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Mon, 20 June 2022

पिनाका एमके-1 के एडवांस वर्जन का सफल परीक्षण

जैसलमेर की पोकरण फील्ड फायरिंग रेंज में भारत में निर्मित पिनाका एमके-1 के एडवांस वर्जन ने सटीक निशाने साध कर 45 किमी दूर टारगेट को नेस्तनाबूद कर दिया। जैसलमेर की पोकरण फील्ड फायरिंग रेंज में भारत में निर्मित पिनाका एमके-1 के एडवांस वर्जन ने सटीक निशाने साध कर 45 किमी दूर टारगेट को नेस्तनाबूद कर दिया। सेना और डीआरडीओ अधिकारियों की मौजूदगी में अपग्रेडेड रॉकेट प्रणाली के ताबड़तोड़ प्रहार से काल्पनिक शत्रु धराशायी हो गया। यह माना जा रहा है कि पिनाका के इस अपडेट वर्जन से सेना की मारक क्षमता में काफी बढ़ोतरी हो जाएगी। पिनाका के एडवांस वर्जन की कामयाबी पर वहां मौजूद अधिकारियों ने एक दूसरे को बधाई दी। इससे पहले भी पोकरण रेंज में ही गत 9 अप्रैल को पिनाका रॉकेट प्रणाली का सफल परीक्षण किया गया था।

1980 में डीआरडीओ ने की विकसित करने की शुरुआत: डीआरडीओ ने वर्ष 1980 में पिनाका रॉकेट सिस्टम को विकसित करने की शुरुआत की थी। इसके दस वर्ष बाद पिनाका मार्क वन का परीक्षण भी सफल रहा। पिनाका सिस्टम की एक बैटरी में छह लॉन्चिंग वाहन होते हैं। पिनाका को एक गाइडेड मिसाइल की तरह तैयार किया गया है। यह नई तकनीक से निर्मित है तथा नई जरूरतों को ध्यान में रखकर बनाया गया है।

मजबूत रॉकेट सिस्टम

75 किलोमीटर तक दुश्मन पर हमला करने की पिनाका में क्षमता। करगिल युद्ध के दौरान पिनाका मार्क-1 का प्रयोग हुआ था। पिछले 10 वर्ष से पिनाका भारतीय सेना के प्रयोग में लाई जा रही है। पुणे स्थित एआरडीई ने पिनाका रॉकेटों के लिए फ्यूज विकसित किए हैं। पिनाका एमके-1 अपग्रेडेड राकेट प्रणाली है, जिसका पूर्व में भी परीक्षण किया गया जो सफल रहा। पिनाका एमके-1 राकेट प्रणाली की मारक क्षमता लगभग 45 किलोमीटर है, वहीं पिनाका -2 राकेट सिस्टम की मारक क्षमता 60 किलोमीटर है। डीआरडीओ ने राकेट सिस्टम को गुणात्मक रूप से बेहतर बनाया है।

<https://www.patrika.com/jaipur-news/successful-test-of-advanced-version-of-pinaka-mk-1-7604554/>

DRDO On Twitter

Mon, 20 June 2022

DRDO (@DRDO_India)



#DRDOforIndia | Hon'ble RM & Hon'ble RRM reviewed the ongoing R&D & Futuristic Tech developments of five DRDO Young Scientists Laboratories (DYSLs) working in the field of AI, Smart Materials, Quantum, Cognitive & Asymmetric technologies.
#AatmanirbharDefence

Twitter · 17 hours ago

Defence News

Defence Strategic: National/International



**Press Information Bureau
Government of India**

Ministry of Defence

Mon, 20 June 2022 7:17 PM

Multinational Peacekeeping Exercise "Ex Khaan Quest – 2022" Concludes at Mongolia

The Multinational Peacekeeping Exercise "Ex Khaan Quest -2022" culminated today at the Peace Support Operations Training Centre in Ulaanbaatar at Mongolia. The exercise conducted from 06 June to 20 June 2022 provided a platform for mutual learning and sharing best practices amongst the armies from 16 Nations. The Indian contingent consisting of personnel from the

LADAKH SCOUTS participated in the field training as well as the Command Post exercise. A number of training activities were organised during the course of the exercise, which included mock tactical operations as per United Nations (UN) mandate, combat discussions, training of staff & command appointments; as part of a combined UN brigade, in order to enhance multinational interoperability. The bonhomie, esprit-de-corps and goodwill generated during the exercise will go a long way in future strengthening of bonds between the Armies of participating Nations.

