

समाचार पत्रों से चयित अंश Newspapers Clippings

दैनिक सामयिक अभिज्ञता सेवा
A daily Current Awareness Service

Vol. 42 No. 224 17 October 2017



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DRDO will empower nation with ‘Make in India’: Nirmala Sitharaman

Defence Minister visits Combat Vehicles Research and Development Establishment in Avadi

Defence Minister Nirmala Sitharaman visited the Combat Vehicles Research and Development Establishment in Avadi on Sunday, where she was given a presentation on the ongoing national programmes in combat vehicles and technologies.

The Defence Minister, during her maiden visit to the facility, was also shown around various technology centres. S. Christopher, Chairman, DRDO & Secretary, Department of Defence, R&D, and P. Sivakumar, Director, CVRDE, gave a presentation about the unit, a press release said.

“The Defence Minister evinced keen interest in the advanced systems like Arjun MBT Mk-II, Arjun Armoured Recovery and Repair Vehicle (ARRV), Arjun Catapult, Unmanned Ground Vehicles, Sub-systems of Light Combat Aircraft –Tejas, Landing Gear, 180 hp engine for Rustom-II, 1000 hp Engine for T-72, 400 hp for BMP-II, besides Armoured Ambulance Tracked, Carrier Command Post Tracked, Bridge Laying Tank (BLT-72),” the release said.

During the visit, the first prototype of Arjun Armoured Recovery and Repair Vehicle (ARRV), was handed over by Deepak Kumar Hota, CMD, BEML to Mr. Sivakumar.

Website launched

Ms. Sitharaman also launched a website, ‘DRDO Robotics & Unmanned Systems Exposition’ (<https://rac.gov.in/druse>) for inviting the young & talented minds of engineering community from all parts of the country to take part in Defence Challenging applications.

She also released two books titled ‘Arjun MBT- an Indian Success Story’ and ‘Achievements of CVRDE’. The Minister expressed confidence that the DRDO will empower the nation with the ‘Make in India’ mission, the release said.

Tejas jets to get French-made radars

Company completes flight test

Thales, a French multinational that makes aerospace and defence equipment, has flight-tested an active array radar built specifically for Tejas, the indigenously built light combat aircraft.

The radar is based on the company’s successful RBE2 radar installed on Rafale fighter jets, 36 of which India is buying from Dassault. It meets the specific requirements of the Hindustan Aeronautics Ltd. to equip the 80 Tejas-Mk1A aircraft under development.

“In just four months, thanks to our solid, proven experience with the RBE2, we’ve been able to carry out successful flights to test the performance of the key features of the radar we’re offering for the Tejas Mk1A light fighter,” Philippe Duhamel, executive vice-president, Defence Mission Systems, Thales, said in a statement on Monday.

The tests were conducted during summer this year at the Cazaux air base in France, on a test-bench aircraft, focussed on metrological analyses of the radar performance, Thales said.

“These test flights proved that the radar is fully operational and perfectly corresponds to the specific requirements of the HAL for its combat and air-superiority missions. It is therefore ready and able to adapt to the tight schedule imposed by the Mk1A LCA,” the statement said.

A Tejas Mk-1A variant with specific improvements is under development and HAL had earlier this year floated a tender for Advanced Electronically Scanned Array (AESA) radar and Self-Protection Jammer. The Defence Ministry has already approved 83 Mk1A for the Air Force, in addition to the 40 basic variants.

LETHAL ARSENAL

INS Kiltan gets its name from Minicoy island in the Lakshadweep. It is the first major warship to have undertaken sea trials of all major weapons and sensors as a pilot project and is ready to be operationally deployed.

