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India to send indigenous Tejas to Bahrain air show

by Sushant Singh

In a first, the government has decided to field indigenously developed combat aircraft Tejas for the fourth edition of Bahrain International Air Show (BIAS). To be held from January 21-23, BIAS will also see participation of Pakistan's JF-17 fighter produced with Chinese help. India will also send IAF Sarang helicopter display team that flies indigenous Dhruv helicopters and DRDO's airborne early warning and control platform. Defence ministry sources said the decision to send two Tejas aircraft to BIAS was "taken at the political level". "We were told to work on sending the Tejas," an official said. The team is to leave Bangalore on January 5 and halt at Jamnagar, followed by a stopover at Muscat for refuelling before arriving at Bahrain's Sakhir Airbase. The decision to field Tejas is being seen as a bold move as its performance would be analysed by aerospace professionals from across the world. Pakistan's move to send JF-17 is likely to lead to a comparison between the two. "We don't want a scenario where Tejas is pitched against the JF-17. They are two different aircraft at different stages of development and cannot be compared," a Tejas test pilot said. JF-17 Thunder was co-produced by Pakistan Aeronautical Complex, Kamra and China's Chengdu Aircraft Industry Corporation. It has been flown by Pakistan Air Force since 2010. Tejas has not been inducted into IAF so far. It has been developed by Aeronautical Development Agency (ADA) with HAL and DRDO. After receiving Initial Operational Clearance in December 2013, Defence Minister Manohar Parrikar handed over the aircraft to IAF last year. ADA is hoping for a Final Operational Clearance (FOC) this year, which will lead to Tejas being operationalised in IAF. ADA sources said LSP-3 and LSP-4 of Tejas have been prepared for BIAS, one for flying duties and the other for static display. But test pilots

flying Tejas are apprehensive. "We have problems with the undercarriage. A short-term solution has been found for this trip but it's not a permanent answer," a test pilot said. ADA officials are worried about further delay in Tejas programme due to the decision to participate in BIAS. They fear it will delay plans to get FOC by mid-2016. "2015 was a bad year for us. Flight schedule wasn't followed in May, June, July and August due to technical issues. In November, we had bad weather and since then we have been focused on the Bahrain trip," an official said.



The Asian Age

02 January 2016

‘DRDO to Call for Contest to Finalise Design for Kalam’s Memorial’

NEW DELHI: Country's top defence research agency DRDO will soon call for a national-level design competition to finalise the design concept for the memorial for former president A P J Abdul Kalam in Pei Karumbu in Tamil Nadu. Defence sources said that the Ramanathapuram District Collector had handed over 1.36 acres of land to the Ministry of Urban Development on December 29 for the memorial. The Ministry has given the go ahead to the DRDO to carry out fence erection around the land. The sources said that the formal transfer of land to the DRDO will be done in due course of time. The foundation stone for the construction of the compound around the proposed memorial complex was laid at a function at the site on December 29. Prime Minister Narendra Modi had announced on October 15, the birth anniversary of Dr Kalam, that a memorial would be built for the late 'Missile Man' and had requested Tamil Nadu government to allocate land for the purpose. The commencement of the construction work came days after media reports stated that the place where the memorial of the former President was proposed to be built was lying neglected. "DRDO will soon call for a national-level design competition," for the design concept of the memorial, the sources said.

Indo-Japan joint exercise from Jan. 12

The latest edition of 'Sahyog-Kaijin,' the Indo-Japan Coast Guard Joint Exercise, will begin in the Bay of Bengal off the Chennai coast on January 12. The five-day event would witness seminars and exercises involving strategic assets of both the countries, besides meeting of high-level officials in Delhi and Chennai, sources said. While one ship would represent the Japanese side, five to six ships are expected to participate from the Indian Coast Guard. The Commandant of the Japan Coast Guard would also meet his Indian counterpart in Delhi and later arrive in Chennai. This would be the second time in the last three months that a ship from Japanese military is participating in an exercise with India in the Bay of Bengal. The Japanese Maritime Self-Defence Force's, FS Fuyuzuk, called on the Chennai port in October last year and later participated in trilateral Malabar exercise with the Indian and the U.S. navies. During the visit of Japanese Prime Minister Shinzo Abe to India last month, Foreign Secretary S. Jaishankar had said that Japan would be a permanent partner in the Malabar naval exercise along with India and U.S. navies. Japan is also likely to send its maritime assets to participate in the International Fleet Review to be conducted by the Indian Navy at Visakhapatnam next month. Sahyog-Kaijin is held once in two years and the venue would shift between India and Japan on alternate occasions. India's ICGS Samudra Paheredar participated in the 2014 edition held at Yokohama in Japan.

Non-descript village to host HAL's helicopter complex

On Sunday, a nondescript backward village about 100 km from this Indian aerospace hub will be flagged off into big-time journey of manufacturing military helicopters. Biderahalla Kaval in Tumakuru's Gubbi taluk is where aircraft maker Hindustan Aeronautics Ltd. (HAL) has planned to start its composite Rs. 4,000-crore helicopter complex. On Sunday afternoon, Prime Minister Narendra Modi is stopping over briefly from Mysuru (after inaugurating the annual Indian Science Congress) to lay the foundation stone for the 600-acre facility. The HAL says the full facility, including a helipad, should be ready by around 2019. Initially, the HAL plans to manufacture the lighter, three-tonne machines - the Light Utility Helicopter (LUH) for reconnaissance and surveillance; and then the attack helicopter LCH (Light Combat Helicopter). It will overhaul and repair military helicopters. "The facility will boost [HAL's] aviation capability in the helicopter segment as it will produce three-tonne to ten-tonne class of helicopters," HAL Chairman T. Suvarna Raju told The Hindu. "Later, it could take up the 10-12-tonne class into which we are yet to venture." The HAL earlier explored the production modalities of this class tentatively. Currently, the Bengaluru Helicopter Division produces the indigenous 5.5-tonne ALH Dhruv for civil and military agencies; the older Cheetah, the Lancer and also the re-engined Cheetal choppers. Repair and overhaul of the forces' rotary fleet are also done here. When the Tumakuru complex gets going, the Bengaluru facility, along with the Rotary Wing Research & Design Centre, would remain busy with next levels of helicopter R&D and design, Mr. Raju said.

Novel Technique to Help Drones Move Better in Tricky Hills

A group of scientists has developed a novel technology to enhance the movement of drones in the tough plateau mountain regions. The unmanned aerial vehicles (UAV) designed for plateau missions are usually installed with high span chord ratio wings, which provides more lifting force at a relatively low airspeed. The UAVs employ high span chord ratio wings but tend to lose their manoeuvrability. Hence, they usually need larger turning radius and unable to maintain the altitude during sharp slope turning as the lifting force produced by the wings decrease dramatically when the bank angle is large. The discarding of the flight performances may risk the safety of the flight in plateau mountain regions. "The new variable thrust direction (VTD) technology is a type of thrust vectoring control (TVC) approach that allows to manipulate the directions of thrust to the fuselage of the aircraft," the authors noted in a paper published in the journal SCIENCE CHINA Information Sciences.

China starts first nuclear reactor in ethnic minority region

China has commissioned its first nuclear power plant in one of its ethnic autonomous regions as it rapidly expands the country's nuclear reactor network to cut down coal burning and CO2 emissions. The first reactor of the Fangchenggang Nuclear Power Plant in Guangxi Zhuang Autonomous Region can supply 24 million kilowatt-hours of electricity a day, catering to the needs of a medium-sized city, said Gong Guangchen, the plant's spokesperson. Based on the domestically developed CPR-1000, the reactor began generating power in October 2015. The plant's second reactor is expected to begin operating in the second half of 2016, Gong was quoted as saying by the state-run the Global Times. The energy produced by the reactor will also cut coal burning by 4.82 million tonnes and CO2 emissions by about 11.9 million tonnes every year. It is also expected to create 64,000 new jobs annually and contribute 8 billion yuan (\$ 1.2 billion) to the local GDP. China has suspended approval of new nuclear programs after Japan's Fukushima nuclear disaster in 2011 and construction projects did not resume until 2014. China currently has operating capacity of 25.5 million kilowatts and aims to raise installed nuclear power to 58 million kilowatts by 2020 in order to reduce pollution from coal-burning generators and deliver on its promise to reduce carbon emissions, the report said.

The Asian Age**02 January 2016**

China restructures 2.3 million-strong military

China has elevated the status of the strategic nuclear missile forces of its Army, Navy and Air Force and formed a new force to provide electronic and cyber intelligence backup for precision missile strikes in war, in a major overhaul of one of the world's largest militaries. In the newly-revamped structure of its 2.3 million-strong military, China's powerful missile force - the Second Artillery Corps (SAC) - which was formed in 1966 has been renamed as People's Liberation Army (PLA) Rocket Force (PRF) while a new PLA Strategic Support Force (SSF) has been formed. With a variety of short-, medium- and long-range nuclear and conventional missiles, China's missile force is regarded as one of the biggest in the world. On Thursday, China confirmed reports of the PLA conducting scientific tests of a railcar-based long-range missile capable of hitting targets across the US. Inaugurating the PRF and SSF, President Xi Jinping on Saturday conferred military flags on the general command of the two new units at a ceremony. CCTV said besides renaming the missile force, Mr Xi who is also the head of the military, elevated the status of the new force with the Army, Navy and Air Force. The two new forces will not be "subordinating forces". While the PRF with number of missiles will carry on as a strategic deterrence force, the job of the SSF will be to provide proper electronic intelligence to it in times war. The new forces, which are part of cyber warfare, will play in important role China's plans to win "information wars", it said. China's military which is in the middle of a massive anti-corruption campaign with about 40 top commanders under investigation is currently undergoing a big revamp of its command structure. Inaugurating the forces Mr Xi, who is the chairman of the powerful central military commission (CMC) which oversees all military forces, said the formation of the Rocket Force and Strategic Support Force is a major decision by the ruling Communist Party of China to realise the Chinese dream of a strong military.

The Indian Express**02 January 2016**

India, Pak Exchange List of N-installations

NEW DELHI: With the year ending on a high note for Indo-Pakistan relations, the neighbours conducted their diplomatic ritual of exchanging lists of nuclear installations and prisoners - a crucial confidence building measure between the nuclear-armed rivals. For the 25th consecutive year, India and Pakistan exchanged the lists through diplomatic channels in New Delhi and Islamabad on Friday. "This is the twenty-fifth consecutive exchange of such lists between the two countries, the first one having taken place on 1 January 1992," said the MEA press release. The exchange is based on the Agreement on the Prohibition of Attack against Nuclear Installations between India and Pakistan, signed on December 31, 1988, and which came into force on January 27, 1991. These lists are exchanged on the 1st of January of every calendar year. Similarly, the two countries also exchanged lists of prisoners, both civil and of fishermen, through the same channels. This is a half-yearly practice of giving each other the comprehensive list of nationals of the countries lodged in jails - implemented on January 1 and July 1. However, though this is supposed to be a routine exercise, there are often discrepancies in the lists.

