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Tejas may create history with flying demo at Bahrain air show

by: Dr Anantha Krishnan M

Light Combat Aircraft (LCA) Tejas is throttling to script history probably by becoming the first home-grown Indian fighter jet to have flown outside the country's airspace. If no last-minute glitches (from babudom or technical) get onboard, then Tejas will strut its stuff at the 4th edition of Bahrain International Air Show (BIAS), scheduled from January 21-23, 2016. BIAS-2016 is being held at the Sakhir Airbase. Senior officials of the Defence Research and Development Organisation (DRDO), Aeronautical Development Agency (ADA) and Ministry of Defence (MoD) will brainstorm one last time in New Delhi on December 9 (Wednesday) to take a final call on Tejas' all-historic out-bound flying mission. "The green signal will be given on Wednesday after the crucial meeting. There are many nagging issues that need to be sorted out, including which country it would stop over during ferry to Bahrain," says an official. Two aircraft being readied ahead of the show As this report goes live on OneIndia, it is confirmed that two Tejas aircraft are being readied in Bengaluru, ahead of its possible historic ferry to Bahrain. With just over a month left for BIAS-2016, the officials are racing against time to put up a smooth show. Engineers and scientists in ADA and Hindustan Aeronautics Ltd (HAL) are all excited about the bright prospects of Tejas flying at BIAS-2016. Ahead of ferrying the platforms to Bahrain, the HAL-ADA team members are working on a 'special software build' to enable the pilots have decided to demonstrate extreme manoeuvres. On the demonstration menu are 'Vertical Square' which demands an 8 G envelope, the 'Knife Edge' and the 'Opposite U-turns. The platforms being readied for BIAS-2016 are LSP-3 and LSP-4, out of which one will be doing the flying duties and other on static display. The SP-1, now under the command of Indian Air Force (IAF) and HAL, is likely to be kept as a stand-by in Bengaluru. Tejas was on static display at BIAS- 2014, with India's prying plane AEW&C (Airborne Early Warning Control) hitting the skies. DRDO had then claimed that the products were displayed with 'the aim of exploring the potential of exporting them to friendly countries in the region.' During Aero India 2015, Ahmed Al Nemah, then acting Under Secretary for Civil Aviation Affairs, Bahrain Ministry of Transportation and Telecommunications, had held discussions with Indian counterparts on BIAS-2016. The show is expected to see an increased participation by 60 percent since its first edition in 2010. Tejas flying picks up after a lull period The Tejas test-flights have started to pick up momentum after months of lull activities owing to technical glitches relating to the undercarriage. The flight plan was badly hit during the months of May, June, July and August this year. In November bad weather further added to the woes of ADA and HAL. The naval programme too slowed down owing to similar issues. The combined number of flights (all variants minus SP-1) stands at 2998 as on December 8, 2015, clocking around 1926 hours. The Tejas was out flying at HAL Airport on Tuesday. "To put in perspective, Year 2015 has not been an inspiring one for Team Tejas. But the programme has seen worst challenges and we are confident of moving ahead," says an official. With the SP-2 reaching the flight integration stage at HAL, the programme is now heading towards the Final Operational Clearance (FOC) in mid-2016. An impatient IAF is finally on the Squadron formation mode with the DRDO pinning hopes on bagging 100 Tejas MK-IAs orders soon. Flight-testing envelope will be expanded Ahead of the Bahrain trip, Tejas is expected to expand the flight envelope clearance to 8G and at a higher Alpha of 24 degrees and more. "These parameters allow the aircraft to perform at higher manoeuvrability. The demonstrations planned for BIAS-2016 will be different from Aero India 2015," says an official. If mission Bahrain finally gets cleared by Delhi on Wednesday, then DRDO-ADA has to quickly put in place the logistics. "It's going to be a great effort. Around 200-250 engineers, scientists and ground support teams will have to be positioned at various bases. Tejas will have to be first ferried to an IAF base on Indian border. For re-fuelling and other checks, a country in the Gulf (enroute Bahrain) needs to be identified. A large number of team will also have to be positioned at Bahrain as well," says an official. For DRDO-ADA-HAL team flying Tejas at BIAS-2016 will be a bold statement. It will also give an opportunity for India to demonstrate (at an international show outside India) its entry into a league of nations capable of building such complex fight jet systems. "If it happens, then it will be a great pride for India. Remember, it is not built on any stolen or borrowed technology," the official adds.

Armed Forces' needs must be realistic: AK Gupta, Defence Production Secretary

By Deepshikha Hooda

The defence ministry believes the armed services need to be more "realistic" in shaping their qualitative requirements for military hardware if they want to support the 'Make in India' initiative. Speaking at a seminar in Delhi, Defence Production Secretary AK Gupta said that "ambitious qualitative requirements" were inhibiting private sector participation in many defence projects. "We are getting too ambitious, the Service Qualitative Requirements (SQR) are not in consultation with the industry, and they need to be realistic and attainable," Gupta said. Gupta made the comments while responding to a question on the delay in procurement of bulletproof jackets during an interaction on Monday at the Indian Institute of Defence Studies & Analyses. The defence production secretary said there is a case for formal discussions on SQRs among stakeholders before they are firmed up. Responding to Gupta's remarks, sources in the armed forces said the current process does take into account views of relevant stakeholders and is quite exhaustive. "SQRs are vetted by not less than 26 agencies, including Defence Research & Development Organisation. It takes six months to approve a SQR and it is not the Army's decision alone. The delay (in bulletproof jackets) has been on account of DRDO not having testing facilities to evaluate the prototype as per the SQR." DRDO has recently procured a testing facility and the defence ministry has ordered the agency to produce bulletproof jackets on the same SQR. Gupta said the defence ministry was doing its best to push the 'Make in India' initiative. "Indigenous defence content in all three services, which has been hovering at around 40% over the past few years, is planned to be pushed to 70% by 2027." He listed several initiatives, including the decision to liberalise the foreign direct investment regime. Also, he added, validity of industrial licences has been increased from three years to 15 years with a provision to further extend it on a case-to-case basis. "So far, 50 companies covering 79 industrial licences have commenced production. Further, 34 joint ventures have been approved for manufacture of various defence equipment."