<https://www.pib.gov.in/PressReleasePage.aspx?PRID=1835630>



Press Information Bureau
Government of India

Ministry of Defence

Mon, 20 June 2022 7:06 PM

Indian 5G Test Bed to be Established at Military College of Telecommunication Engineering (MCTE), MHOW

An Indian 5G test bed is to be established at the Military College of Telecommunication Engineering (MCTE), MHOW in collaboration with Indian Institute of Technology, Madras (IIT-M). An Memorandum of Understanding (MoU) to facilitate the same was signed between MCTE & IIT-M at a function in Chennai today. The test bed will facilitate Indian Army to utilise the 5G technology for its operational use, especially along its borders.

The MoU signed will give an impetus to induction of systems, devices & equipment using niche technology and also use of AI based algorithms for enhancing capabilities of our Armed Forces. It will also promote collaborative and cooperative research and facilitate exchange of ideas for development of new technologies. It will encourage students, faculties and scientist for research in area of 5G communications and development of military applications. Joint partnership between MCTE and IIT-Madras aims to accelerate Indian Army's indigenisation efforts for achieving 'Atmanirbharta' in the fields of communications and provide a testing facility for Tri-Service and thus act as a catalyst for Research and Development. Under the ambit of the MoU, IIT Madras will provide consultancy, duly supported by research for feasibility studies and prototype development on 5G enabled future communications.

<https://www.pib.gov.in/PressReleasePage.aspx?PRID=1835627>

Business Standard

Tue, 21 June 2022

Australian Defence Minister Arrives in India to Boost Security Ties

Australian Defence Minister Richard Marles arrived in India on Monday to hold a bilateral meeting with his Indian counterpart Rajnath Singh to strengthen defence and security

cooperation between both the countries. "Arrived in India - a top-tier partner + close friend to Australia. I look forward to advancing our ongoing defence engagement as Comprehensive Strategic Partners and reiterate our commitment for closer cooperation in the #IndoPacific," Marles tweeted. His visit marks the first high-level visit from Australia after newly-elected prime minister Anthony Albanese took office on May 23. During his visit from June 20-23, the Australian Defence Minister will hold his first bilateral meeting with his Indian counterpart Rajnath Singh.

"Australia and India are Comprehensive Strategic Partners. I am committed to strengthening Australia's defence and security cooperation with India," said Marles. "I am looking forward to meeting with my counterpart, Defence Minister Rajnath Singh, and holding our first bilateral Defence Ministers' Meeting," he added. Marles stated that Rajnath Singh has been instrumental in advancing India-Australia defence ties and he looks forward to working with him to enhance the defence pillar of the Comprehensive Strategic Partnership between the two countries. The minister also noted that India is one of Australia's closest security partners and the Government is focused on revitalising Australia's historically deep engagement with our partners across the Indo-Pacific. "The rules-based international order that has brought peace and prosperity to the Indo-Pacific for decades is experiencing pressure, as we face shifts in the geostrategic order," he said. "Australia stands ready to work closely with India in support of an open, inclusive and resilient Indo-Pacific".

During the visit, Deputy Prime Minister Marles will also meet External Affairs Minister Dr S Jaishankar and engage national security and defence policymakers and personnel. Earlier, the Australian PM Albanese had said that the relationship with India is very important and ties between the two countries have never been closer. "Our relationship with India is a very important one and it was a great honour to meet with Prime Minister Narendra Modi." PM Modi congratulated Prime Minister Albanese on his election victory. Both leaders reviewed the multi-faceted cooperation under the Comprehensive Strategic Partnership, including trade and investment, defence manufacturing, renewable energy, green hydrogen, education, science and technology, agricultural research, sports, and people-to-people ties. Both Prime Ministers affirmed their desire to continue the positive momentum in the bilateral relationship. Bilateral discussions with PM Modi focused on Australia and India's full strategic and economic agenda, including clean energy technology.