Modi pitches for India's self-reliance in defence manufacturing

Prime Minister Narendra Modi today made a strong pitch for India's self-reliance in defence production, saying it has to be ensured that the weaponry and equipment its soldiers carry should be "the best in the world". "If India has to be self-reliant in the area of security, we have to make our own weapons," he said. "Indian Armed Forces are ready to make any sacrifice for the country and are second to none. But the time has come now to ensure that the weapons and equipment they carry and use are also the best in the world," he said addressing a gathering after laying the foundation stone for a Rs 5,000 crore greenfield helicopter project of HAL at Biderhalla Kaval in the district. The Prime Minister said imported weapons were expensive and India had to spend huge sums of money for defence acquisition. "We import weapons from other countries to equip our armed forces. India not only spends crores of rupees but also gets relatively not so latest technology," he said. To address the problem, Modi said, before striking a deal for import of weaponry India was now buying only a part of the order directly from the manufacturers and for the rest it was insisting on manufacturing it in the country. "We say we will buy the rest of what has been ordered only if it is made in India," he said. "Indian Armed Forces should be second to none. Its weaponry has to be second to none," he said. Describing the HAL helicopter project as a new effort towards making India self-reliant in defence production, Modi said he wanted the first totally indigenously produced helicopter to lift-off from the facility by 2018. "I have another dream that within 15 years of that lift off, 600 helicopters made here reach the Armed Forces, to the government for the benefit of the country," he said. He said the project is expected to bring in huge investments to Tumakuru district and generate 4000 jobs directly or indirectly. "What is being set up here is no ordinary factory and very soon this district is going to come on the world map," Modi said. The helicopter facility, for which Karnataka government has allotted 610 acres, will house composite parts manufacturing unit and helicopter transmission manufacturing unit. HAL will also build an integrated township. To begin with, HAL expects light utility helicopter to fly out from this facility once the plant gets ready. Advanced light helicopter Dhruv, multi-role new generation helicopter in 5.5 tonne weight class, indigenously designed and developed by HAL, will also be made at the facility. According to HAL Chairman and Managing Director Suvarna Raju, the facility, which will produce three to 10-tonne class helicopters, will boost to the country's aviation capability in the helicopter segment.

Mail Today

04 January 2016

'Indo-China ties are still complex'

WITH Prime Minister Narendra Modi and Chinese President Xi Jinping set to exchange visits this year, the two nations are looking to upgrade their relationship and build a more robust architecture to manage ties which still remain complex, India's outgoing envoy to China has said. Ambassador Ashok Kantha, who will complete his assignment in January 7, said 2016 would be "very active". Xi will be in India for the BRICS Summit - his second visit in three years, unusual for a Chinese President - and Modi will visit China for the G20 meet in September, little over a year after his first visit. Kantha said both the countries will step up engagement, having recognised the "need for dialogue of strategic character that's informal and fairly open". National Security Adviser Ajit Doval will visit Beijing on January 5 and 6 for informal strategic consultations, and will hold meetings with Chinese State Councillor Yang Jiechi, who is also his counterpart as Special Representative on the boundary. Vijay Gokhale, Ambassador to Germany - said both sides had in the past couple of years, under new governments, stabilised relations and "upgraded question, as well as Premier Li Keqiang. Kantha, who will be succeeded by another Mandarin speaking career diplomat-upgraded our strategic template for engagement". This was underscored in two key understandings reached during Xi's visit to India in September 2014 and Modi's May 2015 visit to China, when the two nations agreed to take forward "a closer developmental partnership", including a bigger role for Chinese investment in India, and to "manage their simultaneous reemergence in a mutually supportive manner keeping in mind each other's interests and concerns". At the same time, the relationship was still "complex", Kantha said. "Regarding the boundary question, the good news is we have been rather successful in maintaining peace and tranquility in the border areas," he said.

PM Abe pledges to keep Japan out of war

Japanese Prime Minister Shinzo Abe on Friday promised he will keep his nation out of war following the introduction of contentious new security legislation, a day after China announced it is building its second aircraft carrier. In September parliament in the officially pacifist nation passed security bills opening the door for Japanese troops to engage in combat overseas for the first time since the end of World War II. The legislation was met with strong public resistance at home with tens of thousands taking part in street protests, while also fuelling anger in China and on the Korean peninsula. Critics have warned that the changes could see Japanese troops dragged into far-flung foreign conflicts similar to the US invasions of Iraq or Afghanistan. "Under the new legislation for peace and security, we will prevent war by taking all possible preparations for any circumstances," Abe said in a New Year's message. "We have successfully built a foundation for handing down a peaceful Japan to the generations of our children and grandchildren." Abe's message came a day after China announced it was building its second aircraft carrier, which will have a displacement of 50,000 tonnes and carry China's indigenous J-15 aircraft along with other planes. Beijing has rapidly expanded its military in recent years, rattling its neighbours and attracting the attention of the United States, which is making a foreign policy "pivot" towards Asia. Relations between Japan and China -- Asia's two biggest economies -- have often been strained over competing claims of the Senkaku islands, or Diaoyu in Chinese. Last month, a Chinese coast guard ship which appeared to be armed with several cannon entered what Tokyo regards as its territorial waters near the disputed islands. Despite steps to improve ties, distrust remains high as China is wary of moves by Abe to raise Japan's military profile while Tokyo frets about Beijing's increasing regional and global assertiveness.

The Asian Age

04 January 2016

Need indigenous arms, says PM Modi

G.S. Srinivas

Prime Minister Narendra Modi emphasised the need to manufacture arms and ammunition for the Indian Armed Forces indigenously and to put an end to the country's dependence on imported weapons. After unveiling a plaque for HAL's new helicopter manufacturing unit at Bedirehalla Kaval village of Gubbi taluk in Tumakuru district on Sunday, he said, "To strengthen the hands of our soldiers, the government has started manufacturing defence equipment using our own research, engineering talent and scientists." He said, "After 'Jai Jawan, Jai Kissan', now it's time for 'Jai Jawan' to make our sainiks strong enough to compete with soldiers from other countries. Imported weapons are expensive and do not carry the latest technology. Our soldiers are ready to even give up their lives for the country, but we need to provide them the latest arms and ammunition. It is time to ensure that they carried the best weapons in the world. The 'Make in India' concept should be taken forward to make the country independent in all sectors," he said. Reiterating the need to manufacture all our defence equipment in the country, Mr Modi said that the helicopters built in Tumakuru will serve various purposes for soldiers, including carrying of war equipment and medicines to those stationed in remote areas. He said that the first helicopter built at the unit might fly in 2018 and hoped that it would produce 600 helicopters in 15 years. Around 4,000 families will get their livelihood directly or indirectly from the unit. "This will also be a platform to empower the poor and downtrodden according to the vision of Dr Babasaheb Ambedkar," he said. Karnataka chief minister Siddaramaiah said that the state government took several steps to start the helicopter unit, including providing 610 acres of land and clearing a high-tension wire line to the unit at a cost of Rs 54 crores. The government will support the growth of the unit as it will provide employment to thousands of people. The government will also focus on aerospace during the Global Investors' Meet scheduled in February. Defence minister Manohar Parrikar too spoke. Union Ministers H.N. Ananthakumar, D.V. Sadananda Gowda and G.M. Siddeshwar, state ministers G. Parameshwar, T.B. Jayachandra and R.V. Deshpande were present. However, people who were eagerly waiting for the scheduled air show, were disappointed when the HAL cancelled it at the last minute. But two helicopters that carried out some manoeuvres enthralled the crowds.

Consider promotion of Army officers absorbed in DGQA: HC

The Delhi High Court has directed the Union government to consider promoting the Army officers, permanently absorbed in the Directorate General of Quality Assurance (DGQA), affected by the bar which excludes them if they were superseded in the Army, irrespective of their work and performance in the DGQA. Allowing a bunch of writ petitions moved by five officers of Colonel rank, a Division Bench declared void and inoperative the relevant part of an impugned memorandum of April 23, 2010, and asked the Centre last week to set up the Quality Assurance Selection Board to appraise and consider their cases for promotion on the dates when they would otherwise have been eligible for it. The Bench, comprising Justice S. Ravindra Bhat and Justice Deepa Sharma, directed that the exercise would be completed within three months and the results made known to the petitioners within the period. The DGQA falls under the Department of Defence Production of the Defence Ministry. It provides quality assurance for an entire range of arms, ammunitions, equipment and stores supplied to Armed Forces. The petitioners complained that the memorandum was discriminatory, because their colleagues, some brought from the Armed Forces and other technical personnel, were considered for promotion purely on the basis of their merit, ability and functioning within the DGQA rather than judged on the basis of their previous performance under other employers. The petitions were filed by Col. K.P. Kumar, Col. G.S. Grewal, Col. Ajay Kumar Dass, Col. Suresh K. and Col. Naval Bhutani. In its 33-page judgment, the court said the impugned condition that the superseded officers could not be considered for promotion beyond a particular rank smacked of discrimination. Neither was there any consistent history of such bar, nor did the rationale have any nexus with the object of ensuring the promotion of most merited officers, it said. The denial of promotion was neither conducive to the object of promoting merited officers, nor would it subserve public interest, because it treated such officers as "virtual pariahs or outcastes", placing them in the limbo so far as promotion was concerned, observed the court.

DESIDOC

Mail Today

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IAF's new Deputy Chief Air Marshal takes over

IAF's new Deputy Chief Air Marshal Rakesh Kumar Singh Bhadauria took over the new position on Friday. Bhadauria returns to the air headquarter where he has handled the projects division in the past. He brings with him his reputation of being a fine officer who has excelled throughout his career spanning 35 years. He has commanded a Jaguar squadron and is an experimental test pilot with over 4,200 hours of flying experience. He has flown 25 types of fighter and transport aircraft. Bhadauria replaces Air Marshal SBP Sinha who has taken over as the new boss of central air command.

Border bonhomie - Indian and Chinese troops greeted New Year's to each other at the eastern Ladakh border outpost to mark the arrival of 2016. A ceremonial Border Personnel Meeting (BPM) was organised at the Chinese troops hut at Moldo Garrison of Chushul sector in eastern Ladakh. The Indian side was led by Brigadier Vijyant Yadav while the Chinese soldiers were represented by senior colonel Fan Jun. A cultural show by the Chinese side followed by lunch marked the New Year bonhomie.