What Ministry of Defence Says

SQRs set by services need to be realistic & attainable

Delay in procurement of bulletproof jackets blamed on unattainable SQRs

What the Armed Forces Say

SQRs vetted by 26 agencies, not the services alone

Delay in bulletproof jackets due to lack of testing facility with DRDO

Russia's Sukhoi optimistic about Tata for India joint venture

By Manu Pubby

Russia's top aircraft manufacturer Sukhoi is exploring the possibility of investing in an Indian joint venture (JV) for the maintenance and spares production of its combat aircraft Su 30 in what could make India a hub for the fighter fleets operating in the region. Atop Sukhoi executive told ET that the liberalised foreign direct investment (FDI) norms have opened the possibility of a JV and the Russian manufacturer is in talks with Indian private sector companies. "In the near future, we may establish a joint venture and create a unit in India for service and maintenance that can implement repair and overhauls of the aircraft and engines jointly. We can also cover all the other nations in the region and repair and service their aircraft in India," Valery V Chishchevoy, marketing director of Sukhoi, told ET. The executive said while similar plans were discussed in the past, the recent changes in the FDI policy has opened up a real possibility of setting up such a unit. On being asked by ET if Sukhoi would consider its traditional partner - Hindustan Aeronautics Limited (HAL) - or other Indian players for the proposed JV, Chishchevoy said the Russian entity is in talks with private companies and that Tata is the only one with technical expertise. "We are also open to other companies (than HAL). We have met some private companies on this issue but we have the impression that they don't have the experience to be involved in such a big project. Except for Tata, which has some good experience that also comes from automobile manufacturing, other companies are not yet capable to undertake this," the Sukhoi official said. Maintenance and servicing of the Su 30 could mean big business, considering that the air force is believed to be spending well over Rs 3,000 crore annually on the fleet.

Country's flagship HAL turns 75

Madhumathi D.S.

Way back in 1939-40, a Gujarati entrepreneur's dream venture to build aircraft in the country took off with Rs. 4 crore on about 2,000 acres of land given by the then Mysore maharaja. Growing in tandem with, and on the outskirts of, what was a small, obscure town, that entrepreneurial spark has gone on to become one of the country's flagships and part of Bengaluru's lore. Hindustan Aeronautics Ltd, now part of the Ministry of Defence, celebrates 75 years this month.

Ranked 34 - Ranked 34 among the world's aerospace companies and easily among the top four in Asia by turnover, the country's sole maker of military aircraft has kicked off a series of programmes across its locations to notch its marquee platinum jubilee. The groundbreaking of its helicopter complex in nearby Tumakuru, the unveiling of the indigenously developed 25-kilo-Newton aeroengine and an integrated 16-acre, Rs. 110-crore campus of its management training academy in Bengaluru are some highpoints, said an official. The Defence Minister and the Minister of State Defence are scheduled to do the honours on separate days this month. "The last 75 years have been an exciting

journey for HAL and I can say the next 25 years are going to be challenging," said HAL Chairman & Managing Director T. Suvarna Raju, who joined HAL in 1980 as a management trainee. "We must constantly adapt ourselves to changing [global] environment, customer demands and government policies," he told The Hindu. HAL is pursuing high-end research to create the country's future aircraft and aeroengine technologies, Mr. Raju said. Started as Hindustan Aircraft Company by visionary industrialist Walchand Hirachand Doshi, HAL was acquired by the British in 1942 and consolidated in 1964 under the present name. Oldtimers recall HAL's bygone, once popular products - the HF-24 'Marut' jet fighter, the Ajeet (Gnat) that fought in the 1965 and 1971 wars; and HJT-16 'Kiran' basic trainer that has regaled Aero India visitors with its aerobatics. HAL's production portfolio includes Sukhoi-30, Mirage 2000 fighters; the DRDO-ADA's Light Combat Aircraft that is in the final configuration; trainer aircraft including the British-make Hawks; transport aircraft for the Forces; and military helicopters. Its own product is the multipurpose Advanced Light Helicopter 'Dhruv' and its variations for combat and surveillance.



HAL-manufactured Dhruv helicopters performing during the Aero India 2013 in Bengaluru.

The Pioneer

09 December 2015

Air chief calls for greater cooperation among forces for stability in Asia-Pacific

Air Chief Marshal Arup Raha has said that there is a pre-eminent shift in global strategic centre of gravity to the Asia-Pacific region and sought greater cooperation among the defence forces of the countries for stability in the region. Raha was speaking on Regional Security Environment at the SASEAN Defence Chiefs Dialogue in Malaysia on Monday. Raha is on a three-day visit for the conference that began on Sunday. "We hope to see increased cooperation and collective action to exchange information, build infrastructure and strengthen capabilities. In this manner, we would gain from each others strengths and understand each other better towards lasting peace, stability and prosperity in the ASEAN region," the Air Chief said at the conference attended by defence chiefs of from ASEAN, SAARC and the observers from China, Russia and United States of America. Raha delivered the talk on "Addressing Dynamic Challenges' from the perspective of Indian Armed Forces. The Air chief further said, "Indian Armed Forces being the 3rd largest military force has the largest volunteers Army. The professionalism and the apolitical nature of the Indian Armed Forces is a major stabilising factor in the Indian Subcontinent," he said. He further said that our Armed Forces are transforming into a modern, flexible and credible Power with Full Spectrum Capability to safeguard India's National Interests and Objectives. In the end he said, "We wish to collaborate and engage effectively with SASEAN nations to enhance the security of our region and further our mutual interests of economic development and progress".

