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US to help India make engine for next combat jet

Shishir Gupta

India and the US will jointly develop a jet engine for the proposed Advanced Medium Combat Aircraft (AMCA) project and participate in development of Electromagnetic Launch Systems (EMALS) for future aircraft carriers on government-to-government basis under the Defence Trade and Technology Initiative (DTTI). Joint working groups on both projects were reviewed by defence minister Manohar Parrikar and his counterpart Ashton Carter during the former's four-day US visit this month. Diplomatic sources based in Washington said that Parrikar was not very happy at the speed at which the private companies on both sides were progressing on the Raven hand-held unmanned aerial vehicle and roll on-roll off modules for C-130 transport aircraft. Both items were identified under the DTTI programme last year but little progress has been made as a result of which Parrikar wanted new technologies to be jointly developed on government-to-government basis rather than leave it to the private sector. While Parrikar became the first Indian defence minister to visit US Pacific Command in Hawaii on December 7, he also landed on US aircraft carrier Dwight Eisenhower off the coast of Norfolk in Atlantic Ocean in a V-22 Osprey aircraft. India is interested in purchasing six attack version V-22 Ospreys for rapid troop insertion in border areas. Official sources said that while jet engine for AMCA developed by Defence Research and Technology Organisation (DRDO) may take years to develop, the F 414 Enhanced Engine used by F-18 multi-role fighters could be used as a bridge subject to US government approval. Defence major Boeing is willing to make F-18 under the "Make in India" flag, and rival Lockheed Martin is ready to offer F-16 fighters under the same scheme. However, the call between F-18 and F-16 fighters will have to be taken by New Delhi as the former has been successfully deployed on US aircraft carriers while the latter has been in the Pakistan inventory since the 1980s.



Official sources said that while jet engine for AMCA developed by Defence Research and Technology Organisation (DRDO) may take years to develop, the F 414 Enhanced Engine used by F-18 multi-role fighters could be used as a bridge subject to US government approval

The Economic Times

16 December 2015

Make-in-India top CEOs to travel with PM

By Manu Pubby

With Russia keen on joint development and manufacturing of aerospace and military systems in India, a large business delegation is likely to accompany PM Narendra Modi when he travels to Moscow on December 24. The CEOs delegation would include most Indian players keen on the aerospace and defence sectors, including Tata, Mahindra Reliance and the Gurgaon based Sun Group. Officials in India and Russia and told ET that the CEOs forum will be given high importance during Modi's Moscow visit with Russia's top aerospace companies keen on pitching for the joint manufacturing of components and parts for both civil and military programs in India and forming JV companies. The umbrella company that controls most Russian aviation programs has said that it is hopeful of tying up with Indian private sector companies during the Modi visit. "We are discussing options for manufacturing aircraft components in India with the largest companies like Tata, Mahindra and Reliance. A business summit is planned during the Indian PMs visit and we hope to move forward on this then," President of the United Aircraft Co, Yury Slyusar told ET. The top official, who is in charge of aircraft companies including Sukhoi and MiG, said that specific talks have already taken place with Tata on the manufacturing of rudders and directional control systems for the Sukhoi Super Jet (SSJ) - a regional jet. Talks are already on for specific projects with companies like Tata and Reliance. Top Indian CEOs from all major companies are expected to accompany the Prime Minister, with Sun Group's Shiv Khemka likely to play a major role in coordinating the CEOs forum. Industry body CII will be involved in sending the delegation of top executives from India. A CII team is already in Russia and a final list of the business delegation is being drawn up. Russia is also keen to expand beyond the military field to the civil aerospace sector. "We would like to look at civil cooperation as well. Indian companies can make components for our Sukhoi Super Jet as well as the MC 21 airliner...", Dy Minister Andrey Boginskiy of the Russian Ministry of Industry and Trade told ET.

Parrikar's visit to the US: traversing the distance from symbolism to substance

by Sushant Singh

On his visit to the US in 1985, Prime Minister Rajiv Gandhi told Secretary of Defence Caspar Weinberger and Chairman of the Joint Chiefs of Staff Gen John W Vessey that India was hesitant to buy arms from them because they came with too many strings and conditions attached. The US cuts off sales and supply of spares arbitrarily under its laws, negates past arms contracts, and refuses to cooperate in co-production ventures, Rajiv and Defence Minister P V Narasimha Rao told the Americans. Last week, Defence Minister Manohar Parrikar would have discovered a very different US defence establishment - one which was willing to rephrase its laws to help India get the best defence technology, wanted more follow-up contracts on past contracts, and was pushing co-production ventures. And Ashton 'Ash' Carter must be among the most India-friendly US Secretaries of Defence ever. As Deputy Secretary of Defence from October 2011 to December 2013, Carter personally pushed defence ties between the countries - noting, in November 2013, that "India (was) destined to be a security partner of the United States in the long run". In an article in Foreign Policy, Carter underscored the change in mindset at the Pentagon on technology transfer to India from a "presumptive no" to a "presumptive yes". The 2012 Defence Trade and Technology Initiative (DTTI) was his brainchild, and was initially called the "Carter Initiative". It awoke from dormancy after Carter returned to the Pentagon early this year - India and the US are now working on six DTTI projects, and Parrikar has asked for highend transformative technologies for co-development. During the DTTI Group's fourth meeting at the Pentagon on November 17, the two sides committed to executing the project plans for two government-to-government pathfinder projects: the Mobile Electric Hybrid Power Sources (MEHPS) and the Next Generation Protective Ensemble (NGPE). Two other projects are nearing finalisation: terms of reference for the Jet Engine Technology Joint Working Group are ready, and the second meeting of the Joint Working Group on Aircraft Carrier Technology Cooperation (JWGACTC) will be held in February 2016. The fifth DTTI Group meeting is scheduled in Delhi in February, and Parrikar hopes to accelerate DTTI projects as part of his larger goal of pushing Make in India in defence. The Minister negotiated for technology transfers and defence manufacturing in India on visits to Russia and South Korea as well. Accompanying the Minister to the US was a heavyweight private sector defence delegation, which interacted with American counterparts in the presence of senior defence officials from the two countries. Concrete outcomes were not expected from the first meeting, but the engagement holds significant potential for the future. Beyond the DTTI, the Americans have already approved BAE Systems' proposal to move the assembly line of M-777 Howitzers to India. Negotiations are complete and the Letter of Agreement has been approved - only the final signatures of the two parties remain to be put. Several issues, however, still need to be resolved before Make in India in defence takes off. The lack of clarity on a Make in India in defence policy, along with the delay in the release of the Defence Procurement Procedure (DPP)2015, has not enthused foreign defence companies. They continue to be harassed by the labyrinthine bureaucracy in the Department of Defence Production in the Defence Ministry, which is seen as unresponsive or unsympathetic to their concerns. Both Indian and foreign defence suppliers are concerned about the announcements of deals and DAC approvals not resulting into firm contracts. Barring the Chinook and Apache deal signed during Modi's US visit in September, no major defence deal has been inked on Parrikar's watch. Concerns are now being expressed over the resources available to his Ministry for new procurements, given the Finance Ministry's keenness to adhere to the fiscal deficit target. On his visit, Parrikar also encountered the US insistence that India sign the foundational agreements: Communications Inter-Operability and Security Memorandum of Agreement (CISMOA), LSA (Logistics Support Agreement), and the Basic Exchange and Cooperation Agreement for Geo-Spatial Cooperation (BECA). Carter's team wanted to see progress here - the Pentagon believes that by not signing the agreements, India is shackling potential for defence and high-technology cooperation. Even during the recent Exercise Malabar, the two navies couldn't cooperate fully - for e.g., exchange fuel from a tanker to a combatant - as no agreements exist. The previous Defence Minister, A K Antony, believed that signing the agreements would grant the US military unencumbered access to Indian military installations and compromise sensitive data. Pentagon sources say that Parrikar has shown an open mind on signing the LSA, and they are hopeful the rest of the agreements will follow. While Parrikar will be judged ultimately by substantive achievements of the India-US partnership, the symbolism around his visit was undeniable. It was the first visit by an Indian Defence Minister to the US after 2008 - the American counterpart has made six visits to India in that period. He was also the first Defence Minister to visit the US Pacific Command, and be hosted on a US aircraft carrier.