IN NUMBERS

109
metres
long

14
metres at
the beam

4 diesel engines propel it to achieve speeds in excess of 25 knots with an endurance of 3,450 nautical miles

13 officers
and 178 sailors
will man the
ship



QUICK FACTS

- INS Kiltan is the third of the four anti-submarine warfare (ASW) corvettes to be built under the ₹7,800-crore Project 28
- Kolkata-based Garden Reach Shipbuilders & Engineers (GRSE) was awarded the contract to build the corvettes in June 2012

- The warships have been designed by the navy's Directorate of Naval Design
- It is the navy's first major warship to have a superstructure of carbon fibre composite material imported from Sweden
- INS Kiltan is 100 tonnes lighter

- than the previous corvettes.
- Weapons include heavy weight torpedoes, ASW rockets, 76mm caliber medium range gun and two multi-barrel 30mm guns
- The propulsion and auxiliary systems provide very low radiated underwater noise required for AWS

Like all its predecessors, INS Kiltan joins Navy with major vulnerabilities

It doesn't have advanced towed array sonar, essential for detecting enemy submarines in the shallow Arabian Sea

By Ajai Shukla

Like numerous Indian warships before it, the navy's newest anti-submarine warfare (ASW) corvette, INS Kiltan, joined the fleet on Monday without equipment crucial for discharging its primary role – detecting and destroying enemy submarines.

The Kiltan, like two predecessor ASW corvettes, INS Kamort and INS Kadmatt, was commissioned by Defence Minister Nirmala Sitharaman in Visakhapatnam without “advanced towed array sonar” (ATAS), essential for detecting enemy submarines in the shallow Arabian Sea where the peculiar temperature and salinity gradients sharply limit the effectiveness of conventional sonars.

Without ATAS, enemy submarines can sneak undetected to within 50-80 kilometres of Indian warships and destroy them with heavy torpedoes from standoff ranges.

The Kiltan will also make do without another vital ASW platform – a naval multi-role helicopter (NMRH), which flies low over the sea, lowering “dunking sonar” into the water listening for audio signals from enemy submarines. The navy is left with just a handful of NMRH choppers – 12 Sea Kings, of which no more than six are usually operational at any time; and eight Kamov-28, of which four-six are available. The navy must distribute these 10-12 helicopters between some 35 capital warships.

“An ASW corvette without towed array sonar and an ASW helicopter, is nothing more than a feeble joke”, says a retired navy commodore with decades of ASW experience.

Yet, neither of the two Indian warships that called on the Japanese port of Sasebo last week – the frigate INS Satpura and ASW corvette, INS Kadmatt – has towed array sonar. While passing through the South China Sea, these warships would have been at the mercy of Chinese submarines.

In June, the defence ministry scrapped an NMRH purchase that had been initiated in 2009 and was at the point of conclusion. Instead, returning to the start line, the navy has now re-initiated fresh procurement for 123 NMRH.

After this newspaper reported that every Indian warship built after 1997 lacked towed array sonar (“Warships in peril as defence ministry blocks sonar purchase”, May 16, 2014), the defence ministry contracted for six ATAS systems from German naval systems giant, Atlas Elektronik, for just under Euro 40 million (Rs 306 crore).

Those six ATAS systems were earmarked for the navy's three Talwar-class frigates (INS Talwar, Trishul and Tabar) and three Delhi-class destroyers (INS Delhi, Mumbai and Mysore). In effect, a Rs 50 crore ATAS multiplied the survival chances of warships worth several thousand crore apiece, each crewed by hundreds of sailors.

Yet, the National Democratic Alliance government has gone slow on a follow-on proposal to build ten more ATAS systems at Bharat Electronics Ltd (BEL), in partnership with Atlas Elektronik. Those ten systems are intended for three Shivalik-class frigates (INS Shivalik, Satpura and Sahyadri); three Project 15A destroyers (INS Kolkata, Kochi and Chennai) and four Project 28 ASW corvettes, the third of which was commissioned today.

Without ATAS, India's frontline capital warships, including the aircraft carrier, INS Vikramaditya, rely on a relatively ineffective Passive Towed Array Sonar (PTAS), and an indigenous hull-mounted sonar called HUMSA to detect enemy submarines.