Many firsts for Manohar Parrikar's visit to US

Much rides on defence minister Manohar Parrikar's visit to the United States this week. If all goes well, defence ties could move up a notch or two, which, in turn, could help India get closer to becoming a hub of defence production. Large US defence companies are straining at the leash to sell more and invest more. But the US government has a veto on critical technology, a veto sustained by a battery of government lawyers who like the status quo. This must change. Lockheed Martin and Boeing have offered production lines for the F-16s and F-18s to India. Boeing is also ready to set up assembly lines for either the Apache or the Chinook helicopters. Other companies trying to enter the market are busy hiring executives with India experience. In short, there is a buzz that can work to India's advantage if policies and ideas are streamlined into a coherent whole and the last year of the Obama Administration in office is used intelligently. As this column has argued before, the last years of an outgoing administration can be more productive than the first years of an incoming one. Why no Indian defence minister has come to Washington since 2008 while US defence secretaries have made six visits to India is a question to ponder. Yes, UPA was not interested in most things American in its second term after the initial burst of activity when it signed a defence framework agreement and concluded a nuclear deal. It set the stage with two historic moves but then abruptly suspended the play. The Modi government has worked to revitalise the Indo-US relationship, reconvening working groups that hadn't met for years. Parrikar's visit should help put the defence partnership front and centre because he has a forward-looking counterpart in defence secretary Ashton Carter. Parrikar is accompanied by a Ficci-led delegation of Indian industry - the first-ever confluence in public. Big players (Tata, L&T, Reliance) and rising players (Dynamatic Technologies, Sun Group) will meet their gigantic counterparts, get a sense of the scaling up required and find partners. Or the much-celebrated Defence Technology and Trade Initiative (DTTI) will remain the jumble of words it is. They are set to tour Huntington Ingalls Industries, America's largest military shipbuilder and the sole builder of US aircraft carriers. It also makes nuclear-powered submarines and India has a keen interest in all of the above. In another first, Parrikar and Carter will visit the Norfolk Naval Station in Virginia, the world's largest naval base with 75 ships and 134 aircraft. The joint visit is crafted to symbolise the "joint-ness" of vision. Parrikar already visited the Pacific Command Headquarters in Hawaii on his way to Washington, first time an Indian defence minister made the trip. But there are problems. Trust remains an issue, especially with respect to Pakistan. Washington's policy of "more toys-for-the-boys" and fervent hopes for behavioural change doesn't inspire confidence. Biggest boy, Raheel Sharif, got star treatment last month with Vice President Joe Biden devoting more than two hours to talk about "peace" in Afghanistan. This year the Obama Administration approved \$952 million in sophisticated weapons for Pakistan's "counter-terrorism operations" apart from the eight F-16s. Sharif will have "smart" bombs, Hellfire missiles, high frequency communication systems and Viper attack helicopters to keep (his own) jihadis at bay. Will he, won't he? is a game US optimists like to play. Trust is also an issue on the business side. Indian officials retain sharp memories of US sanctions imposed after the 1998 nuclear tests. So intense was the Clinton Administration's desire to punish, it ended up giving a fresh lease to kneejerk anti-Americanism in Delhi. The sanctions were lifted completely only in 2010. Fears the nightmare could return are real. But staying still is not an option for India because it must modernise and choices are few. The Russian proverb - "doveryai, no proveryai" (trust but verify) - applies. It became Reagan's favourite phrase during arms control negotiations with Gorbachev, and can be a good adage here. DTTI can be a real engine if the two sides find a meeting point, choose carefully and put a healthy dose of R&D to ensure the project has a future. It can't be yesterday's technology. India could take another look at the "foundational agreements" US wants it to sign to make technology sales easier. Above all, continuity must be ensured even if India and the United States find themselves on opposite sides of the fence on some issues sometime in the future.

CAG slams poor planning, project mismanagement for delay in submarine refit

The CAG has slammed the defence establishment's poor planning and gross project mismanagement, coupled with long delays in supply of requisite material by Russia, which led to submarine INS Sindhukirti being stuck in a refit for a decade at Hindustan Shipyard (HSL) in Visakhapatnam. "The medium refit of INS Sindhukirti was scheduled to be completed by January 2009. But due to deficiency in manpower deployment at the yard, lack of protection to main line cables, delayed supply of materials and modernization, the submarine was delivered to the Navy only in June 2015," said the audit watchdog. In effect, the Navy was unable to use the Kilo-class submarine over the last decade, with the refit cost going up from Rs 629 crore to over Rs 1,000 crore, at a time when the force continues to grapple with an ageing and depleting underwater combat arm. As reported by TOI earlier, the 3,000-tonne INS Sindhukirti's re-induction into the fleet recently came as a big relief since the Navy is down to just 13 old diesel-electric submarines (nine Russian Kilo and four German HDW-origin vessels) and one nuclear-powered submarine (INS Chakra) without nuclear-tipped missiles on lease from Russia. Moreover, with 10 of the 13 submarines being over 25 years old, only half of them are operationally available at any given time. China, incidentally, has 51 conventional and five nuclear submarines, and is on course to induct another five JIN-class SSBNs with the 7,400-km range JL-2 missiles. Pakistan, too, has recently ordered eight more advanced diesel-electric submarines from China. In its report tabled in Parliament on Tuesday, the CAG said the operational-cum-refit cycle for INS Sindhukirti, which was acquired from Russia in November 1989, should have taken place from 2001 to 2004. "But it was actually carried out from 2006 after the submarine witnessed extensive deterioration and was put on extended notice for motoring (meaning it could not be deployed at short notice) in June 2004," it said. The submarine's refit was to be completed by January 2009 but its duration was extended four times till May 2015. This was due to delay of 11 to 19 months in supply of "yard material by Russian arms company Rosoboronexport (ROE), growth of work on hull and main line cable (MLC) renewal and 16 months of time taken in the government approval for MLC renewal with consequent refit extension and problems. Apart from the lack of a dedicated project team and constant monitoring, the CAG also criticized the government for not ensuring the inclusion of standard contractual clauses like liquidated damages (LD) in the contracts between ROE and HSL. "Lack of LD clauses prevented remedial action against ROE despite delayed deliveries which had affected the overall progress of refit," said the CAG.

