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# US to help India develop engine for Gen-5 fighter

New Delhi eyes US-designed catapult launch system for planned second aircraft carrier

Ajai Shukla

On Defence Minister Manohar Parrikar's first official visit to the United States from December 7-10, Washington has signalled its willingness to co-develop with India an aircraft engine for India's indigenous fifth-generation fighter that is called the Advanced Medium Combat Aircraft (AMCA). India's Defence R&D Organisation (DRDO) believes it essential to work with US company General Electric Aviation (GE) in up-rating its F-414S6 engine into the so-called F-414 Enhanced Engine, which would power the futuristic AMCA. As Business Standard reported earlier (June 1, "Carter to face Indian demand for engine technology"), GE has been eager to partner DRDO in this lucrative project. But the US government had earlier stood in the way, reluctant to transfer to India strategic technologies, such as the high-melting-point alloys needed to build the gas turbine. During Parrikar's visit, Washington signalled that it has changed its mind. "Secretary (of Defense Ashton) Carter informed Minister Parrikar that in light of the strengthening relationship between the United States and India, the (US Department of Defense) has updated its policy on gas turbine engine technology transfer to India. As a result of this policy update, the Secretary is confident that the United States will be able to expand cooperation in production and design of jet engine components," says the joint statement issued on Friday by the Indian Embassy in Washington. That opens the doors for GE and DRDO to work together in uprating the F-414S6 engine, which India has already selected for the indigenous Tejas Mark II. This will enhance the current engine's peak power of 90 KiloNewtons (KN), delivering 110 KN of thrust. The AMCA's twin F-414 Enhanced Engine will thus deliver an awesome 220 KM of peak power. The green signal for co-developing this engine appears to have been given, with the joint statement saying: "Secretary Carter and Minister Parrikar look forward to US companies working with their Indian counterparts to submit transfer requests that will benefit from this updated policy." For GE, this could be a commercial windfall, providing it an assured market for all India's indigenous fighters. This would include 100 F-404 engines for the Tejas Mark I, another 100 F-414 engines for the Tejas Mark II; and 400 F-414 Enhanced Engines for a planned 200 AMCAs. Since an aero engine's life is about 1,500 hours, each fighter - with a service life of 5,000-6,000 hours - consumes 3.5 engines. That means GE could be supplying 700 engines for the Tejas Marks I and II, and 1,400 engines for the AMCA over their service lives. This is a sizeable share of the Indian aero engine market, which the DRDO estimates to be worth Rs 3,50,000 crore over coming decades. Given this massive requirement, India put jet engine technology, along with aircraft carrier design, at the core of its high-technology expectations from Washington. The joint statement issued on January 22, after President Barack Obama met Prime Minister Narendra Modi in Delhi, agreed to "form a working group to explore aircraft carrier technology sharing and design, and explore possible cooperation on development of jet engine technology." During his visit, Parrikar's counterpart Carter accompanied him on a visit to aircraft carrier USS Dwight D Eisenhower. Parrikar is the first Indian defence minister to visit an American carrier. With India's first indigenous aircraft carrier, INS Vikrant, likely to be commissioned in 2018, the navy is focused on designing a second, larger, indigenous carrier that could include advanced American knowhow and technologies. Business Standard understands the navy is opting for indigenous nuclear reactors to power the second carrier. However, the admirals are keen to incorporate an American-designed catapult launch system. A catapult allows a carrier to launch larger aircraft, more quickly, than the ski-jump that equips contemporary Indian carriers. This would allow Indian aircraft carrier battle groups to launch not just heavier fighters, but airborne early warning (AEW) aircraft, fitting with radars, that monitor and control the aerial battle space. "Minister Parrikar and Secretary Carter commended positive discussions at the Joint Working Group on Aircraft Carrier Technology Cooperation (JWGACTC), especially in the area of Aircraft Launch and Recovery Equipment (ALRE), and look forward to continued progress to be achieved at the second meeting of the JWGACTC in February 2016 in India," said the joint statement. Carter, during his visit to the Eastern Naval Command in Visakhapatnam earlier this year, became the first US defense secretary to visit an operational military command in India. With that gesture reciprocated by Carter, Parrikar became the first Indian defense minister to visit the US Pacific Command in Hawaii en route to Washington. According to the Pentagon website, Parrikar and Carter "also discussed the importance of India's participation in US military exercises such as Malabar, Rim of the Pacific, and for the first time in eight years for India, participation in Red Flag, which Carter called 'the premier air-to-air combat exercise'."

## US for jet engine tech transfer to India

The United States has modified its policies to facilitate transfer of jet engine technology to India, indicating a clear sign of increased trust between the two strategic partners. This was conveyed to Defence Minister Manohar Parrikar by his US counterpart Ashton Carter during a bilateral meeting in Washington. "Secretary Carter informed Minister Parrikar that in light of the strengthening relationship between the United States and India, the Department of Defence has updated its policy on gas turbine engine technology transfer to India," said a joint statement issued after the meeting. With this update, the US will be able to expand cooperation in production and design of jet engine components. Jet engine technology was identified as one of the areas of cooperation by President Barak Obama and Prime Minister Narendra Modi in January 2015. It was one of the biggest take away from the Modi-Obama summit meeting and it came soon after Defence Research and Development Organisation folded up its three decade old Kaveri gas turbine engine project after spending nearly Rs 2,000 crore. "The Jet Engine Technology Joint Working Group that met this week in Bengaluru, had concluded its Terms of Reference and had productive discussion on cooperation in this area," the statement added. Originally meant for use in the indigenous light combat aircraft, the Kaveri jet engine was developed with support from Russia. But the engine developed by the Gas Turbine Research Establishment, Bengaluru can fly the engines only for 73 hours on the IL-76 Flying Test Bed in Russia. Because of the delay, the DRDO picked the US-made GE 404 engine for Tejas Mk-I and GE 414 for Tejas Mk-II aircraft.



**Offers tech collaboration** - Parrikar and Carter also talked about the aircraft-carrier technology, as the US offered technical collaboration in constructing India's second indigenous aircraft carrier, which could be in the range of 60-65,000 tonne class. The Joint Working Group on Aircraft Carrier Technology Cooperation would meet in February 2016 in India to discuss the scope of cooperation especially in the area of aircraft launch and recovery equipment. Parrikar was the first Indian defence minister to visit the Pacific command headquarters in Hawaii, where he met Admiral Harry Harris, the PACOM Commander. He was also given a peek into the US nuclear-powered aircraft carrier USS Dwight D Eisenhower (CVN-69).

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The Times of India

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## World's smallest combat jet's Mark-II avatar to be longer

**Chethan Kumar**

The Light Combat Aircraft (LCA) Tejas, pegged as the world's smallest combat jet, will become longer by 500mm-550mm in its Mark-II avatar, which is expected to take off after 2021, the defence PSU Hindustan Aeronautics Limited has said. Besides, the cost of Mark-IA, the upgraded version of the series production (SP) fighters, will be Rs 190 crore up from Rs 160-crore estimated last year, due to integration of more systems as requested by the Indian Air Force. The IAF, which among other improvements has specified the need for higher thrust in the upgraded version - it means MK-II - will migrate to the GE-414 engine from GE-404 engine with that. "For this, we will have to insert one fuselage that is larger by 500-550mm than the present one. This means that the aircraft has to be made bigger," HAL chairman T Suvarna Raju told TOI. The LCA has three fuselages - the front, centre and rear - and the change is expected in the centre one. Arguing that the tweaks in design to accommodate the fuselage may seem simple on paper, Raju said: "But that would mean a change in the airframe and once the aircraft changes in size, a set of new tests will have to be done." LCA division general manager V Sridharan said: "It is keeping in mind all this (the long process for the changes) that we said we would accommodate 43 of the 57 requests for action (RFAs) in the MK-IA version, which will have the 404 engine. Now that it's been accepted and the standard of preparation (SOP) is frozen, we will go through with this for the 100-odd aircraft." Raju added that most of the 43 RFAs will be accommodated from the fifth or sixth aircraft that is to be produced for the IAF. On the cost of the LCA MK-IA increasing by Rs 30 crore compared to the SP version, Sridharan said: "The cost is bound to go up when new things have to be integrated. And when some of the things include complex systems like the electronic warfare suit, new radar and mid-air refueling, it will (cost will go up)." He said the MoD and the IAF have been intimated of this and that HAL is going ahead with the improvements as sought.

# India set to develop own stealth combat drones

Rajat Pandit

India is finally getting set to launch an ambitious project to develop its own stealth combat drones or UCAVs (unmanned combat aerial vehicles), which will be capable of firing missiles and precision-guided munitions at enemy targets and then returning to home bases to re-arm for further missions. Sources said the government was close to approving a Rs 2,650 crore Project Ghatak to develop the futuristic "Indian Unmanned Strike Air Vehicle", which has already been cleared by the defence ministry. "The project is now being evaluated by an expert committee set up by the finance ministry. Once approved, Project Ghatak will be placed before the cabinet committee on security for the final nod," said a source. Project Ghatak flows from the earlier AURA (autonomous unmanned research aircraft) programme, which was sanctioned in 2009 at a cost of Rs 12.50 crore to carry out a "conceptual and feasibility study" for the future Indian UCAV. "The (AURA) project was successfully completed in April 2013 within the time schedule," minister of state for defence Rao Inderjit Singh told Parliament earlier this month. Project Ghatak, initiated by the Aeronautical Development Agency-DRDO combine in consultation with the IAF, now plans to bring in "collaborators" from the initial stage itself. Weighing less than a fighter jet since it will be "more of a flying-wing in design", the UCAV will take at least a decade to become fully-operational. Interestingly, the UCAV will be powered by a "52-kilonewton dry variant" of the indigenously-developed Kaveri aerospace engine, which could not pass muster to become the power plant for the Tejas light combat aircraft. The Kaveri engine failed to provide the higher thrust required to power Tejas throughout its flight envelope, which led India to procure American GE engines for the indigenous fighter project. But all the work done on the Kaveri engine, on which Rs 2,839 crore have been spent after it was first approved way back in 1989, will now not go waste, sources said. Incidentally, the armed forces already have Israeli Harop 'killer' drones, which basically act as cruise missiles to first detect and then destroy specific enemy targets and radars by exploding into them in kamikaze fashion. Moreover, some of the existing Indian fleet of Israeli Heron and Searcher-II UAVs are also being upgraded with "add-ons" to ensure they can undertake a combat mission over and above their current surveillance and precision-targeting roles, as earlier reported by TOI. But UCAVs are far more advanced, and considered among the most potent game-changers in modern day warfare. The 'Predator' and 'Reaper' drones which are controlled from the US through satellites, for instance, have been extensively used to fire 'Hellfire' missiles against Taliban targets in the Af-Pak region. The armed forces, on their part, are keen to further induct a wide variety of drones, ranging from hand-launched mini ones to full-fledged UCAVs. The Army, for instance, wants at least 598 mini-UAVs to ensure "battlefield transparency" and "beyond the hill surveillance" in a 10-km radius for its infantry soldiers.

## UAVs: FORCE MULTIPLIERS

UAVs are major force-multipliers for surveillance, sending back real-time imagery & data to direct precision fire at enemy targets

Kamikaze drones act as missiles to hit high-value targets. UCAVs like US 'Predators' & 'Reapers' work like fighters to fire missiles on enemy targets and then return to re-arm for next mission



- ▶ Are stealthy & cost-effective, with no risk of air crew being killed since remotely-piloted from far away
- ▶ Can be deployed for high-risk missions in NBC warfare environment

- ▶ Range from hand-launched micro UAVs to fighter-size UCAVs
- ▶ Future UCAVs could replace fighters for long-range bombing missions

### INDIA'S DRONE FLEET

- ▶ Over 200 UAVs, bulk of them imported from Israel after 1999 Kargil conflict
- ▶ Israeli Heron & Searcher-II drones used for long-range surveillance & precision-targeting

- ▶ Israeli Harop "killer" drones act as cruise missiles by exploding into specific targets & radars
- ▶ DRDO has several UAV

development projects from Russian-II medium-altitude, long-endurance drones (₹ 1,341 crore) to Project Ghatak for UCAVs (₹2,650 crore) now

## Defence ties reset as Japan joins Malabar naval exercises

Points to a new strategic realignment in Indo-Pacific region

Kallol Bhattacharjee

Charting a new course, India and Japan on Saturday announced a series of military and strategic agreements and understandings. Unveiling the new bilateral military cooperation, visiting Japanese Prime Minister Shinzo Abe said, "We have created a new chapter in India-Japan relationship with important defensive initiatives." The high point of the new strategic and military realignment is Japan's formal entry into the India-U.S. Malabar bilateral maritime exercises, turning it into a trilateral initiative aimed at ensuring peace, security and freedom of navigation in the Indo-Pacific region. Announcing the landmark naval trilateral, Foreign Secretary S. Jaishankar said: "Japan used to be an irregular participant in the Malabar naval arrangement. From now Japan will be a formal partner of the Malabar exercise." "Defence related agreements are indeed the most important part of this particular visit by Prime Minister Shinzo Abe to India," Yasuhisa Kawamura, Director General for Press and Public Diplomacy of the Ministry of Foreign Affairs of Japan told The Hindu in an exclusive meeting. Mr Kawamura highlighted the "agreement on transfer of defence equipment and technology cooperation" and the "agreement on security measures for the protection of classified military information".

**Defence ties with Japan to help 'Make in India'** - Mr. Yasuhisa told The Hindu that defence ties with India are now "fundamentally important" to Japan and that India's flagship "Make in India" programme also will benefit from defence co-production plans. Following Saturday's understanding, it is expected that Japan will soon take up production of US-2 amphibious aircraft, 15 of which are reportedly to be purchased by India. Japanese sources emphasised that the emerging military ties are not targeted at China. "The Malabar naval trilateral is does not have any designated target, and we plan to work with India and the U.S. for peace, security, freedom of navigation, in the South China Sea and the important energy lanes of Indo-Pacific region," Mr. Kawamura said. He pointed out that there were serious challenges emerging between China and Japan.

**No n-deal** - The positive military-level negotiations however, did not help in ensuring the final draft of the civil nuclear deal. Briefing the media, Foreign Secretary Jaishankar pointed out that "legal, legislative, expert-level negotiations are yet to be concluded though the government-to-government negotiation on the principles have been sealed". Apparently, the Indian side gave assurances to Japan's strong non-proliferation lobby to expedite the deal, the Japanese preferred to play safe and sought time for Prime Minister Abe to convince the Japanese parliament on the assurances.

## Japan keen on 'making in India'

Kallol Bhattacharjee

Japan Prime Minister Shinzo Abe says his country is interested in the full spectrum of major government schemes. Japan's new and aggressive investment plans in India will not be limited to mega infrastructure projects such as bullet trains and will cover almost the full spectrum of prominent government schemes such as "Make in India" and Swachh Bharat. Expressing his government's desire to invest in key sectors, Prime Minister Shinzo Abe on Friday said: "Japan has decades of experience of doing business with India. It is this experience which will help us in India." Mr. Abe delivered a brief speech at the Japan-India Innovation Seminar two hours after landing at the Indira Gandhi International Airport on Friday. The seminar was attended by Hiroaki Nakanishi, CEO of Hitachi Ltd, Kaoru Yano, Chairman of the Board, NEC Corporation among several other top level officials and corporate heads who are also in town along with Mr Abe. Soon after his arrival Mr. Abe held a meeting with External Affairs Minister Sushma Swaraj on the agenda for Saturday's summit with Prime Minister Narendra Modi. Mr. Abe will hold the summit meeting with Prime Minister Narendra Modi on Saturday, when key announcements on the bullet train, defence ties will be made. The broader regional issues will be discussed at the meeting. The bullet train project between Mumbai and Ahmedabad and will be a showpiece of India-Japan collaboration. Japan has offered to finance 80 per cent of the cost of the project interest rate of less than 1 per cent. But the high point of Modi-Abe summit of Saturday will be expression of Japan's support to India's growing presence in the Asia-Pacific region.

**Nuclear cooperation** - Following his summit meeting, Prime Minister Abe is expected to announce steps that will help in realising India-Japan civil nuclear cooperation. Japanese sources also told The Hindu that major defence cooperation agreements are expected during the visit to boost India's defence production sector following the Make in India programme.

