THE ECONOMIC TIMES
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Fri, 11 Oct 2019

Home Ministry tells BSF to adopt anti-drone technology

The BSF is considering the matter and specifically working on "detection, identification and interdiction" of the drones which were used from across the border to drop weapons reportedly meant for terrorist activities in Punjab and also in Jammu a...

New Delhi: In the wake of weapons drop by drones in Punjab last month, the Union Home Ministry has asked the Border Security Force (BSF) to adopt anti-drone mechanism aimed at preventing such activities on western border which is guarded by the paramilitary force.

The BSF, which is termed the first line of defence of India, has been asked to launch necessary counter-measures against drones which were used to drop a large number of AK-47 assault rifles and grenades from Pakistan in Punjab's Amritsar district in the last week of September, Home Ministry sources said.

The direction came after Union Home Minister Amit Shah on October 4 chaired a highlevel meeting with the Director Generals of all paramilitary forces to review the current status of border security and measures to be taken to strengthen it further.

Informed sources told IANS that the matter was raised in the meeting in which questions were raised why the Indian Air Force and the BSF were unable to detect these drones.

The BSF is considering the matter and specifically working on "detection, identification and interdiction" of the drones which were used from across the border to drop weapons reportedly meant for terrorist activities in Punjab and also in Jammu and Kashmir, said another official.

The official, who is privy to the development, said: "The BSF, in its initial move, first of all trying to figure out the real threat from drones."

"It is necessary to understand the threat perception. The BSF is trying to identify whether these drones are being used by anti-national elements for smuggling of arms to carry out terror activities in India or it is just a cross-border crime."

In the lack of an "anti-drone technology", the official said that the issue has been a challenging task for the newly-appointed BSF Director General V.K. Johri, who has been instrumental in many covert operations during his stint in Research and Analysis Wing (RAW) - the country's foreign intelligence agency.

The BSF has deputed a team to get information about a drone which has been found by Punjab Police, said the source, adding what we could knew about the drone was that it is a made-in-China "hexacopter".

In its explanation, the BSF had informed the Home Ministry that neither it has the capacity to monitor any kind of aerial movement nor any such infrastructure.

"As most of such acts are done during night hours, it is difficult to observe drones through naked eyes. Even radars cannot detect these drones. With the current information, it is learnt that these drones are GPS-enabled and move through RF (radio frequency) signals," said an official.

Amid the hue and cry over the issue, intelligence agencies recently informed the Home Ministry that "state actors" of Pakistan were behind the drone weapons drop incidents in Punjab and the one recovered drone was made of China.

As per intelligence report, officials have been able to detect as many as eight sorties made by the drones to drop weapons in September. The possibility of undetected sorties has also not been ruled

out. On each sortie, the drones have dropped packages weighing upto 10 kg, which could have been arms, explosives, or means of communication, like cell phones or satellite phones, the report said.

As per Punjab Police sources, a large number of AK-47 assault rifles and grenades were dropped in Amritsar by drones in September that came from Pakistan.

The Home Ministry, the official said, has already asked the National Investigation Agency (NIA) to investigate the matter and find out the role of Pakistan's "state actors".

The National Technical Research Organisation (NTRO) is also learnt to be given the task to find out the frequency on which these drones have been operating along the border to get information about the contact between the drones and their base stations.

It is reported that some drones were seen by villagers in Hazarasingh Wala and Tendiwala villages in Ferozpur district.

https://economictimes.indiatimes.com/news/defence/home-ministry-tells-bsf-to-adopt-anti-drone-technology/articleshow/71534266.cms

THE NEW INDIAN EXPRESS

Fri, 11 Oct 2019

Indian Army to shift its wargaming centre to Mhow in Madhya Pradesh

The move is part of the restructuring process that the Army is undergoing to make it a nimble and agile force

New Delhi: Mhow in Madhya Pradesh is all set to emerge as the nerve centre of the Army to develop, exercise and analyse war-fighting concepts. “The Army has decided to shift the Wargaming Development Centre (WARDEC) from New Delhi to Mhow,” said an officer. The aim is to bring all such wings and departments together at one place, added the officer.

The move is part of the restructuring process that the Army is undergoing to make it a nimble and agile force. “WARDEC has been an important centre which keeps working with the fighting formations to incorporate new strategies and tactics to develop and validate new plans at the higher levels of the combat formations,” said another senior officer.

