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Press Information Bureau
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Ministry of Defence

Thu, 12 Aug 2021 5:56PM

Raksha Mantri Shri Rajnath Singh to virtually launch major events to mark 75th Independence Day

Key Highlights:

- ***Armed Forces & MoD carrying out nationwide events to celebrate 'Azadi Ka Amrit Mahotsav'***
- ***RM to virtually launch major eventsrelated to Independence Day tomorrow***
- ***Events include National Flag unfurling at various places, product/facility launch, cleaning of statues, Jan Sampark Abhiyaan for veterans& book on deeds of gallantry***

The Armed Forces and different organisations of Ministry of Defence have been conducting various events across the countryto commemorate the 75th anniversary of India's Independence, being celebrated as 'Azadi Ka Amrit Mahotsav'. Raksha Mantri Shri Rajnath Singh will formally launch various major events virtually from New Delhi on August 13, 2021. Following are the events to be launched in the run-up to Independence Day 2021:

- **Unfurling of National Flag at 75 Passes/Places**: To commemorate 75 years of Independence, Border Roads Organisation (BRO) will unfurl the National Flag at 75 Important Passes and Places in the country, displaying their resolve in developing border infrastructure. 75 teams of BRO will depart on August 13, 2021 to these remote passes. The most prominent among them is 'Umlingla Pass', which is the Highest Motorable Road in the World at 19,300 feet, in Eastern Ladakh. The national tri-colour will also be unfurled at prominent infrastructure landmarks like Atal Tunnel, Rohtang and Dhola Sadiya Bridgein the Northeast, besides in friendly foreign countries.
- **Unfurling of National Flag in Islands**: Indian Coast Guard will be unfurling the National Flag at 100 islands Pan-India on August 15, 2021 as part of 'Azadi ka Amrit Mahotsav'. The proceedings will start on August 13, 2021.
- **Freedom Run**: Indian Navy personnel and their families will participate in the freedom run at Naval Officers Mess Varuna, New Delhi. The Raksha Mantri will virtually flag off by the freedom run, which is part of the Fit India Freedom Run 2.0being launched across the country on August 13, 2021 to celebrate 'Azadi Ka Amrit Mahotsav'.
- **Army Expedition**: To instill a sense of pride and confidence among citizens that the Indian Army is committed to protecting the country in all types of terrain & climate, the teams of the Army will scale 75 mountain passes to mark this momentous occasion.The passes include Saserla Pass in Ladakh region, Stakpochan Pass in Kargil region, Satopanth, Harshil, Uttarakhand, Phim Karnla, Sikkim and Point 4493, Tawang region of Arunachal Pradesh.The Raksha Mantri will flag off the event on August 13, 2021.
- **Cleaningof statues**:To pay homage to the freedom fighters and the bravehearts of the country for their invaluable role in India's Independence, National Cadet Corps (NCC)will conduct a

Pan-India event, 'Swatantra Senaniyon ko Naman'. The NCC cadets will carry out cleaning and maintenance of 825 statues adopted by 825 NCC Battalions.

- **Crowdsourcing module for Gallantry awards portal:** To honour the Gallantry award winners and motivate people, especially the youth, to interact with the Gallantry awards portal (https://www.gallantryawards.gov.in/), a 'Gallantrypedia of Awardees' will be launched. People will be able to share their own content about the awardees which would help in making the portal more engaging, dynamic and informative. The portal is a one-stop platform to holistically showcase and celebrate the bravery of the Gallantry award winners.
- **Book on 'Deeds of Gallantry'**: To commemorate India's victory in the 1971 war, a book 'Deeds of Gallantry' will be launched by the Raksha Mantri. The book details 20 selected battles and highlights the gallantry of Indian soldiers.
- **Defence Products**: To showcase and expand the defence export capabilities, various products/facility will be launched by the Raksha Mantri. 'Off the Shelf' Export Ready Defence Products Portfolio will be launched beginning with Fast Interceptor Boat by Goa Shipyard Limited (GSL). Other launches include a Transducer Manufacturing & Production facility developed by Bharat Electronics Limited (BEL) to cater to the production of wide range of Transducers & underwater equipment and oxygen concentrator developed by BEL which works by filtering and concentrating oxygen molecules from the ambient air to provide patients with 90-95 per cent pure oxygen.
- **Jan Sampark Abhiyan**: In another initiativeaimed at addressing the issues of the veterans, Jan Sampark Abhiyan will be launched wherein a representative each of the respective Zila Sainik Board along with a representative of Indian Ex-Servicemen League, a recognised ESM association, will interact simultaneously with the ESM fraternity in 75 districts across the country. The objective is to address the issues of the veterans in a time-bound manner.
- **Rejuvenation of water bodies**: Water is life! Underlining the importance ofconservation of this precious resource,Shri Rajnath Singh will flag off activities for rejuvenationof 75 water bodies across 62 Cantonments by inaugurating the work on the Patel ParkLake in Ambala Cantt.Rejuvenation of traditional and other water bodies/tanks is one of the intervention areas of Jal Shakti Abhiyan, a time-bound, mission-mode water conservation campaign.
- **DRDO Scientists**: A team of scientists of Defence Research and Development Organisation (DRDO) will be moving to border area villages to celebrate Independence Day.

https://pib.gov.in/PressReleasePage.aspx?PRID=1745196

पत्र सूचना कार्यालय
भारत सरकार

रक्षा मंत्रालय

Thu, 12 Aug 2021 5:56PM

रक्षा मंत्री श्री राजनाथ सिंह 75 वें स्वतंत्रता दिवस के अवसर पर आभासी माध्यम से प्रमुख कार्यक्रमों की शुरुआत करेंगे

प्रमुख बातें:

- ***सशस्त्र बल और रक्षा मंत्रालय 'आजादी का अमृत महोत्सव' मनाने के लिए देशव्यापी कार्यक्रम आयोजित कर रहे हैं***
- ***रक्षा मंत्री कल स्वतंत्रता दिवस से संबंधित प्रमुख कार्यक्रमों का आभासी माध्यम से शुभारंभ करेंगे***
- ***इन कार्यक्रमों में विभिन्न स्थानों पर राष्ट्रीय ध्वज फहराना, उत्पाद/ सुविधा का शुभारंभ, प्रतिमाओं की सफाई, पूर्व सैनिकों केलिए जन संपर्क अभियान और शौर्यगाथाओं पर पुस्तक शामिल है***

रक्षा मंत्रालय के अधीन सशस्त्र बल और विभिन्न संगठन भारत की स्वतंत्रता की 75 वीं वर्षगांठ के उपलक्ष्य में देश भर में विभिन्न कार्यक्रमों का आयोजन कर रहे हैं जिसे 'आजादी का अमृत महोत्सव' के रूप मेंमनाया जा रहा है। रक्षा मंत्री श्री राजनाथ सिंह दिनांक 13 अगस्त, 2021 को औपचारिक रूप से नई दिल्ली से आभासी तरीके से अनेक प्रकार के बड़े कार्यक्रमों का शुभारंभ करेंगे। स्वतंत्रता दिवस 2021 के लिए निम्नलिखित कार्यक्रम शुरू किए जाने हैं:

75 पहाड़ी मार्गों/ स्थानों पर राष्ट्रीय ध्वज फहराना: स्वतंत्रता के 75 वर्ष पूरे होने के उपलक्ष्य में सीमा सड़क संगठन (बीआरओ) देश के 75 महत्वपूर्ण पहाड़ी मार्गों और अन्य स्थानों पर राष्ट्रीय ध्वज फहराकर सीमा के बुनियादी ढांचे के विकास में अपने संकल्प को प्रदर्शित करेगा। बीआरओ की 75 टीमें दिनांक 13 अगस्त 2021 को इन सुदूर पहाड़ी मार्गों के लिए रवाना होंगी। उनमें से सबसे प्रमुख 'उमलिंगला दर्रा' है, जो पूर्वी लद्दाख में 19,300 फीट पर दुनिया की सबसे ऊंची वाहन चलाने योग्य सड़क है। मित्र देशों के अलावा पूर्वोत्तर में अटल सुरंग, रोहतांग और ढोला सादिया ब्रिज जैसे प्रमुख अवसंरचना स्थलों पर भी राष्ट्रीय तिरंगा फहराया जाएगा ।

द्वीपों में राष्ट्रीय ध्वज फहराना: भारतीय तटरक्षक दिनांक 15 अगस्त, 2021 को 'आजादी का अमृत महोत्सव' के अंतर्गत पूरे भारत में 100 द्वीपों पर राष्ट्रीय ध्वज फहराएगा। यह कार्यक्रम 13 अगस्त, 2021 से शुरू होगा ।

आज़ादी की दौड़: भारतीय नौसेना के जवान और उनके परिवार नौसेना अधिकारी मेस वरुण, नई दिल्ली में आज़ादी की दौड़ में भाग लेंगे। रक्षा मंत्री आभासी तरीक़े से फ्रीडम रन को हरी झंडी दिखाएंगे, जो 'आजादी का अमृत महोत्सव' मनाने के लिए दिनांक 13 अगस्त, 2021 को देश भर में लॉन्च किए जा रहे फिट इंडिया फ्रीडम रन 2.0 का भाग है।

सेना का अभियान: नागरिकों के बीच गर्व और विश्वास की भावना पैदा करने के लिए कि भारतीय सेना सभी प्रकार के इलाकों और जलवायु में देश की रक्षा के लिए प्रतिबद्ध है, सेना की टीमें इस महत्वपूर्ण अवसर को मनाने के लिए 75 पर्वतीय दर्रों को पार करेंगी। इनमें शामिल हैं लद्दाख क्षेत्र में ससेरला दर्रा, कारगिल क्षेत्र में स्टेकपोचन दर्रा, सतोपंथ, हर्षिल, उत्तराखंड, फिम करनाला, सिक्किम और अरुणाचल प्रदेश

के तवांग क्षेत्र में प्वाइंट 4493। रक्षा मंत्री दिनांक 13 अगस्त, 2021 को इस कार्यक्रम को हरी झंडी दिखाएंगे।

