CONTENTS

![Press Information Bureau Government of India emblem]

Press Information Bureau
Government of India

Ministry of Defence

Thu, 15 July 2021 4:59PM

Raksha Mantri launches Artificial Intelligence powered grievance management application;

Shri Rajnath Singh lauds the citizen centric reform that empowers the people;

Raksha Mantri stresses on use of AI for overall development of the nation

Raksha Mantri Shri Rajnath Singh launched an Artificial Intelligence (AI)-powered grievance management application in New Delhi on July 15, 2021, developed by Ministry of Defence with the help of IIT-Kanpur. Minister of State (Independent Charge) for Personnel, Public Grievances & Pensions Dr Jitendra Singh graced the occasion.

This is the first AI based system developed to improve grievance redressal in the Government. The AI tool developed as part of the initiative has capability to understand the content of the complaint based on the contents therein. As a result, it can identify repeat complaints or spam automatically. Based on the meaning of the complaint, it can categorise complaints of different categories even when key words normally used for such search are not present in the complaint. It enables geographical analysis of complaints in a category including analysis of whether the complaint was adequately addressed or not by the concerned office. Easy user-friendly search enables user to formulate his own queries/categories depending on management requirements and seek performance results based on the query. Given that lakhs of complaints are received on CPGRAMS portal of DARPG, this application will have great use in understanding the nature of complaints, geographies from where they emanate and policy changes which can be introduced to create systemic improvements to address these grievances.

Speaking on the occasion, the Raksha Mantri described the application as a product of good governance, which reflects the growing synergy between the Government and academia. He said this initiative is another citizen centric reform of the Government that aims to empower the people at large.

Shri Rajnath Singh lauded Department of Administrative Reforms & Public Grievances (DARPG) for playing an important role in the reform of the Public Grievances Redressal System, saying that resolving the grievances of people is a great service in itself. He added that the active

involvement of reputed institutions like IIT Kanpur will further bolster the system and resolve the grievances of people in a transparent and effective manner.

The Raksha Mantri was briefed that this AI-powered application will automatically handle and analyse the complaints of the people and would reduce human intervention, save time and bring more transparency in their disposal.

A tripartite MoU for the project was signed among Department of Defence, MoD, DARPG and IIT, Kanpur on August 04, 2020.

The release of this application marks the introduction of AI-based innovations into governance and administration. This project is first of its kind initiative of the Government for using AI, data science and Machine Learning techniques in grievance redressal. The success of this project in MoD will pave the way for extension of this application across other Ministries. The MoD and IIT, Kanpur intend to drive their collaboration forward in the coming years, seeking to better leverage the use of AI for the disposal of citizens' complaints. The web-based application has been jointly developed by Department of Defence, MoD; DARPG and a team of IIT Kanpur comprising of Professors Shalabh, Nisheeth Srivastava and Piyush Rai.

Defence Secretary Dr Ajay Kumar; Additional Secretary, DARPG Shri V Srinivas, Additional Secretary MoD Smt Nivedita Shukla Verma, Director, IIT Kanpur Prof Abhay Karandikar and other senior officials of MoD were present on the launch of the application.

https://pib.gov.in/PressReleasePage.aspx?PRID=1735885

रक्षा मंत्रालय

रक्षा मंत्री ने आर्टिफिशियल इंटेलिजेंस द्वारा संचालित शिकायत प्रबंधन के एप्लिकेशन का शुभारंभ किया

श्री राजनाथ सिंह ने लोगों को सशक्त बनाने वाले नागरिक केंद्रित सुधारों की प्रशंसा की

रक्षा मंत्री ने राष्ट्र के समग्र विकास के लिए आर्टिफिशियल इंटेलिजेंस के उपयोग पर जोर दिया

रक्षा मंत्री श्री राजनाथ सिंह ने 15 जुलाई, 2021 को नई दिल्ली में एक आर्टिफिशियल इंटेलिजेंस (एआई)- संचालित शिकायत प्रबंधन एप्लिकेशन का शुभारंभ किया जिसको रक्षा मंत्रालय ने आईआईटी-कानपुर की मदद से विकसित किया है। इस अवसर पर कार्मिक, लोक शिकायत और पेंशन राज्य मंत्री (स्वतंत्र प्रभार) डॉ. जितेंद्र सिंह भी मौजूद थे।

यह शिकायत निवारण में सुधार के लिए विकसित की गई पहली कृत्रिम बुद्धिमता आधारित प्रणाली है। इस पहल के अंतर्गत विकसित एआई टूल में शिकायत में लिखी बातों के आधार पर शिकायत को समझने की क्षमता है। नतीजतन यह दोहराई जाने वाली शिकायतों या स्पैम की पहचान स्वचालित रूप से कर सकता है। शिकायत के अर्थ के आधार पर यह विभिन्न श्रेणियों की शिकायतों को वर्गीकृत कर सकता है, भले ही ऐसी खोज के लिए सामान्य रूप से उपयोग किए जाने वाले कीवर्ड शिकायत में मौजूद न हों। यह एक श्रेणी में शिकायतों के भौगोलिक विश्लेषण की सुविधा प्रदान करता है जिसमें यह विश्लेषण भी शामिल है कि शिकायत का संबंधित कार्यालय द्वारा ठीक प्रकार से निपटारा किया गया या नहीं। आसान उपयोगकर्ता-अनुकूल सर्च करने की सुविधा उपयोग करने वाले को प्रबंधन आवश्यकताओं के आधार पर अपने प्रश्नों/श्रेणियों को तैयार करने और पूछे गए प्रश्न के आधार पर प्रदर्शन का परिणाम प्राप्त करने में सक्षम बनाती है। यह देखते हुए कि प्रशासनिक सुधार और लोक शिकायत विभाग (डीएआरपीजी) के सीपीजीआरएएमएस पोर्टल पर लाखों शिकायतें प्राप्त होती हैं, इस एप्लिकेशन का शिकायतों की प्रकृति को समझने में तथा जहां से वह शिकायतें आ रही हैं, उन स्थानों को समझने में बहुत उपयोग होगा तथा उन नीतिगत बदलावों को करने में मदद मिलेगी जो इन शिकायतों को दूर करने हेतु प्रणालीगत सुधार करने के लिए लाए जा सकते हैं ।

इस अवसर पर बोलते हुए रक्षा मंत्री ने एप्लिकेशन को सुशासन का परिणाम बताया, जो सरकार और शिक्षाविदों के बीच बढ़ते तालमेल को दर्शाता है। उन्होंने कहा कि यह पहल सरकार का एक और जन-केंद्रित सुधार है जिसका उद्देश्य बड़े पैमाने पर लोगों को सशक्त बनाना है।

श्री राजनाथ सिंह ने लोक शिकायत निवारण प्रणाली के सुधार में महत्वपूर्ण भूमिका निभाने के लिए प्रशासनिक सुधार और लोक शिकायत विभाग (डीएआरपीजी) की सराहना करते हुए कहा कि लोगों की शिकायतों का समाधान करना अपने आप में एक महान सेवा है। उन्होंने कहा कि आईआईटी कानपुर जैसे प्रतिष्ठित संस्थानों की सक्रिय भागीदारी इस प्रणाली को और मजबूत करेगी और लोगों की शिकायतों का पारदर्शी और प्रभावी तरीके से समाधान करेगी।

रक्षा मंत्री को बताया गया कि यह कृत्रिम बुद्धिमता आधारित एप्लिकेशन लोगों की शिकायतों को स्वचालित रूप से देखकर उनका विश्लेषण करेगा और मानवीय हस्तक्षेप को कम करेगा, समय बचाएगा और उनके निपटान में अधिक पारदर्शिता लाएगा।

4 अगस्त, 2020 को रक्षा विभाग, रक्षा मंत्रालय, प्रशासनिक सुधार और लोक शिकायत विभाग तथा आईआईटी कानपुर के बीच परियोजना के लिए एक त्रिपक्षीय समझौता ज्ञापन पर हस्ताक्षर किए गए।