Air India to re-enact JRD's historic 1932 Karachi-Mumbai mail flight

Air India is poised to re-enact the first airmail flight from Karachi to Mumbai flown by JRD Tata on October 17, 1932 in a Puss Moth with a fuel stopover at Ahmedabad. The national carrier wants to do it in 2017 on the 85th anniversary of the flight that launched TATA Airlines, which later became Air India. The re-enactment will be in a Leopard Moth, the plane JRD flew on the first flight's 30th anniversary in 1962 and again on its 50th in 1982. After the flight in 1982, the aircraft has been displayed at the Aero Club of India. The plan to pull it out of the club and fly it again has been drawn up at a time the airline is headed by CMD Ashwani Lohani. In an earlier stint with the Indian Railways, Lohani executed a number of heritage projects, including running the Fairy Queen Express hauled by the oldest steam locomotive in the world. The feat earned a place in the Guinness Book of Records. "We dream to re-create a historic event," said Lohani. On the 1982 flight, JRD Tata had carried a mail bag with messages from the president of Pakistan to the president of India, and from the mayor of Karachi to the mayor of Mumbai. Air India has the support of the Aero Club, the apex body for aero-sport activities in the country. "It's a great idea. I want to discuss it with Air India and make it happen. It will happen," said Captain Satish Sharma, the club's president. Air India has sought advice of the Indian Air Force's chief adviser for vintage aircraft projects, the UK-based Capt Mike Edwards, MBE, to restore the Leopard Moth to flying condition.



JRD Tata with the Leopard Moth he flew in 1962 and then again in 1982 to mark his historic 1932 Karachi-Mumbai airmail flight.

The Hindu

16 December 2015

India vigilant on security front: PM

Mr. Modi said India would test Pakistan's intentions to define the path ahead.

Prime Minister Narendra Modi has made it clear that while India is committed to engaging Pakistan in high-level dialogue in order to bring stability and peace in the region, it will "continue to judge the progress on their commitments on terrorism" and will not lower its guard on the security front. "We are engaging Pakistan to try and turn the course of history, bring an end to terrorism, build peaceful relations, advance cooperation and promote stability and prosperity in our region. There are many challenges and barriers on the path. But, the effort is worth it..." he said while addressing the Combined Commanders' Conference held for the first time outside Delhi, on board the aircraft carrier INS Vikramaditya on the seas off Kochi on Tuesday. Mr. Modi said India would test Pakistan's intentions to define the path ahead. "For this, we have started a new NSA-level dialogue to bring security experts face to face with each other." India was pursuing closer ties with China to harness the full potential of the mutual economic partnership. Earlier, Mr. Modi said India was a difficult neighbourhood with a full spectrum of security challenges. "We see terrorism and ceasefire violations; reckless nuclear build-up and threats; border transgressions; and, continuing military modernisation and expansion. The shadow of West Asian instability is becoming longer." The region, he said, was marked by uncertain political transitions, weak institutions and internal conflicts. Mr. Modi said his government had infused a new intensity and purpose in India's foreign policy. Citing threats emanating from the cyber and space domains as emerging challenges spawned by technological advancements and economic changes, he said India possessed the know-how and wherewithal to tackle security challenges. From aboard the Vikramaditya, he witnessed a naval operational demonstration involving the aircraft carrier INS Viraat and nuclear submarine INS Chakra, frontline warships and aircraft.



Prime Minister Narendra Modi being briefed by Chief of the Naval Staff R.K. Dhowan, on board INS Vikramaditya in Kochi on Tuesday.

India Moves to Retake Its Place As Major Partner

PM MODI'S VISIT TO MOSCOW In addition to strengthening defence ties and expanding trade basket, India and Russia may finalise \$3-billion joint fund to promote nanotechnology startups

Dipanjan Roy Chaudhury

India and Russia are keen to utilise PM Narendra Modi's upcoming visit to Moscow to strengthen ties beyond defence with creation of a joint innovation fund, besides prospective investments from Russia in National Infrastructure Fund as well as expanding bilateral trade basket beyond diamonds and pharmacy. Officials said a joint \$3-billion fund to promote startups in the nanotechnology field, with applications from defence to aerospace and manufacturing, could be concretised during the PM's visit. Russia had earlier expressed its keenness to participate in Modi's 'Make in India' initiative. The proposal to set up a joint innovation fund has been in the pipeline for over a year. RUSNAN, a state-run Russian firm which is working on commercialising nanotechnology, has put forward a proposal that India and Russia equally contribute to the fund that will select and nurture companies working in the field, officials said. India is also seeking Russian investments in the National Infrastructure Fund and this could gather momentum during the PM's trip, according to officials. The two countries are also exploring various other sectors to expand the trade basket. Modi and Russian president Vladimir Putin are expected to deliberate on this issue during the annual summit in Moscow, where a number of Indian businessmen are expected to be present. The Western sanctions owing to Ukraine crisis followed by the recent downslide in Russian-Turkish relations (after a Russian fighter jet was shot down by Turkey) have compelled Russia to look towards old partners such as India as investment destinations, people familiar with the matter indicated. Russia has cancelled a number of joint projects that it was undertaking with Turkey in retaliation to downing of its fighter jet. Russia needs India as a major trade and economic partner, Deputy PM Dmitry Rogozin told TASS after his last week's visit to India to prepare for Modi's trip. "In conditions of sectoral sanctions, which have been imposed on Russia, we still need a big partner that can fill the vacuum that appeared after our retaliatory measures," Rogozin said. "I am confident that this should and can be filled with Indian manufacturers." Rogozin said further, "Previously, we were focused on military-technological cooperation. It is no longer so. We need India as a major trade and economic partner in the first place in conditions when we can no longer maintain economic interaction with partners like Turkey because they have indeed been treacherous and cunning and have committed something, which is going to throw our relations far back."

