviation Administration for the Cessna Citation Longitude, the upcoming super mid-size aircraft from Textron Aviation Inc., a Textron Inc. company. The HTF7000 engine family has a demonstrated track record of low cost of ownership and best-in-class reliability, providing operators with the optimal balance of performance and value.

The HTF7000 family is designed for on-condition maintenance, which means the HTF7700L's periodic inspections and standard maintenance are easily performed on-wing, reducing costly downtimes. Honeywell's HTF7000 family has achieved more than 3.5 million flight hours, and is fast approaching the 2,000th production engine delivery in 2018, only 14 years after its first entry into service. This type certification marks the sixth application of the highly successful HTF7000 family of engines; variants of the engine family are also in service on the Bombardier Challenger 300 and Challenger 350, the Gulfstream G280, the Embraer Legacy 450 and Legacy 500, and now the Cessna Citation Longitude. ■

Boeing, Air China Celebrate Delivery of China's First 737 MAX 8



SEATTLE. Boeing and Air China celebrate the delivery of the airline's first 737 MAX 8. China's national flag carrier is the first airline in the country to receive the 737 MAX. Customers throughout China will take delivery of nearly 100 737 MAXs by the end of next year.

"Air China has been a longstanding valued customer for decades," said Rick Anderson, vice president of Sales, Northeast Asia, Boeing Commercial Airplanes. "This delivery marks another significant milestone in our enduring partnership. We are confident that the 737 MAX 8 will play a key role in Air China's continued growth."

Boeing's partnership with Air China dates back to the 1970s. Air China's fleet includes seven Boeing 747-8s, 26 777-300ERs, 11 787-9 Dreamliners and more than 140 Next-Generation 737s.



The 737 MAX family has been designed to offer customers exceptional performance, flexibility and efficiency, with lower per-seat costs and an extended range that will open up new destinations in the single-aisle market.

The 737 MAX incorporates the latest technology CFM International LEAP-1B engines, Advanced

Technology winglets, the Boeing Sky Interior, large flight deck displays, and other improvements to deliver the highest efficiency, reliability and passenger comfort in the single-aisle market. The 737 MAX is the fastest selling airplane in Boeing history, accumulating more than 3,900 orders to date from 92 customers worldwide. ■

Boeing, Air India Celebrate Airline's 125th



EVERETT, WASHINGTON.

Boeing and Air India celebrated October 11 the delivery of the airline's 125th airplane from Boeing. The airplane is the 27th 787-8 Dreamliner for the national carrier.

"Boeing airplanes are, and always have been, the foundation of Air India's fleet, providing us with the very best in economics, fuel efficiency, flexibility and passenger comfort," said Rajiv Bansal, Chairman and Managing Director, Air India. "Taking delivery of our 125th Boeing airplane and 27th 787 Dreamliner marks an important day for Air India. The 787 has been integral to our expansion and competitiveness, enabling us to

Boeing, Mitsubishi Reach Agreement on Cost Reduction for 787

SEATTLE. Boeing and Mitsubishi Heavy Industries, Ltd. (MHI) on October 23 announced an agreement to strengthen collaboration in ways that will enhance both companies' competitiveness. The agreement includes efforts to reduce costs in MHI production of wings for the 787 Dreamliner and joint studies of advanced aerostructure technologies for future-generation commercial aircraft.

MHI manufactures 787 composite wings at its factory in Nagoya. The agreement aims to enable sales by pursuing increased efficiency in MHI's production system and its supply chain through lean production methods, automation and other activities.

"This agreement advances the strong relationship between Boeing and MHI through joint efforts to reduce cost and improve efficiency, with a focus on MHI's production for the 787 Dreamliner," said Boeing Commercial Airplanes President and



CEO Kevin McAllister. "Collaboration with suppliers is at the heart of our Partnering for Success efforts, positioning our companies to win in

today's competitive marketplace and look ahead to future opportunities."

"We are delighted to be enhancing the competitiveness of our

Delivery

open numerous new and nonstop routes and provide our customers with an unrivalled flying experience."

Air India was an original member of the 787 Dreamliner launch group and took delivery of its first 787-8 in 2012. In all, the airline now operates 27 787-8 Dreamliners, along with 777-200LRs (Longer Range), 777-300ER (Extended Range), and 747-400s.

The 787 Dreamliner family is the most innovative and efficient airplane family flying today. Since entering service in 2011, the 787 family has flown more than 196 million people on more than 560 unique routes around the world, saving an estimated 18 billion pounds of fuel. ■

Production

commercial aircraft business with this agreement," said Shunichi Miyanaga, President and CEO of Mitsubishi Heavy Industries. "We have built our partnership with Boeing over more than 40 years, collaborating on various aircraft programmes including the 737, 747, 767, 777, 787 Dreamliner and state-of-the-art 777X and look forward to cooperating to explore future opportunities."

MHI's work statement for Boeing Commercial Airplanes also includes fuselage sections for the 767, 777 and 777X programmes. In total, about 150 Japanese companies are suppliers to Boeing across its commercial and defence product lines. Boeing procures approximately \$5 billion worth of goods and services from Japan every year, and Boeing-related work supports tens of thousands of highly skilled aerospace jobs in the United States and Japan. ■

Boeing Launches Outreach Campaign in Canada

OTTAWA, CANADA. On October 10 Boeing launched an intensive multimedia campaign to raise awareness and understanding across Canada of the company's significant presence and annual impact on the nation's economy.

"Boeing contributes approximately \$4 billion Canadian dollars annually to Canada's economic growth and development, which is nearly 14 percent of Canada's entire aerospace economic impact," said Kim Westenskow, managing director, Boeing Canada. "What we accomplish together benefits Canada and the entire global aerospace industry. It is a compelling story that is overdue to be told." The public outreach campaign will distribute detailed information about the company's work with its

560 Canadian suppliers, the more than 17,500 jobs supported in the supplier network, the company's extensive operations with 2,000 employees, and its substantial contribution to Canada's economy. Information will be shared through traditional and digital media outlets.

"Boeing's partnership with Canada spans an entire century dating back to when founder Bill Boeing launched the world's first international mail service between Vancouver, B.C., and Seattle in the Boeing C-700," said Westenskow. "Today, Boeing is the largest non-Canadian aerospace manufacturer in Canada. We have close partnerships with government, industry and customers in both commercial airlines and the military. It is important that we share this story with the people of Canada." ■

Solar Bags Big Orders for Explosives

NAGPUR. Solar Industries India Ltd., the nation's largest manufacturer and exporter of commercial explosives and explosives initiating systems, has bagged orders worth Rs. 1144 crore from Coal India Ltd.

The company won Coal India's recently concluded tender for supplying 375,412 MT Bulk Explosives to the subsidiaries of Coal India Ltd. amounting to Rs. 1143.63 cr. The order is to be executed between Nov 1, 2017 and October 31, 2019. The share of Solar Industries in the tendered quantity was 28 per cent in the previous order, which has now increased to 36 per cent.

Commenting on the development, Mr. Roomie Dara Vakil, Executive Director, Solar Industries India Limited said, "We are glad to receive orders from Coal India Ltd., which is the world's largest consumer of explosives

in India. This is the biggest order we have received recently. We are confident that we will execute the orders within the stipulated period.

The running contract is valid for two years and Solar Industries will be supplying 182,204 MT bulk explosives (worth Rs. 555.52cr) till 2018 and the rest 193,208 MT (worth Rs. 588.11cr) will be supplied till 2019.

