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India successfully test-fires N-capable cruise missile

By Rajat Pandit

India on Tuesday successfully flight-tested its indigenous 'Nirbhay' (the fearless) land-attack cruise missile, which can deliver nuclear warheads to a strike range of 1,000km, after a string of failures since March 2013. The development is significant because the armed forces have for long been demanding nuclear land-

attack cruise missiles (LACMs), with ranges of over 1,000km and versatile enough to be fired from land, air and sea.

Often brandished as India's answer to the famed American Tomahawk missiles, as also an effective counter to Pakistan's Babur LACM, Nirbhay has been in the making for a decade.

The sub-sonic missile is designed to carry a 300kg nuclear warhead. Tuesday's test, the missile's fifth (see graphic), at 11.20am from the Integrated Test Range at Chandipur off Odisha, was dubbed a "complete success by DRDO." "The flight test achieved all mission objectives completely from lift-off till the final splash. The missile majestically cruised for 50 minutes, achieving the range of 647km," said an official.

Defence minister Nirmala Sitharaman expressed "optimism" the successful trial would take India into "the select league of nations that possess this complex technology of sub-sonic cruise missile capability". A series of successful tests of this ground-launched version of Nirbhay will pave the way for its induction into the armed forces, though its sea-based variant, capable of being fired from nuclear-powered submarines, will be the real game-changer.

Cruise missiles like the Nirbhay are designed to fly at low altitudes to evade enemy radars and missile defence

THE DESI TOMAHAWK

NIRBHAY MISSILE:

- > Indigenous cruise missile
- > 1,000-km strike range
- > Carries nuclear warhead
- > Can loiter & cruise at Mach 0.7 (sub-sonic) at altitudes as low as 100-metre
- > 1st test in Mar 2013 failed
- > 2nd test in Oct 2014 was a partial success
- > 3rd & 4th tests in Oct 2015 & Dec 2016 also flopped

CRUISE VS BALLISTIC:

- > Ballistic missiles follow parabolic path, leave & re-enter atmosphere to hit target
- > Ballistic missiles have longer ranges & predetermined targets
- > Cruise missiles fly at low-altitudes, hugging terrain to evade radars
- > Cruise missiles loiter before striking targets

BRAHMOS MISSILE:

- > Cruise missile jointly produced by India & Russia
- > Only 290-km range inducted. Extended range missile (450-km) undergoing trials
- > Carries conventional (not nuclear) warhead
- > Supersonic, flies at Mach 2.8

INDIA'S BALLISTIC MISSILES:

- > Agni -I (700-km), Agni-II (2,000-km) & Agni-III (3,000-km) inducted
- > 2 years to induct Agni-IV (4,000-km) & Agni-V (5,000-km)
- > Prithvi-II & Dhanush (150-350-km) inducted
- Submarine-launched ballistic missiles K-15 (750-km) & K-4 (over 3,000-km) being tested

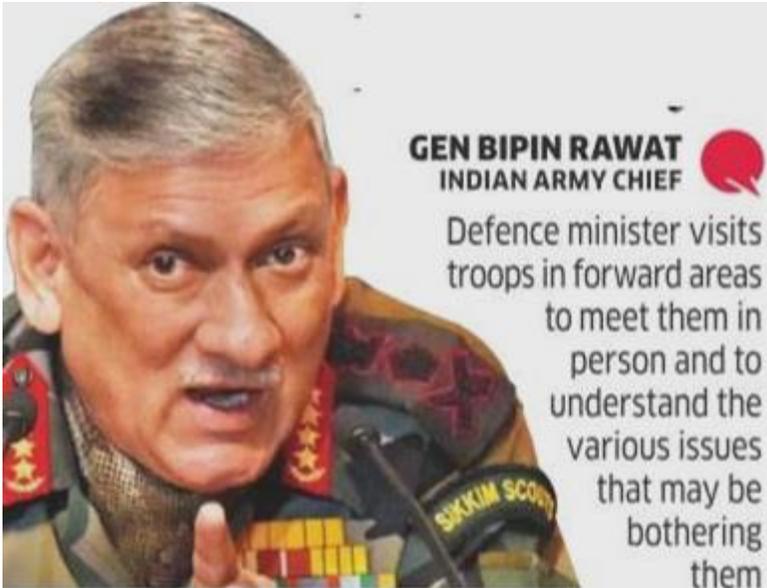
systems. After an initial blast-off with a solid-propellant booster rocket engine to gain speed and altitude, Nirbhay deploys its smallish wings and tail fins in the second stage to fly like an unmanned aircraft. It's designed to be highly maneuverable with "loitering capabilities" to identify and then hit the intended target.