Fate of Military Aircraft Project Still in Limbo

Manu Pubby

A joint project between India and Russia to develop a military transport aircraft is on tenterhooks due to differences between the two sides and officials now bet on intervention during PM Narendra Modi's Moscow visit this month to rescue it. Officials in both the countries have shared with ET that the project to develop a new 20-tonne military transport aircraft (MTA) to replace Indian Air Force's ageing fleet of Antonov AN32 aircraft, with \$300 million investment from each side, is on thin ice, and Moscow now plans to go ahead on its own if the Indian side does not come on board. The main point of contention is the engine for the new generation transporter. Sources in India have told ET that the Indian Air Force (IAF) is insisting on a new generation engine with a full authority digital engine control (FADEC) system to give adequate power to the new plane. Russia, however, wants to use the PS 90 that powers its new generation Ilyushin IL-76 transporters for the MTA project. The Russian side believes that the new variant of its PS 90 engine will offer adequate performance and a FADEC power plant is not necessary. It also argues that IAF put up the demand for FADEC only at a later stage.



Modi reviews naval exercise after tri-services meet in Kochi

An impressive array of warships, including nuclear capable submarines, and about 8000 men and officers of Indian Navy presented an exquisite display of operational capabilities in an exercise reviewed by Prime Minister Narendra Modi off the Kochi coast in Kerala on Tuesday. Having chaired the Combined Commanders Conference, an annual tri-services event held for the first time outside New Delhi onboard INS Vikramaditya, the Prime Minister reviewed the exercise about 50 km off the coast where the naval guns blazed and fighter jets roared in a dazzling display of India's military might. The annual event, held against an operational backdrop of the high seas for the first time, was attended by Defence Minister Manohar Parrikar, National Security Advisor Ajit Doval, Chiefs of Army, Navy and Airforce, secretaries of the government of India besides top tri-services commanders. "Indian Navy displayed its Naval as well as air power capabilities during the approximately 40 to 45 minute (exercise). Ships of the Navy were there including submarines, as also aircraft, and about 8000 plus men of Indian Navy participated as part of the exercise," a Defence spokesman said. He said it was the Prime Minister's Office which wanted the tri-services meet to be held in an operational setting. "So it was moved out of the South Block and it is a reality today. It is now going to be from operational backdrops to operational backdrops," he said. After Prime Minister Modi had chaired the meet onboard INS Vikramaditya which lasted for about an-hour-and-half, he reviewed the exercise that began with firing by naval guns followed by a rocket-fire demonstration. "We had 30 plus ships outside, which included INS Vikramaditya, Virat, Kochi, Delhi, Mysore....," the Defence spokesman said. "Then we had nuclear submarine INS Chakra... ..We had 60 aircraft of the Naval aviation ranging from one end of the spectrum to other end. We also showcased the actual operations of MiG 29 K from INS Vikramaditya. A number of sorties were taken off, one from the larger runway--that is 195 meters and one from the 100 meter runway," he said.

Deccan Herald

16 December 2015

N pact with Japan welcome sign

Japanese Prime Minister Shinzo Abe's visit to India saw the two sides clinch several significant deals, the most momentous of these being a Memorandum of Understanding (MoU) on civil nuclear cooperation under which Japan will sell India nuclear reactors. A few minor differences on technical and other matters remain to be ironed out but an agreement is now within reach. Japan was among the most vociferous opponents of India's nuclear programme - relations froze following the 1998 nuclear tests - and that the two sides have signed an MoU allowing for nuclear commerce indicates how far they have come. A nuclear agreement with Japan will not only enable India to buy reactors from Japanese companies like Toshiba, Hitachi and Mitsubishi but also from American and French companies like GE, Westinghouse and Areva where Japan has significant stakes. The two sides must accelerate efforts to make the MoU a concrete agreement at the earliest. With India and Japan becoming strategic partners, defence and security cooperation is on the rise. During Abe's visit, agreements on transfer of defence equipment and technology, and intelligence sharing were signed. Japan will join the India and US as a regular participant in the Malabar naval exercises in the Bay of Bengal. Certainly, their defence/security cooperation is driven by apprehensions over a rising China. Still they must avoid giving their joint exercises and other cooperative efforts an anti-China colour. Japan has beaten China to get the first deal to build a bullet train in India. An agreement was signed during Abe's visit that will see the Japanese provide India with expertise, technology and soft loans for developing a bullet train between Mumbai and Ahmedabad. While India-Japan relations are growing, there are issues of concern. Is India using Japanese expertise in the best way possible? While the bullet train deal will speed up travel between two commercial hubs, what India needs more urgently is technology to improve safety of train travel. The safety record of Japanese trains is well known and India could have drawn on their technology to improve safety on existing trains on all routes rather than spend several billions of dollars for a showpiece train on one route. Besides, although bilateral trade is growing - a Comprehensive Economic Partnership Agreement is being implemented since August 2011 - India remains just a speck in Japan's trade with the world, accounting for just 1 per cent of Japan's total foreign trade. Clearly, much potential remains untapped. India must step up efforts to expand its exports to Japan.

Why defence ties may be the main driver of Indo-US relations in 2016

Seema Sirohi

Here's a prediction for 2016: Defence ties will continue to be the main driver of Indo-US relations and may even be the catalyst for the Make in India initiative. Why? Because 2015 ended with the most successful bilateral visit. Defence minister Manohar Parrikar's four days to the United States, stretching from Hawaii to Virginia, covered crucial ground while laying some new. The clear takeaways: US agreed to transfer key technologies to co-develop a jet engine, six new visits at various levels were planned, an August 2016 deadline was set for tangible results, Indian defence industry players got facetime with both Indian and US governments, India showed new willingness to discuss "foundational agreements" the US wants, and finally the two sides revived a working group on humanitarian and disaster relief - something we tend to do together but on an ad hoc basis. Parrikar and his counterpart, defence secretary Ashton Carter spent an entire day together, half in meetings and half on the deck of a US aircraft carrier drifting along the coast of Virginia. They were largely by themselves, free to discuss both the hurdles and the promise. The weather was pleasant, the legendary military hospitality on full display as Parrikar watched fighter jets take off and land on the mega deck of USS Dwight D Eisenhower. He felt the "technology" and the "speed" - both key to what India wants to shore up its defence manufacturing. The minister and the secretary met three times this year and visited each other's operational commands for the first time - Carter went to Eastern Naval Command in Visakhapatnam and Parrikar to the Pacific Command in Hawaii. They got on so well. Parrikar was all smiles, talking of how their background in physics may have helped. He had clear milestones in mind and declared that things "will be speeding up now" because in the end it's the execution that counts. The two men may have begun to establish that most elusive of building blocks - trust. Parrikar acknowledged it was one of his objectives for the visit. Both sides seem willing to act on each other's concerns - US on export control issues to make it easier for American companies to do business with India while New Delhi is more open to discuss "foundational agreements" the US wants. At least one of the three - the Logistics Support Agreement - shouldn't be a problem. It only requires both countries to provide each other's visiting ships and jets exactly what it says - logistical support of base facilities, fuel, and may be some laundry detergent! Believe it or not, the LSA is hanging fire since 2006 and such was the level of jitters in the last government, it suggested renaming it but couldn't come up with a more anodyne name than it already had. The other two agreements deal with secure communications interoperability and exchange of topographical, nautical and aeronautical data and products. In a change of pace, Carter and his team got an earful on US export controls. Parrikar said he got the "assurance" and "a very clear promise" that Indian projects would be fast tracked. Indian requests should now get a "presumed yes" rather than a "presumed no" on tech transfer issues. If that actually happens, it would mean a newer, better phase. Before doing real business, US defence companies must clear the impenetrable web of mysterious export control laws administered by three separate government agencies - defence, state and commerce. Since no one wants to lose turf or control, reasons for denial are not always clear. They find ways around the Byzantine system - some just don't sell to the government, or sell the product only after it is widely distributed in the commercial market and finally many companies shift product development abroad to escape the controls. The last tactic has benefitted one country in particular and that is China as companies moved crucial operations abroad with Chinese partners. The US Congress doesn't like this phenomenon and fitfully argues for rationalising export controls. The Obama Administration to its credit launched export control reforms in its first term but it's not clear where the process is. The question is what's keeping American companies from taking the plunge when Israeli, French and German companies are successfully teaming up with their Indian counterparts. "They have seen the light," piped a visiting Indian defence industry wallah. "And there hasn't been a single case of IPR theft," he added for good measure. Now will the Americans make in India?