https://www.business-standard.com/article/current-affairs/australian-defence-minister-arrives-in-india-to-boost-security-ties-122062100103_1.html



Tue, 21 June 2022

Amid Tensions with Taiwan, China Successfully Tests Anti-Ballistic Missile Interceptor

China carried out a land-based missile interception test that “achieved its expected purpose”, its defence ministry announced late on Sunday amid the ongoing military standoff along the

disputed land border with India to the northwest of the country and rising tension with Taiwan off its southeastern coast. The test details of the anti-ballistic missile (ABM) including the location where it was carried out remains shrouded in mystery. ABMs are typically meant to provide an umbrella of security against missile attacks in case of a war by intercepting incoming ones including intercontinental ballistic missiles. The Chinese defence ministry said that the “ground-based mid-course anti-missile intercept technology” test had been carried out within the country’s territory, the defence ministry said in a brief statement.

The test was conducted at night, the statement said. “The test reached its expected goals,” the ministry said, adding: “This test was defensive and not aimed at any country.” China had carried out the test of a similar missile in February, 2021. The latest test brings the tally of publicly announced Chinese land-based ABM technical tests to six. “According to media reports and official statements, other known ABM tests were carried out by China in 2010, 2013, 2014, 2018 and 2021. It was not revealed in which interception phase the test in 2014 was carried out, while all other five were carried out in the mid-course phase,” the state-run tabloid, Global Times reported on Monday.

Military expert Song Zhongping told the tabloid that China had mastered the mid-course ABM system, and conducting the latest test shows that the system is becoming mature. China’s land-based conventional missile capabilities have developed significantly over the last several years. “According to the US Department of Defence (DoD), China’s missile forces in 2000 ‘were generally of short range and modest accuracy.’ In the years since then, China has developed the world’s “largest and most diverse’ arsenal of ground-launched ballistic and cruise missiles”, a 2020 report by the Centre for Strategic and International Studies’s (CSIS) ChinaPower which tracks the country’s development said.

<https://www.hindustantimes.com/world-news/amid-tensions-with-taiwan-china-tests-anti-ballistic-missile-interceptor-101655724946253.html>



Mon, 20 June 2022

Israel Says it's Building Regional Air Defence Alliance Under U.S.

Israel is building a U.S.-sponsored regional air defence alliance, the Israeli defence minister said on Monday, adding that the apparatus has already foiled attempted Iranian attacks and could be boosted by President Joe Biden's visit next month. Drawing closer in recent years to U.S.-aligned Arab states which share its Iran concerns, Israel has offered them defence cooperation. They have been publicly reticent on the idea. Washington hopes more cooperation, especially on security, would help further integrate Israel in the region and isolate Iran. It may also preface more normalisation deals with Israel, including by heavyweight Saudi Arabia, following the forging of relations with the United Arab Emirates and Bahrain in 2020. Unveiling what he dubbed the "Middle East Air Defence Alliance" in a briefing to Israeli lawmakers, Defence Minister Benny Gantz said such cooperation is already under way.

"Over the past year I have been leading an extensive programme, together with my partners at the Pentagon and in the U.S. administration, that will strengthen the cooperation between Israel and countries in the region," he said, according to an official transcript. "This program is already operative and has already enabled the successful interception of Iranian attempts to attack Israel and other countries." The transcript did not name partner countries, give further details on the thwarted attacks nor provide details on the mechanics of the alliance. The U.S. Embassy in Jerusalem did not immediately respond to a request for comment. Speaking to Reuters on condition of anonymity, an Israeli official said partner countries were synchronising their respective air defence systems through remote electronic communication, rather than using the same physical facilities.