The Hindu

09 December 2015

Deals worth \$3.5-b likely to be inked during Parrikar's US visit

Nayanima Basu

Defence deals worth \$3.5 billion are expected to be signed during Defence Minister Manohar Parrikar's meeting with his American counterpart Ashton Carter in Washington on December 10. The big defence deals that are likely to be signed under the Defence Trade and Technology Initiative (DTTI) will include purchases of P-81 maritime patrol aircraft, C-17 globemaster-III and M777 ultra-light howitzers for the Indian armed forces, sources told BusinessLine. Parrikar, who is on his maiden visit to US as Defence Minister, will be meeting Carter informally on December 9, followed by a formal round of talks on December 10 at Pentagon. According to a Pentagon statement, both Parrikar and Carter will be holding the talks in Pentagon, after which they will be travel to Norfolk, Virginia, to inspect a ship. While India is seeking more cooperation in the defence sector from US in terms of joint production and development, the US is pushing India to relax some of the offset norms, especially transfer of technology under the revised Defence Procurement Procedure (DPP).

FDI limit - The American defence industry has been also rallying behind their government to nudge India into allowing 74 per cent foreign direct investment (FDI) in defence. Both sides will also be discussing the modalities in accordance with 2015 Framework for the US-India Defence Relationship that comprises increased intelligence exchanges, maritime security and shipping data.

Indian Navy set to negotiate purchase of multi-role helicopters

The Indian Navy is finally set to open price negotiations with Sikorsky Aircraft Corporation for buying 24 Seahawk S-70B shipboard multi-role helicopters (MRHs) for its operational requirements. Indian Ministry of Defence (MoD) sources told India Strategic defence magazine that although the helicopters were selected in December 2014, there were some issues over cost escalations due to the delay in the procurement process, and the Connecticut, US-based company's insistence that it could not hold the prices it had offered in 2008. Recently, however, Sikorsky had relented and its team is due to be invited soon for an early conclusion of the price negotiations. The subject is also likely to be on the agenda during Defence Minister Manohar Parikkar's visit to Washington on December 9-10. Notably, the Indian Navy had invited bids in 2008 from Sikorsky for S-70B and European NH Industries (NHI) for NH 90. There was some hesitation in opening the latter's bid, as Finmeccanina, which got embroiled in controversy over the acquisition of VVIP helicopters for the Indian Air Force (IAF), is a major partner in this European consortium. Sikorsky accordingly had a walkover, but it asked for revision in prices as the selection process had taken more than twice the stipulated timeline and the delivery, in any case, has to be three years after the price negotiations conclude and a contract is signed. That is roughly 10 years after its offer was submitted. Somehow, the MoD repeatedly sought extensions of Sikorsky's bid, delaying the acquisition process timelines from less than three years to six. Nonetheless, it said there was no provision for cost escalation during the selection and negotiation process. Meanwhile, in another development, Sikorsky has been acquired by Lockheed Martin (LM) from United Technologies Corporation (UTC). After the completion of the merger process in early November, Sikorsky was shown for the first time as a Lockheed Martin company at the Dubai Airshow on November 8. As for the current status in negotiations with the Indian Navy, the chief of the naval staff, Admiral Robin Dhowan, when asked about the Seahawks, replied that the process was now in an "advanced stage". Notably, the tender, or Request for Proposals (RfP), had sought 16 helicopters with an option for eight more. But Admiral Dhowan had told India Strategic earlier that as the navy was short of these machines, the deal could be for all the 24 machines. It may be recalled that the navy had originally planned to acquire 54 MRHs, and 16 of these should have come in 2007 as replacement for the first lot of quarter-century-old British Westland Sea Kings. More were to follow progressively. This has not happened, and the Sikorsky Seahawks are likely to start arriving only from 2019, more than a decade late. The Sikorsky deal is estimated to be around \$1 billion-plus for 16 helicopters but there is no official word yet on prices from either side. Weapons and sensors will be extra - possibly from other companies but Sikorsky will integrate them in accordance with the contract. The weapon suite will have the capability to deal with both underwater (ASUW or anti-submarine warfare) and ASW (anti-surface-ship warfare). Among the suppliers for radars and weapons should be the US Raytheon and Telephonics as well as French Thales. The power plants (two engines per machine) will be from GE. It may be noted that the Indian Navy has substantial achievements to its credit for building ships indigenously, and with a three aircraft carrier policy, it will need several hundred helicopters for engaging threats and for ship to ship or ship to shore communications.

Pak-China joint military exercise begins

A two-week long joint training exercise 'YOUYI 5' between special forces of China and Pakistan started at Qingtongxia, Ningxia Hui Autonomous Region, China on Tuesday. According to ISPR, the impressive opening ceremony was attended by senior military officers of special forces of Pakistan and People Liberation Army. National anthems of both the countries were played on the occasion. The joint exercise as part of Year of Friendship 2015 will focus on anti-terrorist operations, hostage and rescue, cordon and search operations. The joint exercise will enhance and further strengthen already deep military ties between Pakistan and China. The YOUYI 5 is being carried out in extreme weather conditions of northern China to impart and share Pakistan army's experiences in war against terrorism.

Naval exercise between India-Russia 'Indra Navy' commences

In the current exercise, Indian Navy is being represented by INS Sahyadri, INS Ranvijay and INS Shakti
A top naval official today said the ongoing exercise between India and Russia in Bay of Bengal would help develop common understanding of procedures for maritime security operations between the two Navies. Addressing a joint media conference on board INS Sahyadri here today, Chief of Eastern Fleet, Eastern Naval Command Rear Admiral S V Bhokare and Deputy Commander of Pacific Fleet, Vice Admiral Ryabukhin Andrey, said the two countries commenced bilateral maritime exercises in 2003 and the 8th edition of 'Indra Navy' series commenced yesterday off Visakhapatnam coast. Bhokare said the bilateral naval exercise is aimed at increasing interoperability between the two Navies and developing common understanding of procedures for maritime security operations. He said the scope of 'Indra Navy 15' includes wide-ranging professional interactions during the Harbour phase and a diverse canvas of operational activities at sea across a spectrum of maritime operations. In the current exercise, Indian Navy is being represented by INS Sahyadri (an indigenous frigate), INS Ranvijay (a guided missile destroyer) and INS Shakti (a fleet support ship). In addition, INS Sindhuvir submarine, the P8I long-range maritime patrol aircraft, Dornier short-range maritime patrol aircraft, Hawk advanced jet trainer and other integral rotary wing helicopters are also participating in the exercise. The Russian Federation Navy (RFN) ships Varyag (cruiser), Bystry (destroyer), Alatau (rescue ocean going tug) and Boris Butoma (fleet tanker) are also taking part in the operation. To a query regarding transfer of technology from Russia, the Rear Admiral said India was taking technology from Russia and some other countries as well. "Russian technology is already in place. We have the deepest relations between the two countries. The technology from Russia available now will be put in use for the development," he said.