The Pioneer

16 December 2015

Samudra Pavak arrives at Porbandar

The Indian Coast Guard (ICG) Ship Samudra Pavak was inducted in service on Tuesday. The ship has arrived at ICG's Porbandar base and will be commissioned by the end of this year. According to official sources in ICG the ship is scheduled to be commissioned by the end of this month and will join the Indian Coast Guard fleet at Porbandar, augmenting the operational capability of the service in the Gujarat Region, especially enhancing the Oil Pollution Response Capability of Indian Coast Guard. The Ship is last in the series of Special Purpose Vessel, especially designed for Pollution Response role of the Indian Coast Guard. The ship will be utilised for Coast Guard charter of responsibilities such as patrolling for enhancement of Coastal Security, Maritime Search and Rescue and Pollution Response in particular. The ship will have crew of 100 Personnel and 10 Officer.

Pakistan test-fires 'Shaheen 1A'

Pakistan on Tuesday successfully test-fired a nuclear capable ballistic missile with a range of 900 kilometres, days after testing a similar missile capable of hitting targets as far as 2,750 kilometres away, bringing many Indian cities under its range. The Shaheen-1A ballistic missile was fired from an undisclosed location with impact in the Arabian Sea.

Range of 900 km - "The flight test was aimed at re-validating several design and technical parameters of the weapon system," the army said in a statement. "It is capable of delivering different types of warheads to a range of 900 kilometers," it said. The launch was witnessed by senior officers from Strategic Plans Division, strategic forces, scientists and engineers of strategic organisations. Director General Strategic Plans Division, Lieutenant General Mazhar Jamil, congratulated scientists and engineers for the successful launch. He said Shaheen-1A, with its sophisticated and advanced guidance system, makes it a highly accurate missile system. He reiterated that Pakistan's strategic capabilities are based on credible minimum deterrence and desire for peaceful co-existence in the region. Last week, Pakistan had test-fired the medium-range Shaheen-III surface-to-surface ballistic missile that can carry nuclear warheads up to 2,750 km.



Chinese Submarine Practiced Missile Attack on USS Reagan

Cruise missile targeting of carrier risked naval shootout

Bill Gertz

A Chinese attack submarine conducted a simulated cruise missile attack on the aircraft carrier USS Reagan during a close encounter several weeks ago, according to American defense officials. The targeting incident near the Sea of Japan in October violated China's 2014 commitment to the multinational Code for Unplanned Encounters at Sea, known as CUES, designed to reduce the risk of a shooting incident between naval vessels, said officials familiar with details of the encounter they described as "serious." A section of the non-binding 2014 agreement states that commanders at sea should avoid actions that could lead to accidents or mishaps. Among the actions to be avoided are "simulation of attacks by aiming guns, missiles, fire control radar, torpedo tubes or other weapons in the direction of vessels or aircraft encountered." Navy officials recently briefed congressional staff on the incident that took place during the weekend of Oct. 24—days before the Navy warship USS Lassens sailed within 12 miles of disputed Chinese islands in the South China Sea, triggering vocal criticism from Beijing. The Obama administration has kept details of the submarine targeting incident secret to avoid upsetting military relations between the Pentagon and the People's Liberation Army. Asked directly about the incident, Adm. Harry Harris, commander of the U.S. Pacific Command, did not deny that the encounter occurred. "I have nothing for you," Harris stated in an email. Pacific Command spokesman Capt. Darryn James earlier directed questions about the targeting to the Chinese navy. James also stated that Navy ships in the region are capable of defending themselves. "I cannot discuss submarine operations, reports of submarine operations, or rumors of submarine operations," James said. "I can tell you that we are completely confident in the effectiveness and capabilities of the ships and aircraft of the forward-deployed naval force." Additional details about the submarine-carrier encounter emerged after the Free Beacon first reported the incident Nov. 3. The nuclear-powered Reagan is currently the Navy's sole forward-deployed aircraft carrier strike group. It arrived at its base in Yokosuka, Japan on Oct. 1 and replaced the USS Washington strike group there. Aircraft carrier strike groups are equipped with anti-submarine warfare capabilities, including ships armed with sensors and submarine-killing torpedoes. Disclosure of the aircraft carrier targeting comes as two Chinese navy warships arrived in Pearl Harbor on Sunday. China's official news agency said the ships' visit to Hawaii will last five days. "During the fleet's stay here, the U.S. navy and the Chinese fleet will hold receptions for each other," Xinhua said. "Friendly sports activities, such as basketball and soccer games, will be held between the two sides." The Pentagon has made developing closer ties with the Chinese military a top priority, despite concerns that the exchanges are boosting Chinese war-fighting capabilities. Members of Congress have called for curbing the exchanges in the face of Chinese cyber attacks and destabilizing activities in the South China Sea. On Capitol Hill, Rep. Randy Forbes (R., Va.), chairman of the House Armed Services subcommittee on sea power, said he is concerned by reports of

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Chinese Submarine Practiced Missile Attack on USS Reagan