Army exercise - A contingent of French soldiers will soon be in India to take part in joint drills with the Indian Army in the Rajasthan desert later this month. The exercise, named Shakti-2016, will be held at Indian Army's Mahajan Field Firing Ranges near Bikaner which is used for practicing military maneuvers. This is the third edition of Shakti where the focus will be on counter-terrorism operations. Troops from French (I) Motorised Brigade and Indian Army's Infantry unit will take part in the drills.

Why is Pathankot on target again?

Through the district pass the strategically important lone rail and road links to Jammu & Kashmir

Ajay Banerjee

An armoured vehicle moves near the Indian Air Force base that was attacked by terrorists in Pathankot on Saturday. A narrow plain (just 30-km wide) lies between the Himalayas and the international border with Pakistan. Located at the eastern edge of this plain and nestled in the foothills at an altitude of 1,090 feet is the militarily vital town of Pathankot. It is the northern-most district of Punjab that is located at the confluence of the boundaries of J&K and Himachal Pradesh. The narrow 30-km plain is clearly India's 'jugular vein' - the weakest point. India's military prowess at Pathankot and around is tasked to ensure dominance in the topography marked by fast-flowing seasonal rivulets and jungles. Through these 30 km pass the lone rail and road connection to J&K. The national highway connecting Jammu is the lone link across the Ravi, allowing military and civilian movement and so is the lone rail link that carries passengers to Udhampur and Katra. The air base at Pathankot had been attacked by the Pakistan Air Force (PAF) during the 1965 and 1971 wars. Today's attempt by terrorists to storm the base can be counted as the third attempt to target it even though it does not match the scale of the PAF attack. "Today's attack had the potential to cause damage to planes and helicopters at the base. Good that it was contained," says Commodore Uday Bhaskar (retired). Besides a MiG 21 fighter jet squadron, Pathankot is home to a squadron of attack copters that fly in tandem with ground-trawling tank regiments. The base also has UAVs, air defence guns and long-distance surveillance radars. A town having 1.56 lakh population, Pathankot houses Mamun cantonment, which is used as a launching ground. The Army has a division -some 15,000 men - complete with artillery guns and tanks. It is also the base for a new division which is part of the upcoming 17 Mountain Strike. Pathankot remains top priority for the IAF which has otherwise formed a formidable 'ring fence' of air fields like Adampur (Jalandhar), Halwara (Ludhiana), Bathinda, Sirsa and Ambala in Haryana and Suratgarh in Rajasthan. Air Commodore Kaiser Tufail (retired) of the PAF - known as an aviation historian - writes in his blog 'aeronaut' about the Pakistan design to damage the Pathankot runway. "In 1971, Pathankot was singled out for two successive raids," he says. SN Prasad in his book 'The India Pakistan War of 1965', an authorised account from the Ministry of Defence archives says the PAF, on the intervening night of September 6 and 7, 1965, launched an unusual attempt to destroy IAF aircraft and airfield installations. Paratroopers of the Special Services Group were air-dropped at night near Pathankot, Halwara and Adampur. Of the 180 Pakistani commandos, 136 were taken prisoner, 22 killed and the rest managed to escape.

Parrikar meets NSA - Defence Minister Manohar Parrikar on Saturday chaired a high-level meeting during which he was briefed in detail by National Security Adviser Ajit Doval on the terror attack. It was attended by the three service chiefs and the Defence Secretary. The meeting lasted 90 minutes during which Parrikar was given a detailed overview about the intelligence received and the action taken. The meeting focussed on the intelligence inputs received and the counter measures taken by the armed forces, including deployment of the NSG commandos, personnel of the special forces belonging to the Army and the IAF, besides regular soldiers.

The Times of India

03 January 2016

Modi sees 'Make in India' dream taking off through Tumakuru chopper unit

ENGALURU: Prime minister Narendra Modi on Sunday said he is seeing his "Make in India" dream getting realized in real sense as he laid foundation to the new helicopter unit at Bidarehalla Kaval in Gubbi taluk of Tumakuru district, about 100km from Bengaluru. Driving home the need for India to attain self sufficiency in defense production, Modi said though the country is spending huge amounts to import modern weapons from other countries, what we get most of the times are outdated technology systems. "There is a greater need to manufacture modern war equipment and tools that would help our soldiers to operate in today tough situations. The HAL unit in Tumakuru would go a long way in making India self reliant in manufacturing indigenous systems and make India self reliant in defense needs," he added. Defense minister Manohar Parikkar said the Tumakuru unit would launch its first chopper in two years and aims to manufacture 600 light utility helicopters, that would be added to defense wings, in the next 15 years. The unit will also provide 4,000 jobs with an investment of 5,000 crore from government of India.

Gun friendly texas becomes more trigger -happy

HOUSTON - Texas is so gun-friendly that it is easier to get into the Capitol in Austin with a firearm than without one - licensed, gun-carrying lawmakers and members of the public have their own no-wait security lane, and the unarmed masses have to stand in line and slog through the metal detectors. But on Friday, gun rights throughout the state expanded still more, as a new law took effect that allows certain Texans to wear their handguns in holsters on their hips - or in shoulder holsters, Dirty Harry-style - openly displaying the fact that they are armed as they work, shop, dine and go about their day. The so-called open-carry law has set off a long-simmering debate over the limits of the Texas gun culture and has given gun rights advocates a hard-fought victory after they pushed for the expansion for years. Members of the pro-gun group Open Carry Texas were to gather at noon Friday on the south steps of the Capitol for a gun-on-their-hips celebration before walking down Congress Avenue. Other groups plan to display their weaponry at events in Houston, Dallas and other cities. Stickers on one of the Grishams' cars indicate their pro-gun positions. Open carry supporters say more public weapons will help deter would-be criminals. Credit Ilana Panich-Linsman for The New York Times. "I think most people can expect Friday to be just like Thursday," said C. J. Grisham, 41, a retired Army sergeant who formed Open Carry Texas in 2013. He says he plans to carry two semiautomatic pistols at the Capitol rally, and gave his 13-year-old daughter a pink .22-caliber rifle for her 12th birthday. "I think everybody is overreacting." More than 40 states allow some form of open carry. But Texas will become the most populous open-carry state, and the public nature of the debate and vote has produced measures of elation, anxiety and confusion over the new law. The mixed emotions have prompted law enforcement agencies to hold public meetings and release informational videos to help put some residents at ease, particularly in the wake of high-profile mass shootings. Open-carry supporters say more public weapons will help deter would-be criminals. Opponents say that police officers will have a hard time separating the good guys from the bad, and that there is no evidence that open-carry states are safer.

The Hindustan Times

02 January 2016

China creates three new military units in push to modernize army

China has created three new military units and will update equipment as well as modernizing its command structure, state media said on Friday, as part of a major overhaul of the armed forces announced by President Xi Jinping in November. Xi's push to reform the military coincides with China becoming more assertive in its territorial disputes in the East and South China Seas. China's navy is investing in submarines and aircraft carriers and its air force is developing stealth fighters. At a ceremony on Thursday, Xi inaugurated a new general command unit for the army, a missile force and a strategic support force for People's Liberation Army (PLA), state news agency Xinhua said. State television showed Xi handing over a large red flag to Li Zuocheng, the new head of the land command force. Li was previously commander of the key Chengdu military region, which includes restless and strategically vital Tibet. The missile force is taking over from the Second Artillery Corps to control the country's nuclear arsenal but keeping the same commander, Wei Fenghe. Xinhua said Xi urged the new unit to "enhance nuclear deterrence and counter-strike capacity, medium- and long-range precision strike ability, as well as strategic check-and-balance capacity to build a strong and modern Rocket Force". His reforms include establishing a joint operational command structure by 2020 and rejigging existing military regions, as well as cutting troop numbers by 300,000, a surprise announcement he made in September. In a separate report listing the powerful Central Military Commission's recommendations on the reform process, Xinhua said the troop cuts will focus on non-combat personnel. Phasing out old equipment and developing new weaponry as well as reducing the number of models operated will be another big feature of the reforms, Xinhua said. China has been moving rapidly to upgrade its military hardware, but integration of complex systems across a regionalized command structure has been a major challenge. The troop cuts and broader reform program have proven controversial, though, and the military's newspaper has published a series of commentaries warning of opposition to the reforms and concern about job losses. Xi has also made rooting out deeply entrenched corruption in the military a top priority, and dozens of senior officers have been investigated and jailed.

China lands 'test flight' on artificial island in disputed South China Sea

China for the first time landed a plane on an artificial island it has built in a contested part of the strategic South China Sea, prompting Vietnam to accuse Beijing of "serious infringement" of its sovereignty. Chinese foreign ministry spokeswoman Hua Chunying said China conducted a "test flight" to check whether the newly-built airfield facilities met the standards for civil aviation. A civilian "test flight" landed on Fiery Cross reef of the South China Sea (SCS) which China calls Yongshu Jiao. There were, however, no details given about when it was conducted. Hua said the test flight was civilian in nature and added that the "relevant activity falls completely within China's sovereignty" dismissing Vietnam's protests. "China has indisputable sovereignty over the Nansha Islands and their adjacent waters. China will not accept the unfounded accusation from the Vietnamese side," she said, referring to the Spratly Islands by their Chinese name. The South China Sea is rich in natural resources. It is also a major shipping lane. Over half of the world's commercial shipping passes through the Indo-Pacific waterways - including one-third of the world's liquefied natural gas. China claims almost the whole of the South China Sea, resulting in overlapping claims with several other Asian nations like Vietnam and the Philippines, Malaysia and Brunei. They accuse China of illegally reclaiming land in contested areas to create artificial islands with facilities that could potentially be for military use. The Vietnamese foreign ministry said the airfield was built illegally on a part of the Spratly archipelago that lies within its territory. In Hanoi, the foreign ministry said it has handed a protest note to China's embassy and asked Beijing not to repeat the action. It described the flight "a serious infringement of the sovereignty of Vietnam on the Spratly."

