Sept
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समाचार पत्रों से चयित अंश
Newspapers Clippings

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रक्षा विज्ञान पुस्तकालय
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Firstpost.

Fri, 17 Sept 2021

DRDO herbal drug Lukoskin proves helpful for vitiligo patients with 70% success rate

Till now, more than one lakh patients suffering from the skin condition, also known as leucoderma, have been treated with Lukoskin, said Nitika Kohli from AIMIL Healthcare

New Delhi: Many people with vitiligo seem to be turning towards herbal remedies like Lukoskin developed by the central government's premier research agency Defence Research and Development Organisation.

Representative image. AyurCentral

Till now, more than one lakh patients suffering from the skin condition, also known as leucoderma, have been treated with Lukoskin, with an average success rate of 70 percent, said Nitika Kohli from AIMIL Healthcare.

AIMIL Healthcare is manufacturing and marketing the herbal drug.

Kohli, an Ayurveda expert herself, said after the Defence Research and Development Organisation (DRDO) transferred the technology, human clinical trials were conducted and the drug was launched in the market in 2011.

"In these ten years, over one lakh patients have been treated with the drug. We found 70 percent success rate," she said.

In fact, AIMIL is in the process of launching an advanced version of the drug, and the DRDO is already working in this direction.

Kohli was speaking at a virtual conference on Clinical Management of Tough Skin Diseases' to mark 10 years of the launch of Lukoskin as well as of AIMIL Healthcare.

Representatives and doctors from various medical streams, including allopathy, participated in the programme and highlighted the role of herbs in general and Lukoskin in particular in the treatment of leucoderma.

The ointment has seven herbal ingredients having properties such as photosensitisation, anti-blister, anti-irritation, anti-septic and wound healing properties, while the oral formulation is designed to improve the auto-immune system and supplement copper which checks the emergence of new spots, Kohli explained.

Deepali Bhardwaj, a city-based dermatologist, pointed out that vitiligo can cause disfiguration, impair social function of patients and induce physiological burdens.

In fact, in India, vitiligo has social stigma attached to it as people confuse it with leprosy.

However, experts made it clear that vitiligo or leucoderma is neither contagious nor life-threatening.

Hence, dermatologists should identify this condition carefully, especially the humanistic factors in social life, and perform individualized and "non-drug" treatment, they asserted.

The incidence of leucoderma is one-two percent of the population worldwide.

Reputed Ayurveda experts Surendra Chaudhary, Bhagwan Sahay, Prabhakar Rao, among others, were also present in the event.

https://www.firstpost.com/india/drdo-herbal-drug-lukoskin-proves-helpful-for-vitiligo-patients-with-70-success-rate-9971221.html

the pioneer

Fri, 17 Sept 2021

Vitiligo patients finding succour in DRDO herbal cure

New Delhi: Many patients with vitiligo, which is an autoimmune disorder characterised by the loss of skin colour in parts of a body, seem to be finding succour in herbal remedies like Lukoskin developed by the Defence and Research Development Organization (DRDO).

Till now, more than one lakh patients suffering from the skin condition, also known as leucoderma, have been treated with Lukoskin with an average success rate of 70 per cent, said Dr Nitika Kohli from AIMIL Healthcare which is manufacturing and marketing the drug.

An ayurveda expert herself, Dr Kohli said, that after DRDO transferred the technology, clinical trials were conducted on the patients and then in 2011 it was launched in the market. “In these ten years, over one lakh patients have been treated with the drug. We found 70 percent success rate,” she said.

An estimated four to five per cent of the Indian population suffers from leucoderma. The condition is characterized by patches of the skin losing their pigment.

The condition is noticeable in people with dark skin.

For better success rate and with an aim to reachout to more patients, the AIMIL is in the process of launching the advanced version of the drug. DRDO is already working in this direction.

Dr Kohli was speaking at a conference “Clinical management of tough skin diseases” held online to mark the ten years of launch of Lukoskin as well as of AIMIL Healthcare.

https://www.dailypioneer.com/2021/india/vitiligo-patients-finding-succour-in-drdo-herbal-cure.html

Fri, 17 Sept 2021

DRDO की सफेद दाग की हर्बल दवा की बढ़ी डिमांड, AIMIL हेल्थकेयर ने दी जानकारी

सफेद दाग (ल्यूकोडर्मा) से ग्रस्त कई लोग अब इसके उपचार के लिए ल्यूकोस्किन जैसी हर्बल दवाओं का रुख कर रहे हैं, जिसे केंद्र सरकार के प्रमुख शोध संस्थान रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) ने विकसित किया है।