## Defence exports by private sector increase six-fold after policy changes

By Manu Pubby

Key policy changes by the Modi government have resulted in a surge of defence exports by private sector companies, with numbers indicating a six-fold increase in shipments and a further rise expected by the end of the financial year. A new liberalised set of laws, which includes an online procedure as well as exemptions from an earlier draconian 'end-user certificate' requirement have spurred the private industry to export much more than before. Statistics shared by Minister of State for Defence, Rao Inderjit Singh, show that private companies exported military stores worth Rs 441 crore in the first six months of the financial year, based on permissions sought from the ministry of defence. Private companies had exported goods worth Rs 132 crore in all of 2014-15 and Rs 286 crore in 2013-14. While half-yearly figures for 2014-15 were not available, on a pro-rated basis, exports in the six months ended September were more than six times higher. The share of the private sector in defence exports also shot up. Over 63 per cent of the total Rs 695 crore worth of defence exports until September was from the private sector compared with a share of 13 per cent in the previous year. Experts and industry leaders said that the numbers will rise further by the end of this financial year as several projects are under way, spurred by the policy changes that make it easier to export military stores and equipment. As first reported by ET, a new set of rules was put in place in July, easing bureaucratic hurdles in export regulations and doing away with a provision that demanded multiple assurances by foreign governments even for the sale of components and parts by Indian entities. The changes included easing of a requirement of getting certification for components and parts only from the immediate buyer and not the ultimate end user and opening sectors such as armoured equipment, weapon control systems, countermeasure equipment, engines, underwater detection devices and military software for easy exports. A formal list of exportable defence items was also endorsed by the ministry of defence this year, bringing India at par with international laws governing arms trade. This identifies 16 broad categories of products that can be exported after clearance, bringing clarity to private companies pursuing overseas sales.



The Tribune

12 December 2015

## Pak tests N-capable Shaheen-III missile

Afzal Khan

Pakistan on Friday successfully test-fired the medium-range Shaheen-III surface-to-surface ballistic missile which can carry nuclear warheads up to 2,750 km bringing many Indian cities within its range. The test flight of the missile was aimed at validating various design and technical parameters of the weapon system, according to a statement from the military's Inter-Services Public Relations (ISPR). The impact point of the missile test was in the Arabian Sea, validating all desired parameters, the statement said. The test was witnessed by senior officers from Strategic Plans Division, Strategic Forces, Scientists and Engineers of Strategic Organisation. Director General Strategic Plans Division, Lieutenant General Mazhar Jamil, said the country had achieved a "significant milestone" in complementing the deterrence capability. Shaheen-I is also capable of carrying nuclear as well as conventional warheads and has a range of 900 kms while the Shaheen-II missile can also carry nuclear and conventional warheads up to a range of 1,500 km.



Shaheen III surface-to-surface ballistic missile takes off from an undisclosed location in Pakistan. It can carry nuclear and conventional warheads within a range of 2,750 km.

# US effects big change in engine tech transfer

Ajay Banerjee

The US has told India it has changed its policy on gas turbine engine technology transfer to India, allowing technology to be shared with Indian companies and indicating a further cementing of defence ties between the two countries. The move, if it comes through, will change the way India makes engines for its warships and future fighter jets. Gas turbine engines are largely used in big warships for the Navy and have a big market in merchant vessels. As many as 47 naval ships are under construction and each needs at least two such engines - costing millions of dollars. A gas turbine-based jet engine, the GE 414, has been selected by India for the next version of its indigenous fighter jet LCA Tejas. The same engine is used by the US Navy's Boeing F-18-E/F Super Hornet Strike Fighter. The Boeing F-18-A is the main jet used by the US on its aircraft carriers. In India, the Tejas is expected to be the main jet on board its upcoming aircraft carrier INS Vikrant. The announcement on policy change was made at a meeting between Defence Minister Manohar Parrikar and his US counterpart, US Secretary of Defence Ashton Carter, at the Pentagon in Washington. This was third meeting between Parrikar and Carter in the past 12 months. The joint statement issued after the meeting said: "The Department of Defence of US has updated its policy on gas turbine engine technology transfer to India." As a result of this policy update, the Secretary (Carter) is confident that the US will be able to expand cooperation in production and design of jet engine components. "Secretary Carter and Minister Parrikar look forward to US companies working with their Indian counterparts to submit transfer requests that will benefit from this updated policy," the statement said. Parrikar and Carter commended positive discussions at the Joint Working Group on Aircraft Carrier Technology Cooperation (JWGACTC), especially in the area of aircraft launch and recovery equipment (ALRE). The Jet Engine Technology Joint Working Group (JETJWG), which met this week in Bengaluru, had concluded its terms of reference and had productive discussion on cooperation in this area, the statement noted. The two sides discussed the India-US defence relationship and broader India-US strategic partnership, and focused on ways to maintain the strong momentum of security and defence engagement, including means to further move the Defence Technology and Trade Initiative (DTTI) forward.

## Rare tour of N-powered USS Eisenhower

- \* Defence Minister Manohar Parrikar got a rare insight into USS Dwight D Eisenhower, one of US' top nuclear powered aircraft carriers
- \* Defence Secretary Carter gave Parrikar the tour of the sophisticated aircraft carrier
- \* The two spent nearly four hours on the ship, which has played a key role in US military operations in Iraq and Afghanistan

## Parrikar deflects Trump's Islamic bomb

- \* Washington: Deflecting a "potential nuclear bomb" of a question about Donald Trump's call to bar entry of all Muslims to the US, Defence Minister Manohar Parrikar said Muslims in India "gel well". "I think your question to me has the potential for nuclear bomb," he said when asked about India's reaction to Republican presidential frontrunner's controversial call.

## Focus on terror, South China Sea in Modi-Abe talks

Freedom of navigation in South China Sea, punishing perpetrators of 26/11 Mumbai terror attacks and stopping cross-border terrorism figured prominently during the talks between Prime Minister Narendra Modi and Japanese PM Shinzo Abe on Saturday. In their joint statement issued after the talks, the two leaders shared concerns about the growing threat and universal reach of extremism and strongly condemned terrorism in all its forms and manifestations. Calling for zero tolerance on violence, they expressed concern over the continued threat posed by terror groups. In this regard the two PMs underlined the need for all countries to effectively deal with trans-national terrorism emanating from their territory and called for stronger international partnership including increased information and intelligence sharing. They also called for eliminating terrorist safe havens and infrastructure, disrupting terrorist networks, financing channels, and stopping cross-border movement of terrorists. They urged countries to implement the United Nations Security Council Resolution 1267 and other relevant resolutions designating terrorist entities. "They affirmed the importance of bringing the perpetrators of terrorist attacks including those of November 2008 terrorist attack in Mumbai to justice," the joint statement said. Noting the developments in the South China Sea, Modi and Abe called upon countries to avoid unilateral actions that could lead to tensions in the region saying sea lanes are critical link of communications for regional energy security and trade and commerce. They were of the view that effective implementation of the 2002 Declaration on the Conduct of Parties in the South China Sea and early conclusion of the negotiations to establish a Code of Conduct in the South China Sea by consensus will contribute to peace and stability of the region. Modi and Abe also underscored the importance of international law including the United Nations Convention on the Law of the Sea (UNCLOS) and peaceful resolution of disputes without use or threat of use of force; freedom of navigation and overflight and unimpeded lawful commerce in international waters. Among other international issues, Modi and Abe discussed North Korea's contentious nuclear programme and expressed concern over its continued development of nuclear weapons and ballistic missile programmes, including its uranium enrichment activities. "They urged North Korea to take actions towards the denuclearising of the Korean Peninsula. They also urged North Korea to address at the earliest the abductions issue," the statement said. On the occasion of the 70th year since the atomic bombings of Hiroshima and Nagasaki, PMs reaffirmed their shared commitment to the total elimination of nuclear weapons. They called for an immediate commencement and early conclusion of negotiations on a non-discriminatory, multilateral and internationally and effectively verifiable Fissile Material Cut-off Treaty (FMCT) on the basis of Shannon Mandate. Underlining the need for closer coordination and effective communication to address challenges in spheres of security, stability and sustainable development, Modi and Abe agreed to strengthen regional economic and security forums and coordinate their actions to tackle global challenges including the reform of the United Nations, climate change as well as terrorism. Japan welcomed India's intensified engagement with export control regimes and the two Prime Ministers affirmed their commitment to work together for India to become a full member in the four international export control regimes: Nuclear Suppliers Group, Missile Technology Control Regime, Wassenaar Arrangement and Australia Group, with the aim of strengthening the international non-proliferation efforts. Modi welcomed the "Japan-India Make-in-India Special Finance Facility" up to 1.5 trillion Yen by Nippon Export and Investment Insurance (NEXI) and Japan Bank for International Cooperation (JBIC). It aims to promote direct investment of Japanese companies and trade from Japan to India, to support their business activities with counterparts in India. Abe expressed Japan's intention to provide ODA loans for the improvement of road network connectivity in northeastern states of India, the peripheral ring road surrounding Bengaluru, and the horticulture irrigation in Jharkhand. Modi also welcomed the Japanese ODA loans of about 100 billion yen for the metro projects in Chennai and Ahmedabad.

# Parrikar gets tour of USS Eisenhower as US-India float ambitious agenda

Chidanand Rajghatta

If the nine hours that India's defence minister Manohar Parrikar and US defense secretary Ashton Carter spent together on Tuesday is any indication, military cooperation between the two sides is proceeding apace. But in their third encounter within a year, it was also the quality of the engagement, which included a tour of the nuclear-powered aircraft carrier USS Eisenhower, that officials from both sides talked up. 'It was fantastic,' Parrikar would say later in a chat with journalists, after Carter, a military historian who has a shared interest for physics with the IIT-ian minister, flew him in his Pentagon aircraft for a four-hour guided tour. Then, waving a jumbo-sized coffee mug and bearing a wide smile, Parrikar added, "I don't think U.S does anything small." Indeed, at a displacement of more than 100,000 tons, Mighty Ike, as the Nimitz class carrier is nicknamed, is among the largest in the world. It more than twice the size of India's own (and currently only aircraft carrier) INS Vikramaditya, and even larger than the nuclear carrier INS Vishal that India hopes to add to its armada. As much as inducing awe, the Carter-Parrikar tour also speaks to a more ambitious bilateral agenda: on the commercial side, settling somewhere between the US desire to sell complete systems to India without the proprietary technology, and India's yearning to acquire technology and manufacturing capability without becoming an off-the-shelf buyer; on the strategic side, outsourcing some of the maritime security aspects in the region and beyond. In a joint statement issued at the end of Parrikar's visit, his first to U.S as defence minister, that included the first by an Indian defence minister to the US Pacific Command in Hawaii, the two sides reflected the rapid progress they were making on this signature item, besides a raft of other military technologies. A Joint Working Group on Aircraft Carrier Technology Cooperation (with the tortuous acronym of JWGACTC) had positive discussions in the first first round, and a second round has been scheduled in February 2016 in India, they disclosed. They also expressed satisfaction that the Jet Engine Technology Joint Working Group (JETJWG), which met this week in Bengaluru, had concluded its Terms of Reference and had productive discussion on cooperation in this area. None of this suggests that U.S made aircraft carriers and fighter jets will be rolling off Indian naval yards and assembly lines anytime soon, but there is a perceptible loosening of strictures (and collars) between the two sides. Secretary Carter informed Parrikar "that in light of the strengthening relationship between the U.S and India, the DoD has updated its policy on gas turbine engine technology transfer to India." As a result of this policy update, Americans will be able to expand cooperation in production and design of jet engine components. Both sides will now wait for U.S. companies working with their Indian counterparts to submit transfer requests that will benefit from this updated policy. On his side, Parrikar apprised Carter of the key policy decisions taken by India in the defence sector, including the increase in FDI limit to 49%, liberal offsets policy and improving the ease of doing business. "We feel that the recent policy initiatives have opened up immense opportunities for the US companies to set up their manufacturing enterprises in India in collaboration with Indian companies," he said. Wrinkles remain, notably in the US insistence that India sign complex foundational agreements that New Delhi feels will give Washington intrusion rights into end-use aspects. The Indian side sought more clarifications on the matter, effectively kicking the can down the road. But good intentions were sounded on both sides. Asked what the two military honchos could have discussed over so many hours together during the day, Parrikar quipped, "When you gel well, you do not remember what you discussed."

# Russia keen on guarantee pact for defence projects

Moscow is ready to transfer technologies under the 'Make in India' initiative

Dinakar Peri

As India and Russia gear up to sign a major deal for manufacture of Russian light utility helicopters in India with significant participation by the private sector, Russia is keen to conclude a mutual investment guarantee pact with India for joint defence projects in future, a senior Russian government official said. "In the first stage it can be a government-to-government agreement. In the second stage it can be at the business-to-business and central bank level. Payment can be in local currencies which will minimise risks," Andrey I Boginskiy, Deputy Minister of Industry and Trade in the Russian Government told a group of visiting Indian journalists. Russia is keen to expand the joint development projects and is ready to transfer technologies under the 'Make in India' initiative. "We understand the 'Make in India' [initiative] and due to our long standing relations we know how to deal with India," said Mr. Boginskiy. Russia has traditionally dealt with Indian government companies and now the government is encouraging the private sector to build capabilities in the complex defence manufacturing business.

**Copter deal** - India and Russia are expected to conclude the Inter-Governmental agreement for the production of 200 Kamov-226K light utility helicopters in India during Prime Minister Narendra Modi's visit to Russia later this month. "For a long time we have discussed the production of Kamov 226 helicopters in India both at the working level between companies and also at the government level. We indeed hope that during the visit [of Mr. Modi] we sign the deal," Mr. Boginskiy observed. A second-level agreement will be signed between Russian Helicopters and the Indian partner. An Indian private player is likely to be chosen to work with Hindustan Aeronautics Limited (HAL) under the Make in India initiative. Anil Ambani's Reliance Defence has been in talks with Russian Helicopters in this regard. On their preference for HAL or a private partner, Mr. Boginskiy said they were ready to work with any partner chosen by the Indian side. "The main thing is that it should be financially and technically capable of taking on such a large project." "Russian Helicopters and its subsidiaries and component manufacturers are ready to supply kits for its assembly in India as well as to localise production," Mr. Boginskiy added. Indian Armed Forces are facing a severe shortage of utility helicopters to replace the ageing Cheetah and Chetak helicopters but several procurement programmes have been repeatedly delayed.

The Pioneer

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# Abe welcomes resumption of India-Pakistan talks

Visiting Japanese Prime Minister Shinzo Abe on Friday welcomed the resumption of talks between India and Pakistan and the visit of External Affairs Minister Sushma Swaraj to Islamabad. Abe conveyed this to Swaraj when she called on him hours after his arrival here for a summit meeting with Prime Minister Narendra Modi on Saturday. The Japanese leader asserted that any steps taken to reduce tension were good and in this context he welcomed the resumption of Indo-Pak talks. Abe welcomed the fact that on her first visit as External Affairs Minister to Pakistan, Swaraj achieved an agreement between India and Pakistan on resuming dialogue. "I am very excited to be here for my third visit to India as the Prime Minister," Abe told Swaraj. On her part, Swaraj briefed the visiting leader on the progress made on various decisions agreed upon by the two prime ministers in their previous meetings, saying he will be happy with the deliverables. Swaraj also briefed Abe about the India-Africa summit and maintained that the African continent could be a possible area of coordination between the two countries. The two countries also discussed the UN Security Council reforms and in this context Abe noted the initiative of Modi holding of G4 meetings on the sidelines of the UN General Assembly in New York in September. Abe arrived here on a three-day visit for annual summit talks with Prime Minister Narendra Modi during which the two sides are expected to seal a `98,000 crore deal for India's first bullet train track and deliberate on a civil nuclear pact. Welcoming Abe, Modi described him as a "phenomenal leader" and said his trip will further deepen the bilateral relations. "Liked how PM @AbeShinzo describes India-Japan ties, the rich potential & cultural bond in his piece" in a newspaper, Modi tweeted. "India is all set to welcome its great friend & a phenomenal leader, PM @AbeShinzo. His visit will further deepen India-Japan relations," he said in another tweet. In the 9th annual Indo-Japan summit talks Saturday, Modi and Abe will review implementation of various decisions taken in course of last one year and are likely to focus on enhancing trade and investment between the two Asian economic powers. Meanwhile, Abe was conferred with an honorary doctorate in International Relations by Jawaharlal Nehru University here for Japan's role in India's economic development.