The Tribune

02 January 2016

China revamps military as Prez Xi eyes 'strong force'

China has elevated the status of the strategic nuclear missile forces of its army, navy and air force and formed a new force to provide electronic and cyber intelligence backup for precision missile strikes in war. In the newly revamped structure of its 2.3 million-strong military, China's powerful missile force - the Second Artillery Corps (SAC) - which was formed in 1966 has been renamed as People's Liberation Army (PLA) Rocket Force (PRF) while a new PLA Strategic Support Force (SSF) has been formed. With a variety of short, medium and long-range nuclear and conventional missiles, China's missile force is regarded as one of the biggest in the world. On Thursday, China confirmed reports of the PLA conducting scientific tests of a railcar-based long-range missile capable of hitting targets across the US. Inaugurating the PRF and SSF, President Xi Jinping today conferred military flags on the general command of the two new units at a ceremony. CCTV said besides renaming the missile force, Xi, who is also the head of the military, elevated the status of the new force with the army, navy and air force. The two new forces will not be "subordinating forces". While the PRF with number of missiles will carry on as a strategic deterrence force, the job of the SSF will be to provide proper electronic intelligence to it in war times. The new forces which are part of the cyber warfare will play a vital role China's plans to win "information wars", it said. Inaugurating the forces, Xi said the formation of the Rocket Force and Strategic Support Force was a major decision by the ruling Communist Party of China (CPC) to realise the Chinese dream of a strong military and a strategic step to establish a modern military system with Chinese characteristics. It will be a key milestone in the modernisation of the Chinese military and will be recorded in the history of the people's armed forces, said Xi who is also the general secretary of the CPC. He said the PLA Rocket Force is a "core force of strategic deterrence, a strategic buttress to the country's position as a major power, and an important building block in upholding national security". - PTI

Starts first nuclear plant in ethnic region

China has commissioned its first nuclear power plant in one of its ethnic autonomous regions as it expands its nuclear network to cut down coal burning and gas emissions

The first reactor of the Fangchenggang Nuclear Power Plant in Guangxi Zhuang Autonomous Region can supply 24 million kilowatt-hours of electricity a day, catering to the needs of a medium-sized city

Iran-US ties scale new nuclear low

US accuses Iran of breaching accord, test-firing missiles, conducting ballistic programmes

Iran's President Hassan Rouhani has denounced possible new US sanctions against his country which could jeopardise a hardwon nuclear deal due to be finally implemented within weeks. In a letter to his defence minister, Rouhani said reports that the US Treasury Department planned to blacklist companies and individuals with ties to Iran's ballistic missile programme constituted "hostile and illegal interventions" that justified a response. The comments from Rouhani, who said the military should intensify its development of missiles, seemed to cause backtracking in Washington with reports that the White House had put the intended sanctions on hold indefinitely. In the five months since the nuclear deal was struck US officials said Iran has conducted two missile tests, one of which state media reported at the time, on October 11. Iran also recently aired television footage of an underground missile base. Hours after circulating a draft of proposed sanctions on Wednesday, however, the White House did not provide a timetable or even say that they would be put into effect. The New York Times reported Rouhani's action on Thursday came a day after the Obama administration sent to the Congress the draft of potential new sanctions against Iran over recent missile tests, which appeared to have violated a United Nations Security Council prohibition. Although no sanctions seemed imminent, the White House said on Thursday that they remained an option. The United States also accused Iran's Revolutionary Guards of recklessly and provocatively firing rockets 26 December in the vicinity of American warships in the heavily trafficked Strait of Hormuz, a vital international waterway bordering southern Iran that connects to the Persian Gulf. US officials said an Iranian vessel had testfired several rockets near three Western warships, including the USS Harry S. Truman aircraft carrier. It drew denials from Iran's Revolutionary Guards, who are responsible for protecting Iranian interests in the strategic waterway where much of the world's oil passes. An United Nations panel found earlier this month that the tests breached previous resolutions aimed at stopping the Islamic republic from developing missiles capable of carrying a nuclear warheads. But the threat of new sanctions ~ the nuclear deal is due to lift past measures that froze Iran out of the global financial system and crippled its oil exports ~ brought already worsening relations to a head. Spokesman General Ramezan Sharif accused the US of fabricating the incident as part of a "psychological operation". The Wall Street Journal first reported Wednesday that the US was preparing fresh sanctions against companies and individuals in Iran, Hong Kong and the United Arab Emirates over alleged links to Tehran's ballistic missile programmes. But on Thursday, the media said the measures had been delayed ~ although they remain on the table ~ over fears that the nuclear deal could be derailed. Were the Treasury to introduce the sanctions it would be a major barrier to the nuclear deal's formal enactment, let alone its durability. Rouhani, whose government negotiated the agreement with United States and five other world powers, warned of reprisals. Rouhani, who had pushed for the nuclear agreement, has been widely perceived as wanting improved relations with United States, a position that has angered some domestic rivals. Rouhani has been less confrontational compared with the supreme leader, Ayatollah Ali Khamenei, who endorsed the nuclear accord but warned that the United States could never be trusted and that new sanctions would be regarded as a violation.

Electric current at room temperature without energy loss soon

Tokyo: A group of researchers in Japan and China has found a clue to generate electric current without energy consumption at room temperature. They have identified the requirements for the development of new types of extremely low power consumption electric devices by studying a specific ferromagnetic thin film. At extremely low temperatures, this specific thin film shows a peculiar phenomenon. As the film itself is ferromagnetic, an electric current is spontaneously generated without an external magnetic field and electric current flows only around the edge of the film without energy loss. At extremely low temperatures, an electric current flows around the edge of the film without energy loss, and under no external magnetic field. This attractive phenomenon is due to the material's ferromagnetic properties. For the first time, researchers have revealed the mechanism by which this occurs. "Hopefully, this achievement will lead to the creation of novel materials that operate at room temperature in the future," said Akio Kimura, professor at Hiroshima University and a member of the research group. However, it was previously unknown as to why such specific film had such ferromagnetic properties that allowed it to generate electric current. "That's why we selected the material as the object of our study," professor Kimura added. The researchers expect that the finding will provide a way to increase the critical temperature for relevant device applications.

Defiant Iran pledges to boost missile plan

A series of Iranian officials vowed on Friday to expand Tehran's missile capabilities, a challenge to the United States which has threatened to impose new sanctions even as the vast bulk of its measures against Iran are due to be lifted under a nuclear deal. "As long as the United States supports Israel we will expand our missile capabilities," the Revolutionary Guards' second-in-command, Brigadier General Hossein Salami, was quoted as saying by the Fars news agency. "We don't have enough space to store our missiles. All our depots and underground facilities are full," he said in Friday Prayers in Tehran. Defence Minister Hossein Dehqan said Iran would boost its missile program and had never agreed to restrictions on it. "Iran's missile capabilities have never been the subject of negotiations with the Americans and will never be," he was quoted as saying by Press TV, an Iranian state channel. The defiant comments are a challenge for the administration of U.S. President Barack Obama as the United States and European Union plan to dismantle nearly all international sanctions against Iran under the breakthrough nuclear agreement reached in July. Iran has abided by the main terms of the nuclear deal, which require it to give up material that world powers feared could be used to make an atomic weapon and accept other restrictions on its nuclear program. But Tehran also test-fired a missile in October, which the United States says would be capable of carrying a nuclear payload and therefore violates a 2010 U.N. Security Council resolution which is still in place. Iran does not accept that the U.N. resolution bars it from testing missiles, as long as it has no nuclear weapons to place on them. The standoff has turned into a diplomatic and political test for both Washington and Tehran, even as the lifting of sanctions under the nuclear deal draws closer. Early in the new year, the United States and European Union are expected to unfreeze billions of dollars of Iranian assets, allow Iranian firms access to the international financial system and end bans that have crippled Iran's oil exports. The deal was a risky diplomatic achievement for both Obama and Iran's President Hassan Rouhani, leaders of countries that have been enemies for nearly 40 years. Both men are under pressure from hardliners at home to demonstrate that they have not compromised on wider issues. U.S. officials have said they are permitted to respond to the missile test by imposing fresh sanctions against a list of Iranian individuals and businesses linked to the missile program. Any such sanctions would be far narrower than the broad measures scheduled to be lifted under the nuclear deal. But Iran says any new sanctions could torpedo the wider accord. Republican lawmakers who control both houses of the U.S. Congress see the plans for new sanctions as a test of the Obama administration's resolve. The Wall Street Journal reported that an announcement of new U.S. sanctions was planned for this week but delayed for an unspecified period without explanation. Rouhani, a relative moderate elected in 2013, has insisted that the nuclear deal does not include any offer to reduce Iran's missile arsenal. On Thursday he ordered his defense minister to expand Iran's missile program. Iran's senior nuclear negotiator Abbas Araqchi said on Thursday Iran's October missile test did not violate the July nuclear accord, known as JCPOA. "There is a clear difference between the JCPOA issue and the missile test and the missile test is not a breach of the JCPOA in any way," he was quoted as saying by Press TV.

China starts 1st nuclear reactor in ethnic minority region

The first nuclear power plant located in one of China's ethnic autonomous regions has begun commercial operations of its first reactor that will cut coal burning and CO2 emissions and can create upto 64,000 jobs annually. The first reactor of the Fangchenggang Nuclear Power Plant in Guangxi Zhuang Autonomous Region can supply 24 million kilowatt-hours of electricity a day, catering to the needs of a medium-sized city, said Gong Guangchen, the plant's spokesperson. Based on the domestically developed CPR-1000, the reactor began generating power in October 2015. The plant's second reactor is expected to begin operating in the second half of 2016, Gong was quoted as saying by the state-run the Global Times. The energy produced by the reactor will also cut coal burning by 4.82 million tonnes and CO2 emissions by about 11.9 million tonnes every year. It is also expected to create 64,000 new jobs annually and contribute 8 billion yuan (\$1.2 billion) to the local GDP. China has suspended approval of new nuclear programs after Japan's Fukushima nuclear disaster in 2011 and construction projects did not resume until 2014. China currently has operating capacity of 25.5 million kilowatts and aims to raise installed nuclear power to 58 million kilowatts by 2020 in order to reduce pollution from coal-burning generators and deliver on its promise to reduce carbon emissions, the report said.

In fact: The rhetoric and reality of India-Pakistan peace

"Are not men strongest, who rule over land and sea and all that is in them," reads the ancient apocalyptic text, The First Book of Esdras? "But the king is stronger; he is their lord and master, and whatever he says to them they obey. If he tells them to make war on one another, they do it; and if he sends them out against the enemy, they go, and conquer mountains, walls, and towers. They kill and are killed." On December 25, Prime Minister Narendra Modi arrived in Lahore to attend the wedding of Prime Minister Nawaz Sharif's granddaughter. The grand gesture served an ambitious peace project: Prime Minister Modi aims, he recently told military commanders, "to turn the course of history". Esdras' warning, however, ought counsel him of the perils that lie ahead: the power to make peace lies in the hands of the country's real king, its Chief of Army Staff. The weekend's attack on the Indian Air Force base in Pathankot has placed General Raheel Sharif's intentions at centre stage. The group which carried out the attack, the Jaish-e-Mohammad, is closely linked to Pakistan's intelligence services. In India's intelligence community, many believe the attack was intended to send a message: that Pakistan's military knows India has no retaliatory options, and can ratchet up the pain if it doesn't get concessions on Kashmir. For New Delhi, the attack thus poses a serious question: does Pakistan's military want normalisation, or just a temporary peace on its eastern flank as it secures victory against internal enemies, and for its Taliban clients in Afghanistan?