Solar Industries India Limited was founded in 1995 by its founder Chairman Satyanarayan Nandlal Nuwal to produce cartridge explosives. Today, it has grown to become India's largest manufacturer of Industrial explosives and Explosive initiating systems and is spreading its presence to Global Markets. Solar's manufacturing facilities span 25 locations across India along with 4 manufacturing units outside India. Further efforts to establish a manufacturing facility to cater Europe is presently underway. ■

Lockheed Martin T-50A Reaches 100 Greenville, South Carolina



GREENVILLE, SOUTH CAROLINA. Lockheed Martin achieved a new milestone last month as the T-50A aircraft flew its 100th sortie at the Greenville, South Carolina, facility.

This flight continues to demonstrate the company's low-risk, Ready Now approach to the Advanced Pilot Training (APT) competition.

Flight operations began at the Greenville site in November 2016

as the team worked toward a March 2017 proposal deadline and submission of the required flight test data at the end of June.

"We've met the US Air Force flight test requirements for the proposal, however our flight operations team continues to produce a regular rhythm of sorties to keep the pilots proficient, the aircraft operational and ensure we're prepared to ramp up operations on day one of a decision," said Doug Batista, T-50A programme director.

"This particular flight in TX-2, included simulated air-to-air engagements, simulated air-to-surface attacks, and instrument proficiency training," said Elliott "Hemo" Clemence, Lockheed Martin test pilot.

In February 2016, Lockheed Martin announced its plans to offer the T-50A in the APT competition and build the aircraft at a final assembly and

Dornier 228 Proves Best Option for Maritime Patrol for

RUAG AVIATION has signed a contract for the sale of two new production Dornier 228 aircraft to Bangladesh Navy (BN), expanding their existing fleet of two Dornier 228s. The versatile aircraft will serve to support surveillance and patrol flights for all aspects of maritime security, exclusive economic zone control, and search and rescue (SAR) operations.

This new contract reinforces BN's efforts to increase their naval and coast guard surveillance activities to further ensure their nation's safety and economic strength. The new Dornier 228s will build on BN's existing capabilities in the patrolling of



Flights in

checkout (FACO) facility in Greenville. Lockheed Martin formally unveiled its T-50A FACO and operations centre in August 2016.

The T-50A is ready on day one of contract award and is purpose-built around 5th Generation thinking. It will train the F-22 Raptor and F-35 Lightning II pilots of tomorrow, as well as pilots for frontline 4th Generation aircraft. The T-50A builds upon the proven heritage of the T-50 family of aircraft with more than 150 T-50s flying today – 150,000 flight hours and counting – and more than 2,000 pilots who have trained in this aircraft.

Lockheed Martin's accompanying T-50A Ground-Based Training System features innovative technologies that deliver an immersive, synchronised ground-based training platform. The T-50A team also brings extensive experience in world-class, worldwide logistics support. ■

Bangladesh Navy

the sea routes, territorial waters, coastal areas, and wetlands, essential to secure fishery operations, and critical vessel tracking. The two additional Dornier 228 will also extend BN's reach and endurance options for SAR and natural disaster missions.

The Dornier 228 offers exceptional performance and operational advantages to BN and other coastal countries looking to safeguard their resources and coastlines. Naval and coast guard organisations worldwide are relying on the Dornier 228 for its renowned versatility, its outstanding speed, range and endurance, and its cost-effective operations. ■

Airbus Helicopters advances onboard image processing

LONDON. In line with its strategy of innovation for the future of vertical flight, Airbus Helicopters is developing an experimental on board image processing management system aimed at performing automatic approaches and landing in challenging conditions, as well as paving the way for future sense & avoid applications on autonomous vertical take-off and landing (VTOL) systems.

Codenamed Eagle, for Eye for Autonomous Guidance and Landing Extension, this system federates the entire helicopter's image processing functions and feeds them into the avionics system, thus improving the crew's situation awareness and reducing the pilot's workload by automating and securing approaches, take-offs and landings in the most demanding environments. Ground tests of Eagle have been ongoing since May this year and initial flights tests on a testbed helicopter will begin shortly.



The system, which could be embedded in a variety of existing and future Airbus VTOL vehicles, relies on a gyro-stabilized optronics package, which includes three high resolution cameras and state-of-the-art processing units, as well as on-board video analytics providing advanced functionalities such as object detection and tracking, digital noise reduction as well as deep learning.

Future versions of the Eagle system will also integrate a laser, which combined with the high processing capability could open the door to other applications such as a new generation of search lights, obstacles detection and 3D terrain reconstruction. ■

Over 100 Business Jets Now Flying With Honeywell-Inmarsat High-Speed Wi-Fi

AS VEGAS. Honeywell and Inmarsat (ISAT.L) have reached a major milestone with the 100th installation of the JetWave™ system, which powers Jet ConneX, the only high-speed, global, in-flight Wi-Fi service for the business aviation industry available today. This rapid adoption is attributed to forward-thinking manufacturers, maintenance professionals and owners/operators who were unhappy with previous connectivity options and believed in the Honeywell-Inmarsat solution. More than 150 business jet installations are anticipated before the end of 2017.

Customers that have adopted this solution are a "who's who" of the biggest names in aviation, from Airbus and Boeing to Bombardier, Dassault, Embraer and Gulfstream. Each is using Honeywell's JetWave hardware and Inmarsat's advanced Ka-band high-throughput satellite network, Jet ConneX, to offer data plans with up to 15 Mbps and consistent global coverage. This allows passengers and operators to enjoy Wi-Fi that is just as good as they are used to at home or in the office. ■

LM to Upgrade IRST21 Sensor System for US Navy

ORLANDO, FLORIDA. Lockheed Martin (LM) recently received two contracts to upgrade its IRST21 sensor system for use on the US Navy's F/A-18E/F fleet. Awarded by aircraft prime contractor Boeing, the Block II contracts provide up to \$100 million for developing advanced software, performing hardware upgrades and delivering prototypes. These efforts will further enhance IRST21's proven detection, tracking and ranging capabilities in radar-denied environments.

"The US Navy's strategic block upgrade programme enables us to continue advancing our technology and rapidly deliver it to the warfighter,"



said Paul Lemmo, vice president of Fire Control/Special Operations Forces Contractor Logistics Support Services

at Lockheed Martin Missiles and Fire Control. "We are excited to implement the Block II upgrades and enhance

Naval Group Outlines its Ambition in MENA Region at Bidec Exhibition

BAHRAIN. Naval Group participated in BIDECE, Bahrain international defence exhibition and conference in Bahrain from 16 to 18 October, expressing its ambitions, to provide high tech solutions and develop ambitious industrial cooperation in the Mena region to serve autonomy and sovereignty to its customers.

With a long tradition of technology transfer, Naval Group has consistently demonstrated that it can be a key partner for navies, giving its customers full control of their sovereignty.

High tech naval solutions on offer to the MENA region include the Gowind 2500 multi-mission corvettes, FREMM multi-mission frigates and the MU90 light-weight torpedoes, etc.

- The GOWIND® 2500 represents a new generation of multi-mission corvettes, robust and well equipped, both in terms of electronics, weapons and projection capacities. Integrating Naval Group SETIS® Combat Management System, she has a comprehensive Combat System

for full-scale multi-threat missions, including a complete Anti-Submarine Warfare, Anti-Air Warfare, and Anti-Surface Warfare suites. GOWIND® 2500 has already enjoyed a significant commercial success as 10 units were sold in 2013 and 2014 for the Malaysian Navy and the Egyptian

Navy. The first of class Gowind® 2500 corvette was delivered to the Egyptian Navy in September this year.

- The FREMM multimission frigate combines the latest technologies developed by Naval Group, being the most advanced ship in her class worldwide. On May 15, 2015, Naval



Fighter Aircraft

IRST21's performance."