Rawat says DefMin Visit Source of Motivation

A Day after China Objects to Sitharaman's Visit to Arunachal Pradesh

A day after China objected to defence minister Nirmala Sitharaman's visit to Arunachal Pradesh, Army chief General Bipin Rawat said on Tuesday the visit was a "source of motivation" which was meant to understand the issues of soldiers deployed in the forward areas.

"Defence minister visits troops in forward areas to meet them in person, to understand the various issues that may be bothering them, and I think visits by raksha mantri are always a source of motivation," he said in response to a question on China's objection, at the sidelines of an event here.



He added: "The raksha mantri has to visit those areas where our troops are deployed. After all it is the Ministry of Defence which is providing support to us."

On Monday, China reacted angrily to Sitharaman's visit to Arunachal Pradesh, saying there is a dispute in the eastern section of the Line of Actual Control. China said the visit to the "disputed" region will not be conducive to peace along LAC. China maintains that Arunachal is a part of South Tibet, a claim which is not accepted by India.

On Sunday, Sitharaman had visited forward army posts in Arunachal and an air force base in eastern Assam. The visit followed her visits to Bomdila and Itanagar in

Arunachal. She visited the army post at Kibithu, Arunachal, and was briefed on the situation and defence preparedness along the Line of Actual Control. She also interacted with the troops. She visited the eastern air base of Chabua, where she took stock of the operational preparedness. The strategic base has combat assets, including Sukhoi 30 MKI fighter aircraft and modern missiles.

Recovery of US-made rifle shows Pak complicity in militancy: Army

An army officer said this was not the only M4 rifle functional in the region, and 510 such weapons could have been brought in by militants

SRINAGAR: The recovery of a US-made rifle, meant for Pakistani army, after an encounter with militants in Kashmir, showed the force's complicity in fuelling insurgency in the Valley, a senior Indian Army officer said on Tuesday.

Major general BS Raju, general officer commanding (GOC) of army's Victor Force, was referring to the M4 carbine colt rifle recovered from the site of encounter in Pulwama district, where three Jaish-e-Mohammed (JeM) militants, including its chief Masood Azhar's nephew, and an army jawan were killed on Monday night.

“This weapon (the M4 carbine) is with the special forces of Pakistan army. So we have reasons to believe that this particular weapon was given by the Pakistani army to JeM cadres. This clearly shows the complicity between JeM and Pakistan and their nefarious designs in Kashmir,” Raju said.

Police had said an M4 carbine colt and an AK-47 Draco rifle were recovered from the site of the gunbattle. A photo of a militant flaunting an M4 rifle also went viral in Kashmiri social media circles last week. Raju said this was not the only M4 rifle functional in the region, and 5-10 such weapons could be brought in by infiltrating militants.

However, this is the first M4 carbine recovered in Kashmir. The three militants killed on Monday were identified as Waseem Ganaie, a Pulwama resident, and Pakistani militants Muhammad Bhai, JeM’s south Kashmir divisional commander, and Azhar’s nephew Talha Rashid. A police spokesperson said it was the same group that was wanted for the attack on the police checkpoint a few days ago.

A local news agency in Kashmir, GNS, said a JeM spokesperson confirmed to them the identity of the militants and accepted that Rashid was Azhar’s nephew.

Inspector general of police, Kashmir range, Muneer Khan said: “For the first time, they have owned a Pakistani militant; saying that yes, he is the nephew of Masood Azhar. Now, we will take up the matter through proper channels and, very firmly, request that please claim the body and please take the body.”

Officer Raju said the increased deployment of JeM in the Valley indicated that the capacity and propensity of Hizbul Mujahideen to survive and grow has reduced.



Wed, 08 Nov, 2017

South Korea in talks to buy nuclear submarine from US

Purchase would redraw the balance of power in northeast Asia, could trigger a regional arms race

South Korea is negotiating with the United States to buy nuclearpowered submarines to guard against threats from Pyongyang, according to local reports as President Donald Trump said Seoul would buy “billions of dollars” of US weapons. Nuclear-powered submarines can stay submerged for months, giving them a far greater range than their dieselpowered counterparts, and are also crucial to any seaborne nuclear deterrent. Such a purchase would redraw the balance of power in northeast Asia, and could trigger a regional arms race.