इस एप्लिकेशन का शुभारंभ शासन और प्रशासन में एआई-आधारित नवाचारों की शुरूआत का प्रतीक है। यह परियोजना शिकायत निवारण में एआई, डेटा विज्ञान और मशीन लर्निंग तकनीकों का उपयोग करने के लिए सरकार की अपनी तरह की पहली पहल है। रक्षा मंत्रालय में इस परियोजना की सफलता अन्य मंत्रालयों में इसके विस्तार का मार्ग प्रशस्त करेगी। रक्षा मंत्रालय और आईआईटी, कानपुर आने वाले वर्षों में अपने सहयोग को आगे बढ़ाने का इरादा रखते हैं, ताकि नागरिकों की शिकायतों के निपटान के लिए कृत्रिम बुद्धिमता के उपयोग का बेहतर लाभ उठाया जा सके। वेब-आधारित एप्लिकेशन को रक्षा विभाग, रक्षा मंत्रालय; प्रशासनिक सुधार और लोक शिकायत विभाग एवं आईआईटी कानपुर की एक टीम जिसमें प्रोफेसर शलभ, निशीथ श्रीवास्तव और पीयूष राय शामिल हैं, द्वारा संयुक्त रूप से विकसित किया गया है।

रक्षा सचिव डॉ. अजय कुमार; डीएआरपीजी के अतिरिक्त सचिव श्री वी श्रीनिवास, अतिरिक्त सचिव रक्षा मंत्रालय श्रीमती निवेदिता शुक्ला वर्मा, निदेशक, आईआईटी कानपुर प्रोफेसर अभय करंदीकर और रक्षा मंत्रालय के अन्य वरिष्ठ अधिकारी इस एप्लीकेशन के शुभारंभ के अवसर पर उपस्थित थे।

Defence Minister launches AI based public grievance lodging application; Lauds DRDO, IIT

Defence Minister Rajnath Singh on Thursday launched a first of its kind artificial intelligence (AI) based public grievance lodging application called CPGRAMS

By Deepan Chattopadhyay

Defence Minister Rajnath Singh on Thursday, July 15, launched an artificial intelligence (AI) based public grievance lodging application called CPGRAMS. The application has been launched with the combined efforts of the Defence research Development Organisation (DRDO) under the Ministry of Defence and IIT Kanpur.

Making a way towards citizen-centric reforms

Acclaiming the introduction of the artificial intelligence-based grievance analysis application, the Defence Minister commended the Defence Research Development Organisation for its effort in paving way for citizen-centric reforms with scientific knowledge and technology in the country. "We are approaching towards citizen-centric reforms with scientific knowledge and technology. It is a pivotal initiative and the defense ministry has been at the forefront. Will will be launching the application today," he said.

IIT applauded for active participation

During the launch, the Defence Minister added that the initiative will be of immense help to the masses while extending his best wishes to all associated with the project. He also applauded the role of esteemed organisations like IITs in developing scientific innovations for reforms in the society."The world is progressing in the field of science and technology. AI is being used in every field. It will help people lodge their complaints easily and effectively. The active involvement of reputed institutions like IIT Kanpur will further strengthen the system and resolve the grievances of people in a transparent and effective manner. I extend my heartiest congratulations and best wishes to all associated with this project," he said.

He further appreciated the DRDO for executing the project under the Ministry of defense. "The Ministry of Defense had been working on Artificial intelligence for a long time and DRDO has done huge work. The organization has successfully developed robots for use in the military, applications like 'NETRA', equipment like 'Atman AI' to detect Covid from chest X-ray and many other things," said the minister.

First of its kind initiative

It may be noted here that, the initiative is considered to be the first of its kind as the launch of the application marks the introduction of AI-based innovations into governance and administration in the country with an aim to improve grievance redressal in the Government.

According to the Department of Administrative Reforms and Public grievances, The Centralized Public Grievance Redress And Monitoring System (CPGRAMS) is an online web-enabled system that primarily aims to enable submission of grievances by the aggrieved citizens from anywhere and anytime (24x7) basis to Ministries/Departments/Organisations who scrutinize and take action for speedy and favorable redress of these grievances. The AI tool developed as part of the initiative has the capability to understand the content of the complaint based on the contents therein. As a result, it can identify repeat complaints or spam automatically. This application will have great use in understanding the nature of complaints, geographies from where they emanate, and policy changes that can be introduced to create systemic improvements to address these grievances.

Defence Secretary Dr Ajay Kumar; Additional Secretary, DARPG Shri V Srinivas, Additional Secretary MoD Smt Nivedita Shukla Verma, Director, IIT Kanpur Prof Abhay Karandikar and other senior officials of MoD were present on the launch of the application.

https://www.republicworld.com/india-news/general-news/defence-minister-launches-ai-based-public-grievance-lodging-application-lauds-drdo-iit.html

Fri, 16 July 2021

रक्षा मंत्रालय के तहत DRDO ने किए कई काम, नए एप्लीकेशन व उपकरणों का किया निर्माण: राजनाथ सिंह

रक्षा मंत्रालय के तहत रक्षा अनुसंधान व विकास संस्थान द्वारा किए गए कामों की जानकारी देते हुए रक्षा मंत्री राजनाथ सिंह ने विकसित किए गए एप्लीकेशन NETRA चेस्ट एक्स रे से कोविड का पता लगाने वाले Atman AI जैसे उपकरणों के बारे में बताया।

By Monika Minal

नई दिल्ली: रक्षा मंत्री राजनाथ सिंह (Rajnath Singh) ने आज रक्षा अनुसंधान व विकास संस्थान (DRDO) की उपलब्धियों के बारे में बताया। रक्षा मंत्री ने कहा, 'DRDO ने पिछले कुछ समय में काफी काम किया है। इस संगठन ने सैन्य उपयोग में आने वाले रोबोट, 'NETRA' जैसे एप्लीकेशन, Chest एक्स रे से कोविड का पता लगाने वाले 'Atman AI' जैसे उपकरण विकसित किए हैं।'

रक्षा मंत्री ने बताया, 'आज दुनिया तेजी से विज्ञान व तकनीक के क्षेत्र में आगे बढ़ रही है। हर क्षेत्र में आर्टिफिशियल इंटेलीजेंस (AI) का उपयोग हो रहा है। रक्षा मंत्रालय इसमें कई स्तरों पर आगे रहा है। Public Grievances के संदर्भ में हम आज इस एप्लीकेशन की शुरुआत कर रहे हैं।' रक्षा मंत्री ने बताया कि इसलिए इसे राष्ट्र के सम्यक विकास के लिए स्वास्थ्य, शिक्षा, कृषि, कौशल, निर्माण व रिटेल जैसे क्षेत्रों भी AI की संभावनाएं तलाशनी चाहिए। इसके लिए तकनीकी अध्ययन का संचालन होना चाहिए।

उल्लेखनीय है कि रक्षा मंत्री ने रक्षा विभाग, प्रशासनिक सुधार और लोक शिकायत विभाग और IIT कानपुर के संयुक्त प्रयासों से निर्मित आर्टिफिशियल इंटेलिजेंस पर आधारित शिकायत विश्लेषण आवेदन का उद्घाटन किया। इस मौके पर उन्होंने बताया, 'ये महत्वपूर्ण पहल है जिसमें वैज्ञानिक ज्ञान, टेक्नोलॉजी से हम सिटीजन सेंट्रिक रिफॉर्म्स की ओर आगे बढ़ रहे हैं। जब कोई कर्मचारी शिकायत सेल में अपनी कोई शिकायत दर्ज करा रहा होता है तो उस समय उसकी उम्मीद एक शिकायत तक ही नहीं बल्कि उसके लोकतांत्रिक अधिकार से जुड़ जाती है।'

उल्लेखनीय है कि DRDO ने कोरोना संक्रमण के लिए दवा 2DG (deoxy-D-glucose) को भी बनाया जिसे हैदराबाद की दवा कंपनी डॉ रेड्डीज लैब ने कर्मिशयली लॉन्च कर दिया है। 2डीजीटीएम (DGTM) के नाम से इस दवा की बिक्री हो रही है और इसके एक सैशे की कीमत 990 रुपये है।

https://www.jagran.com/news/national-under-defence-ministry-drdo-has-done-a-lot-of-work-rajnath-singh-21833007.html

Army Chief reviews firing of Howitzers, Bofors and Sharang in Pokhran

Indian Army Chief General Manoj Mukund Naravane on Thursday reviewed the firing of several artillery guns at the firing ranges of Jaisalmer in Rajasthan

By Manjeet Negi

Pokhran: Indian Army Chief General Manoj Mukund Naravane on Thursday reviewed the firing of several artillery guns at the firing ranges of Jaisalmer in Rajasthan

.The artillery guns that the Army chief reviewed include the Sharang, M-777 ultra-light Howitzer, Bofors and Dhanush that were fired at the Pokhran field firing ranges in Jaisalmer. The firing drill was part of the review of the capabilities and operational preparedness of the Indian Army's Corps of Artillery.