The Asian Age

09 December 2015

N-deal with Pak not in US interest

Pursuing a civil nuclear deal with Pakistan is not only unrealistic, poorly timed, and unwise, but also counterproductive to the US' national interest in the near term, a leading South Asia expert on terrorism has told American lawmakers. "My concern is that by turning senior-level attention to a nuclear deal, Washington sends a wrong and counterproductive message to Pakistan, as we have many times in the past," Daniel Markey, a senior research professor in international relations at the Johns Hopkins School of Advanced International Studies has said. In prepared remarks submitted ahead of a Congressional hearing on 'Civil Nuclear Cooperation with Pakistan: Prospects and Consequences' Markey said the US is likely to come across as distracted, unable to set and maintain priorities, and suffering from unfounded expectations. "This leads to my conclusion that pursuing a nuclear deal with Pakistan now is unrealistic, poorly timed, and unwise," Markey said, according to his prepared statement submitted to the terrorism, nonproliferation, and trade subcommittee of the committee on foreign affairs. "A nuclear deal of the sort apparently being discussed with Pakistan is hardly the 'blockbuster' that some commentators in the media would have us believe. Even so, it is still poorly timed and, if pursued further, would be more likely to prove counterproductive to other near term US security interests than deliver significant benefits," he said. Markey argued that even if Pakistan were to take incremental steps to limit the future growth of its nuclear programme, it would be insufficient for the US to become a champion of Pakistan's membership in the NSG. Limiting future nuclear growth would do too little to address Washington's most pressing concerns about Pakistan's nuclear arsenal, which would still pose serious threats, including insider theft, onward proliferation, accident, sabotage, or unauthorised use. Further, there is no indication that Pakistan's military leadership is inclined to place voluntary limits on the growth of its nuclear arsenal. That arsenal has always been justified as a deterrent against Indian aggression. And India-Pakistan relations are stuck in hostility, he said. Notably both Pakistan and the US have refuted media reports that they are in any kind of talks for an India-type civil nuclear deal. Markey said the nuclear discussion shifts attention away from the underlying causes of American anxiety with Pakistan and the greatest stumbling blocks to effective partnership between Washington and Islamabad.

Tensions along South China Sea hastened Su-35 deal

Atul Aneja

Russia's decision to export its highly capable Su-35 planes is expected to bolster China's military presence in the South China Sea. It is also set to escalate military technology exchanges that would help Beijing and Moscow develop cutting edge weapons. After protracted negotiations that lasted several years, Russia finally relented to sell China, 24 Su-35 planes. In doing so Moscow overrode apprehensions that Beijing's panache for "reverse engineering" Russian weapons, could hasten its rise as a formidable competitor to Russia, in the global arms market. The \$2 billion deal means that transfer of technology, which Beijing badly requires to develop the next generation of weapons, is part of the contract. Analysts say that geopolitics has played a major part in cementing the deal. Both Russia and China are now strategically well aligned. Russia saw the toppling of an elected government Ukraine as an attempt by the Atlantic Alliance to dislodge it from Sevastopol, the headquarters of its Black Sea fleet in Crimea.

U.S.'s Asia Pivot - The Chinese are also wary of Washington's growing presence in the western Pacific, following the "Asia Pivot" doctrine of the Obama administration. Washington's doctrinal shift would bolster the Pacific command, which would accumulate nearly 60 per cent of all U.S. forces under the wings. Russian media reports have concluded that growing tensions between China and the U.S. over the South China Sea clinched the S-35 deal, whose negotiations had commenced in 2008. The Chinese felt the urgency of these planes as battle readiness of its home-grown J-20 and J-31 stealth fighters - the eventual replacement for the Su-35 - was still a few years away. China will benefit from the purchase of the Russian jets in three ways. First, the acquisition of 24 Su-35 planes would greatly extend China's reach over the South China Sea. Su-35 planes, capable of taking off from short runways, will cover a large footprint if deployed from China's newly developed artificial islands in the South China Sea. Second, the Russian jets can effectively counter the U.S. F-35 stealth fighters.



A Russian Sukhoi Su-35 performs at Le Bourget airport, near Paris, in 2013.

Tracking U.S. jets - The Irbis-6 radars on the Su-35 can track the state-of-the-art American jets nearly 90 km away. Finally, China can acquire valuable radar and engine technology by inducting the Russian jets. This would plug a major gap in China's drive for developing homegrown planes. Mil.huanqiu.com, China's official military forum acknowledges Beijing's interest in the engine and radar of the SU-35. The Su-35 deal has also benefited Russia significantly. Cash-strapped Russia has acquired funds which could help alleviate mounting expenses both at home and abroad. Moscow has already profited from the financial transfers resulting from its previous decision to export its advanced S-400 air defence missile systems to Beijing. Chinese media reports suggest that Beijing is now keen on acquiring technology used in Russia's Lada class submarines.

