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DefenceNews

Fri, 24 May 2019

U.S. Air Force's new radar system detects breakup field from India anti-satellite test

U.S. Air Force's new radar system plays a vital role as space becomes more congested and contested with satellites and orbital debris, according to the news release put out by Lockheed Martin.

The aerospace giant reported U.S. Air Force's Space Fence system detected the breakup field from an anti-satellite test conducted by India during a scheduled endurance exercise of the new space surveillance radar.

As MICROSAT-R was expected to pass through the un-cued surveillance fence, Space Fence automatically issued a "breakup alert" indicating there were multiple objects within close proximity. Space Fence observed a significant amount of debris tracks surrounding the time of the event crossing labeled as uncorrelated targets. Long-arc tracking was initiated within the orbital debris cloud to form accurate initial orbit determinations. With this information, the system was able to automatically predict and correlate the next crossing time.

Lockheed Martin (NYSE: LMT) system operators then prepared for the next crossing by setting up an enhanced sensitivity task volume ahead of the normal un-cued surveillance fence to increase the low altitude track duration. Although the Space Fence is currently in its test phase and not yet operational, the Space Fence un-cued surveillance coverage showed its unique ability to observe these events unfolding at different altitudes in real time. Although the anti-satellite test was conducted at approximately 300 kilometers, the debris cloud extended beyond the original parent object orbit.

"Although the Space Fence system is still under test, it continues to demonstrate its advanced capabilities providing operationally-relevant information in all orbital regimes from Low Earth Orbit through Geosynchronous Earth Orbit," said Dr.Rob Smith, vice president and general manager of Radar and Sensor Systems for Lockheed Martin. "The criticality of space assets to both national defense and the world economy cannot be understated. As multiple new mega constellations consisting of thousands of satellites become a reality and the space domain continues to become more congested, the demand for more accurate and timely space situational awareness data will be of the utmost importance to the warfighter."

The Space Fence system continues to track objects from the anti-satellite event through the government-led testing phase which began in early April.

ColonelStephen Purdy, Director of the Space Superiority Systems Directorate, Space and Missile Systems Center,Los AngelesAir Force Base, who oversees the Space Fence program said, "Space Fence is already proving itself as a capable system even before becoming operational. The Indian test showcased Space Fence's capabilities in a real-world event. The system was able to quickly respond to a highly dynamic situation providing critical data. Space Fence is the latest in a long line of capabilities we are collectively bringing to the warfighter as we continue to build out space capabilities forthe United States."

http://www.defencenews.in/article/US-Air-Force%e2%80%99s-new-radar-system-detects-breakup-field-from-India-anti-satellite-test-584839

hindustantimes

Fri, 24 May 2019

Meet Ipsita Biswas, scientist who developed non-lethal plastic bullets

A rising number of women are opting for career in science and research. Beginning today, Hindustan Times starts a new weekly column on women scientists of tricity. Featured first in the ten-part series is Ipsita Biswas, a scientist at the Terminal Ballistics Research Laboratory

By Aakriti Sharma

Chandigarh: It pierced her heart, the picture of a young girl's face disfigured with pellet injuries that surfaced on social media after clashes between Kashmiri residents and Army personnel over the killing of militant group Hizbul Muhahideen commander Burhan Wani in 2016. Pellets, also known as riot control ammunition, were being widely used to control crowds.

However, after coming under fire for grievous injuries caused to civilians in Jammu and Kashmir (J-K) by the pellets, the Union home ministry had set up a panel to come up with a non-lethal alternative to the pellets to control riots.

This was how plastic pellets were developed and tested by scientist Ipsita Biswas, 57, and her team at the Terminal Ballistics Research Laboratory (TBRL), Chandigarh, under Defence Research and Development Organisation (DRDO) in just one-and-a half years.

"I work with life-saving devices and that too for our forces. If somebody saves a little bird, that is in itself a good feeling and when I work to build armour for the forces responsible for our protection, it comes with a responsibility and feels great," she says.

Proud of her team's work, Biswas points out that the plastic bullets are non-lethal and serve as a means to disperse crowds. No special weapon is required to fire them and AK 47's work just fine, which 70% of the Indian Army is equipped with. Unlike a pellet (burst), only one plastic bullet is released at a time and hits the area of target. Since the speed of the bullet decreases as it nears the target, it reduces fatalities," she says.

A scientist with 20 years standing, Biswas heads three technical divisions at TBRL, which she joined in 1998 when she came to Chandigarh. She leads a team of 10 scientists in areas of test and evaluation of life saving devices, characterisation of armour material and more.