"DESPERATION"

Iran said joint military activities of Israel and some Arab countries in the Gulf are done "out of desperation". Saudi Arabia, Bahrain and the UAE governments did not immediately respond to requests for comments on the alliance mentioned by Gantz. A Western diplomat in the region told Reuters last week that Washington was still working to convince Gulf Cooperation Council states as a bloc to agree on joining a U.S.-Israeli integrated air defence system. The GCC groups Saudi Arabia, the UAE, Bahrain, Qatar, Kuwait and Oman. "(The proposal) would help to fill the gap left by the withdrawal of U.S. hardware over the last two years from the region ... and would draw Israel and Saudi Arabia closer to reaching a normalisation deal," the diplomat said. Riyadh, which was supportive of Israel's rapprochement with its Gulf neighbours, has said normalising its own relations with Israel would need the creation of a sovereign Palestinian state with Jerusalem as its capital.

"I hope that we will take another step forward in this aspect (of regional cooperation) during President Biden's important visit," Gantz said. Biden is visiting the region July 13-16 with stops in Israel and Saudi Arabia, where he will meet Arab leaders. As tensions have mounted over Tehran's nuclear programme, Israel, Saudi Arabia, the UAE and parts of Iraq have come under UAV or missile strikes that were claimed by or blamed on Iranian-backed militias. Gulf states had been frustrated over perceived reduced U.S. commitment to regional security and for not addressing their concerns over Iran's missile programme and regional proxies.

<https://www.reuters.com/world/middle-east/israel-says-building-regional-air-defence-alliance-under-us-2022-06-20/>



Press Information Bureau
Government of India

Ministry of Science & Technology

Mon, 20 June 2022 4:47 PM

Sleep Organisation Stabilizes Among Vipassana Meditation Practitioners: Study

Researchers have found that practitioners of meditation transition from light to deep sleep faster, and their period of transition does not increase with age as against those who do not practice meditation, and duration of the deep sleep period is longest among the former, whereas this duration reduces with age among the latter. They have demonstrated organisation of sleep stabilizes among Vipassana meditation practitioners. Frequent sleep transitions (from higher deep sleep to lighter sleep) are seen in sleep disorders, and with age, these transitions increase. Traditionally, meditation has been recommended as solution for ameliorating sleep disorders. However, scientific evidence on the relationship between meditation and sleep disorders was lacking. A study by the National Institute of Mental Health & Neurosciences (NIMHANS) has established the association between meditation and proper sleep organization as well as sleep stability.

The study supported by the SATYAM programme of the Department of Science and Technology, which investigated the importance of meditation on sleep organization and the correlation between sleep, meditation, and progress in well-being, demonstrated the distinct changes brought by Vipassana meditation practices on the sleep variables and hence on the macro-sleep architecture. The team led by Prof. Bindu M. Kutty explored the efficacy of Vipassana meditation on the micro-sleep architecture dynamics, especially the spindle dynamics and Electroencephalogram (EEG) dynamics that determine the role of meditation on the thalamocortical synchronizing mechanisms essential for sleep intensity and continuity, memory consolidation etc. The study was published in the journal *Neuromodulation: Technology at the Neural Interface*.

Several Event-related potential (ERPs) responses generated by the brain have been identified during non-rapid eye movement (NREM) and REM sleep, and important ERPs during various stages of sleep have been demonstrated in the study. These ERPs responses are possible indicators of sleep stability. A sleep protocol involving conventional sleep study (Polysomnography), sleep ERPs and tACS was proposed, tested and standardized to infer sleep stability in control subjects and meditators. It includes indices/measures which capture sleep fragmentation (stage transitions), sleep initiation (sleep latency), sleep continuity, sleep deepening etc. With the help of this protocol, the study evaluated sleep stage transitions and continuity of sleep stages to evaluate the quality of sleep.

The work also provides a broad overview of the application of Transcranial Alternating Current Stimulations (tACSs – a device that uses electrical current to boost brain function) while sleeping on normal healthy individuals and meditators to modulate sleepiness, and evaluated the effect of tACS on the endogenously generated brain oscillations using different frequencies.