General MM Naravane during his visit to Jaisalmer and Pokhran Field Firing Ranges. (Twitter)

The Dhanush is an indigenous version of the Bofors guns while the Sharang is an upgraded version of the M-46 guns used by the Army.

The ultra-light Howitzer is an imported weapon that was recently inducted into the force after a government-to-government deal with the US.

The Indian Army is also going to buy new Howitzers, including the Advanced Towed Artillery Gun System, which has been developed by the DRDO and manufactured by private players.

https://www.indiatoday.in/india/story/army-chief-reviews-artillery-guns-firing-pokhran-1828534-2021-07-15

Ahmedabad's Science City to get a boost! PM Modi set to inaugurate aquatic gallery, nature park, robotic gallery

Science City: It had been set up to merge science with entertainment to encourage scientific temperament in young minds.

Ahmedabad's Science City: Science City premises in Gujarat's Ahmedabad is set to get an aquatic gallery, a nature park and a robotic gallery, as Prime Minister Narendra Modi would be inaugurating these attractions on Friday. The inauguration would be held virtually. According to a report in IE, the Science City in Ahmedabad came into being after the state government in 1999 set up the Gujarat Council of Science City or GCSC as an autonomous body under the Department of Science & Technology (DST) to realise the Gujarat Science City mandate. It had been set up to merge science with entertainment to encourage scientific temperament in young minds.

The Science City got the first IMAX 3D Theatre in India back during its first phase of development in 2002. During the same phase, a hall of space and a hall of science had been established in the Science

The three new additions are a part of the second developmental phase of the Science City, which sees an annual footfall of more than eight lakh. (Image: IE/Nirmal Harindran)

City's main building which has been shaped like a dome. An amphitheatre, a life science park, energy education park, simulated thrill rides, a planet earth pavilion, an activity centre for children, and a musical fountain were also set up in the City during the phase.

The three new additions are a part of the second developmental phase of the Science City, which sees an annual footfall of more than eight lakh.

Ahmedabad Science City's Aquatic Gallery: Attractions and maintenance

The aquatic gallery has been built across an area of more than 15,000 square metre, and has been equipped with 68 tanks having fresh water, brackish water and marine water, the report said. A whopping 188 marine species have been added to the gallery, including amphibians and penguins, with the total number of animals to be housed in the gallery expected to be 11,690. The gallery would also have a 28-metre shark tunnel, which is expected to be the key attraction due to housing bonnethead sharks, zebra sharks and grey reef sharks.

The gallery is being given exhibit and technical support by New Zealand's Marinescape, while it would be maintained by Shapoorji Pallonji-Marinescape JV for a minimum of five years. As per the report, the gallery is being constructed and will be maintained at a total cost of Rs 260 crore, and it is poised to be the largest public aquarium in the country.

The species are being procured from different parts of the world. For instance, the penguins have been brought in from South Africa for the exhibit. This means that the species are coming from different eco-regions and are therefore being acclimatised in stages, with each stage lasting for one to two weeks.

Multiple ecosystems like Indian Zone, African Zone, American Zone, Asian Zone among others are being emulated in the various tanks, and that means that precise maintenance of several parameters have to be ensured for the water, including the salinity level, the pH level, the chemical oxygen, etc, to be suitable for the species.

Apart from this, the gallery also has on-site touch pad displays which would allow visitors to select a species and learn more about it. A 5D theatre and an interactive exhibit have also been added in the gallery.

The entry fee of the aquatic gallery is Rs 200 as per the website of the Science City, and for a minimum group of 10 children, school groups would be allowed entry at a subsidised fee of Rs 50.

Robotics gallery and Nature Park: What we know so far

As per the report, the robotics gallery has been developed by Cube Construction Engineering Limited in Vadodara, which will also be maintaining it for the next five years. The construction, operation and maintenance of the gallery collectively cost Rs 127 crore. The gallery is a three-storey unit and it has a self-driving car track on the perimeter. A cafeteria has also been added on the ground floor, but there is a twist – it is manned by robots who act as servers as well as chefs. Interactive exhibits are also present on the ground floor, which also has a courtyard where pop culture robots of Wall-E and Transformer are presented.

At the gallery, the visitors can learn about the journey of the evolution of robots, and how these machines have been able to change the landscape of human lives by serving in many fields including medical surgeries and rescue operations. Apart from this, the gallery also allows visitors to play games like air hockey against robot opponents, or even see robots competing against each other in soccer or badminton. DRDO and ISRO have also added their exhibits to the gallery, and so have engineering institutes. A workshop to encourage youth in the field of robotics has also been incorporated. VR and AR space has also been added, and a performing troupe of robots including five dancing robots, one pianist, a trumpetist and a drummer have also been added for the entertainment factor.

Meanwhile, the nature park spanning across eight hectares has been developed along with the forest department, the report added.

https://www.financialexpress.com/lifestyle/travel-tourism/ahmedabads-science-city-to-get-a-boost-pm-modi-set-to-inaugurate-aquatic-gallery-nature-park-robotic-gallery/2290995/

अमर उजाला

ऑक्सीजन प्लांट में उपकरण लगाने का काम शुरू, डीसी ने किया निरीक्षण

जिला के नागरिक अस्पताल में जल्द ही बेहतर सुविधा मिलने वाली हैं। नागरिक अस्पताल के पास ऑक्सीजन प्लांट के उपकरणों को स्थापित करने का काम शुरू हो गया है और जल्द ही उत्पादन शुरू होने की उम्मीद है। ऑक्सीजन की उपलब्धता के लिए अब दादरी को दूसरे जिलों पर निर्भर नहीं रहना पड़ेगा। वीरवार को डीसी ने ऑक्सीजन प्लांट में लगाए जा रहे उपकरणों का जायजा लिया और जल्द इस काम को पूरा करने के आदेश दिए। उन्होंने कहा कि उत्पादन शुरू होने के बाद प्लांट स्वास्थ्य विभाग को सौंपा जाए।

सिविल अस्पताल में ऑक्सीजन उत्पादन के लिए उपकरण प्लांट के अंदर रख दिए गए हैं और डीआरडीओ से आई टीम के तकनीकी विशेषज्ञ उपकरणों को स्थापित कर रहे हैं। डीसी अमरजीत सिंह मान ने अस्पताल परिसर पहुंचकर किए जा रहे कार्य का जायजा लिया और आवश्यक दिशा निर्देश दिए। डीसी ने कहा कि लंबे इंतजार के बाद दादरी में ऑक्सीजन प्लांट की स्थापना का कार्य पूरा होने को है। अब केवल उपकरणों को स्थापित किया जाना बाकी है। लोगों को इस प्लांट से काफी उम्मीद है।

