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रक्षा विज्ञान पुस्तकालय
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हिन्दुस्तान

Thu, 07 Apr 2022

रक्षा वैज्ञानिक बनने वालों के लिए सुनहरा मौका, DRDO कराएगा 500 पीएचडी

डीआरडीओ रक्षा क्षेत्र में 500 पीएचडी कार्यक्रम शुरू करने जा रहा है। अभी सिर्फ सालाना 40 पीएचडी रक्षा से जुड़े मुद्दों पर होती हैं। इसे देश में रक्षा संबंधी अनुसंधान की दिशा में महत्वपूर्ण माना जा रहा। जो लोग रक्षा क्षेत्र में वैज्ञानिक बनकर अपना करियर बनाना चाहते हैं, उनके लिए एक अच्छी खबर है। रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) रक्षा क्षेत्र में 500 पीएचडी कार्यक्रम शुरू करने जा रहा है। अभी सिर्फ सालाना 40 पीएचडी रक्षा से जुड़े मुद्दों पर होती हैं। इसे देश में रक्षा संबंधी अनुसंधान को तेज करने की दिशा में महत्वपूर्ण कदम माना जा रहा है।

सरकार की कोशिश है कि ज्यादातर रक्षा तकनीकों का विकास देश में ही किया जाए। रक्षा मंत्रालय के सूत्रों के अनुसार, हाल में डीआरडीओ की तरफ से इस बाबत संसदीय समिति को यह जानकारी दी गई है। इसमें कहा गया है कि देश में रक्षा से जुड़े अनुसंधानों को बढ़ाने के लिए पीएचडी की संख्या को पांच सौ तक किया जाएगा। ये पीएचडी आईआईटी, अपनी प्रयोगशालाओं, विश्वविद्यालयों तथा इंजीनियरिंग कॉलेजों में शुरू की जाएंगी। समिति को यह भी बताया गया कि एमटेक इन डिफेंस टेक्नोलॉजीज कोर्स की शुरुआत 2021 में की गई है। अब तक 42 कॉलेजों में यह कोर्स शुरू हो चुका है तथा और कॉलेजों में शुरू कराने की कोशिश जारी है। डिफेंस टेक्नोलॉजीज में एमटेक करने वाले छात्रों को डिफेंस में पीएचडी करने के लिए भी प्रत्साहित किया जाएगा। बता दें कि देश में हर साल औसतन पांच हजार छात्र पीएचडी करते हैं लेकिन उनमें रक्षा जैसे विषयों पर पीएचडी की संख्या बेहद कम होती है। इसकी वजह संस्थानों में आवश्यक संसाधनों की कमी होना है।

डीआरडीओ के वैज्ञानिक बनेंगे प्रोफेसर रक्षा मंत्रालय की तरफ से जानकारी दी गई है कि विश्वविद्यालयों एवं कॉलेजों में डिफेंस से जुड़े कोर्स और पीएचडी शुरू करने के साथ ही डीआरडीओ के सेवानिवृत्त वैज्ञानिकों

को वहां बतौर प्रोफेसर नियुक्त किया जाएगा। इन लोगों के पास रक्षा क्षेत्र के लंबे अनुभव होते हैं, जो छात्रों के काम आएंगे।

https://www.livehindustan.com/national/story-golden-opportunity-for-those-who-become-defense-scientists-drdo-will-conduct-500-phds-6203243.html

The Indian EXPRESS

Thu, 07 Apr 2022

Security agencies to get indigenous equipment to counter Pak drones

Security agencies tasked with the protection of the Indo-Pak border areas, particularly in Punjab and J&K, will soon be equipped with indigenous anti-drone equipment developed by the Electronics and Radar Development Establishment (LRDE) of Defence Research and Development Organisation (DRDO) to deal with the drones, which are operated from within Pakistan and drop weapons and rugs in Indian territory.

Sources in the Ministry of Defence have informed that the counter drone system developed by DRDO was tested in Punjab region in 2020 and has been put through extensive trials since then. This equipment has a laser weapon which is effective till 1,000 metres range with other features, including a radio frequency jammer and a GPS jammer/spoofer.

"Orders have been placed in sufficient numbers for this anti-drone equipment that will be supplied to the stake holders dealing with border security by Bharat Electronics Limited (BEL)," said an official who did not want to be named. While the initial numbers may not be enough to meet the requirement, yet the usual suspect routes of ingress will be covered adequately.

"The entire border cannot be covered so the counter drone systems have to be placed based on intelligence inputs, past behaviour and the anticipated reaction in future," another official said.

An intra-departmental task force is also working on the aspects of counter drone measures, especially in Punjab and adjoining Jammu and Kashmir. The urgency in the matter stems not only from the frequent deliveries of arms and ammunition and drugs through drones discovered in Punjab but also the drone attack on Air Force Station in Jammu in June 2021.

A report of the Parliamentary Standing Committee on Home Affairs submitted last month has noted that, "Punjab has not drafted or articulated a separate police drone policy. However, specific area-based detection and neutralization of threats of drones are available and being improved upon. However, larger areas like borders remain a challenge. This is being done by physical patrolling and nakabandi by police which is backed by effective intelligence inputs".

The report has further stated that the state government of Punjab has informed the Committee that in recent past, the movement of drones from across the international border has increased significantly. Drones have been sighted over 133 times near international border in the last two years.

The first recorded delivery of arms/ammunition by drone was in August, 2019. “Similar drone sightings have also been observed in Jammu and Kashmir. Besides, there is no effective anti-drone technology available in the country. Number of public and private sector companies are involved in countering drone technologies. In this regard, Punjab is following the policy notified by Ministry of Civil Aviation, Centre,” the report notes.

Data available with the security agencies shows that the majority of drone sightings have been in Punjab in 2021 compared to Jammu and Kashmir. The BSF has reported 100 drone sightings along the International Border in Punjab, Rajasthan and J&K in 2021 and out of these 67 have been in Punjab, 24 in Jammu area, six in Rajasthan, two in Gujarat and one in Kashmir region.

In the absence of an affective counter-drone technology the BSF has been relying on firing at the drones sighted along the border though with little success of bringing them down. It is often claimed that the drones go back into Pakistani territory after being fired upon.

More than two years back, Army tried using anti-aircraft guns to bring down drones crossing over from Pakistan in areas falling under the Ferozepur Army Division but it was found that the air defence radars could not capture the small objects.

https://indianexpress.com/article/cities/chandigarh/security-agencies-to-get-indigenous-equipment-to-counter-pak-drones-7857119/

IDN INDIAN DEFENCE NEWS
Global Defence, Aerospace & Security

Thu, 07 Apr 2022

India, Israel hold bilateral workshop on Quantum technologies

The objective of the workshop was to deliberate on quantum technologies, evolve a joint quantum technology roadmap and plan for developing technologies by collaboration between both countries, a Defence Ministry statement said. The areas of discussion were around photonics-based quantum computing, sensing, encryption, quantum magnetometry, atomic clocks and free-space quantum communication. The collaborative research proposals discussed during the workshop will help in evolving technological solutions for various applications. Quantum technology has multiple applications ranging from scientific exploration to secured communication, gravimetry and navigation, etc.

The workshop was the next step of the Bilateral Innovation Agreement (BIA) signed between DRDO and Israel's Directorate of Defence Research and Development (DDR&D) in November 2021 to promote innovation and accelerated R&D in start-ups and MSMEs of both countries. The MoU was to promote the development efforts on various technologies including quantum technology by joint funding by DRDO and DDR&D. The technologies developed under BIA will be available to both countries for their domestic applications.