The IRST21 sensor system uses infrared search and track technology to detect and track airborne threats. Compared to radar, IRST21 significantly enhances the resolution of multiple targets, enabling pilots to accurately identify threat formations at longer ranges. This "see first, strike first" capability empowers pilots with greater reaction time, improving survivability. IRST21 is the next generation of Lockheed Martin's legacy IRST sensor system, which accumulated more than 300,000 flight hours on the US Navy's F-14 and on international F-15 platforms. Currently, IRST21 flies mounted in the F/A-18E/F's centerline fuel tank. ■

in Bahrain

Group achieved a world premiere in Europe in successfully launching from a surface ship - the first-of-class FREMM Aquitaine - the first Naval Cruise Missile (NCM). The NCM can strike distant land targets with very high precision, thanks to its guidance system, reducing the risk of collateral damage. France's total order is eight vessels with a delivery scheduled by 2022. In addition, one FREMM frigate has been delivered to the Royal Moroccan Navy in January 2014 and one to the Arab Republic of Egypt in June 2015, simultaneously with a five-year through-life support contract.

- The MU90 lightweight torpedo is the sole new lightweight torpedo in the world. Designed and built with the most advanced technologies, the MU90 torpedo is capable to counter any type of submarine even acoustically coated, deep diving, fast evasive, deploying anti-torpedo effectors or bottomed in littoral areas.

Airbus Helicopters and Southern Vietnam Helicopter Corporation celebrate 30 years of collaboration



LONDON. Airbus Helicopters has presented VNH South with an award celebrating its 30 years of flying Airbus helicopters in offshore missions. "We are honoured to recognise VNH South for their dedication and to highlight our longstanding partnership," said Guillaume Faury, President and CEO of Airbus Helicopters. "They have placed their trust in a variety of our helicopters for more than three decades, and we commend their unwavering commitment not only to their operations but to the entire oil & gas community."

VNH South became Vietnam's very first helicopter operator when it began in 1986 with a Puma. Its reputation began to grow, particularly within Vietnam's

burgeoning oil & gas industry, and the company is now one of the leading helicopter service providers in South East Asia, operating four AS332 L2s, two H155s, and four H225s. "Airbus Helicopters and VNH South have always worked closely together to support safe and continued offshore operations in our region, and we are pleased to celebrate this milestone," said Capt. Kieu Dang Hung, Director of VNH South. "We are proud to be a trusted partner of Airbus Helicopters and we look forward to advancing this partnership for many years to come." Chief among VNHS's achievements is 30 years of safety in offshore oil and gas flights, accumulating more than 270,000 flight hours, many of which aboard their H225 fleet. ■

Saab to Provide Multi-Mode radar for US Coast Guard OPC

LONDON. Defense and security company Saab has received an order from the US Navy to provide the Sea Giraffe Agile Multi Beam (AMB), Multi-Mode Radar (MMR) – a 3D, electronically scanned phased array radar – to be deployed on the US Coast Guard's (USCG) newest class of ship, the Offshore Patrol Cutter (OPC). The MMR provides high radiated power, selectable waveforms, and modern signal processing to consistently achieve high performance across various marine environments. The initial order covers the procurement of two systems with options for additional radars providing a total potential contract value of up to \$118.5 million (960 MSEK).

"The US Coast Guard is increasingly called upon to support an array of critical missions in the most challenging conditions. Saab's OPC MMR will support the customer in fulfilling those missions, from the tropics to the Arctic. The MMR radar provides simultaneous sea to sky radar coverage against the



most challenging tracks to ensure total situational awareness", says Erik Smith, President and CEO of Saab Defense and Security USA.

Saab is a world leader in radar and sensor technology. The company's AN/SPS-77 radar is currently deployed on the US Navy's Independence-class Littoral Combat Ship. Additionally, a derivative of AN/SPS-77 known as

AN/SPN-50, is being developed to meet the Air Traffic Control needs on aircraft carrier and amphibious assault class ships for the US Naval Air Systems Command. The addition of the OPC programme to the current Sea Giraffe deliveries will allow Saab to further leverage commonality and provide additional value to the US Navy and Coast Guard. ■

GA-ASI Transitions to an all Gray Eagle Extended Range Production Line for the US Army

AUSA, WASHINGTON. General Atomics Aeronautical Systems, Inc. (GA-ASI) officially transitioned its production line from the MQ-1C Gray Eagle to its new long-range variant, the MQ-1C ER Gray Eagle Extended Range following the completion of the last contracted MQ-1C aircraft.

GA-ASI's investment in airframe composite tooling enabled the company to start manufacturing the MQ-1C ER ahead of schedule, with its production running in parallel with the MQ-1C line. The first four MQ-1C ER aircraft are now being used for developmental testing that will lead to follow-on operational test and



evaluation in spring 2018. Customer deliveries of MQ-1C ER will begin in summer 2018. The MQ-1C Gray Eagle UAS has been fielded to 12 US Army operational units and has accumulated more than 290,000 flight hours. The MQ-1C is the Army's most active kinetic platform in theatre.

"We are proud of our many years of effort to complete the factory build of 165 MQ-1C Gray Eagles for the US Army," said David R. Alexander, president, Aircraft Systems, GA-ASI. "We're now focused on delivering the Gray Eagle ER and believe its endurance and other improved capabilities will be a game changer on the battlefield."

In addition to improved reliability and maintainability, MQ-1C ER brings considerable improvement in endurance and payload capabilities. As part of a recent endurance test flight, an MQ-1C ER aircraft flew for 41.9 consecutive hours, a significant increase over the 25-hour capability of the current Gray Eagle UAS. ■

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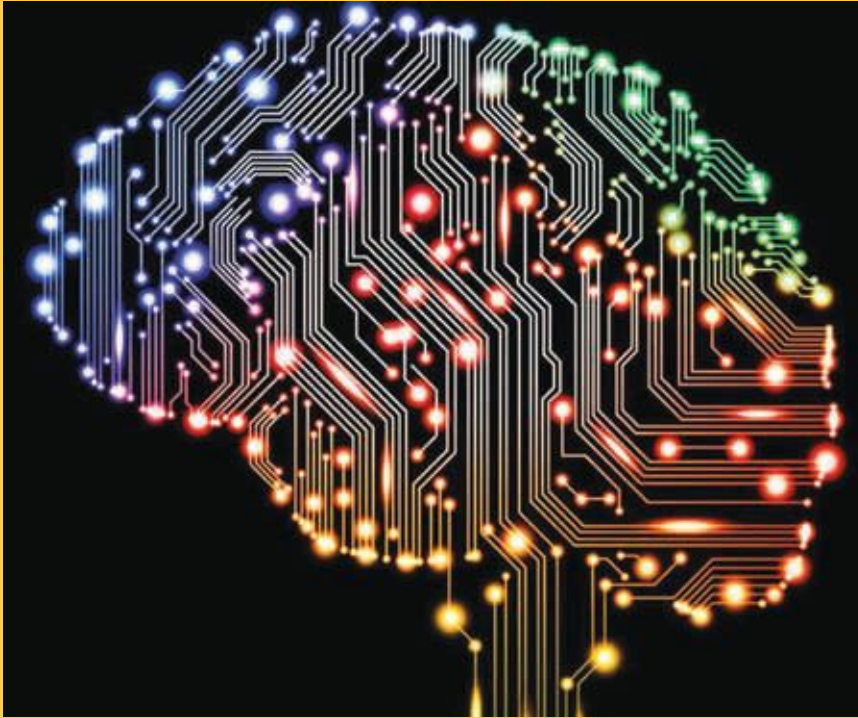
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Thales Selects Canada as new Global hub to Boost Artificial Intelligence Expertise



MONTREAL, CANADA. Thales announced October 11 the creation of the Centre of Research and Technology in Artificial Intelligence eXpertise (cortAIx). Led by Thales, cortAIx, in collaboration with the MILA (Artificial Intelligence Institute of Quebec), the IVADO (Institute of Data Valorisation) and the Vector Institute of Toronto, will be located in Montreal, one of the world's leading Artificial Intelligence (AI) ecosystems. This investment supports Thales' global strategy of technology leadership.