उन्होंने कहा कि उपकरण लगाने के लिए आई टीम के अधिकारी प्लांट में उत्पादन शुरू होने के बाद पूरी जांच के बाद ही इसे अस्पताल को सौंपे। प्लांट की क्षमता और कार्य कुशलता की अच्छी तहर सेजांच करें। साथ ही अस्पताल के कुछ कर्मचारियों को प्लांट की सभी बारीकियों के बारे में भी पूरी जानकारी दें और उनसे प्लांट के अंदर कार्य करवाकर भी देंखे।

डीआरडीओ के इंजीनियर ने बताया कि प्लांट ऑनलाइन कनेक्ट होगा और पेट्रोलियम मंत्रालय के आला अधिकारी के कार्यालय से भी इसके संचालन को देखा जा सकेगा। प्लांट में एनालाइजर के माध्यम से एक स्क्रीन पर पूरा डाटा आता रहेगा। उसमें ऑक्सीजन उत्पादन की रियल टाइम क्षमता, ऑक्सीजन की शुद्धता और अन्य पैरामीटर भी दिखाई देंगे। आक्सीजन प्लांट की क्षमता 500 लीटर प्रति मिनट होगी।

सिविल अस्पताल में सेंट्रेलाइज्ड ऑक्सीजन आपूर्ति सेवा भी जल्द शुरू होने की उम्मीद है। ऑक्सीजन प्लांट के वर्किंग में आने के बाद आईसीयू या अन्य वार्डों में ऑक्सीजन पाइप के जरिये बेड तक आसानी से पहुंचाई जा सकेगी। अब तक ऑक्सीजन सिलिंडर के जरिये ही मरीजों को ऑक्सीजन की पूर्ति की जा रही है।

ऑक्सीजन प्लांट में उत्पादन शुरू होने से काफी फायदा होगा। एक तरफ ऑक्सीजन की कमी दूर होगी तो वहीं दूसरी ओर स्वास्थ्य सेवाओं का दायरा भी बढ़ेगा। ऑक्सीजन प्लांट विभाग को सुपुर्द होने के बाद अन्य योजना भी तैयार की जाएंगी। डॉक्टर सुदर्शन पंवार, सीएमओ, चरखी दादरी।

ऑक्सीजन प्लांट के उपकरण पहुंच गए है और अब जल्द ही उत्पादन शुरू हो जाएगा। वीरवार को मैंने अस्पताल पहुंचकर उपकरण लगाने के कार्य का जायजा भी लिया है। जल्द ही जिला वासियों को ऑक्सीजन प्लांट की सेवाओं का लाभ मिलेगा। -अमरजीत सिंह मान, डीसी, चरखी दादरी।

कल मेडिकल कालेज पहुंचेगा दूसरा ऑक्सीजन प्लांट

बदायूं: राजकीय मेडिकल कालेज में एक ऑक्सीजन प्लांट तैयार हो चुका है, जबकि दूसरा डीआरडीओ की ओर से लगेगा। इसके लिये प्लांट शनिवार 17 जुलाई तक बदायूं पहुंच जायेगा।

बदायूं राजकीय मेडिकल कालेज के लिये केंद्र सरकार से एक और सौगात मिल गयी है। मेडिकल कालेज के लिये केंद्र सरकार से एक और ऑक्सीजन प्लांट स्वीकृत कर दिया है। यह दूसरा ऑक्सीजन प्लांट भी डीआरडीओ द्वारा लगाया जायेगा। बताया जा रहा है कि मेडिकल कालेज में शनिवार शाम तक प्लांट आ जायेगा। इसके बाद मेडिकल कालेज में प्लांट को लगाने का काम शुरू कर दिया जायेगा।

अब मेडिकल कालेज में ऑक्सीजन के दो प्लांट हो जायेंगे, जिससे कभी भी ऑक्सीजन का संकट कभी नहीं आयेगा। बता दें कि कोरोना काल में सबसे बड़ा ऑक्सीजन का संकट आया था जिसकी वजह से कई लोगों की मौत भी हुई थी। ऑक्सीजन का संकट आया था तब सरकार ने प्लांट की स्वीकृति दी है अब प्लांट लगाने की स्थिति की ओर बढ़ रहा है।

सपा प्रतिनिधियों ने भी लगवाया प्लांट

बदायूं राजकीय मेडिकल कालेज में एक ऑक्सीजन प्लांट लग चुका है। प्लांट संचालित भी हो गया है केवल फीता कटने का इंतजार रह गया है। सपा प्रतिनिधियों द्वारा 93 लाख रुपये अपनी निधियों से दिया गया था, जिसमें विधायक, एमएलसी सहित सपा नेताओं की निधि से प्लाट लगाया गया है। इस प्लांट से मरीजों को ऑक्सीजन मिलने लगी है और संकट के दौर में भी पूर्ति होती रहेगी।

एक हजार प्रति लीटर प्रति घंटा की है क्षमता

बदायूं राजकीय मेडिकल कालेज में एक ऑक्सजीन प्लांट लग गया है। इस प्लांट को मरीजों के लिये एक हजार प्रति लीटर ऑक्सीजन प्रति घंटे पर मिलती रहेगी। अब सरकार से दूसरा प्लांट भी इसी क्षमता का दिया गया है। अब प्लांट लगने के बाद ऑक्सीजन का संकट खत्म हो गया है।

एक ऑक्सीजन प्लांट संचालित है। उद्धाटन का इंतजार है। केंद्र सरकार से दूसरा प्लांट और दे दिया है। दूसरा प्लांट डीआरडीओ द्वारा लगवाया जा रहा है। प्लांट कंपनी से निकल चुका है कल तक मेडिकल कालेज पहुंच जायेगा। जिसके बाद लगाने का काम शुरू कर दिया जायेगा।

डॉ. धर्मेंद्र गुप्ता, प्राचार्य राजकीय मेडिकल कालेज

https://www.livehindustan.com/uttar-pradesh/badaun/story-tomorrow-the-second-oxygen-plant-will-reach-the-medical-college-4226285.html

DRDO on Twitter

ANI ✔ @ANI · 18h

Under the Ministry of Defence, DRDO has done a lot of work. The organization has developed robots for military use, applications like 'NETRA', equipment like 'Atman AI' to detect Covid from chest X-ray: Rajnath Singh Defence Minister

Rajnath Singh ✔ @rajnathsingh · 21h

Addressing the launch ceremony of MoD's AI Powered CPGRAMS, an App to lodge a grievance online. Watch

9:45 | 12.4K viewers

Rajnath Singh ✔ @rajnathsingh

Addressing the launch ceremony of MoD's AI Powered CPGRAMS, an App to lodge a grievance online. Watch

Defence Strategic: National/International

DAILYEXCELSIOR.COM

Fri, 16 July 2021

CDS reviews situation, preparedness of troops along LoC in Rajouri, Poonch

Drone threat to major installations discussed

Jammu: Chief of Defence Staff (CDS) Gen Bipin Rawat today reviewed situation along the Line of Control (LoC) in the twin border districts of Poonch and Rajouri where fresh ceasefire agreement is in force between the Indo-Pak troops since February 25 this year but two major infiltration attempts were foiled by the troops in Sunderbani and Nowshera sectors recently in which a total of four militants were killed while two soldiers attained martyrdom.

Gen Rawat, who reached here yesterday, visited several forward locations in Rajouri and Poonch districts along with top Army Commanders and reviewed situation as well as operational preparedness of the troops with local commanders.

The Chief of Defence Staff visited forward points in Rajouri and Poonch where India shares LoC with Pakistan which was quite tense with regular ceasefire violations from Pakistan till February 25 when Indo-Pak troops reached fresh ceasefire agreement on LoC and International Border.

Chief of Defence Staff General Bipin Rawat reviewing security situation and operational preparedness at Rajouri-Poonch sector along Line of Control on Thursday.

No major ceasefire violation has been reported from Pakistan side since latest agreement. However, two infiltration attempts were successfully foiled by the Indian troops in Sunderbani and Nowshera sectors of Rajouri district recently. In Sunderbani sector, Army gunned down three hardcore Pakistani militants while two Army jawans were martyred in the operation. In Nowshera, one infiltrator was killed and two soldiers were injured.