The workshop was attended by Indian and Israeli delegations consisting of academic experts, R&D professionals and Industry partners. A total of 175 experts and scientists from the Indian

Institute of Science (IISc), Tata Institute of Fundamental Research (TIFR), IIT Bombay, IIT Madras, IIT Kanpur, IIT Kharagpur, IIT Tirupati, Indian Institutes of Science Education and Research (IISER), Jaypee Institute of Information Technology (JPIT) Noida, Bharat Electronics Limited (BEL), The Centre for Development of Advanced Computing (CDAC), Centre for Development of Telematics (CDoT) and Department of Space participated in the workshop. Many start-ups and Micro, Small and Medium Enterprises (MSMEs) from the Indian industry participated and presented their work. From Israel, representatives of Israel's Ministry of Defence and delegates from Israel Aerospace Industries (IAI) also participated in the workshop discussions. The two-day workshop was inaugurated by Dr G Satheesh Reddy, Secretary, Department of Defence R&D and Chairman DRDO and Professor Rangan Banerjee, Director IIT Delhi on April 05, 2022.

http://www.indiandefensenews.in/2022/04/india-israel-hold-bilateral-workshop-on.html?m=1

DRDO On Twitter

Defence News

Defence Strategic: National/International

पत्र सूचना कार्यालय
भारत सरकार

रक्षा मंत्रालय

Wed, 06 Apr 2022 3:14 PM

रक्षा मंत्री श्री राजनाथ सिंह प्रमुख उपकरणों/प्लेटफॉर्मों की तीसरी सकारात्मक स्वदेशीकरण सूची कल जारी करेंगे

रक्षा मंत्रालय ने 'आत्मनिर्भर भारत' की सोच को प्राप्त करने के लिए एक और बड़े कदम के रूप में तीसरी सकारात्मक स्वदेशीकरण सूची जारी करने वाला है। रक्षा मंत्री श्री राजनाथ सिंह 7 अप्रैल, 2022 को नई दिल्ली में उन प्रमुख उपकरण/क्षेत्र वाली तीसरी सूची जारी करेंगे, जिनका दिसंबर 2025 तक पूरी तरह से स्वदेशीकरण किया जाना है।

101 वस्तुओं की पहली सूची और 108 वस्तुओं की दूसरी सूची के आधार पर तीसरी सूची को तैयार किया गया है। इन दोनों सूचियों को क्रमश: 21 अगस्त, 2020 और 31 मई, 2021 को जारी किया गया था। पहली सूची के प्रमुख मदों में 155 एमएंम/39 सीएएल अल्ट्रा-लाइट होवित्जर, हल्के लड़ाकू विमान (एलसीडब्ल्यू) एमके- आईए - उन्नत स्वदेशी सामग्री, पारंपरिक पनडुब्बी और संचार उपग्रह जीसैट-7सी शामिल हैं। वहीं, दूसरी सूची के प्रमुख वस्तुओं अगली पीढ़ी का युद्धपोत, भूमि आधारित एमआरएसएएम हथियार प्रणाली, स्मार्ट एंटी-फील्ड हथियार प्रणाली (एसएएडब्ल्यू) एमके-I, लड़ाकू विमानों के लिए ऑनबोर्ड ऑक्सीजन जनरेशन सिस्टम (ओबीओजीएस) आधारित एकीकृत जीवन समर्थन प्रणाली और टैंक के लिए 1000 हॉर्सपावर (एचपी) इंजन (टी-72) शामिल हैं।

तीसरी सूची में जटिल उपकरण और प्रणालियों सहित 100 से अधिक चीजें शामिल होंगी, जिनकी सूची तैयार की जा रही है और इन्हें अगले पांच वर्षों में फर्म ऑर्डर में रूपांतरित करने की संभावना है। तीसरी सूची में शामिल वस्तुओं के तहत अगले पांच वर्षों में उद्योग को 2,10,000 करोड़ रुपये से अधिक के ऑर्डर दिए जाने की संभावना है। इस अधिसूचना के साथ जटिल हथियार प्रणालियों से लेकर बख्तरबंद वाहनों,

लड़ाकू विमानों और पनडुब्बियों आदि जैसे महत्वपूर्ण प्लेटफार्मों तक 300 से अधिक परिष्कृत वस्तुओं को शामिल किया जाएगा।

प्राप्त की गई प्रगति

पहली और दूसरी सूची की अधिसूचना के बाद से सशस्त्र बलों ने 53,839 करोड़ रुपये की 31 परियोजनाओं के अनुबंध पर हस्ताक्षर किए हैं। वहीं, 1,77,258 करोड़ रुपये की 83 परियोजनाओं के लिए आवश्यकता स्वीकृति (एओएन) दी गई है। इसके अलावा अगले पांच-सात वर्षों में 2,93,741 करोड़ रुपये की परियोजनाओं को आगे बढ़ाया जाएगा।

'आत्मनिर्भर भारत' का विजन

तीसरी सूची की अधिसूचना रक्षा विनिर्माण के क्षेत्र में आत्मनिर्भरता प्राप्त करने की एक प्रमुख पहल है और घरेलू उद्योग में सरकार के इस बढ़ते विश्वास को दिखाता है कि वे सशस्त्र बलों की मांग को पूरा करने के लिए अंतरराष्ट्रीय मानकों के उपकरण का निर्माण और इसकी आपूर्ति कर सकते हैं। प्रधानमंत्री श्री नरेन्द्र मोदी की परिकल्पित 'आत्मनिर्भर भारत' का उद्देश्य अन्य देशों से आयात पर निर्भर रहे बिना एक संप्रभु राष्ट्र के लिए जरूरी निरंतर सुरक्षा प्राप्त करना है।

https://pib.gov.in/PressReleasePage.aspx?PRID=1814176

Press Information Bureau
Government of India

Ministry of Defence

Wed, 06 Apr 2022 3:14 PM

Raksha Mantri Shri Rajnath Singh to release third positive indigenisation list of major equipment/platforms tomorrow

In another major step to achieve 'Aatmanirbhar Bharat', Ministry of Defence is coming out with third positive indigenisation list. Raksha Mantri Shri Rajnath Singh will release, in New Delhi on April 07, 2022, the third list comprising major equipment/platforms, which are scheduled to be completely indigenised by December 2025.

This third list builds on the first list of 101 items and second list of 108 items that were promulgated on August 21, 2020 and May 31, 2021 respectively. The major items in the first list include 155mm/39 Cal Ultra-Light Howitzer, Light Combat Aircraft (LCA) Mk-IA – Enhanced Indigenised Content, Conventional Submarines and Communication Satellites GSAT-7C. The major items in the second list include Next Generation Corvette, Land Based MRSAM Weapon System, Smart Anti-Field Weapon System (SAAW) Mk-I, Onboard Oxygen Generation System

(OBOGS) based integrated life support system for fighter aircraft and 1000HP Engine for Tank (T-72).

The third list will consist of over 100 items, including complex equipment and systems which are being developed and likely to translate into firm orders over the next five years. Orders worth more than Rs 2,10,000 crore are likely to be placed on the Industry in the next five years as part of the items covered in the third list. With the notification, over 300 sophisticated items will be covered, ranging from complex weapon systems to critical platforms such as Armoured vehicles, combat aircraft, submarines etc.

Progress achieved

Since the notification of the first and second lists, contracts for 31 projects worth Rs 53,839 crore have been signed by the Armed Forces. Acceptance of Necessity (AoNs) for 83 projects worth Rs 1,77,258 crore have been accorded. In addition, cases worth Rs 2,93,741 crore will be progressed in the next five-seven years.