Perhaps oblivious to all this, Sitharaman stated today while commissioning Kiltan that: "[T]he government fully appreciates the nation's defence requirements and requisite finances... would be made available for the modernisation and development plans of the Navy", according to a defence ministry release.

INS Kiltan's keel was laid in Garden Reach Shipbuilders & Engineers, Kolkata (GRSE) in August 2010 and she was launched in March 2013. She has been undergoing sea trials since May, and has taken more than seven years in construction.

The corvette, manned by 13 officers and 178 sailors, is propelled by a combination of four Wartsila diesel engines to achieve a cruising speed of 25 knots. She has an endurance of 3,500 nautical miles.

In a significant departure from her predecessors, INS Kamorta and Kadmat, INS Kiltan is India's first major warship with an all-composite superstructure. This has made the vessel lighter by about 100 tonnes.

Her weapons package includes heavy weight torpedoes, ASW rockets, an Otomelara 76 millimetre anti-aircraft gun and two multi-barrel 30 mm AK-630 guns for close-in protection against enemy aircraft.

The corvette, in naval tradition, inherits her name from a previous INS Kiltan (numbered P 79), a Soviet-supplied Petya-class ASW vessel that served in the fleet for 18 years before she was decommissioned in June 1987. The four Project 28 corvettes are all named after coral islands in the Lakshadweep archipelago in the Arabian Sea.



*Mon, 16 Oct, 2017
(Online)*

Russia's state arms seller quits India's tenders for over 20,000 automatic rifles — source

The tender documentation is 99% specified for the outdated Kalashnikov automatic rifles produced in Bulgaria under the expired Soviet license, the source said

Russia's state arms seller Rosoboronexport has decided against participating in the tenders of India's Interior Ministry for the purchase of over 20,000 7.62x39 mm automatic rifles, a source in the system of military and technical cooperation told TASS on Monday.

"The tender documentation is 99% specified by specialists of India's Interior Ministry for the outdated Kalashnikov automatic rifles produced in Bulgaria under the expired Soviet license. The requirements of India's Interior Ministry for the purchase of over 20,000 automatic rifles for the reserve of the national police and the border guard service do not allow Russian companies from the very outset to submit their commercial bids," the source said.

According to the source, the Indian side has specified among the tender's essential terms the availability of a metal magazine whereas Russia has long given up this option in favor of more reliable plastic items; appliances for the assembly and disassembly of the trigger and firing mechanism, although this mechanism's design in new Russian assault rifles of the hundredth series has been improved and no longer requires such an accessory and also steel folding butts whereas modern butt-stocks are made of composite materials.

A source in Rosoboronexport confirmed the state arms exporter's withdrawal from the Indian Interior Ministry's tenders for the purchase of automatic rifles, saying that Russia's AK-103 submachine guns did not

comply with the terms of the tenders. However, the source declined to comment on the Indian Interior Ministry's current procurement policy, saying such statements would be incorrect.

In turn, the Kalashnikov Group said it was greatly surprised that old metal magazines were important for the purchasers from the Indian Interior Ministry.

"They are less reliable and subject to rust in a hot climate. The entire world has long been switching over to plastic magazines," the Kalashnikov Group press office reported, noting that the company planned to invite Indian journalists and experts in the arms sphere to Russia so that they could see with their own eyes modern and qualitative arms, which the Indian police and border guards could get, if the current tender terms "would be more beneficial for the producer of genuine Kalashnikov automatic rifles."

"No doubt, the Indian side has the right to choose any arms for its law-enforcement, defense and security agencies. In turn, the Russian side has the full right not to act in the role of the tender's marginal participant and so the refusal by Rosoboronexport to give up the tenders is a logical decision. But if the terms of the tenders are altered, we are ready to take part in them," the Kalashnikov Group press office said.