Japan -- another US ally - - does not have nuclear-powered submarines, and is barred from having a military under its post-World War II pacifist constitution. And while China's increasingly powerful navy does include them in its fleet, Beijing would undoubtedly be infuriated by any such acquisition by Seoul. After a summit in South Korea with his counterpart Moon Jae-In, Trump today said Seoul would be buying a large amount of US weapons “whether it's planes, whether it's missiles, no matter what it is”.

“South Korea will be ordering billions of dollars of that equipment, which for them makes a lot of sense and for us it means jobs, reducing our trade deficit with South Korea,” he said. While Moon did not give specific details of the purchases, he described them as essential for national defence. Multiple South Korean media outlets said the two leaders ordered officials to begin the purchase talks “immediately”, citing a senior official who gave an anonymous briefing.

“The strategic assets under discussion include a nuclearpowered submarine and a sophisticated surveillance asset,” the reports quoted a senior official of Moon's office as saying. “We will have close consultations with the US about these two in the future,” the official was quoted as saying. Seoul heavily relies on its security guarantor Washington, which has 28,500 troops stationed in the South, for national defence to protect itself against potential attacks by the nuclear-armed North Korea. But growing atomic and missile threats by the North in recent years prompted calls in the South to have more sophisticated weapons of its own, with some even demanding that Seoul develop its own nuclear weapon.

The country is currently barred from developing atomic weapons under the deal with the US, which in turn offers Seoul “nuclear umbrella” against potential attacks by the North. Pyongyang staged a sixth atomic test in September and has test-launched multiple missiles capable of reaching the US mainland, sparking global alarm over its military ambition. Trump also said the US had agreed to remove a 500 kilogram (1,100 pound) warhead weight limit on Seoul's ballistic missiles.

The allies had agreed in principle to do so in September following the North's latest nuclear test, by far its most powerful to date. Moon, noting “ever-growing threats” from the North's missiles and nuclear weapons, said Tuesday the two allies had reached a “final agreement” to remove the restriction. “We also reaffirmed our stance to put maximum pressure and sanctions on the North until it... comes forward for genuine negotiations,” he told reporters. Meanwhile, North Korea poses a worldwide threat that requires worldwide action, President Donald Trump said in Seoul today, but insisted “we are making a lot of progress” in reining in the rogue state. The US leader, standing alongside his South Korean counterpart Moon Jae-In, reiterated he was prepared to use the full range of American military might in order to halt Pyongyang's march towards becoming a full-fledged nuclear power.

But he added: “It makes sense for North Korea to come to the table to make a deal that is good for the people of North Korea and the people of the world.” “North Korea is a worldwide threat that requires a worldwide action. “I think we are making a lot of progress,” he said, adding that Chinese President Xi Jinping -- whom he has often claimed holds the key to disarming the North -- has been “very, very helpful”. After a relaxed few days in Tokyo, Seoul is a more complicated stop for the mercurial US president. Trump's relationship with the liberal-leaning Moon has been cool, and the former real estate magnate has railed at South Korean moves to engage its neighbour -- something he has previously labelled “appeasement”. But he began his diplomatic day vowing to “figure it all out” with “fine gentleman” Moon, despite their differences on the nuclear-armed North.

As tensions over Pyongyang's weapons programme have soared, the US president has traded personal insults and threats of war with North Korean leader Kim JongUn. Trump arrived from Japan, where he secured Tokyo's full support for Washington's stance that “all options are on the table” regarding Pyongyang, and declaring its nuclear ambitions “a threat to the civilised world and international peace and stability”.

He enjoyed three days of near-bromance with Prime Minister Shinzo Abe, calling him “wonderful” after a round of golf and describing USJapan ties as “really extraordinary”. But at Camp Humphreys on Tuesday, where US forces stationed in the country have moved their headquarters from downtown Seoul, he and Moon sought a rapprochement. “Ultimately, it will all work out” on North Korea, said Trump.

“It always works out. It has to work out.” And Moon -- whose parents were evacuated from the North on a US ship during the Korean War -- was abundant in his praise for the United States. “They say one knows a true friend when one is in need,” he told Trump. “The United States is a true friend who has been with us and has bled with us in our time of need.”