Novel technique can help improve diabetes treatment

Scientists have deployed a new drug discovery technique to identify an anti-diabetes compound with a novel mechanism of action, which may lead to a new type of treatment. The new technique may enable researchers to quickly find drug candidates that activate cellular receptors in desired ways. For the study, researchers from US used the technique to target a receptor linked to type 2 diabetes. The GLP-1 receptor, as it is known, is expressed by insulin-producing 'beta cells' in the pancreas. Several drugs that activate this receptor - drugs called GLP-1 receptor agonists - are already approved for treating type 2 diabetes. In this case, the researcher's aim was to find a molecule that activates the GLP-1 receptor. The researchers generated a library of candidate molecules - based on a known GLP-1 receptor agonist, Exendin-4, a small protein originally found in the venom of Gila monster lizards; a synthetic version of this protein is now used as a type 2 diabetes medication. They created about one million new peptides by randomly varying one end of Exendin-4 - the end that activates the G protein and beta arrestin pathways. "The idea was that at least one of these many variants would induce a change in the shape of the GLP-1 receptor that would activate the G-protein pathway without activating the beta arrestin pathway," said Hongkai Zhang, co-first author of the study.

US conducting “serious review” of alleged Iran missile test

The United States is reviewing and seeking to confirm reports that Iran launched a ballistic missile last month in violation of UN Security Council resolutions, US Ambassador to the United Nations Samantha Power said on Tuesday. "The US is conducting a serious review of the reported incident," Power told reporters after a meeting of the Security Council on unrelated issues. She added that if Washington confirmed the reports that Iran tested a medium-range ballistic missile on November 21 in violation of UN resolutions, the United States would bring the issue to the 15-nation council and seek appropriate action. A Western diplomatic source said last week on condition of anonymity that the test of a Ghadr-110, a spinoff of the Shahab-3 missile, was held near Chabahar, a port city near Iran's border with Pakistan. He said it was a liquid-fuelled missile with a 1,900 km (1,180 mile) range and was capable of carrying a nuclear warhead. All ballistic missile tests by Iran are banned under a 2010 Security Council resolution that remains valid until a nuclear deal between Iran and six world powers is implemented. Under that deal, reached on July 14, most sanctions on Iran will be lifted in exchange for curbs on its nuclear programme. According to a July 20 resolution endorsing that deal, Iran is still "called upon" to refrain from work on ballistic missiles designed to deliver nuclear weapons for up to eight years. In October, the United States, Britain and France called for the Security Council's Iran sanctions committee to take action over a test by Tehran of a nuclear-capable missile that month that they said violated UN sanctions. So far, no action has been taken by the committee, though Power said council members would be discussing the issue next week. In Paris, a Foreign Ministry spokesman said France would pay close attention to ensure Iran respects the ban on ballistic missile tests. He did not specifically confirm the launch and officials declined to comment when pressed.



US aid to Pak will be used against India: Ex-diplomat

As the US prepares to sell F-16s to Pakistan, the country's former top diplomat has warned the Congress that such fighter jets would end up being used against India and not against terrorists. Describing sale of such military hardware and even reported talk of a civil nuclear deal as an appeasement policy towards Pakistani military, the former top Pakistani diplomat has urged the US to tell the leaders in Pakistan that their ambition of rivalling India is akin to Belgium trying to rival France or Germany. "The Obama administration's consideration of a nuclear deal with Pakistan, just like its decision a few months ago to sell almost USD 1 billion in US-made attack helicopters, missiles and other equipment to Pakistan will fuel conflict in South Asia without fulfilling the objective of helping the country fight Islamist extremists or limit its nuclear arsenal," said Husain Haqqani, the former Pakistani Ambassador to the US. In a prepared remark submitted ahead of a Congressional hearing on 'Civil Nuclear Cooperation with Pakistan: Prospects and Consequences to the Terrorism, Nonproliferation, and Trade Subcommittee of the Committee on Foreign Affairs', Haqqani said Pakistan's failure to tackle its jihadist challenge is not the result of a lack of arms but reflects an absence of will. "Unless Pakistan changes its worldview and its compulsive competition with its much larger neighbour even in violation of international commitments, American weapons will end up being used to fight or menace India and perceived domestic enemies instead of being deployed against jihadists," he said. Currently, director of South & Central Asia at the Hudson Institute, a top American think-tank, Haqqani said competition with India remains the overriding consideration in Pakistan's foreign and domestic policies.

Carbon emissions to stall in 2015

Growth in global carbon dioxide emissions is expected to slow for a second year running in 2015, in spite of economic growth, after typically rising by around 2 to 3 per cent since the turn of the century, according to research published on Monday. Global carbon emissions edged up by 0.6 per cent last year, compared to 2.4 per cent annual growth from 2004-2013, said the study by Britain's University of East Anglia (UEA) and the Global Carbon Project, which compiles data from research institutes worldwide. In 2015, however, the researchers expect global carbon emissions to decline by 0.6 per cent to 35.7 gigatonnes - their central projection from a range of -1.6 per cent to +0.5 per cent. "These figures are certainly not typical of the growth trajectory seen since 2000 where the annual growth in emissions was between 2 and 3 per cent," said Corinne Le Quéré, of the UEA and one of the authors of the study in the journal Nature Climate Change. "What we are now seeing is that emissions appear to have stalled and they could even decline slightly in 2015," she added. Other organisations have said that world carbon emissions growth stalled last year, after decades of gains. The report is published as around 190 countries meet in Paris to agree on what will likely be the strongest global climate pact yet to curb emissions. It is widely acknowledged that current emissions cut pledges will not be enough to prevent the world's average temperature from rising beyond 2 degrees Celsius (3.6 Fahrenheit) above pre-industrial levels, viewed as a threshold for dangerous and potentially catastrophic changes in the planet's climate system. Myles Allen, professor of geosystem science at the University of Oxford, said the report showed it was possible for the world economy to grow while reducing emissions, but he said in order to stop temperatures rising, emissions need to peak and then be reduced to zero. Michael Grubb, professor of international energy and climate change policy at University College London, said: "The trend of rapid global emissions growth has been broken: this keeps 2 degrees C in play.... There could hardly be better news to help the Paris conference in its final days." The UEA and Global Carbon Project said their projection for 2015 is based on available energy consumption data in China and the United States, as well as forecast economic growth for the rest of the world. "The projected decline (in emissions) is largely down to China's decreased coal use, driven by its economic adjustment," Le Quéré added. China's emissions have been called into question lately due to difficulties in interpreting its data. China was still the world's biggest emitter last year, releasing 9.7 billion tonnes of CO2 but its emissions growth is expected to decline in 2015 by 3.9 per cent after rising by 1.2 per cent last year and 6.7 per cent a year for the previous decade, the report said. Globally, it is unlikely that emissions have peaked for good because many growing economies still rely on coal for energy generation and emissions reductions in some industrialised countries are still very modest, the study said.