मूर्तियों की सफाई: भारत की स्वतंत्रता में अमूल्य भूमिका के लिए स्वतंत्रता सेनानियों और देश के वीरों को श्रद्धांजलि देनेके लिए राष्ट्रीय कैडेट कोर (एनसीसी) एक अखिल भारतीय कार्यक्रम 'स्वतंत्रता सेनानियो को नमन' आयोजित करेगा । एनसीसी के कैडेट 825 एनसीसी बटालियनों द्वारा अपनाई गई 825 प्रतिमाओं की सफाई और रखरखाव का कार्य करेंगे ।

वीरता पुरस्कार पोर्टल के लिए क्राउड सोर्सिंग मॉड्यूल: वीरता पुरस्कार विजेताओं को सम्मानित करने और लोगों, विशेष रूप से युवाओं को वीरता पुरस्कार पोर्टल (https://www.gallantryawards.gov.in/) से जोड़ने हेतु प्रेरित करने के लिए 'पुरस्कार विजेताओं का गैलेंट्री पीडिया' शुरू किया जायेगा। लोग पुरस्कार विजेताओं के बारे में अपनी विषय वस्तु साझा करने पाएंगे जो पोर्टल को अधिक आकर्षक, गतिशील और सूचना प्रदान करने वाला बनाने में मदद करेगा। पोर्टल वीरता पुरस्कार विजेताओं की शौर्य को समग्र रूप से प्रदर्शित करने और जश्न मनाने का एक ही स्थान पर समस्त सुविधा प्रदान करने वाला मंच है।

शौर्यगाथाओं पर पुस्तक: 1971 के युद्ध में भारत की जीत का जश्न मनाने के लिए रक्षा मंत्री द्वारा एक पुस्तक 'डीड्स ऑफ गैलेंट्री' का विमोचन किया जाएगा। इस पुस्तक में 20 चयनित लड़ाइयों का विवरण दिया गया है और भारतीय सैनिकों की वीरता पर प्रकाश डाला गया है।

रक्षा उत्पाद: रक्षा निर्यात क्षमताओं का प्रदर्शन और विस्तार करने के लिए रक्षा मंत्री द्वारा विभिन्न उत्पादों/ सुविधाओं का शुभारंभ किया जाएगा। गोवा शिपयार्ड लिमिटेड (जीएसएल) द्वारा 'ऑफ द शेल्फ' एक्सपोर्ट रेडी डिफेंस प्रोडक्ट्स पोर्टफोलियो की शुरुआत फास्ट इंटरसेप्टर बोट से की जाएगी। अन्य लॉन्च में भारत इलेक्ट्रॉनिक्स लिमिटेड (बीईएल) द्वारा विकसित एक ट्रांसड्यूसर विनिर्माण और उत्पादन सुविधा शामिल है, जोबीईएल द्वारा विकसित ट्रांसड्यूसर और पानी के नीचे के उपकरण और ऑक्सीजन कंसन्ट्रेटर की विस्तृत श्रृंखला के उत्पादन के लिए आसपास की वायु से ऑक्सीजन अणुओं को फ़िल्टर और केंद्रित करके काम करता है जिससे रोगियों को 90-95 फीसदी शुद्ध ऑक्सीजन प्राप्त हो सके ।

जन संपर्क अभियान: भूतपूर्व सैनिकों के मुद्दों के समाधान के उद्देश्य से एक अन्य पहल के अंतर्गत जन संपर्क अभियान शुरू किया जाएगा, जिसमें संबंधित जिला सैनिक बोर्ड का एक प्रतिनिधि एक मान्यता प्राप्त ईएसएम एसोसिएशन इंडियन एक्स-सर्विसमैन लीग के प्रतिनिधि के साथ एकसाथ देश भर के 75 जिलों में ईएसएम बिरादरी के साथ बातचीत करेगा। इसका उद्देश्य समयबद्ध तरीके से पूर्व सैनिकों के मुद्दों का समाधान करना है ।

जल निकायों का कायाकल्प: जल ही जीवन है! इस बहुमूल्य संसाधन के संरक्षण के महत्व को रेखांकित करते हुए श्री राजनाथ सिंह अंबाला छावनी में पटेल पार्क झील पर कार्य का उद्घाटन करके 62 छावनियों में 75 जल निकायों के कायाकल्प के लिए गतिविधियों को हरी झंडी दिखाएंगे। पारंपरिकऔर अन्य जल निकायों/टैंकों का कायाकल्प जल शक्ति अभियान के हस्तक्षेप वाले क्षेत्रों में से एक है, जो एक समयबद्ध, मिशन-मोड जल संरक्षण अभियान है ।

डीआरडीओ वैज्ञानिक: रक्षा अनुसंधान और विकास संगठन के वैज्ञानिकों की एक टीम स्वतंत्रता दिवस मनाने के लिए सीमा क्षेत्र में स्थित गांवों में जाएगी।

https://pib.gov.in/PressReleasePage.aspx?PRID=1745276

Hindustan Times

Fri, 13 Aug 2021

LCA Mk-1A to take first flight by March, Says HAL Chairman

HAL will also next week announce a multimillion-dollar engine deal with US firm GE Aviation for 99 F404 engines to power India's latest indigenous fighter, chairman R Madhavan said

By Rahul Singh

New Delhi: State-run plane maker Hindustan Aeronautics Limited (HAL) has set a March 2022 deadline to carry out the first flight of the LCA (light combat aircraft) Mk-1A jet after wrapping up the necessary design activities, HAL chairman R Madhavan said on Thursday.

The contract for the 83 Mk-1A jets took the total number of LCA variants ordered to 123.(PTI file photo)

HAL will also next week announce a multimillion-dollar engine deal with US firm GE Aviation for 99 F404 engines to power India's latest indigenous fighter, he said. The developments come six months after the defence ministry awarded a ₹48,000-crore contract to HAL for 83 LCA Mk-1A jets for the Indian Air Force (IAF). The first Mk-1A aircraft will be delivered to the air force by March 2024, with the rest slated to join its combat fleet by 2029.

"The preliminary design review is over and so is the critical design review for several systems, including mission computer, digital map generator and digital flight control systems. We are integrating the active electronically scanned array (AESA) radar and the electronic warfare suite on the final operational clearance (FOC) version of the LCA. After it is proven there, we will integrate it on the final Mk-1A version," the HAL chairman said. AESA radar provides superior detection, tracking and targeting capabilities.

The contract for the 83 Mk-1A jets took the total number of LCA variants ordered to 123. The 40 LCAs already ordered by IAF are in the initial operational clearance (IOC) and the more advanced FOC configurations. The LCA Mk-1A will come with a raft of additional improvements over the FOC aircraft, making it the most advanced LCA variant so far.

Madhavan said HAL was working with Aeronautical Development Agency, a principal partner in the fighter jet project, on software development for the Mk-1A jet and the effort was progressing smoothly. "This is for all the software that has to be changed in the Mk-1A aircraft because of new systems coming in. We plan to carry of out the first flight of the aircraft by March 2022 and get the certification from the Centre for Military Airworthiness and Certification (CEMILAC) by mid-2023 before kicking off production," he said.

A regulatory body under the Defence Research and Development Organisation (DRDO), CEMILAC is responsible for the airworthiness certification of military aircraft, helicopters, aero-engines and air-launched weapons.

The delivery schedule requires HAL to provide the IAF with the first two aircraft in 2024, eight in 2025 and the remaining in batches by 2029 at the rate of 14 to 16 fighters every year.

"We are working on a tight schedule, but HAL may deliver all the aircraft ahead of time. We will deliver a new aircraft with significant changes three years after the signing of contract. Even foreign original equipment manufacturers (OEM) take about five to six years to do something like that," the HAL chairman said.

He said the deal for the F404 engines for the Mk-1A aircraft had been finalised, with HAL striking a good bargain with GE Aviation after several rounds of negotiations. Expected to be

worth around $700 million, the engine deal is the biggest contract being awarded by HAL for the project. The existing LCA variants use the same engine.

"We have got a good price from GE Aviation after 17 to 18 rounds of negotiations. HAL is also holding discussions with its entire vendor base for reducing cost as the volumes are higher. The target is a price reduction of 15% to 20%," Madhavan said. HAL has set a deadline of November 2021 to place purchase orders for raw materials so that machining activities can begin next year onwards, he said.

The Mk-1A variant will come with digital radar warning receivers, external self-protection jammer pods, AESA radar, advanced beyond-visual-range (BVR) missiles and significantly improved maintainability. The fighter's indigenous content is expected to be around 60%, compared to 50% in the existing variants.

"HAL now has to perform since the stakes involved are very high -- IAF's potency is dependent on it. HAL's work culture and ethos have to turn a new leaf to ensure that aircraft production timelines are met. Rigid adherence to quality in production and timely provisioning of spares would define successful contract implementation," Air Vice Marshal Manmohan Bahadur (retd), former additional director general, Centre for Air Power Studies, previously told HT.

https://www.hindustantimes.com/india-news/lca-mk-1a-to-take-first-flight-by-march-says-hal-chairman-101628794848874.html

THE WEEK

Fri, 13 Aug 2021

Arjun tanks to mark the finest chapter in 'Make in India'

By Pradeep R Sagar

If tanks succeed, victory follows," said Heinz Wilhelm Guderian, a German general during World War II. A tank warfare strategist, Guderian was a firm believer in the utility of the armoured behemoths.

Ready to roll: CVRDE director V. Balamurugan (centre) with Team Arjun in front of the battle tank, in Chennai | Arvind Jain

India's own main battle tank has been in the making for 50 years. In November last year, while visiting soldiers at the border town of Longewala in Rajasthan, Prime Minister Narendra Modi rode an armoured beast—Arjun Mk-IA, a third-generation main battle tank indigenously designed, developed and manufactured by the Defence Research and Development Organisation, in association with 15 academic institutions, eight labs and several micro, small and medium enterprises. Modi's ride was a proud moment for the team of 500 scientists and technicians who developed Arjun. The Army will now order 118 units of the upgraded tank, in what is expected to mark the finest chapter in the Make in India story.