This new centre supports the creation of approximately 50 new world class jobs of AI researchers and developers. Their mission will be to advance the safe and ethical applications of artificial

intelligence across Thales' vast product portfolio. cortAIx will focus on creating solutions to help airlines, satellite operators, air traffic controllers, mainline and light rail operators, armed forces and critical infrastructure managers, make the best decisions in decisive moments – from the bottom of oceans to the depths of space and cyberspace.

The biggest challenge faced by AI experts today is to perfect the understanding of the mechanisms behind AI developments, while simultaneously evaluating human behaviors as people interact with these new systems. The key mission of Thales' cortAIx is to build "AI inside" solutions that are safe and ethical while granting full authority to the human decision makers. ■

Pratt & Whitney Succ

EAST HARTFORD, CONNECTICUT. Pratt & Whitney, a division of United Technologies Corp. recently completed more than 175 hours of ground testing of a next-generation Geared Turbofan (GTF) engine propulsor technology as part of the Federal Aviation Administration's (FAA) Continuous Lower Energy, Emissions and Noise (CLEEN) programme, an FAA NextGen initiative to accelerate the development of environmentally-friendly aircraft technologies. The full-scale test, conducted in West Palm Beach, Fla., marks 10 years since Pratt & Whitney first successfully demonstrated the GTF, a revolutionary new engine that delivers 16 per cent better fuel efficiency, 50 per cent lower nitrogen oxide emissions to the

Rostec Assembles the 300th

MOSCOW. The 300th Russian-French SaM146 current engine for the Sukhoi Superjet 100 (SSJ100) aircraft has been assembled at UEC – Saturn (operating as part of Rostec's United Engine Corporation) and delivered to Sukhoi Civil Aircraft Company. To date, the SaM146 engine fleet has logged over 700,000 flight hours.

The SaM146 is an integrated power plant that incorporates an engine and a nacelle equipped by a thrust reverser. Deliveries and all after-sales services on the SaM146 are performed by PowerJet, a Franco-Russian joint venture between Safran Aircraft Engines and UEC – Saturn. UEC – Saturn, operating as part of Rostec State Corporation, is responsible for the design and manufacturing of a fan, a turbine and a low-pressure compressor, as well as for the general assembly and

Successfully Tests N-Gen Pure Power Geared Turbofan Technology

regulatory standard and a 75 per cent smaller noise footprint.

“The success of this ground test is an important step in taking our Geared Turbofan engine technology to the next level,” said Alan Epstein, vice president of Technology and Environment for Pratt & Whitney. “We are working to make sure the next generation GTF engine – already a game-changer – remains on the cutting edge of performance and sustainability.”

The CLEEN programme is an FAA initiative to accelerate the development of environmentally friendly aircraft technologies. The programme is part of the FAA’s Next Generation Air Transportation System (NextGen) strategy and focuses on the reduction of aircraft noise, emissions and fuel burn. ■



SaM146 Current Engine for the Sukhoi Superjet 100 at UEC – Saturn



testing of the SaM146 engine, while the area of responsibility of Safran Aircraft Engines (France) covers a compressor, a high-pressure turbine, a combustion chamber, an accessory gearbox, AFC and power plant integration. The SaM146 engine and its manufacturing process are certified to the EASA and IAC AR regulations.

The SaM146 completed its certification tests in 2010 entering commercial operation as part of the Sukhoi Superjet 100 airliner in 2011. Today, the SaM146 powers international operators’ aircraft both in Russia and overseas, specifically in Mexico, Ireland, Thailand (Royal Air Force) and in Kazakhstan. ■

Rajnath Singh inaugurates the First BIMSTEC Disaster Management Exercise

NEW DELHI. The Union Home Minister Mr Rajnath Singh inaugurated the four-day first Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation Disaster Management Exercise (BIMSTEC DME-2017) here, October 10. The Exercise was conducted by the National Disaster Response Force (NDRF) as the lead agency from October 10-13, 2017 in Delhi and the National Capital Region (NCR).

Addressing on the occasion, Mr Rajnath Singh extended warm greetings to all delegates from BIMSTEC nations that have come together to participate in this joint exercise. He said that their presence for this exercise represents their governments' commitment to regional co-operation in the area of disaster risk management. Mr Singh said that over the period 1996 to 2015, the BIMSTEC countries have lost 317,000 lives to disasters, with millions becoming homeless. He said, in terms of number of extreme weather events – floods, droughts, heat waves and cyclones – the future is not going to be any better and the frequency and intensity of such events is likely to rise in view of the climate change. However, if we make our communities, our towns



and villages, and our economic activities resilient, we can reduce the losses, the Home Minister said. He said that the improved disaster preparedness is a corner stone of this effort and in this direction all the BIMSTEC nations have made significant progress over the last two decades.

The Home Minister said that over a period of time we need to use exercises to develop a pool of BIMSTEC disaster responders spread across all

participating nations. These building blocks will ensure that when need arises, we can mobilise an effective response and help each other in a timely manner. He expressed sincere belief that BIMSTEC nations need to join hands to mitigate disasters since they face problem of floods on a regular basis. For example, if the BIMSTEC member states start sharing the hydrological data of transnational rivers with downstream countries, it will certainly help the nations in risk reduction and better disaster preparedness. We need to build a consensus on regular sharing of hydrological data of transnational rivers, he emphasised.

Delegation and response teams of all seven BIMSTEC nations i.e. – Bangladesh, Bhutan, India, Myanmar, Nepal, Sri Lanka and Thailand were present during the session. Representatives from Embassies/High Commission of BIMSTEC nations in Delhi, MHA, MEA, NDMA, NIDM, NDRF, SDRF, senior officers of CAPFs and state representatives were also present. Over 150 delegates of BIMSTEC member nations participated in the event. ■





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Dr S. Jaishankar*
Secretary
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- 1) Participation of Top ISRO Leadership.
- 2) Participation of Top Industry Leadership from India and Abroad.
- 3) High-Powered Industry representation of stakeholders from the Space Ecosystem of Australia, France, Germany, Israel, Japan, Russia, Singapore, South Africa, Thailand , USA etc.
- 4) Select congregation of global scientists, senior policymakers, global industry & technology leaders, niche researchers and leaders of global space associations.
- 5) Focused deliberations on Capacity Building and Talent Management & Panel Discussion on the Role of Industry in Indian Space Programme.
- 6) B2G and B2B Meetings.
- 7) Branding Opportunities.
- 8) Release of First Compendium of Space Industry during inaugural.
- 9) Dedicated Indoor Stalls for Industry to showcase their Strengths and Capabilities at the event.