# The defining partnership

## Defence at the core of new India-US bilateral

The highlights from Defence Minister Manohar Parrikar's recently concluded trip to the US are testimony to how defence cooperation has been at the crux of the transformative process driving the India-US bilateral in these past two decades or so. Apart from the long and extensive discussions that he had with his American counterpart Ashton Carter, in Washington, DC, Mr Parrikar announced India's participation, alongside the US, in the Rim-of-the-Pacific naval exercise and the Red Flag air-to-air combat exercise next year. On his part, Mr Carter announced that the US will be participating in the Indian Navy's International Fleet Review at Visakhapatnam in February next year. These will be in addition to the annual Indo-US Malabar naval exercise. India already conducts more military exercises with the US than with any other country - and these make for the building blocks of any strong defence relationship. The other big development came from the defence technology transfer arena - which can be considered to be the next level in the strengthening of a defence relationship. Herein, the US updated its policy on gas-turbine engine technology transfer to India so as to expand cooperation in the production and design of sensitive jet engine components. Finally, the fact that Mr Parrikar began his tour with a visit to the US Pacific Command headquarter in Hawaii, the first Indian Defence Minister to do so, and ended it with an inspection of one of America's top nuclear powered aircraft carriers, USS Dwight D Eisenhower, a rare privilege for any foreign leaders, was the cherry on the cake. It generated heartwarming visuals of how significantly the India-US relationship has changed - moving from decades of mistrust and acrimony to a genuine partnership now that stands on shared values and common interests. To measure the actual success of Mr Parrikar's visit, however, we need to look at two factors: Progress in defence trade and technology transfers in the short to medium term; and an upgradation of the overall India-US defence cooperation strategy wherein the US actively enables India to maintain an operational military advantage in the Indo-Pacific. In the first case, there has been consistent, if not rapid, progress, particularly since the Modi Government came to power in May 2014. Stronger defence ties with the US fit perfectly with the BJP-led NDA Government's flagship Make in India plan; and also the current dispensation in Delhi doesn't have the ideological baggage of the past that had undercut India-US ties during the UPA regime (despite the historic nuclear deal and Prime Minister Manmohan Singh's personal commitment to the bilateral). In the second case - of the US supporting India's emergence as the region's primary military power and security provider - there will, of course, be resistance from competing American policy imperatives with regard to Pakistan and China. But over time, it is in this direction that India and the US should be heading.

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The Tribune

13 December 2015

## Tokyo to be permanent partner in navy exercise that riled China

Ajay Banerjee

Today's military-diplomatic moves between India and Japan fit into what, among strategic circles, is referred to as a "security diamond"-an alliance or a close-knit group comprising India, the US, Japan and Australia. Prime Minister Narendra Modi and his Japanese counterpart Shinzo Abe in a joint statement today made it clear that Japan would be a permanent partner in the much-watched navy exercise named "Malabar" - the last one conducted in the Bay of Bengal in October included a "hunt for a submarine". The joint statement said: "The two prime ministers welcomed Japan's participation in the India-US Malabar exercises on a regular basis, as it would help create stronger capabilities to deal with maritime challenges in the Indo-Pacific region." This is what India tried in 2007 and then backed off under pressure from China that had protested against such an India-US-Japan grouping and termed it "anti-China". The "security diamond" got boost recently when India-Japan-Australia launched their trilateral dialogue in addition to the existing India-US-Japan dialogue. The moves fall in place with Prime Minister Abe's advocated "security diamond" policy. In December 2012, Abe in an essay posted on the website of Project Syndicate, a Prague- and New York-based non-profit syndicate of newspapers from around the world saying, "I envisage a strategy whereby Australia, India, Japan and the US state of Hawaii form a diamond to safeguard the maritime commons stretching from the Indian Ocean region to the western Pacific."

# India, Japan agree on N-pact

First bullet train on its way amid push for 'Make in India' in defence

Simran Sodhi

India and Japan today signed an agreement on Peaceful Uses of Nuclear Energy, bringing to end years of tough negotiations between the two countries. The agreement was signed during the visit of Japanese Prime Minister Shinzo Abe to India. Another hallmark agreement signed between the two countries is building of the first bullet train network between Mumbai and Ahmedabad at a cost of about Rs 98,000 crore. The memorandum of understanding (MoU) on nuclear energy was signed by Prime Minister Narendra Modi and Abe. "No friend will matter more in realising India's economic dreams than Japan. We have made enormous progress in economic cooperation as also in our regional partnership and security cooperation," said Modi after signing the deal. Abe in return said his country's public and private sector would act in unison to support the growth of India. It is also learnt that during the one-hour summit meeting between the two Prime Ministers, Abe said he was pleased that the two countries had an agreement and that it 'wouldn't have been accomplished by other Prime Ministers. No other leaders could have done it". While the MoU on nuclear deal brings an end to the negotiations between India and Japan, the process is yet to be completed. Yasuhisa Kawamura, Press Secretary accompanying Abe, at a media briefing explained that the final document will have to "withstand the scrutiny of the Diet (parliament)" before Japan can go ahead with the implementation side of the deal. In other words, the MoU today lays the groundwork for the final agreement which will be signed after technical details have been sorted out. Kawamura also said if India was to go in for another nuclear test, "It will be quite natural for Japan to review the cooperation". But he added Japan did not see that happening. The joint statement issued at the end of the summit states: "The two Prime Ministers welcomed the agreement reached between the two governments on the Agreement between the Government of Japan and the Government of the Republic of India for cooperation in the Peaceful Uses of Nuclear Energy and confirmed that this agreement will be signed after the technical details are finalised, including those related to the necessary internal procedures." Another significant announcement was in the area of defence that Japan would now be a regular partner in the India-US Malabar exercises.

## Key pacts signed

- \* Transfer of defence equipment and technology; Security measures for protection of classified military information
- \* Regular consultations on maritime safety and security of sea lanes of communication; Japan to be a regular partner in the India-US Malabar exercises
- \* Amendment of Double Taxation Avoidance Agreement (DTAA) to help reduce tax avoidance
- \* \$12 bn Japanese fund for its companies to manufacture in India. Another \$5 bn under Overseas Development Assistance to India
- \* India to extend 'visa on arrival' to Japanese people from March 1 next year PTI

## Japan to import Maruti cars

\* In a first, Japan will import cars from India. 'Maruti (Suzuki) will manufacture here... The Japanese company will manufacture here and export it to Japan,' PM Narendra Modi said. Maruti expects to export Baleno to Japan from January 2016 with a target of 20,000 to 30,000 units a year.

# 'Defence contracts of Rs 90,000 cr signed'

Gurmeet Kanwal

Defence Minister Manohar Parrikar, who has just completed one year in office, has given a free hand to the army to act pro-actively in response to cease-fire violations on the LoC. He convinced the Cabinet Committee on Security to launch a raid on insurgent camps across the border with Myanmar. The minister worked closely with the leadership of the armed forces and the bureaucracy to put defence preparedness back on the rails and give a fillip to the stalled process of military modernisation.

In an interview with Brig Gurmeet Kanwal (rtd), former Director, Centre for Land Warfare Studies, New Delhi, Parrikar commented on the adequacy of the defence budget, the state of military modernisation, his emphasis on defence procurement as well as defence reforms, including the appointment of a Chief of Defence Staff (CDS), and the need for a comprehensive national security strategy. Excerpts:

**Are you satisfied with the response of the army to cease-fire violations on the LoC? Is it sufficiently pro-active to act as a deterrent to the Pakistan army to stop aiding and abetting infiltration? What additional measures, if any, are necessary?**

Compared with the past, the response has been more pro-active. However, we need to improve the acquisition of intelligence further to ensure that infiltration attempts are checkmated at source.

**How do you rate the present state of defence preparedness and how do you intend to proceed to enhance it further?**

The present state of defence preparedness is satisfactory. However, the same needs to be enhanced further by improving the equipment status using the latest IT tools and improved training methods.

**You have taken several pragmatic measures to give a fillip to military modernisation. However, while a large number of defence acquisition projects have been approved in principle, relatively only few contracts have been actually signed. How do you propose to rectify this?**

It is not correct to say that contracts signed are few in number. In fact, we have already signed contracts worth around Rs 90,000 crore during the past year while acquisition plans worth around Rs 1,00,000 crore are at final (Competent Financial Authority) stage of approval and are expected to be signed in the next six months. It should be realised that contracts signed have two important factors to be taken into consideration. Firstly, the financial provisions available during the current year and next five years - the contract period after taking into consideration committed liabilities; and, secondly, the urgency or priority accorded to the acquisition.

**The defence budget has slipped to 1.74 per cent of India's GDP. This low level of funding leaves little in the kitty for major modernisation projects. How do you plan to ensure that the level of funding for military modernisation is increased so that the pace gathers steam?**

While increasing funding will definitely help and is one of the issues of priority, utilising the available resources efficiently and critically is equally important. I intend to ensure that expenditure incurred on modernisation is utilised efficiently and judiciously. Further, improving indigenisation can, in the medium and long run, be less costly, if managed properly.

**While the Defence Procurement Procedure is under revision, other defence reforms continue to languish. For example, a Chief of Defence Staff (CDS) has not yet been appointed. How do you plan to implement much needed defence reforms?**

All aspects of defence modernisation and reforms are being actively pursued. This includes the appointment of CDS.

**India still does not have a comprehensively formulated National Security Strategy. Does the Cabinet Committee on Security intend to rectify this lacuna? Do you intend to personally work towards the formulation of such a strategy?**

The formulation of a comprehensive National Security Strategy is receiving my attention as it is one of the important aspects of the country's defence.

# Onus on US to boost defence ties with India

Saroj Bishoyi

Amid the growing congruence of interests between the two countries on bilateral, regional and global issues, India-US defence cooperation is set to reach new heights. However, America needs to gain India's trust by helping India in building indigenous defence industries, meeting energy demands, and including it into global decision-making bodies like UNSC. India-US relationship has been transformed over the last one and a half decades. In this ameliorating relationship, defence cooperation has emerged as the most visible aspect of bilateral ties. The foundation of this lies in India's rise as economic, military, and political power; and its potential role as a net security provider in Asia and beyond. India has also emerged as the world's largest defence market where the US has become the top arms supplier to India. In addition, China's ambitious foreign policy to dominate the Asian region, its ever growing military assertiveness, territorial claims, and rapid construction of artificial islands and reefs in the disputed South China Sea (SCS) has thrown serious challenges to American leadership where India is seen as a balancing power. Besides, the growing transnational security threats such as international terrorism, climate change, WMD proliferation, etc, have further brought the two nations closer on regional and global security issues. Hence, amid the growing congruence of interests between the two countries on bilateral, regional and global issues, India-US defence cooperation is set to reach new heights. Economically, India's growth rate has been accelerated. In 2014, its GDP was over \$ 2 trillion. Militarily, India is one of the strongest countries in the world. It has over 1.3 million soldiers (third largest army in the world), and a huge arsenal of weaponry, including nuclear weapons. Politically, India is the world's largest democratic country with a stable political system. In 2014 General Election, for instance, out of the total 834.1 million eligible voters, 553.8 million people cast their vote for a stable BJP-led NDA Government in an atmosphere of confusing array of political parties. India's rise with such economic, military and political power significantly contributes to Asia's peace, stability and prosperity. This has attracted world's attention, especially that of the US which seeks to build a robust strategic partnership with India for protecting and promoting its regional and international interests. India's growing defence market has also substantially contributed to the development of India-US defence cooperation. According to the Stockholm International Peace Research Institute (SIPRI) 2015 year book, India emerged as the largest buyer of weapons and defence equipment during 2010-2014. Its share in global imports has increased by 140 per cent over the previous five-year bloc, 2005-2009. Importantly, with almost 40 per cent share in the Indian defence market, the US has overtaken Russia (30 per cent), France (14 per cent), and Israel (4 per cent) to become India's largest arms supplier during 2011-2014. Providing statistics about India's arms imports, Finance Minister Arun Jaitley told the Rajya Sabha that out of Rs 83,458 crore spent on defence imports during 2011-2014, the US got Rs 32,615 crore. Since 2007, India has in fact bought \$13 billion defence equipment from the US. India's major imports from the US include 10 C-17s Globemaster -III strategic airlift for \$4.1 billion and 8 P-8I maritime patrol aircraft for \$2.1 billion. India and the US are now working towards greater collaboration in joint research, design, development, and production of gen-next military technology under the Defence Trade and Technology Initiative (DTTI). They have already finalised the joint development of Mobile Electric Hybrid Power Sources and the Next Generation Protective Ensembles under the DTTI. In a clear signal to India's growing importance to American interests, both as a major arms buyer and potential collaborator in the defence sector, the US established in February 2015 an India Rapid Reaction Cell (IRRC) to speed up defence cooperation between the two countries. Moreover, as part of an ongoing series of high-level meetings aimed at establishing broader cooperation on the joint research, co-development, and co-production of high-end defence equipment, the two sides held the first formal meeting of India-US Joint Aircraft Carrier Working Group (JACWG) in Washington in August 2015. Defence Minister Parrikar and his American counterpart Ashton Carter on December 10 ramped up defence and strategic ties by agreeing to fast-track co-production ventures. "The Indo-Asia-Pacific is one of the most consequential parts of the world for America's future. And we welcome India's rise as a security partner in a region where half of humanity lives, and half of the world's economic activity takes place," Carter told reporters at a joint news conference. However China's growing military assertiveness and its ambitious foreign policy to dominate the Asian region have raised serious concerns for both India and the US. While the US strongly believes that a robust defence and security cooperation between the world's largest and strongest democracy would help maintain region's peace and security, it encourages India to play a proactive role in managing the balance of power in the region. On the other hand, despite recent

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part-2

## Onus on US to boost defence ties with India

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improvement in its ties with Beijing, India remains increasingly concerned about the unresolved border problem, frequent eruption of border incursions, China's support to Pakistan's defence building, and Beijing's growing military assertiveness in the India-Pacific region, especially China's growing proximity towards India's immediate neighbours. India has recently expressed strong resentment over Beijing's blocking of its move in the UN seeking action against Zaki-ur-Rehman Lakhvi, a Pakistan-based terrorist and the mastermind behind the 26/11 Mumbai terror attacks. Japan's inclusion in the 2015 Malabar joint military exercises is another crucial step towards strengthening regional strategic partnership. Modi Government's current "Act East Policy" rather than the earlier "Look East Policy" also increasingly converges with the Obama Administration's Asia "rebalancing strategy" where both sides look to play proactive role in maintaining regional peace, stability and security. The signing of the "Joint Strategic Vision for the Asia-Pacific and Indian Ocean Region" in January 2015 further strengthened the two countries strategic partnership in the region. The US sees India's rise with economic and military power as in American interests and eagerly looks to share security burden with India. In fact, it has been urging India to play proactive role and become "a net provider of security" in Asia and beyond. The US now needs to help India in building indigenous defence industries, in technology transfer, innovation, meeting the growing energy demands, and inclusion in India into global decision-making bodies like UNSC. The American support to India in these areas is a litmus test of its commitment to build a robust India-US strategic partnership in the 21st century.

Deccan Herald

13 December 2015

## India, Japan inch closer to N-deal

Anirban Bhaumik

India and Japan are now close to signing a civil nuclear cooperation agreement after Prime Minister Narendra Modi and his Japanese counterpart Shinzo Abe inked an MoU on Saturday. The deal would be clinched after finalising technical details and completing internal procedures in both nations. The annual India-Japan summit also saw Modi and Abe agreeing to step up security and defence cooperation, and inking two agreements, which would pave the way for transfer of defence equipment and technology between the two nations. The two nations also inked 13 other agreements, including one for developing Mumbai-Ahmedabad high-speed rail corridor, using Japanese Shinkansen technology with financial assistance from Tokyo. Though India and Japan are likely to take some more months to actually sign the nuclear agreement, the breakthrough reached during Modi-Abe meeting in New Delhi is significant, as it signalled substantial progress in the protracted negotiation for a deal, which would clear roads for bilateral cooperation in peaceful use of atomic energy. A nuclear deal with Japan - the only country that experienced the devastation by atomic bombs - is also important for India, as it would be yet another sign of global acknowledgement of the impeccable non-proliferation record of India. Modi said that India-Japan MoU on civil nuclear cooperation was "more than just an agreement for commerce and clean energy". New Delhi and Tokyo started formal negotiations in June 2010 - two years after the Indo-US nuke deal ended India's isolation from global nuclear commerce. Japanese atomic power companies like Toshiba, Hitachi and Mitsubishi have been eyeing the huge nuclear market opened up for the world by the Nuclear Suppliers Group's 2008 waiver for India. Besides, even US companies, which partnered with Japanese firms (like GE-Hitachi and Toshiba-Westinghouse), need a deal between Tokyo and New Delhi in place to be able to sell India nuclear technologies and equipment with components originated in Japan. Tokyo's decision to enter into nuke talks with New Delhi sparked off strong reactions from the anti-nuclear activists in Japan, as India did not sign the Nuclear Non-Proliferation Treaty and the Comprehensive Test Ban Treaty.