Vision of 'Aatmanirbhar Bharat'

The notification of the third list is a major initiative to achieve self-reliance in defence manufacturing and shows the growing confidence of the Government in the domestic industry that they can create and supply equipment of international standards to meet the demand of the Armed Forces. The aim of 'Aatmanirbhar Bharat' as envisioned by Prime Minister Shri Narendra Modi is to achieve sustained security, essential for a sovereign nation, without relying on imports from other countries. The objective is to build the domestic industry in order to make India a defence manufacturing hub which not only caters to the domestic needs, but also fulfils international requirements.

https://pib.gov.in/PressReleasePage.aspx?PRID=1814072

पत्र सूचना कार्यालय
भारत सरकार

रक्षा मंत्रालय

Wed, 06 Apr 2022 4:42 PM

रक्षा मंत्री ने वायुसेना कमांडरों के सम्मेलन को संबोधित किया

माननीय रक्षा मंत्री श्री राजनाथ सिंह ने आज नई दिल्ली स्थित वायु सेना मुख्यालय में वायु सेना कमांडरों के सम्मेलन (एएफसीसी) का उद्घाटन किया। इस सम्मेलन में माननीय रक्षा राज्य मंत्री श्री अजय भट्ट और रक्षा सचिव डॉ. अजय कुमार सहित भारतीय वायु सेना के वरिष्ठ कमांडरों ने हिस्सा लिया। वरिष्ठ कमांडरों के साथ बातचीत में रक्षा मंत्री ने कहा कि इस सम्मेलन में जिन विषयों पर चर्चा की गई, वे वर्तमान संदर्भ में प्रासंगिक और समकालीन हैं तथा राष्ट्र के सामने आने वाले मुद्दों/चुनौतियों को व्यापक रूप से कवर किया गया है। श्री राजनाथ सिंह ने बताया कि उन्हें यह देखकर प्रसन्नता हुई कि इस

सम्मेलन में उच्च प्राधिकारों की ओर से दिए गए निर्देशों पर व्यापक रूप से चर्चा की गई है और यह भविष्य के सभी कार्यों के लिए मार्गदर्शक का काम करेगा। उन्होंने उत्तरी और पश्चिमी सीमाओं की मौजूदा चुनौतियों के बारे में बात की। साथ ही, रक्षा मंत्री ने भारतीय सशस्त्र बलों के उभरती परिस्थितियों का जवाब देने में सक्षम होने पर अपनी संतुष्टि व्यक्त की।

माननीय रक्षा मंत्री ने ऑपरेशन गंगा, जिसकी पूरे देश ने सराहना की है, के तहत रूस-यूक्रेन युद्ध के चलते वहां फंसे भारतीयों को भारतीय वायु सेना द्वारा देश वापस लाने के प्रयास की प्रशंसा की। इसके अलावा उन्होंने कहा कि मौजूदा भू-राजनीतिक परिस्थिति ने फिर से स्वदेशीकरण की जरूरत को रेखांकित किया है।

रक्षा मंत्री के बाद वायु सेना प्रमुख एयर चीफ मार्शल वीआर चौधरी ने कमांडरों को संबोधित किया। उन्होंने कमांडरों से सभी चुनौतियों का सामना करने के लिए तैयार रहने और कम समय में कई कार्यक्षेत्र में जवाब देने की क्षमता बढ़ाने के लिए कहा। उन्होंने राष्ट्रीय सुरक्षा को बढ़ाने के लिए परिसंपत्तियों के संरक्षण, संसाधनों के बेहतर उपयोग और संयुक्त कौशल की जरूरत पर भी जोर दिया।

वृद्धिशील स्वदेशी ड्रोन उद्योग को बढ़ावा देने के लिए माननीय रक्षा मंत्री ने "मेहर बाबा प्रतियोगिता - II" को शुरू किया। इस प्रतियोगिता का उद्देश्य "विमान परिचालन सतहों पर बाह्य वस्तुओं का पता लगाने के लिए समूह ड्रोन आधारित प्रणाली" के लिए प्रौद्योगिकी विकसित करना है।

इस तीन दिवसीय सम्मेलन के दौरान वायु सेना के कमांडर उच्च प्रौद्योगिकी और इवाल्विंग परिचालन परिदृश्य में भविष्य की चुनौतियों से संबंधित महत्वपूर्ण मुद्दों पर चर्चा करेंगे। इसके अलावा इसमें ड्रोन से उत्पन्न खतरों से निपटने पर भी विचार-विमर्श किया जाएगा।

https://pib.gov.in/PressReleasePage.aspx?PRID=1814231

Press Information Bureau
Government of India

Ministry of Defence

Wed, 06 Apr 2022 4:42 PM

Raksha Mantri addresses IAF commanders' conference

The Hon'ble Raksha Mantri (RM), Shri Rajnath Singh, inaugurated the Air Force Commanders' Conference (AFCC) at Air Headquarters in New Delhi today. The conference was attended by Hon'ble Raksha Rajya Mantri, Shri Ajay Bhatt and Defence Secretary Dr Ajay Kumar, along with senior commanders of the Indian Air Force. Speaking to the senior commanders, the RM stated that the topics being discussed in AFCC were relevant and contemporary in the-present context, and covered the entire canvas of issues/ challenges that are

being faced by the Nation. He brought out that he was happy to observe that the directions given by higher authorities were comprehensively being discussed in the conference and would be the guiding light for all future courses of action. He covered the challenges being faced on the Northern and Western borders and expressed his satisfaction in the way Indian Armed Forces have been able to respond to emerging situations.

The Hon'ble RM praised the Indian Air Force's evacuation effort in Operation Ganga which has been appreciated by the Country. He brought out that the current geopolitical situation has again highlighted the need for indigenisation. The Chief of the Air Staff, Air Chief Marshal VR Chaudhari, subsequently addressed the commanders and asked them to be ready to meet all challenges and enhance capabilities for responding in multiple domains at short notice. He also emphasised the need for conserving assets, optimally utilising resources and the need for jointmanship to enhance National Security.

To provide a boost to the growing indigenous drone industry, Hon'ble Raksha Mantri launched the "MEHAR BABA COMPETITION - II". The competition is aimed at developing technology for a "Swarm Drone based system to detect Foreign Objects on Aircraft Operating Surfaces". During the three-day conference, the Air Force Commanders will discuss important issues related to future challenges in a Hi-tech and evolving operational scenario. The theme for this Conference is 'Optimising human resources' and the focus will be on conduct of operations in a smart and efficient manner. Mitigation of threats posed by drones will also be brainstormed during the conference.

https://pib.gov.in/PressReleasePage.aspx?PRID=1814124

पत्र सूचना कार्यालय
भारत सरकार

रक्षा मंत्रालय

Wed, 06 Apr 2022 4:56 PM

भारत और किर्गिस्तान के बीच संयुक्त विशेष बल अभ्यास बकलोह (हिमाचल प्रदेश) में संपन्न

भारत और किर्गिस्तान के बीच संयुक्त विशेष बल अभ्यास का 9वां संस्करण 06 अप्रैल 2022 को समाप्त हो गया। यह संयुक्त अभ्यास विशेष बल प्रशिक्षण स्कूल, बकलोह (हिमाचल प्रदेश) में 25 मार्च 2022 को शुरू हुआ था। पिछले दो हफ्तों में, भारत और किर्गिस्तान के विशेष बलों की टुकड़ियों ने संघर्ष के पूरे स्पेक्ट्रम में मौजूदा और आकस्मिक खतरों का मुकाबला करने के लिए अपनी विशेषज्ञता, तकनीकों और युद्ध कौशल की बेहतरीन कार्य प्रणालियों को साझा किया। अभ्यास के दौरान कॉम्बेट शूटिंग, स्निपिंग, पहाड़ों में जीवित बचने, बंधक होने पर बचाव और निहत्थे युद्ध का व्यापक अभ्यास किया।

भाग लेने वाले विशेष बलों की टुकड़ियों के बीच विशेष कौशल और तकनीकों को साझा करने के अलावा, संयुक्त प्रशिक्षण ने भारत और किर्गिस्तान के बीच मौजूदा रिश्तों को और मजबूत किया है। इससे पिछले कुछ वर्षों में दोनों देशों के बीच रणनीतिक स्वायत्तता, लोकतांत्रिक मूल्यों और आतंकवाद को किसी भी कीमत पर बर्दाश्त नहीं करने के लिए पारस्परिक सम्मान को बढ़ावा मिला है।

https://pib.gov.in/PressReleasePage.aspx?PRID=1814182

Press Information Bureau
Government of India

Ministry of Defence

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INDIA – Kyrgyzstan joint special forces exercise concludes at Bakloh (HP)

The 9th Edition of the India – Kyrgyzstan Joint Special Forces Exercise which commenced on 25 Mar 2022 at Special Forces Training School, Bakloh (HP) culminated on 06 April 2022. Over the past two weeks, Special Forces contingents from India and Kyrgyzstan shared their expertise and best practices of tactics, techniques and procedures to counter existing and emergent threats across the entire spectrum of conflict. Combat shooting, sniping, survival in mountains, hostage rescue drills and unarmed combat were practiced extensively during the Exercise.