With around 4,300 tanks and 8,700 armoured vehicles, India's armoured strength is one of the best in the world. "Though every country boasts tank capability, the way Arjun has been tested is beyond what any army in the world can do," said V. Balamurugan, director of Combat Vehicles Research and Development Establishment (CVRDE) at Avadi near Chennai, the DRDO's lead laboratory that designed the tank. "Arjun (upgraded version) has done over 7,000km of trial runs, which does not happen in any country. It is on par with other main battle tanks in the world."

When THE WEEK visited Avadi, the mood was upbeat. The developers expect Arjun to replace the Russian T-72 that is still in service. And when it happens, it will be a dream come true. The need to develop a battle tank had become clear in 1971, when India fought its last full-fledged war with Pakistan with the help of Russian tanks.

Tank development is based on two philosophies—eastern and western. The eastern philosophy, dominated by the Russians, lays stress on smaller, lightweight tanks for en masse attacks. The western philosophy, followed by the British, Americans and Germans, focuses on heavy tanks. While building Arjun, the DRDO chose the western philosophy—and emulated German tanks in particular.

A tank requires firepower, mobility and protection as basic features. The specifications for Arjun, however, kept changing for more than two decades as the Army kept upgrading requirements. Also, India's diverse terrain conditions—from the rocky parts of Jammu and Kashmir to the alluvial soil of Punjab and northern Rajasthan to the marshy Rann of Kutch—posed a huge challenge in terms of cross-country mobility capability. Though India had been making Vijayanta tanks under license from Vickers in the UK, developing a main battle tank was an altogether different ball game.

In 2007, almost 24 years after its first prototype rolled out, and four years after it formally entered service in the Army, Arjun was fielded against the Russian T-90 and T-72 in Rajasthan. Unimpressed, the Army pointed out several deficiencies—inadequate fire control system, inaccurate guns, low speeds in tactical areas, and persistent inability to operate in temperatures over 50 degrees Celsius. Within two years, though, the DRDO solved the problems.

It was initially named Chetak (after the horse of Maharana Pratap). But, by then, automobile manufacturer Bajaj Autos had launched its scooter by the same name. It was General A.S. Vaidya (then army chief), in 1985, who suggested the name Arjun.

India's armoured fleet has names like Bhishma (Russia's T-90) and Ajay (T-72) and Vajra (the latest K9 155 self-propelled artillery gun).

With the induction of the first batch of Arjun, India entered a select group of 10 countries that have designed and developed their own main battle tanks. The group includes the UK, France, Germany, the US, Israel, South Korea, Russia, Japan and China. As it prepares to become India's main battle tank, Arjun would also have to face additional threats from air, particularly from low-flying aircraft. "Therefore, an air-defence gun would have to be added," said Balamurugan.

The latest version of Arjun (Mk-1A) is considered to be one of the world's most advanced tanks. It carries 39 rounds of different types of ammunition, including thermobaric shells designed as bunker-busters. It is also armed with a 12.7mm anti-aircraft gun that is remotely operated from within the crew compartment.

Arjun weighs 68 tonnes, though, making deployments tough. Existing culverts and bridges are not designed to carry such a heavyweight tank. The DRDO says the upgrade is heavier because of modifications sought by the Army and the stipulated inclusion of an extra crew member. Unlike Russian tanks, which has a crew of three (commander, driver and gunner) Arjun has to accommodate four (including a loader). Russian tanks are autoloaders.

"With additional protection and armaments, the tank's weight increased," said V. Balaguru, additional director of CVRDE. According to him, though, Arjun's weight is more or less equal to that of several main battle tanks. Challenger 2 of the UK weighs 62.5 tonnes (combat-ready weight of 75 tonnes), Leopard 2A6M of Canada weighs 62.5 tonnes and Abrams M1A1 of the US weighs 67.5 tonnes. Arjun's suspension running system—which stabilises the tank while firing—was one of the most difficult technologies to develop. "Besides providing a stable platform to the tank that is essential for ensuring fire-on-the move capability, it also gives excellent ride comfort for the crew, minimising fatigue even on extended runs," said S. Ganesan, additional director (mechanical), at CVRDE.

In 2000, the Army had inducted 124 Arjun Mk-1 tanks, with 62 per cent of equipment sourced from abroad. More than two decades later, the DRDO is preparing to roll out the next-gen Arjun.

Four years from now, most of the items that are currently imported will be manufactured in India as part of the Atmanirbhar initiative.

"We have waited 22 years to convince the military that Arjun (with 81 improvements) is the best tank," said Balamurugan. "And finally, we are getting an order for 118 units."

https://www.theweek.in/theweek/current/2021/08/12/arjun-tanks-to-mark-the-finest-chapter-in-make-in-india.html

The EurAsian Times

Fri, 13 Aug 2021

DRDO successfully tests missile engine technology; experts say will boost India's military drone capability

By Aritra Banerjee

India's successfully tested the Nirbhay subsonic cruise missile, powered by an indigenous engine, for a range of 150 kilometers off the coast of Odisha on August 11, according to reports.

The missile engine called 'Manik' was developed by the Defence Research and Development Organisation (DRDO) under its Indigenous Technology Cruise Missile (ITCM) program. Interestingly, the engine may be used in one more weapon system as well.

Manik has been described as a 450 kgf thrust class Small Turbo Fan Engine (STFE) and is the brainchild of the Gas Turbine Research Establishment (GTRE). The DRDO public relations officer (PRO) did not reply to a text message sent by The EurAsian Times seeking his comments on the latest test.

India had moved a limited number of Nirbhay missiles to the Line of Actual Control where the Indian Army is locked in a standoff with China's PLA, Hindustan Times reported in December last year.

The STFE is a generic twin-spool engine without an afterburner. It is an expendable, single-use, short-life turbofan engine. The DRDO is reportedly planning to replace the foreign engine used by the missile with Manik.

The latest exercise is part of a series of tests that have been conducted for the Nirbhay missile — a project which has long been mired in technical failures.

The two-stage ICTM has a length of six meters, a diameter of 0.52 m, a wingspan of 2.7 meters, and a launch weight of about 1.5 tons, all of which correspond to the dimension of the Nirbhay cruise missile. The 150 Km test should validate the vertical climb of the engine. However, it is not yet known whether the subsequent dive and horizontal flight have been tested.

According to experts, this engine has been built not only to power Indian cruise missiles but also Unmanned Aerial Vehicles (UAVs).

Significance of The Missile Test

Speaking about the August 11 test, Dr. S Guruprasad, a former DRDO Director-General (Production Coordination and Services Interaction), told The EurAsian Times, "This development is very significant. First, it is an excellent design and state-of-the-art in this class of engines. The long experience while developing the Kaveri engine has come in handy here; GTRE has excellence and a complete knowledge repository."

"The material technologies that are required have already been developed by DMRL Hyderabad. This engine does not have or rather does not need an afterburner for this application or even if this

engine is used in UAVs. Secondly, the industry base for manufacturing these engines is well established. HAL has been manufacturing aero engines and even the private industries are capable of manufacturing these engines," added the former senior DRDO official.

"The engines of UAVs are a sensitive issue internationally, especially weaponized UAVs with very long endurance and range," said Dr. Guruprasad, adding that with the completely indigenous technologies India can build and operate a variety of long-range UAVs with significant surveillance and weaponized UAVs.

"The cruise missiles built around this engine can easily cover 1000 km and UAVs may have a range of 2000 km depending on the design and altitude of operation".

Shashwat Gupta Ray, a veteran defense journalist and former editor, Gomantak Times, who has extensively covered DRDO developments in the past, has echoed Dr. Guruprasad's views that the successful testing of the Manik would provide a big boost to the Nirbhay program.

"The test-launch of Indigenous Technology Cruise Missile with a new Made-in-India turbofan engine is a remarkable technological breakthrough. The successful testing of the Manik engine can lead towards developing a wider range of engines that could enhance the reach and speed of our cruise missiles in the future," Ray told The Eurasian Times.

"Most importantly, it could play a crucial role in strengthening our UAV technology, considering that the Armed Forces is actively sourcing powerful drones to counter a similar kind of threat emerging from across the border," he added.

Some military technology analysts believe that the real-world application of the indigenously developed Manik engine in UAVs is speculative at best. However, a fact that has largely been accepted by the strategic community is that the use of weaponized drones is a reality and that India needs a well-defined counter-drone policy.

UAVs — A High-Priority Area

The strategic discourse towards anti-drone operations became increasingly vocal in the wake of the drone attack inside the highly sensitive Jammu Airforce Station last month.

A pair of UAVs successfully managed to infiltrate and exfiltrate from the airbase before dropping two different types of Improvised Explosive Devices (IED) in a span of a few minutes of one another.

The remotely piloted attack (which was believed to have had a Pakistani signature) resulted in two Indian Air Force (IAF) personnel sustaining minor injuries. Mere weeks after this attack, another drone was detected flying near the air force station.

"UAV operations are coming of age and the UAV threat is increasing by the hour. As the threat increases, the need to protect own forces and vulnerabilities against this potent game-changing threat is also growing," wrote former Director-General of Artillery, Lieutenant General PR Shankar (Retd) in a paper published by the United Services Institute of India (USI).

The retired General, who is currently a professor of Aerospace Engineering at the Indian Institute of Madras, outlined a comprehensive counter-drone doctrine in his paper and stressed the need to focus on the mounting drone threat.

"Commercial drones with military GPS facilities are a potent threat for delivery of ordnance accurately on a target, without endangering the originator. The need, therefore, exists to look at regulation of ownership and operation within the country," said Rear Admiral Vineet Bakshi (Retd), when asked about the drone threat and ease of commercial drone ownership in the country.