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China's simulated ship attack. "If true, this would be yet another case of China trying to show us that they can hold our forces in the region at risk," said Forbes. "Coming on the heels of anti-satellite tests and other demonstrations, this latest incident should be a reminder of the destabilizing course that China is on and the challenges we face in maintaining a stable military balance in the Asia-Pacific region," Forbes added. Naval warfare analysts said the incident highlights Chinese efforts to counter U.S. aircraft carrier strike groups, the United States' major power projection capability in the Pacific. Retired Navy Capt. Jim Fanell, a former Pacific Fleet intelligence chief, said the submarine incident, if confirmed, would be another clear case of the Chinese navy targeting the carrier strike groups, known as CVNs. "The PLAN submarine force is on the leading edge of the PLAN for targeting U.S. CVNs in the East Asia arena, all for the expressed purpose of being able to attack and disable them in a contingency operation" he said. PLAN stands for People's Liberation Army Navy. Rick Fisher, a China military specialist at the International Assessment and Strategy Center, said the Chinese navy operates several types of submarines capable of firing anti-ship cruise missiles. The Song-class and Yuan-class attack submarines can fire two types of torpedo tube-launched anti-ship cruise missiles, including the YJ-82 with a range of up to 22 miles. Eight of China's 12 Russian-made Kilo-class submarines are armed with Club anti-ship missiles with a range of up to 137 miles. Newer Shang-class submarine can also fire cruise missiles. "That the U.S. side would be able to determine that the submarine was conducting a cruise missile strike would indicate that the Chinese submarine was under close surveillance," Fisher said. "That also raises the potential that the U.S. side could determine the Chinese submarine had hostile intent, potentially leading to the launching of defensive weapons." Fisher said the incident was serious because a U.S.-China shootout would likely result in the destruction of the Chinese submarine and the loss of its crew. "Even though China would have been at fault for the incident, the Chinese government would likely then use it as an excuse for initiating a series of attacks or incidents against U.S. naval forces," he said. Additionally, the targeting "certainly runs counter to a 2014 U.S.-China agreement to avoid such incidents at sea, which could indicate that China may have little intention to honor such this or other military confidence building agreements," Fisher said. The Navy's main close-in anti-submarine warfare weapon is the RUM-139C rocket-launched anti-submarine torpedo, with a range of about 17 miles. Ben Ho Wan Beng, a military analyst at Singapore's S. Rajaratnam School of International Studies, said the Chinese military is focused on using of cruise missiles against carriers. "China seems to stress the centrality of this weapon in attacking ships," he wrote last week in the Diplomat. Recent improvements in Navy defenses against submarines include a new electronic combat system, a towed sensor array, and the P-8 maritime submarine patrol aircraft. "Whether or not these and similar measures would enable the U.S. to retain a distinctive edge in the undersea combat realm vis-à-vis China remains to be seen," Ho said. Lyle J. Goldstein, a U.S. Naval War College expert on the Chinese military, wrote on Sunday that a Chinese defense journal recently discussed ways to sink U.S. aircraft carriers. A Chinese military analyst recently revealed that China is closely studying a report from earlier this year revealing that a small nuclear-powered French submarine successfully conducted a simulated attack on the aircraft carrier USS Roosevelt, sinking the ship and several support ships in the simulation. "The article illustrates how Chinese military analysts are diligently probing for cracks in the U.S. Navy's armor," Goldstein wrote in the National Interest. The October showdown between the Chinese submarine and the Reagan took place as the carrier sailed around the southern end of Japan on the way exercises in the Sea of Japan along with four other strike group warships. Days after the incident, two Russian strategic bombers flew within a mile of the carrier at a height of 500 feet, prompting F-18s from the ship to scramble and intercept them. The October incident was not the first time a Chinese submarine threatened a U.S. carrier strike group. In 2006, a Song-class attack submarine surfaced undetected within torpedo range of the USS Kitty Hawk. The state-controlled China Daily praised the implementation of the CUES maritime code agreement last year as a major step in U.S.-China military relations. Wen Bing, a researcher at the Chinese army's Academy of Military Sciences, told the newspaper that the code of conduct and U.S.-China warship exercise at the time "demonstrate the resolve of both countries to deepen military ties and avoid a maritime conflict escalating due to a lack of communication." In December 2013, a Chinese amphibious warship sailed in front of the guided missile cruiser USS Cowpens and stopped, causing a near collision in the South China Sea.

Iran threatened with new sanctions over missile test

UN panel finds that Tehran violated Security Council resolution by test-firing nuclear-capable missile in October. Iran violated a United Nations Security Council resolution in October by test-firing a missile capable of delivering a nuclear warhead, a team of sanctions monitors said, leading to calls in the United States for more sanctions on Tehran. The White House said it would not rule out additional steps against Iran over the test of the medium-range Emad rocket, on the same day that the global nuclear watchdog concluded its 12-year investigation into Iran's nuclear activities. The Security Council's Panel of Experts on Iran said in a confidential report, that the launch showed the rocket met its requirements for considering that a missile could deliver a nuclear weapon. "On the basis of its analysis and findings the Panel concludes that Emad launch is a violation by Iran of paragraph 9 of Security Council resolution 1929," the panel said. The finding from the panel could trigger moves to impose sanctions on Iran, although such a decision would require agreement from China and Russia. The two countries along with Britain, France, Germany and the US took part in successful negotiations on the landmark deal reached with Iran in July on curbing Tehran's nuclear programme. Diplomats said the rocket test on October 10 was not technically a violation of the July nuclear deal between Iran and world powers. In Washington, a senior US administration official stressed that sanctions had already been imposed over the UN ban on ballistic missile launches but that more Iranian entities could be blacklisted. France emphasised the importance of an "appropriate response" after the UN report's findings and Britain's envoy Matthew Rycroft said the council must "respond effectively to what appears to be a breach". Iran has said any new sanctions would jeopardise the nuclear deal. The UN panel's report was dated last Friday and went to members of the Security Council's Iran sanctions committee in recent days. The report came up on Tuesday when the 15-nation council discussed the Iran sanctions regime. It said the panel considered ballistic missiles capable of delivering nuclear weapons to be those that can deliver at least a 500kg payload within a range of at least 300km. Iran's UN mission did not respond to a request for comment. In October, Tehran disputed the Western assessment that the missile was capable of delivering a nuclear warhead. On a day of mixed messages, the report was delivered on Tuesday as the International Atomic Energy Agency's 35-nation board decided to close its investigation of Iran's past nuclear activities, throwing its support behind Tehran's deal with major powers. "The agency has no credible indications of activities in Iran relevant to the development of nuclear explosive devices after 2009," said IAEA Director-General Yukiya Amano. "Nor has the agency found any credible indications of the diversion of nuclear material in connection with the possible military dimensions to Iran's nuclear programme." US Secretary of State John Kerry welcomed the decision to close the investigation into whether Iran once had a secret nuclear weapons programme. Al Jazeera's Gabriel Elizondo, reporting from the UN in New York, said the UN now had to make a decision about what action it would take regarding the October 10 test. "Essentially, the IAEA signalled they wanted to move forward on the Iran nuclear deal, rather than further probe Iran's past nuclear activities," our correspondent said. "And here at the UN, the divided Security Council is now faced with what - if any - action they'll take."

The Hindu

16 December 2015

IAEA closes Iran nuclear probe

The UN atomic watchdog's board Tuesday drew a line under a long-running probe into Iran's past efforts to develop nuclear weapons, removing an important obstacle to implementing July's landmark deal with big powers. A resolution approved by the International Atomic Energy Agency's 35-nation board of governors in Vienna "closes the board's consideration of the matter" and clears the way to annul previous resolutions. Iran's envoy to the IAEA said afterwards that Tehran would now "accelerate" enacting July's accord to scale down its nuclear programme in exchange for sanctions relief, and fulfil its side of the bargain within "two to three weeks". The IAEA keeps close tabs on Iran's nuclear programme, and its inspections role is set to grow under July's hard-fought deal, which defused a standoff dating back to 2002.