Speaking Slots

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Territorial Army Celebrates 68th Raising Day

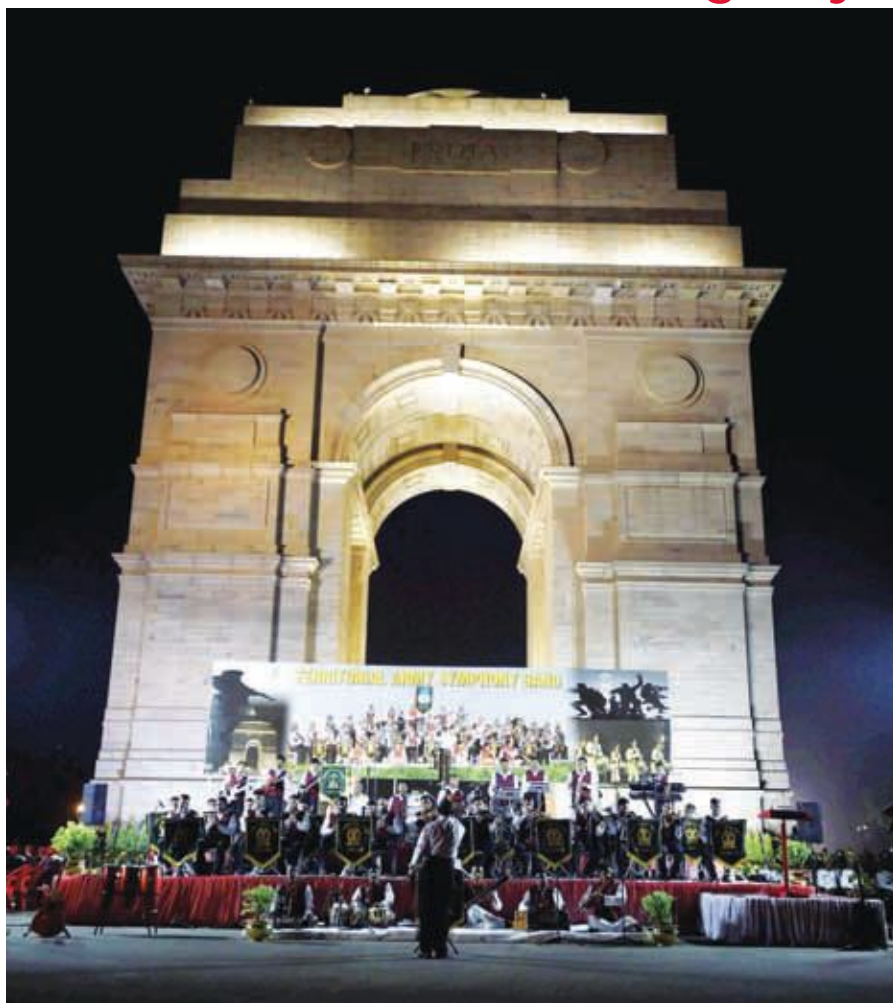
NEW DELHI. Territorial Army (TA) celebrated its 68th Raising Day in New Delhi October 10. As per tradition, the TA fraternity led by ADG TA Major General DA Chaturvedi, called on the President Mr Ram Nath Kovind and payed their respect to the Supreme



Commander of the Armed Forces. In the run-up to the Raising Day several events were organised across the country. In Delhi the TA organised a half marathon on October 2, in the true spirit of Citizens' Army. TA symphony Band performed at the iconic India Gate on October 8, which attracted large crowds who were enthralled by the excellent music of the Band and added to the patriotic fervour of the evening. The TA is citizen's army of volunteers, who have the zeal to contribute towards the country's defence. The Territorial Army provides an ideal opportunity to the youth of the country to receive military training in their spare time and serve the Nation in times of national emergency and internal disturbances.

The TA is in the process of expanding its footprint with raising of one Infantry Battalion (TA) at Nicobar and an Ecological Task Force Battalion for drought region of Marathwada, in Maharashtra. Also, case for raising of one Composite Ecological Task Force for National Mission for Clean Ganga is in final stages of approval. These new raisings and especially the unit for Namame Ganga Mission will allow the TA to contribute immensely in a National cause. In near future the unique strength of TA could be an ideal platform to build national effort during disaster management.

The TA has achieved many glorious feats and earned laurels during the past wars of 1962, 1965 and 1971. It has displayed its grit and courage in operations Pawan, Vijay and Parakram. For outstanding performance in various operations, the TA personnel have been



conferred with numerous awards. The award of Kirti Chakra (Posthumous) to Maj David Manlun of 164 Inf Bn (TA) (H&H) NAGA and Army Commander's Unit Citations awarded to three TA units on the occasion of Independence Day 2017 bears testimony to the bravery and unrelenting spirit of the Terriers.

After Independence in 1947, the Territorial Army Act was enacted on 18 August 1948 by the Constituent Assembly resulting in the constitution of the present Territorial Army. The TA started functioning through re-designation and re-organisation of 11 Indian Territorial Force Infantry units. The TA's first camp was formally inaugurated by Mr C Rajagopalachari, the first Indian Governor General of India on October 9, 1949 and therefore, 9th October is celebrated as TA Day every year.

With Savdhani and Shoorta as the emblem, the 47,000 strong TA comprises 46 non-departmental units, funded by Ministry of Defence and 18 departmental units, funded by various State Government and Central Ministries like the Oil sector, Railways and Environment. 42 Infantry Battalions with 70 per cent of TA troops being deployed on Counter Insurgency/Counter Terrorism environment have achieved a high degree of op focus and synergy with relentless efforts. 10 Home & Hearth Battalions deployed in Eastern and Northern theatre and three Engineer Regiments deployed in Northern theatre for maintenance of LC Fence are tasked in challenging operational environment and have shown exemplary professional standards, commitment, devotion and dedication to service. ■

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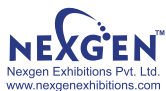
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Defence Industry

Boeing, Air Force Test Team Completes First KC-46 to KC-46 Refueling



EVERETT, WASHINGTON. A Boeing US Air Force test team recently refueled a KC-46A tanker from another KC-46A tanker for the first time.

During the four-hour flight, the two aircraft successfully refueled each other and achieved the maximum fuel offload rate of 1,200 gallons per minute. The programme's first and second tankers transferred a total of 38,100 pounds of fuel over the course of the flight. Both aircraft took off and landed at Boeing Field, south of Seattle.

The milestone flight helps pave the way for the next phases of certification and specification

compliance testing.

The KC-46 will refuel US, allied and coalition military aircraft using both its boom and hose and drogue systems. The boom allows the tanker to transfer up to 1,200 gallons of fuel per minute, while the plane's hose and drogue systems, located on both the plane's wing and centerline, enables the KC-46 to refuel smaller aircraft with up to 400 gallons of fuel per minute.

To date, the programme's test aircraft have completed 2,000 flight hours and more than 1,300 contacts during refueling flights with F-16, F/A-18, AV-8B, C-17, A-10 and KC-10 aircraft.

DRDO Transfers Technology for Bullet Proof Jacket



NEW DELHI. Defence Research and Development Organisation (DRDO) has transferred the technology of Bullet Proof Jacket (BPJ) to M/S MKU Limited, Kanpur for manufacturing these for the Indian Army and Para-Military Forces personnel, at a function held in New Delhi.

The Indian Army General Staff Qualitative Requirement (GSQR) No. - 1438 BPJ technology has been developed by Defence Materials & Stores Research & Development Establishment (DMSRDE), a Kanpur based premier laboratory of DRDO. This technology is challenging and one of the most significant matured personal protection systems developed by DRDO among the various GSQRs of Indian Army meeting NIJ III+ Standard. Dr Christopher, Chairman DRDO & Secretary DDR&D in his address urged M/S MKU, Kanpur to maintain a strict vigil on the quality of the Bullet Proof Jackets for the Indian Army and the Paramilitary Forces and to collaborate with DRDO to absorb the DRDO developed technologies.