PAKISTAN ARMY'S AMBITIONS - The simple truth in reply to the question is this: we don't know. The question, however, needs to be read in its historical context. Inside months of its independence, the scholar-diplomat Husain Haqqani has noted, the Pakistan army was "moving in the direction of adopting an Islamic ideological colouring". In 1960, General Ayub Khan, often cast as a secularising modernist, argued that Pakistan was the site for an Islamic experiment in welding together the spiritual and temporal into a state. For all the proclamations of fidelity to Muhammad Ali Jinnah's vision for Pakistan, no chief of army staff has replaced General Muhammad Zia-ul-Haq's military slogan, 'Iman, Taqwa, Jihad (Faith, Piety and Jihad)' with the founding father's choice, 'Faith, Unity and Discipline'. This is because the Generals, the scholar Christine Fair has noted, see India as an ideological, not military, problem: "to acquiesce (to India) is tantamount not only to defeating the Pakistan Army, but also... to eroding the legitimacy of the Pakistani state". Earlier this year, on a visit to Washington, DC, General Shareef made the point bluntly to US diplomats, saying normalisation with India meant surrender on Kashmir, something he was unwilling to acquiesce to. The brother of an officer killed in the 1971 war, Shareef's dislike of India is intensely personal. From an Indian optic, two steps would make clear Pakistan's military has, indeed, committed to a new strategic vision. The first would be legal action against the perpetrators of violence against India; the second, dismantling the military infrastructure of terrorist groups like the Lashkar-e-Taiba and Jaish-e-Muhammad. There's some evidence that Pakistan has acted against terror, prodded by the US. Ever since 2003, violence in Kashmir has declined steadily - and, notwithstanding commentary in the media, official statistics demonstrate it stayed in line with the low levels seen in recent years through 2015. Even violence levels, which showed an uptick through 2013 and 2014, showed a marginal decline. Ever since 26/11, moreover, there hasn't been a major terrorist attack outside J&K that has traced back to Pakistan. Indian Mujahideen jihadist Muhammad Ahmad Zavar Siddiqui, arrested by the National Investigation Agency, told investigators the ISI Directorate has placed severe restraints on anti-India operations. It is also clear, though, that the ISI hasn't kicked its jihad habit: the Lashkar-e-Taiba's attack in Gurdaspur earlier this year could have claimed hundreds of lives had landmines planted on a railway line exploded. In discussions with Indian interlocutors, Pakistan has said it hopes, in the long term, to defang organisations like the Lashkar-e-Taiba and Jaish-e-Muhammad by bringing them into political life. This is, however, a post-dated cheque, one held out to prime ministers from Atal Behari Vajpayee onwards. Pushed hard by the United States, which is fearful of a regional crisis, Modi has decided to take the chance.

RHETORIC AND REALITY - Is India prepared to negotiate the minefields along the road to peace? If there's some uncertainty about the Indian government's seriousness of thought, ministers have no one to blame but themselves. External Affairs Minister Sushma Swaraj, just months ago, was vowing no talks could take place as long as 26/11 perpetrator Zaki-ur-Rehman Lakhvi was out of jail. In December 2014, Defence Minister Manohar Parrikar warned of "strong action" against Pakistan if it didn't de-escalate within six months - and warned again, in January 2015, that Islamabad had not "learned its lesson". Prime Minister Modi's own twists and turns are legion: having come to power attacking Prime Minister Manmohan Singh's efforts at detente, he invited Prime

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In fact: The rhetoric and reality of India-Pakistan peace

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Minister Sharif to his oath-taking ceremony, then ordering a sharp escalation of retaliatory fire along the Line of Control, called off Secretary-level talks, signed the Ufa declaration, then backtracked after Pakistan said it would meet the Hurriyat, only to talk again. For years now, Indian politicians have drawn on the same rhetorical template. In the wake of the attack on Parliament House on December 13, 2001, Prime Minister Atal Bihari Vajpayee had promised an "aar paar ki ladai", or all-out war. Inside days, he expressed happiness that Pervez Musharraf "had extended a hand of friendship to me". Such jalebi-shaped discourse points to a deeper malaise. In 2001-2002, Vajpayee's military build-up did bring India gains in Kashmir, but at a military price unacceptable to both Pakistan and India. Pakistan's generals know India's search for economic growth has made it risk averse - and that this gives them opportunity. Modi knows, moreover, that the exhortations of his hawks offer little in terms of policy responses. India's armed forces, research by experts like Walter Ladwig has made clear, cannot win a decisive, short war. Air strikes or targeted assassinations wouldn't degrade terror infrastructure, and invite retaliatory attacks - which India's anaemic police and intelligence services are in no position to pre-empting. Like his predecessors, the Prime Minister has gone out to bat against hostile bowling without a helmet or pads. He may graft a few runs, but will have to bear agonising pain. He'll be tempted, often, to leave the game. It didn't have to be so. *Si vis pacem, para bellum*, the Roman author Publius Flavius Vegetius Renatus's taught in his treatise, *De Re Militari*: to ensure peace, prepare for war. Like his predecessors, Modi seems to have missed the second part of that lesson.

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New method to make fuel cells cleaner, efficient

Scientists have developed new ion-exchange synthetic membranes that could be used to make cleaner and more efficient fuel cells. Fuel cells use a reducing agent (usually hydrogen, methanol or methane) and an oxidising agent, oxygen, to convert energy of chemical reactions into electrical current. They consist of a cathode and an anode, separated by an ion-exchange membrane. Choosing the correct membrane plays an important role in improving fuel cells. The material that the membrane is made from must be as inexpensive as possible, chemically stable, technologically advanced, and its pores must provide adequate selectivity. The pore size is directly related to the efficiency of the fuel cell. These pores determine how efficiently ions are screened and energy is converted in a fuel cell. Scientists, including those from Moscow Institute of Physics and Technology and Moscow State University, were able to form pores from certain molecules for membranes of a fuel cell so that the opening is exactly the diameter required for the optimum functioning of the cell. The molecules called A-Na and Azo-Na are classified as benzenesulfonates, the researchers said. They are wedge-shaped and can independently assemble themselves into supramolecular structures - complex organised groups of multiple molecules. Depending on the conditions set by the scientists, the molecules form discs which in turn form columns with ion channels inside. This self-assembly of complex structures of individual molecules is possible due to their electrical properties. At one end of these molecules is a polar chemical group, ie a group with an electric charge, and in a solution it naturally turns towards charged water molecules. At the other end of these molecules there are non-polar hydrocarbon "tails" that again due to their electrical properties try to stay as far away from water molecules as possible. Scientists were able to predict the formation of these discs with pores and cylinders based on information on the structure, geometry, physical and chemical properties of the benzenesulfonates being studied. Using this information, the scientists first made a mathematical model based on the properties of complex supramolecular structures formed by A-Na and Azo-Na. During experiments, they obtained various different forms of ion channels maintaining the substances at a certain humidity and temperature, and then irradiating them with UV light for polymerisation. The polymers created with this method were tested for selective permeability of ions and this enabled the scientists to identify which conditions of the synthesis of polymer membranes are best suited for making potential fuel cells.

Gene editing tool to help treat muscular dystrophy

After decades of disappointingly slow progress, researchers have taken a substantial step toward a possible treatment for Duchenne muscular dystrophy with the help of a powerful new gene-editing technique. Duchenne muscular dystrophy is a progressive muscle-wasting disease that affects boys, putting them in wheelchairs by age 10, followed by an early death from heart failure or breathing difficulties. The disease is caused by defects in a gene that encodes a protein called dystrophin, which is essential for proper muscle function. Because the disease is devastating and incurable, and common for a hereditary illness, it has long been a target for gene therapy, though without success. An alternative treatment, drugs based on chemicals known as antisense oligonucleotides, is in clinical trials. But gene therapy - the idea of curing a genetic disease by inserting the correct gene into damaged cells - is making a comeback. A new technique, known as Crispr-Cas9, lets researchers cut the DNA of chromosomes at selected sites to remove or insert segments. Three research groups, working independently of one another, reported in the journal *Science* on Thursday that they had used the Crispr-Cas9 technique to treat mice with a defective dystrophin gene. Each group loaded the DNA-cutting system onto a virus that infected the mice's muscle cells, and excised from the gene a defective stretch of DNA known as an exon. Without the defective exon, the muscle cells made a shortened dystrophin protein that was nonetheless functional, giving all of the mice more strength. The teams were led by Charles A. Gersbach of Duke University, Eric N. Olson of the University of Texas Southwestern Medical Center and Amy J. Wagers of Harvard University. "The papers are pretty significant," said Louis M. Kunkel, a muscular dystrophy expert at Boston Children's Hospital who discovered the dystrophin gene in 1986. The dystrophin protein plays a structural role, anchoring each muscle fiber to the membrane that encloses the muscle-fiber bundle. The dystrophin gene, which guides the protein's production in the cell, sprawls across about 1 percent of the X chromosome and is the largest in the human genome. That gene has 79 sections, or exons, but can evidently maintain reasonable function even if a few exons in the middle are lost. The protein works as long as its two ends are intact. This is what happens in a milder disease known as Becker muscular dystrophy, in which mutations cause instructions from a few exons to be skipped during the protein-making process. In Duchenne muscular dystrophy, however, mutations cause muscle cells to make a truncated protein missing one end, and this protein does not work at all. This difference suggests a possible treatment strategy: removing damaged exons so Duchenne patients' muscle cells produce an intact, though shorter, dystrophin protein, much like that seen in Becker patients. A laboratory strain of mice has Duchenne-type muscular dystrophy in which a major part of the dystrophin protein is lost because of a mutation in the 21st exon of the gene. In 2014, Dr. Olson's team reported that it had been able to edit out the damaged exon, enabling muscle cells to generate a functional protein. That gene editing was done in the fertilized egg of the mouse, making an inheritable change to the mouse's genome. There is a moratorium on making such changes to the human genome, and in any case, such an intervention would come too late for muscular dystrophy patients. So Dr. Olson's next step was to see if he could produce the same result in the muscles of young mice. In the study published Thursday, Dr. Olson's team reported that they loaded the gene-editing system into a harmless virus, along with guides that directed it to cut the two ends of the 21st exon. The virus infected muscle cells throughout the mouse's body, snipping out the exon from the dystrophin gene. The muscle cells repaired the DNA by joining the pieces of the cut chromosome and generated an effective dystrophin protein. The two other teams performed almost exactly the same experiment, each pursuing a consequence of its own previous research. Dr. Gersbach's group reported earlier in 2015 that, with Crispr-Cas9 editing, they could remove the 45th to 55th exons of the dystrophin gene from Duchenne patient cells grown in laboratory cultures. With the damaged exons removed, the cells started to produce dystrophin proteins. More than 60 percent of Duchenne patients have mutations in these exons, so this approach could be significant for them. Dr. Wagers has long been interested in the stem cells that generate new muscle cells. Her team's experiment differed from the others in that it looked specifically at whether the gene-altering virus could infect these stem cells, and found that it could. Treating a patient's muscle stem cells could produce a more permanent result than changing ordinary muscle cells, which turn over at a brisk rate in muscular dystrophy patients, though not in healthy people. All three teams have filed for patents. But considerable work lies ahead before clinical trials can start. It is not clear how the human immune system would react to the components of the gene-editing system or to modified dystrophin proteins to which it has not been habituated. If a gene therapy for muscular dystrophy can be developed, it will compete with the antisense