**Nuke test** - The "difficult issues" in negotiations included Japan's insistence to add a clause in the agreement providing for termination of the cooperation in the event of a nuclear test by India. New Delhi was reluctant and pointed out to Tokyo that it had declared a unilateral moratorium on nuclear tests in 2008 and it still remained in force. New Delhi has been insisting on right to reprocess nuclear fuel to be procured from Japan. Tokyo has also been seeking rights to track fuel being used in Japanese reactors installed in India. Earlier this year, Japan agreed to grant India the right to reprocess spent nuclear fuel. However, a report in "Japan Times" quoted the Japanese government's Deputy Chief Cabinet Secretary Koichi Hagiuda telling journalists in New Delhi that bilateral nuclear cooperation would stop if India conducted a nuclear test.

# Latest FDI reforms could hit Make in India

The FDI policy announced by the government ahead of PM's visit to U.K. entailed liberalising norms for 15 sectors

Vikas Dhoot

The latest changes to the country's foreign direct investment or FDI policy could end up hurting the government's ambition to make India a global manufacturing hub, as they have introduced an element of uncertainty over manufacturing investments where none existed before. The new FDI policy announced by the government ahead of Prime Minister Narendra Modi's visit to the United Kingdom and the G20 summit in Turkey last month, entailed liberalising norms for 15 sectors, including defence, construction, civil aviation, FM radio, single brand retail, private banks and manufacturing.

**Double whammy** - But the notification to effect these changes issued by the department of industrial policy and promotion on November 24, introduces the definition of what constitutes 'manufacture' within the purview of the FDI policy - which industry experts and representatives say could be a 'double whammy' for investments. Defining manufacturing in the FDI policy could end up restricting foreign investments in some sectors, including the likes of electronics and hardware manufacturing. At the same time, Indian firms are worried that this could open the door for competitors to make minor changes to imported goods and still call it 'manufacture'. "Indian manufacturing companies are now up in arms against this definition because they believe that under this definition, foreign companies will effect minor modifications to goods and re-label them as "Made in India", which will make similar Indian goods less competitive," Akil Hirani, Managing Partner at Majmudar and Partners, an international law firm told The Hindu. "The government, although well-intentioned, could have done without this definition because definitions are prone to interpretations which can vary and, thereby, cause ambiguity," Mr. Hirani said. The FDI policy has defined manufacture, with its grammatical variations, as a change in a non-living physical object, resulting in transformation of the object into a new and distinct article having a different name, character and use, or bringing into existence of a new and distinct thing with a different chemical composition or integral structure. The CEO of an information, communications, technology and electronics (ICTE) hardware company said that the definition of manufacture would lead to a lot of unnecessary litigation by the excise, service tax departments and other government agencies. Manufacturing is defined differently in the excise, service tax and income tax laws. However, the definition in the FDI policy is based on the income tax law.

**Traditional sectors** - "Why have multiple definitions in the first place? And if the FDI policy must lay out what is manufacturing, it could have simply referred to the definition under the excise law where the Supreme Court has laid down a lot of norms on what constitutes manufacture," said Dhiraj Mathur, partner (regulatory affairs) at consulting firm PwC. Mr. Mathur said that though this discrepancy may not impact traditional manufacturing sectors, it would be a source of confusion in some sectors, including electronics and IT. "If a company assembles various computer hardware and embeds it with software, I would define it as manufacturing, but it may not be so clear as per the definition in the FDI policy," he pointed out. In the case of a conflict between the FDI policy and excise law definitions of manufacturing, Mr. Mathur said that the Central Excise Act of 1944 would prevail as it is a law passed by Parliament, while the FDI policy is based on an executive decision. As per Section 2 (f) of the excise law, 'manufacture' includes any process, incidental and ancillary to the completion of a manufactured product. The law separately specifies the goods that come under its ambit, with a separate schedule that lists goods, whose packing, labelling or alterations made to make it marketable to consumers also constitute manufacture. "With the Goods and Services Tax regime coming in soon, why do we want to get into this hair-splitting over a new interpretation of manufacturing now?" asked the hardware company's CEO, who did not wish to be identified owing to the sensitivity of the matter. Under the new FDI policy, slitting complex films for electronic capacitors, testing, etching a surface etc. may be declared as not manufacturing, for instance, he said, stressing that the issue is being discussed among industry bodies. These FDI reforms are 'one more proof of



The intent of this policy seems to be to encourage firms to Make In India and sell it in any mode they prefer, in the context of single brand retail firms that were already allowed 100 per cent FDI, but couldn't sell online so far

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part-2

## Latest FDI reforms could hit Make in India

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minimum government and maximum governance... opening up the manufacturing sector for wholesale, retail and e-commerce so that the industries are motivated to Make In India and sell it to the customers here instead of importing from other countries,' the commerce and industry ministry had said in a statement on November 10. Rajat Mukherjee, partner at law firm Khaitan & Co, said that FDI in manufacturing was always allowed at 100 per cent, barring the few sectors that were reserved in the past for small-scale industries. "The intent of this policy seems to be to encourage firms to Make in India and sell it in any mode they prefer, in the context of single brand retail firms that were already allowed 100 per cent FDI, but couldn't sell online so far," he said. "But the definition of manufacture leaves room for problems, when taken together with the conditions imposed on Indian manufacturers with branded goods," he added.

**New conditions** - Indian manufacturers can now sell their own 'branded products' in any manner, including online, but the FDI policy places onerous conditions on them. They must own the Indian brand and manufacture at least 70 per cent in value terms of its products in-house within India, and source a maximum of 30 per cent from other Indian manufacturers. Further, the Indian brand must be owned and controlled by resident Indian citizens and/or companies that are owned and controlled by resident Indian citizens. "These additions are confusing and it is unclear whether it will apply only to Indian manufacturing companies or to foreign companies who also have established Indian manufacturing subsidiary or joint venture companies," said Mr. Hirani, adding that the government needs to clarify this.

Deccan Herald

13 December 2015

## Japan to be regular at Malabar exercise

**Abe-Modi Meet: Leaders urge nations to avoid unilateral actions in South China Sea**

Prime Minister Narendra Modi and his Japanese counterpart Shinzo Abe on Saturday agreed that Japan would now regularly join India and the US in the annual Malabar naval exercise. The move signals a growing convergence in strategic interests of the three nations in Asia Pacific and may be seen by Beijing as a bid to contain China. Modi and Abe also urged all states to avoid unilateral actions that could lead to tensions in South China Sea - a not-so-veiled call to Beijing to refrain from building new islands and airstrips in the disputed waters as well as from efforts to curb freedom of navigation and over-flight. A meeting between Modi and Abe saw New Delhi and Tokyo signing of two agreements, one for transfer of defence equipment and technology from Japan to India and another for protection of classified military information. The agreements are likely to set the stage for production of Japanese US-2 amphibious aircraft in India. New Delhi is also interested to get Japanese Soryu class submarines for Indian Navy. The two leaders also agreed to launch regular interactions between the officials of air forces of the two nations, apart from existing mechanisms for military-to-military dialogue and cooperation between the coast-guards. According to a joint statement, the two prime ministers were of the view that "full and effective implementation of the 2002 Declaration on the Conduct of Parties in the South China Sea and early conclusion of the negotiations to establish a Code of Conduct in the South China Sea by consensus will contribute to peace and stability of the region". They also decided to hold regular close consultations on the issues related to maritime safety and security of sea lanes of communication. Just a day after a commentary on Chinese state-run newspaper "Global Times" termed Abe's visit to New Delhi and his meeting with Modi as part of Tokyo's strategy to contain China, the two prime ministers noted that "stability and development in the Indo-Pacific region" was "indispensable to national security and prosperity" of India and Japan. They reaffirmed that close cooperation between Japan and India was the "key to achieving peace and stability in the region". Though the Malabar exercise has so far been an annual bilateral drill by the navies of India and US, Japan's Maritime Self Defence Force participated in it in the Bay of Bengal last October. In September, India held a bilateral naval exercise with Australia off the coast of Vizag in Bay of Bengal. New Delhi's moves are intended to flex its maritime muscles in response to China's growing assertiveness in the Indian Ocean. In 2007, India joined the US, Australia, Japan and Singapore for the 'Malabar' naval exercise in Bay of Bengal. The five-nation drill had purportedly rattled China, which had earlier that year issued strong demarches to New Delhi, Washington, Canberra and Tokyo seeking to know details of a quadrilateral initiative launched by the four nations.

# A cannon yet to fire - not a single big ticket proposal

**India is still reliant on importing military equipment to fulfil its short-term needs**

**Jayant Sriram**

**Where does India stand on defence manufacturing and how have the government's recent moves on easing FDI norms and ease of doing business helped the sector?**

The reality on the ground, according to several senior analysts is that little has come in by way of tangible large investments and for now India is still reliant on importing military equipment to fulfil its short term needs.

**Why is this still the case?**

Following on the heels of its heavy defeat in the Bihar elections, the NDA government moved quickly to ease FDI regulations for several key sectors including defence. The government allowed foreign investment up to 49 per cent under the automatic route, from the earlier government approval route. It also stipulated that investments exceeding 49 per cent would now be cleared by the Foreign Investment Promotion Board rather than going through the more circuitous route of the Cabinet Committee on Security. Yet, more than a year after the NDA government first announced that it would increase the FDI cap in the defence sector to 49 per cent, from 26 per cent, there is still a reluctance on the part of most global majors to come in with a significant project. Part of this problem is linked to an ongoing debate about whether 49 per cent is actually enough given that the limit is designed to ensure that control of the venture remains with the Indian companies. From an industry perspective it's long been the opinion of several analysts that unless the FDI cap is increased to at least 74 per cent things are unlikely to move on the ground. Most other developed countries have recognised the fact that defence production necessarily involves a series of international collaborations. However, as India gradually opens up the sector there remains a lingering sense of mistrust among Indian companies who don't want to lose control of the venture. Conversely, foreign firms are unwilling to transfer high-end technology unless the cap is increased to a level above 50 per cent (and perhaps significantly more), because it simply doesn't make business sense.

**But is the debate about investment caps merely a superficial one that covers up some deeper issues with policy planning in defence?**

Amit Cowshish, a former financial advisor to the Ministry of Defence, explained that in reality there has always been a provision to raise the cap over 49 per cent if it involved a significant transfer of high-tech technology. In September this year, a U.S. official noted that when there was 'industry anxiety over control of technology' then the FDI limit would be increased on a case-to-case basis. Yet despite this clause there has not been a single big ticket proposal for investment. Figures tabled in parliament in March showed that the government has got just six FDI proposals worth a paltry Rs 96 crore (\$15.3 million) in the defence production sector, with only two of them being for 49 percent. This was for a period of seven months and the situation hasn't really improved since. In the meantime, India's defence expenditure is expected to accelerate heavily over the next three decades, with the country expected to spend another \$120 billion on arms acquisition over the next 10 years. Given such a large domestic need, why have Indian companies continued to be such poor suppliers and why are foreign companies still unwilling to invest given the potentially huge market. "Design and Development projects usually entail a long gestation period and there is an inherent risk of failure," Mr. Cowshish observed. "Therefore no one would run the risk of making heavy investments in such projects unless there is a guarantee of orders coming in and clarity on the exact nature of the domestic market," he said. There is therefore a catch 22 situation where local manufacturers like Bharat Forge, L&T and Tata require high-end technology to scale up manufacturing but there is no clarity from the MoD on what exactly its requirements are. "On the MoD website there is a document called the Technology Prospectus and Capability Roadmap but the targets mentioned here are vague with no idea even of what the requirements are over the next five or even fifteen years," Mr. Cowshish pointed out. "And it is difficult to make out a business case from this document." Another senior industry analysts points out that India has a history of dragging its feet on defence deals. Added to this is the fact now that the Make in India campaign sends out mixed signals with regards to foreign investment. "There is a hesitation on the part of foreign companies because they don't know where they are going to fit in. It's clear that the MoD will now prioritise Indian manufacturing," he explained. The central government is now cognizant of the fact that the majority of technology, at least for the short term, has to come in the form of off-the-shelf purchases like the Rafale deal. In the long term, the plan may be to have Indian companies scale up to the level of a Lockheed or a Boeing.

**But can this be done without properly addressing the issue of creating an ecosystem for the same?**

Contd...

part-2

## A cannon yet to fire - not a single big ticket proposal

Contd...

According to Rear Admiral (Retd.) Vijai S Chaudhari, Additional Director of the Centre for Joint Warfare Studies, a few policy correctives to improve the ease of doing business are imperative. "To start with if a company is going to spend so much money on a project there is not even now the guarantee of export even to a benign country. It will be dealt with on a case to case basis," he explained. The other major stumbling block is India's Defence Procurement Policy (DPP) that keeps getting updated every few years. "There was a proposal sometime back to allow someone who has signed under the old policy to migrate easily to the new one but that was rejected," Mr. Chaudhari said. The reason the DPP goes through periodic revisions, he said, is that India has always remained cautious about big bang reforms in the sector and so change is always piecemeal. This FDI phobia, he pointed out, has to change. "The final nail on the coffin is that there is a clause in the DPP which says that in case of a foreign collaboration the department will nominate the production agency," Mr. Chaudhari said. "This would stack the odds very much in favour of a PSU. The better alternative would be to let a potential bidder reach his own agreement with a private agency."

The Pioneer

13 December 2015

## Modi, Abe scale up Defence cooperation

For the first time, India and Japan on Saturday forged Defence ties with both the countries agreeing to cooperate in the joint development and production of weapon systems, including submarines and amphibious aircraft. Japan also agreed to regularly take part in the Malabar series of Naval exercises held every two years. So far, these exercises were bilateral, involving Indian and US Navy, with Japan taking part off and on like it did this year in October. These key pacts were signed during the summit-level talks between Prime Minister Narendra Modi and his Japanese counterpart Shinzo Abe here on Saturday. Terming these agreements as "decisive steps in our security cooperation", Modi said they will deepen the Defence relations and promote Defence manufacturing in India. "This builds on our decision to expand staff talks to all three wings of the Armed Forces and make Japan a partner in Malabar Naval Exercises," he added. The two leaders also issued a joint statement on 'India and Japan Vision 2025: Special Strategic and Global Partnership Working Together for Peace and Prosperity of the Indo-Pacific Region and the World.' The joint statement said the two Prime Ministers view that imperatives of a stronger bilateral strategic partnership require deep and broad-based cooperation and concrete actions in Defence, security. It said the Defence agreements signed further strengthen the foundation of "deep strategic ties." Taking note of the agreements, the two leaders reaffirmed their commitment to continue discussions to deepen the bilateral Defence relationship - including two-way collaboration and technology cooperation, co-development and co-production. "The two Prime Ministers expressed their intention to explore potential future projects on Defence equipment and technology cooperation such as US-2 amphibian aircraft," the statement said. Japan had offered its Shinmayawa US-2 amphibious aircraft to India nearly three years back to meet the Navy's requirement for at least 12 such planes which can land at sea surface as well on land. It was for the first time since World War-II that Japan was willing to sell Defence equipment to another country. The two countries have held preliminary talks about the proposed deal and New Delhi wants Tokyo to build these planes as part of 'Make in India' initiative to boost the Indian industry. The summit talks between the two Prime Ministers will now give momentum to the deal, officials said. Similarly, India has invited Japan to take part in its Rs 50,000-crore plan to build six conventional submarines as part of 'Make in India' drive. Japan manufactures Soryu class of submarines and India wants it to take part in Project-75 I for building six submarines in Indian yards. Other countries -- including France, Germany and Russia -- are also keen to vie for this lucrative contract. Meanwhile, the two PMs also reaffirmed their desire to further develop dialogue and exchanges between the two countries in the security and Defence fields, including through the full utilisation of '2+2 Dialogue', Defence Policy Dialogue, Military-to-Military Talks and Coast Guard to Coast Guard cooperation. The leaders also appreciated the decision to begin Air Force-to-Air Force Staff Talks. On joint Defence production, Modi and Abe welcomed the conclusion of the Agreement concerning the Transfer of the Defence Equipment and Technology and the Agreement concerning Security Measures for the Protection of Classified Military Information, which further strengthens the foundation of deep strategic ties.