Thales offers AESA radar to HAL for its LCA Mk 1A

IN RESPONSE to HAL's tender for an AESA radar for its LCA Mk 1A, Thales is offering a lightweight, compact active array radar. The latter is a result of Thales' unmatched expertise as regards the development and mastery of active array technologies – as demonstrated by the RBE2 radar installed on Rafale – combined with the operational reliability of this combat-proven technology.

The tests conducted during summer 2017 at the Cazaux air base in France, on a test bench aircraft, focused on metrological analyses of the radar performance. These test flights proved that the radar is fully operational and perfectly corresponds to the specific requirements of HAL for its combat and air superiority



missions. It is therefore ready and able to adept to the tight schedule imposed by LCA Mk 1A.

Thales radar is an advanced Fire Control Radar (FCR) designed for air-to-air superiority and strike missions, based on fully solid-state Active Electronically Scanning Array (AESA) technology, enabling the radar to

achieve long detection ranges, high mission reliability and multi-target tracking capabilities. The Thales radar is compliant with the requirement and provides simultaneous modes of operation supporting multi-mission capabilities for air-to-air, air-to-ground and air-to-sea operation modes, and weapon deployment.

Saab Signs Contract With Nato For Upgrading Norwegian Air Surveillance Radars



Defence and security company Saab has signed a contract with NATO Support and Procurement Agency (NSPA) in Luxembourg for upgrading three SINDRE I air surveillance radars in Norway. Deliveries will take place between 2017 and 2020, with work undertaken by Saab Technologies Norway, in Halden, Norway and Saab Defense and Security USA, in Syracuse, New York, USA.

"Saab's radar upgrading approach is a proven and effective way to extend the service life of existing air surveillance radars. The Royal Norwegian Air Force will benefit from our low-risk, cost efficient upgrade programme", says Tore Bekkevold, managing director, Saab Norway. Saab's upgrade will include replacing obsolete hardware as well as upgrading software.

Lockheed Martin's ATACMS Successful in Flight Test

DALLAS, USA.

Lockheed Martin conducted another successful Army Tactical Missile System (ATACMS) modernisation flight test recently at White Sands Missile Range, New Mexico. All test objectives were achieved. Launched from a Soldier-manned High Mobility Artillery Rocket System (HIMARS) launcher, the ATACMS missile flew approximately 140 kilometers and demonstrated a proximity sensor height-of-burst detonation over the



target area. This is a new ATACMS feature that allows battlefield commanders to address imprecisely located or area targets. More than 600 TACMS missiles have been fired in combat, and the system has demonstrated extremely high rates of accuracy and reliability while in theatre. Each ATACMS missile is packaged in a Guided Missile Launch Assembly pod, and is fired from the MLRS family of launchers.

Armed Forces

New Zealand Navy Chooses Saab TactiCall for Future Communications Solution



DEFENCE AND security company Saab has signed a contract to provide a complete communications system on board the Royal New Zealand Navy's future fleet replenishment vessel, HMNZS Aotearoa. The Royal New Zealand Navy (RNZN) has selected Saab to equip its new Maritime Sustainment Capability vessel, HMNZS Aotearoa. Saab will provide the TactiCall integrated communications system, which interconnects communication technologies regardless of radio band, frequency or hardware. Electronic Navigation Ltd (ENL) will provide

in-service support as Saab's partner in New Zealand.

HMNZS Aotearoa will sustain New Zealand's defence forces with fuel, fresh water, equipment and ammunition. It will also be ice-strengthened and 'winterised' for operations in

Antarctica. This will allow the ship to deliver fuel and other goods to support the Scott Base and McMurdo Station, during the summer months once an icebreaker has cleared a path.

New Zealand's new naval tanker is currently being built by Hyundai Heavy Industries in South Korea and is scheduled to be delivered in 2020. The new ship will replace the 30-year old tanker HMNZS Endeavour. It will be able to refuel two ships at the same time while underway, carry and refuel New Zealand Defence Force helicopters, produce and store water, and store and transport bulk goods.

IN Training Ships Visit Penang, Malaysia

NEW DELHI. IN Ships Tir, Sujata, Sudarshini, Shardul and ICGS Sarathi visited Penang, Malaysia October 8-12. The visit was aimed to expose the trainees to the conduct of IN warship in foreign waters, port familiarisation and foster 'bridges of friendship' between the two countries. The ships belong to the First Training Squadron of the Indian Navy functioning under the Southern Naval Command, headquartered at Kochi and comprises six indigenously built ships, namely, Indian Naval Ships Tir, Sujata, Shardul, Indian Coast Guard Ship Sarathi and two Sail Training Ships, viz, INS Sudarshini and INS Tarangini. At the First Training Squadron, the IN also trains officers from friendly foreign countries. The Indian Navy has imparted training to international trainees for more than four decades, and approximately 13,500 personnel from over 40 countries have been trained. Presently four officers from Malaysia are undergoing various Ab-initio to advanced courses at SNC. The Command has gained the reputation of being the finest training destination by maintaining a focused approach to provide high quality training and by constant adaptation to evolving tactics and technologies.

Integration of Services My Priority: Says Sitharaman

NEW DELHI. Integration of Indian armed forces is the priority agenda of Defence Minister Nirmala Sitharaman. She was addressing the ongoing Army Commanders' Conference at Manekshaw Centre in Delhi Cantonment October 10. Welcoming Mrs Sitharaman, Army Chief informed the audience about the extensive travel undertaken by her to forward posts including Siachen in Ladakh, Sikkim and Arunachal Pradesh after taking over the charge of the Ministry. During her address, the Defence Minister conveyed admiration of the Nation for the professionalism of the Indian Army during events like Doklam standoff,

response to natural disasters and keeping the situation of insurgency in the North East states under control. Assuring focus on capacity and capability development, she promised close monitoring of improvement in strategic infrastructure, long pending force modification requests, welfare of serving, retired and families.

Listing her top priorities, she said integration of the Armed Forces is essential particularly in the domain of training, communication, logistics and cyber among others to prepare for any



future conflict. She called upon the Army to continue leveraging its strength in diplomatic defence cooperation with neighbourhood and in the region, support for Make in India dream and Nation building during all times.

Mrs Sitharaman confirmed that morale of forces will remain the highest among the priorities of the government.

Admiral Sunil Lanba visits Vietnam



NEW DELHI. Admiral Sunil Lanba, Chairman Chiefs of Staff Committee and Chief of the Naval Staff was in Vietnam on a bilateral visit October 4-7 to consolidate cooperation between the Armed Forces of India and Vietnam and also to explore new avenues of defence cooperation.

During his visit, Adm Lanba held bilateral discussions with Mr Nguyen Xuan Phuc, Prime Minister of Vietnam, General Ngo Xuan Lich, Defence Minister of Vietnam, Senior Lieutenant General Phan Van Giang, Chief of General Staff and Vice Minister of National Defence, Vietnamese Armed Forces, and Rear Admiral Pham Hoai Nam, Commander-in-Chief of the Vietnam People's Navy. In-addition to holding important bilateral discussions, the Admiral also visited the National Defence Academy of Vietnam to deliver a talk on the 'Importance of

Maritime Power'.

At a reception on October 4 in Hanoi Prime Minister Nguyen Xuan Phuc expressed Vietnam's support for India's Act East policy. Mr Phuc said, "As a close friend of India and a coordinating country in ASEAN-India relations, Vietnam supports India's strengthened cooperation in East Asia and its permanent membership to the expanded UN Security Council."

He also thanked India for assisting Vietnam in national defence over the past years and expressed his wish to further boost economic, trade and investment ties with India and welcome more Indian investors to do business in Vietnam.