Conferred with the Narishakti Puruskar in March 2019 by President Ram Nath Kovind for her contributions to the army and paramilitary forces, Biswas is currently working on frangible bullets, a specific application for sky marshals, which crumbles to pieces when it strikes something harder than itself with no damage to the aircraft in the case of a hijack attempt.

Even though she's from a family of engineers, Biswas, who loves math, had always wanted to pursue research and development.After completing her postgraduate degree in applied mathematics from Jadavpur University, Kolkata, in 1988, Biswas did not pursue a PhD because she had filled a job application for DRDO and "in the first shot in 1988, right after my postgraduation, I got the job at DRDO in Delhi after an interview," she says.

She took up the chance immediately as her parents thought it was a good opportunity. "So I did not go anywhere else, not even for UGC interview," says Biswas, who was born and brought up in Kolkata.

Driven by curiosity and indulged in developing life-saving devices, Biswas has been evaluating bullet-proof jackets and mine protected vehicles for the armed forces and paramilitary jawans. "Working on it for over 10 years, a partially completed project still requires work on bullet-proof

helmets. Helmets are crucial because head injury can kill a person. So it is more important to come-up with a successful bullet-proof helmet," she says.

About challenges, Biswas says usually women are perceived as being unable to do complicated jobs as they don't want to shift their focus from their families. "Women understand science just as well as men but the demands of a job in science and research leads to problems in families as women are expected to work during certain hours, only after finishing household chores," she says.

That's why balancing everything is important, says Biswas, who stays up till late to finish her reading, both personal and work-related, after her family has gone to sleep. "I don't mix the two. I find time for my studies somewhere in between."

Asked whether the glass ceiling exists in her field of work, Biswas says, "the younger generation of women does not have to worry about it because we have done it for them.We have faced the biases and taboos around women in science and now everyone knows that women know and understand science equally well. They just have to explore now. Every profession has its hurdles but if you are driven, there is no limit," she says. "There is no limitation to opportunities for women." What's her Eureka moment? " It is yet to come" she signs off with her signature modesty.

Biswas, who prefers reading Bengali books and is also a Harry Potter fan, finds her inspiration in Dr APJ Abdul Kalam. She says she met him when he was working in DRDO and admired him for his work and simplicity.

https://www.hindustantimes.com/punjab/ipsita-biswas-scientist-at-tbrl-more-hits-than-misses/story-XckCsHioqpHFo2i7VzXrXK.html

THE HINDU

Fri, 24 May 2019

Pakistan successfully test-fires ballistic missile Shaheen-II capable of hitting India

"Shaheen-II Missile is capable of carrying both conventional and nuclear warheads upto a range of 1,500 km. Shaheen-II is a highly capable missile which fully meets Pakistan's strategic needs towards maintenance of desired deterrence stability in the region," the Army said

Islamabad: Pakistan on Thursday successfully test-fired surface-to-surface ballistic missile Shaheen-II, capable of hitting targets as far as 1,500 kilometers away, bringing major Indian cities under its range. The Pakistan Army said in a statement that the launch was aimed at ensuring operational readiness of the Army Strategic Forces Command.

"Shaheen-II Missile is capable of carrying both conventional and nuclear warheads upto a range of 1,500 km. Shaheen-II is a highly capable missile which fully meets Pakistan's strategic needs towards maintenance of desired deterrence stability in the region," the Army said.

It said that the launch, having its impact point in the Arabian Sea, was witnessed by Director General Strategic Plans Division, Commander Army Strategic Forces Command, senior officers from the Army Strategic Forces Command, scientists and engineers of the strategic organisations.

Chairman Joint Chiefs of Staff Committee and Services Chiefs congratulated the scientists and engineers on conduct of successful launch.

President Arif Alvi and Prime Minister Imran Khan have also congratulated scientists on their achievement, the statement said.

https://www.thehindu.com/news/international/pakistan-successfully-test-fires-ballistic-missile-shaheen-ii-capable-of-hitting-india/article27216766.ece

DefenceNews

Fri, 24 May 2019

The F-21 could be one tough fighter (with F-35 DNA). Here's the problem.

For the purposes of Lockheed's marketing campaign, the F-21 is a new fighter, although it shares many of its major features with the F-16V the company has sold to Bahrain, Greece, Slovakia, South Korea and Taiwan. Lockheed can build new F-16Vs or upgrade older F-16s to the V-standard.

Lockheed Martin is developing a new variant of its iconic F-16 single-engine fighter in order to compete in India's 2019 tender for 110 new warplanes.