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Gene editing tool to help treat muscular dystrophy

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oligonucleotide drugs that are already in clinical trials. These work on the same principle of avoiding damaged exons, but instead of cutting them out of the DNA, they force the exons to be skipped at a later stage of the protein manufacturing process. The drugs do not target the heart muscles very well, however, and they must be given weekly. A gene therapy treatment should last longer. "The advantage of the DNA approach is that the cell has no choice but to make the protein you want," Dr. Wagers said. Some fear that Duchenne patients may get only one shot at treatment before developing resistance to the virus used to edit the defective exons. But Dr. Gersbach played down this concern. "The hope for gene editing is that if we do this right, we will only need to do one treatment," he said. "This method, if proven safe, could be applied to patients in the foreseeable future." Dr. Olson also said that progress would be rapid. "To launch a clinical trial, we need to scale up, improve efficiency and assess safety," Dr. Olson said. "I think within a few years, those issues can be addressed."

Deccan Herald

02 January 2016

They can sense 'almost anything'

By Madhukar Putty

SCIENCE SOLUTIONS Madhukar Putty writes about emerging advances in sensor technology that may change the phase of health sector in the long run. When you take a photo with a simple digital camera, the camera sets a few parameters depending on the amount of light in the environment. But how does it get to know the 'amount of light?' Behind the scenes, there is a device that can 'sense' the intensity of light. Similarly, there are devices that can sense different things - temperature, pressure, motion etc. It's not an exaggeration to say that sensors are one of the most fundamental units of an increasingly connected world in which we thrive. "If you have a fibre Bragg grating, you can sense almost anything," says Sundarrajan Asokan, professor at the Department of Instrumentation and Applied Physics in Indian Institute of Science, Bengaluru. In the last decade, his work on, what are called, the fibre Bragg gratings has resulted in remarkably sensitive sensors for a wide variety of applications. When he says, "one can 'sense almost anything' with a fibre Bragg grating," he means it. The sensors created by him can measure your pulse pressure, can sense if an elephant is approaching or moving away, can reliably catch onto a specific biomolecule in blood, and can even detect if a tsunami is developing beneath the vast Indian Ocean. Some of the sensors, specially developed for the Aeronautical Development Agency under the Development Initiative for Smart Aircraft Structure programme, can replace long electrical cables in the wings of the aircraft and can constantly monitor the structural health of the wings. He, along with researchers from the Department of Civil Engineering, has developed sensors that monitor the structural integrity of bridges. Recently, his lab has also come up with sensors to detect harmful gases like carbon dioxide and nitrogen dioxide. The fibre Bragg grating is the dark horse of Sundarrajan's work. Called the FBG, in short, the fibre Bragg grating is a highly skilled makeover of an optical fibre that delivers high speed internet to our houses and offices. The interesting property they exhibit is that they reflect one wavelength, like a mirror, and allow other wavelengths to pass through, like a piece of transparent glass. Optical fibres are mainly used in electronic communication, and Sundarrajan's is one of the few labs in the country that study them for sensing purposes. Sundarrajan has also successfully combined futuristic materials like graphene with the FBG to create ultrasensitive biosensors. He and his collaborator, Prof Ajay Sood, removed the outer layer of the optical fibre and put a single layer of reduced graphene oxide to form the 'etched fibre Bragg grating'. Using this configuration, the team developed a sensor to detect 'C-reactive protein', a protein which is produced in excess during infections. An above normal C-reactive protein level is a reliable biomarker for inflammations and cardiovascular diseases. Sundarrajan and Ajay are working to develop this technology into a full-fledged, yet handy, medical diagnostic kits.

Health applications - With more than six crore diabetics, India has the second highest number of people affected by diabetes. Looking at the current trend, the number may reach 10 crores by 2030. More alarmingly, more than 40 lakh Indians, aged

Type 2 diabetes increases dementia risk

People with type 2 diabetes are at higher risk for dementia in general. And for one form, called vascular dementia, diabetes brings more risk to women than men, according to a new review. The most common cause of dementia is Alzheimer's disease, which is non-vascular, said senior author Rachel R. Huxley of Curtin University in Perth, Australia. Nonvascular means it's not related to problems with blood vessels. "In Alzheimer's disease, nerve cells throughout the brain die off, and abnormal proteins accumulate in the brain for reasons not entirely known," Huxley said. "Vascular dementia, in contrast, is the result of impaired blood flow to the brain, usually by a series of small, imperceptible strokes." Diabetes in women seems to confer more risk for other conditions as well, Huxley said. "These findings add to the evidence that diabetes confers a greater vascular hazard in women compared with men," Huxley told Reuters Health by email. "Diabetes confers a greater risk of developing heart disease, stroke and now vascular dementia in women compared with men." The authors reviewed 14 studies involving a total of more than 2 million individuals, including more than 100,000 dementia patients. They reported their findings in *Diabetes Care*. Overall, people with diabetes were 60 percent more likely to develop any dementia than people without diabetes. Women with diabetes were more than twice as likely as those without it to develop vascular dementia, compared to a smaller increase in risk for men with diabetes. There need to be more research into how sugar in the blood interacts with the blood vessels and whether that process is different in women in men, Huxley said. Women tend to be undertreated for vascular risks relative to men, she noted. "We can't definitively say whether the relationship is causal or not because the studies were all observational (rather than randomized trials) and therefore there always remains the possibility that the relationship is confounded," Huxley said. A third factor, like obesity, could have been part of the relationship between diabetes and dementia, she said. Keeping fit, maintaining a healthy diet, quitting smoking and giving your brain as well as your body regular workouts can help decrease the risk of dementia for people with diabetes, Huxley said.

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Better days ahead for Bharat Electronics

Government-owned defence equipment manufacturer Bharat Electronics Limited (BEL) is expected to outperform the broader indices in the next two years. The stock, a multi-bagger for investors since 2014, thanks to the government's renewed focus on the defence sector, could gain thanks to the defence capital budget of Rs 94,600 crore. Also, with home-grown companies expected to benefit from the new defence policy (likely in January 2016), Vijay Gyanchandani of Way2Wealth believes BEL, which holds a 37 per cent market share (despite the privatisation drive in FY07), is poised to capture a larger share in the defence space. "BEL has the right execution power and scale and if the government executes its defence plans, BEL has to be the forerunner," he says. Stretched timelines for approval from clients has impacted the revenue growth of BEL. Historically, its revenues have expanded by a mere four per cent. However, the first half of FY16 saw revenues grow seven per cent on a year-on-year basis. Earnings before interest, taxes and amortisation (Ebitda) doubled, thanks to improved operational efficiencies and margins expanded from three per cent to seven per cent. Profits doubled (Rs 267 crore) in the first half of FY16 were helped by other income (mainly dividends of Rs 263). Outsourcing non-core products and reduced dependency on foreign technology due to better utilisation of in-house talent pool has helped improve operational performance. Research and development cost has steadily climbed from 3.6 per cent in FY07 to eight per cent in FY15. Raw material and employee costs (85 per cent of total cost) might, however, remain a drag on Ebitda. Being a 'zero debt' public sector firm could support BEL's working capital requirement as its scale of business increases. An impressive order book (Rs 21,648 crore as on October 1), which translates to 3.1 times a book to bill ratio, is a key positive for BEL. Analysts have raised the FY17 earnings growth estimates by 10-12.5 per cent, as BEL expects order flows of Rs 15,000 crore in FY17. Trading at 21 times its FY17 price to earning ratio, BEL's stock holds the potential for investors wanting to cash in on India's defence theme. Analysts believe at current valuations, BEL is at a discount to global defence companies, trading at 24-25 times the price to earnings ratio, hinting at further room for re-rating the stock.