The Eurasian Times reported that India's home-grown Rustom-2 medium-altitude long-endurance (MALE) drone could be manufactured by state-owned Hindustan Aeronautics Limited (HAL). Rustom-2, now called TAPAS BH-201, is touted to be India's first indigenously built unmanned combat aerial vehicle (UCAV) and has an operational range of 1000 km, with a payload capacity of 350 kg.

https://eurasiantimes.com/drdo-successfully-tests-missile-engine-technology-experts-say-will-boost-indias-military-drone-capability/

जागरण

Fri, 13 Aug 2021

स्वतंत्रता दिवस की वजह से इन दो दिनों मेट्रो स्टेशनों पर बंद रहेगी पार्किंग

वतंत्रता दिवस के अवसर पर सुरक्षा उपायों के मद्देनजर दिल्ली मेट्रो के स्टेशनों पर शनिवार यानि 14 अगस्त 2021 को सुबह 600 बजे से रविवार 15 अगस्त तक पार्किंग की सुविधा नहीं मिलेगी। 15 अगस्त की दोपहर 2 बजे के बाद वाहन चालक यहां अपने वाहन पार्क कर सकेंगे।

By Vinay Kumar Tiwari

नई दिल्ली: स्वतंत्रता दिवस के अवसर पर सुरक्षा उपायों के मद्देनजर दिल्ली मेट्रो के स्टेशनों पर शनिवार यानि 14 अगस्त, 2021 को सुबह 6:00 बजे से रविवार 15 अगस्त तक पार्किंग की सुविधा नहीं मिलेगी। 15 अगस्त की दोपहर 2 बजे के बाद वाहन चालक यहां अपने वाहन पार्क कर सकेंगे। हालांकि मेट्रो सेवाओं पर इसका कोई असर नहीं पड़ेगा। दिल्ली मेट्रो रेल कारपोरेशन के कार्यकारी निदेशक अनुज दयाल की ओर से ये जानकारी दी गई। उन्होंने बताया कि हर साल सुरक्षा के मद्देनजर इस तरह के एहतियाती कदम उठाए जाते हैं।

इस बार लालकिला की सुरक्षा और भी कड़ी कर दी गई है। पहली बार रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) द्वारा दो एंटी ड्रोन रडार लगाया गया है। अगर कोई संदिग्ध ड्रोन लालकिला के तीन-चार किलोमीटर के दायरे में दिखाई देगा तो डीआरडीओ के जवान उसे वहीं जाम कर जमीन पर गिरा सकेंगे। पुलिस अधिकारियों का कहना है कि इस बार सीसीटीवी कैमरे भी हर बार की तुलना में काफी अधिक लगाए गए हैं। प्रधानमंत्री जिन मार्गो से लालकिला आएंगे और वापस लोक कल्याण मार्ग जाएंगे। उक्त रूटों के अलावा लालकिला के चारों तरफ जगह-जगह सीसीटीवी कैमरे लगाए गए हैं। सीसीटीवी कैमरों पर निगरानी के लिए दस कंट्रोल रूम बनाए गए हैं।

स्वतंत्रता दिवस पर लालकिले की सुरक्षा इस साल सबसे अधिक कड़ी रहेगी। अब से पहले सात लोक कल्याण मार्ग स्थित प्रधानमंत्री आवास से लेकर लालकिला तक 11.2 किलोमीटर के बीच कोई सेफ हाउस नहीं बनाया जाता था। केवल लालकिला के अंदर एक सेफ हाउस होता था। लेकिन इस साल पहली बार ड्रोन हमले के संभावित खतरे को देखते हुए प्रधानमंत्री आवास से लालकिला के बीच हर दो किलोमीटर पर एक-एक सेफ हाउस बनाया गया है।

पीएम आवास से लालकिला के बीच इस बार कुल पांच सेफ हाउस बनाया गया है। अत्यंत गोपनीय तरीके से बनाया गया सेफ हाउस ऊंची इमारतों में बनाया गया है। इसका मसकद यह है कि प्रधानमंत्री द्वारा लालकिला के लिए आवास से निकलने पर सुरक्षाकर्मियों को जैसे ही कहीं हमले की जानकारी मिलेगी तो उन्हें तुरंत नजदीक के सेफ हाउस में सुरक्षित ले जाया जा सके।

https://www.jagran.com/delhi/new-delhi-city-ncr-delhi-metro-parking-news-parking-will-be-closed-at-metro-stations-from-august-14-to-15-at-2-pm-21921971.html

COVID 19: DRDO's Contribution

THE FREE PRESS JOURNAL SINCE 1928

Fri, 13 Aug 2021

Madhya Pradesh: Combined capacity of two oxygen plants raised to 830 liters per minute in Jaora

Now 83 people will get 10 liters of oxygen per minute.

Jaora (Madhya Pradesh): The health department of Jaora village of Ratlam has speeded up its preperation in its fight against the much anticipated covid third wave.

The department is emphasising on an uninterrupted oxygen supply to the patients, as many people here had to face a lots of trouble to get oxygen during the time of second wave here.

From the supply of oxygen to the supply of all kinds of tests, arrangements have been.

An oxygen plant of 330 litre per minute capacity is already in place. Another 500 litre per minute capacity plant approved by the central government will also be commissioned within a fortnight. The machines have come here from Pune.

However, there is a shortage of staff, so the health department is preparing to take the help of public health workers in the field.

They have also been given the preliminary training along with PSC selection process is going on and it is also expected to get doctors.

Not only government, but the social workers also came forward and Rogi Kalyan Samiti got about Rs one crore with public cooperation. Due to this, the oxygen plant of 330 LPM capacity became operational in May-June. Along with the CM, MLA Dr Rajendra Pandey inaugurated it.

After this the MLA discussed with the CM regarding the demand for additional plant. The state government sent the proposal to the centre and from there the plant of 500 LPM (liter per minute) capacity was approved. It is to be set up through DRDO. Its machines arrived from Pune on Tuesday.

The installation will be done in a fortnight. With this the total capacity of both the plants together is 830 LPM. Even if 10 liters of oxygen is given per person, 83 people will be supplied with oxygen.

At the same time, at the rate of 5 liters, 164 patients will be able to get oxygen. On the second floor, two wards for 20 children and 80 beds including private ward below are ready for older patients. Oxygen pipeline has also been laid till the beds.

https://www.freepressjournal.in/indore/madhya-pradesh-combined-capacity-of-two-oxygen-plants-raised-to-830-liters-per-minute-in-jaora

Defence News

Defence Strategic: National/International

Press Information Bureau
Government of India

Ministry of Defence

Thu, 12 Aug 2021 6:02PM

Validation & closing ceremony exercise INDRA-21

The closing ceremony of the Indo-Russia joint exercise INDRA was held on 12 Aug 2021. The aim of the exercise was to acquaint each other with operational planning, procedures, combat drills and conducting of joint operations against internationalterrorist groups.

Both the contingents, comprising of 250 soldiers from each side displayed great enthusiasm and professionalism while practicing joint drills during the conduct of the exercise. During the validation phase, Mechanised Forces and Special Sorces practiced integrated live firing and specialised joint operations which included clearance of rebel stronghold in an urban setting. The troops not only learnt about each others organizations, but also exchanged ideas and best practices being followed in Peace KeepingOperations underaegis of the United Nations.

The exercise was a grand success and has taught valuable lessons to the troops of the participating countries. The camaraderie developed between the contingents during the course of exercise will certainly assist in enhancing confidence between the armies. The conduct of such Joint Military Exercises is an important step to strengthen the relations between India and Russia.

https://pib.gov.in/PressReleasePage.aspx?PRID=1745198

पत्र सूचना कार्यालय
भारत सरकार

रक्षा मंत्रालय

Thu, 12 Aug 2021 6:02PM

प्रमाणीकरण और समापन समारोह अभ्यास इंद्र-2021

भारत और रूस की सेनाओं का संयुक्त युद्ध अभ्यास इंद्र का समापन समारोह 12 अगस्त 2021 को आयोजित किया गया। इस युद्धाभ्यास का उद्देश्य दोनों सेनाओं को एक दूसरे की परिचालन योजना, प्रक्रियाओं, युद्ध अभ्यास और अंतरराष्ट्रीय आतंकवादी समूहों के खिलाफ संयुक्त अभियानों के संचालन से परिचित कराना था। युद्धाभ्यास के संचालन के दौरान संयुक्त प्रशिक्षण में हिस्सा लेते हुए दोनों सेनाओं के 250 सैनिकों की दो टुकड़ियों ने बेहद उत्साह और अपने पेशेवराना अंदाज का प्रदर्शन किया। अभ्यास के अंतिम चरण के दौरान मैकेनाइज्ड फोर्सेज और विशेष दस्तों ने एकीकृत लाइव फायरिंग तथा विशेष संयुक्त अभियानों में भाग लिया, इनमें शहरी इलाकों में विद्रोहियों की निकासी का अभियान भी शामिल था। इस दौरान सैनिकों ने न केवल एक-दूसरे के संगठनों के बारे में सीखा, बल्कि संयुक्त राष्ट्र के दिशा-निर्देशों के अंतर्गत शांति अभियानों में अपनाए जा रहे विचारों और सर्वोत्तम प्रथाओं का भी आदान-प्रदान किया।

यह युद्ध अभ्यास बेहद सफल रहा और इस दौरान प्रशिक्षण में भाग लेकर दोनों देशों के सैनिकों को महत्वपूर्ण कार्य विधियां सीखने को मिली हैं। युद्धाभ्यास के दौरान दोनों टुकड़ियों के बीच विकसित सौहार्द निश्चित रूप से सेनाओं के बीच आपसी विश्वास को बढ़ाने में मदद करेगा। इस तरह के संयुक्त सैन्य अभ्यास का आयोजन भारत और रूस के बीच संबंधों को मजबूत करने के लिए एक महत्वपूर्ण कदम है।

https://pib.gov.in/PressReleasePage.aspx?PRID=1745250

Press Information Bureau
Government of India

Ministry of Defence

Thu, 12 Aug 2021 2:10PM

Maiden Al-Mohed Al-Hindi exercise set to begin between Indian Navy and Saudi Arabia Navy

The Indian Navy's visit to Kingdom of Saudi Arabia was set rolling with the Flag Officer Commanding Western Fleet (FOCWF), Rear Adm Ajay Kochhar visiting the Fleet Cdr of Royal Saudi Navy's Eastern Fleet, Rear Adm Majid Al Qahtani on 10 Aug 21. This was held at King Abdul Aziz Naval Base, which is the Headquarters for Saudi Eastern Fleet. The FOCWF also visited the King Fahd Naval Academy and met with the Commandant Rear Admiral Faisal Bin Fahd Al Ghufaily.