Besides sharing special skills and techniques between participating Special Forces contingents, the joint training further strengthened the existing bond between India and Kyrgyzstan that has fostered over years of mutual respect for strategic autonomy, democratic values and zero tolerance for terrorism.

https://pib.gov.in/PressReleasePage.aspx?PRID=1814128

पत्र सूचना कार्यालय
भारत सरकार

रक्षा मंत्रालय

Wed, 06 Apr 2022 4:56 PM

क्वांटम प्रौद्योगिकी पर भारत-इजरायल द्विपक्षीय कार्यशाला संपन्न हुई

रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) और डीआरडीओ इंडस्ट्री एकेडेमिया सेंटर ऑफ एक्सीलेंस (डीआईए-सीओई) तथा आईआईटी दिल्ली द्वारा क्वांटम प्रौद्योगिकी (आई2क्यूटी-2022) पर

आयोजित दो दिवसीय भारत-इजरायल द्विपक्षीय कार्यशाला 06 अप्रैल 2022 को नई दिल्ली में संपन्न हुई। इस कार्यशाला का उद्देश्य क्वांटम प्रौद्योगिकियों पर विचार-विमर्श करना, एक संयुक्त क्वांटम प्रौद्योगिकी रोडमैप विकसित करना और दोनों देशों के बीच सहयोग से प्रौद्योगिकियों के विकास की विस्तृत योजना तैयार करना था। नीति आयोग के सदस्य डॉ. वी. के. सारस्वत की अध्यक्षता में कार्यक्रम के समापन सत्र को भविष्य के रोडमैप और सहयोग के विशिष्ट क्षेत्रों को विकसित करने के लिए विचार-मंथन सत्र के रूप में आयोजित किया गया था। यह कार्यशाला क्वांटम प्रौद्योगिकियों के क्षेत्र में अनुसंधान की गति बढ़ाने के लिए अनुसंधान समुदाय को एक साथ लाने की दिशा में एक महत्वपूर्ण कदम है।

कार्यशाला नवंबर 2021 में भारतीय डीआरडीओ और रक्षा अनुसंधान एवं विकास निदेशालय (डीडीआर&डी) तथा इजरायल के बीच हस्ताक्षरित द्विपक्षीय नवाचार समझौते (बीआईए) का अगला चरण थी, ताकि दोनों देशों के स्टार्टअप्स व एमएसएमई क्षेत्र में नवाचार और त्वरित अनुसंधान एवं विकास को बढ़ावा दिया जा सके। समझौता ज्ञापन डीआरडीओ, भारतीय रक्षा अनुसंधान एवं विकास निदेशालय (डीडीआरएंडडी) और इजरायल द्वारा संयुक्त रूप से वित्त पोषित क्वांटम प्रौद्योगिकी सहित विभिन्न प्रौद्योगिकियों पर विकास के प्रयासों को और आगे ले जाना था। बीआईए के तहत विकसित प्रौद्योगिकियां दोनों देशों को उनके घरेलू अनुप्रयोगों के लिए भी उपलब्ध होंगी।

कार्यशाला में अकादमिक विशेषज्ञों, अनुसंधान एवं विकास पेशेवरों और उद्योग भागीदारों के साथ भारतीय तथा इजरायली प्रतिनिधिमंडल ने भाग लिया। भारतीय विज्ञान संस्थान (आईआईएस), टाटा इंस्टीट्यूट ऑफ फंडामेंटल रिसर्च (टीआईएफआर), आईआईटी बॉम्बे, आईआईटी मद्रास, आईआईटी कानपुर, आईआईटी खड़गपुर, आईआईटी तिरुपति, भारतीय विज्ञान शिक्षा एवं अनुसंधान संस्थान (आईआईएसईआर), जेपी सूचना प्रौद्योगिकी संस्थान (जेपीआईटी) नोएडा, भारत इलेक्ट्रॉनिक्स लिमिटेड (बीईएल), द सेंटर फॉर डेवलपमेंट ऑफ एडवांस्ड कंप्यूटिंग (सीडीएसी), सेंटर फॉर डेवलपमेंट ऑफ टेलीमेटिक्स (सीडीओटी) और अंतरिक्ष विभाग के कुल 175 विशेषज्ञ तथा वैज्ञानिक इस कार्यशाला में शामिल हुए।

भारतीय उद्योग जगत के कई स्टार्टअप्स और एमएसएमई ने इस कार्यशाला में हिस्सा लिया और अपने कामकाज के बारे में जानकारी साझा की। इजरायल की तरफ से इजरायली रक्षा मंत्रालय के प्रतिनिधियों तथा इजरायल की एयरोस्पेस इंडस्ट्रीज (आईएआई) के प्रतिनिधियों ने भी कार्यशाला की चर्चा में भाग लिया। इस दो दिवसीय कार्यशाला में चिन्हित किये गये प्रौद्योगिकी क्षेत्रों में कई तकनीकी सत्र आयोजित हुए। चर्चा के मुख्य बिंदु फोटोनिक्स-आधारित क्वांटम कंप्यूटिंग, सेंसिंग, एन्क्रिप्शन, क्वांटम मैग्नेटोमेट्री, परमाणु घड़ियां और फ्री स्पेस क्वांटम संचार के आसपास केंद्रित थे। कार्यशाला के दौरान चर्चा में शामिल किए गए सहयोगी अनुसंधान प्रस्तावों से विभिन्न अनुप्रयोगों के लिए तकनीकी समाधान विकसित करने में मदद मिलेगी। क्वांटम तकनीक में वैज्ञानिक अन्वेषण से लेकर सुरक्षित संचार, गुरुत्वाकर्षण और नेविगेशन आदि तक के कई अनुप्रयोग शामिल हैं। दो दिवसीय कार्यशाला का उद्घाटन

05 अप्रैल, 2022 को रक्षा अनुसंधान एवं विकास विभाग के सचिव और डीआरडीओ के अध्यक्ष डॉ. जी. सतीश रेड्डी तथा आईआईटी दिल्ली के निदेशक प्रोफेसर रंगन बनर्जी ने किया था।

https://pib.gov.in/PressReleasePage.aspx?PRID=1814266

THE HINDU

Wed, 06 Apr 2022

HAL ties up with IAI of Israel to convert passenger aircraft into mid-air refuellers

In a significant development, Hindustan Aeronautics Limited (HAL) and Israel Aerospace Industries (IAI) have entered into a Memorandum of Understanding (MoU) to convert civil passenger aircraft to Multi Mission Tanker Transport (MMTT) aircraft in India. The Indian Air Force (IAF) has been looking to procure new mid-air refuellers for sometime.

"Under the pact signed recently, HAL will convert pre-owned civil (passenger) aircraft into air refueling aircraft with cargo and transport capabilities. The move will provide India's defence ecosystem with new capabilities and cost effective solutions in the market," HAL said in a statement. The scope of the MoU also covers "passenger to freighter aircraft" conversion along with MMTT conversions, it stated. A defence official said the aircraft likely to be converted was a Boeing 767 passenger jet.

'Long-standing partner'

"We are glad to join hands with our long-standing partner IAI in this venture of MMTT conversion business, which is one of the strategic diversification avenues identified by HAL," R. Madhavan, Chief Managing Director HAL, said.