Tue, 17 Oct, 2017

Indian personnel head to Russia for 1st tri-service combat exercise

Around 880 Indian military personnel, along with multi-role stealth frigate INS Satpura, anti-submarine warfare corvette INS Kadmat and two IL-76 heavy-lift aircraft, are now headed for Russia to take part in the "Indra" tri-service combat exercise.

"The exercise will provide an opportunity to the armed forces of the two countries to train in counter-terrorism operations in a multinational scenario in a tri-service environment," said Integrated Defence Staff chief Lt General Satish Dua, addressing the contingent at Palam airport on Monday .

India is deploying manpower and assets from the Army , Navy and IAF together for the first time for an exercise with any nation. Indra will be held at the 249th Combined Army Range Sergeevskiy in the eastern military district of Russia and the Sea of Japan off Vladivostok from October 19 29. "India is not sending fighters, tanks, infantry combat vehicles and the like for the exercise because our personnel will use Russian platforms. Almost 60% of Indian military equipment, after all, is of Russian-origin. Both countries, for instance, fly the MiG-29 and Sukhoi fighters," said an official. The Indra exercise is significant because while Russia has been India's largest defence supplier since the early 1960s, the militaries from the two countries do not exercise much with each other.

Russia has begun to hold friendship exercises with Pakistan since last year, with the second edition being held just last month.

India also holds several exercises with the US, including the naval Malabar war-games. The US has also bagged Indian arms contracts worth \$15 billion since 2007, even overtaking Russia. In 2016, India inked pacts to acquire equipment worth around \$10.5 billion from Russia.

Tue, 17 Oct, 2017

NSA Doval visits Kabul to strengthen Indo-Afghan ties

New Delhi: India and Afghanistan decided to strengthen their strategic dialogue and stressed on the regional initiative to bring peace and stability to the war-torn country during the visit of country's national security adviser to Kabul on Monday. Ajit Doval who visited Afghanistan at the invitation of his counterpart Hanif Atmar also met President Ashraf Ghani and chief executive Abdullah Abdullah and exchanged views. "Both sides exchanged views on various facets of the bilateral partnership and regional and global issues of mutual interest," a joint statement said.

Tue, 17 Oct, 2017

Navy sends aircraft to rescue missing sailors in Manila

New Delhi: An Indian Navy plane took off for Manila in Philippines to conduct a search and rescue operation for the missing sailors of MV Emerald Star, which sank north-east of the capital city. The aircraft is equipped with two SAR kits that contain a 10 men inflatable dinghy, emergency food and water supply onboard, which can be airdropped for survivors. According to reports, the ship was carrying 26 Indians. On Friday, the 33,205-tonne cargo ship Emerald Star sank off Okinawa.

Tue, 17 Oct, 2017

Middleman visited India 25 times for Agusta deal

By Neeraj Chauhan

Agencies to Send Fresh Extradition Request for Michel

As the CBI and ED have filed their respective chargesheets against UK-based Christian James Michel in the VIP chopper scam, both the agencies are preparing to send a formal extradition to Britain against the alleged middleman, who was given ₹42 million bribes by AgustaWestland for further payments to Indian politicians, public servants and other middlemen.

Earlier, India's request to extradite Michel was turned down by the UK last year on the basis of incomplete details provided by the Indian authorities.

Sources told TOI that this time, a foolproof request will be sent in which details of his visits to India, money trail and his association with other European middlemen Guido Haschke, Carlo Gerosa and AgustaWestland functionaries would be provided.

Michel, against whom an Interpol red corner notice has already been issued, is considered to be the most important person to link the bribery to politicians and bureaucrats.

He was said to be living in UAE as well, but sources said that they will send extradition request giving his UK address and details.

The CBI, in its chargesheet filed last month, has claimed that while final negotiations were going on in the ministry of defence and Indian Air Force for supply of 12 VIP choppers, Michel visited India on more than

25 occasions and had stayed in different hotels -Hotel Ashoka and Claridges at New Delhi and Hotel ITC Windsor in Bengaluru.