But don't count on the American firm's "F-21" to win the contract.

According to journalist Angad Singh, the likely winner is French company Dassault's Rafale twin-engine fighter.

Singh explains his rationale in the May 2019 issue of Combat Aircraft magazine. India previously ordered 36 Rafales as part of an earlier fighter tender. "With 36 aircraft already on order and the infrastructure in place for an additional 36, a case could certainly be made that training, basing and sustainment costs for additional aircraft would not be an impossible burden."

Other candidates for the Indian tender are the Saab Gripen from Sweden, the European Eurofighter Typhoon, the MiG-35 from Russia and the Boeing Super Hornet from the United States. Whichever fighter New Delhi selects, it needs the new jets now, according to Singh.

"The government-approved strength of the Indian Air Force, given the country's well-publicized security scenario and the possibility of a 'two-front' threat of combined Pakistani and Chinese air action to the west and northeast, is 42 fighter squadrons," Singh writes.

"There is little clarity on how this exact number was arrived at, but nonetheless, the IAF hasn't come close to this strength for two decades, and has never approached anything near a force entirely equipped with modern aircraft."

In 2019 the Indian air force maintains just 30 fighters squadrons. The units operate, among other plane types, 244 1960s-vintage MiG-21s and 84 MiG-27s that are only slightly younger. The MiG-21s, in particular, are accident-prone. Since the first of 874 MiG-21s entered Indian service in 1963, around 490 have crashed, killing around 200 pilots.

But the MiG-21s remain active. On Feb. 26, 2019 Indian planes crossed the line of control at India's border with Pakistan and bombed what New Dehli described as a terrorist training camp near Balakot.

Several days of aerial fighting followed the bombing raid. On Feb. 27, 2019, Pakistani F-16s and other planes crossed the line of control to attack Indian forces, New Delhi claimed. Indian MiG-21s and other fighters intercepted the Pakistanis and shot down one plane, according to the Indian government.

The U.S. government reportedly counted Pakistan's F-16s after the battle and concluded that none was missing, casting doubt on New Delhi's claim.

Islamabad stated its forces shot down two Indian MiG-21s, but New Delhi copped to losing just one jet. Pakistani forces captured the MiG-21 pilot, Wing Commander Abhinandan Varthaman, and held him for two days before handing him over to Indian officials.

Now New Delhi wants to spend around $18 billion acquiring 110 new fighters to replace the old MiGs. The new planes would fly alongside European-designed Jaguars, French Mirage 2000s and Rafales, Russian MiG-29s and Su-30s and India's own indigenous Tejas fighter in what Lockheed described as "the world's largest fighter aircraft ecosystem."

For the purposes of Lockheed's marketing campaign, the F-21 is a new fighter, although it shares many of its major features with the F-16V the company has sold to Bahrain, Greece, Slovakia, South Korea and Taiwan. Lockheed can build new F-16Vs or upgrade older F-16s to the V-standard.

Still, renaming the F-16V isn't only semantic. An F-16V or F-21 is a radically different warplane compared to the F-16A that first flew in 1978. The F-16A is a nimble, eight-ton fighter with an unsophisticated radar and short-range weapons. The F-16V weighs 10 tons, boasts a cutting-edge radar and other sensors and carries a wide array of long-range weaponry, all at the cost of maneuverability.

Lockheed initially implied India could follow an acquisition of F-21s with a separate purchase of the company's F-35 stealth fighters.

"The F-21 has common components and learning from Lockheed Martin's fifth-generation F-22 and F-35 and will share a common supply chain on a variety of components," Lockheed stated on its website on the morning of Feb. 20, 2019.

A few hours later, that claim disappeared from the site. Despite Lockheed's stealth tease, the French Rafale might be the frontrunner in the Indian fighter contest.

http://www.defencenews.in/article/The-F-21-Could-Be-One-Tough-Fighter-(With-F-35-DNA)-Heres-the-Problem-584850

DefenceNews

Fri, 24 May 2019

Successful BrahMos test gives IAF big strategic boost in Indian ocean region

The Indian Air Force (IAF) on Wednesday successfully test-fired the BrahMos air-launched cruise missile (ALCM) from its frontline striker Sukhoi (Su-30 MKI).

This was the second test-firing of the BrahMos ALCM from Sukhoi, the first being held on November 22, 2017 against a sea target.

The IAF thereby became the first air force in the world to have successfully fired an air-launched 2.8 Mach surface attack missile of this category on a sea target.