The IAF presently has six Russian IL-78 tankers and has been looking to procure six new aircraft for sometime, but the deal has been repeatedly delayed. It has been looking to reissue the tender but the financial crunch had made it rethink the acquisition. To meet requirements in the interim, it has been looking at leasing some mid-air refuellers, an option introduced in the Defence Acquisition Procedure 2020. Mid-air refuelling significantly enhances the range and payload of fighter jets. It also allows the aircraft to stay in the air much beyond their normal limits allowing better exploitation of the platforms capabilities.

As reported by *The Hindu* earlier, IAF officials had stated that broadly wet lease of platforms could be used for peacetime use and dry leasing to cater to operational requirements. In wet lease, the platforms have to be maintained by the company supplying them, be it the original equipment manufacturer or the aggregator. On Thursday, Defence Minister Rajnath Singh is all set to release the third positive indigenisation list, the items in which cannot be imported by the Services. The earlier lists have barred imports of 209 major platforms and systems.

Workshop on Quantum Technologies

In a separate development, a two-day Indo-Israel bilateral workshop on Quantum Technologies organised by Defence Research and Development Organisation (DRDO) and IIT Delhi

concluded. The objective of the workshop was to deliberate on quantum technologies, evolve a joint quantum technology road map and plan for developing technologies by collaboration between both the countries, the DRDO said in a statement. The workshop was the next step of the Bilateral Innovation Agreement (BIA) signed between the DRDO and the Directorate of Defense Research & Development, Israel, in November 2021 to promote innovation and accelerated research and development in start-ups and MSMEs of both countries.

https://www.thehindu.com/news/national/hal-ties-up-with-iai-of-israel-to-convert-passenger-aircraft-into-mid-air-refuellers/article65296877.ece

Hindustan Times

Wed, 06 Apr 2022

US F-18 fighters to be tested for INS Vikrant at Goa on May 21

US defence major Boeing will be sending two F-18 Super Hornet fighters next month for the Indian Navy to conduct flight trials at INS Hansa's shore-based test facility in Goa for consideration as the main weapon on India's new aircraft carrier INS Vikrant. Still called as indigenous aircraft carrier-1 (IAC-1), the warship is going to be commissioned on August 15, 2022, the 75th year of Indian independence, by Prime Minister Narendra Modi. According to information available from New Delhi and Washington, the flight trials of the F-18 carrier capable fighter on the mockup 928 feet deck of India's sole aircraft carrier INS Vikramaditya are expected around May 21. This date may depend on the availability of mid-air refuelling tankers with Boeing to fly the F-18s to Goa.

While INS Vikramaditya is soon to be joining duties after more than a yearlong overhaul and maintenance, the IAC-1 or INS Vikrant is under exhaustive sea trials and will be in action later this year with MiG-29K fighters on board for the time being. The other fighter considered for INS Vikrant and Vikramaditya is Rafale-M, which was tested by the Indian Navy this January at the same facility in Goa with good results. The Indian Navy as of now has plans to buy 26 fighters on a government-to-government basis as the ADA designed indigenous twin-engine deck-based fighter may be ready for trials by the end of this decade With China building its third aircraft carrier indigenously, India needs a minimum of two aircraft carriers to project dominance in the Indo-Pacific along with other QUAD partners. The Indian plan is to station one carrier group each on the western and eastern seaboard with forward deployment capability in Andamans and Nicobar Islands.

The highly capable and versatile F-18 Super Hornet can fit into both elevators of IAC-1 with folded wings. A maximum of eight two-seater F-18 fighters are capable of launching from the deck of both Vikrant or Vikramaditya unlike Rafale-M two-seaters, which can only operate from shore-based facility and thus losing one-third of its combat capacity. This means while F-18 twin-seater fighters can be launched from carrier deck during war, the twin-seater Rafale-M fighters can only be launched from the shore. Although the two aerial platforms under consideration of the Indian Navy can carry massive weapon loads, long-range air to air missiles and air to ground weapons, the F/A-18 Hornet can carry up to four anti-submarine missiles as

compared to one by the Rafale-M fighter. Both are proven 4.5 generation fighters with F-18 having a huge successful history of combat over high seas and land.

https://www.hindustantimes.com/india-news/us-f-18-fighters-to-be-tested-for-ins-vikrant-at-goa-on-may-21-101649214644477.html

THE ECONOMIC TIMES

Wed, 06 Apr 2022

BrahMos deal with Philippines widens scope in aerospace, Navy, says envoy

The Brahmos deal is truly a transformational moment in India-Philippines ties and has widened the scope of bilateral defence cooperation that would cover cyber security, space-based applications and new technologies. The defence deal accrues to the similarity and opportunities in the larger context of India-Philippines' existing bilateral ties, Indian envoy to Manila Shambhu Kumaran said at a session organised by Ananta Aspen Centre, India's leading public policy body.

Cybersecurity, space-based applications and new technologies that help in development as well as national security could all be very important areas of future cooperation between the two countries, Kumaran said, adding, negotiations are going on various issues related to defence. There is a degree of interest in aerospace and potential for naval sector systems in the Philippines, Kumaran further noted. "India is looking forward to a sustainable capability enhancement and far deeper military-to-military engagements with the Philippines." The Philippines is a rapidly developing economy with a growth rate of about 5-6 per cent in the last decade. The economic relationship is broadly the driver of India-Philippines ties. The Indian envoy pointed out the Philippines could be a trillion-dollar economy by 2030 as per a report by a think tank. In terms of larger policy approaches, the Philippines under President Duterte has developed an independent foreign policy. It seeks to diversify its relationship and broad base them and carve out a key new partnership. Similarly, India through its Act East Policy finds the Philippines in tandem with its Indo-Pacific approach. India is the largest supplier of pharmaceuticals to the Philippines, Kumaran noted. The Philippines is India's largest pharma market in ASEAN. That amounts to USD 300 million in pharma exports in the Philippines.

India's vaccine capability and larger healthcare segments such as medical devices and healthcare services are of immense significance to the Philippines, Kumaran said. Almost all major Indian IT companies have a branch or a subsidiary in the Philippines. There are 150,000 to 250,000 jobs created by these IT companies in the Philippines. Wipro is one of the largest IT recruiters in the country. India's digital governance model is well accepted in the Philippines. Some of the key projects in the Philippines such as the National ID Project are also implemented by an Indian IT Company as the main system integrator. There are also talks of providing additional soft loans to the Philippines such as through Exim Bank Lines of Credit, according to Kumaran.

https://m.economictimes.com/news/defence/brahmos-deal-with-philippines-widens-scope-in-aerospace-navy-says-envoy/amp_articleshow/90693045.cms

Defense News

Wed, 06 Apr 2022

NATO unveils tech accelerator footprint, with plans for over 60 sites

NATO is set to establish a new trans-Atlantic initiative meant to speed up the development of critical technologies, with one Euro-centric headquarters stationed in London and more than 60 partner sites around its alliance. Last summer at the 31st annual NATO Summit in Brussels, Secretary General Jens Stoltenberg announced plans to establish the Defence Innovation Accelerator of the North Atlantic, or DIANA, based on the U.S. Defense Advanced Research Projects Agency.

Nearly a year later, NATO's foreign ministers are ready to approve a formal charter for DIANA and commit to providing an initial €1 billion (U.S. $1.1 billion) innovation fund. The ministers will approve DIANA's charter during their April 6-7 meeting in Brussels, Stoltenberg said April 5 during a pre-ministerial press briefing. The initiative comes with more than 60 innovation sites. That includes a headquarters in Europe and another in North America, about 10 "accelerator sites" that provide financing, mentorship and exposure to business opportunities to participating startups, and more than 50 dedicated test centers hosting labs and equipment.

"Altogether, the initial footprint will cover 20 NATO nations, representing a true trans-Atlantic endeavor, and we expect it will continue to expand in the future," Stoltenberg said. The technology accelerator will be a new NATO body, tasked to bring innovative civilian and military organizations closer together to develop cutting-edge solutions in the realms of emerging and disruptive technologies, said David van Weel, NATO assistant secretary general for emerging security challenges.