Looking Beyond the Internet of Things

If you have sent email on Google or used Microsoft's browser or databases, you have touched the technology handiwork of Adam Bosworth. Mr. Bosworth, a tall and grizzled but still trim 60-year-old, is a Johnny Appleseed of sorts in the tech industry, with a penchant for being intimately involved in the creation of generations of widely used technology. While it is never easy to predict what the next big thing will be, identifying what Mr. Bosworth is working on is always good for clues. Right now, along with competitors at companies like Amazon and Google, he is building what some call a "data singularity." Imagine if almost everything - streets, car bumpers, doors, hydroelectric dams - had a tiny sensor. That is already happening through so-called Internet-of-Things projects run by big companies like General Electric and IBM. All those devices and sensors would also wirelessly connect to far-off data centers, where millions of computer servers manage and learn from all that information. Those servers would then send back commands to help whatever the sensors are connected to operate more effectively: A home automatically turns up the heat ahead of cold weather moving in, or streetlights behave differently when traffic gets bad. Or imagine an insurance company instantly resolving who has to pay for what an instant after a fender-bender because it has been automatically fed information about the accident. Think of it as one, enormous process in which machines gather information, learn and change based on what they learn. All in seconds. "I'm interested in affecting five billion people," said Mr. Bosworth, a former star at Microsoft and Google who now makes interactive software at Salesforce.com, an online software company that runs sales for thousands of corporations. "We're headed into one of those historic discontinuities where society changes." It is lofty language, no doubt, but he and others believe they are on the brink of one of the next big shifts in computing, perhaps as big as the web browser or the personal computer. But building an automated system that can react to all that data like a thoughtful person is fiendishly hard - and that may be Mr. Bosworth's last great challenge to solve. It is difficult to say just how big this business could be, but there are two good indicators: Analysts at Gartner estimate that by 2019 retail cloud computing - the data center side of the equation Mr. Bosworth is working on - will double in size, to \$314 billion. The sensors on objects will be a \$2.6 trillion business, an increase of 250 percent, Gartner estimates. Mr. Bosworth went to Harvard with Bill Gates, where he took just one class in computers while studying Asian history. He nonetheless landed a job on Wall Street, where he persuaded his bosses to give him \$1 million for minicomputers - the cutting edge of computing before personal computers - that could deliver the first instant reports on how business was doing. He got interested in tech's next big thing, PCs, and wrote an early spreadsheet program. He joined Microsoft in 1989. His first years there were spent on databases, but as the Internet got big he helped turn browsers from software that looks up web pages to software that interacts with the web. He and Mr. Gates repeatedly argued over the importance of the Internet, according to people there at the time. Mr. Gates may also have goaded Mr. Bosworth, knowing he is the sort who does not like to be told something is not possible. "He sees out into the future, but not too far that you can't build something," said Brad Silverberg, a Seattle venture capitalist who has known Mr. Bosworth since 1981 and was his boss at Microsoft. "If you want to make sure something gets done, tell him not to do it." The son of a demanding private school headmaster, Mr. Bosworth also clashed with Larry Page, Google's co-founder and chief executive, while working there on interactive software and a failed effort to build online health services. "We had styles that weren't synergistic," said Mr. Bosworth. "He looks intensively at massive amounts of data-gathering, and assumes he'll be able to do something with it using math. I was focused on getting people to communicate with other people." Looking Beyond the Internet of Things He left Google in 2007 to start Keas, an online health management company. He left in 2011 for Salesforce, but is still on Keas's board.

PM for adoption of five E's in scientific research

Prime Minister Narendra Modi on Sunday called for adoption of five E's, namely economy, environment, energy, empathy and equity, to develop desi scientific research. Addressing the 103rd Indian Science Congress in Mysuru he said he was encouraging greater scientific collaboration between Central and State institutions and agencies as part of cooperative federalism. "We will make it easier to do science research in India," said Modi, as the annual five-day mega science event began on the Manasa Gangotri campus of the University of Mysore with over 500 eminent scientists and experts from the country and abroad scheduled to address the meet. The Prime Minister raised the challenges of rapid urbanisation and asked the scientific community to address them as it would be critical for a sustainable world. "Cities are the major engines of economic growth, employment opportunities and prosperity. They account for more than two-thirds of global energy demand and result in up to 80 per cent of global greenhouse gas emission," he said. "What we do on land, but also on how we treat our oceans", he said, adding the Government had increased focus on ocean or blue economy. "We will raise the level of our scientific efforts in marine science," he said. Modi said better scientific tools must be developed to improve city planning with sensitivity to local ecology and heritage and affordable and practical solutions found for solid waste management. Noting that yet another revolution of empowerment and opportunities in India had been launched, Modi said, "We are once again turning" to the country's scientists and innovators to realise the goals of human welfare and economic development. "Our success spans from the core of the tiny atom to the vast frontier of space. We have enhanced food and health security and, we have given hope for a better life to others in the world," he noted. As the level of our ambition for our people was being increased, the scale of the efforts would also have to be increased, the Prime Minister said. In this context, he referred to good governance and said it is about integrating science and technology into the choices to be made and the strategies to be pursued. "Our digital networks are expanding the quality and reach of public services and social benefits for the poor," he said. Underlining that innovation must also drive the scientific process, Modi said, "We succeeded in bringing innovation and technology to the heart of the climate change discourse." "Innovation is important not just for combating climate change, but also for climate justice. We need research and innovation to make clean energy technology available, accessible and affordable for all. We need innovation to make renewable energy much cheaper, more reliable and easier to connect to transmission grids," he said. The five-day science carnival, Indian Science Congress is returning to Karnataka after a 13-year hiatus with Mysuru hosting the event after a 34-year gap at a time when the University of Mysore is celebrating its centenary. The Congress' focal theme is "Science and Technology for Indigenous Development in India" in tune with Modi's big push for "Make in India" programme. Later in the day, Prime Minister laid the foundation stone of a new helicopter manufacturing unit of Hindustan Aeronautics Limited (HAL) at Bidarehalla Kaval in Tumkur district in Karnataka and made a strong pitch for Make in India programme. He said the new HAL factory would produce desi helicopters to safeguard the borders of the country. "In an era where defence forces required the best and latest equipment to firmly secure the borders of the nation, this village in Gubbi taluk would be producing the helicopters for the Indian forces," he said. Modi hoped that Rs 5,000 crore Helicopter Manufacturing unit of the public sector Hindustan Aeronautics Limited would create job opportunities to many and said first helicopter will be airborne by 2018. He recalled former Prime Minister Lal Bahadur Shastri's famous slogan - 'Jai Jawan, Jai Kisan' and said that in the last fifty years, a lot of progress had been made in agriculture, and the country is now self-sufficient in food grains. Lauding the Indian Armed Forces, he said that they were second to none, and now the time had come to ensure that the weapons and equipment they carried and used were also the best in the world. "For this India needed to end dependence on imported weaponry, which is expensive and is not of the latest technology," Prime Minister Modi said. He added that the Union Government has decided to lay stress on manufacturing of defence equipment and that the helicopters manufactured in Tumkur will serve soldiers stationed in remote locations.

Knowledge, info ammunition of new age, says PM

Prime Minister Narendra Modi greets Chief Minister Siddaramaiah during the birth centenary celebrations of Shivaratri Rajendraswami in Mysuru on Saturday. Also seen are Governor Vajubhai Rudabhai Vala and Suttur seer Shivaratri Deshikendra Swami. Prime Minister Narendra Modi has said that knowledge and information are the new ammunition in the new age and India's sages had realised this thousands of years ago. Inaugurating the centenary celebrations of the late seer of Suttur mutt Shivaratri Rajendra Swami at Maharaja's College grounds here on Saturday, the prime minister said that one cannot run a nation with just money and military power. "The world understands that knowledge is power and it has been accorded utmost importance in India since ages. Now, technology is so advanced that innovations are surpassing our dreams and imagination. But, can we expect miracles in the field of knowledge and information? That is why seers and pontiffs are establishing seats of higher education. The spiritual and religious institutions are actually doing what the governments should be doing. They are helping ease the government's burden," he said. Recalling the unveiling of a statue of social reformer Basaveshwara in London recently, Modi said that he was happy to be associated with the legacy of the great reformer by visiting the Suttur mutt, which is a major centre for prorogating Basaveshwara's principles. "Today, we are talking about democracy, social equality and women's empowerment, but Basaveshwara not only preached them, he practised them some 900 years ago. Whenever society was treading a wrong path due to degeneration of values, our saints have emerged as reformers and have saved society," he said. Describing Mahatma Gandhi as a saint, Modi said that the saints emerged as leaders in the 20th century and stepped out to reform society through education and social movements. "Even the 1857 uprising was influenced by spiritual leaders, while it was taken to a logical end in 1947, again by a saint," he said. Earlier, the prime minister inaugurated a new building of Sri Ganapathy Sachchidananda Hospital on the premises of Sri Avadhoota Datta Peetha.

The Asian Age

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CIC: Email IDs of govt officers can't be sought via RTI

Email IDs of all government officials cannot be provided under the Right to Information Act as it could cause a serious security threat, the CIC has ruled. The full bench of the Commission, however, directed the NIC to quickly complete a web directory carrying email IDs of officials dealing with public issues in the larger public interest. "Providing the list of all email IDs in a CD format could pose a security threat as well as the risk of disruption of essential public services by making the information susceptible to misuse/abuse," the bench comprising information commissioners Basant Seth, Yashovardhan Azad and Sridhar Acharyulu said. It also said the government has to make sure that the emails and websites of its ministries and departments do not become targets for anti-social elements "within and beyond the country". The bench said that on a "practical and possible logical front," the apprehension of the NIC, while withholding the email IDs of all the officials, cannot be completely overlooked because "availability and access to such wide array of information leaves scope for misuse and abuse of the same at the hands of any person". "Apart from random mischief mongers or technical geeks or harmless but curious persons who may disrupt the entire cyber network by irresponsible handling of the information viz. the list of email IDs; the country actually runs a far greater risk of exposing itself to inimical, hostile nations, waiting to harm national security and interest by triggering a cyber attack or even worse, hacking into the systems and obtaining valuable confidential information of national importance," the order said. Rejecting the plea of Maniram Sharma, the bench said there is a high possibility of misuse of information if the email addresses of public authorities are released in a consolidated CD form. "The respondents have repeatedly voiced their apprehension that such disclosure of information could make the government Internet network vulnerable to cyber attacks in the form of humongous amount of unwanted interest communications sent from fake IP addresses, choking the government network and blocking access of the NIC servers," it said. The Commission lauded the efforts of the government for its project to centralise all official communications by creating a hub on single platform. "Such a development, in larger public interest augurs well for the cause of transparency and also caters to the demand of the appellant. "Believing that directory is being developed under the vigilant and watchful government set up, we require the aspects of national security and larger public interest and public reach shall be adequately addressed," it said.