With the shifting of WARDEC to Mhow, “the spectrum of activities will widen as the Army War College will have facilities to wargame right from the basic tactical level to the strategic division and Corps level at one place”. The Army War College, Mhow, at present houses tactical training and research institution of the Army.

http://www.newindianexpress.com/nation/2019/oct/11/indian-army-to-shift-its-wargaming-centre-to-mhow-in-madhya-pradesh-2045950.html

THE ECONOMIC TIMES
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Fri, 11 Oct 2019

President lauds School of Artillery's role in warfare training

The century-old establishment at Devlali near here in North Maharashtra provides high quality training to soldiers

Nashik: The School of Artillery plays an important role in creating a capable Army to keep the country safe from all dangers, President Ram Nath Kovind said on Thursday.

The century-old establishment at Devlali near here in North Maharashtra provides high quality training to soldiers, he said.

"As the soldiers of the country are getting high quality training in the School of Artillery, they will become capable for modern warfare and also tackle any situation," said the president, who is also the supreme commander of the armed forces.

Kovind was speaking after inaugurating 'Rudranaad', the centenary museum in the premsies of the premier institution of the Indian Army.

In the last few years, new guns with long range capacity have been included in the army. Indian projects have large participation in it.

"The journey of the School of Artillery, which began (in 1918) at Kakul (now in Pakistan), is admirable and the nation is proud of the soldiers in this centre. The school is the support base for making the artillery of the nation more alert," he said.

Maharashtra Governor Bhagat Singh Koshiyari, Army chief General Bipin Rawat and Lieutenant General S K Saini, GOC-in-C, Southern Command, were among dignitaries present on the occasion.

"The loyalty of the officers in the School of Artillery towards training is laudable. The fame of the School of Artillery will boom like Rudranaad (mighty roar) and create fear in the minds of enemies of the nation," said Kovind.

"The School of Artillery plays an important role in creating a capable army to keep the country safe from all dangers, the president added.

After inaugurating the museum, the president unveiled the centenary trophy.

General Rawat released a book titled School of Artillery' and gifted its first copies to Kovind and Koshiyari.

The school is an important institution of the Army which imparts training, evaluates new equipment for induction and develops new concepts and doctrine for application of artillery fire.

https://economictimes.indiatimes.com/news/defence/president-lauds-school-of-artillerys-role-in-warfare-training/articleshow/71534144.cms

DNA
DAILY NEWS & ANALYSIS

Fri, 11 Oct 2019

Rafale RB 002: Dassault releases new photos of Indian Air Force's next fighter aircraft

During his visit, Rajnath had emblazoned the Rafale aircraft with an 'Om' and laid flowers, coconut and lemons to ward off the evil eye

After Defense Minister Rajnath Singh received India's first Rafale fighter jet, 'RB 001', at the handing-over ceremony in France, Dassault Aviation released a series of five photos of Rafale 'RB 002' flying over different terrains on Wednesday.

The induction of Rafale fighter jets into the Indian Air Force will give a boost to India's air dominance exponentially, Defence Minister Rajnath Singh said on Tuesday at the handing-over ceremony of the Rafale jet and added that the occasion signifies the depth of the strategic partnership between India and France.

"Our air force is the fourth largest in the world and I believe that the Rafale medium multi-roll Combat aircraft will make us even stronger and give a boost to India's air dominance exponentially to ensure peace and security in the region," Singh said.

During his visit, Rajnath had emblazoned the Rafale aircraft with an 'Om' and laid flowers, coconut and lemons to ward off the evil eye.

The ceremony coincided with the foundation ceremony of the IAF.

The Inter-Governmental Agreement (IGA) for 36 Rafale aircraft procurement was signed between the Government of India and Government of France on September 23, 2016.

In the photos posted by Dassault Aviation, the Rafale 'RB 002' fighter jet could be seen flying over sea, plains and forested area. (With inputs from ANI)

1. What does 'RB' signify?

The first aircraft with tail number RB-01 was received by a team of Indian Air Force officers led by Air Marshal VR Chaudhary in France who also flew in the plane for around one hour, Indian Air Force sources told ANI.

The tail number 'RB-01' has been named after Indian Air Force Chief-Designate Air Marshal RKS Bhadauria who had played a very important role in finalising the country's biggest-ever defence deal.

2. How many Rafale aircraft will IAF recieve?

Indian Air Force (IAF) will receive a total of 36 Rafale jets consisting of eight twin-seaters and twenty-eight single-seaters.

3. Rajnath performed Shastra Puja on 'RB 001' fighter jet

Defense Minister Rajnath Singh performed Shastra Puja on the first of the 36 Rafale jets he received after the official handing over ceremony in France.