MAIL TODAY

Wed, 08 Nov, 2017

Trump hopes US never uses arms against N Korea

Says he is prepared to defend nation, its allies ‘using full range of unmatched army capabilities’

President Donald Trump grouched Tuesday in South Korea that he has had to spend so much time managing the rogue regime to the ally's north the first year of his presidency. North Korea's nuclear ambitions ought to have been curbed 25 years ago, Trump said during a news conference with South Korean President Moon Jae-in in Seoul. “This is not the right time to be doing it, but that's what I got.

That's what I got," Trump lamented. Both presidents said they are hopeful that worldwide sanctions will bring North Korea to the table. "We have many things happening that we hope, we hope, in fact I'll go a step further, we hope to God we never have to use," Trump said of a United States military build-up along the Korean Peninsula and warning once again that he's not afraid of "using the full range" of the nation's "unmatched military capabilities". Trump said North Korean dictator Kim Jong-un has to be aware of the United States' "unparalleled strength", reminding him that three US aircraft carriers and a nuclear submarine would soon be in his backyard.

"As we work together to resolve this problem using all available tools short of military action, the United States stands prepared to defend itself and its allies using the full range of our unmatched military capabilities, if need be," Trump threatened. The US Navy said Tuesday that aircraft carriers, guided-missile destroyers and submarines were on their way to the Pacific for a drill. No reason was provided for the command, CNN reported, although it was an evident show of force just as the president was visiting. Trump said North Korea "is a grave nuclear threat to South Korea and indeed the entire world".

"We cannot allow North Korea to threaten all that we have built, and we have built it very much together," Trump said. "We will together confront North Korea's actions and prevent the North Korean dictator from threatening millions of innocent lives." "He is indeed threatening millions and millions of lives so needlessly," the US president added in a castigation of Kim. Trump said all nations must cut off North Korea's cash flow by imposing and enforcing international sanctions on Kim and his government.

"It's time to act with urgency and with great determination," Trump said. Earlier Tuesday, in South Korea, Trump said he was optimistic about his chances to stop North Korea from deploying a nuclear missile capable of reaching America's allies. "I think we're going to have lots of good answers for you over a period of time, and ultimately it will all work out," Trump said before a military operational briefing at Camp Humphreys, near Seoul. "It always works out. It has to work out!" North Korean dictator Kim Jong-un hasn't carried out a ballistic missile test since September, but there are real concerns at the Pentagon that he might conduct a test launch while Trump is nearby.



Wed, 08 Nov, 2017

Deformities in babies due to N Korean tests

The site and surrounding areas have turned into a wasteland

Tests at North Korea's underground nuclear site have caused deformities in babies and turned the surrounding area into a wasteland, it has been claimed. A group of defectors say springs have run dry while 80 per cent of newly planted trees have withered and died at Punggye-ri in the secretive country's north east. One, who used to live in Kilju county — where the site is located — claimed that "deformed babies" were being born in hospitals in the area. It comes as pictures reveal the impact North Korea's sixth nuclear bomb test, carried out in early September, has had on the mountainous area, including "multiple landslides".

One defector told South Korea's Chosun Ilbo newspaper that locals were concerned about radioactive contamination and that residents were not given prior warning of nuclear tests. He said: "I heard from a relative in Kilju that deformed babies were born in hospitals there." Another, referring to Kim Jongun's latest nuclear test, added: "I spoke on the phone with family members I left behind there and they told me that all of the underground wells dried up after the sixth nuclear test."

Specialties like trout and pine mushrooms "disappeared" after the first test in 2006, he claimed, with another defector claiming: "If you plant trees in the mountains there, 80 percent of them die. You can blame it on poor planting, but the number of trees that die is higher than in other mountains." The claims come after it was reported that more than 200 people were killed when a tunnel caved in at Punggyeri after its latest detonation.

This is the universe

The universe is so vast it's almost impossible to picture what it might look like crammed into one field of view. But musician Pablo Carlos Budassi managed to do it by combining logarithmic maps of the universe from Princeton and images from Nasa. He created the image above that shows the observable universe in one disc. Our sun and solar system are at the very centre of the image, followed by the outer ring of our Milky Way galaxy, the Perseus arm of the Milky Way, a ring of other nearby galaxies like Andromeda, the rest of the cosmic web, cosmic microwave background radiation leftover from the big bang, and finally a ring of plasma also generated by the big bang.

Logarithms help us make sense of huge numbers, and in this case, huge distances. Rather than showing all parts of the universe on a linear scale, each chunk of the circle represents a field of view several orders of magnitude larger than the one before it. That's why the entire observable universe can fit inside the circle. Budassi got the idea after making hexaflexagons for his son's birthday one year.