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India software market to grow to \$5.3 billion in 2016: Gartner

The growth is being driven by trends like increasing adoption of SaaS and OSS

Yuthika Bhargava

Software market in India is expected to grow at 12.8 per cent to reach \$5.3 billion in 2016, research firm Gartner said on Wednesday. "The enterprise software marketplace is dynamic and ever-changing. Its growth and structure are being shaped by factors and forces of decentralised purchasing, consumerisation, mobility, influence of other emerging markets, cloud-based implementations, and new consumption models," Gartner Research Director Bhavish Sood said in a statement. The growth is being driven by trends like increasing adoption of Software as a service (SaaS) and open source software (OSS), changing buying behaviours and purchasing styles associated with digital business and Digital India initiative of the Indian government. "In 2015, the Indian economy has shown signs of resurgence, with increased efforts by the government toward ease of doing business... It is also evident that the Indian government is serious about leveraging information technology for effective governance. The Digital India initiative, MyGov citizen portal, the Self-Employment and Talent Utilization (SETU) program for startups, and smart cities initiatives are some examples." Mr. Sood said. Corporations also want to know how to use digital technologies, services and disciplines to create new growth opportunities. Businesses are getting ready to digitally transform, creating new organisations, and leadership roles. This transformation is generating varying degrees of adoption, experimentation and spending in the newest technologies, Gartner said. Branded companies that sell to consumer markets are more rapidly purchasing and adopting digital applications to expand their digital footprint and strengthen their competitive positioning, it added.

Glaciers in Everest have shrunk by 28% in 40 years'

Glaciers on Mount Everest, source of major Asian rivers like Brahmaputra, have shrunk by 28% over the past 40 years due to climate change, according to a report. The glacial shrinkage area is compared to the measurements taken in the 1970s in the report released by the Chinese Academy of Sciences (CAS), Hunan University of Science and Technology, and Mount Qomolangma Snow Leopard Conservation Centre. The glacial area on the south slope of the world's highest mountain, in Nepal, has decreased by 26% since the 1980s, the report said. Part of the report also said Everest, known as Mount Qomolangma in Tibet, has been getting warmer for the past 50 years. Kang Shichang, a researcher with the State Key Laboratory of Cryospheric Sciences under the CAS, said the data was based on long-term remote sensing and on-site monitoring. At present, there are 1,476 glaciers in China's Mt Qomolangma national nature reserve, covering 2,030 square kilometres, state-run Xinhua news agency reported. The shrinking glaciers have resulted in swelling of glacial lakes and higher river levels downstream, Kang, who has led several glacier inspection teams, said. Remote sensing data showed that the area of a glacial lake in Mount Everest nature reserve increased from about 100 square kilometres in 1990 to 114 square kilometres in 2013, Kang said. Mount Everest is the source of a number of major Asian rivers, including Brahmaputra and Ganges. Earlier in May, a group of international researchers had warned that the estimated 5,500 glaciers in the Hindu Kush-Himalayan region - site of many of the world's tallest peaks, including Mount Everest - could reduce their volume by 70-99% by 2100, with dire consequences for farming and hydropower generation downstream.

The Times of India

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World's Tiniest Temperature Sensor Developed

Scientists have developed a tiny, wireless temperature sensor which is powered by the radio waves that are part of the device's own network. This means that the sensor needs not even a single wire, nor a battery that would have to be replaced, researchers said. The arrival of such sensors is an important development on route towards smart buildings, for instance. But the applications are many and various, they said. The smart buildings of the future will be full of sensors that will respond to the residents' every need, and will be as sustainable as possible. Like heating and lighting that only switches on when someone is in the room. That is only possible if these sensors are wireless and need no batteries, otherwise in a large building you would have to change the batteries every day, researchers said. Hao Gao, researcher at the Eindhoven University of Technology (TU/e) in the Netherlands, developed the sensor that measures just 2 square millimetres and weighs a mere 1.6 milligrammes, equivalent to a grain of sand. The current version of the sensor has a range of 2.5 centimetres; the researchers expect to extend this to a meter within a year, and ultimately to 5 meters. The sensor has a specially developed router, with an antenna that sends radio waves to the sensors to power them. Since this energy transfer is accurately targeted at the sensor, the router consumes very little electricity. And the sensors themselves are made such that their energy consumption is extremely low. The sensor also operates beneath a layer of paint, plaster or concrete. This makes the sensor easy to incorporate in buildings, for instance by 'painting' it onto the wall with the latex, Peter Baltus, TU/e professor of wireless technology, said. The sensor contains an antenna that captures the energy from the router. The sensor stores that energy and, once there is enough, the sensor switches on, measures the temperature and sends a signal to the router. This signal has a slightly distinctive frequency, depending on the temperature measured. The router can deduce the temperature from this distinctive frequency. The same technology enables other wireless sensors to be made, for example to measure movement, light and humidity. The application areas are enormous, Baltus said, ranging from payment systems and wireless identification to smart buildings and industrial production systems.