Dr Ausaf Sayeed, Indian Ambassador to Kingdom of Saudi Arabia, visited INS Kochi at Al Jubail where he held a press conference onboard along with the FOCWF and the Commanding Officer of the ship.

On 11 Aug 21, the Indian Western Fleet Commander accompanied by the Indian Ambassador called on the Governor of Eastern Province of Kingdom of Saudi Arabia, Saud bin Nayef Al Saud at Dammam.

On the operational front, gearing up for the maiden bilateral exercise 'AL – Mohed AL – Hindi', the team of Indian Navy met with counterparts of the Royal Saudi Navy for a co-ordinating conference at King Abdulaziz Naval base in Al Jubail, Saudi Arabia. For deeper understanding of each other’s operational practices, lectures by subject matter experts from both navies were also held.

https://pib.gov.in/PressReleasePage.aspx?PRID=1745103

पत्र सूचना कार्यालय
भारत सरकार

रक्षा मंत्रालय

Thu, 12 Aug 2021 2:10PM

भारतीय नौसेना और सऊदी अरब नौसेना के बीच पहला अल-मोहेद अल-हिंदी अभ्यास शुरू होने को तैयार

भारतीय नौसेना की वेस्टर्न फ्लीट के फ्लैग ऑफिसर कमांडिंग रीयर एडमिरल अजय कोचर के दिनांक 10 अगस्त 2021 को रॉयल सऊदी नौसेना के ईस्टर्न फ्लीट के फ्लीट कमांडर रीयर एडमिरल माजिद अल कहतानी से मुलाकात करने के साथ ही भारतीय नौसेना की सऊदी अरब की यात्रा की शुरुआत हुई। यह आयोजन किंग अब्दुल अजीज नेवल बेस में आयोजित किया गया जो सऊदी अरब के पूर्वी बेड़े का मुख्यालय है। एफओसीडब्ल्यूएफ ने किंग फहद नौसेना अकादमी का भी दौरा किया और कमांडेंट रीयर एडमिरल फैसल बिन फहद अल घुफैली से मुलाकात की।

सऊदी अरब में भारत के राजदूत डॉ औसाफ सईद ने अल जुबैल मेंआईएनएस कोच्चि का दौरा किया जहां उन्होंने एफओसीडब्ल्यूएफ और जहाज के कमांडिंग ऑफिसर के साथ एक प्रेस कॉन्फ्रेंस की ।

दिनांक 11 अगस्त 2021 को भारतीय नौसेना के पश्चिमी बेड़े के कमांडर ने भारतीय राजदूत के साथ सऊदी अरब के पूर्वी प्रांत के गवर्नर सऊद बिन नायेफ अल सऊद से दम्मम में मुलाकात की ।

नौसैनिक अभियान के मोर्चे पर प्रथम द्विपक्षीय अभ्यास 'अल -मोहेद अल - हिंदी' के लिए तैयार भारतीय नौसेना की टीम ने अल जुबैल, सऊदी अरब में किंग अब्दुल अज़ीज़ नौसेना बेस में एक समन्वय सम्मेलन के लिए रॉयल सऊदी अरब नौसेना के अपने समकक्षों के साथ मुलाकात की। एक-दूसरे की अभियानगत परिपाटियों की बेहतर समझ के लिए दोनों नौसेनाओं के संबंधित विषयोंके विशेषज्ञों द्वारा व्याख्यान भी आयोजित किए गए।

https://pib.gov.in/PressReleasePage.aspx?PRID=1745279

BHASKAR LIVE
bhaskarlive.in

Fri, 13 Aug 2021

Must build capacity to improve operability in complex conditions: IAF Chief

New Delhi: Indian Air Force maintenance command must have a building capacity to improve maintainability and operability in complex conditions along with a thrust on active pursuance of indigenised projects, said Air Chief Marshal R.K.S Bhadauria, the Indian Air Force chief.

He said this during Commanders' Conference on the Maintenance Command at Vayu Sena Nagar in Nagpur on August 11 and 12. Air Chief Marshal Bhadauria on arrival was received by Air Marshal Shashiker Choudhary.

The two-day conference was attended by the commanders of base repair depots, equipment depots and other stations and units under maintenance command, who reviewed the ongoing projects.

Indian Air Force chief took stock of goals and tasks for maintenance command for the year ahead.

In his address to the Commanders, Air Force Chief noted the pivotal role of maintenance command in meticulous management of the vast and varied inventory of the Indian Air Force.

Commending the Command for initiatives launched to meet the evolving needs of a modern and future ready IAF, he highlighted "the need for building capacity to improve maintainability and operability in complex conditions along with a thrust on active pursuance of indigenised projects".

While highlighting recent events, the Indian Air Force chief underscored the importance of due vigilance to meet newer security challenges.

He delved on aspects of embracing modern technology such as Artificial Intelligence and automation in the task of transformation and restructuring of IAF to ensure that it is always combat ready.

He exhorted the Commanders to imbibe the 'mantras' of indigenisation and modernisation in their efforts to ensure that maintenance command remains the fountainhead of maintenance and logistics support to integrated operations in the future.

Earlier this month, Air Chief Marshal Bhadauria was in Israel and the visit was aimed at enhancing military cooperation between the two countries.

During his visit to Israel, the Indian Air Force in a statement had said, "As strategic partners, India and Israel enjoy strong, multi-dimensional ties, an important pillar of which is defence cooperation and military level exchanges."

"Both sides will discuss enhancement in the depth and scope of bilateral exchanges between the two Air Forces."

Prior to his visit to Israel, Air Chief Marshal Bhadauria called on Major General Ibrahim Nasser M. Al Alawi, Commander of the UAE Air Force and Air Defence. Both noted the rapid progress made in bilateral engagements and had wide-ranging talks to identify avenues and measures for further strengthening the robust relationship between the two Air Forces.

https://www.bhaskarlive.in/must-build-capacity-to-improve-operability-in-complex-conditions-iaf-chief/

Hindustan Times

Fri, 13 Aug 2021

UP defence corridor: 2 firms invest ₹580 crore to make drones

In February 2018, PM Modi had announced ₹20,000 crore defence industrial corridor in Bundelkhand - considered one of the most backward regions in the state. The corridor will have six nodes - Aligarh, Agra, Jhansi, Chitrakoot, Kanpur and Lucknow

By Amit Chaturvedi

New Delhi: In a major push to the defence corridor in Uttar Pradesh, the Yogi Adityanath government announced on Thursday that two companies are investing over ₹580 crore to make drones. The announcement to establish a defence corridor in the state was made by Prime Minister Narendra Modi in 2018.

The companies - Encore Research Lab LLP and Allen & Alvan Private Limited - are investing ₹550 crore and ₹30.75 crore, respectively to set up plants in Aligarh node to make drones. These unmanned aerial vehicles (UAVs) will not only help the Indian security forces, but can be used in disaster management, enhancing security and agriculture, the UP government said in a release.

Uttar Pradesh government said that a number of companies have shown interest in setting plants in the state make defence equipment.(HT File Photo)

The companies have already been allotted 10 hectares of land and the construction is expected to begin soon, the relsease said.

Many domestic and foreign companies have shown interest in setting up defence related projects in Uttar Pradesh, the government said, adding that memorandums of Understanding (MoUs) worth ₹50,000 crore were signed durign Defence Expo held in Lucknow in 2020.

Chief minister Yogi Adityanath has directed the officials to remove all the bottlenecks and ensure thhat companies do not face any hurdles in procuring land, or in other procedures for setting up their units.

According to Uttar Pradesh Expressways Industrial Development Authority (UPEIDA), 29 companies have submitted their proposals to state government for setting up factories near Aligarh, 11 around Lucknow, eight in Kanpur and six in Jhansi. Based ont eh requests received from these companies, UPEIDA has so far allotted 55.40 hectares of land to 19 reputed companies in the Aligarh node. Together, these companies will invest ₹1245.75 crore to make defence equipment.

UPEIDA is set to inaugurate Aligarh node of the defence corridor this month while Kanpur and Jhansi nodes would be opened in September and October respectively.

The defence corridor would come up in Bundelkhand region and is expected to generate more than one lakh jobs. The corridor will have six nodes - Aligarh, Agra, Jhansi, Chitrakoot, Kanpur and Lucknow.

On February 21, 2018, PM Modi had announced ₹20,000 crore defence industrial corridor in Bundelkhand - considered one of the most backward regions in the state.

https://www.hindustantimes.com/india-news/up-defence-corridor-2-firms-invest-rs-580-crore-to-make-drones-101628770936984.html

THE HINDU

Fri, 13 Aug 2021

Pakistan successfully test-fires nuclear-capable surface-to-surface ballistic missile

Islamabad: Pakistan on Thursday successfully test-fired a nuclear-capable surface-to-surface ballistic missile which can strike targets up to 290 kilometres, the army said.

The successful training launch of ballistic missile 'Ghaznavi' was aimed at ensuring operational readiness of Army Strategic Forces Command, besides re-validating technical parameters of the weapon system, the army said in a statement.

The training launch was witnessed by Lt. Gen Muhammad Ali, Commander Army Strategic Forces Command, senior officers from Strategic Plans Division, Army Strategic Forces Command, Scientists and Engineers of the strategic organizations, it said.

As per the military's media wing, missile Ghaznavi is capable of delivering multiple types of warheads up to a range of 290 kilometres.

Commander Army Strategic Forces Command appreciated the excellent standard of training, handling of the weapon system and execution of launch mission in the field by troops, the statement said.