Isro to launch rocket carrying 6 Singapore satellites today

India is all set to launch PSLV-C-29 rocket carrying six Singapore satellites on Wednesday from the country's space port of Sriharikota. Indian Space Research Organisation (Isro) on Tuesday said the 59-hour countdown, which started on Monday, is progressing smoothly. A senior official from Isro told Deccan Herald that propellant and mixed oxides of nitrogen filling operation of the fourth stage has been completed. Isro's most-trusted rocket and workhorse launch vehicle PSLV-C29, in its thirty-second flight, will carry these six satellite to be thrust into 550-km circular orbit after its takeoff at 6 pm from the launch pad in Satish Dhawan Space Centre. According to the Isro officials, 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, Isro has launched 14 satellites (3 Indian and 11 foreign) from its rocket port in Sriharikota till date. Thirteen satellites were launched with PSLV rocket and one communication satellite-GSAT-6-with geosynchronous satellite launch vehicle (GSLV). The December 16 PSLV-C-29 launch will take the total number satellite launches from India to 20. Last month, India also launched its communication satellite GSAT-15 using the Ariane rocket of the European space agency which takes the total number of satellite launches in 2015 to 21 (17 foreign, 4 Indian).

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Sacked officers bind NTRO in litigation

Dinakar Peri

The National Technical Research Organisation (NTRO) is facing a legal challenge from over a hundred casual and contractual officers for its administrative actions, including abrupt removal of many of them from service, that they describe as illegal actions by the country's premier technical intelligence agency. Three of the cases, involving over 100 employees, are up for hearing before the Central Administrative Tribunal (CAT) in the next three months. However, the NTRO is not new to such controversies. The Comptroller and Auditor-General (CAG), in its 2011 report, had pulled up the organisation for irregularities in appointments of regular and contractual staff and procurement of equipment, misuse of official position and security violation. But the Prime Minister's Office (PMO) refused to make the report public as it is classified.

Abrupt removal - In May 2015, 47 officers employed on casual basis were removed abruptly without any reason being given. One of the sacked employees said that their names were in the duty roster for the week but when they turned up for work on May 07, 2015 there was a notice that "all casuals have been dis-empanelled." The officers have been working here from 4-15 years. Some of the officers have since approached the CAT and the next hearing is scheduled for January 11, 2016. There is another petition by the casual officers coming up for hearing on February 15, 2016. In August 2013 an assessment exam was conducted following which 60 officers were removed and eight of them have approached the CAT. In the third case 70 contractual employees approached the CAT after they were asked to give an undertaking that they would not seek extension. Though their contracts expired in December, they are still in service as the court has given a stay. There are about 400 such employees in the 6-7 divisions of the NTRO. The officers were part of the Centre for Focussed Open Source Intelligence Generation (CFOG) which is tasked with monitoring open source information coming out on India and its policies, both domestic and in the neighbourhood - Weapons of Mass Destruction (WMD), energy security, Pakistan, China, Afghanistan and Myanmar - and disseminate it to the concerned ministries. The CFOG itself metamorphosed from the Central Monitoring Service (CMS) which was originally under the Information & Broadcasting Ministry (I&B) and was transferred to the NTRO in 2005. However, CFOG was shut down in May 2015 and while some employees were removed others were transferred to the Centre for Intelligence Research and Analysis (CIRA) and other divisions. Officials said that when the CFOG came into being the television monitoring unit was wound up. "The idea was why monitor television when everything is available online," one officer said. Another officer, part of the China monitoring desk, said that on the one hand the government talks of generating employment while on the other hand sacks experienced people without any reason. "It is not just about employment. In a way they are playing with national security," said another who has approached the CAT.

Science Congress to steer clear of mythology

No storytelling will be allowed... I have strongly resisted attempts, says ISCA president

Jacob Koshy

Stung by the backlash over the inclusion of pseudo-science at the 2015 Indian Science Congress, organisers of its January 2016 edition have said the forum will steer clear of mythology or anything that doesn't have a "scientific basis." "Nothing without a scientific basis or any form of storytelling will be allowed at the congress. I've strongly resisted attempts this year too and only proven facts will be presented," said Ashok Kumar Saxena, general president, Indian Science Congress Association (ISCA). The congress, organised by the ISCA, is a century-old annual meeting that draws Nobel science laureates, NRI scientists, Indian researchers and students. Though less a forum for discussing new research, it always has the Prime Minister in attendance and over the years, has morphed into a forum for India's political class - since Jawaharlal Nehru - to comment on the state of Indian science as well as proclaim the country's expectations from its scientists. The conference is supported by the Ministry of Science and Technology. Last year, the Science Congress in Mumbai was Narendra Modi's first as Prime Minister. Along with lectures by eminent Indian-American researchers there was a special session, inaugurated by Environment Minister Prakash Javadekar called "Ancient Sciences Through Sanskrit." The highlight of the session, that later on was widely condemned, was a presentation by a former pilot, Anand Bodas, who claimed that Indian sages knew how to build planet-hopping spacecraft. Dr. Saxena said that "criticism" last year had made the organisation more circumspect about including science and Sanskrit sessions and the focus this year would be on "Made in India" rather than Mr. Modi's own more-encompassing slogan of 'Make in India.' The conference this year will be held in January at Mysore University. K. Rangappa, Vice-Chancellor of the university and a key organiser, said that while there wouldn't be a focus on ancient sciences, India's historical contribution to science wouldn't be ignored.

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Psycho tests for airline pilots from next year

Saurabh Sinha

Psychometric tests for pilots of Indian airlines are all set to begin early next year. The Directorate General of Civil Aviation (DGCA) has asked the Air Force-run Institute of Aerospace Medicine (IAM) to finalise the details of these tests - the tests to be conducted and at what intervals - within three months. "Once we get the final modalities from them and the government approves, the psycho tests for pilots should start within the first half of next year," DGCA chief M Sathiyavathy said. The aviation regulator had started contemplating these tests after the Germanwings crash of March 24, 2015. The aircraft was on its way from Barcelona to Dusseldorf when its co-pilot reportedly 'deliberately' crashed the plane in the French Alps. Following this, Sathiyavathy set up a panel of experts to decide on psychometric tests for pilots. This panel recommended four-level tests for pilots, starting from the time a student wants enrol for a flying school. The other three stages at which pilot were recommended to undergo and clear the tests are: at the time of joining an airline or charter company; at the time of being promoted to commander and whenever they exhibit any abnormal behaviour like picking fights in the cockpit. The first stage has been recommended to avoid situations where middle or lower middle class families spend anywhere up to Rs 40 lakh to get their child trained as a pilot only to be rejected by airline at induction screening process on psychometric grounds. Some airlines already conduct this test on pilots at induction time. Earlier this year, Air India had rejected 56 out of 278 pilots who appeared for job interviews after they failed their psycho tests. While pilots welcome this move, they also want the regulator to take care of other factors that cause distress to pilots and affect them severely - like financial health of carriers that often makes pay an uncertainty. In fact, the issue is so critical that a profitable Indian airline has this written on the cockpit doors of all its aircraft: "Flying is a serious business. Leave your worries behind before entering it." Meanwhile, the DGCA is going to reduce the frequency of medical tests (non psycho) for pilots. At current schedule, airline pilots have to undergo medicals twice a year. Now, in a bid to improve ease of doing business for airlines these tests will be made once a year for pilots in the age group of 40 to 60. "This is being done as per International Civil Aviation Organization norms," Sathiyavathy said.