Sources, however, told TOI that Michel used to frequently come to India earlier also. According to the investigators, it is suspected that Michel visited India around 100 times since 1993 and had links in government including the defence ministry and political circles.

The CBI has claimed that he was in possession of secret de fence ministry files, including cabinet committee on security (CCS) documents when AgustaWestland's case was being pushed by IAF.

The central probe agency claims that it was Christian Michel who played a crucial role in eliminating Ms Sikorsky from the competition to get contract for supply of VIP choppers.

“On April 10, 2008, Michel had sent a report from Mumbai to Giuseppe Orsi (former chief of AgustaWestland's parent compa ny Finmeccanica) and other officers of Ms AgustaWestland mentioning that AgustaWestland had succeeded in flight trials, in distancing itself from the competition, and if the commercial bids of Ms Sikorsky are opened then Ms Agusta would in a trouble since Sikorsky would submit its dollar rates,” said the CBI chargesheet.

As reported by TOI, Sikorsky had quoted a price which was approximately 80% less than the rate quoted by AgustaWestland for 12 VIP choppers but was still rejected.

The CBI said that “Michel further reported (to AgustaWestland) that he was consciously and deliberately trying to disqualify the competition at that stage only (trial stage) so that the financial bids of Sikorsky are not opened.”

As claimed by Michel, ministry of defence had rejected Sikorsky at trial stage itself.

“As revealed during investigation, Sikorsky was disqualified during field trial and therefore, its unopened commercial bid submitted in February 2007 was returned to the company by ministry of defence,” the CBI said.



Tue, 17 Oct, 2017

Army veterans must act responsibly

By Harsha Kakar

As compared to other organisations in the country, the armed forces are the only ones without a voice. They have no means of venting their unhappiness at government decisions to those that matter, no union to support their demands, nor any right to protest while wearing the uniform. Their top hierarchy can only raise its voice and request the government through interactions and notes, but can do little if the government is unrelenting. These silent warriors only have their veterans, who having shared the pains and difficulties of service, understand their constraints and have become their public voice.

The culture of silence and discipline ingrained while in service tends to remain within an individual even after his retirement. Hence open protests by veterans are rare. In most cases he continues to behave responsibly and disciplined. Even in the OROP protests, there was a large community which felt that agitating was incorrect by veterans and legal action was the option. Hence, the long-drawn agitation took time to gain momentum, solely because a cultural change was essential amongst the veteran community.

Once it gained momentum, there was nothing stopping the enthusiasm till the initial release of OROP. Most participants quit after the initial release because they felt the government had acted, despite the action being half-baked. Even at the peak of the agitation, there was no violence, no insults to the government, solely

cries for rights and shouts of 'Bharat Mata ki Jai', in contrast to the behaviour sometimes visible in assemblies, parliament or in other protests.

The visuals of aged veterans being manhandled by police or of surrendering their medals, which every soldier considers most dear, hurt sentiments across the nation and compelled the government to act. The agitation was aimed at resolving pension issues of not only veterans but also of generations of serving and future soldiers, as every soldier of today is a veteran of tomorrow. Hence, the agitators protested not solely for themselves but for the tomorrow of those now in service. The military was never criticised, despite claims of non-involvement of its hierarchy.

However, in recent times, there has been a marked change in the comments by veterans on social media. Critical comments against the service, at times even based on fake content, have been on the rise. A recent case where social media became a battle ground was the Major Gogoi incident, where there were clearly two opposing veteran groups, one for and the other critical of the service. The other was the helicopter crash in Arunachal, after which the remains of the deceased were initially lifted and brought to the base in cardboard boxes.