Rajnath had emblazoned the Rafale aircraft with an 'Om' and laid flowers, coconut and lemons to ward off the evil eye.

4. Rajnath Singh flew a sortie

After performing 'Shastra Puja', Rajnath Singh flew a sortie in the Rafale fighter jet, commanded by Dassault Aviation's head test pilot Philippe Duchateau.

https://www.dnaindia.com/india/photo-gallery-rafale-rb-002-dassault-releases-new-photos-of-indian-air-force-s-next-fighter-aircraft-2796069

THE ECONOMIC TIMES
WWW.ECONOMICTIMES.COM

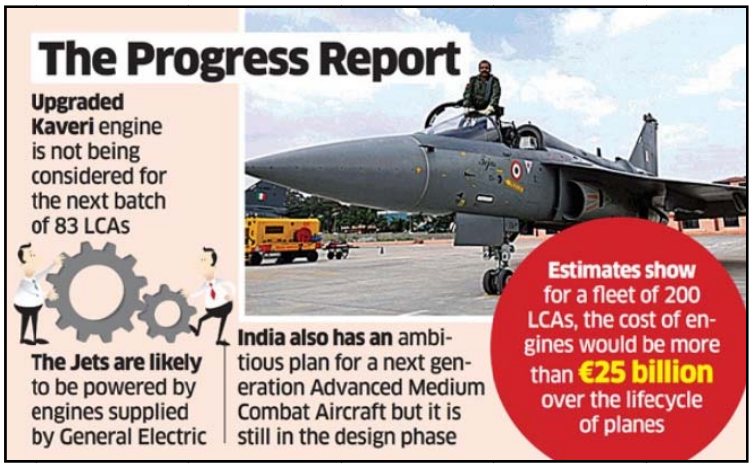
Fri, 11 Oct 2019

France makes move to revive Kaveri jet engine project

A detailed presentation on creating an aircraft engine ecosystem in India was given to the minister who had gone for the handing over ceremony of the Rafale fighter jets

By Manu Pubby

New Delhi: France has made fresh efforts to revive plans to develop the indigenous Kaveri fighter jet engine as part of the Rafale offsets deal, with a briefing for the project made to defence minister Rajnath Singh during his visit this week.



A detailed presentation on creating an aircraft engine ecosystem in India was given to the minister who had gone for the handing over ceremony of the Rafale fighter jets. French engine manufacturer Safran, which makes the engines and electronics for the Rafale fighters, pitched its proposal for the co-development of the Kaveri engine for the Indian Light Combat Aircraft (LCA) program.

According to sources, the French side emphasised that India was the only country to which such advanced technology transfer was being offered and that the country would achieve 'sovereignty' on aero engine tech.

The French side also pledged to transfer more work for the production of the M 88 engine that powers its fighter jets to India if orders for more of the combat aircraft are received. "If India orders 36 more Rafale jets, more engine parts would be made in India to meet offset conditions," sources aware of the briefing said.

As reported by ET, plans to revive the indigenous Kaveri project with the help of French technology fell through after the Indian side found the pricing prohibitive. Talks hit a roadblock after it emerged that only a part of the offsets — just over Euro 250 million — could be utilised for the projects and that Defence Research and Development Organisation would have had to provide the remaining Euro 500 million.

The upgraded Kaveri engine is not being considered for the next batch of 83 LCAs to be made in India and the jets are likely to be powered by engines supplied by US' General Electric. India also has a plan for a next generation Advanced Medium Combat Aircraft (AMCA) but it is still in the design phase.

Estimates shows that for a fleet of 200 LCAs, the cost of engines alone would be in excess of Euro 25 billion over the lifecycle of the planes.

https://economictimes.indiatimes.com/news/defence/france-makes-move-to-revive-kaveri-jet-engine-project/articleshow/71532719.cms

THE ECONOMIC TIMES
WWW.ECONOMICTIMES.COM

Fri, 11 Oct 2019

Turkish shipyard's Pakistan links may nix its $2.3 billion India deal

While Turkish yard's 'win' was announced in June, no formal contract signed yet

By Manu Pubby

New Delhi: A $2.3-billion deal to build fleet support vessels in collaboration with a Turkish shipyard has come into question after security concerns were raised over the firm, including links with Pakistan.

Turkey's TAIS had emerged as the lowest bidder in June this year, following a global competition, for a contract to manufacture five of the 45,000-tonne fleet support vessels (FSV) at the Vizag-based Hindustan Shipyard Limited (HSL).