President Arif Alvi, Prime Minister Imran Khan, Chairman Joint Chiefs of Staff Committee and the Service Chiefs have congratulated all ranks of Army Strategic Forces Command, the scientists and engineers on successful conduct of today's launch, the army said.

https://www.thehindu.com/news/international/pakistan-successfully-test-fires-nuclear-capable-surface-to-surface-ballistic-missile/article35876138.ece

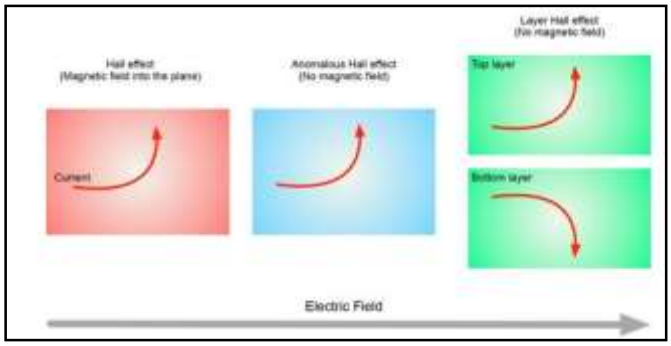
Press Information Bureau
Government of India

Ministry of Science & Technology

Thu, 12 Aug 2021 2:44PM

Electric tuning of magnetism in some exotic states of matter can lead to bizarre optical effects

Scientists have found that electric tuning of magnetism in certain exotic states of matter can lead to striking optical effects that are useful in some optical devices. They discovered that on application of an electric field, electrons from the top and bottom layers of a special kind of magnetic insulator called antiferromagnetic axion insulator spontaneously deflect in opposite directions. This property called the Hall layer effect allows magnetism of such materials to be effectively controlled by an external electric field leading to electric tuning of magnetism with important applications in next-generation magnetic and optical devices.



Anti-ferromagnetic axion insulators are an exotic state of matter that was proposed decades ago but remain experimentally elusive till date. Manganese bismuth telluride (MnBi2Te4) series of compounds has emerged as a promising class of antiferromagnetic axion insulators, and scientists are exploring its unique properties for using these in more innovative ways.

A team from IIT Kanpur has stumbled on the ‘layer Hall Effect’ property in a few nanometer thick devices made of Manganese bismuth tellurideMnBi2Te4 layers. Hall Effectrefers to the generation of a transverse voltage in the response of an electric field. It occurs in materials in the presence of a magnetic field. More recently, it has been shown to arise even in the absence of a magnetic field, originating from the 'geometry' of the electron motion in a crystalline solid in a paper published in the journal Nature. The IIT Kanpur team led by Prof. Amit Agarwal experimentally observed a new kind of Hall effect called layer Hall Effect in which the top and the bottom layer of the device generate transverse current in the opposite directions, which is made possible by a geometric property of the electron in crystals.

Additionally, the IIT Kanpur team observed that the magnetic state of MnBi2Te4 can be effectively switched by a coupled magnetic and electric field known as the axion field. This study, supported by the Science Engineering and Research Board (SERB) and the Department of Science and Technology (DST), opens up the field for exploration of more exotic transport and optical effects in MnBi2Te4 using the axionic electromagnetic coupling.

Publication link:[*https://doi.org/10.1038/s41586-021-03679-w*](https://doi.org/10.1038/s41586-021-03679-w)

[*https://pib.gov.in/PressReleasePage.aspx?PRID=1745113*](https://pib.gov.in/PressReleasePage.aspx?PRID=1745113)

पत्र सूचना कार्यालय
भारत सरकार

विज्ञान एवं प्रौद्योगिकी मंत्रालय

Thu, 12 Aug 2021 2:44PM

पदार्थ की असामान्य अवस्थाओं में विद्युत चुम्बकीय ट्यूनिंग से विचित्र दृष्टिजन्य (ऑप्टिकल) प्रभाव मिल सकते हैं

वैज्ञानिकों ने पता लगाया है कि पदार्थ की असामान्य अवस्थाओं में विद्युत चुम्बकीय ट्यूनिंग (समस्वरण) से ऐसे विचित्र दृष्टिज्न्य (ऑप्टिकल) प्रभाव मिल सकते हैं जो कुछ विशिष्ट प्रकार के दृष्टिजन्य (ऑप्टिकल) उपकरणों के लिए बहुत उपयोगी होंगे। उन्हें ज्ञात हुआ है कि एक विशेष प्रकार के एंटीफेरोमैग्नेटिक एक्सियन इंसुलेटर कहे जाने वाले चुम्बकीय कुचालक (इन्सुलेटर) पर विद्युतीय क्षेत्र का प्रयोग करने से उस इन्सुलेटर की ऊपरी और निचली सतह से विपरीत दिशाओं में इलेक्ट्रानों का स्वत एवं निरंतर प्रवाह शुरू हो जाता है। हॉल सतह प्रभाव नामक यह गुण ऐसे पदार्थों के चुंबकत्व को बाहरी विद्युत क्षेत्र द्वारा प्रभावी ढंग से नियंत्रित करने की अनुमति देता है, जिससे अगली पीढ़ी के चुंबकीय और ऑप्टिकल उपकरणों में महत्वपूर्ण अनुप्रयोगों के साथ चुंबकत्व की विद्युत ट्यूनिंग होती है।

एंटी-फेरोमैग्नेटिक एक्सियन इंसुलेटर पदार्थ की एक ऐसी असामान्य अवस्था है जिसके बारे में दशकों पहले परिकल्पना कर ली गई थी, लेकिन आज तक इसका प्रयोग नहीं हो पाया है। मैंगनीज बिस्मथ टेलुराइड (एमएनबीआई2टीई4) यौगिकों की श्रृंखला एंटीफेरोमैग्नेटिक एक्सियन इंसुलेटर के एक ऐसे ही आशाजनक वर्ग के रूप में सामने आई है और वैज्ञानिक इनका अधिक नवीन तरीकों से उपयोग करने के लिए इसके अद्वितीय गुणों की खोज कर रहे हैं।

भारतीय प्रौद्योगिकी संस्थान (आईआईटी) कानपुर की एक टीम ने मैंगनीज बिस्मथ टेलुराइड (एमएनबीआई2टीई4) की कुछ नैनोमीटर मोटी परतों से बने उपकरणों में 'लेयर हॉल इफेक्ट' गुण का पता लगाया है। हॉल प्रभाव विद्युत क्षेत्र की प्रतिक्रिया में एक अनुप्रस्थ वोल्टेज उत्पन्न होने को संदर्भित करता है। ऐसा पदार्थ में विद्यमान चुंबकीय क्षेत्र की उपस्थिति में होता है। हाल ही में नेचर पत्रिका में प्रकाशित एक शोध पत्र में क्रिस्टलीय ठोस में इलेक्ट्रॉन गति की 'ज्यामिति' से उत्पन्न चुंबकीय क्षेत्र की अनुपस्थिति में भी इसे उत्पन्न होता दिखाया गया है। प्रो. अमित अग्रवाल के नेतृत्व में आईआईटी कानपुर की टीम ने प्रयोगात्मक रूप से एक नए प्रकार के हॉल प्रभाव का अवलोकन किया, जिसे लेयर हॉल इफेक्ट कहा जाता है, जिसमें उपकरण (डिवाइस) की ऊपरी और निचली सतह विपरीत दिशाओं में अनुप्रस्थ धारा उत्पन्न करती है और ऐसा किसी क्रिस्टल में इलेक्ट्रानों के ज्यामितीय गुणों के कारण संभव होता है।

इसके अतिरिक्त, भारतीय प्रौद्योगिकी संस्थान (आईआईटी) कानपुर टीम ने यह भी पाया कि मैंगनीज बिस्मथ टेलुराइड (एमएनबीआई2टीई4) की चुंबकीय स्थिति को एक ऐसे युग्मित चुंबकीय और विद्युत क्षेत्र द्वारा प्रभावी रूप से परिवर्तित (स्विच) किया जा सकता है जिसे एक्सियन क्षेत्र के रूप में जाना जाता है। विज्ञान इंजीनियरिंग और अनुसंधान बोर्ड (एसईआरबी) तथा विज्ञान और प्रौद्योगिकी विभाग (डीएसटी) की सहायता से चल रहे इस अध्ययन से अक्षीय विद्युत चुम्बकीय युग्मन का उपयोग करके मैंगनीज बिस्मथ टेलुराइड (एमएनबीआई2टीई4) में अधिक असामान्य संचरणों और ऑप्टिकल प्रभावों की खोज हेतु कुछ और नए क्षेत्र भी सामने आ रहे हैं।

https://pib.gov.in/PressReleasePage.aspx?PRID=1745210

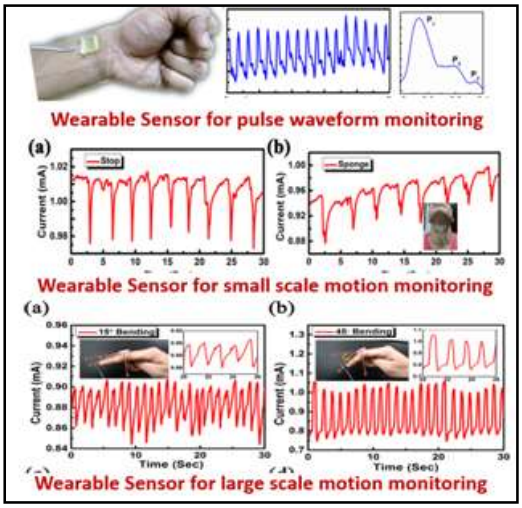
Press Information Bureau
Government of India

Ministry of Science & Technology

Thu, 12 Aug 2021 2:47PM

Low-cost Flexible Tactile Sensors having Robotics and Bio-medical applications developed

An Indian researcher has developed low-cost soft, flexible, and wearable sensors that can be used for diagnosis of pulse rate variability in humans. Being a high sensitivity flexible pressure/strain sensor, it can also be used for small and large scale motion monitoring, with potential applications in robotics, prosthetics, as well as minimal invasive surgery and identification of tumor/cancerous cells.