Sources said the Chief of Defence Staff called for strict surveillance all along the LoC as ceasefire agreement notwithstanding the Pakistan army could facilitate infiltration attempts by the militants. According to sources, it wasn't clear whether Pakistan army had facilitated the Nowshera and Sunderbani infiltration attempts or not. However, as per sources, it wasn't possible for the militants to reach close to the LoC on Pakistan side and intrude into the Indian territory without support of Pakistani troops.

Yesterday, Gen Bipin Rawat had visited Indian Air Force base at Satwari in Jammu district where twin drone terror strikes took place in the wee hours of June 27 which were the first of its kind not only in the Union Territory of Jammu and Kashmir but entire country. Two Indian Air Force personnel were injured while minor damage was caused to the building.

After IAF base terror strikes, several drones were sighted flying above military installations at Kaluchak, Ratnuchak and Kunjwani but had returned. A day before, the BSF fired at Pakistani drone in Arnia sector forcing it to fly back.

Sources said Gen Bipin Rawat is also reported to have reviewed the preparedness of troops to counter drone attacks from Pakistan as well as militants on the military installations. It may be mentioned here that the security agencies are in advanced stage of installation of anti-drone technology.

https://www.dailyexcelsior.com/cds-reviews-situation-preparedness-of-troops-along-loc-in-rajouri-poonch/

India eases drone norms in boost for future tech

This comes days after Prime Minister Narendra Modi chaired a meeting of top ministers to discuss the formulation of a policy for the traffic management of unmanned aircraft systems (UAS) or drones

By Anisha Dutta

The Union civil aviation ministry on Thursday released the draft of the national drone policy, making it significantly easier for people and companies to own and operate drones, while also streamlining a labyrinthine certification process for manufacturers, importers and users, in a move that aims to boost future tech.

Civil aviation minister Jyotiraditya Scindia underlined the key highlights of the new policy in a series of tweets on Thursday. The document has been now been put up for public inputs till August 5, following which it will be notified. The rules will replace the Unmanned Aircraft System Rules (UAS), 2021, which came into force in March.

Representational image. (Shutterstock)

"In a major fillip to the drone industry, I am happy to present the Draft Drone Rules 2021 that mark a stark shift from the earlier UAS Rules. 10 key takeaways: Several approvals abolished & processes made easier; number of forms reduced from 25 to 5; coverage of drones increased from 300 kg to 500 kg; fee reduced to nominal levels; yellow zone reduced from 45 km to 12 km from the airport perimeter; no flight permission required up to 400 ft in green zones...," Scindia wrote.

Drones have been in the spotlight since such a device was used to target an Indian Air Force (IAF) base in Jammu with explosives last month. Officials in defence have since said they are working on anti-drone technologies. Typical consumer drones usually have some inbuilt safeguards, which mean not all are unsafe.

Drones now form a significant new consumer tech category, particularly among hobbyists and visual artists, and are being tested for a range of practical as well as industrial uses such as automated package deliveries by e-commerce companies.

Last month, Prime Minister Narendra Modi chaired a meeting of top ministers to discuss the policy regarding drones, which has been long awaited. The existing regulation, notified in March 2021, was seen to have a labyrinthine approval process.

According to the draft rules, seen by HT, many of the approvals previously required, such as unique authorisation number, unique prototype identification number, certificate of conformance, certificate of maintenance, import clearance, operator permit, authorisation of R&D organisation, and student remote pilot licence, have been abolished.

The draft rules also propose to reduce fee to nominal levels and not linking the fee with the size of the drone.

Building on its attempt to make rules easier, the rules state no pilot licence will be required for micro drones (for non-commercial use), nano drones and for research and development (R&D) organisations. There will no longer be a ban on the use of drones by foreign-owned companies registered in India and no security clearance will be required before any registration or licence is issued.

The government plans to open what is known as the Digital Sky platform, which manufacturers will be able to use for certification process, and from where interactive airspace maps with green, yellow, and red zones can be accessed.

Digital Sky will also serve as a unified platform for users to obtain the mandatory registration number and remote pilot license, and people will need to check the service to determine if any restrictions are in place before they fly a drone at a location. The platform will be under India's aviation regulator, the Directorate General of Civil Aviation (DGCA).

"The central government may, within 30 days of the date of notification of these rules, publish on the digital sky platform, an airspace map for drone operations segregating the entire airspace of India into red, yellow and green zones, with a horizontal resolution equal or finer than 10 metre," the draft rules state.

The zones pertain to what is known as geo-fencing, which prohibit or limit the use of drones at some places, like close to an airport or over sensitive military and VIP locations.

The yellow zone has been reduced from 45 km to 12 km from an airport's perimeter, and the new rules suggest no flight permission will be required for operations up to 400 feet in green zones and up to 200 feet in the area between 8-12 km from an airport perimeter.

"Green zone" refer to the airspace from the ground up to a vertical distance of 400 feet (120 metre) above ground level (AGL) that has not been designated as a red zone or yellow zone in the airspace map for drone operations; and the airspace from the ground up to a vertical distance of 200 feet (60 metre) AGL in the area located between a lateral distance of 8 kilometre and 12 kilometre from the perimeter of an operational airport, the draft rules say.

In red zones, drone operations shall be permitted only under exceptional circumstances by the central government, the rules add. To fly in the yellow zone, a drone pilot will require permission from the air traffic control authority.

"The airspace map for drone operations shall be designed to be programmatically accessible through a machine readable Application Programming Interface (API) and interactive so that drone pilots will be able to plot their proposed flight plan and easily identify the zone(s) within which it falls so as to assess whether or not they need to make an application for prior approval," it said.

This will allow for automatic drones to be automatically updated with geo-fencing details of where they can and cannot be flown. Some companies build such failsafe fences into their products, typically earmarking no-fly zones around airports and other sensitive locations.

Discussions on a draft policy on drones have been on for over two years. The policy document uploaded on Thursday says integration of unmanned aircraft systems (UAS) into the National Airspace System (NAS) presents several challenges, technically and operationally. Integrating UAS within the current air traffic management systems need additional hardware on board, it added.

The objective of the policy is to enable more types of unmanned aircraft operational scenarios, increase the ease of compliance for the unmanned aviation industry, and ensure safety and security.

Industry representatives welcomed the rules.

"The ministry of civil aviation's decision to liberalise the drone policy even after the recent drone incidents in Jammu showcases the government's bold approach to promote the use of the drone and focus on the development of counter-drone technology to address the threat posed by rogue drones. We appreciate the ministry's initiative and will continue to extend our support towards making India global drone hub." said Smit Shah, director, Drone Federation of India.

Most powerful fighter jets: A list - US made F-22, China made Chengdu J20 and more

There are only a handful of advanced fifth-gen jets in service as of 2021 and we have compiled a list of the most powerful of these fighter jets from across the world

In the modern day warfare, a country with the most advanced weaponry holds an upper edge. While there are many destructive weapons that can be used to annihilate enemies including the likes of nuclear submarines to modern-day naval aircraft carriers, none could match the sheer speed of a fighter jet. A fighter aircraft or a fighter jet, is a fixed-wing aircraft designed for air-to-air combat and is one of the most widely used form of firepower by any country. A fighter jet is used to dominate the battlefield and can change the course of a war.

USAF F-22 Raptor fighter jet is widely considered the most powerful fighter jet and is not being sold to other countries.