The missile is being developed by BrahMos Aerospace Private Limited (BAPL), an Indo-Russian joint venture firm.

Smooth Launch ::

The IAF termed Wednesday's launch as 'smooth one' with the missile following the desired trajectory before hitting the land target.

Wednesday's test-firing of BrahMos, with strike range closer to 300-km, saw the missile hitting the target at Andaman & Nicobar Islands.

During the test, the missile is said to have pierced through the land target proving its high accuracy hit-rate once again. This was the first test of BrahMos ALCM against a land target.

"It was a kinetic kill (no warhead used) and the missile hit the target bang at the centre. A perfect text-book launch," an official said.

The target was set at an uninhabited island in A&N and the missile had a direct hit with very minimal CEP (circular error probability). CEP is normally the mode used to measure the precision of a ballistic weapon.

Under SAC Eyes ::

During Wednesday's test, the Sukhoi operations were initiated from Air Force Station Thanjavur – a future base for the mighty striker. The station falls under Southern Air Command (SAC) headquartered at Thiruvananthapuram.

The Sukhoi was piloted by a Squadron Leader with a Wing Commander being the WSO (Weapon Systems Officer), responsible for initiating the launch. A chase aircraft was capturing all the launch activities, while an IAF tanker too was in action providing support to the team.

All the pilots who took part in the mission were from the Aircraft and Systems Testing Establishment (ASTE) situated in Bengaluru.

Various monitoring stations of IAF and Defence Research and Development Organisation (DRDO) tracked Wednesday's mission. On its part, the Indian Navy ships ensured the range and safety clearances.

Air Marshal Balakrishnan Suresh, AOC-in-C, SAC, Dr Sudhir Kumar Mishra, DG (BrahMos), representatives of NPOM (Russia) and Hindustan Aeronautics Ltd were among those present during the mission.

Strategic Reach ::

IAF says the BrahMos missile provides much desired capability to strike from large stand-off ranges on any target at sea or on land with pinpoint accuracy by day or night and in all weather conditions.

The capability of the missile coupled with the superlative performance of the Su-30MKI aircraft gives the IAF the desired strategic reach.

"The Sukhois range with refueling capabilities and BrahMos' current range are very critical for IAF to keep its interests intact in the Indian Ocean Region (IOR)," says an official.

During the recent Commanders' Conference Defence Minister Nirmala Sitharaman had asked IAF to play a proactive role in the IOR. She also wanted IAF to look at the future with the latest technologies available across the world and those that can be developed within India, in order to meet its needs.

"Today, the formidable BrahMos ALCM has perfectly validated its precision attack capability against a land target. With this successful mission, the IAF's air combat power has reached an unprecedented level," the defence minister said, congratulating the team.

Close to Induction ::

BrahMos officials now say that the ALCM will be ready for induction, probably after one more mission. The production mandates seem to have already begun so as to save time.

BAPL will now focus all its energies to develop the BrahMos NG (new generation) missile.

During Aero India 2019, Dr Sudhir Kumar had told Onmanorma that BrahMos NG will be ready within two years, including the air version that can be launched from Tejas.

"Today's test has brought in a quantum leap in the IAF's air combat capabilities. The missile, after being gravity dropped from the fighter's fuselage, flew for its full range towards the designated land target. It hit with bull's eye precision," BrahMos officials said.

Better synergies between IAF, DRDO, BAPL and HAL right from the inception of the mission have contributed immensely to the success of BrahMos ALCM.

http://www.defencenews.in/article/Successful-BrahMos-test-gives-IAF-big-strategic-boost-in-Indian-Ocean-Region-584848

DefenceNews

Fri, 24 May 2019

India, facing sanctions for Russian arms deals, says it wants to pivot spending to the US

Highlights

- India, the world's second-largest arms importer and fifth-largest economy, has inked the majority of its weapons deals with Russia.
- Indian Ambassador Harsh Shringla says New Delhi wants to pivot its defense spending to the United States.
- Countries like India, that heavily pursue arms deals with the Kremlin are subject to U.S. sanctions, under President Donald Trump's "Countering America's Adversaries Through Sanctions Act," or CAATSA.

On the heels of India's re-election of Prime Minister Narendra Modi, the nation's Ambassador to the United States says national security and modernizing the military are among the government's top priorities.

And while India, the world's second-largest arms importer and fifth-largest economy, has inked the majority of its weapons deals with Russia, Indian Ambassador Harsh Shringla says New Delhi wants to pivot its defense spending to the United States.