Turkish shipyards are a major supplier of warships to the Pakistani Navy and concerns have been raised in India on how access to the strategic HSL by its engineers and workers can result in serious security issues.

HSL is located close to the Ship Building Centre, where India's nuclear armed submarines are built and the Eastern Naval Command has its headquarters.

Last month, Turkish President Recep Tayyip Erdogan had used the ceremony to launch new corvettes for the Pakistani Navy last month to once again talk about the Kashmir issue.

He said that he would continue to raise the issue at global platforms and attempted to draw parallels between the Kashmir issue and the Palestine conflict. The platform was also used by the Pakistan Navy chief Admiral Zafar Mahmood Abbasi for anti-India propaganda.

Besides four new corvettes, Turkey has designed a fleet support vessel for Pakistan and has signed a deal to sell 30 T129 attack helicopters that have been developed in collaboration with Italian company Finmeccanica (since renamed Leonardo).

The Indian FSV project has been running behind schedule since it was given a go-ahead in 2016 after the navy projected a requirement for ships that can carry fuel and other supplies for warships at sea. In a decision that triggered protests by private shipyards, the defence ministry decided to nominate HSL for the project without opting for competitive bidding.

The state-owned shipyard commenced its own selection process to identify a foreign technology partner after its initial talks with South Korea's Hyundai Heavy Industries fell through. The competitive tender closed in on three possibilities — the Turkish yard, Russia's Shipbuilding Corporation and Germany's TKMS.

While the Turkish yard's "win" was announced in June, no formal contract has been signed with the company so far. The matter is being discussed at the top level in the ministry, after which formal action will be initiated for the way forward, according to people aware of the matter.

https://economictimes.indiatimes.com/news/defence/turkish-shipyards-pakistan-links-may-nix-its-2-3-billion-india-deal/articleshow/71530038.cms

The Indian EXPRESS

Fri, 11 Oct 2019

India hits back at Turkey: Deep concern over military offensive

This is Delhi's latest signal to the international community that siding with Pakistan will entail disapproval from India

By Shubhajit Roy

Mahabalipuram: IN WHAT could be seen as a tit-for-tat move over Turkey's statements on J&K, India on Thursday expressed "deep concern" over the "unilateral military offensive" by Turkey in northeastern Syria, and asserted that the action could undermine stability in the region as well as the fight against terrorism.

This is Delhi's latest signal to the international community that siding with Pakistan will entail disapproval from India.

As Chinese President Xi Jinping comes to India on Friday, the issue of favouring Pakistan on the J&K issue has emerged as the touchstone for a normal diplomatic relationship. "On whether a country is with Pakistan or India, this has become the new loyalty test for Indian diplomacy," an Indian diplomat told The Indian Express.

The issue of siding with India or Pakistan began with the Uri attack in 2016, when Indian diplomats were activated across the world and statements were solicited from world capitals condemning the terrorist attack — and, if possible, slamming Pakistan.

The issue came up again when the Pulwama terrorist attack took place in February this year. Once again, ambassadors were called and asked to convey to their respective capitals to issue statements.

The trend continued, as many countries were asked to speak in favour of India's right to self-defence — the US support also came, and an emboldened Delhi carried out the Balakot air strikes.

Following the government's August 5 decision to revoke J&K's special status and bifurcate the state into two Union Territories, the diplomatic community was activated again. The challenge, this time, was that it involved a ground situation. So, although world leaders like US President Donald Trump and French President Emmanuel Macron supported India's move, there were statements from the US and French administration on the issue of human rights.

However, China, Turkey and Malaysia have been critical of India's move on Kashmir. And, India has reacted very sharply.

In early October, India said it "deeply regrets" the statements of Turkey and Malaysia attacking New Delhi on the Kashmir issue, and termed it an internal matter.

MEA spokesperson Raveesh Kumar asked Ankara to have a proper understanding of the situation before making further comments. "India and Turkey are friendly countries. We, therefore, deeply regret that since August 6, there have been repeated statements by the Turkish government on a matter completely internal to India. These statements are factually incorrect, biased and unwarranted," he said.

Malaysian Prime Minister Mahathir Mohamad raised the Kashmir issue at the United Nations, alleging that India had "invaded and occupied" J&K and asked New Delhi to work with Islamabad to resolve the issue.

"We have noted the comment on J&K by the Prime Minister of Malaysia. We deeply regret these comments since they are not based on facts," Kumar said. "Government of Malaysia should bear in mind the friendly relations between the two countries and desist from making such comments," he added.