While a lot depends on the skill of the pilot, the machine plays the most crucial role. A fighter jet can act as a bomber, interceptor, heavy fighter, interceptor, reconnaissance aircraft and night fighter. The modern day fifth-gen jets are far superior than any other generation of fighter jets. While there's no fixed definition of a fifth-generation jet fighter, Giovanni de Briganti, an Italian World War I fighter pilot has mentioned the defining elements of a fifth-generation fighter to be:

Stealth

High maneuverability

Advanced avionics

Networked data fusion from sensors and avionics

Multirole capabilities

There are only a handful of fifth gen fighter jets in service as of 2021. We have compiled a list of the most advanced fighter jets in the world, which by default, are all fifth gen fighter jets. Here's the list-

Lockheed Martin F-22 Raptor

Country of Origin - USA

The F-22 Raptor is the oldest and most advanced fighter jets in the world. Developed by Lockheed Martin and Boeing for the USAF, the fighter jet is not for sale to other countries and was inducted by the US Air Force in 2005. The F-22 Raptor is a single-seat, twin-engine fifth-generation extremely advanced tactical fighter known for its stealth, integrated avionics, superior performance and super-maneuverability. The Raptor made its first flight in September 1997 and can be used in a wide array of missions, including surveillance, reconnaissance, attack, electronic warfare and signals intelligence.

Lockheed Martin F-35 Lightning II

Country of Origin - USA

Yet another Lockheed Martin's creation, the F-35 Lightning II is widely regarded as the one of the most sophisticated fighter jets in the world. It is also the only international fifth-generation multirole fighter plane in the world, which means unlike F-22 Raptor that can't be exported, the F-35 Lightning II can be used by Air Force of other countries like Turkey and Japan are current

buyers of this fighter jet that can do vertical take-off and landing, much like helicopters. The single-seat fighter is armed with a range of weapon systems such as Sidewinder and Storm Shadow, as well as Joint Direct Attack Munitions (JDAMs). The F-35 comes in three variants - the conventional take-off and landing (CTOL), short take-off / vertical landing (STOVL) and carrier variant (CV).

Sukhoi Su-57

Country of Origin - Russia

Competing against the duo of US made fifth gen fighter jets is the Russia made Sukhoi Su-5, which is the countries first fifth-generation fighter jet. The Su-57 is a single-seat, twin-engine, multi-role fighter aircraft manufactured by Sukhoi, the same company that makes Su-30 MKI for India. Formerly called PAK FA and T-50, the Su-57 is still to be inducted in the Russian Air Force due to some delays. However, the jet is fully ready and will replace the existing fleet of Su-27 fourth-generation fighter. The aircraft can defend all types of ground, air and surface targets of the enemy and can carry short-range air-to-air missiles, air-to-surface missiles, short and medium-range guided and unguided weapons, and aerial bombs in 250kg, 500kg, and 1,500kg classes.

Chengdu J-20

Country of Origin - China

Last on our list is the China made Chengdu J-20, which is a fifth-generation, single-seat, twin-engine stealth fighter jet manufactured by Chengdu Aircraft Industry Group (CAIG). The jet is made for the People's Liberation Army Air Force (PLAAF) and has been on the active duty since 2017. The aircraft can hold a mix of beyond-visual-range air-to-air and short-range missiles, air-to-surface missiles, laser-guided bombs and anti-radiation missiles.

Apart from these fifth gen fighter jets, the current-gen fighter jets used by most of the countries across the globe are called the fourth gen fighter jets and some of them after inducing advanced updates are also called 4.5 gen fighter jet or 4++ fighter jet. Dassault Rafale is one such fighter jet which was recently inducted in the Indian Air Force. Eurofighter Typhoon and Sukhoi Su-35 among others are few other popular names. However, these jets are not as advanced as the fifth-gen fighter jets and hence, were not included in the list.

https://www.news18.com/news/auto/most-powerful-fighter-jets-a-list-us-made-f-22-china-made-chengdu-j20-and-more-3961628.html

ZEENEWS

Exclusive: ISRO one step closer to converting cargo rocket GSLV into human-carrier

ISRO is working on converting its cargo-carrying rocket into a reliable human-carrier, meant for astronauts. ISRO Chairman Dr K Sivan revealed this and much more in an exclusive conversation with Zee Media

By Sidharth MP, Edited By Saurabh Sinha

Highlights

1. *ISRO is planning manned missions to space*
2. *It aims to convert cargo-carrier rocket to human-carrier*

Chennai: The Indian Space research Organization (ISRO) on Thursday (July 15) announced the successful test fire of its Vikas (Vikram A Sarabhai) Engine or the Core stage L110 Engine of its heaviest operational rocket - the GSLV Mk 3.

While this engine and the rocket comprising it have flown several times in the past, the test is part of a series of new evaluations. They are meant to ensure the human-rating of the rocket.

Simply put, ISRO is working on converting its cargo-carrying rocket into a reliable human-carrier, meant for astronauts. ISRO Chairman Dr K Sivan revealed this and much more in an exclusive conversation with Zee Media.

"The fundamental difference in carrying cargo and humans to space is that satellite missions are about carrying more payload (heavy satellite or multiple small satellites) to orbit. Whereas, human spaceflight is about ensuring fail-safe, reliable flight of astronauts, even if the rocket is not carrying its maximum payload. Once launched by a rocket, a satellite carries out its functions in space, based on commands from its control facility, back on Earth," said Dr K Sivan.

"In case of India's Human Spaceflight programme, the capsule or spacecraft carrying humans must be launched into space via a rocket, the astronauts must perform their activities, experiments in space for a defined time. Later, the spacecraft propels and re-aligns itself to re-enter earth's atmosphere, overcoming extreme high temperature and friction. Then, it is recovered after a splash down in the sea," he added.

Human rating is the process of certifying a rocket's capability to safely carry such a capsule to space. As far as ISRO is concerned, it involves strengthening the overall launch system, modifying its design and components for high-reliability. Owing to these modifications, additional testing is required for each of its hardware.

The GSLV Mk3 is a three-stage rocket powered by two S200 Solid fuel boosters, two liquid fuel Vikas engines (L110 core stage) and the CE-20 Cryogenic Engine that burns a mixture of liquid hydrogen and liquid oxygen. It must also be noted that the same Vikas Engine also powers India's PSLV rocket that has a stellar success record of over 96% in 53 flights. Even the two failures that so occurred in the PSLV launches were unrelated to its engines and core rocketry.

The human-rated GSLV would be housing the crew module under the rocket's nose cone. The rocket is capable of carrying a 4-ton payload to Geosynchronous Transfer Orbit (36,000kms from earth's surface) and 8-ton payload to Low Earth Orbit (LEO is 400-600 km) respectively.

Despite the GSLV Mk3 rocket having flown four times till date and having performed each mission successfully, ISRO is testing each of its engines multiple times, in order to ensure they can perform above their operational requirements.

"Normally we conduct two tests for an engine, but for Gaganyaan we are conducting five or six tests. The third successful test of the Vikas engine (done on Wednesday) is a major milestone and gives us confidence about its robustness. Similar tests will be carried out on the S200 Boosters in October, in addition to tests on the Cryogenic engine," Dr Sivan said.

Simply put, the tests are about pushing the rocket components beyond their limits and capabilities.

"Suppose the Engine's operating pressure has 'X value', we will test its performance at an 'X+ value' and do this for multiple parameters" he explained.

ISRO's work that was hit owing to the COVID-19 Lockdown has now picked up pace, with private industries and suppliers resuming operations. Queried on the status of the human module, Dr Sivan said that its design phase was completed and it was handed over for fabrication.

With regards to the spacesuits, ISRO would be utilizing the tried and tested Russian suits for the manned flight of Gaganyaan.

Announced in 2018 by Prime Minister Narendra Modi, Gaganyaan or Human Spaceflight programme is India's most ambitious space-faring mission. Following two unmanned flight trials of the human-rated GSLV Mk3, Indian astronauts would head for space in the third flight.

https://zeenews.india.com/india/exclusive-isro-one-step-closer-in-converting-cargo-carrier-gslv-rocket-into-human-carrier-2376530.html

Optical levitation of glass nanosphere enables quantum control
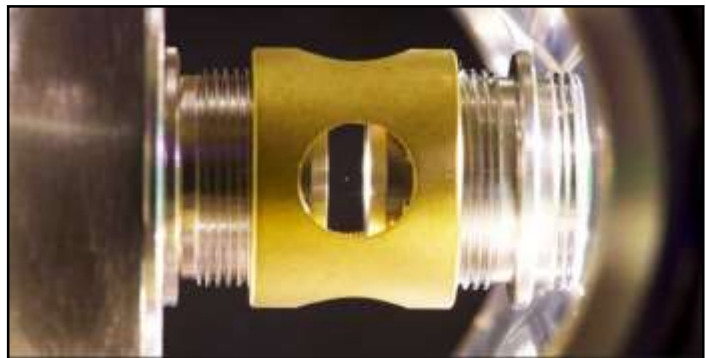
By Oliver Morsch

Researchers at ETH Zurich have trapped a tiny sphere measuring a hundred nanometres using laser light and slowed down its motion to the lowest quantum mechanical state. This technique could help researchers to study quantum effects in macroscopic objects and build extremely sensitive sensors.