## Nuclear deal hinges on Abe's political skills

Kallol Bhattacharjee

Japan had previously insisted on the "nullification clause" which would allow automatic freezing of India-Japan nuclear ties if New Delhi carried out any further nuclear tests. The civilian nuclear deal between India and Japan which has been under negotiation since 2010 finally might move beyond the "nullification clause" which had been the major condition that Japan refused to compromise on in the previous rounds of negotiations. However, complex legislative negotiation in Tokyo will determine how fast both sides can finalise the draft of the civilian nuclear energy treaty. Speaking to The Hindu, Yasuhisa Kawamura, Director General of Press and Public Diplomacy of the Ministry of Foreign Affairs of Japan said the latest round of negotiations has not imposed any restrictive measures on India. "Japan is satisfied by the fact that India has a voluntary moratorium on further nuclear testing. Earlier India separated its military and civilian nuclear programme and that apart we also appreciate India's policy on reprocessing of spent nuclear fuel which provides further safeguards," Mr Kawamura said. In view of the several steps that India has already taken in the field of nuclear safety and nuclear fuel reprocessing, Japan has not insisted on any "nullification clause" during the latest round of negotiations, Mr Kawamura said. It is this relaxation of some of the past rigidity which paved the way for the MoU on the principles of negotiation exchanged during the latest visit by Prime Minister Shinzo Abe to India. Japan had previously insisted on the "nullification clause" which would allow automatic freezing of India-Japan nuclear ties if New Delhi carried out any further nuclear tests. Nuclear experts and commentators are however, pointing out that Prime Minister Shinzo Abe will find it tough to justify discarding of the "nullification clause" in the Japanese parliament. Prof Anuradha Chenoy, Dean, School of International Studies, JNU, told The Hindu that the sidelining of the "nullification clause" is meant to save the nuclear deal but a lot will depend in the coming months on the political acumen of Mr. Abe and his cross-party networking in the Japanese parliament. Arundhati Ghose, India's former Permanent Representative to the Conference on Disarmament (CD) said the commercial pragmatism of the Japanese nuclear lobby will help in finalising the deal soon. "The specificity of the Japan-India civil nuclear negotiation is its commercial aspect. Because of the commercial aspect, Mr Abe is under pressure from Japanese nuclear energy giants like Toshiba and Hitachi, who own American nuclear energy firms like Westinghouse and GE. In brief, Mr Abe will have to free Japanese nuclear companies so that the American companies can benefit from energy deals with India, as without that, the India-U.S. nuclear deal remains unfulfilled too," Ms Ghose explained. Finalisation of the deal will signal an irreversible change in the international civilian nuclear market of which India is poised to be a major consumer.

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Deccan Herald

12 December 2015

## Isro to launch six Singapore satellites

Indian space scientists will launch a Polar Satellite Launch Vehicle (PSLV) rocket carrying six Singapore satellites on December 16 at Sriharikota. Indian Space Research Organisation (Isro) on Friday said the Mission Readiness Review Committee (MRRC), which approved the launch will soon meet to decide the countdown activities of the rocket. Isro's most trusted rocket and workhorse launch vehicle PSLV-C29 will carry these six satellite to put into 550 km circular orbit after its takeoff at the first launch pad in Satish Dhawan Space Centre (SDSC), about 90 km north of Chennai. "It is a commercial launch. The countdown for the launch is expected to begin on December 14 after approval of MRRC," a senior Isro official said on Friday. According to him, of these six satellites, TeLEOS-1 is the primary satellite weighing 400 kg whereas the other five are co-passenger satellites, which include two micro-satellites and three nano-satellites. This is the eleventh flight of PSLV in "core-alone" configuration that will not use the solid strap-on motors. The official said the TeLEOS-1 is the first Singapore commercial earth observation satellite designed and developed by ST Electronics. This electro-optical satellite is to be launched into a low earth orbit for remote sensing applications. In 2015 calendar year, Isro has launched 14 satellites (3 Indian and 11 foreign) from Sriharikota till date. Thirteen satellites were launched with PSLV rocket and one communication satellite - GSAT-6 -with geosynchronous satellite launch vehicle (GSLV). When the December 16 PSLV-C-29 launch turns successful, then the total number of satellite launched from India will be 20. In November, a communication satellite - GSAT-15 - using the Ariane rocket of the European space agency was launched taking the total in 2015 to 21 (17 foreign, 4 Indian).

## At India-Nepal border, a pile-up of angst, anxiety and 'betrayal'

Indrani Bagchi

It's called the Maitri Bridge. But "maitri (friendship)" is the last thing on everyone's mind here. Linking Nepal's Birgunj with India's Raxaul is a dusty connector overrun with motorcycles, tongas, rickshaws and cycles. Since September, a bamboo-and-plastic shelter has partially covered it, protestors camping inside imposing a blockade on themselves, refusing food, fuel and essentials supplies from India to get in. There are no police lines here or agitators visible, just people hurrying to Raxaul to pick up supplies. Any police force should have broken the protest. But for three months, the stir has continued. How? "Thousands converge here within minutes to take on the police," Aslam, an agitator, says. Policemen have beaten up protestors. But only one day they managed to clear the bridge for stranded Indian trucks to return. Birgunj is the nerve centre of the Madhesi protests against Kathmandu and its elite. Although the border has about 20 transit points, over 60% of trade is through Birgunj. That's been closed for three months. Factories in and around Birgunj are shut. Last week, schools opened for a few hours every day. No cars ply here, motorbikes are the only way to get around quickly. Petrol and diesel sell in plastic bottles, dirt cheap. "We have strong roti-beti ties with Indians. My wife is Indian, now I don't know if my daughter will be a Nepalese citizen by birth or naturalization," says Om Prakash Sikariya a businessman. The new Nepal constitution says children born to a Nepalese women marrying foreigners would be naturalized citizens, not by descent. They'll be denied employment in certain government positions. This is believed to be against the Terai people who marry Indians. "We won't budge," says Ram Sahay, a protest leader. "Yeh aar-paar ki ladaai hai," Munni Srivastava, who heads the Mahila Morcha cuts in. "The Terai people are with us," Sahay adds. The protestor's rallying cry has so far been: "ek Madhes, ek pradesh." None wants it to morph into: "ek Madhes, ek Desh." That's what Indian officials, both in Delhi and Nepal, fear. "We don't want Birgunj to be the next Jaffna," an Indian official says. India's official presence in Birgunj is led by a feisty foreign service official, Anju Ranjan. Anju has ensured that Indian trucks and interests aren't harmed, stressing that the blockade isn't India's doing. "The dry port (where goods from third countries come in) is working. If we wanted a blockade, why would we allow it to function? Indian trucks don't want to come because of the agitation," Ranjan reasons.

**ANTI-INDIA** - But everyone in Nepal is convinced India is imposing a version of economic sanctions. Last week, India was for the first time criticized in the Nepal parliament. Protests are common outside the Indian embassy in Kathmandu. But Ambassador Ranjit Rae insists: "India's on the right side of history." That may be the case, but, for now, every Nepalese news channel has a single bugbear: India. This has enabled the Nepali leadership maintain the fiction in Kathmandu that the problem is being created by India, not a section of their own people. The anger in Kathmandu centres on Indian "interference" in Nepal's internal matters. Kathmandu residents feel the blockade pinch most. There are queues outside filling stations, sometimes the wait is for two days. Everything is expensive. In the Terai, the anti-India resentment remains equally strong. The blockade has impacted the livelihoods of the business community. Community members, generally Marwaris, are somewhat unsure of the Madhesis. They have a relationship with the hill people, but Madhesis are unknown. Madhesis often look at India as a close relative. But some concede: they want India to be proactive.

**CHINA CARD** - India has been wary of being upstaged by China in Nepal. This time too, Kathmandu turned to Beijing for fuel supplies. After an agreement with China, on October 28 for 1,000 metric tons of fuel came through its border post at Rasuwagadi. Until the protests, India supplied 1.3 million tonnes of petroleum products worth Rs 9,000 crore annually. But now more trucks aren't taking the quake-hit highway from China. Negotiations with Beijing on a longterm fuel deal have slowed after differences over whether China should waive taxes on the supplies.

**QUIET BORDER** - Many trucks have returned from Birgunj. But this town has learnt to live with the "blockade" - it's now a thriving centre of a parallel black economy. Fuel slips in, so do other supplies. At evening shops are lit up, shelves stocked. In fact, all over Nepal a parallel economy has sprung up and many are benefiting from the so-called blockade. After refusing to mediate between Madhesis and Kathmandu, India capitulated, hosting Kamal Thapa, Nepal's foreign minister. He came with a written assurance that key Madhes demands would be met.



## Lakhs at risk as Jabalpur sits on Kargil duds, Russian RDX

P Naveen

Thousands of unexploded and rejected bombs from 1999 Kargil war lie buried in the premises of Ordnance Factory Khamaria (OFK), located in a densely populated area in Jabalpur town in Madhya Pradesh, posing a huge security risk for the town which also happens to be quake prone. The danger to OFK can be huge given reports of sporadic explosions on the premises in the last few years: The latest incident occurred as recent as Friday night when two employees were injured in a minor explosion. Insiders claim over a lakh of 84mm mortars, L70 and BMP2 shells are stockpiled underground at OFK. These detonators have corroded to the point where it is dangerous to defuse them, sources said. Besides, there was risk of spontaneous combustion due to rapid deterioration of the duds. Magazine F12, where the Kargil explosives are stored, is out of bounds for employees as it was recently sealed by OFK authorities. Among the explosives that are stored in F12 are bombs, mortars, improvised explosive devices (IEDs), artillery shells, rockets, torpedoes and grenades. "We have raised the issue with authorities several times, but nobody is willing to take the risk. The dump at OFK has enough ammunition to go to war with any country," said Arun Dubey, member, joint consultation machinery (JCM) at Khamaria, which is under ministry of defence. What's also ringing alarm bells at OFK is the stock of 4000-kg RDX supplied by Russian state arms export agency M/s Rosoboronexport in 2003. "Russian RDX worth crores had failed quality check and could not be used. There were several communications between OFK and the Russian agency on the issue. In 2014, the agency replaced the stock without taking back the inferior RDX," claimed an OFK employee. Besides Kargil explosives, a stockpile of rejected bombs is also awaiting disposal at the ordnance factory, which was hastily set up by the British in 1942 at the peak of World War II to feed Allied forces in Africa and Eastern Europe. There was a series of communications between OFK and higher authorities in the ministry of defence over transportation and disposal of these explosives, but nothing moved, sources said. "Nobody knows the exact quantum of explosives stored. General managers are posted and transferred. The bosses concentrate on their production targets, not disposal," said Dubey. However, he added that OKF ensures safety protocols to avert accidents. There are several bomb storage magazines across 7000-acre ordnance factory, most of them being from the British era. The magazines also contain raw material for assembly of L77, VMP 2, 551, SSAPDS 125mm, 36mm GHASA, 23mm Silka and Adan bombs. While OFK general manager Sanjeev Gupta is on tour, assistant GM AK Thakur refused to comment. "I have recently joined and let me settle down," he said. General secretary of Intuc unit of OFK K B S Chouhan said there is no policy to dispose these explosives. "Disposal should be planned to avert accidents. Earlier, OFK was a forested area but is now an urban cluster. High-intensity bombs cannot be defused here," he said.

### TICKING BOMB



Incidents of sporadic explosions on the OFK premises had been reported in the last few years: The latest incident occurred last Friday when two employees were injured in a minor explosion

# Can cyber warfare be deterred?

Joseph S. Nye

Fear of a "cyber Pearl Harbor" first appeared in the 1990s and for the past two decades, policymakers have worried that hackers could blow up oil pipelines, contaminate the water supply, open floodgates and send airplanes on collision courses by hacking air traffic control systems. In 2012, then US Secretary of Defense Leon Panetta warned that hackers could "shut down the power grid across large parts of the country." None of these catastrophic scenarios has occurred, but they certainly cannot be ruled out. At a more modest level, hackers were able to destroy a blast furnace at a German steel mill last year. So the security question is straightforward: Can such destructive actions be deterred? It is sometimes said that deterrence is not an effective strategy in cyberspace, because of the difficulties in attributing the source of an attack and because of the large and diverse number of state and non-state actors involved. We are often not sure whose assets we can hold at risk and for how long. Attribution is, indeed, a serious problem. How can you retaliate when there is no return address? Nuclear attribution is not perfect, but there are only nine states with nuclear weapons; the isotopic identifiers of their nuclear materials are relatively well known; and non-state actors face high entry barriers. None of this is true in cyberspace where a weapon can consist of a few lines of code that can be invented (or purchased on the so-called dark web) by any number of state or non-state actors. A sophisticated attacker can hide the point of origin behind the false flags of several remote servers. While forensics can handle many "hops" among servers, it often takes time. For example, an attack in 2014 in which 76 million client addresses were stolen from JPMorgan Chase was widely attributed to Russia. By 2015, however, the US Department of Justice identified the perpetrators as a sophisticated criminal gang led by two Israelis and an American citizen who lives in Moscow and Tel Aviv. Attribution, however, is a matter of degree. Despite the dangers of false flags and the difficulty of obtaining prompt, high-quality attribution that would stand up in a court of law, there is often enough attribution to enable deterrence. For example, in the 2014 attack on SONY Pictures, the United States initially tried to avoid full disclosure of the means by which it attributed the attack to North Korea, and encountered widespread skepticism as a result. Within weeks, a press leak revealed that the US had access to North Korean networks. Skepticism diminished, but at the cost of revealing a sensitive source of intelligence. Prompt, high-quality attribution is often difficult and costly, but not impossible. Not only are governments improving their capabilities but many private-sector companies are entering the game, and their participation reduces the costs to governments of having to disclose sensitive sources. Many situations are matters of degree, and as technology improves the forensics of attribution, the strength of deterrence may increase. Moreover, analysts should not limit themselves to the classic instruments of punishment and denial as they assess cyber deterrence. Attention should also be paid to deterrence by economic entanglement and by norms. Economic entanglement can alter the cost-benefit calculation of a major state like China, where the blowback effects of an attack on, say, the US power grid could hurt the Chinese economy. Entanglement probably has little effect on a state like North Korea, which is weakly linked to the global economy. It is not clear how much entanglement affects non-state actors. Some may be like parasites that suffer if they kill their host, but others may be indifferent to such effects. As for norms, major states have agreed that cyber war will be limited by the law of armed conflict, which requires discrimination between military and civilian targets and proportionality in terms of consequences. Last July, the United Nations Group of Government Experts recommended excluding civilian targets from cyber attacks and that norm was endorsed at last month's G-20 summit. It has been suggested that one reason why cyber weapons have not been used more in war thus far stems precisely from uncertainty about the effects on civilian targets and unpredictable consequences. Such norms may have deterred the use of cyber weapons in US actions against Iraqi and Libyan air defenses. And the use of cyber instruments in Russia's "hybrid" wars in Georgia and Ukraine has been relatively limited. The relationship among the variables in cyber deterrence is a dynamic one that will be affected by technology and learning, with innovation occurring at a faster pace than was true of nuclear weapons. Cyber learning is also important. As states and organizations come to understand better the importance of the Internet to their economic wellbeing, cost-benefit calculations of the utility of cyber warfare may change, just as learning over time altered the understanding of the costs of nuclear warfare. Unlike the nuclear age, when it comes to deterrence in the cyber era, one size does not fit all. Or are we prisoners of an overly simple image of the past? After all, when nuclear punishment seemed too draconian to be credible, the US adopted a conventional flexible response to add an element of denial in its effort to deter a Soviet invasion of Western Europe. And while the US never agreed to a formal norm of "no first use of nuclear weapons," eventually such a taboo evolved, at least among the major states. Deterrence in the cyber era may not be what it used to be, but maybe it never was.