Astronomy Gravity's rainbow

A novel approach to observing the heavens from orbit

Most people have heard of Hubble, an American space telescope that, besides doing a lot of science, also provides NASA's public-relations department with an endless stream of pictures which show how beautiful the universe is. Hubble, however, is merely the best-known of a clutch of telescopes in orbit around Earth. These instruments all look at the cosmos in different ways, but they have one thing in common: their view is restricted to various parts of the electromagnetic spectrum (Hubble takes its pictures in and around the visible-light part of the spectrum). This is a fruitful way of looking at things, but it is not the only way. And on December 3rd, as *The Economist* went to press, the pioneer of another approach was scheduled to take off from French Guiana. LISA Pathfinder (the acronym stands for Laser Interferometer Space Antenna) is intended to demonstrate the technology needed to detect waves of gravity, rather than light, X-rays or gamma rays. Gravitational waves are rippling distortions in space given off when massive bodies are accelerated. They are predicted by Einstein's general theory of relativity, which celebrates its centenary this year. Physicists have compelling indirect evidence that they are real. (The 1993 Nobel prize for physics was awarded for observations of a pair of superdense stars whose orbits around each other are decaying in a way that can be accounted for only if gravitational waves are carrying away some of their momentum.) But researchers have never seen a gravity wave directly. Since gravity waves stretch and compress space, one way to spot them is to look for temporary changes in the distance between two fixed objects. Some Earth-based experiments, such as LIGO, an American detector, use exquisitely tuned lasers for this purpose, firing beams up a pair of long tunnels arranged at right-angles to each other and sporting mirrors at their far ends. The idea is that passing gravity waves, by distorting the tunnels, will distort the beams' paths and produce a signal. The trouble is that the distortions such instruments are hunting for are tiny. That makes them both hard to see and hard to distinguish from other, more pedestrian effects. LIGO's operators must account for things like passing traffic, logging in distant forests and the constant, almost unnoticeable seismic grumblings of the Earth itself. LISA Pathfinder takes this idea and moves it into space, where things are much quieter. The craft contains two cubes, made of an alloy of gold and platinum, that float motionless (at least with respect to the rest of the craft) in separate chambers. It also contains a laser system designed to measure the distance between the cubes to an accuracy of a few picometres (much less than the radius of a hydrogen atom). The idea is to isolate the cubes so comprehensively that gravity waves are the only things that can affect their positions relative to each other. The European Space Agency, whose baby LISA Pathfinder is, therefore describes the cube-containing chambers as "the quietest places in the universe". The craft's body is designed to protect its payload from pressure exerted by sunlight and the solar wind, and is built from non-magnetic materials. The temperature of the interior is carefully controlled. The experiment also has to deal with the effects of cosmic rays-energetic particles that can zip right through the craft's skin-for, unchecked, these would cause a slow build-up of electric charge on the masses, which would cause them to move. Such a build-up can, however, be counteracted by using an ultraviolet light to strip electrons, and therefore electric charge, from the cubes. Anticlimactically, all this sophisticated equipment will not actually be able to sense gravitational waves itself. As the craft's name suggests, it is indeed a pathfinder, designed to prove that such sensitive technology can work in space. If it does, the way will be clear for the next phase of the project, known as Evolved LISA. This is a far bigger experiment. It will employ a trio of spacecraft flying in formation in the shape of an equilateral triangle that has sides 1m kilometres long, with lasers shining between the craft. Evolved LISA is not, though, scheduled to launch until 2034. This may seem a long time to wait, especially since ground-based experiments such as LIGO are almost certain to beat it to the first detection of a gravitational wave. But Paul McNamara, the project's boss, argues that the wait will be worth it. Ground-based detectors' relatively modest sizes (LIGO's tunnels are a mere 4km long, though the lasers bounce back and forth up to 400 times) means they will be sensitive only to the high-frequency waves caused by smallish objects such as modest black holes or pairs of sun-sized stars. Evolved LISA's enormous dimensions will permit it to look at the lower-frequency waves given off by larger beasts, like the colossal black holes found in the centres of most galaxies. In this regard, says Dr McNamara, gravity-wave astronomy is rather like the traditional electromagnetic sort-you need different telescopes if you want to peer into different parts of the spectrum.



India No. 1 choice for global tech R&D

Sujit John

India remains the No. 1 location for MNCs to establish product engineering and R&D centres outside their home countries, and the growth of these centres in India is outpacing the average global growth. India accounted for \$12.3 billion, or 40%, of the total of \$31 billion of globalized engineering and R&D in 2015, according to a study by consulting firm Zinnov. Compared to 2014, the revenues of the captives in India grew by 8.3%, as against the growth of 7.6% for all captives. China follows India with revenues of \$9.7 billion. Zinnov, which has been focused on this space since it was founded over a decade ago, finds that 69% of all new offshore technology centres this year were set up in India. The past two years have seen a spate of new centres being set up and the older ones expanding, including those of Exxon Mobil, Lowe's, Visa, Victoria's Secret, JC Penny, CME Group, Wells Fargo, and British Telecom. Software & internet accounts for 35% of the work being done in the captives, telecom & networking follows with 14% and semiconductors 12%. Consumer electronics, automotive, computer peripherals, medical devices, industrial, and aerospace & defence are other areas of work. Zinnov finds another interesting trend: Engineering and R&D outsourcing to third parties is beginning to outpace growth of captives in India. India is the second biggest outsourcing destination, after Western Europe, where companies like Altran, Alten, Akka Technologies, Assystem and Harman Connected Services are strong. India accounted for \$7.8 billion, or 21.6%, of the total outsourced engineering and R&D services of \$36 billion in 2015. Compared to 2014, it grew at 12.7%, as against the global growth of 8.7%. "Five years ago, the growth was coming primarily from captives. Now, the captives have matured, and it is the third-party service providers who are growing faster," Sidhant Rastogi, partner in Zinnov, said. While captives do more of the work they consider proprietary and those that involve new technologies, they outsource a lot of the rest of the work. Independent software vendors and telecom outsourcers dominated the outsourced pie. But the fastest growth came in the automotive, software and medical segments, the first thanks to the trend towards connected cars and change in labour laws in Germany. TCS, Wipro and HCL Technologies have traditionally been the leading players in this space. "However, Infosys, Tech Mahindra, L&T and Aricent are giving good competition to the top 3. Even European players like Altran and Alten are setting up centres in India," Rastogi said.

R&D: GLOBALIZED & OUTSOURCED