Why can atoms or elementary particles behave like waves according to quantum physics, which allows them to be in several places at the same time? And why does everything we see around us obviously obey the laws of classical physics, where such a phenomenon is impossible? In recent years, researchers

A glass sphere a hundred nanometres in diameter (green dot in the centre of the picture) is made to hover by a tightly focused laser beam. Credit: ETH Zurich

have coaxed larger and larger objects into behaving quantum mechanically. One consequence of this is that, when passing through a double slit, these objects form an interference pattern that is characteristic of waves.

Up to now, this could be achieved with molecules consisting of a few thousand atoms. However, physicists hope one day to be able to observe such quantum effects with properly macroscopic objects. Lukas Novotny, professor of photonics, and his collaborators at the Department of Information Technology and Electrical Engineering at ETH Zurich have now made a crucial step in that direction. Their results were recently published in the scientific journal *Nature*.

Hovering nanosphere

The macroscopic object in Novotny's laboratory is a tiny sphere made of glass. Although it is only a hundred nanometres in diameter, it consists of as many as 10 million atoms. Using a tightly focused laser beam, the sphere is made to hover in an optical trap inside a vacuum container cooled down to 269 degrees below zero. The lower the temperature, the smaller is the thermal motion.

"However, to clearly see quantum effects the nanosphere needs to be slowed down even more, all the way to its motional ground state," explains Felix Tebbenjohanns, a postdoc in Novotny's lab. The oscillations of the sphere, and hence its motional energy, are reduced to the point where the quantum mechanical uncertainty relation forbids a further reduction. "This means that we freeze the motional energy of the sphere to a minimum that is close to the quantum mechanical zero-point motion," Tebbenjohanns says.

Measuring and slowing down

To achieve this, the researchers use a method that is well-known from slowing down a playground swing: just the right amount of pushing or pulling in the right direction, depending on where the swing happens to be. With a swing, taking a good look and acting accordingly will do the trick. In the case of a nanosphere, however, a more precise measurement is required. This measurement consists of superimposing the light reflected by the sphere onto another laser beam, which results in an interference pattern. From the position of that interference pattern it is possible to deduce where the sphere is located inside the laser trap. That information, in turn, is used to calculate how strongly the sphere has to be pushed or pulled in order to slow it down. The slowing itself is done by two electrodes, whose electric field exerts a precisely determined Coulomb force on the electrically charged nanosphere.

First quantum control in free space

"This is the first time that such a method has been used to control the quantum state of a macroscopic object in free space," Novotny says. Even though similar results have been obtained with spheres in optical resonators, Novotny's approach has important advantages: it is less susceptible to disturbances, and by switching off the laser light one can, if required, examine the sphere in complete isolation.

Such an isolated examination becomes particularly relevant when trying to actually perform interference experiments, like those observed with light waves, with the nanosphere. This is because in order to see interference effects, the quantum mechanical wave of the sphere needs to be sufficiently large. One way to achieve this is to switch off the laser trap after cooling the sphere to its motional ground state, which allows its quantum wave to expand freely. Different parts of the wave can then fall through a double slit. As with molecules, also in this case the superposition of the matter waves is expected to result in a characteristic interference pattern.

Possible applications in sensors

"For now, however, that's just a pipe dream," Novotny cautions. Still, he also mentions that hovering nanospheres are of interest not only to basic research, but can also have practical applications. Nowadays there are already sensors that can measure the tiniest accelerations or rotations by using interfering atomic waves. As the sensitivity of such sensors increases with increasing mass of the quantum mechanically interfering object, the sensors could be immensely improved with nanospheres.

https://phys.org/news/2021-07-optical-levitation-glass-nanosphere-enables.html
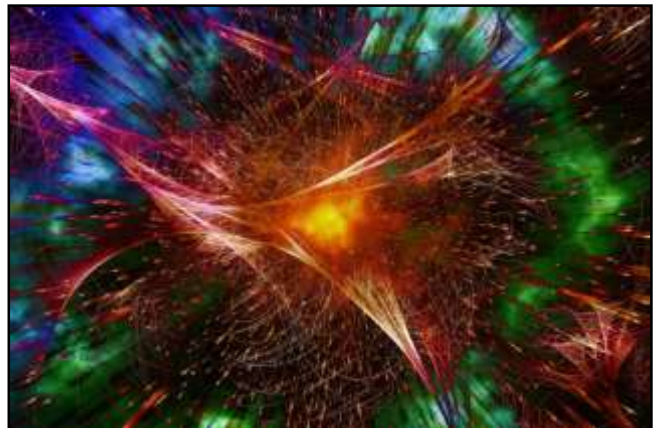
Adding logical qubits to Sycamore quantum computer reduces error rate

By Bob Yirka

The Google Quantum AI team has found that adding logical qubits to the company's quantum computer reduced the logical qubit error rate exponentially. In their paper published in the journal *Nature*, the group describes their work with logical qubits as an error correction technique and outline what they have learned so far.

One of the hurdles standing in the way of the creation of usable quantum computers is figuring out how to either prevent errors from occurring or fixing them before they are used as part of a computation. On traditional computers, the problem is mostly solved by adding a parity bit—but that approach will not work with quantum computers because of the different nature of qubits—attempts to measure them destroy the data. Prior research

Credit: Pixabay/CC0 Public Domain

has suggested that one possible solution to the problem is to group qubits into clusters called logical qubits. In this new effort, the team at AI Quantum has tested this idea on Google's Sycamore quantum computer.

Sycamore works with 54 physical qubits, in their work, the researchers created logical qubits of different sizes ranging from five to 21 qubits to see how each would work. In so doing, they found that adding qubits reduced error rates exponentially. They were able to measure the extra qubits in a way that did not involve collapsing their state, but that still provided enough information for them to be used for computations.

They suggest their findings indicate that it is possible to use logical qubits as a viable means of error correction, though much more work needs to be done. They point out that using logical qubits as a means of error correction introduces another problem—those qubits that are added are also susceptible to errors. And as more are introduced, the problem grows—the point where using such an approach becomes unfeasible is called, quite naturally, the threshold. The Google team has not yet reached the threshold, but expect it to be found in machines with more qubits. They further note that for the approach to work in a true usable quantum computer, a means of reducing the noise that leads to errors is still required.

https://phys.org/news/2021-07-adding-logical-qubits-sycamore-quantum.html

Scientists take first snapshots of ultrafast switching in a quantum electronic device

Electronic circuits that compute and store information contain millions of tiny switches that control the flow of electric current. A deeper understanding of how these tiny switches work could help researchers push the frontiers of modern computing.

Now scientists have made the first snapshots of atoms moving inside one of those switches as it turns on and off. Among other things, they discovered a short-lived state within the switch that might someday be exploited for faster and more energy-efficient computing devices.

A team of researchers created a new method to capture ultrafast atomic motions inside the tiny switches that control the flow of current in electronic circuits. Pictured here are

The research team from the Department of Energy's SLAC National Accelerator Laboratory, Stanford University, Hewlett Packard Labs, Penn State University and Purdue University described their work in a paper published in *Science* today.

"This research is a breakthrough in ultrafast technology and science," says SLAC scientist and collaborator Xijie Wang. "It marks the first time that researchers used ultrafast electron diffraction, which can detect tiny atomic movements in a material by scattering a powerful beam of electrons off a sample, to observe an electronic device as it operates."