## Nuclear cooperation to bring state-of-the-art reactors

**Pramit Pal Chaudhuri**

India will be able to access a new generation of nuclear reactors, over 1,000 MW and hi-tech safety features, with the finalising of the IndoJapanese nuclear agreement. Sources say Westinghouse is readying to offer a deal under which India would buy six of its state-of-the-art AP1000 reactors by March next year. Though a US-based firm, Westinghouse is a wholly-owned subsidiary of the Japanese firm Toshiba. Prime Ministers Narendra Modi and Shinzo Abe announced on Saturday that negotiations for a bilateral civil nuclear agreement had been successfully concluded. A lot of technical details as well ratification by the Japanese Diet still has to be done, but the diplomatic work is over. Japanese companies are world leaders in nuclear technology, say Indian sources. Whether a reactor is French or Korean, key components like reactor vessels are the monopoly of Japanese firms like JSW. Only Russian reactors are not dependent on Japanese parts, but their reactors are limited to 1,000 MW and have outdated safety technology. Indian officials noted there were actually no "American reactors", only Japanese. Westinghouse is a Toshiba subsidiary and even the GE reactor core is built by Hitachi. In other areas, said officials, like nuclear fuel fabrication and breeder technology the Japanese are the best or at the least very close to being so. "Having the Japanese on your side makes nuclear arrangements with other countries much easier," said a senior Indian official. Even as Abe arrived in India on Friday, the two sides were still talking. "The last parts were agreed on Friday night, but we received confirmation from Tokyo only on Saturday morning," said one of the negotiating team. India and Japan have struggled with civil nuclear talks since New Delhi struck a similar deal with Washington. Because of the Hiroshima-Nagasaki legacy, Tokyo had asked for further commitments from New Delhi on issues like nuclear testing and disarmament. India, however, insisted it could not go beyond what it had agreed to with the US. The diplomatic compromise was to explore areas of nuclear cooperation which were not covered in detail in the Indo-US agreement, said Japanese sources. "This way the substantive part of the detail remained true to the template of the Indo-US agreement," said an Indian official. One of these grey areas that the two found common ground was nuclear safety, a Japanese concern since their own Fukushima disaster. "That was something prominent with the Japanese public and plus for India as well," the official added. It is known that earlier rounds of negotiations were successful in everything except three areas. Two of them were resolved in talks between April and October. The last pending issue revolved around termination - the circumstances under which Japan could cancel the agreement - and how this would affect bilateral work in the ultra-sensitive field of reprocessing technology. Reprocessing allows a country to separate potentially weapons-grade plutonium from nuclear waste. Reportedly there are some tricky areas where India and Japan have reached a gentleman's agreement to not write down specific clauses, but allow the other side to revert to its own internal procedures.



A model panel of an AP1000 nuclear reactor.

**The Hindu**

**14 December 2015**

## ISRO gears up for PSLV C-29 launch

**G. Ravi Kiran**

According to officials, this will be the 32nd flight for the Polar Satellite Launch Vehicle. Through this launch, ISRO will be sending six satellites belonging to Singapore. Space scientists of the Indian Space Research Organisation (ISRO) are all set to launch the PSLV C-29 rocket from the Sriharikota space centre in Nellore district here on December 16 at 6 p.m. Through this launch, ISRO will be sending six satellites belonging to Singapore. Of these, the TeLEOS-1 will be the main satellite which weighs 400 kg and it is meant for remote sensing applications for commercial purposes. Officials of the Satish Dhawan Space Centre (SDSC) at Sriharikota said that the countdown for the PSLV C-29 launch will begin on Monday. This is the 32nd flight for the Polar Satellite Launch Vehicle. The launch will be made from the first launch pad of Sriharikota centre with the rocket having a lift off mass of nearly 227.6 tonnes. This is a core-alone model with no usage of solid strap on motors. The rocket will put the main satellite into a circular orbit at a distance of 550 km from the Earth.

## Teen invents noise-damping device

**P. Sujatha varma**

His model reduces sound generated by aircraft while landing and take-off. Participation in The Hindu 'Young Scientist' contest brought Y. Navadheer appreciation which set him on the path to glory. A student of Class 10 in St. John's English Medium High School, Gunadala, Vijayawada, the boy is basking in the novelty of his working models that demonstrate the mechanism to reduce sound pollution generated by an aircraft while landing and taking off, and air pollution by moving vehicles. Among the lakhs of entries the newspaper received, Navadheer's name was shortlisted among the 64 finalists who had the opportunity to visit Sriharikota, which houses the Satish Dhawan Space Centre.

**Visits to airport** - Explaining about the model designed to reduce the sound pollution generated by an aircraft while landing and take-off, he says several visits to the Gannavaram airport and interaction with officials there helped him understand the principle behind noise pollution. He realised that the turbo fan is responsible for the noise generated by a flight and used nichrome plates to give shape to his ideas. "Aeroplanes produce 140-150 dB of sound while landing or taking off, much higher than the permissible level of noise. Since pollution is an issue which touches every section of society, I decided to do something in this area," he explains. Impressed by the originality of his ideas, his uncle suggested that he protect the intellectual property rights by seeking patent over the products. He registered online in the website and was pleasantly surprised to receive a reply in 10 days. "It usually takes a minimum of six months for approval of the application. The fact that the first stage, the toughest of all in terms of the large volume of applications received, was a cakewalk pumped in enthusiasm and confidence in me." Of the long-winding path comprising 25 stages before achieving his goal, Navadheer has crossed 17 steps in a span of 10 months. "Mishelle K. Lee, chief secretary of the World Intellectual Patent Organisation (WIPO), an international organisation based in Geneva, Switzerland, which is the administrative body that oversees the filing of international applications under the PCT, has been in touch with the science wizard, guiding him in the complicated procedure of acquiring patent. Besides his regular study, Navadheer had to focus on the 2,000-odd pages patent rulebook. "It has been a learning experience; I have gone to different places, met important people in the course of this project," he says. The next task before the boy is to go around 20 States across India and make presentations for approval of the set of people engaged in the job of endorsing patent rights. "If I manage to get approval of at least four of these 20 destinations, I would earn for myself a 10-day trip to NASA and of course my ultimate objective of finding a market for my product across the world," he says enthusiastically. Navadheer's classmate P. Laya assisted him in the project which was made under the guidance of their physics teacher P.V.H.S. Brahmam.

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**The Hindustan Times**

**13 December 2015**

## Tech titans pledge \$1 bn for 'artificial intelligence'

Several big-name Silicon Valley figures have pledged \$1 billion to support a nonprofit firm that said it would focus on the "positive human impact" of artificial intelligence. Backers of the Open AI research group include Tesla and SpaceX entrepreneur Elon Musk, Y Combinator's Sam Altman, Linked In co-founder Reid Hoffman, and PayPal cofounder Peter Thiel. "It's hard to fathom how much human-level AI could benefit society, and it's equally hard to imagine how much it could damage society if built or used incorrectly," read the inaugural message posted on the OpenAI website. "Our goal is to advance digital intelligence in the way that is most likely to benefit humanity as a whole, unconstrained by a need to generate financial return," the statement read. The OpenAI funders "have committed \$1 billion, although we expect to only spend a tiny fraction of this in the next few years." Artificial intelligence is a red-hot field of research and investment for many tech companies and entrepreneurs. However, leading tech investors, including Musk, have expressed concern over the risks that artificial intelligence could pose to humanity if mismanaged, such as the potential emergence of "Terminator"-type killer robots. "We believe AI should be an extension of individual human wills and, in the spirit of liberty, as broadly and evenly distributed as is possible safely," read the statement, co-signed by the group's research director Ilya Sutskever.

# Gene editing on a roll, but safe to clear the way?

Global scientific opinion on germline editing, a new generation of genetic engineering techniques, is that it would be irresponsible to proceed with any clinical use until safety and efficiency issues are resolved

Anjali Thomas

A green translucent test tube, with a baby floating in it, greets you at the entrance of an in vitro fertilization (IVF) clinic in one of Bengaluru's leafy neighbourhoods. Spanning two storeys of the building, it is a rather literal interpretation of the test tube baby, and perhaps also a celebration of humankind's triumph over infertility. Through IVF, cells from embryos are being screened for specific genetic disorders. The genetically defective ones are eliminated. In principle, you can erase an inherited genetic disorder from a single generation of family. Now, the scientific community has the technology that can, in principle, be developed to make specific and targeted genetic alterations in embryos, which will be carried by all the cells of a resulting child and passed on to his/her offspring, a part of the human gene pool. In scientific jargon, it's called germline editing. The world over, laboratories have been conducting experiments and altering the genome of mice and other animals. Then, scientists in China used non-viable human embryos to modify the gene responsible for thalassaemia, an inherited blood disorder. The outcome of this experiment convinced them that it was too immature to edit human embryos. Nevertheless, there are rumours in the scientific community that similar experiments are being conducted on embryos. Using genome editing technology to reverse a defect in a human embryo, implant and then bring it to term is taboo. "Apart from the fact that it is unethical, the problem is that the current state of technology is imprecise, and there will be unintended consequences," says Dr. S. Ramaswamy, senior professor, Institute for Stem Cell Biology and Regenerative Medicine, Bengaluru. It is tempting to imagine permanently erasing of say BRAC1, the breast-cancer causing gene from the human genome. But the risk is too high. There are horrors hidden behind the banality of the term "unintended consequences". "We are not ready to play god," he says. At the heart of the debate is a powerful gene-editing technology, CRISPR-Cas9, which is relatively inexpensive, accessible and effective. Above all, it is easy to use if you have the right training. It brings the idea of designing a perfect human who is healthy and intelligent many steps closer to becoming a reality. But even if we do develop more accurate ways to edit our DNA, we do not have the means to predict the kind of damage that we could be causing. "It's hard to predict what will happen when we make changes in a single gene today," says Dr. Ramaswamy. With germline editing, the consequences will be felt for generations.

**No laws in India** - But the recent and growing tide of voices convey a sense of urgency. Is the sound and fury justified? For India, the answer is a yes. "The current technology can have success rates of anywhere between 10 to 40 per cent or even higher. That changes germline editing from a practical impossibility to very high probability," says neurobiologist Dr. Mitrdas Panicker, a professor at the National Centre of Biological Sciences (NCBS), Bengaluru. There is no law stopping research laboratories and private companies from using the technology to experiment on embryos. One of the reasons is the lack of consensus among regulatory bodies. "There is nothing stopping rogue practices and this has become a big issue," says Dr. Ramaswamy, adding that the Drug Controller General of India is trying to use interpretations of existing laws on drugs to clamp down on improper use. The United States has banned federal aid from being used to support germline editing while in the United Kingdom, you can apply to the regulatory body for a licence to edit the genomes of a human embryo, but only for research work. The embryos have to be destroyed within 14 days. The guidelines in India are in keeping with international regulations, though they cannot be enforced. The ones listed by the Indian Council of Medical Research clearly state that germline editing is forbidden, says Dr. Panicker. It is in the process of being legislated. "Editing embryonic stem cells could be very interesting for research purposes and in my view does not have the same ethical implications as editing the genome of a human embryo," said Natalie de Souza, chief editor, Nature Methods, in an email interview.

**Genomic medicine** - A degenerative eye disease called Retinitis pigmentosa affects one in 3,000 Indians, and is especially prevalent among families where there are consanguineous marriages. Blindness is inevitable. One of the ideas is that you take skin cells, or let's say a blood cell, and make them stem-cell like. The technical term is induced pluripotent cells where adult cells are genetically reprogrammed to give them properties of stem-like cells. "We can engineer these stem-like cells so that they don't carry the disease and then convert them into retinal cells. Using a scaffold - that may be generated by 3-D printing - we can generate sheets of these cells that can then be grafted into the patient through microsurgery," says Dr. Ramaswamy, adding that this could well become a reality within two to three years. At NCBS, Dr. Odity Mukherjee, Dr. Sanjeev Jain of the National

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## Gene editing on a roll, but safe to clear the way?

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Institute of Mental Health and Neurosciences, Dr. Panicker and their teams are also using human induced pluripotent cells to examine the Apolipoprotein-4 (APOE) gene, which is linked to Alzheimer's disease. Using CRISPR-Cas9, they are altering alternative forms of a gene found on the same place in the chromosome, or alleles, and examining their effects on neurons generated from these cells. "We are taking blood cells from individuals out and turning them into neurons. In these experiments, we need to create aberrant neurons and control neurons and characterise them" says Dr. Panicker. In Massachusetts, Editas Medicine, a company founded by some of the scientists who developed CRISPR-Cas 9 - there is an ongoing patent war on the technology - announced that although its focus is to correct disease-causing genes, it will use only somatic cells, or cells whose genome are not transmitted to the next generation. In August this year, it raised \$120 million from Bill Gates and other industry heavyweights. In the backdrop of calls for a ban or a moratorium on germline editing, hundreds of scientists from all over the world converged at the International Summit on Human Gene Editing, held on December 1-3, 2015, in Washington, D.C., to discuss scientific, medical, ethical, and governance issues associated with recent advances in human gene-editing research and also the the implications of this technology. After three days of debate, the summit announced that it would be irresponsible to proceed with any clinical use of germline editing until the relevant safety and efficiency issues were resolved. However, it stopped short of calling for a moratorium or a ban. Change is coming and it is time for India to weigh in on this debate.

The Hindu

14 December 2015

## Differentiation in climate responsibility now forward-looking: U.S.

Varghese K George

Differentiation in climate responsibility will now be a forward-looking concept, as opposed to the earlier backward-looking notion, a senior Obama administration official said hours after countries arrived at an agreement in Paris. The Paris agreement, among other things made emission cuts a responsibility of all countries - both the developing and the developed. "It [Paris agreement] revises the architecture of climate system with the means of differentiation that looks forward, not back. It provides for robust financial and technological support for the poor and developing countries with a strong participation of private sector. This was a very big deal, a long time coming," the official said, speaking on background, minutes before President Barack Obama made a TV appearance to hail the deal "historic." "We came together around a strong agreement the world needed," said Mr. Obama. "We met the moment.... This agreement represents the best chance we have to save the one planet that we have got." 'U.S.-China joint statement, a key milestone' Explaining the background of the deal, the official said Mr. Obama had resolved soon after the failed 2009 Copenhagen climate conference that progress had to be made on this front. "As a result, you saw a deliberate strategy unfold over the course of several years. What has been agreed in Paris fundamentally change the dynamic of climate talks," the official said. He said the President's strategy had been to turn the debate domestically and internationally simultaneously. "Strong domestic action is the foundation of the U.S leadership across the globe to change the international dynamic," he said. The official said reaching out to China culminating in the U.S-China joint statement of November 2014 was the key milestone in the route to Paris. He said building on the success with China, President Obama could get India, Brazil and Mexico on board subsequently. "Strong accountability and transparency system for both developed and developing countries," he said. While it is clear that Mr. Obama's attempt will be to project the Paris climate agreement as the finest feather in his presidential cap, he is certain to face criticism from two opposite perspectives. One section believes that the agreement does too little to deal with climate challenges - Democratic presidential candidate Bernie Sanders tweeted that the agreement is not bold enough though it is in the right direction. The other section believes America would be conceding too much in terms of finances and emission cuts. Senate Environment and Public Works Committee chairman Jim Inhofe said nations like China and India, were not being held to high standards and the administration had no power to commit finances without Congressional approval. The administration official that briefed the media, however, said no Congressional approval was necessary for the rollout of the agreement. "Sceptics can remain sceptics. But the tide of history is moving with us. Paris represents a watershed," he said.

# What technology trends to expect in 2016

Peerzada Abrar

With more inventions and innovations in tech than ever, one may even witness a Bot that will keep us company or possibly make us fall in love. Now more than ever, emerging technology breakthroughs are outpacing the evolution of public policies and discussions regarding ethics, says the Webbmedia Group's 2016 Trend Report. As human beings, our evolutionary response to complicated technologies we don't understand is either to ignore them or to fear the worst, it says. As a result, 2015 was a year marked by poor decisions made by several companies and governmental agencies, many of which advocated for short-sighted policy. Businesses didn't work hard enough to secure their data. News organisations published lots of incendiary pieces about job-killing robots and artificial intelligence powered supercomputers which might eradicate our species. Retailers made deals for our medical data. Researchers figured out how to edit and re-implant DNA. Facebook ran experiments on our news feeds. "Technology can be simultaneously exciting, bewildering, thrilling, confounding and terrifying in the present," says the Webbmedia Group's report. As we approach 2016, it is a good time to look at technologies that will influence consumer behaviour, society, organisations and also give rise to startups to disrupt the market. Here are few of the emerging technology trends collated by Webbmedia Group's 2016 Trend Report.