The plan is for allies to agree upon a new strategic direction every two years, which will then dictate critical defense and security problems as well as the desired solutions. "This provides strong signals of market demand and opportunity for innovators," van Weel said at a Tuesday press briefing. From there, startups, academic institutions and nontraditional industry members can participate in so-called challenge programs that work to solve real-world problems — such as operating in a GPS-denied environment — and submit proposals to participate in DIANA's accelerator effort.

Member nations submitted proposals for more than 90 institutions to be part of the DIANA footprint; after evaluations, NATO pared it down to more than 10 accelerator sites and over 50 test centers, with many already in existence, van Weel said.

Among those selected sites are the Niels Bohr Institute at the University of Copenhagen in Denmark, which will focus on quantum technologies, and a new site in Turin, Italy, which will be dedicated to the space domain. Imperial College London will host the European headquarters along with a DIANA accelerator, in a space currently housing the U.K.'s Defence and Security Accelerator, according to the British government. The U.K.'s program will be "twinned" with a new accelerator based in Tallinn, Estonia, to help share expertise, test cyber innovations and explore the viability of "virtual sites" to trial new tech such as autonomous vehicles.

“The UK and Estonia are two of the most innovative countries in NATO, and our hosting of DIANA will harness that innovation for the benefit of all allies tackling future military threats,” British Defence Secretary Ben Wallace said in a news release. While the centers on the European side have all been selected, the North American footprint will be announced at the NATO Summit in June in Madrid, Spain. The goal is to have DIANA reach its full operational capability by 2025, said van Weel.

Alongside the tech accelerator is a nascent venture capital fund, dubbed the NATO Innovation Fund. “Ultimately, reimagining NATO’s engagement with civilian innovators is only credible if we also provide the right funding mechanisms,” van Weel noted. Twenty-one members worked together to establish the underlying framework of the fund — outlining the investment strategy, the pool of capital, and determining the fund’s structure and governance. They also provided initial financial support. The Innovation Fund will invest €1 billion into “deep-tech startups” over 15 years. These are public funds that participating nations can allocate, either from their existing defense budgets or established innovation funds, a senior NATO official said Tuesday.

The participating nations in DIANA’s innovation fund currently include Belgium, the Czech Republic, Denmark, Estonia, Germany, Greece, Hungary, Italy, Latvia, Lithuania, Luxembourg, Montenegro, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Turkey and the United Kingdom.

Other member nations can decide to contribute to the Innovation Fund at a later date, but they would have no say over its framework, the NATO official said.

A key aspect of DIANA will be to support NATO’s work in harnessing critical technology areas known as emerging and disruptive technologies, or EDT. The alliance recently identified propulsion and new materials as two new EDTs the deserve attention, joining artificial intelligence, autonomy, big-data processing, quantum-enabled technologies, biotechnology, hypersonic technology and space-related systems. NATO has released public strategies for several of these EDTs — for space, AI and big-data processing. The alliance’s strategy on autonomy is expected to be released this year, and one on quantum-enabled technologies will come the following year, the official said.

https://www.defensenews.com/global/europe/2022/04/06/nato-unveils-tech-accelerator-footprint-with-plans-for-over-60-sites/

Press Information Bureau
Government of India

Ministry of Science & Technology

Wed, 06 Apr 2022 4:56 PM

Climate & policy experts discuss the seriousness of climate impact on South Asia & adaptation and mitigation steps need for it

Climate and policy experts discussed the seriousness of climate impact on South Asia as highlighted in the IPCC report, and the adaptation and mitigation steps that need to be taken under the current scenario along with necessities for climate finance, net-zero emission, sustainable lifestyle at a panel discussion titled 'The IPCC Report 2022: Is it Code Red for South Asia?'.Dr Akhilesh Gupta, Senior Adviser, Department of Science and Technology, Govt of India, reiterated India's commitment towards serious mitigation and adaptation measures to achieve net-zero by 2070 while maintaining the human development index.

Dr Gupta highlighted the DST's efforts to understand the quantum of present and future f impacts of climate change through studies like the district level vulnerability assessment as well as disaster risk assessment. "The assessment will help in initiating appropriate climate actions. It will also benefit climate-vulnerable communities across India through the development of better-designed climate change adaptation projects," he pointed out at the online webinar. "We need to work together to meet those challenges whether in local level or global level with our collective wisdom," he added and underlined that climate funding by developed countries to developing and underdeveloped countries are not up to the mark.

The panel discussion on the recently released sixth assessment report was organized by the AIT School of Environment, Resource and Development (SERD) and moderated by Dr Anamika Barua, Visiting Faculty, SERD, AIT and attended by several students from different parts of South Asia. Dr Eden Woon, President, Asian Institute of Technology (AIT), Bangkok, said that climate change is changing quicker than expected and indicated the need for a proper road map and immediate action. "As climate change is a serious issue, which has an impact on every element of the earth, the role of policymakers is crucial, and the formulation of action should range from local level to global level," he added. "The IPCC report shows that there is a need for a paradigm shift of climate mitigation by putting people at the centre and aiming towards sustainable development," said Prof Joyshree Roy, Bangabandhu Chair Professor at AIT, Bangkok and Coordinating lead author of WGIII report of the IPCC Sixth Assessment cycle while speaking about mitigation options to be adapted in various development activities to reduce the emission.

Mr Saad Hayat Tamman, Prime Minister's Office, Pakistan, highlighted the need for regional-level adaptation and mitigation efforts and said that South Asia needs capital finance to tackle the problem. Mr. Sanjay Bhowmik, MoEF, Bangladesh, elaborated on Bangladesh's climate strategy plan, which prioritises local adaptation to address climate change, while Dr. Fida Mallik, CEGIS, Bangladesh, highlighted issues like sea-level rise, city heat, and urban burden in Bangladesh and the urgency for putting science into action. Dr Abid Hussain, ICIMOD, Nepal, stressed on the vulnerability of the mountains, the increasing impacts like loss of glaciers, change in timing of seasons as well as socio-economic changes. Dr. Arun Prakash Bhatta, Under Secretary, MoFE, Nepal, emphasized the need for immediate implementation of the National Framework on Local Adaptation Plans for Action (LAPA) through the participation of people.

"The impact on South Asia is serious. This will impact both urban and rural areas and their livelihood. Cities in particular also have an impact on climate, and hence cities need to come up with action plan and act with urgency," Dr. Anjal Prakash, Indian School of Business (ISB), Hyderabad and coordinating lead author for the IPCC special report on the ocean and cryosphere in a changing climate (SROCC) pointed out. The sixth assessment report highlights that increased heatwaves, droughts, and floods are already exceeding plants' and animals' tolerance thresholds, driving mass mortalities in species such as trees and corals. These weather extremes are occurring simultaneously, causing cascading impacts that are increasingly difficult to manage. They have exposed millions of people to acute food and water insecurity, especially in Africa, Asia, Central, and South America, on Small Islands, and in the Arctic.

To avoid mounting loss of life, biodiversity, and infrastructure, ambitious, accelerated action is required to adapt to climate change, at the same time as making rapid, deep cuts in greenhouse gas emissions. So far, progress on adaptation is uneven, and there are increasing gaps between action taken and what is needed to deal with the increasing risks, the new report stressed.

https://pib.gov.in/PressReleasePage.aspx?PRID=1814129

Wed, 06 Apr 2022

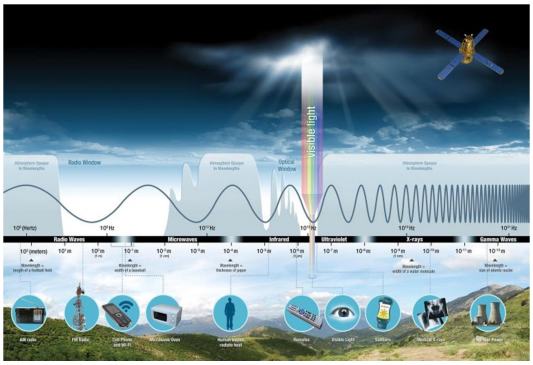
NASA Uses Reflected Moonlight to Improve Satellite Accuracy

NASA's airborne Lunar Spectral Irradiance, or air-LUSI, flew aboard NASA's ER-2 aircraft from March 12 to 16 to accurately measure the amount of light reflected off the Moon. Reflected moonlight is a steady source of light that researchers are taking advantage of to improve the accuracy and consistency of measurements among Earth-observing satellites.