While the army termed it as an aberration and the few who have served in the area understood the difficulties of rescue in such terrain, some veterans ignoring sane voices were extremely critical and accused the army of insensitivity, ignoring the fact that the armed forces respect their martyrs and treat each one with dignity and honour.

The honour provided once the remains reached the base and beyond was ignored. This increased unwanted criticism has become a norm. Many, when questioned, state that it is a means of advising the armed forces to improve, while enhancing awareness amongst the public.

There are some who are permanently critical because they bear a personal grudge against the organisation. The media is only too happy when such differences crop up and seek to play one group against the other on national channels.

The critiques may gain media glare, but their negative comments have impact. Social media being open is regularly injected with comments from forces inimical to the nation, seeking to impact morale. These when circulated with adverse comments spread faster even within the serving community, causing greater harm than good.

On many occasions there have even been comments stating that the service chiefs should resign in case the armed forces are not granted their due, without understanding that such an action is tantamount to mutiny, unheard of in independent India. The veterans are always a respected community within the armed forces family. Their experience and contribution has been respected by the organisation, if not the government.

The present young generation look up to them as mentors. They must realize that it is the service which has made them what they are today, respected members of the community. The services would continue to care for them, solely because they sacrificed their youth for the service of the nation. If they profess a negative outlook, continue criticising the service, rather than supporting it, they project a poor image of the military and its hierarchy amongst the public and within the serving community.

It also impacts those seeking to join it as a career. The serving community is also on social media, though not as active participants. But they observe and are influenced. Hence veterans as a community need to understand their role in impacting the minds of serving services personnel. Positive approach builds confidence and trust into the system, negative outlook erodes the same.

The more senior the veteran, the more positive and advisory should be his role, after all he may be a role model for many. Wrong or negative actions should be gently criticised, as the incident may not have been intentional but accidental.

A positive veteran community would enhance service prestige, while a negative one would degrade it in the public eye. Also missing are the media cells of the services.

Once malicious content is identified on social media, they need to step in and clarify if it is false. Silence on their part adds to the damage. They are aware but are not given freedom to act.

Unless this is done, malicious posts on social media would continue spreading, harming the reputation of the military, both outside and within.



Tue, 17 Oct, 2017

Iran nuclear deal hinges on trust. This is missing

The Obama administration focused on the positives of the agreement, but Trump's spotlight is on the negatives

Recently, United States President Donald Trump kicked the onus of the US backing out of the Iran nuclear deal to the Congress. The question is how we interpret this in terms of domestic politics and of geopolitics. Those supporting the JCPOA, the technical term for the Iran deal, point to fact that Iran's immediate ability to weaponise has been taken away. They also claim that an unprecedented set of intrusive inspections aimed at building trust between the International Atomic Energy Agency (IAEA) and Iran will ensure enforcement of the deal and verify Iran's intent. They also claim that this sets a very good carrot/stick pathway for other errant states to re-enter the NPT fold.

Those who oppose the deal say that these inspections are subject to a sunset clause, that is when the IAEA certifies continued good behaviour, these intrusive inspections will end, subsequent to which Iran may start cheating. They argue that intent can be gauged in other ways, such as Iran's resurgent ballistic missile programme. What is to prevent Iran, when it has perfected its missiles, to simply buy an off-the-shelf bomb from an increasingly desperate and isolated North Korea, as the Syrians bought an off-the-shelf reactor from the same vendor?

There are short to medium term benefits of the JCPOA. But there are equally good, long term arguments against it. Ultimately whether you choose for or against depends on what remains unsaid by both sides is that this deal, like any other, hinges on trust.

Trust of course is one of the most difficult things to achieve when your political goals are so diametrically opposed to each other. Under Barack Obama, the JCPOA was seen as merely one chip, in a larger goal towards normalising relations with Iran. This accepted that Iran was indispensable towards stabilising Central Asia, specifically Afghanistan where its interests were more aligned with the West than Pakistan. After all, if Iran were to provide alternate access to the US to supply its forces there, the salience of Pakistan ends for good. On the other hand, Iran's positions in West Asia are frequently in conflict with the West.