A climate more congenial to India

Navroz K. Dubash

The Paris Agreement preserves space for greater energy use, but with the caveat that India's actions will be subject to scrutiny. We should use these mechanisms to hold others to account. Is the Paris Agreement on climate change a good or bad deal for India? The complex text, produced after four years of tortuous negotiations, does not lend itself to a simple answer. But this is the question that matters for India, and is worth trying to answer. Efforts at international cooperation imply that countries must concede something with the intent of obtaining some greater gain. The premise of the climate agreement is that by agreeing to some checks on national greenhouse gas emissions, and hence energy use patterns, each country benefits from decreased collective exposure to harmful global climate change. Most Indian analyses of the Paris Agreement have focussed on the concession - what did India give up? But since India is a country at great risk from climate impacts, a balanced reckoning requires a close look at both sides of the ledger, the loss and the gain.

Securing our energy future - On the loss side, India's long-standing objective in climate talks is to avoid undue limits on energy options. This is important, as India will require a great deal more energy in the coming decades: for commercial cooking fuels, access to electricity, and power for industries and commerce to provide livelihoods. Although huge, these needs are also uncertain; much depends on how India grows, and on how technology changes. This uncertainty also makes negotiation difficult, as it is hard to know how much to bargain away without causing harm. The bedrock of India's approach to ensuring we do not give away our energy future is the principle of "common but differentiated responsibility and respective capabilities" embedded in the underlying Framework Convention on Climate Change. Without this safeguard, all countries would have been placed on the same footing. India, despite contributing little to the problem and having limited capacity to address it, would have been placed under undue pressure to prematurely limit emissions. Developed countries have long argued for a dilution of this principle, saying that the world has changed since 1990 when the Convention was negotiated - particularly referring to the rise of China - and that static lists of developed and developing countries fail to capture this dynamic global context.

Developed-developing distinction - This deadlock was broken at Paris by acknowledging that the world has indeed changed, yet not so much that these categories are no longer relevant; developed and developing country categories are retained but made more fluid. Moreover, the Agreement usefully specifies what the principle means in practice for key climate policy areas such as mitigation, adaptation, finance, and transparency provisions. In this respect, India demonstrated some nimbleness at Paris, by shifting from arguing for blanket invocation of the principle to seeking its specific application in key areas. For example, in the core mitigation area, the Agreement states that developed countries should take the lead with economy-wide emission reduction targets, while developing countries should aspire to do so over time, recognising that they will need to grow their emissions. This allows some countries to cross categories when it deems fit, as China has done by pledging a "peaking year" for its emissions, while allowing other, like India, to persist with an emissions intensity pledge, which allows emissions to rise. Significantly, it maintains a distinction between developed and developing countries in the provision of climate finance, using the same model of creating a somewhat porous boundary. This distinction retains a key idea for India - expectations of mitigation actions by developing countries are related to expectations of support from developed countries. Together, retention of categories of countries and their operationalisation in key provisions ensure India's losses at Paris are limited. An important caveat is that what was a relatively impervious boundary has been made permeable, increasing the risk that India will be pressured to 'voluntarily' cross that boundary sooner rather than later. On this aspect, one dissonant note in the negotiations was a successful last-minute effort by a coalition of countries to introduce the idea of attempting

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A climate more congenial to India

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to limit temperature increase to 1.5°C instead of 2°C. While highly desirable in principle, this increase in 'ambition' was not backed by an increase in action, particularly from the developed countries, increasing the risk that India will be asked to prematurely step up to fill the gap.

National pledges - What, then, are the gains for India? Will India gain, and how much, from the Paris Agreement in terms of avoided climate harms? One common line of argument is that the Paris Agreement is relatively toothless, does not bind countries (including India) to actual emission limits, has no mechanisms to enforce actions, and therefore will have little impact. If so, India would have little to gain. But this description entirely misses the point. It rests on a presumption that international agreements drive domestic actions in countries, even against the run of domestic politics. The Paris Agreement is built on a different logic: the motive power for change in energy systems will come from domestic politics in country after country, but the international process can amplify and provide leverage for domestic actors. By this logic, the key elements of the Paris Agreement are the national pledges made before Paris, and the mechanism to encourage those pledges to be ratcheted up over time. This mechanism includes: a mandatory five-yearly update of all pledges; a technical review process of both climate actions and financial contributions that is meant to ensure countries take their updates seriously; transparency provisions; and a global 'stocktake' on the aggregate effect of these actions. The idea is that the Paris Agreement will set in place mandatory procedures, which then stimulate an iterative process in country after country, ideally stimulating ever greater shifts to low-carbon trajectories. The first round of pledges submitted before Paris were conservative and have fallen short of what is required, bridging only about a quarter to a third of the necessary gap between emissions pledged and what is required by science. This is why the update and ratchet mechanism is essential; it is designed to stimulate a virtuous cycle of more ambitious pledges, greater investment in low emissions options, and lower costs and barriers to implementation of those options, leading to yet more ambitious pledges. If this works, and it does result in enhanced collective action to limit climate change, then India will be a substantial gainer.

For a robust energy policy - But will this work? The answer rests, as it probably should, in national political processes in all countries, including India, rather than in the international arena. For India, the imperative now is twofold. First, we should make sure the ratchet mechanism sustains pressure on developed countries to ramp up their efforts. This will require and upgrading our ability to analyse other country contributions and actively shaping the fine print of implementing language for the Paris Agreement in the coming years. Second, and perhaps more important, we have to build a robust and ongoing national process to examine our energy and climate future, to replace India's current ad hoc, disconnected, process of energy planning and policy. This requires a more cogent system of energy information gathering and analysis. It also requires exploring actions that bring synergies across development and climate outcomes (such as energy efficiency and public transport) and those that come with direct costs to the economy. We also need answers to longer-term questions salient to future pledges, such as: how much additional coal energy do we anticipate needing; and, to what extent can we urbanise while limiting high carbon lock-in? Looking at both sides of the ledger, India has limited losses because the Agreement preserves space for greater energy use, but with the caveat that we have to better justify our actions through a national process that will also be subject to international scrutiny. Moreover, we can and should use these same mechanisms to hold others to account. On the positive side, there is a plausible, if challenging, pathway to improved global action to limit climate change and its harmful impacts. And, the Paris Agreement offers the not trivial benefit of inducing India to establish a more robust domestic process for energy planning and policy. In my opinion, the balance is, on net, positive.