So, India's statement on Turkey needs to be viewed in this context.

On Wednesday, Turkish jets and artillery targeted Kurdish-controlled areas in Syria, forcing thousands of civilians to flee their homes.

Reacting to the development, the MEA said in a statement: "We are deeply concerned at the unilateral military offensive by Turkey in northeast Syria." Turkey's actions can undermine stability in the region and the fight against terrorism, it said. The action also has the potential to cause humanitarian and civilian distress, the MEA said.

"We call upon Turkey to exercise restraint and respect the sovereignty and territorial integrity of Syria. We urge the peaceful settlement of all issues through dialogue and discussion," it said.

It is highly unusual for India to react on a third country's actions in a region which is not India's immediate neighbourhood. Sources said this was a clear signal to Turkey to be sensitive to India's interests, and not take sides with Pakistan on J&K.

Sources said a signal is being sent to other countries as well, including the US, where a US Congress hearing is likely to take place on October 22 on the J&K situation. Already, several US Congressmen and European parliamentarians have criticised India for the communication shutdown and restrictions.

EXPLAINED

Show of strength

India's statement on Turkey's offensive is rather unusual, and is being seen as a response to Turkey's statements on J&K over the last two months. Since 2011, when the turmoil began in Syria, India has never targeted Turkey or any other country which is involved. It is a symptom of India's muscle-flexing against Pakistan.

https://indianexpress.com/article/india/india-hits-back-at-turkey-deep-concern-over-military-offensive-6063394/

INDIA TODAY

Fri, 11 Oct 2019

North Korea threatens to resume nuclear, long-range missile tests

North Korea threatened again on Thursday to resume nuclear and long-range missile tests, accusing the US of having instigated some members of the UN Security Council to condemn its recent weapons tests

Seoul: North Korea threatened again on Thursday to resume nuclear and long-range missile tests, accusing the US of having instigated some members of the UN Security Council to condemn its recent weapons tests.

The warning by Pyongyang's Foreign Ministry followed the weekend breakdown of North Korea-U.S. nuclear negotiations in Sweden, the first such talks between the countries in more than seven months. North Korea said the talks collapsed because the U.S. didn't have any new proposals and whether it maintains a self-imposed moratorium on major weapons tests was up to Washington.

Some observers say North Korea's threat may be a tactic to pressure the U.S. into making concessions as a restart of nuclear and long-range missile tests would likely derail negotiations, deepen its international isolation and further dim prospects for rebuilding its moribund economy.

A ministry statement took issue with condemnation Tuesday by the European members of the U.N. Security Council of North Korea's recent ballistic missile and other weapons tests, including its first underwater-launched missile launch in three years on Oct. 2. North Korea said those tests were of the self-defense nature.

North Korea also accused the U.S. of being behind the European condemnation of its weapons tests after having begged for working-level North Korea-U.S. talks in Sweden.

On Tuesday, the U.N. council discussed the North's latest underwater-launched missile test and its European members urged Pyongyang to abandon all weapons of mass destruction and engage in meaningful negotiations with the U.S. The council meeting was called by France, Germany and the United Kingdom.

Council members Belgium and Poland joined in supporting the statement along with Estonia, which will join the council in January.

The North Korean statement said the condemnation is particularly a grave provocation to us because the Security Council didn't act on the Oct. 2 U.S. test of an unarmed Minuteman 3 intercontinental ballistic missile, which it said was apparently designed to apply pressure on North Korea. A U.S. Air Force Global Strike Command statement said that such tests demonstrate the capability of the intercontinental ballistic missile system and are not a response to world events or regional tensions.

North Korea said it can make a response on the same level but is refraining from doing that because it's still unnecessary or premature to do so.

But the statement said that our patience has a limit and the European condemnation is pushing North Korea to reconsider whether to maintain the disarmament steps it has taken to build confidence with the U.S.

North Korea last year suspended nuclear and long-range missile tests, partially dismantled its long-range rocket test site and dismantled its only known underground nuclear testing site.

U.S.-led diplomacy aimed at stripping North Korea of its nuclear program had been stalemated since the second summit between President Donald Trump and North Korean leader Kim Jong Un in Vietnam in February ended without any agreement. That summit fell apart because of Trump's rejection of Kim's demands for major sanctions relief in return for a limited denuclearization step.

https://www.indiatoday.in/world/story/north-korea-threatens-to-resume-nuclear-long-range-missile-tests-1607992-2019-10-10

DefenceNews

Fri, 11 Oct 2019

'Training for Gaganyaan crew begins in Russia'

India's first 'Gaganyaan' human space flight mission is slated to take off in 2022 and the training for its crew, drawn from among experienced Indian Air Force pilots, has already commenced in Russia, according to S Somnath, Director, Vikram Sarabhai Space Centre (VSSC).