**Bots** - Software applications that run automated tasks are called bots. 2016 will bring a host of creative bots that will supercharge our productivity, keep us company, and possibly make us fall in love. Microsoft's experimental Mandarin-language bot, Xiaolce, is akin to Samantha in the movie Her. She lives inside a smartphone and has intimate conversations with her users, because the program is able to remember details from previous conversations. She also mines the Chinese internet for human conversations in order to synthesize chat sessions. We'll see advanced bots manipulating social media and stocks simultaneously. The intelligence community might deploy bots for surveillance and for digital diplomacy.

**Algorithmic personality detection** - Did you know that some life insurance underwriters are attempting to assess your personality -- via your magazine and website subscriptions, the photos you post to social media, and more -- in order to determine how risky an investment you are? Some lenders have used personality algorithms to predict your future financial transactions. Algorithms will harness your data in order to assess your predicted success at work, how likely you are to bounce around jobs and more.

**Algorithms for design** - Algorithms are coming to runways soon. Startup KnitYak uses elementary cellular automata to create one-of-a-kind scarves out of merino wool. Designs are based on a perpetually-changing algorithm. Similar techniques are being used to create unique fabrics and 3D-printed clothing, shoes and jeans that fit. Within the coming year, robotic 3D printing company MX3D will use tech firm Autodesk's design system Dreamcatcher to design, print, troubleshoot and install a working bridge.

**Deep learning** - Artificially intelligent computers are now capable of deep learning using human brain-like neural networks. Facebook is using this technology to automatically generate face prints -- which is like a fingerprint, but using our photos instead. Scientists at the Karlsruhe Institute of Technology developed a deep neural network that can automatically identify people's faces using infrared cameras -- law enforcement will soon be able to see as clearly in total darkness as they can in the bright daylight.

**Cognitive computing** - Cognitive computing systems use natural language processing and artificial intelligence in order to understand our intentions. IBM's supercomputer Watson is learning how to read and interpret medical images -- a job that was previously reserved for highly-trained radiologists. Watson is also being trained as a cancer expert, which will eventually advise community physicians and nurse practitioners. Working together with Watson, your local pharmacist may begin to offer you holistic advice and interventions.

**Personality analytics** - Emerging predictive analytics tools wrangle your data, behaviour and preferences

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## What technology trends to expect in 2016

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in order to map your personality -- and predict how you're likely to react in just about any situation. The U.S.-based startup Crystal culls thousands of public data sources to help you learn about someone's personality before calling or emailing them. It even offers a kind of spell check for sentiment, autocorrecting phrases and making recommendations so that the message resonates better with your intended recipient.

**Glitches** - Expect to hear more about 'glitches' in 2016. They're problems that don't have an immediate, obvious cause but nonetheless can cause frustrating problems. In 2013, technical glitches caused a three-hour stop at the Nasdaq. Last year, a glitch caused 5,000 United flights to be grounded for two hours. Technical glitches halted trading at the New York Stock Exchange recently. Glitches cause temporary outages -- and big headaches -- for streaming providers such as Dish's Sling TV, which interrupted service during the premiere of Walking Dead spinoff Fear the Walking Dead. Glitches at Netflix have caused outages and strange mashup summaries for different films. In many cases, glitches have to do with degraded network connectivity or a miscalculation of the bandwidth needed. But a lot of times, glitches have to do with newer technologies.

**Right to eavesdrop on and be eavesdropped upon** - As we connect more and more devices to the Internet of Things -- fitness trackers, mobile phones, cars, coffee makers -- those devices are having extended interactions with each other and the companies who make them. Our devices aren't just talking to each other anymore. They're talking to one another, learning about us, and starting to talk about us. Increasingly, consumers are being left out of the conversation, unable to listen in and make sense of how their data is exchanging hands. A debate over consumer rights will heat up in 2016: should consumers be given the right to eavesdrop on what their own devices are saying?

**Drones** - Drones are now available in an array of sizes and form factors, from lightweight planes and copters to tiny machines no bigger than a humming bird. Soon, they'll include powerful sense and the ability to fly on their own. In 2016, drones will be programmed to navigate along the path of GPS waypoints and they will make decisions mid-air about the best path to take. This includes when to avoid objects like building, trees, mountains and other drones. As sense and avoid technology become more refined in unmanned vehicles, we will see lots of new applications. Drones will make deliveries, they'll inspect towers, and they will be used to issue parking tickets. Micro drones will autonomously navigate through tiny spaces to investigate collapsed buildings or areas with hazardous materials. A military drone could be programmed to find and hit a human target and report back to base, all on its own.

**Virtual reality** - In 2016, virtual reality headsets will finally hit the mass market. Virtual reality is a computer simulated environment. It can stimulate sensations of being physically present in the scenes a user is viewing. The year 2016 will be an important year for the virtual reality community. There will be enough opportunities for consumers to use them outside the gaming world, like in films, documentaries, military training and even financial services.

**Robots** - Softbank's humanoid robot Pepper went on sale in Japan last June and sold out immediately. It can function as an automated office receptionist or a home assistant for the elderly. In 2016, Taiwan's Asustek plans to release a humanoid robot of its own.

**Internet of X** - Israeli startup Consumer Physics wants to put molecular spectroscopy into smartphones so that you can extract information out of your food and pills. This would enable you to scan a piece of chicken in order to search the fat and calories on your plate. Their research also applies to medicine where it can recognise prescription and over the counter drugs in order to spot counterfeits.

**Genomic editing** - We will see a number of companies competing in 2016 to develop gene-editing therapies. But it does not warrant meaningful planning. We probably shouldn't be working towards a day when a baby's eye colour or athletic ability can be edited into her embryonic DNA.

## Satellites to check climate vows

Scientists from the US, Japan, and China are racing to perfect satellite technology that could one day measure green house gas emissions from space, potentially transforming the winner into the world's first climate cop. Monitoring a single country's net emissions from above could not only become an important tool to establish whether it had met its promises to slow global warming, a point of contention at climate talks in Paris, but also help emitters to pinpoint the sources of greenhouse gases more quickly and cheaply. "The real success of a deal here fundamentally revolves around whether we can see emissions and their removals," said John-O Niles, director of the US-based Carbon Institute, which studies methods of carbon dioxide (CO<sub>2</sub>) measurement. While spacebased measurement is unlikely to be mentioned in any deal agreed by the nearly 200 countries negotiating in Paris, the EU is leading a push for a system of measuring, reporting and verifying emissions data. European and Japanese satellites have been monitoring overall carbon concentrations in the atmosphere since 2002, but calculating emissions at a national or local level is far harder. For example, the margin of error for China, presumed to be the world's top carbon polluter, is greater than the entire carbon footprint of Europe, according to experts. China announced plans ahead of the Paris talks to launch its first emissions-monitoring satellites next year. But it says trade restrictions are hampering cooperation. "NASA and Japan are sharing the best sensors, but not China," said Yi Liu, a lead scientist in China's effort. "This is a problem. We need to work to make this work." NASA launched its first satellite to measure atmospheric CO<sub>2</sub> in July last year. The challenge now is to convert the images -which pick up carbon concentrations in the form of yellow, orange, and red blobs -into emissions data, said Steven Pawson, chief of the Global Modelling and Assimilation Office at NASA's Goddard Space Flight Center. NASA scientist Lesley Ott said that the satellite, named OCO-2, also showed there was potential to zoom into urban areas to record carbon pollution. Scientists are also struggling to measure changes in forests that absorb CO<sub>2</sub>, a key part of the calculation for net emissions, from space. Trees bind carbon while they are growing, but stop once they mature. Masanobu Shimada of at the Japanese Aerospace Exploration Agency JAXA, is working on distinguishing between the two on a global scale. "We can get an idea about biomass from the shading of its images," he said. Back on earth, climate activists hope a Paris deal will include helping poor countries measure their own net carbon emissions on the ground, a process that can be difficult and costly. Michael Gillenwater, of the not-for-profit Greenhouse Gas Management Institute, said that kind of monitoring was better suited than satellites to pinpointing the source of emissions. "We need to know where emissions are coming from," he said. But calculating net emissions at a single poultry farm in China, for example, requires a 54-page UNcertified rulebook that factors in everything from the amount of methane removed from the chicken manure to local temperatures and animal weight to come up with a figure. At some point, that kind of detailed analysis may also be possible from space. A Canadian satellite company called GHGSat has launched a small-scale effort to do exactly that. Its nanosatellite, nicknamed CLAIRE, will launch in April aiming to provide a way for energy producers to measure their carbon footprint.



# Diesel exhaust increases risk of lung cancer

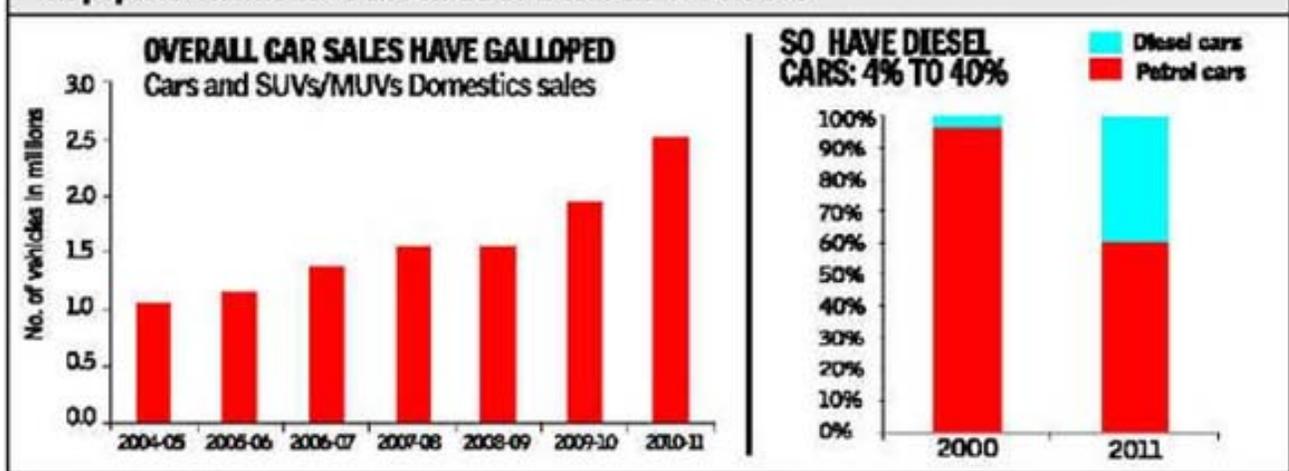
The WHO reclassified diesel exhaust from 'probable carcinogen' to a list of substances that have definite links to cancer

**Bindu Shajan Perappadan**

The Centre for Science and Environment (CSE) on Friday welcomed the move by the National Green Tribunal (NGT) to restrict sales of diesel cars in Delhi. Anumita Roychowdhury, executive director of CSE, said: "Emissions from diesel cars enhance lung cancer risk, and contribute to the rising particulate matter (PM) and nitrogen oxide, which in turn forms ozone. The CSE noted that diesel cars are legally allowed to emit more PM and nitrogen oxides than petrol cars, it is known to have strong link with lung cancer and cheap diesel can make India more energy-insecure. Emissions factor of the Automotive Research Association of India (ARAI) shows that diesel cars emits five times more PM and seven times more total air toxins compared to petrol cars. The CSE called the NGT's move a long-pending air pollution control action that needs to be implemented urgently to reduce risk to public health. "While restraining use of diesel in personal vehicle segment, India needs a clean diesel road map for other uses like freight and generator sets, prevent use of under-taxed and under-priced toxic diesel in cars and reduce its overall consumption in all sectors," stated CSE. "It is therefore important that Euro VI emissions standards are introduced quickly to get clean diesel for all other uses like freight and commercial transport," said Roychowdhury. The International Agency for Research on Cancer (IARC) of the World Health Organisation (WHO) has also said that diesel engine exhaust can cause cancer, especially lung cancer, in humans. The IARC has reclassified diesel exhaust, removing it from group 2A list of 'probable carcinogens' to its group 1 list of substances that have definite links to cancer. The diesel exhaust is now in the same class of deadly carcinogens as asbestos, arsenic and tobacco, among others. "The diesel car market, by shifting to bigger cars, is plainly undermining the fuel efficiency advantages that small cars bring. While the bulk of petrol car sales (87 per cent) are for vehicles below 1200 cc in engine capacity, more than 40 per cent of diesel car sales are for those above 1,500 cc. Last year, SUV sales alone witnessed 41 per cent growth," noted CSE. Roychowdhury added that the government suffers revenue loss from diesel used in cars. "Why should rich car-owners be allowed to use under-taxed diesel in cars? Today a two-wheeler user pays more tax per litre of petrol than a diesel car and an SUV-user pays for a litre of diesel. With each litre of diesel that is replaced with petrol, excise revenue drops," she added.

## DIESEL CAR SALES HIT ALL TIME HIGH

In popular car models the share of diesel car is 70-75%



Source: Based on STAM data

## Climate pact will be ready today, says Laurent Fabius

**G. Ananthkrishnan**

French Foreign Minister Laurent Fabius said on Friday that the final Paris Climate Agreement will be ready at 9 p.m. on Saturday. His announcement pointed to an imminent resolution of disputes on three major issues and adoption of the agreement by all parties on Saturday. Despite 48 hours of crunch time talks that have gone on late into the night on two days amid pressure from civil society for an ambitious temperature goal of 1.5 degrees C, Mr. Fabius and U.N. Secretary General Ban Ki-moon acknowledged that the stalemate over the differentiation question between rich and poor countries on their obligations, provision of finance for developing and vulnerable countries, and the underpinning ambition for temperature rise had to be resolved. Mr. Fabius, who holds the presidency of the Conference of the Parties meeting in Paris, had a discussion with Mr. Ban, and the two made a joint media appearance around noon here. The U.N. Secretary-General said: "This is not a moment to talk about national perspectives. Good global solutions will help good local solutions. This [agreement] will help the low carbon economy. The low carbon economy will help implement Sustainable Development Goals which were adopted by world leaders with strong excitement last September. I am again urging and appealing to all leaders and all state parties to take a final decision for humanity."

## Climate change actions must respect rights, equity: Paris pact

**G. Ananthkrishnan**

The preamble to the Agreement states that climate change is a common concern of humankind, and when countries take action, they must respect, promote and consider their obligations on human rights, right to health, rights of indigenous peoples, local communities, migrants, children, persons with disabilities and people in vulnerable situations, the right to development, gender equality, empowerment of women and inter-generational equity. Developed countries would be required to raise more funds over time to help developing countries and strike a balance between their need to adapt to climate change and cut their emissions. This equity provision is particularly aimed at the least developed countries and the small island developing states facing rising sea levels. The fund-raising nations must file a report every two years with qualitative and quantitative information, and the level of public finances to be provided, all of which will be reviewed at the global stock taking exercise. The Paris Agreement also establishes a system of technology transfer for developing countries, through a new technology framework, for both reduction of their carbon emissions and adaptation programmes. Collaborative approaches are enabled for research and development, and facilitation of access to and transfer of technology. Transparency, a key issue for India, has been laid down in a separate framework. It will require countries to regularly provide a standardised national inventory of man-made greenhouse gas emissions by sources and the ways in which they are being removed - such as through artificial carbon capture, and natural trapping of carbon in forests and so on. This provision, however, includes flexibility for countries based on capacity, which the first meeting of the Paris Agreement will consider. A transparent review of whether adaptation actions are adequate and effective is also part of the pact.