Lanba in turn praised traditional friendship and cooperation with Vietnam, saying that his nation will continue to further bilateral cooperation in multiple fields.

DM Nirmala Sitharaman interacts with IAF Commanders during Air Force Commanders' Conference

NEW DELHI. The bi-annual three-day IAF Commanders' Conference was inaugurated by the Defence Minister, Mrs Nirmala Sitharaman October 10 at Air Headquarters (Vayu Bhavan). During her address the Defence Minister said that the devolved powers given to the Service Chiefs should be fully utilised for achieving their capabilities. The Minister said that Air Force along with Ordnance Factory Board and DRDO should make an assessment about indigenisation under 'Make-in-India' programme. She said that the budgetary allocations should not be viewed as a constraint and

should be looked at to acquire what is absolutely necessary. She said that the Government is committed to fill the gaps which have arisen due to lack of timely decision making in the last decade. The Chief of the Air Staff while addressing the Commanders emphasised the need for continuous effort and training to maintain IAF's cutting edge. He also reiterated the IAF's role as the first responder in most contingencies and thus the need to sustain the ongoing process of capability enhancement making use of the Government's thrust on 'Make-in-India' initiative.

General Atomics Awarded Contract for Ford-Class EMALS and AAG Spares

SAN DIEGO. General Atomics Electromagnetic Systems (GA-EMS) announced October 9 that it has been awarded a definitised delivery order for the first set of on board repair parts (spares), providing sustainment support to the Electromagnetic Aircraft Launch System (EMALS) and Advanced Arresting Gear (AAG) system on the USS Gerald R. Ford (CVN 78). This delivery order also provides spares to support the AAG land-based site at Joint Base McGuire-Dix-Lakehurst, New Jersey.

"We've worked tirelessly with the Navy to bring these complex and transformative systems to life, from the initial EMALS and AAG concepts through the first successful F/A-18F aircraft launch and arrestment on CVN 78 at sea," stated Rolf Ziesing, vice president of Programs at GA-EMS. "This delivery order, along with other GA-EMS delivery orders and contracts, provides the Navy with a source for spares, depot repairs, and technical support necessary to keep EMALS and AAG performing efficiently and consistently."

"GA-EMS is leaning forward and building the foundation for EMALS and AAG system sustainment for the entire Ford-class, including the future USS John F. Kennedy (CVN 79), which is currently under construction, and the future USS Enterprise (CVN 80)," continued Ziesing. "We are committed to implementing the most efficient plans and processes that will continue to meet the Navy's requirements as each carrier joins the fleet."

Homeland Security

Royal Thai Police becomes first H175 operator in Asia Pacific

LONDON. The Royal Thai Police has received two H175 helicopters from Airbus Helicopters, making it the first in Asia Pacific to operate the newest rotorcraft. The Royal Thai Police will be using this super medium aircraft, equipped with the latest aircraft technology and capabilities, for VVIP transportation and various police missions. "We welcome the Royal Thai Police as the inaugural H175 operator for this region and we are grateful for their continued trust in our products as they expand their fleet. We have full confidence of the H175's performance

and capabilities, in fulfilling its most challenging missions. Besides a strong product, our Bangkok-based support centre stays committed to supporting our customer's operations in close proximity", said Philippe Monteux, Head of Southeast Asia and Pacific of Airbus Helicopters.

The Royal Thai Police currently operates nine Airbus helicopters, comprising five H155, two AS365 N3+ and two H175.



Rosoboronexport Delivers 2 Mi-35M Attack Helicopters to Mali



JSC ROSOBORONEXPORT (part of the Rostec State Corporation) has completed delivery of the Mi-35M transport/attack helicopters and associated equipment to the Republic of Mali. "We have shipped two Mi-35 helicopters to Mali as was requested by our Malian partners. The Malian Side has been very grateful to us for meeting its request and has also expressed satisfaction with the quality of equipment. I am confident that the helicopters will help the nation protect its sovereignty and

successfully fight the main challenge of the 21st century, namely, terrorism", - Director General of Rosoboronexport Alexander Mikheev said.

Mi-35M is the world's only multirole attack helicopter capable of effective fire engagement, transportation of up to 8 fully-equipped troops, munitions or other cargos weighing up to 1,500 kg inside a cargo cabin and up to 2,400 kg with an external sling, evacuation of the injured and delivery of technical personnel to the independent basing areas.

Home Minister Inaugurates NIA HQ Office Complex

NEW DELHI. The Union Home Minister Rajnath Singh said the National Investigation Agency (NIA) has played a key role in making the country a safer place and shielded India from the onslaught of global terrorism. Inaugurating the new Headquarters Office Complex of the NIA in New Delhi, October 10, Mr Rajnath Singh said the NIA is on course to check the threat posed by terrorism.

The Union Home Minister said the NIA recently launched a crackdown on terrorism funding in the Kashmir Valley sponsored from a hostile neighbouring country and their accomplices in third countries abroad. He commended the NIA, other Security Agencies, the Army, CAPFs and ATS of State Police Forces for coordinated efforts resulting in the elimination of a good number of terrorists. Mr Rajnath Singh said the Government initiated steps to grant full autonomy to the NIA in investigations.

Union Home Minister attends Passing Out Parade at CISF Regional Training Centre Arakkonam

ARAKKONAM, TAMIL NADU. The Union Home Minister Mr Rajnath Singh has said the Central Industrial Security Force (CISF) needs to upgrade and technologically advance itself to face and counter any incident of cyber terrorism. Addressing the Passing Out Parade of Assistant Commandants (Executive), Sub Inspectors (Executive) and Assistant Sub Inspectors (Executive) at the CISF Regional Training Centre (RTC) Arakkonam, in Vellore district of Tamil Nadu October 9, Mr Rajnath Singh said a specialised Wing in the CISF should be created to conduct regular cyber security audits and build capacities to deal with cyber-terrorism.

Pointing out that cyber-terrorism has emerged as a major terror threat facing several countries in the world;



the Union Home Minister said the cyber terrorists use digital tracks to attack important institutions, buildings and installations. During the Dikshant Parade, the Union Home Minister also awarded medals and prizes. Mr

Rajnath Singh later laid the Foundation Stone of the Sub-Officers' Ladies Hostel, at the CISF RTC, Arakkonam. The Director General, CISF, Mr OP Singh and other dignitaries were present on the occasion.

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Nuclear & Space

US Air Force Declares First Lockheed Martin GPS III Satellite "Available for Launch"



DENVER, USA. Ushering in a new era of advanced Global Positioning System (GPS) technology, the US Air Force declared October 10 the first Lockheed Martin built GPS III satellite "Available for Launch."

The Air Force's "AFL" declaration

is the final acceptance of Lockheed Martin's first GPS III Space Vehicle (GPS III SV01) prior to its expected 2018 launch. GPS III SV01 will bring new capabilities to US and allied military forces, and a new civil signal that

will improve future connectivity worldwide for commercial and civilian users.

One of the keys to Lockheed Martin's GPS III is it was designed for today's mission with an eye on

tomorrow's needs. "As we designed GPS III, we knew that mission needs would change in the future and that new technology will become available. We wanted the satellite to be flexible to adapt to those changes," said Mark Stewart, vice president of Lockheed Martin's Navigation Systems mission area. "To do that, we intentionally developed GPS III with a modular design. This allows us to easily insert new technology into our production line."

GPS III SV01 now awaits a call up to begin pre-launch preparations. In the meantime, the advanced satellite is stored in an environmentally-controlled clean room, where engineers can perform maintenance and continue to service the satellite.