IIT-M: designer alloys by chemical reactions

Clusters of gold and silver react spontaneously to make alloy clusters. Nothing whatsoever will happen if large chunks of silver and gold kept in proximity even for infinite period. But the same cannot be said when the two metals are at nanoscale. A path-breaking work by a team led by Prof. T. Pradeep, Department of Chemistry, IIT Madras has shown that two nanoscale pieces of metals react spontaneously at room temperature even in solution to make new alloys of well-defined composition. The study was published recently in the Journal of American Chemical Society (JACS). "This means that metals with well-defined properties may be created in solution, just by chemical reactions. From a scientific perspective, this study shows that nanoparticles are similar to molecules and reactions between them can be written like chemical reactions: $A + B \rightarrow C + D$. This is a big step forward in the chemistry of nanomaterials," said Prof. Pradeep. "So far we wrote such reactions only with organic and inorganic molecules, as: $2H + O \rightarrow 2H_2O$. Alloys are made mostly by heating the constituents, often to high temperatures. But in this case, the researchers have been able to make alloys in solution at room temperature with precise composition control, to the extent that each atom is controlled. The team of researchers led by Prof. Pradeep has shown that nanometre-sized particles or clusters of gold and silver react spontaneously in solution at room temperature to make alloy clusters of precise structure and composition. "Metal clusters comprise a few atoms of matter and are very different from their bulk powders. Reactions happen between clusters and not between bulk powders of gold and silver. This is because nanomaterials are 'metastable' and are more reactive than their bulk counterparts," he said. As a result, clusters of gold and silver produce new alloys when in solution. The clusters of gold (Au) and silver (Ag) used in the study were Au₂₅ and Ag₄₄. These are precise molecules composed of 25 atoms of gold and 44 atoms of silver respectively, and are under 2 nanometres in diameter. A chemical reaction between Au₂₅ and Ag₄₄ in solution will give rise to alloys of AgAu and AuAg composition. The reaction can be represented as: $Au_{25} + Ag_{44} \rightarrow AgAu_{24} + AuAg_{43}$. In this case, the reaction products are alloys of precise composition. "The final composition of the product will depend on the composition of the reactants. So more of Ag and less of Au will give rise to an alloy of Ag type," Prof. Pradeep explained. Such reactions may be made to happen to make alloys of many different metals such as platinum, palladium, iridium, nickel, etc. and new materials may be made, all in solution, at room temperature. "The excitement in nanotechnology is due to the unusual properties of materials when sizes of particles reduce to nanometres. This happens because of 'electronic confinement' - an effect when electron motion is limited to extremely short distances, of the order of nanometres," he said. This kind of reactions would mean that metallurgical processes may be done differently tomorrow. "Many nanoscale materials have new properties which are useful in catalysis. They could be luminescent or magnetic. Designer alloys with new properties may be made by these reactions," he added.

The Tribune

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Doing scientific research to be made easier, says Modi

By Shubhadeep Choudhury

Hinting at increase in government's budgetary support for science research in certain areas, Prime Minister Narendra Modi today said the government would try to increase the level of resources for science and deploy them in accordance with the country's strategic priorities. Modi, who was speaking at the inaugural session of the Indian Science Congress being held on the campus of Mysore University here, said the government would make it easier to do science research, improve science administration and improve the quality of science education and research in the country. The Prime Minister also revealed that a framework of scientific audit for scientific departments and institutions in the government was being formulated under his instructions. He also spoke at length about the utility of traditional knowledge for addressing modern-day problems. Harnessing of traditional knowledge was a must to achieve harmony between human and nature, he said. Modi, who was addressing a gathering of distinguished scientists, including Nobel laureates, said traditional knowledge held the secrets to "economic, efficient, and environment-friendly solutions" to many of the problems of current days. "Like traditional knowledge, science has also evolved through human experiences and exploration of nature. We must recognise that science, as we see it, does not constitute the only form of empirical knowledge about the world," he said. The PM said the impact of science would be maximum if scientists kept the principle of "Five Es" at the centre of their research. The "Five Es", according to Modi, were "Economy, Environment, Energy, Empathy and Equity".

To keep or discard?

By usha raman

Books add to the knowledge we acquire through our degrees. Filter the notes before you do away with them. One of the things we do when we move from one term to the next is to clear out our notes and papers from previous courses to make room for what is to come in the next semester/term. If we have taken only sparse notes or no notes at all, this is not a problem, but if you're the kind who takes detailed notes and meticulously files all the handouts, and in addition acquires all the recommended books, this can be quite a task. How do you decide what you need and what you can discard? The answer, of course, depends on the kind of degree/programme you are pursuing. Most programmes are designed in such a way that the knowledge and skills gained in each semester or year build upon the previous one. So courses are planned in a sequential fashion, the simple or foundational ones offered in the first year, the intermediate ones in the second year and the advanced levels in the final year (for a typical three-year degree course). Our understanding of a particular subject deepens and the way we engage with it becomes more complex as we progress across the course series. But, we also assume that the information that we have been exposed to in one semester/year is not needed for the next. After all, in school, we're used to giving away our textbooks to our juniors or our younger siblings when we move on to the higher class. We rarely look back at class VII social studies or science texts when we move on to high school. When we come to college, however, books and notes serve a slightly different function. Yes, they are aids to passing an examination and demonstrating our mastery of the material in tests, but they also form the substance of the expertise we are gaining - whether in a technical or theoretical area. The problems in an engineering textbook or the case discussions in an area of law, or even the literary classics we read as part of a criticism course, all add to the knowledge bank we are supposed to be holding when we get a degree in that subject. It's entirely possible that a test or an assignment in the third year draws on some of the material that we may have encountered in a previous year. It is also possible that to understand something in third year, it would help to go back to our notes from an earlier class. These days, some of us keep our notes in digital form and use e-books, so the problem of clutter does not arise (although digital clutter is also something to watch out for). But, if we're still using paper notes and "dead-tree" books, as I would guess many still do, we may worry about not having enough shelf space to accommodate all our stuff. So the natural urge is to junk everything as soon as the exams are over and we are reasonably certain we won't have to appear for a supplementary. You may wish to resist that urge for a few more years, and, instead, put those books and papers in a safe place for a while. Maybe not all of them, but the material that relate to crucial or core courses - the course you consider your main reason for being in the programme. I'm not suggesting you turn into a hoarder. You need to subject your notes through a process of filtering and keep only the important things. Here's a checklist that could help.

DISCARD IF: The material is easily available on the web, The information is of the kind that gets outdated quickly, It deals with concepts that have nothing to do with your main subject, It is not in good condition, Your writing is messy and makes no sense to you, It made no sense to you even when you were doing the course,

KEEP IF: It includes many of your original ideas, It has been preserved well and your notes are legible, There is a clear link with the courses you are doing now, It deals with abstract information that does not go out of date. The books are not easy to find in the market, Another reason to keep notes and books is the possibility that you might go in for a higher degree, and, maybe, teach later on, I often look at my notes from my master's courses when I am preparing for a lecture. I've even loan my old notes to students, As for digital notes and e-books... the issue with those is not whether you keep them or not, but how you label and save them so that you can retrieve them easily when needed. But that's another discussion entirely!

Einstein theory faces rare radio signal test

Scientists have developed a new way to test one of the basic principles of Einstein's theory of General Relativity using brief blasts of rare radio signals from space. The new method using radio waves, called Fast Radio Bursts, is ten to hundred times better than previous testing methods that used gamma-ray bursts, researchers said. The method is considered to be a significant tribute to Albert Einstein on the 100th anniversary of his first formulation of the Equivalence Principle, which is a key component of the theory of General Relativity. It also is a key component of the concept that geometry of spacetime is curved by the mass density of individual galaxies, stars, planets and other objects. Fast Radio Bursts are super-brief blasts of energy - lasting just a few milliseconds. Until now, only about a dozen Fast Radio Bursts have been detected on Earth. They appear to be caused by mysterious events beyond our Milky Way Galaxy, and possibly even beyond the Local Group of galaxies that includes the Milky Way.

Splitting Internet into walled networks

Internet.org states that the goal of the Facebook-led initiative is to provide access and benefits of connectivity to two-thirds of the world, which doesn't have it, an objective governments across the globe and the civil society have been trying to achieve and no one would have any objection to that. But when Free Basics, a bouquet of select sites, including Facebook, is offered as the answer to the problem of access, that is treating the citizens of the global south as "less equal" who don't deserve the entire open Internet. The Internet as we know today is dominated by a few monopolies, whether it is Facebook for social networking or Google for search purposes. These monopolies have emerged in a relatively short period upsetting their competitors, be it MySpace or AltaVista. Their success was due to the open nature of the Internet permitting anyone to innovate without permission and the whole world being able to access their services. Facebook clearly sees that in order to continue its domination in the social networking space, it needs to expand in the global south. Its user base is reaching saturation in the developed world and the growth would have to be driven by the users in the developing world. At present, Free Basics is claimed to be offered in 37 countries in Africa, Asia Pacific and Latin America. The intention is thus very clear. Facebook and any other corporate entity can design any method to increase its user base so long as it does not run foul with the law. The problem, however, is when corporate interests are camouflaged in the name of public interest of providing access. Civil societies from countries across the world were quick to see through Facebook's intentions and opposed it. Internet.org, offered in partnership with Telenor in Pakistan, met with opposition from the civil society there as they said that it curtails innovation and jeopardises the growth of the Internet in the country. Facebook has dealt with the opposition through huge advertising and PR campaigns, often trying to discredit the opponents. Nations across the world have identified increasing Internet access and connectivity as a key focus area for ensuring development and has firmed up their commitment in the "Tunis Agenda" approved at the World Summit on Information Society in 2005. In India, we have seen many governments, from the Centre to the block level, like in Kerala, which offer free Wi-Fi. Digital literacy Civil society organisations have also carried out various programmes across the country to improve digital literacy. While Facebook's Mark Zuckerberg has cited the case of one Ganesh who has benefited from Free Basics, civil society organisations can cite the cases of many persons, including students in slums, who have benefited from their programmes. The rhetoric of "some access is better than no access" is propounded to promote the walled garden approach which helps Facebook by being the default social networking choice of millions of first time internet users. Most telecom service providers also seem to be supporting the zero-rating model with an eye on promoting their content and also content of their partners. Access can be improved in a multitude of ways without violating the principles of Net Neutrality. There are various methods including ad supported services, data coupons and low monthly free data caps that have been proposed. Zuckerberg has also claimed that Facebook fully supports the principle of Net Neutrality and that Free Basics does not violate it. The principle of Net Neutrality is about non-discrimination of services and providing no service a competitive advantage over others. Free Basics, by acting as a gatekeeper offering a selection of services and sites, is clearly in violation of this principle. While Facebook at its infancy needed permission from none to innovate, it expects new startups to play by its rules. With zero-rated services like Facebook, the open Internet is in danger of being split into islands of walled networks with the disadvantaged sections being relegated to the "basic" network. Free Basics, thus, instead of solving the digital divide, creates a new digital inequality. Free Basics also routes all traffic through their servers, thus exposing the private data of all users to Facebook and reducing security. Does that mean that the poor require less privacy and security? Free Basics is creating a new digital inequality where the poor are given access to a few select sites decided by Facebook. As Facebook sees it, in the digital world, some are more equal and some are less equal. (Sugathan is counsel and Choudhary is executive director at Software Freedom Law Centre, New Delhi)

Triple-therapy strategy to fight lung cancer

A triple therapy treatment consisting of two experimental drugs and radiation therapy may help fight lung cancers that are resistant to current treatments, a new study has said. The study, conducted on mice, has shown that cancers with KRAS-related gene mutations might benefit from the triple therapy. The study was published in the journal Clinical Cancer Research.