<https://www.pib.gov.in/PressReleasePage.aspx?PRID=1835550>



Mon, 20 June 2022

Speeding Up Molecule Design with a New Technique That can Delete Single Atoms

Every time a new cancer drug is announced, it represents hundreds of scientists spending years behind the scenes working to design and test a new molecule. The drug has to be not only effective, but also as safe as possible and easy to manufacture—and these researchers have to choose among thousands of possible options for its chemical structure. But building each possible molecular structure for testing is a laborious process, even if researchers simply want to change a single carbon atom. A new technique published by University of Chicago chemists and the pharmaceutical company Merck & Co. in the journal *Science* offers a way to leapfrog that process, allowing scientists to quickly and easily produce new molecules of interest.

“This allows you to make a tweak to a complex molecule without having to start the design process entirely over,” said Mark Levin, assistant professor of chemistry at UChicago and co-author on the new study. “Our hope is to accelerate discovery by reducing the time and energy that goes into that process.”

Bulldozing the house

As researchers are considering a molecule, there are many tweaks they might want to test. Attaching a pair of hydrogen atoms instead of nitrogen atoms, for example, might make it easier for the body to take up the drug. Perhaps removing one carbon atom would reduce a particular side effect. But actually making that new molecule can be surprisingly difficult. “Even though it looks on the surface like a tiny switch, there are certain things that are not fixable without going all the way back to the beginning and starting from scratch,” said Levin. “It’d be as if you were talking to a contractor about redoing one bathroom in your house, and he says, ‘Sorry, we’d have to bulldoze the entire house and start over.’”

Levin’s lab has made it a goal to sidestep that laborious process and allow scientists to make one or two changes to an almost-finished molecule. In this instance, they wanted to be able to snip a single bond out of a popular and useful class of molecules called quinoline oxides and turn them into another type of molecule called indoles. “Essentially, we want to pull out a single carbon

atom and leaving everything else still connected as if it was never there,” said Levin. They came across an old technique from the 1950s and 60s that uses light to catalyze certain reactions. It isn’t used widely today because the method was powerful but indiscriminate; the mercury lamps used in the 1960s shone out the full spectrum of light, which set off too many reactions in the molecule—not just the ones the scientists wanted.

But Jisoo Woo, a UChicago Ph.D. student and first author of the new paper, thought the results might be different with newer LED lamps that have become available in the last decade. These lamps can be programmed to emit only certain wavelengths of light. It worked. By shining only a particular wavelength, the scientists could catalyze only one particular reaction, which cut the carbon bonds quickly and easily. Levin, Woo and their colleagues wanted to find out how widely useful this technique might be. They worked with Alec Christian, a scientist at the pharmaceutical company Merck, to test it on several different sets of molecules. The technique showed promise across several families of molecules.

“For example, we showed we could take the cholesterol drug pitavastatin and turn it into another cholesterol drug called fluvastatin. These are two completely different molecules only related by one carbon atom deletion,” said Woo. “Before this method, you would have to make it from two entirely different processes and starting materials. But we were able to just take one drug and turn it into another drug in one transformation.” The scientists hope this process can ease and speed the process of designing new molecules, especially ones that involve this particular transformation, which chemists call a “scaffold hop.” “There are all kinds of scaffold hops where it could result in a very useful molecule, but the time involved is just prohibitive and so chemists never look at it,” said Levin. “There might be phenomenal drug compounds are hiding out there because teams just couldn’t get the time to start over.”

Christian agreed: “There are projects I’ve seen come to a crossroads because someone wants to try a change like this, but it would take a month to even work out the initial chemistry. Whereas with this process, you could have your answer in a day. I think a lot of people will want to use this method.” To conduct part of this research, the scientists used the ChemMatCARS beamline at the Advanced Photon Source, an enormous X-ray synchrotron facility at the U.S. Department of Energy’s Argonne National Laboratory.

<https://scitechdaily.com/speeding-up-molecule-design-with-a-new-technique-that-can-delete-single-atoms/>



Mon, 20 June 2022

A Transfer-Printing Technique to Integrate Metal Electrodes and 2D Materials on a Wafer-Scale

Metal-semiconductor junctions, electrical junctions in which a metal is linked to a semiconducting material, are crucial components for numerous electronic and optoelectronic devices. While they are now widely produced and used worldwide, creating good quality junctions that integrate conventional metals and 2D semiconductors can be difficult. In fact,

when applied to 2D materials, conventional metal deposition techniques, which entail a process known as ion bombardment, can cause a chemical disorder. In addition, existing transfer printing techniques, which involve the pre-deposition and transfer of metal electrodes on the surface of 2D materials, have been found to perform poorly due to the creation of chemical bonds on the substrate for the pre-deposition that hinder the electrodes' transfer.