While the Obama administration preferred to focus on the areas of agreement, Trump focuses on the areas of disagreement. He understands the consequences of his actions on US' Afghanistan policy as well as on non-proliferation goals in the short term, and this may explain some of his reluctance. What we can be sure about is that he is determined to pass the consequences of his actions onto Congress, in the same way as Congress chose to pass on the consequences to Obama. Abhijit IyerMitra is senior research fellow, Nuclear Security Programme, Institute of Peace and Conflict Studies, New Delhi

US, South Korea Conduct Joint Navy Drills to Counter North Korea Threat

North Korea calls joint military exercises by the US and South Korea as a 'rehearsal for war'

South Korea and the United States began week-long joint Navy drills in the waters around the Korean peninsula on Monday, amid high tensions over North Korea's nuclear and missile programme.

About 40 Navy ships from both countries, including the nuclear-powered US S Ronald Reagan aircraft carrier, are taking part in the exercises on the east and west coasts of the peninsula from October 16 to October 20, a spokesman for the South's defence ministry said on Monday.

North Korea has called joint military exercises by the US and South Korea as a "rehearsal for war".

On Sunday, US Secretary of State Rex Tillerson said that President Donald Trump had instructed him to continue diplomatic efforts to calm rising tensions with North Korea, saying "those diplomatic efforts will continue until the first bomb drops".

Tensions on the Korean peninsula have risen sharply in recent weeks following a series of weapons tests by Pyongyang, including its sixth and most powerful nuclear test on September 3 and two missile launches over Japan, and a war of words between the US and North Korea.

North Korea is preparing to test a long-range missile which it believes can reach the west coast of the United States, said a Russian lawmaker who returned from a visit to Pyongyang earlier this month.

South Korean intelligence officials and analysts have said that North Korea might time its next provocation to coincide with China's all-important Communist Party Congress which begins on Wednesday.

Speaking at a military conference in Seoul on Monday, General Terrence J. O'Shaughnessy, commander of US Pacific Air Force, said North Korea's nuclear weapons and missile development programme was "truly a threat to us all" and the United States remains poised to defend allies.

"Although countries like North Korea threaten regional peace and security, our allied air power must be ready to respond with rapid, lethal and overwhelming force to respond to preserve our interests," O'Shaughnessy said.

Nobel-winning team spots merging neutron stars

By Shubashree Desikan

For the first time, a cosmic event has been observed with gravitational waves and also light waves.

The LIGO-VIRGO collaboration, three members of which won this year's physics Nobel Prize, strikes again, this time, to detect the merger of two neutron stars — extremely dense, massive but tiny, objects. What is more striking is that gamma rays bursting from the event were observed by nearly 70 ground and space-based observatories.

This is the very first time that a cosmic event has been observed with gravitational waves as well as the light emanating from it. Earlier observations made by LIGO have been of black hole mergers, and as no light can escape from a black hole, there was no such light counterpart to the measurements.

According to a press release circulated by the collaboration, “On August 17, LIGO’s real-time data analysis software caught a strong signal of gravitational waves from space in one of the two LIGO detectors. At nearly the same time, the Gamma-ray Burst Monitor on NASA’s Fermi space telescope had detected a burst of gamma rays.”

“The fact that these two signals [the gravitational waves and the gamma ray bursts, which are essentially light waves] arrived at nearly the same time tell us that the speed of gravitational waves is extremely close to the speed of light. This was predicted by Einstein, but it is the first time we are making a direct measurement,” says P. Ajith, of International Centre for Theoretical Sciences, Bengaluru. Dr. Ajith is one of the leading contributors to the theoretical studies on gravitational waves. In all, the LIGO-VIRGO collaboration includes about 1,500 scientists and of this about 40 are Indians.