Inaugurating the citizen familiarisation programme, participated by invited senior citizens as part of the World Space Week -2019 at the VSSC campus, he said the short duration mission to be undertaken at the low earth orbit (LEO) within 300-400 km from Earth, would also comprise an effective crew escape system, akin to ejection by pilots from fighter jets in the event of any possible rocket explosion. This is to prevent loss of human life and land them in sea for their safe recovery. Multiple trials in each stage of the mission are in different stages of progress. The prestigious mission had been taken up in accordance with the Prime Minister's 2018 independence day speech.

The director elicited opinions of the senior citizens on the growing budgetary requirements of India's space research programmes, adding that they had the right to know how and for what purposes tax payers' money was being utilised by ISRO.

Somanath said India's space research programmes had substantially contributed to the country's overall economic development, covering a large spectrum of areas touching on defence requirements, agricultural production, accurate weather forecast, and industrial developments, and new are continuously being added.

Notable among the achievements of ISRO programmes was its high productivity in space applications in the recent past, enabling it to undertake increased satellite launch programmes year-on-year, while retaining its staff strength at the same level from what it was in 1985.

About 400 senior citizens attended the day-long programmes, based on online registration, and the activities included lectures by eminent scientists, video presentations, panel discussions and a visit to the ISRO museum.

http://www.defencenews.in/article/%e2%80%98Training-for-Gaganyaan-crew-begins-in-Russia%e2%80%99-737356

TIMESNOWNEWS.COM

Fri, 11 Oct 2019

Chandrayaan 2 orbiter monitors solar flare and can provide detailed info about processes on the Sun: ISRO

ISRO on Thursday revealed that Chandrayaan 2 orbiter is measuring Solar X-ray flux and studying various processes on the Sun

KEY HIGHLIGHTS

- ***Chandrayaan 2 is monitoring Solar X-ray flux***
- ***This will help ISRO study various processes on the Sun***
- ***Chandrayaan 2 Orbiter is fitted with two instruments to measure the lunar elemental composition***

ISRO (Indian Space Research Organisation) on Thursday in its new update revealed that the Chandrayaan 2 orbiter is observing solar flare by the Solar X-ray Monitor fitted onboard. The space agency said that the Chandrayaan 2 orbiter carries two instruments, namely Chandrayaan 2 Large Area Soft X-ray Spectrometer (or referred to as CLASS) and Solar X-ray Monitor (also known as XSM) which measure the lunar elemental composition using this technique.

"Here, the CLASS payload detects the characteristic lines from the lunar surface, and the XSM payload simultaneously measures the solar X-ray spectrum," ISRO explained it its latest statement.

ISRO has shared a graph chart measuring a series of small flares measured by XSM during the period 30th September 2019 00:00 UTC - 1st October 2019 23:59 UTC. The data measured by XSM has been compared with the solar X-ray flux measured by X-ray sensor on the Geostationary Operational Environmental Satellite (GOES-15).

#ISRO

Solar flare measured by XSM instrument of #Chandrayaan2 and GOES-15 of US during 30th September to 1st October 2019.

Clearly XSM provides very detailed information which will help in understanding various processes on the Sun.

Details at https://t.co/OccLzYCfZp pic.twitter.com/SBb9ZztZlv

— ISRO (@isro) October 10, 2019

"It shows that XSM is able to detect the intensity variations of the Sun much beyond the sensitivity limit of GOES," ISRO adds in its statement. The GOES data was obtained from the National Center for Environmental Information of National Oceanic and Atmospheric Administration, USA.

"Apart from the better sensitivity, XSM also measures the spectrum of solar X-ray in the energy range of 1 - 15 keV with highest energy resolution so far for any broadband solar X-ray spectrometer over intervals as short as 1 second," ISRO added.

Chandrayaan 2 orbiter is sending solar flare data, but ISRO says that it won't be enough for studying the lunar surface composition because of the large angle between Sun, lunar surface and the Chandrayaan 2. ISRO says that the angled gap is close to 90 degrees in this case against a desirable low value, close to zero. However, ISRO adds that XSM observations provide very useful data to understand various processes on the Sun.

https://www.timesnownews.com/technology-science/article/chandrayaan-2-orbiter-monitors-solar-flare-and-can-provide-detailed-info-about-processes-on-the-sun-isro/502409

Business Standard

Fri, 11 Oct 2019

'Plastic-eating' bacteria discovered by Indian scientists

New Delhi: Researchers have discovered two strains of 'plastic-eating' bacteria from the wetlands of Greater Noida, an advance that may lead to eco-friendly alternative clean-up methods for plastic waste worldwide.