Researchers at the Chinese Academy of Sciences, Hunan University, City University of Hong Kong and Fudan University have recently developed a new technique that could be used to transfer metal electrodes on 2D materials more effectively, enabling the development of more reliable metal-semiconductor junctions. This technique, introduced in a paper published in *Nature Electronics*, entails the delamination of metal electrode arrays from a graphene wafer, and their subsequent transfer printing onto different 2D materials.

"For the first time, in 2013, we reported that continuous graphene monolayers can be grown via CVD directly on semiconducting Ge(001) surfaces, making a significant departure from conventional metallic systems," Zengfeng Di, one of the researchers who carried out the study, told TechXplore. "Because of the insulating property of intrinsic Ge at the temperature below 10K, we carried out the research on graphene-mediated superconductivity in the metal nano-islands/graphene hybrid on Ge substrate, without the transfer of graphene from Ge substrate to SiO₂ substrate."

While conducting their previous research, Di and his colleagues realized that when deposited on graphene, metals can be peeled off very easily. This was also true for titanium or nickel, which are typically very difficult to exfoliate from conventional silica substrate. In their recent study, the team used their technique to deposit six different kinds of metals onto a wafer-scale graphene/Ge donor substrate. This included both weakly adhering metals, namely copper, silver and gold, and strongly adhering metals, namely platinum, titanium and nickel. "Both weakly adhering metals and strongly adhering metals can be easily delaminated," Di explained. "Our scalable, universal, and wafer-scale metal transfer technique can be utilized to create van der Waals contacts between two-dimensional semiconductors and three-dimensional metals, which are essential for developing 2D electronic and optoelectronic devices."

The researchers' approach for the integration of metal electrodes on 2D materials has several steps. First, it requires the deposition of a metal electrode array on a graphene/Ge substrate. As graphene is free from dangling bonds, the array can be easily peeled off from the substrate's surface using a polymer film. "After removing the polymer film by deionized water, wafer-scale 3D metal patterns can transfer onto an arbitrary target," Di said. "Compared with the previous transfer printing methods using silica substrate, we can transfer arbitrary metal with 100% yield and scale up the transfer technology to wafer size." The approach developed by Di and his colleagues is universal and could be used to form van der Waals contacts between various 2D semiconductors and 3D metals. In the future, it could be used to realize new types of van der Waals integrated circuits.

"A prerequisite for practical batch production of 2D devices is the ability of reliable mass production," Di said. "With the graphene-assisted metal transfer-printing approach, we created MoS₂ transistor arrays which show uniform electrical characteristics and good average values for the on/off current ratio, on-current, and subthreshold swing." Based on the initial tests they ran, Di and his colleagues think that their graphene-assisted metal transfer approach is a reliable solution for the large-scale manufacturing of integrated circuits based on 2D materials. In their

next studies, they plan to start using their technique to develop specific components for electronic and optoelectronic devices, to evaluate its effectiveness further. "Beyond a simple 2D transistor, we are using this technique to fabricate basic 2D logical units, including AND-OR, NOR, and AND gate," Di added. "In addition, the cost of our approach should be further reduced by optimizing the process and increasing the reusability of graphene/Ge substrate."

<https://techxplore.com/news/2022-06-transfer-printing-technique-metal-electrodes-2d.html>



Tue, 21 June 2022

IIT Jodhpur Claims Developing Indigenous Metal 3D Printer for Aerospace, Defence

Researchers at the Indian Institute of Technology (IIT) Jodhpur have developed a metal 3D printer for potential use across a range of industries like aerospace, defence, automotive, oil and gas, and general engineering, the institute said on Monday. All the components of this metal 3D printer, except the laser and robot systems, are designed and manufactured in India. The project's main objective is to reduce the cost of metal 3D printers and attract a broader range of users.