According to the latest tally from the Stockholm International Peace Research Institute, also known as SIPRI, Russia remains India's top arms supplier, with the United States holding down the No. 2 spot.

"There has been a tradition of dependence on defense equipment from Russia," Shringla told CNBC Thursday at the Indian Embassy in Washington when asked about arms from Moscow.

"But if you go by SIPRI figures, in the block year 2008 to 2013 we imported 76% of our defense items from Russia. In the next five-year block, from 2013 to 2018, this came down 58% and in the same period our imports from the United States increased by 569%," he said.

"So that itself tells you that, when we have a choice ... we are obviously diversifying our purchases," he added. Ten years ago, the country didn't have as many options, he said.

Countries like India, that heavily pursue arms deals with the Kremlin are subject to U.S. sanctions under President Donald Trump's Countering America's Adversaries Through Sanctions Act, or CAATSA.

India is currently at risk of U.S. sanctions after agreeing to a $5 billion deal to buy Russia's S-400 missile system last year.

Russia's S-400 system — a mobile, long-range, surface-to-air missile system — made its debut on the world stage in 2007. The platform rivals Lockheed Martin's THAAD, or terminal high-altitude area defense, system and Raytheon's Patriot system.

About 13 countries have expressed interest in buying the S-400. China, India and Turkey have already signed purchase agreements for the missile platform. China is in the middle of receiving its final shipment of the S-400 system. Turkey, a NATO ally, is slated to receive its S-400 next year and is expected to have the system ready for use by 2020.

http://www.defencenews.in/article/India,-facing-sanctions-for-Russian-arms-deals,-says-it-wants-to-pivot-spending-to-the-US-584847

Fri, 24 May 2019

Angolan Air Force receives last batch of Su-30Ks belonging to Indian Air Force

The Angolan National Air Force reportedly has taken delivery of the final four of 12 Su-30K multirole fighters refurbished at the Belarusian 558th Aviation Repair Plant to the Su-30SM standard. The 12 fighters were part of a batch of 18 first used by the Indian Air Force as a bridge to the Su-30MKI and then returned to Russia. Angola is believed to still be in negotiations for the final six aircraft.

Angola has received the first two of 12 Sukhoi Su-30K multirole fighters and is expected to receive the rest by early 2018, Aleksandr Vorobei, the CEO of the 558th Aviation Repair Plant in Belarus.

The aircraft were formerly operated by the Indian Air Force, which has ordered more than 200 Su-30MKIs in a number of batches. The early models delivered were basic aircraft without features like canards and thrust vector controls, and it is these 18 early model aircraft (ten Su-30MK and eight Su-30K fighters delivered between May 1997 and December 1999) that were returned to Russia and replaced with more advanced Su-30MKIs.

India had intended to upgrade these early aircraft but instead used them as part-exchange for new aircraft. They were retired in 2006 and sent to the 558th Aircraft Repair Plant at Baranovichi in Belarus between August and November 2011 as the property of Irkut Corporation.

http://www.defencenews.in/article/Angolan-Air-Force-Receives-Last-Batch-Of-Su-30Ks-belonging-to-Indian-Air-force-584845

Wed, 22 May 2019

One billion year old fungi found are Earth's oldest

Scientists have unearthed fossilised fungi dating back up to one billion years, in a discovery that could reshape our understanding of how life on land evolved, research showed Wednesday.

For decades, the earliest known fungi—organisms such as mushrooms, mould and yeast—was thought to have appeared on earth around half a billion years ago.

But recent fossil specimens unearthed in Canada and analysed using the latest dating technology appear to push back fungi's arrival to the earliest reaches of life on land.

Corentin Loron, a PhD student from the University of Liege, Belgium, and colleagues examined the microfossils to determine the chemical composition of their cells.

They found the presence of chitin—a fibrous substance that forms on fungal cell walls—and examined the age of the rock the fossils were found in by its ratio of radioactive elements.

They concluded the microfossils were between 900 million and one billion years old.

Loron said the finding was significant because in the "tree of life", fungi are part of the same umbrella group of organisms—known as Eukaryotes—as plants and animals.

"This means that if fungi are already present around 900-1000 million years ago, so should animals have been," he told AFP.

"This is reshaping our vision of the world because those groups are still present today. Therefore, this distant past, although very different from today, may have been much more 'modern' than we thought."

Fungi are among the most abundant organisms on the planet and are the third largest contributor to global biomass after plants and bacteria.

They are six times heavier than the mass of all animal scombined—including humans.

The study was published in the journal *Nature*.

https://phys.org/news/2019-05-billion-year-fungi-earth-oldest.html