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Lockheed Martin Completes First Flexible Solar Array for LM 2100 Satellite



SUNNYVALE, CALIFORNIA. After years of development, Lockheed Martin completed the first flight build of its new Multi-mission Modular (MM) Solar Array. This new flexible array advances Lockheed Martin's significant heritage flying flexible arrays on such programs as the International Space Station and a constellation for the US Air Force. The new design is a major component of Lockheed Martin's multi-year modernisation of its LM 2100 satellite bus, which is part of its newly-enhanced family of buses.

The MM Array incorporates three key features in the satellite design: higher power, less mass and compact stowage, and all of this enables satellite designers to better meet customers' growing power needs. This compact flexible array design delivers 50 per cent more power than previous rigid array designs at 30 per cent less mass.

"The new arrays can generate 20 kilowatts of energy in orbit, enough to power an entire home. These new arrays deliver enough energy for even the most advanced communications or remote sensing payloads," said Wahid Azizpor, manufacturing director at Lockheed Martin Space Systems. "Built on an innovative flexible material, these arrays are rugged and reliable at a fraction of the weight and stowed size, which lets customers pack more payload capability into the satellite."

Airbus-built full electric EUTELSAT 172B satellite reaches geostationary orbit in record time

PARIS/TOULOUSE. The EUTELSAT 172B spacecraft, built by Airbus for Eutelsat, one of the world's leading satellite operators, has now reached geostationary orbit, breaking the record for the fastest satellite electric orbit raising (EOR). EUTELSAT 172B was launched by Ariane 5 from Kourou, in French Guiana, on June 1, 2017. The Airbus spacecraft control centre in Toulouse took control for early operations, initialisation, deployment of the solar array and electric propulsion arms, and completed initial testing prior to initiating the Electric Orbit Raising phase on June 8. During this four-month phase, electric thrusters smoothly and efficiently propelled the satellite to the targeted orbit, consuming almost six times less propellant mass than for a



satellite with chemical propulsion.

Following completion of the payload in-orbit tests and drift to its operational location led by the Eutelsat team, the satellite is scheduled to enter commercial service in November to provide enhanced telecommunications, in-flight broadband and broadcast services for the Asia-Pacific region. Its life span is expected to exceed 15 years thanks to electric propulsion for in-orbit raising and station-keeping. ■

Upcoming Events

DEFENSE & SECURITY 2017

November 6-9, 2017
Bangkok Thailand
Contact: +66 (0) 2642 6911
www.asiandefense.com

DUBAI AIRSHOW 2017

November 12-16, 2017
Dubai, UAE
Contact: +971 4 603 3300
www.dubaiairshow.aero

MILCIS 2017

November 14-16, 2017
National Convention Centre,
Canberra, Australia
Contact: +61 2 6252 1200
www.milcis.com.au

IITSEC 2017

November 27-December 1, 2017
Orlando, Florida, USA
Contact: (703) 247-2569
www.iitsec.org

EXPODEFENSA 2017

December 4-6, 2017
Bogota, Colombia
Contact: +33 (0)1 44 14 64 82
www.expodefensa.com.co

MARITIME INFORMATION WARFARE 2017

December 6-7, 2017
London, United Kingdom
Contact: +44 (0)20 7827 6000
www.maritimeinfowarfare.com

GULF DEFENSE & AEROSPACE

December 12-14, 2017
Kuwait
Contact: +1 703 406 0010
www.gulfdefense.com

ELECTRONIC WARFARE 2018

January 16-17, 2018
Warsaw, Poland
Contact: +44 (0) 20 7384 8102
www.eweurope.com

DIMDEX 2018

March 12-14, 2018
Doha, Gharafat al Rayyan,
Doha, Qatar
Contact: (+974) 4492 2970
<http://dimdex.com>

AIR OPERATIONS FROM HIGHWAYS

• Spectacular; But need to be selective with due operational Relevance



IN ITS efforts to emulate some other air forces round the world, what started by the Indian Air Force (IAF) as a single aircraft landing on a highway two years ago, built up to an eye-catching airshow on October 24 with aircraft of different types taking part in highway operations on the Lucknow-

Agra Expressway. It was indeed a spectacular show with as many as 16 aircraft comprising Mirage 2000, Su-30 MKI and Jaguar jet fighters as also a C-130J transport aircraft participating in the two-hour aerial drill (covered in detail elsewhere in this Issue).

On the face of it, a jet fighter roaring down a highway (normally meant for the more staid road vehicles) or, for that matter, a burly four-engined transport aircraft alighting with its wings covering not only the entire width of the highway but considerably hanging on the outside as well, is more than a adrenalin-pumping sight. And, as was expected, Indian Media's coverage of the event was steeped in hysterical fascination. But, to a true professional and well-trained military flyer, all this should come as part of a day's work, as was indeed the case as far as the IAF is concerned.

It is true that a highway cannot possibly provide all the safety features that are inherent to operations from a normal operational airfield. Therefore such operations are naturally coloured with a certain dare devilry hue. To begin with, while a 3-km straight stretch can be identified for use, highways are normally not as wide as standard runways. Highways also suffer from other inherent inadequacies such as lack of proper/level shoulders, an accepted safety requirement for aircraft operations. Also, they are bereft of airfield services such as Air Traffic Control towers and safety vehicles like crash tenders, etc. Makeshift arrangements would have to be made every time to bring in a certain modicum of safety as it was done for the exercise on October 24.

Under the circumstances, it is evident that air operations from highways cannot be carried out randomly, without proper preparations. For example, in case of a sudden runway blockage at a previously intended airfield, activation of a highway site from a 'Cold Start' position would certainly be a 'No Go' situation, as the reaction time would not be adequate to carry out such an operation.

It is worth noting that air forces which practice

operations from highways and have included them in their war plans generally belong to small countries which lack strategic depth. Nordic states - Sweden, Norway and Finland - were the pioneering countries which were followed by others like Poland, South Korea, Taiwan and Pakistan, etc. Highways in these countries provide their air forces greater flexibility to disperse air assets to a larger number of locations, allowing them to make up for the lack of depth while making it more difficult for the enemy to conduct counter-air operations against them.

In the Indian context however, thanks to its huge geographic area, lack of strategic depth is not a constraint. The IAF can rightly boast of a large number of in-depth airfields that it has at its disposal, where it can easily disperse its forces in case of an operational requirement. The author recalls how during the 1965 and 1971 Indo-Pak wars, the IAF was able to disperse its aircraft – especially its bombers and transporters – to third and fourth tier airfields to keep them out of harm's way. With mid-air refuelling capabilities of the IAF gaining considerable currency, the same could be done selectively in the case of fighters as well, without losing their operational effectiveness. The air leg of India's nuclear triad for example, could have great operational relevance in this scenario.

It may also be remembered that IAF has adopted a standard policy of providing its bases, especially its forward and second-tier airfields with parallel taxi tracks, which run the length of the runway with half the width (75 ft) of a standard (150 ft) runway. In case of a runway blockage due to any reason, the parallel taxi track could be utilised for emergency operations by aircraft. As a matter of fact, IAF carries out regular practices and 'fully ops' pilots are specifically cleared for parallel taxi track operations.

In the final analysis however, it is not intended to imply that air operations from highways have no relevance at all in the Indian context. The art must be kept alive by regular practices at carefully selected places, which gives the IAF added operational flexibility. While necessary infrastructure would have to be added at the already existing highways, India's ambitious plans to construct multi-lakh crore RUPEES' highway projects need to include IAF- identified areas to create facilities for air operations, FROM THE WORD GO. However, these must be extremely selective and should have the potential to contribute meaningfully to IAF's operational plans – not merely sites for emergency recovery of aircraft.

– Air Marshal VK Jimmy Bhatia (Retd)

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