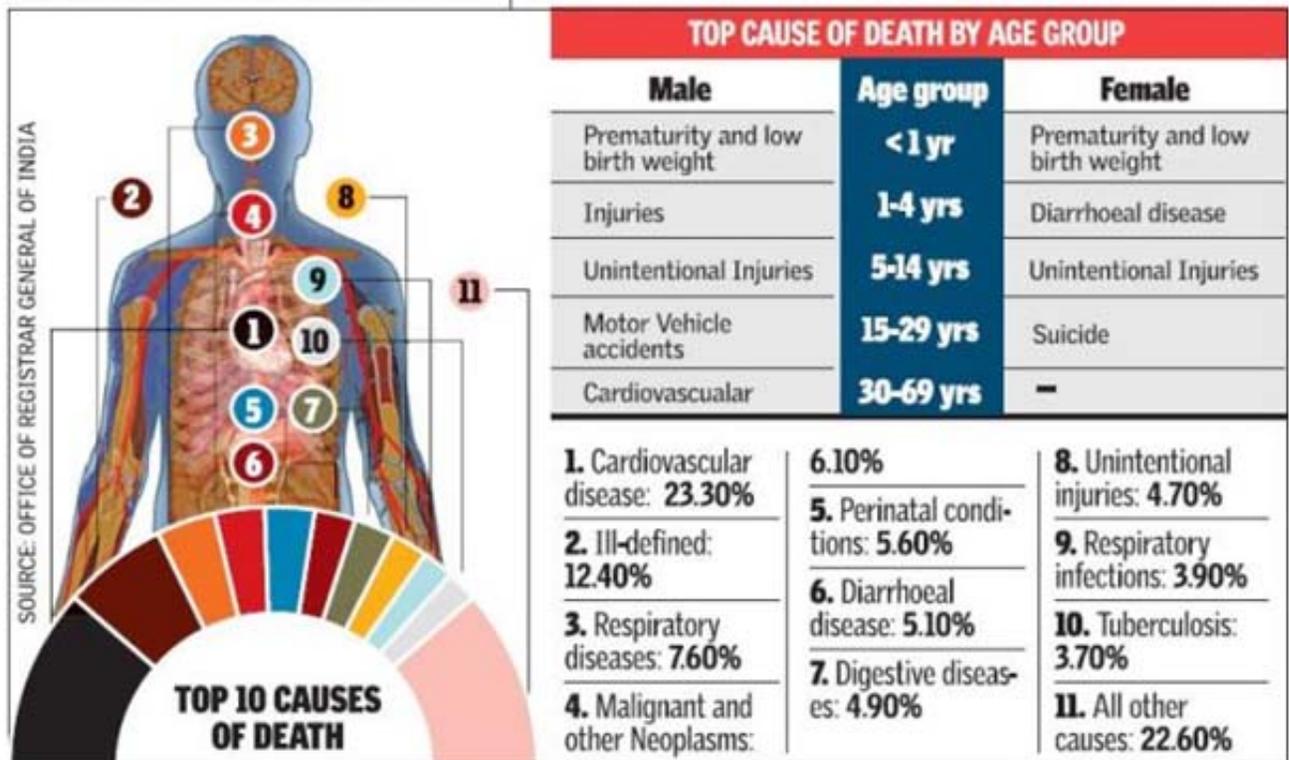
‘Cardiovascular disease top killer’

Rukmini S

For the population as a whole, non-communicable diseases including cancers and digestive disease are bigger killers while infant mortality and diarrhoeal disease are reducing in impact, the data shows. Suicide and road accidents are the leading cause of death among young women and men respectively, new data from the Registrar General of India shows. For the population as a whole, non-communicable diseases including cancers and digestive disease are bigger killers while infant mortality and diarrhoeal disease are reducing in impact, the data shows. Since death certification in India is rare, restricted to urban areas and of poor quality, the RGI's office has been conducting "verbal autopsies" on a sample group across the country every few years. The last such 'causes of death study' was conducted in 2004-6, and the RGI's office released data for 2010-13 on Tuesday. The sample consisted of 1.8 lakh deaths across the country, and the cause of death was established by interviewing the household, followed by analysis by a team of medical professionals. The data shows that overall, cardiovascular disease is the top killer of Indians, accounting for 23 per cent of all deaths in 2010-13 as compared to 20 per cent in 2004-06. The proportion of infant and child deaths to total deaths has come down substantially, and improved healthcare has meant more deaths in the 70+ age group instead. Noncommunicable diseases account for more deaths in India's richer states than in its poorer states. Among neonatal and infant deaths, prematurity and low birth weight has become a progressively biggest cause of death as more institutional deliveries have meant fewer birth trauma-related deaths. However there is a substantial difference between India's richer and poorer states; deaths of children under the age of 4 account for nearly 40 per cent of all deaths in the poorest states including Bihar, Uttar Pradesh and Assam, and just 17 per cent of deaths in the other states. The burden of child death is also higher in rural than in urban areas. Injuries have now surpassed diarrhoeal disease as the leading cause of death among boys aged 1-4 years. "Unintentional injuries" have also become the leading killers of young boys and girls aged 5-14. Among young adults aged 15-29, road accidents have surpassed suicides as the leading cause of death of young men, while suicides are not responsible for an even larger proportion of young female deaths. Cardiovascular disease is the biggest killer of older adults, followed by cancers. Suicides are particularly high in the south; it is the sixth largest cause of death across age groups in the four southern states, while it does not figure among the top ten causes of death in any other region.

POINTS TO PONDER

Suicides sixth largest cause of death in South India



Camera technology Round the bend

Efforts to see around corners get a boost from better detectors

Using a cameraphone to catch the indivisible packets of light energy known as photons is easy: around a trillion of them impinge on its sensor every second. Catching just one photon, however-and knowing exactly when it arrived-is far trickier. Many branches of research in the physical sciences depend on specialised kit that can do this, but quotidian equipment is not up to the job. "So what?" you might think. But there is at least one application outside the laboratory that it might be useful for. This is seeing what is around a corner, something both soldiers and drivers would like to be able to do. And, as they describe in *Nature Photonics*, a group of researchers led by Daniele Faccio of Heriot-Watt University, in Edinburgh, have indeed worked out a way to capture simple movies of what is around the bend. Dr Faccio's group is one of several trying to do this. All use a method similar to that employed in radar, except that it substitutes light for radio waves and is thus known as LIDAR. Unlike conventional LIDAR, though, the pulses sent out from looking-around-the-corner equipment have to bounce off three things before they make it back to the detector. First, they must be reflected from something in the line of sight of their source. This pushes some of them in the direction of the hidden target. Then, they have to be reflected from that target back in the direction of the first reflector so that they can undergo a third reflection, towards the device that sent them out. Since each step of this journey scatters or absorbs much of the incident light, what returns is a tiny fraction of what was sent out-the trillions of photons are reduced to just a few thousand. But even that handful is, in principle, enough to construct an image of what cannot be seen directly. To do so, however, it helps to have expensive detectors shielded by filters that let through only light of the frequency used by the LIDAR; a set of complex algorithms; and minutes or hours of scanning to provide the data for said algorithms to chew on. Dr Faccio has managed to speed this process up. Partly, he does so by sacrificing detail. But his main advance is to use an array of devices called single-photon avalanche diodes (SPADs), deposited on a semiconductor chip, to create something rather like a camera sensor. As the name suggests, each SPAD can register the arrival of a single photon. Such a packet of light triggers an avalanche of electric charge through the diode's semiconducting material, creating a signal. This arrangement can measure a photon's arrival time to within 45 trillionths of a second, a period during which light travels 1.35cm. Like conventional LIDAR, the round-the-corner sort works by measuring the time it takes for a pulse, or part of it, to return. It can then work out how far the photons it has seen are from the bit of the target they have reflected from. And it works. The system can now see someone (usually one of Dr Faccio's students) hidden four metres away around a corner. It can also produce new images sufficiently quickly (once every three seconds) to shoot a jerky movie of her. That, of course, falls far short of something that might show a driver what lies around the bend. But Dr Faccio hopes for rapid improvements. A tenfold increase in sensitivity, for example, could be had just by using a more powerful laser. The SPADs themselves are improving swiftly, too. The ability to see around corners, then, could be just around the corner.