The bacterial strains discovered by researchers at Shiv Nadar University in Greater Noida, Uttar Pradesh, have the potential to decompose polystyrene -- a key component in Single-Use Plastic (SUP) items such as disposable cups, cutlery, toys, packaging materials etc.

The bacterial species namely Exiguobacterium sibiricum strain DR11 and Exiguobacterium undae strain DR14 were isolated from the wetlands adjoining the university.

Polystyrene is quite resistant to degradation due to its high molecular weight and long chain polymer structure. This is the reason for their persistence in the environment, according to the study published in the journal Royal Society of Chemistry (RSC) Advances.

The exponential production and consumption of polystyrene in various sectors has presented a great environment risk and raised the problem of waste management, the researchers noted.

"Our data support the fact that strains of extremophile bacterium Exiguobacterium are capable of degrading polystyrene and can be further used to mitigate the environmental pollution caused by plastics," Richa Priyadarshini, Associate Professor at Shiv Nadar University, Greater Noida, told PTI.

"Wetlands are one of the richest habitats of microbial diversity but are relatively unexplored. Hence, these ecosystems are ideal grounds for isolating bacteria with novel biotechnological applications," said Priyadarshini who discovered the bacteria strains along with her team at the Department of Life Sciences, School of Natural Sciences.

According to industry estimates, India consumes about 16.5 million metric tonnes of plastic annually. The All India Plastic Manufacturers Association (AIPMA) estimates that the plastic industry produces about 14 million metric tonnes of polystyrene, which is non-biodegradable.

This effects both terrestrial and marine life, e.g. a plastic fork can take up to 450 years or more to decompose, the researchers noted.

In the universe of plastic items used daily, SUP constitutes about a fifth in volume, they said.

The finding assumes significance in India given the recent announcement by the Prime Minister to eliminate SUP by 2022.

The research team identified that upon coming into contact with the plastic (polystyrene), the two isolated bacteria strains use it as a carbon source, and create biofilms.

This alters the physical properties of polystyrene, and initiates a process of natural degradation with the release of hydrolysing enzymes to break the polymer chains.

"Biodegradation is a process by which microbial organisms -- mainly bacteria and fungi -- transform or degrade chemicals introduced into the environment," Priyadarshini said.

The team is currently trying to evaluate the metabolic processes of these strains for utilisation in the environmental bioremediation.

"What started as a scientific exploration of the wetland in our campus has led to this significant discovery of plastic-eating bacteria," said Rupamanjari Ghosh, Vice-Chancellor, Shiv Nadar University. "This is a dream solution of breaking plastic in a natural process and making it biodegradable," Ghosh said.

"We started out by just exploring the area to get a sense of bacterial species prevalent in these areas, but ended up isolating numerous bacterial species with unique and useful properties," added Priyadarshini.

With new bacterial species being discovered with plastic biodegradation ability, she noted that novel enzymes and new potential metabolic pathways can be discovered which could help in bioremediation in future.

The researchers noted that both Exiguobacterium strains were able to establish biofilms on polystyrenes surfaces.

Biofilms are an assemblage of bacterial cells, which grow as communities, reaching to very high cell densities. This leads to more targeted and localised action of polymer degrading enzymes, the researchers said.

"Polystyrene is quite recalcitrant to degradation and requires some form of pre-treatment like chemical, thermal, photo-oxidation etc prior to biodegradation," said Priyadarshini.

Both DR11 and DR14 strains were able to not only form biofilm on non-treated polystyrene, but were also found capable of degrading unmodified plastic, researchers said.

"Human dependence on plastic material has increased substantially over the years, which has led to huge amount of plastic accumulation in the environment leading to adverse effects on the ecosystem," Priyadarshini said.

She noted that more sustainable methods for plastic degradation are required.

The researchers note that the use of both indigenous and genetically modified bacteria could lead to eco-friendly alternative clean-up methods for plastic waste.

Further research should be directed towards making these process faster, sustainable and cost-effective, they said.