Black hole jets

Scientists have moved a step closer to understanding nature's own Star Warslike Death Star beams — ultra powerful jets of energy that shoot out from the vicinity of black holes. The study has been investigating the mysterious cosmic phenomena — known as relativistic jets — by measuring how quickly they switch on and shine brightly once they are launched. In the research published in Nature Astronomy, the international team of scientists show how they used precise multi-wavelength observations of a binary system called V404 Cygni — consisting of a star and a black hole closely orbiting each other, with the black hole feeding off matter from the star that falls through the disc — to throw light on this hotly debated phenomenon.

Professor Vik Dhillon, from the University of Sheffield's department of physics and astronomy said, "One of the best ways of observing a black hole is in a binary system, where the black hole is in orbit with a star and pulling gas from it. Some of this gas doesn't fall into the event horizon of the black hole, but is instead ejected in the form of a jet emanating from close to the black hole. "Our observations have demonstrated that the rapidly varying optical light we see comes from this jet, only about 40,000 km above the black hole, allowing us to test theoretical models of how black hole jets are believed to form."

V404 Cygni is located about 7,800 light years away in the constellation of Cygnus, and weighs as much as about nine of our suns put together. The research team captured the data in June 2015 when V404 Cygni was observed radiating one of the brightest "outbursts" of light from a black hole ever seen — bright enough to be visible to small telescopes used by amateur astronomers, and energetic enough to tear apart an Earth-like planet if properly focused. The research, which was led by the University of Southampton, included the universities of Sheffield, Oxford, Cambridge and Warwick, in the UK, as well as universities in Italy, Spain, France, USA, Canada, Netherlands, Switzerland, India, Germany and the United Arab Emirates.

Wed, 08 Nov, 2017

ISRO set to scale up outsourcing, double launches

By Surendra Singh

With Isro gearing up to resume satellite launch services from mid-December after a three-month lull, it is planning not only to double its launch frequency from next year but also to scale up outsourcing to the private sector.

Currently, the space agency launches 9 to 10 spacecraft built by it every year. Dr K Sivan, director of Vikram Sarabhai Space Centre, said, "Isro is targeting to double the number of launches from 9-10 to 18-19 per year."

On outsourcing, Isro chairman A S Kiran Kumar said the space agency does as much activity as possible with the industry.

Dr Sivan said, "Currently, 80-90% of work relating to launch vehicles are being done by the industry. Isro focuses on vehicle integration, engineering, mission design, launch and quality assurance." "But gradually Isro wants vehicle parts vendors to become part of the system through joint ventures." The Isro chief, too, said the agency is looking at the possibility of building a PSLV in a JV with industry partners by 2020-21.

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Wed, 08 Nov, 2017

Science and technology must be gender neutral

Hundred and fifty years after Marie Curie, women are still fighting old prejudices

In 1903, she became the first woman ever to win the Nobel Prize. In 1906, she became the first woman professor at Sorbonne University in Paris. In 1911, she became the first person (not woman, person) to ever win two Nobel Prizes in a lifetime. Marie Curie, who was born on November 7, 150 years ago, was a rare successful woman in an overwhelmingly male world of scientific research at a time when it was unheard of for women to be in positions of authority that they hadn't been born into. Her 150th birth anniversary is as good a reason as any to look at how far women in science have come since.

More than a century after Marie Curie broke that glass ceiling, the number of women in STEM fields continues to belie the number of years that have passed. Consider this: Since Curie's physics Nobel in 1903, only one other woman has ever won the physics Prize and three, the chemistry Prize. A survey found that while 46% of undergraduate students in STEM fields are women, not many continue to work in the field; 41% of women quit their role after a decade, as compared to 17% of men; and 81% of women in STEM fields in India perceived a gender bias in performance evaluation.

It is not just blatant misogyny and sexual harassment which works against women. The deep-seated bias that women simply cannot "do" science keeps them from even breaking into the networks that are so essential for rising in research. Having been slotted into the arts, social work, and teaching bracket that is seen as appropriate for the gentler sex, it isn't easy for women to break free. It is the job of universities, governments, and society at large to ensure that hiring practices in organisations are free from the insidious sexism that keeps women from achieving their full potential. Or we are face the danger of squandering the legacy of one of the greatest scientists to ever walk the earth.