Dr. Dipti Gupta from IIT Bombay has fabricated these tactile (pressure and strain) sensors using low-cost polyurethane foam and nanomaterial-based inks that can coat several substrates with support from the Advanced Manufacturing Technologies programme of the Department of Science & Technology (DST), Government of India. Reduced graphene oxide (rGO) was used as the sensing material. The fabrication of sensors based on reduced graphene oxide (rGO) as the sensing material was challenging due to the intrinsic hydrophobic behavior of graphene oxide inks as well as the agglomeration of graphene oxide flakes after reduction. A reducing agent called hydrazine and a dual-component additive comprising of compounds benzisothiazolinone and methylisothiazolinone in appropriate proportion were used to synthesize rGO ink with a hydrophilic nature. Utilizing this hydrophilic rGO ink mixed with multiwalled carbon nanotubes (MWNTs), a very simple, low-cost approach was found for the fabrication of a pressure sensor based on polyurethane (PU) foam coated with the MWNT−rGO ink (MWNT− rGO@PU foam). The MWNT−rGO@PU foam-based devices were shown to be versatile pressure sensors with the potential to detect both small-scale and large-scale movements.

The research was published in the journal ACS Applied Materials and Interfaces. The technology which can be used to monitor the pulse waveform of a human radial artery in real-time is aligned with the 'Make in India' initiative, and Dr. Gupta has applied for 3 national patents for these sensors. The sensors have been tested for their different level of strains like micro and large scale motion monitoring and have potential applications in biomedical devices, skin electronics, and minimal invasive surgery. This frontier technology for wearable and robotic devices applications is in the third stage of Technology Readiness Level, and Dr Gupta further plans to develop a prototype for an array of sensors in the future.

Patent details:

- Chithra Parameshwaran, Dipti Gupta, "Hydrophilic elastomer sponge and method of preparation thereof", Indian Patent Application no.201821014916
- Amit Tewari, G. Srinivas, S. Bohm, Dipti Gupta, "Highly dispersive and adhering reduced grapheme oxide ink". Indian Patent Application no. 201721017339
- Amit Tewari, G. Srinivas, S. Bohm, Dipti Gupta, "Fabrication of piezoresistive pressure sensor", Indian Patent Application no. 201721029674

Publication link: DOI: 10.1021/acsami.7b15252

https://pib.gov.in/PressReleasePage.aspx?PRID=1745115

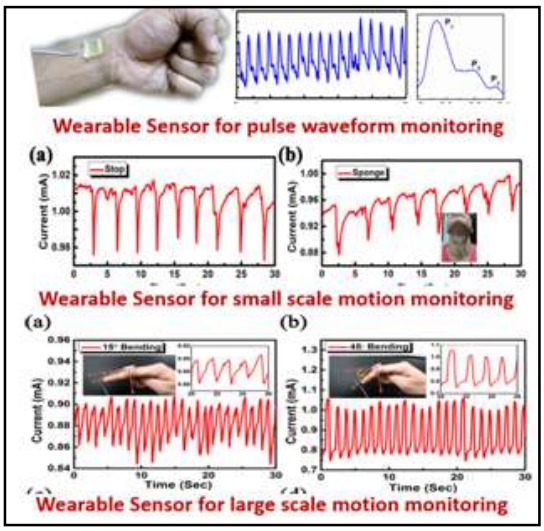
पत्र सूचना कार्यालय
भारत सरकार

विज्ञान एवं प्रौद्योगिकी मंत्रालय

Thu, 12 Aug 2021 2:47PM

रोबोटिक्स और जैव-चिकित्सा अनुप्रयोगों में इस्तेमाल के लिए कम लागत वाले लचीले स्पर्श सेंसर विकसित किए गए

एक भारतीय शोधकर्ता ने कम लागत वाले नरम, लचीले और पहनने योग्य स्पर्श सेंसर विकसित किए हैं, जिनका उपयोग किसी मनुष्य में नाड़ी की गति की अस्थिरता को जानने और उसका निदान करने के लिए किया जा सकता है। एक उच्च संवेदनशीलता वाले लचीले प्रेशर/स्ट्रेनसेंसर होने के कारण इसका उपयोग रोबोटिक्स तथा प्रोस्थेटिक्स में संभावित अनुप्रयोगों के साथ-साथ न्यूनतम इनवेसिव सर्जरी और ट्यूमर/कैंसर कोशिकाओं की पहचान तथा छोटे व बड़े पैमाने पर गति निगरानी के लिए भी किया जा सकता है।



आईआईटी बॉम्बे की डॉ. दीप्ति गुप्ता ने भारत सरकार के विज्ञान एवं प्रौद्योगिकी विभाग (डीएसटी) के उन्नत विनिर्माण प्रौद्योगिकी कार्यक्रम के सहयोग से पॉलीयूरेथेन फोम और नैनोमेटेरियल-आधारित स्याही का उपयोग करके कम लागत वाले इन स्पर्शक (प्रेशर/स्ट्रेन) सेंसर का निर्माण किया है, जो कई सब्सट्रेट को कोट कर सकते हैं। इसके लिए संवेदन सामग्री के रूप में रिड्यूस्ड ग्रेफीन ऑक्साइड (आरजीओ) का उपयोग किया गया था। सेंसिंग सामग्री के रूप में रिड्यूस्ड ग्रेफीन ऑक्साइड (आरजीओ) पर आधारित सेंसर का निर्माण ग्रेफीन ऑक्साइड स्याही के आंतरिक हाइड्रोफोबिक व्यवहार के साथ-साथ इसमें कुछ कमी के बाद ग्रेफीन ऑक्साइड फ्लेक्स के ढेर के कारण काफी चुनौतीपूर्ण था। हाइड्राज़िन नामक एक अपचायक एजेंट और एक दोहरे घटक योजक जिसमें बेंज़िसोथियाज़ोलिनोन और मेथिलिसोथियाज़ोलिनोन जैसे यौगिक उचित अनुपात में होते हैं, इनका उपयोग हाइड्रोफिलिक नेचर के साथ आरजीओ स्याही को संश्लेषित करने के लिए किया जाता था। एक बहुत ही सरल तरीके से मल्टीवॉल कार्बन नैनोट्यूब (एमडब्ल्यूएनटीएस) के साथ मिश्रित इस हाइड्रोफिलिक आरजीओ स्याही का उपयोग करते हुए एमडब्ल्यूएनटी–आरजीओ स्याही (एमडब्ल्यूएनटी– आरजीओ@पीयू फोम) के साथ लेपित पॉलीयुरेथेन (पीयू) फोम पर आधारित प्रेशर सेंसर के निर्माण के लिए इसमें कम लागत वाला *दृष्टिकोण* पाया गया। एमडब्ल्यूएनटी– आरजीओ@पीयू फोम-आधारित उपकरणों को अस्थिर प्रेशर सेंसर के रूप में दिखाया गया था, जिसमें छोटे और बड़े पैमाने पर दोनों तरह की हरकतों का पता लगाने की क्षमता थी।

यह शोध एसीएस एप्लाइड मैटेरियल्स एंड इंटरफेसेज पत्रिका में प्रकाशित हुआ था। वास्तविक समय में ह्यूमन रेडियल आर्टरी की पल्स तरंगों की निगरानी के लिए इस्तेमाल की जाने वाली तकनीक को 'मेक इन इंडिया' पहल के साथ जोड़ा गया है। डॉ दीप्ति गुप्ता ने इन सेंसरों के लिए 3 राष्ट्रीय पेटेंट के लिए आवेदन किया है। सूक्ष्म और बड़े पैमाने पर गति की निगरानी जैसे विभिन्न स्तरों के तनावों को समझने के लिए इस सेंसर का परीक्षण किया गया है और इसको बायोमेडिकल उपकरणों, स्किन इलेक्ट्रॉनिक्स और मिनिमल

इनवेसिव सर्जरी में प्रयोग करने की संभावनाएं हैं। पहनने योग्य और रोबोटिक उपकरणों के अनुप्रयोगों के वास्ते यह महत्वपूर्ण प्रौद्योगिकी, तकनीकी तैयारी स्तर के तीसरे चरण में है और डॉ गुप्ता आगे भविष्य में सेंसर की एक सारणी के लिए एक प्रोटोटाइप विकसित करने की योजना बना रही हैं।

https://pib.gov.in/PressReleasePage.aspx?PRID=1745224

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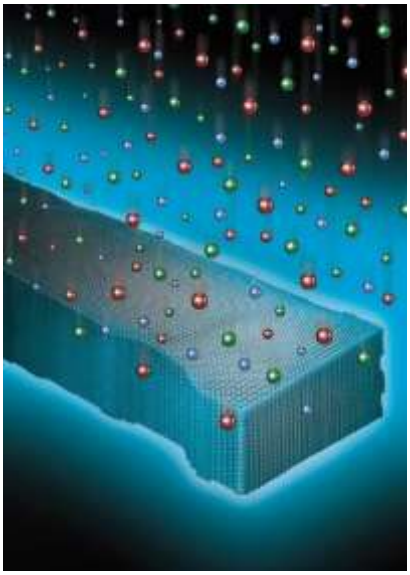
Fri, 13 Aug 2021

Patterning silicon at the one-nanometer scale

Researchers have developed an innovative technique for creating nanomaterials. These are materials only atoms wide. They draw on nanoscience to allow scientists to control their construction and behavior. The new electron beam nanofabrication technique, plasmon engineering, achieves unprecedented near-atomic scale control of patterning in silicon. Structures built using this approach produce record-high tuning of electro-optical properties.



Ions from a reactive plasma shape a silicon nanowire approximately 40 atoms wide. The periodic atomic arrangement is preserved up to the edge of the nanowire. Credit: V.R. Manfrinato et al., Patterning Si at the 1 nm Length Scale with Aberration-Corrected Electron-Beam Lithography: Tuning of Plasmonic Properties by Design, Adv. Funct. Mater. 2019 1903429. Wiley-VCH GmbH. Reproduced with permission

In this research, scientists used plasmon engineering to control the optical and electronic properties of silicon. The technique uses aberration-corrected electron beam lithography. This process involves using a beam of electrons to modify the surface of a material. Plasmon engineering allowed researchers to modify material at the near atomic scale. The use of "conventional" lithography means this approach could one day be applied to industrial applications. It will benefit researchers working on optical communications, sensing, and quantum computing.