(This story has not been edited by Business Standard staff and is auto-generated from a syndicated feed.)

https://www.business-standard.com/article/pti-stories/plastic-eating-bacteria-discovered-by-indian-scientists-119101000455_1.html

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NASA Launches Long-Delayed ICON Space Weather Satellite to Study Earth's Ionosphere

ICON will study the link between space weather and Earth weather By Amy Thompson

Cape Canaveral: A long-awaited NASA mission designed to probe Earth's upper atmosphere has finally taken off after years of delays.

The Ionospheric Connection Explorer (ICON) spacecraft launched tonight (Oct. 10) at 10:00 p.m. EDT (0200 GMT on Oct. 11) aboard a Northrop Grumman Pegasus XL rocket, which was released in midair from its carrier plane, a Stargazer L-1011. The aircraft had taken off about an hour and a half earlier from Cape Canaveral Air Force Station here.

ICON will make its way to Earth orbit on a mission to study the planet's ionosphere, a massive layer of our atmosphere that overlaps with the boundary of space. The spacecraft's measurements will help scientists better understand the link between space weather and terrestrial weather, and how the two interact in the ionosphere, mission team members said.

"The ionosphere is continually changing, and it's very dynamic," Nicky Fox, head of NASA's heliophysics division, explained during a prelaunch news briefing on Tuesday (Oct. 8).

"The ionosphere is a remarkable physics lab," Fox said. "It's not only a great place to go and study plasma physics, but it's also a region that has a big space weather impact on us."

Scientists have long been eager for the vending-machine-size satellite to get off the ground to see what it might tell us about this mysterious region. According to Fox, the ionosphere gets its name thanks to radiation from the sun, which bombards the atoms and molecules in this part of the atmosphere, essentially giving them a charge — a process called ionization.

It's here where strange and unique phenomena, such as the auroras and geomagnetic storms, are created. It's hard to forecast when these types of events will occur, because the ionosphere is an incredibly difficult region to study.

Until about a decade ago, scientists thought the sun caused most of the changes in the ionosphere, but more recent research suggests that is not the case; daily changes in the region are observed even when the sun isn't generating powerful storms. Fox explained that this is because terrestrial weather patterns and extreme events such as hurricanes also cause changes in the ionosphere.

This dynamic region where Earth weather meets space weather is home to the International Space Station and is a critical pathway for communications satellites. Radio waves and Global Positioning System (GPS) signals pass directly through this turbulent layer, and those signals can be distorted by patches of ionized material.

This is an issue because space weather can not only have an impact on communications systems but also electronics and even power grids. To mitigate these effects, scientists are

hoping to better understand the sun and its many processes. And ICON can help with that, mission team members said. The $252 million probe is going right into the thick of the ionosphere, heading for a circular orbit 357 miles (575 kilometers) above Earth's surface. Equipped with various instruments that are designed to measure winds and particles, ICON will also measure how dense the atmosphere is and analyze its chemical composition.

Such data were supposed to be rolling in already. ICON was originally scheduled to launch in 2017, but issues with the Pegasus caused multiple lengthy delays. (Bad weather also scuttled an attempt yesterday, Oct. 9.)

ICON finally got aloft tonight. Stargazer L-1011 took off from the Skid Strip runway at Cape Canaveral Air Force station at 8:32 p.m. EDT (0032 GMT) and headed for its planned drop zone about 50 to 100 miles (80 to 160 km) east of Daytona Beach.

The crew released the 57-foot-long (17 meters) rocket at 10:00 p.m. (0200 GMT), on its second approach to the drop zone. (On the first try, mission control briefly lost communication contact with the carrier plane, leading to an abort.) Five seconds after the drop, the three-stage Pegasus ignited and began to climb to orbit.

Don Walter, Northrop Grumman's chief pilot for the L-1011, said the flight is like an attraction at Disney World. "When the rocket launches, the airplane wants to go up, and you get pushed back in your seat," he told Space.com. "Which is a good thing for us. When the rocket lights, we want to be a long way away."

He went on to explain that the experience is also quite noisy. "It sounds like a freight train underneath the plane," he added.

This flight was the 44th launch of a Pegasus rocket on a satellite delivery mission and the seventh out of Cape Canaveral.

While in space, ICON will work in tandem with another NASA mission called GOLD (Global-scale Observations of the Limb and Disk), which launched as a tagalong payload aboard a ommercial communications satellite in January 2018. From its orbital perch 22,000 miles (35,400 km) above the Earth, GOLD has been monitoring the ionosphere from above. The two missions will work together to provide a complete picture of the inner workings of the ionosphere.

https://www.space.com/nasa-icon-space-weather-mission-launch-success.html