Despite the fact that metal 3D printing technology started a few years after the launch of polymer 3D printing, it is yet to experience the tremendous growth that the polymer 3D industry has achieved, especially in India. The high price of the product and the more expensive proprietary metal powders imported from abroad are some of the reasons for the limited growth of metal 3D printers. The new printer developed is suitable for repairing and adding additional material to existing components. It can print 3D parts with metal powders made in India, the researchers said. In addition, India's first state-of-the-art variable spot size laser optics without compromising on laser beam homogeneity for laser cladding and additive manufacturing process is available in this machine.

"Our study results show that if all the parts needed to make a metal printing machine could be manufactured indigenously, the cost of a metal 3D printing machine could be reduced by two to three times," said Dr. Ravi K. R., Associate Professor, Department of Metallurgical and Materials Engineering, IIT Jodhpur, in a statement. "Moreover, such an initiative would further strengthen the policy decisions of the Government of India under the 'Atmanirbhar Bharat' initiative," he added.

<https://www.thehansindia.com/featured/womenia/woman-entrepreneur-spreads-wings-in-aerospace-engineering-sector-744152?infinitescroll=1>

Explained: How Bird Strikes Take Planes Down

The Delhi-bound Spicejet aircraft from Patna had to make an emergency landing after a bird struck the engine and damaged three blades. Bird strikes, unfortunately, pose a real threat to passenger planes. Let's look at the statistics around birds that strike aircraft. A 2006 study on bird collisions conducted by the University of Nebraska showed that most strikes happen at an altitude lower than 500 feet. Almost 70 per cent of collisions happened during the initial stages of take-off or the final phase of landing and affected mostly the frontal aircraft regions like wings, jet engines and windshields. Collisions keep increasing. The number of bird collisions with aircraft has substantially increased. According to UK Civil Aviation Authority data on bird strikes, 1,835 confirmed hits were reported in 2016. In India, this number was 839, a DGCA report showed. Both these numbers were the highest in the five years from 2012 to 2016.

DRDO data has been gathered on bird strikes (for IAF from 2010-2018) and has been categorised as per the locations where the hits occurred. The strikes in the sanitised zone, where dedicated personnel are deployed to observe, report and scare away birds (runway area and approach path) were observed to be 25.46 per cent and hits outside the sanitised zone were found to be 13.97 per cent. The most strikes were revealed to be in unknown locations with 60.55 per cent. Most collisions take place during daylight when bird movement is particularly strong. Why do collisions occur? An International Civil Aviation Organization-backed 2014 study lists several reasons for bird strikes. Habitat features like open grass areas, water, etc. and the presence of shrubs and trees can act as bird attractants. Many airports have considerable grass areas within their perimeters. Landfills and waste disposal sites near airports can increase the influx of birds. Airport locations can also influence increased bird movement. Airports in coastal regions have much more uncontrolled bird activity than inland airports.

What happens in a bird strike? Certain bird strikes pose a serious threat to aircraft. Flight deck windshields are made of three layers of glass-faced acrylic. Between them, there is a thin urethane layer and each panel has an anti-fog and anti-ice system. While small birds are not a serious problem, the outer layers can suffer cracks if a heavy bird hits the aircraft. The presence of multiple layers ensures that the aircraft remains pressurised during bird collisions. The pilots are also trained to turn on window heating before takeoff, which makes windows softer and less fragile. Plane engines, however, are vulnerable to disruption in the movement of the rotatory blades when a bird hits the turbine and gets caught in the engine. This can damage blades and cause a partial or total engine failure. The good news is that plane engines are generally robust and can withstand some bird strikes. In case one engine is lost, the thrust from the remaining engines can be increased to limit the problem. Most aircraft can continue to fly even if one engine ceases to function. As of today, there is no solution to the problem of bird strikes. More research and analysis are required to come up with practical and cost-effective ways to tackle the challenge.

<https://www.deccanherald.com/specials/explained-how-bird-strikes-take-planes-down-1119800.html>