**Overall welcome** - The Agreement was welcomed by experts on science and the economy. Nicholas Stern, Chair of the Grantham Research Institute on Climate Change and the Environment at the London School of Economics and President of the British Academy said, "This is a historic moment...The Agreement creates enormous opportunities as countries begin to accelerate along the path towards low-carbon economic development and growth." "Importantly, the Agreement takes into account that current pledges for emissions limits in 2030 fall short of the collective ambition required and so it includes a commitment by countries to review every five years their efforts to reduce annual emissions of greenhouse gases and to ramp up their emissions cuts. And it recognises that that rich countries are expected to mobilise more financial support to help poor countries make the transition to a low-carbon economy and become more climate-resilient. National, and local governments, cities and businesses must now raise their efforts to match the ambition of this Agreement." John Schellnhuber, Director of the Potsdam Institute for Climate Impact Research, said if the agreement was implemented, it would mean "bringing down greenhouse-gas emissions to net zero within a few decades. It is in line with the scientific evidence we presented of what would have to be done to limit climate risks such as weather extremes and sea-level rise. To stabilize our climate, CO2 emissions have to peak well before 2030 and should be eliminated as soon as possible after 2050. Technologies such as bio-energy and carbon capture and storage as well as afforestation can play a role to compensate for residual emissions, but cutting CO2 is key."

# Paris deal may bind India on emissions data

G. Ananthakrishnan

Transparency framework requires all countries to submit a national inventory by source. The Paris Agreement on climate, adopted on Saturday by the member countries of the United Nations Framework Convention on Climate Change, creates an enhanced transparency framework that requires all countries to submit a national inventory of greenhouse gas emissions arising from human activity using standardised methodologies accepted by the Intergovernmental Panel on Climate Change. External monitoring of the national pledge on climate action to "track progress made in implementing and achieving the Nationally Determined Contributions (NDCs)", a technical review of the emissions data submitted, and participation in a facilitative, multilateral consideration of progress are among the provisions in the Agreement, all of which are significant for India, since many activities involving carbon emissions involve policy made or implemented by the State governments, and not just the Centre. In the voluntary pledge - the Intended NDCs (INDCs) - submitted to the UNFCCC, India lists investments in agriculture, water resources, coastal regions, health and disaster management, besides major goals such as reducing emissions intensity of the GDP by 33-35 per cent over 2005 levels by 2030. New initiatives are to be launched in areas such as cleaner thermal power generation, promoting renewable energy, reducing emissions from transport and waste, and creating climate resilient infrastructure. Although India's INDC includes a caveat that the country will not be bound by any sector-specific mitigation, and only aims at achieving better overall energy efficiency reflected in lower intensity, the measurements prescribed under the transparency framework clearly stipulate that the national inventory should be "by source." The transparency framework under Article 13 of the Paris Agreement does provide "built-in flexibility", which takes into account the different capacities of countries. As a fast-developing country with growing carbon emissions, the framework is expected to significantly apply to India. One of the provisions in the Paris Agreement that India was not comfortable with during the negotiations pertains to submission of an NDC every five years. The public Indian position throughout the talks was that it had submitted its INDC for the period between 2021 and 2030. Article 4, however, mandates that each country should, in five-year cycles, prepare, communicate and maintain an NDC.

Deccan Herald

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## New Human Skin Detection Technology For Improved Security

Scientists have developed a new technology that can better characterise human skin using spectral imaging of melanin, hemoglobin and water, which could improve security, search and rescue operations. Spectral imaging systems use information from the entire electromagnetic spectrum to provide digital images with much greater information per pixel than traditional cameras. Feature spaces in a spectral imaging system are vectors that numerically represent an object's characteristics. Researchers at the Air Force Institute of Technology (AFIT) in US have developed a novel two-dimensional feature space which uses the spectral absorption characteristics of melanin, hemoglobin and water to better characterise human skin. The researchers used feature spaces to key in on specific constituents of human tissue by using a skin index concerned with how water and melanin's presence in skin manifests at two different wavelengths in the near-infrared region. This would cut the overall cost of hyperspectral-based search and rescue systems by a factor of seven. "The study represents a crossroads between physics and statistical pattern recognition," said Michael J Mendenhall, assistant professor at AFIT. "The features were designed based on an understanding of the physics behind skin's spectral shape, but in such a way that the features separated skin and non-skin pixels in order to make the pattern recognition portion of the problem more effective," said Mr Mendenhall. "After a lot of investigation into spectral properties of false alarm sources, we arrived at a simple observation that skin is more red than green, due to the melanin in darker skin and oxygenated hemoglobin in lighter skin, whereas many of the false alarm sources were more green than red," he said. Many current image recognition programmes employ hyperspectral imaging systems, which allow engineers to search for a wide variety of objects - exoplanets, oil wells, or human skin, to name a few - by looking for specific "fingerprints" in the electromagnetic spectrum. However, the involved image acquisition and post-processing are typically too slow for live search and rescue operations. Additionally, specific air platform requirements and the high cost of acquisition and management currently puts hyperspectral systems out of reach for search and rescue organisations. The researchers used their skin detection and false alarm suppression feature space to design an application-specific optical system using three framing cameras. Their skin detection solution can be implemented with less expensive technology capable of live video frame rates.

# Magnetism around a black hole

Shubashree Desikan

The term "black hole" conjures up images of a stellar object from which nothing can escape. This is only true of small black holes, and supermassive black holes, which are millions of times as massive as the Sun can actually beam out energy from matter falling into it in the form of intense radiation. Further, if the black hole is spinning, the radiation can beam into galaxies that are millions of light years away and shape them. Now, a team of researchers from the Harvard-Smithsonian Centre for Astrophysics has discovered magnetic fields on the event horizon - which is the surface surrounding the black hole from beyond which light cannot escape - of such a supermassive black hole, which they have published in the journal *Science*. It had been discovered some time ago that a supermassive black hole exists at the centre of our galaxy - the Milky Way. This black hole is now known as Sagittarius A-star. Astronomers detected the magnetic field using the powerful Event Horizon Telescope, which is a global array of radio telescopes that link together to function as one giant unit. Geared for very high detail observations, the Event Horizon Telescope will have a resolution of 15 arc-seconds. This is equivalent to being able to see a golf ball on the moon, according to a release from the Centre for Astrophysics. High resolution is needed as black holes are really compact objects. Sagittarius A-star, for instance, is about four million times as massive as the sun, yet its event horizon is only 8 million miles across. Being located 25,000 light years away, this would measure only 10 micro-arc seconds across. The interesting thing is that the intense gravity of Sagittarius A-Star warps light and magnifies its event horizon so that it appears larger - about 50 arc-seconds, which can be easily resolved by the Event Horizon Telescope. As Sagittarius A-star spins away furiously, matter encircles it in the form of an accretion disc. The team found magnetic fields in some regions near the black hole which are highly disorderly, in the form of loops and whorls, like spaghetti, whereas in other regions it is more orderly, presumably the places where jets of radiation are emitted. The magnetic fields were also seen to fluctuate at time scales of about 15 minutes.

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The Hindu

14 December 2015

## IISc develops solar hybrid desalination system

Mohit M. Rao

The system met the major objectives: low lifespan cost and performance. "Water, water, every where, Nor any drop to drink," cries out the sailor in Samuel Taylor Coleridge's classic 'The Rime of the Ancient Mariner.' The desperation is not entirely unknown in Peninsular India, where, even with seas surrounding the land on three sides, water often eludes parched tongues. With desalination - that involves converting saline sea water to potable water - being out of reach currently for the shallow pockets of the government, researchers of Indian Institute of Science (IISc) have hit upon the idea of utilising copious solar energy in the South to reduce the costs of the process. Ravinder Kumar and Umanand L., from the Department of Electronic Systems Engineering at IISc, have developed a solar hybrid desalination system that works for saline and brackish water. The process described in the *International Journal of Low Carbon Technologies* shows that at its peak (around 27 degree C) could the system can purify nearly 6.5 litres of saline water per sq.m. of the instrument in six hours of use (tested between 9 a.m. and 3 p.m.). The stepped solar-still, comprising of semi-circular pipe sections welded progressively one next to the other so as to maintain a constant slope was fabricated to serve as the water channel basin. Vacuum jackets were provided to minimize thermal losses. The instrument could hold between 3 and 4 litres for treatment. During the experimentation, solar intensity was observed at 718.76 Watt per sq.m. With the set-up ensuring pressure was high within, saline water saw evaporation at temperatures lesser than 100 degree C. Water was further pumped in and out using photovoltaic cells as a source of energy - making the instrument self-reliant. Mr. Kumar believed the system met the major objectives of desalination system: to reduce life span cost, while meeting performance requirements. "This system shows promise that the problem of clean drinking water can be solved in any coastal area where seawater and sunlight are available freely," he said.

## Son guarantee at MP's herbal mela

**Defying Science Ayurvedic practitioners offer herbs to turn female foetus into male at govt-organised fair**  
**Shruti Tomar**

By spending a mere ₹ 1,100, any couple can bear a son and change the gender of an unborn child in the mother's womb. Several self-styled vaidyas, or ayurvedic practitioners, are making such science-defying claims at an herb fair organised in Bhopal by the Madhya Pradesh government. When this reporter approached a number of these vaidyas without disclosing her identity, at least six of them promptly agreed to supply herbs which they said would transform a female foetus into a male one. "Yes, this is possible. I would place a flower on the palm of the woman who wants a son and that would produce the desired result," said a female ayurvedic practitioner, who claimed she was from Kanpur. The controversy comes against the backdrop of a slew of studies expressing concern over the skewed child sex ratio in India and pointing to a deep preference among large sections of the population for sons over daughters. "It is shocking for me to know that all this is happening under the nose of the government in the state capital, that too when chief minister Shivraj Singh Chouhan has launched a campaign to save the girl child," said activist Sarika Sinha. "The government should take stringent action against those people." Another vaidya from the state, Ramdin Shahu, refused to say much at the Bhopal fair, maintaining that he wished to be consulted over the phone. When contacted later, he asked this reporter to collect ayurvedic medicines worth ₹ 1,100 from his shop, Amleshwar Jadi Booti Kendra. The products purchased included some seeds and a powder. The vaidya advised that the "Shivling" seeds be consumed with cow's milk only after performing a puja. "In ayurveda there is no medicine which can change the gender of the baby," renowned ayurveda expert Dr Umesh Shukla said. Other ayurvedic practitioners who made such claims on the phone include Mohd Firoz Akhtar from Himganga Herbal, Satish Bharti from Vaishnav Aushadhi Sansthan and a representative of Anandeshwar Gram Seva Samiti. When HT contacted them later, most of the vaidyas backtracked from their promises, but some like Bharti and Akhtar stuck to their claims. "It is not possible that vaidyas at the fair are making these claims," said forest minister Gaurishankar Shejwar. Perhaps some quacks are wandering around there and making such assertions."

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## Google Net balloons to affect telco operations

Google's Project Loon to provide Internet connectivity using balloons in India has run into a technical hurdle as it will interfere with cellular transmissions of telcos, the government said on Friday. "The proposed frequency band to be used in the Loon Project of Google is being used for cellular operations in India and it will lead to interference with cellular transmissions," telecom minister Ravi Shankar Prasad said in a written reply to the Rajya Sabha. Prasad's statement assumes significance as consumers are facing serious call drop problems due to poor network quality. On a question as to whether there are technical glitches in according approval to Project Loon, Prasad replied in affirmative. Google, under its Project Loon, is using big balloons floating at a height of 20 km above the earth's surface for transmission of Internet services. It has already tested this technology in New Zealand, California (the US) and Brazil. According to Google, each balloon can provide connectivity to a ground area about 40 km in diameter using the 4G, or LTE wireless communications technology. To use LTE, Project Loon partners with telecom companies to share spectrum so that people will be able to access the Internet everywhere directly from their phones and other LTE-enabled devices. Google uses solar panel and wind to power electronic equipment in the balloons throughout the day. Google was working with the government on a pilot project for providing Internet connectivity by using such balloons. A committee under chairmanship of secretary, DeitY, was formed to work on it, according to a senior official. The thinking in the government was that Google may initially partner with BSNL for testing this technology by using broadband spectrum in 2.6 GHz band.

# Historic Paris climate pact puts world on green path

G. Ananthakrishnan

The stage is set for all countries to move to a low carbon pathway with the Paris Agreement on climate change adopting a goal of "well below 2 degrees C" for temperature rise, and instituting a regime of financing of developing economies to help make the transition. Nations are to pursue efforts to aim at the more difficult objective of pegging temperature rise under 1.5 degrees C. Underpinning the Agreement, which is scheduled to go into effect from 2020, is the system of voluntary pledges, or nationally determined contributions made by individual countries to peak their greenhouse gas emissions that are warming the atmosphere and changing the climate. The reference in the text for the need to achieve an equalisation between emission of Green House Gases (GHGs) and their removal by 'sinks' by the second half of the present century has been welcomed widely since it turns attention to renewable energy, and away from fossil fuels. The text of the Agreement unveiled on Saturday at the 21st meeting of the Conference of the Parties to the UN Framework Convention Climate Change after two weeks of talks and an intensive three days of convergence negotiations was formally adopted amid cheers at the Plenary. The UNFCCC principle of Common But Differentiated Responsibilities ensuring equity is incorporated into the Paris Agreement to provide developing countries a cushion. India's Environment Minister Prakash Javadekar expressed happiness that the text addressed the concerns raised by India in all areas - mitigation of carbon emissions, adaptation to climate change, financing, technology development and transfer, capacity building and transparency. He said there were some concerns, which he would raise at the Plenary. Mr. Javadekar told the media that Prime Minister Narendra Modi had always advocated a sustainable lifestyle and climate justice. Both find a place in the Agreement text. The solar alliance which the Prime Minister had launched was another success, bringing together 120 nations and winning plaudits from France. French President Francois Hollande had on Saturday called Mr. Modi about the Agreement, and he expressed hope that it would be a historic pact fulfilling the aspirations of seven billion people. The Paris Agreement requires developed countries to raise finances with \$100 billion per year as the floor by 2020, to help developing nations in both mitigation and adaptation activities, while other nations are encouraged to provide funding voluntarily. However, any basis

for liability of countries which have historically accumulated greenhouse gases in the atmosphere causing disastrous climate events such as droughts, floods and extinctions, has been excluded. The first global evaluation of the implementation of the Paris Agreement is to take place in 2023, and thereafter every five years to help all countries. Pledges by countries with an end date of 2025 or 2030 will need to be updated by 2020, and enhanced action every five years thereafter. It will also be possible for countries to cooperate voluntarily, form groups of nations for climate goals, and use both public and private finances, market and non-market mechanisms to meet the objective. A facilitative dialogue of countries is to be held in 2018 to review the collective efforts, and the Intergovernmental Panel on Climate Change is to be

## We will always have Paris

Paris Agreement sets framework for concerted global action to tackle climate change through a low carbon pathway addressing various stakeholder concerns



NASA Time series shows 5-year mean variation of surface temperatures from 1884 to 2014. Dark blue indicates areas cooler than mean. Dark red; warmer than mean

 We are happy that India's concerns have been taken care of in the final climate draft of the negotiating text... It is a balanced text and is a way forward for the world

— Prakash Javadekar 

### Salient points

**DIFFERENTIATION** Common But Differentiated Responsibilities ensuring equity to provide developing countries a cushion

**TARGET** Sets a binding target of well below 2 degrees for rise in temperature. Also endeavours to keep rise to 1.5 degrees. Nations will regularly provide a national inventory of greenhouse gas emissions

**FINANCING** Developed countries to raise more funds over time to help developing countries and strike balance between need to adapt to climate change and cut their emissions

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part-2

# Historic Paris climate pact puts world on green path

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asked for a special report in the same year, on the impacts of global warming of 1.5 degrees C above pre-industrial levels.

Major features of the text outlined by French Foreign Minister and CoP21 president Laurent Fabius are:

- \* It takes into account the differentiation and responsibility of developing countries, and their respective capacities in light of national circumstances
- \* Confirms the key objective of containing mean global temperature rise well below 2 degrees Celsius and to endeavour to limit it to 1.5 degrees

## Draft Paris Agreement

- \* There will be five-yearly national contributions on actions taken to address climate change
- \* There is provision for adaptation to climate change. Cooperation on loss and damage suffered by countries on a long term basis to provide necessary means to all countries for durable development.
- \* Provision of 100 billion per year as a floor by 2020 to help developing nations.
- \* A new figure to be defined for the period between now and 2020
- \* Collective stocktaking every five years of national actions and consideration of steps if efforts are insufficient for the objective set

DESIDOC