"The Moon is extremely stable and not influenced by factors on Earth like climate to any large degree. It becomes a very good calibration reference, an independent benchmark, by which we can set our instruments and see what's happening with our planet," said air-LUSI's principal investigator, Kevin Turpie, a research professor at the University of Maryland, College Park. The air-LUSI flights are part of NASA's comprehensive satellite calibration and validation efforts.

The results will compliment ground-based sites such as Railroad Valley Playa in Nevada, and together will provide orbiting satellites with a robust calibration dataset.

NASA has more than 20 Earth-observing satellites that give researchers a global perspective on the interconnected Earth system. Many of them measure light waves reflected, scattered, absorbed, or emitted by Earth's surface, water and atmosphere. This light includes visible light, which humans see, as well as invisible ultraviolet and infrared wavelengths, and everything in between. Like musical instruments in an orchestra, the individual satellite instruments need to be "in tune" with each other in order for researchers to get the most out of their data. By using the Moon as a "tuning fork," scientists can more easily compare data from different satellites to look at global changes over long periods of time.



This electromagnetic spectrum shows how energy travels in waves; Humans can only see visible light, but the entire spectrum is used by NASA instruments to observe Earth and more. Credit: NASA

That's where air-LUSI comes in. Developed in partnership with the National Institute of Standards and Technology (NIST), U.S. Geological Survey and McMaster University, air-LUSI is a telescope that measures how much light is reflected off the lunar surface to assess the amount of energy Earth-observing satellites receive from moonlight. It was mounted aboard the ER-2 aircraft managed by and flying out of NASA's Armstrong Flight Research Center in Palmdale, California. The ER-2 is a high-altitude aircraft that flew at 70,000 feet, above 95% of the atmosphere, which can scatter or absorb the reflected sunlight. This allowed air-LUSI to collect very accurate, NIST traceable measurements that are analogous to those a satellite would make from orbit. In order to improve the accuracy of lunar reflectance models, air-LUSI measurements are accurate with less than 1% uncertainty. During the March flights, air-LUSI measured the Moon for four nights just before a full Moon.

This airborne approach has the advantage of studying moonlight during different phases of the Moon while being able to bring the instrument back between flights for evaluation, maintenance, and, if necessary, repair.

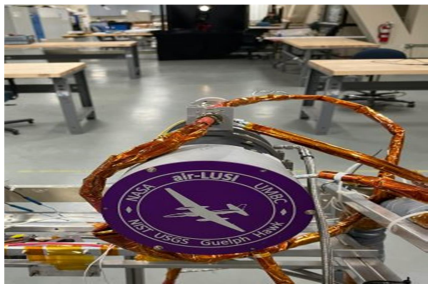


Figure Shown is the air-LUSI telescope positioned to measure a simulated Moon in a laboratory for testing and calibration before and after the flight campaign. Credit: Kevin Turpie

Making Improvements for Better Accuracy

The air-LUSI spectrometer is hermetically sealed within an enclosure that keeps the instrument constantly at sea level temperature and pressure. Light collected by a telescope enters an integrating sphere which directs the light to the spectrometer, which is an instrument that measures variances of light waves. The air-LUSI first flew in similar flights in November 2019. Since then, the air-LUSI team has continued to improve the instrument's accuracy.

The team improved the internal monitor so they can better check instrument accuracy over a greater range of wavelengths, from the ultraviolet to the near infrared. They were also able to redesign the integrating sphere to remove small effects of changing temperature. "This will help

the instrument make measurements with the more than 99% accuracy levels we're looking for," said Turpie.

Making these changes was challenging. Delays from the COVID-19 pandemic caused the chief engineer, who was working on the instrument updates and repairs, to develop a new remote work plan. Both he and the principal investigator received special permission to have parts delivered directly to their homes so they could work on the instrument and be prepared for the 2022 flights.

Using the Moon as a Common Standard

The data from 2019 and 2022 together has the potential to assist scientists in making Earth-observing satellite data in the ultraviolet to near-infrared range more consistent. In addition, the common Moon standard would make it easier to compare and fine-tune current and future satellite observations. NASA's upcoming Plankton, Aerosol, Cloud, ocean Ecosystem (PACE) mission is planning on using the Moon as a common benchmark to make its observations more accurate and inter-consistent with other satellite measurements of Earth. Over the next decade, PACE and the future orbiting sensors of NASA's Earth System Observatory will help create a more cohesive picture of our planet.

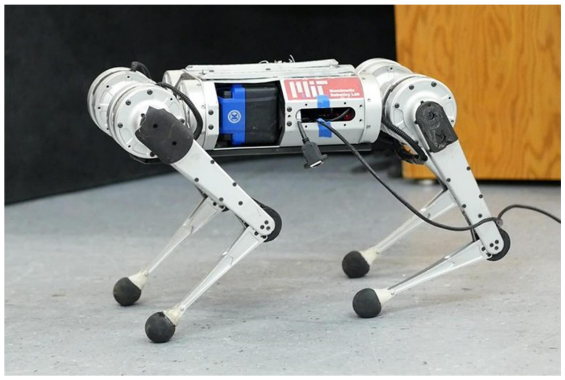
"Having a common calibration source outside of the Earth will help us reach this objective," said Turpie. "Once air-LUSI measurements are used to improve the accuracy of the total amount of light coming from the Moon, we can take extensively more accurate measurements of Earth using current and future space-borne observatories."

https://scitechdaily.com/nasa-uses-reflected-moonlight-to-improve-satellite-accuracy/

Thu, 07 Apr 2022

How the MIT Mini Cheetah Robot Learns To Run Entirely by Trial and Error

CSAIL scientists came up with a learning pipeline for the four-legged robot that learns to run entirely by trial and error in simulation. It's been roughly 23 years since one of the first robotic animals trotted on the scene, defying classical notions of our cuddly four-legged friends. Since then, a barrage of the walking, dancing, and door-opening machines have commanded their presence, a sleek mixture of batteries, sensors, metal, and motors. Missing from the list of cardio activities was one both loved and loathed by humans (depending on whom you ask), and which proved slightly trickier



MIT's mini cheetah, using a model-free reinforcement learning system, broke the record for the fastest run recorded. Credit: Photo courtesy of MIT CSAIL

for the bots: learning to run.

Researchers from MIT's Improbable AI Lab, part of the Computer Science and Artificial Intelligence Laboratory (CSAIL) and directed by MIT Assistant Professor Pulkit Agrawal, as well as the Institute of AI and Fundamental Interactions (IAIFI) have been working on fast-paced strides for a robotic mini cheetah — and their model-free reinforcement learning system broke the record for the fastest run recorded. Here, MIT PhD student Gabriel Margolis and IAIFI postdoc Ge Yang discuss just how fast the cheetah can run.

We've seen videos of robots running before. Why is running harder than walking?

Achieving fast running requires pushing the hardware to its limits, for example by operating near the maximum torque output of motors. In such conditions, the robot dynamics are hard to analytically model. The robot needs to respond quickly to changes in the environment, such as the moment it encounters ice while running on grass. If the robot is walking, it is moving slowly and the presence of snow is not typically an issue. Imagine if you were walking slowly, but carefully: you can traverse almost any terrain. Today's robots face an analogous problem. The problem is that moving on all terrains as if you were walking on ice is very inefficient, but is common among today's robots. Humans run fast on grass and slow down on ice — we adapt. Giving robots a similar capability to adapt requires quick identification of terrain changes and quickly adapting to prevent the robot from falling over. In summary, because it's impractical to build analytical (human-designed) models of all possible terrains in advance, and the robot's dynamics become more complex at high-velocities, high-speed running is more challenging than walking.