Patterning materials at single nanometer resolution allows scientists to precisely engineer quantum confinement effects. Quantum effects are significant at these length scales, and controlling the nanostructure dimensions provides direct control over electrical and optical properties. Silicon is by far the most widely-used semiconductor material in electronics, and the ability to fabricate silicone-based devices of the smallest dimensions for novel device engineering is highly desirable.

Researchers at Brookhaven's Center for Functional Nanomaterials, a Department of Energy user facility, used aberration-corrected electron-beam lithography combined with dry reactive ion etching to achieve patterning of 1 nanometer features as well as surface and volume plasmon engineering in silicon. The nanofabrication technique employed here produces nanowires with a line edge roughness of 1 nanometer. In addition, this work demonstrates tuning of the silicon volume plasmon energy by 1.2 electron volt from the bulk value, which is ten times higher than previous attempts of volume plasmon engineering using lithographic methods.

The study is published in *Advanced Functional Materials*.

More information: Vitor R. Manfrinato et al, Patterning Si at the 1 nm Length Scale with Aberration-Corrected Electron-Beam Lithography: Tuning of Plasmonic Properties by Design, *Advanced Functional Materials* (2019). DOI: 10.1002/adfm.201903429

Journal information: *Advanced Functional Materials*

https://phys.org/news/2021-08-patterning-silicon-one-nanometer-scale.html

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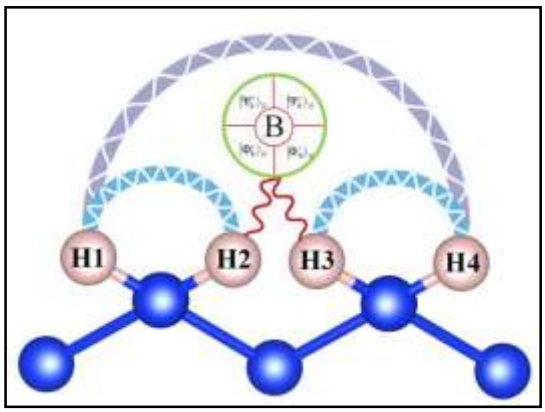
Fri, 13 Aug 2021

The best of both worlds: Combining classical and quantum systems to meet supercomputing demands

Quantum entanglement is one of the most fundamental and intriguing phenomena in nature. Recent research on entanglement has proven to be a valuable resource for quantum communication and information processing. Now, scientists from Japan have discovered a stable quantum entangled state of two protons on a silicon surface, opening doors to an organic union of classical and quantum computing platforms and potentially strengthening the future of quantum technology.



This study shows how quantum entanglement displays a huge energy difference between its states unlike those of molecular hydrogen, promising ultra-fast processing in the order of 106 qubits and atom teleportation H4). Credit: Takahiro Matsumoto from NCU, Japan

One of the most interesting phenomena in quantum mechanics is "quantum entanglement." This phenomenon describes how certain particles are inextricably linked, such that their states can only be described with reference to each other. This particle interaction also forms the basis of quantum computing. And this is why, in recent years, physicists have looked for techniques to generate entanglement. However, these techniques confront a number of engineering hurdles, including limitations in creating large number of "qubits" (quantum bits, the basic unit of quantum information), the need to maintain extremely low temperatures (<1 K), and the use of ultrapure materials. Surfaces or interfaces are crucial in the formation of quantum entanglement. Unfortunately, electrons confined to surfaces are prone to "decoherence," a condition in which there is no defined phase relationship between the two distinct states. Thus, to obtain stable, coherent qubits, the spin states of surface atoms (or equivalently, protons) must be determined.

Recently, a team of scientists in Japan, including Prof. Takahiro Matsumoto from Nagoya City University, Prof. Hidehiko Sugimoto from Chuo University, Dr. Takashi Ohhara from the Japan Atomic Energy Agency, and Dr. Susumu Ikeda from High Energy Accelerator Research Organization, recognized the need for stable qubits. By looking at the surface spin states, the scientists discovered an entangled pair of protons on the surface of a silicon nanocrystal.

Prof. Matsumoto, the lead scientist, outlines the significance of their study: "Proton entanglement has been previously observed in molecular hydrogen and plays an important role in a variety of scientific disciplines. However, the entangled state was found in gas or liquid phases only. Now, we have detected quantum entanglement on a solid surface, which can lay the groundwork for future quantum technologies." Their pioneering study was published in a recent issue of *Physical Review B*.

The scientists studied the spin states using a technique known as "inelastic neutron scattering spectroscopy" to determine the nature of surface vibrations. By modeling these surface atoms as "harmonic oscillators," they showed anti-symmetry of protons. Since the protons were identical (or indistinguishable), the oscillator model restricted their possible spin states, resulting in strong entanglement. Compared to the proton entanglement in molecular hydrogen, the entanglement harbored a massive energy difference between its states, ensuring its longevity and stability. Additionally, the scientists theoretically demonstrated a cascade transition of terahertz entangled photon pairs using the proton entanglement.

The confluence of proton qubits with contemporary silicon technology could result in an organic union of classical and quantum computing platforms, enabling a much larger number of qubits

(10^6) than currently available (10^2), and ultra-fast processing for new supercomputing applications. "Quantum computers can handle intricate problems, such as integer factorization and the 'traveling salesman problem,' which are virtually impossible to solve with traditional supercomputers. This could be a game-changer in quantum computing with regard to storing, processing, and transferring data, potentially even leading to a paradigm shift in pharmaceuticals, data security, and many other areas," concludes an optimistic Prof. Matsumoto.

We could be on the verge of witnessing a technological revolution in quantum computing.

More information: Takahiro Matsumoto et al, Quantum proton entanglement on a nanocrystalline silicon surface, *Physical Review B* (2021). DOI: 10.1103/PhysRevB.103.245401

Journal information: *Physical Review B*

https://phys.org/news/2021-08-worlds-combining-classical-quantum-supercomputing.html

COVID-19 Research News

INDIA TODAY

Fri, 13 Aug 2021

Covid may become a mostly childhood disease in few years: Study

A modelling study published on Thursday claimed that Covid-19 may behave similarly to other common-cold coronaviruses in the coming years

Washington: Covid-19 may behave like other common-cold coronaviruses in the next few years, affecting mostly young children who have not yet been vaccinated or exposed to the virus, according to a modelling study published on Thursday.

The US-Norwegian team noted that because Covid-19 severity is generally lower among children, the overall burden from this disease is expected to decline as the SARS-CoV-2 virus becomes endemic in the global population.

“Following infection by SARS-CoV-2, there has been a clear signature of increasingly severe outcomes and fatality with age,” said Ottar Bjornstad from the University of Oslo in Norway.

“Yet, our modelling results suggest that the risk of infection will likely shift to younger children as the adult community becomes immune either through vaccination or exposure to the virus,” he said.

The study, published in the journal Science Advances, noted that such shifts have been observed in other coronaviruses and influenza viruses as they have emerged and then become endemic.

“Historical records of respiratory diseases indicate that age-incidence patterns during virgin epidemics can be very different from endemic circulation,” Bjornstad said.

“For example, ongoing genomic work suggests that the 1889-1890 pandemic, sometimes known as the Asiatic or Russian flu -- which killed one million people, primarily adults over age 70 -- may have been caused by the emergence of HCoV-OC43 virus, which is now an endemic, mild, repeat-infecting cold virus affecting mostly children ages 7-12 months old,” he said.

Bjornstad, however, cautioned that if an immunity to reinfection by SARS-CoV-2 wanes among adults, the disease burden could remain high in that group, although previous exposure to the virus would lessen the severity of the disease.

“Empirical evidence from seasonal coronaviruses indicates that prior exposure may only confer short-term immunity to reinfection, allowing recurrent outbreaks, this prior exposure may prime the immune system to provide some protection against severe disease,” said Bjornstad.

“However, research on Covid-19 shows that vaccination provides stronger protection than exposure to the SARS-CoV-2 virus, so we encourage everyone to get vaccinated as soon as possible,” he explained.

The team developed a 'realistic age-structured (RAS) mathematical model' that integrates demography, degree of social mixing, and duration of infection-blocking and disease-reducing immunity to examine potential future scenarios for age-incidence and burden of mortality for Covid-19. The researchers analysed disease burden over immediate, medium and long terms -- 1, 10 and 20 years, respectively.

They also examined disease burden for 11 different countries -- China, Japan, South Korea, Spain, UK, France, Germany, Italy, the US, Brazil and South Africa -- that differed widely in their demographics.

The team used data from the United Nations for each of these countries to parameterise the model.

The team's model assumes that the reproduction number (R) -- or the level of transmissibility -- on any given day is linked to the amount of mobility on that day.

The model also incorporates a variety of scenarios for immunity, including both independence and dependence of disease severity on prior exposure, as well as short- and long-term immunity.

“For many infectious respiratory diseases, prevalence in the population surges during a virgin epidemic but then recedes in a diminishing wave pattern as the spread of the infection unfolds over time toward an endemic equilibrium,” said Ruiyun Li, a postdoctoral fellow at the University of Oslo.

“Depending on immunity and demography, our RAS model supports this observed trajectory. It predicts a strikingly different age structure at the start of the Covid-19 epidemic compared to the eventual endemic situation,” he added.

The researchers noted that in a scenario of long-lasting immunity, either permanent or at least 10 years, the young are predicted to have the highest rates of infection as older individuals are protected from new infections by prior infection.

Jessica Metcalf, an associate professor at Princeton University, US, noted that this prediction is likely to hold only if reinfections produce only mild disease.

However, the burden of mortality over time may remain unchanged if primary infections do not prevent reinfections or mitigate severe disease among the elderly, she added.

https://www.indiatoday.in/coronavirus-outbreak/story/covid-may-become-mostly-childhood-disease-in-few-years-study-1840250-2021-08-13