The neutron stars of the signal detected on August 17 were located about 130 million light years away. As these neutron stars spiraled together, they emitted gravitational waves that were detectable for about 100 seconds. When they collided, a flash of light in the form of gamma rays was emitted. This “gamma ray burst” was seen on Earth about two seconds after the gravitational waves were observed. As a result, the gravitational wave detectors caught the signal which is the longest “chirp” heard so far — it lasted 100 seconds.

Neutron stars are the smallest, densest stars known to exist. These could be about 20 kilometres in diameter and have masses much greater than the Sun. A teaspoonful of neutron star material could hold a mass of a billion tonnes. They are formed when massive stars explode in supernovae.

“From informing detailed models of the inner workings of neutron stars and the emissions they produce, to more fundamental physics such as general relativity, this event is just so rich. It is a gift that will keep on giving,” David Shoemaker, spokesperson of the LIGO collaboration, is quoted as saying in the press release.



Tue, 17 Oct, 2017

Planet Nine does exist in solar system: NASA

The elusive entity may be 10 times the Earth’s mass and 20 times away from the Sun than Neptune

The elusive ‘Planet Nine’ does exist, and may be 10 times the mass of the Earth and 20 times away from the Sun than Neptune, NASA scientists say.

Planet Nine could turn out to be our solar system’s missing ‘super Earth’ — a planet with a mass higher than the Earth’s, but substantially lower than the masses of ice giants Uranus and Neptune.

The signs so far are indirect, mainly its gravitational footprints, but that adds up to a compelling case, they have said.

Proofs that it exists

“There are now five different lines of observational evidence pointing to the existence of Planet Nine,” said Konstantin Batygin, a planetary astrophysicist at the California Institute of Technology (Caltech) in the U.S.

“If you were to remove this explanation and imagine Planet Nine does not exist, then you generate more problems than you solve. All of a sudden, you have five different puzzles, and you must come up with five different theories to explain them,” said Mr. Batygin.

Six known objects in the distant Kuiper Belt, a region of icy bodies stretching from Neptune outward towards interstellar space, all have elliptical orbits pointing in the same direction, researchers have said.

However, these orbits also are tilted the same way, about 30 degrees “downward” compared to the pancake-like plane within which the planets orbit the Sun, they added.

More objects tilted like it

Computer simulations of the solar system with Planet Nine included show there should be more objects tilted with respect to the solar plane.

The tilt would be on the order of 90 degrees, as if the plane of the solar system and these objects formed an “X” when viewed edge-on.

Caltech graduate student, Elizabeth Bailey, showed that Planet Nine could have tilted the planets of our solar system during the last 4.5 billion years.

In the study published in the *Astronomical Journal*, researchers wondered why the plane in which the planets orbit is tilted about 6 degrees compared to the Sun’s equator.

“Over long periods of time, Planet Nine will make the entire solar-system plane precess or wobble, just like a top on a table,” Mr. Batygin said.

This is clinching evidence

The last telltale sign of Planet Nine’s presence involves the solar system’s contrarians: objects from the Kuiper Belt that orbit in the opposite direction from everything else in the solar system, researchers have said.

Planet Nine’s orbital influence would explain why these bodies from the distant Kuiper Belt ended up “polluting” the inner Kuiper Belt, they said.

“No other model can explain the weirdness of these high- inclination orbits,” Mr. Batygin said.

“It turns out that Planet Nine provides a natural avenue for their generation. These things have been twisted out of the solar system plane with help from Planet Nine and then scattered inward by Neptune,” said Mr. Batygin.

“The possibility of a new planet is certainly an exciting one for me as a planetary scientist and for all of us,” said Jim Green, director of NASA’s Planetary Science Division.

“This is not, however, the detection or discovery of a new planet,” said Mr. Green.

“What we’re seeing is an early prediction based on modelling from limited observations. It’s the start of a process that could lead to an exciting result,” he said.