Previous agile running controllers for the MIT Cheetah 3 and mini cheetah, as well as for Boston Dynamics' robots, are "analytically designed," relying on human engineers to analyze the physics of locomotion, formulate efficient abstractions, and implement a specialized hierarchy of controllers to make the robot balance and run. You use a "learn-by-experience model" for running instead of programming it. Why?

Programming how a robot should act in every possible situation is simply very hard. The process is tedious, because if a robot were to fail on a particular terrain, a human engineer would need to identify the cause of failure and manually adapt the robot controller, and this process can require substantial human time. Learning by trial and error removes the need for a human to specify precisely how the robot should behave in every situation. This would work if: (1) the robot can experience an extremely wide range of terrains; and (2) the robot can automatically improve its behavior with experience.

Thanks to modern simulation tools, our robot can accumulate 100 days' worth of experience on diverse terrains in just three hours of actual time. We developed an approach by which the robot's behavior improves from simulated experience, and our approach critically also enables successful deployment of those learned behaviors in the real world. The intuition behind why the robot's running skills work well in the real world is: Of all the environments it sees in this simulator, some will teach the robot skills that are useful in the real world. When operating in the real world, our controller identifies and executes the relevant skills in real-time.

Can this approach be scaled beyond the mini cheetah? What excites you about its future applications?

At the heart of artificial intelligence research is the trade-off between what the human needs to build in (nature) and what the machine can learn on its own (nurture). The traditional paradigm in robotics is that humans tell the robot both what task to do and how to do it. The problem is that such a framework is not scalable, because it would take immense human engineering effort to manually program a robot with the skills to operate in many diverse environments. A more practical way to build a robot with many diverse skills is to tell the robot what to do and let it figure out the how. Our system is an example of this. In our lab, we've begun to apply this paradigm to other robotic systems, including hands that can pick up and manipulate many different objects.

This work was supported by the DARPA Machine Common Sense Program, the MIT Biomimetic Robotics Lab, NAVER LABS, and in part by the National Science Foundation AI Institute for Artificial Intelligence Fundamental Interactions, United States Air Force-MIT AI Accelerator, and MIT-IBM Watson AI Lab. The research was conducted by the Improbable AI Lab.

https://scitechdaily.com/how-the-mit-mini-cheetah-robot-learns-to-run-entirely-by-trial-and-error/

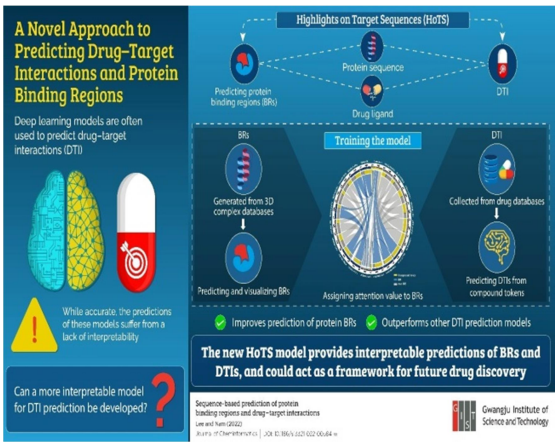
CISION
PR Newswire

Wed, 06 Apr 2022

Researchers at the GIST Identify New Medicines using Interpretable Deep Learning Predictions

In the drug discovery process, drugs are tested for their ability to bind or interact with target molecules in the body. While deep learning models have made this process quite efficient, their predictions often lack interpretability. Addressing this, researchers at the Gwangju Institute of Science and Technology develop a new deep learning model that not only makes better predictions of drug-target interactions but does so interpretably, providing a good starting point for further drug discovery.

Researchers at the GIST Identify New Medicines Using Interpretable Deep Learning Predictions An important aspect of drug discovery involves determining how well a drug binds to its target (protein) molecule. Typically, this step involves aligning a 3D structure of a drug and its target protein at various configurations in a process called "docking." Preferred binding sites are then discovered by running docking simulations repeatedly with multiple drug candidates for a particular target molecule. Typically, owing to the vast number of likely candidates for potential drug-target interactions, deep learning models are used to carry out such simulations. However, a



Researchers at the GIST Identify New Medicines Using Interpretable Deep Learning Predictions

problem with using such models is the difficulty in interpreting their predictions. While deep learning certainly makes for a speedy drug discovery, it is little more than a black box. Additionally, docking simulations cannot be used to develop drugs for novel targets that have no known 3D complex with an interacting drug. Associate professor Hojung Nam and her Ph.D. student Ingoo Lee from the Gwangju Institute of Science and Technology in Korea developed an new deep learning model called "Highlights on Target Sequences" (HoTS) for predicting the binding between a drug and a target molecule. The new model not only makes better predictions but, more interestingly, did so in an interpretable manner. Moreover, the model could predict drug-target interactions (DTIs) without the need for simulations or 3D structures.

How did the team achieve this remarkable feat? Professor Nam explains how their drug-target interaction prediction model works: "First, we explicitly teach the model which parts of a protein sequence will interact with the drug using prior knowledge. The trained model is then utilized to recognize and predict interactions between drugs and target proteins, giving better prediction performances. Using this, we built a model that can predict the target proteins' binding regions and their interactions with drugs without a 3D-complex." Rather than dealing with the complete length of the protein sequence, the model could make predictions based only on the parts of the protein that are relevant to the DTI interaction. "We taught the model where to 'focus' to ensure that it can comprehend important sub-regions of proteins in predicting its interaction with candidate drugs," elaborates Professor Nam. This, in turn, allowed the model to predict DTIs more accurately than existing models.

Considering that the model does not require information about the 3D structure and provides predictions that are clearly understandable, the findings of this study provide a good starting point for further docking simulations to predict new drug candidates for targeted therapy, accelerating advancements in this field. "The model used in our study would make the drug discovery process more transparent as well as low-risk and low-cost. This will allow researchers to discover more drugs for the same amount of budget and time," concludes Professor Nam.

https://www.prnewswire.com/news-releases/researchers-at-the-gist-identify-new-medicines-using-interpretable-deep-learning-predictions-301518004.html

THE TIMES OF INDIA

Thu, 07 Apr 2022

More space research hubs in offing, 7 missions to be launche this yr: Minister

The government is planning to establish more research centres in the country to support ’s R&D and that the Space Technology Incubation Centre and Regional Academia Centre for Space will get a grant of Rs 2 crore per year, space minister Jitendra Singh said in Parliament on Wednesday. The minister also told the in a written reply that Isro plans to launch seven missions, including two development flights of the Small Satellite Launch Vehicle this year. Giving details of the upcoming missions this year, the minister said two PSLV missions, including one dedicated commercial mission and one mission for launching EOS-06 observation satellite; two

developmental flights of Isro's Small Satellite Launch Vehicle (SSLV); one GSLV mission for launching NVS-01 navigation satellite for NavIC; one communication satellite mission (Gsat-24) through procured launch for a commercial customer and one GSLV Mk-III mission, which is a dedicated commercial mission, will be launched this year.

In another reply, Singh informed that the Kalpana Chawla Centre for Research in Space Science and Technology was inaugurated at Chandigarh University on January 3 this year with the objective of training students in space science, satellite development, to meet future challenges in space research to ensure India's leading position in future technologies. He said the government pursues collaborative projects with foreign space research organisations with the objective of enhancing the capacity of the Indian space programme for advancing programmatic priorities, augmenting space science and earth observation database, widening ground station networks, bettering products and services through joint experiments and creating platforms for inflow of expertise. Currently, Isro is working with to jointly realise a satellite mission named 'Nasa-Isro Synthetic Aperture Radar (NISAR)' for scientific studies of Earth.

https://timesofindia.indiatimes.com/india/more-space-research-hubs-in-offing-7-missions-to-be-launched-this-yr-minister/articleshow/90694416.cms