Capturing the cycle

For this experiment, the team custom-designed miniature electronic switches made of vanadium dioxide, a prototypical quantum material whose ability to change back and forth between insulating and electrically conducting states near room temperature could be harnessed as a switch for future computing. The material also has applications in brain-inspired computing because of its ability to create electronic pulses that mimic the neural impulses fired in the human brain.

The researchers used electrical pulses to toggle these switches back and forth between the insulating and conducting states while taking snapshots that showed subtle changes in the arrangement of their atoms over billionths of a second. Those snapshots, taken with SLAC's ultrafast electron diffraction camera, MeV-UED, were strung together to create a molecular movie of the atomic motions.

"This ultrafast camera can actually look inside a material and take snapshots of how its atoms move in response to a sharp pulse of electrical excitation," said collaborator Aaron Lindenberg, an investigator with the Stanford Institute for Materials and Energy Sciences (SIMES) at SLAC and a professor in the Department of Materials Science and Engineering at Stanford University. "At the same time, it also measures how the electronic properties of that material change over time."

With this camera, the team discovered a new, intermediate state within the material. It is created when the material responds to an electric pulse by switching from the insulating to the conducting state.

"The insulating and conducting states have slightly different atomic arrangements, and it usually takes energy to go from one to the other," said SLAC scientist and collaborator Xiaozhe Shen. "But when the transition takes place through this intermediate state, the switch can take place without any changes to the atomic arrangement."

Opening a window on atomic motion

Although the intermediate state exists for only a few millionths of a second, it is stabilized by defects in the material.

To follow up on this research, the team is investigating how to engineer these defects in materials to make this new state more stable and longer lasting. This will allow them to make devices in which electronic switching can occur without any atomic motion, which would operate faster and require less energy.

"The results demonstrate the robustness of the electrical switching over millions of cycles and identify possible limits to the switching speeds of such devices," said collaborator Shriram Ramanathan, a professor at Purdue. "The research provides invaluable data on microscopic phenomena that occur during device operations, which is crucial for designing circuit models in the future."

The research also offers a new way of synthesizing materials that do not exist under natural conditions, allowing scientists to observe them on ultrafast timescales and then potentially tune their properties.

"This method gives us a new way of watching devices as they function, opening a window to look at how the atoms move," said lead author and SIMES researcher Aditya Sood. "It is exciting to bring together ideas from the traditionally distinct fields of electrical engineering and ultrafast science. Our approach will enable the creation of next-generation electronic devices that can meet the world's growing needs for data-intensive, intelligent computing."

More information: "Universal phase dynamics in VO2 switches revealed by ultrafast operando diffraction" *Science* (2021). science.sciencemag.org/cgi/doi … 1126/science.abc0652

Journal information: *Science*

https://phys.org/news/2021-07-scientists-snapshots-ultrafast-quantum-electronic.html

The Guardian
For **200** years

Long Covid has more than 200 symptoms, study finds

Calls for national screening programme as symptoms revealed range from brain fog to tinnitus

The largest ever international study of people with long Covid has identified more than 200 symptoms and prompted researchers to call for a national screening programme.

The study found the myriad symptoms of long Covid – from brain fog and hallucinations to tremors and tinnitus – spanned 10 of the body's organ systems, and a third of the symptoms continued to affect patients for at least six months.

A national screening programme would help produce a better understanding of how many people are affected and the kind of support they would need, the researchers said.

The researchers also called for the clinical guidelines for assessing patients with suspected long Covid to be widened beyond cardiovascular and lung-function tests.

Athena Akrami, a neuroscientist at University College London, and senior author of the study, said: "A lot of post-Covid clinics in the UK have focused on respiratory rehabilitation. It's true that a lot of people

A Covid-19 patient being treated in an ICU unit in India. People who have had the virus can later experience a variety of symptoms. Photograph: Xavier Galiana/AFP/Getty Images

have shortness of breath, but they also have a lot of other problems and types of symptoms that the clinics need to provide a more holistic approach to."

She said that she was still experiencing symptoms 16 months after becoming infected with coronavirus, adding: "There are likely to be tens of thousands of long Covid patients suffering in silence, unsure that their symptoms are connected to Covid-19.

"Building on the network of long Covid clinics, which take GP referrals, we now believe a national programme could be rolled out into communities able to screen, diagnose and treat all those suspected of having long Covid symptoms."

The study, published in the Lancet's journal EClinicalMedicine, surveyed 3,762 people with confirmed or suspected long Covid from 56 countries. It identified 203 symptoms, of which 66 were tracked for seven months.

The most common symptoms were fatigue, post-exertional malaise (where people's health worsens after physical or mental exertion) and brain fog. Other effects included visual hallucinations, tremors, itchy skin, changes to the menstrual cycle, sexual dysfunction, heart palpitations, bladder control issues, shingles, memory loss, blurred vision, diarrhoea and tinnitus.

The researchers also captured the progression of symptoms over time. "After six months most of the remaining symptoms are systemic – things like temperature regulation, fatigue, post-exertional malaise – and neurological [affecting the brain, spinal cord and nerves]," Akrami said.

Respondents with symptoms lasting longer than six months, a total of 2,454, said they experienced an average of 13.8 symptoms during the seventh month.

Across the course of their illness, patients' symptoms affected nine organ systems on average. "This is important for medical researchers who are looking for the underlying [disease mechanisms], and also for doctors that provide care and treatment because it suggests they should not just be focusing on one organ system," said Akrami.

About 22% of the people who participated in the survey reported not being able to work – being fired, taking prolonged sick or disability leave, or quitting – due to their illness. And 45% required a reduced work schedule.

Meanwhile, a review led by researchers at the University of Birmingham and published in the Journal of the Royal Society of Medicine, found that those who experienced more than five symptoms of Covid-19 during the first week of infection were at significantly greater risk of developing long Covid, irrespective of age or gender.

Separate research flagged the substantial strains that could be placed on health and social care systems in the coming years, as a result of Covid-related complications that occurred during the acute phase of illness among those patients who were admitted to hospital. It found that half of those hospitalised with Covid-19 developed at least one additional complication during their stay, while a quarter of patients were less able to look after themselves when they were discharged from hospital than before they had the virus. This impact on self-care was even higher among those with neurological complications such as strokes or meningitis.

"Being admitted to hospital with breathing problems is not a complication in itself, the complication is if they get a pneumonia on top of that, or a blood clot or an acute kidney injury," said Dr Annemarie Docherty, an honorary consultant in critical care at the University of Edinburgh, who was involved in the study.

The study, which was published in The Lancet and involved more than 70,000 people in 302 UK hospitals, found that the most common complication was sudden damage to the kidneys causing them to not work properly. This affected one in four of those admitted to hospital with severe Covid. It was followed by lung complications, such as pneumonia or severe inflammation of the lungs, which affected around one in five patients; and heart complications, such as heart attack, inflammation around the heart or an abnormal heart rhythm, which affected just over one in eight (12%).

Although men and over-60s were most commonly affected, 27% of 19- to 29-year-olds and 37% of 30- to 39-year-olds who were admitted to hospital also experienced at least one complication.

"I was actually really quite surprised, because I was expecting the same relationship that we see with death – in other words, that the complications would [primarily affect] the frail and elderly people," said Prof Calum Semple at the University of Liverpool, the study's chief investigator. "I was really quite distraught to see that we were talking about young people, who were previously fit and well, having complications such as an acute kidney injury."

He warned that policymakers must consider the risk of complications for Covid survivors, not just deaths, when making decisions around easing restrictions. For instance, someone with an acute kidney injury will require ongoing monitoring and may require kidney dialysis or transplantation. They could also be at increased risk of cardiovascular disease and osteoporosis in later life because their kidneys are no longer properly regulating their blood pressure and bone minerals.

https://www.theguardian.com/society/2021/jul/15/long-covid-has-more-than-200-symptoms-study-finds