नई दिल्ली: सफेद दाग (ल्यूकोडर्मा) (Leucoderma) से ग्रस्त कई लोग अब इसके उपचार के लिए ल्यूकोस्किन जैसी हर्बल दवाओं (Herbal Medicine) का रुख कर रहे हैं, जिसे केंद्र सरकार के प्रमुख शोध संस्थान रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) (DRDO) ने विकसित किया है। एआईएमआईएल हेल्थकेयर की नीतिका कोहली ने कहा कि अब तक इस समस्या से जूझ रहे एक लाख से ज्यादा मरीजों का उपचार ल्यूकोस्किन से किया गया और औसत सफलता दर 70 प्रतिशत रही है। एआईएमआईएल हेल्थकेयर इस हर्बल औषधि के उत्पादन व विपणन का काम कर रही है।

प्रतीकात्मक तस्वीर (Photo Credits: File Image)

आयुर्वेद विशेषज्ञ कोहली ने कहा कि डीआरडीओ द्वारा प्रौद्योगिकी स्थानांतरण के बाद इंसानों पर इसके परीक्षण किए गए और 2011 में यह दवा बाजार में उतारी गई। उन्होंने कहा, "इन 10 सालों में इस दवा से एक लाख से ज्यादा मरीजों का उपचार किया गया। हमनें पाया कि इसकी सफलता दर 70 प्रतिशत है।"

वास्तव में, एआईएमआईएल दवा का एक उन्नत संस्करण लाने की प्रक्रिया में है और डीआरडीओ पहले से ही इस दिशा में काम कर रहा है। कोहली ल्यूकोस्किन के साथ-साथ एआईएमआईएल हेल्थकेयर के शुरू होने के 10 साल पूरे होने पर 'जटिल त्वचा रोगों के नैदानिक प्रबंधन' पर एक डिजिटल सम्मेलन को संबोधित कर रही थीं।

एलोपैथी सहित विभिन्न चिकित्सा क्षेत्रों के प्रतिनिधियों और चिकित्सकों ने कार्यक्रम में हिस्सा लिया और ल्यूकोडर्मा के उपचार में सामान्य रूप से जड़ी-बूटियों व विशेष रूप से ल्यूकोस्किन की भूमिका पर प्रकाश डाला। दुनियाभर में एक से दो प्रतिशत आबादी में ल्यूकोडर्मा के मामले पाए जाते हैं। विशेषज्ञों ने हालांकि स्पष्ट किया कि ल्यूकोडर्मा न तो संक्रामक है और न ही जानलेवा।

(यह सिंडिकेटेड न्यूज़ फीड से अनएडिटेड और ऑटो-जेनरेटेड स्टोरी है, ऐसी संभावना है कि लेटेस्टली स्टाफ द्वारा इसमें कोई बदलाव या एडिट नहीं किया गया है)

https://hindi.latestly.com/agency-news/drdos-demand-for-herbal-medicine-for-white-spots-increased-aimil-healthcarer-1021527.html

Fri, 17 Sept 2021

Action Construction Equipment Ltd receives LoI for supply of cranes

In continuation of company's efforts to expand business in the Defence Sector, Action Construction Equipment Limited ('the Company') has developed an indigenous Special Low Silhouette Knuckle Boom Crane for DRDO, Ministry of Defence (MoD).

The Company has received a letter of Intent from Tata Advanced Systems Limited for manufacturing and supply of the said cranes which have been integrated on TATA HMV 8X8 chassis.

The said Knuckle Boom Cranes of the specified capacity are the first of its kind being developed by an Indian company using advanced technology.

Action Construction Equipment Limited qualified by proving the capability of the system through comprehensive testing and these special purpose cranes demonstrate our efforts under the 'Make in India' and 'AatmaNirbhar Bharat' initiatives of our Government.

Shares of Action Construction Equipments Ltd. was last trading in BSE at Rs. 268.95 as compared to the previous close of Rs. 277. The total number of shares traded during the day was 118040 in over 2686 trades.

The stock hit an intraday high of Rs. 279 and intraday low of 267.7. The net turnover during the day was Rs. 32295148.

https://www.equitybulls.com/admin/news2006/news_det.asp?id=298432

THE TIMES OF INDIA

Fri, 17 Sept 2021

French connection: Recalling over 300 yrs of scientific ties with India

Hyderabad: From visual analytics to geographic research, French have an old connection with the city in terms of scientific alliances. Now, an Indo-French Scientific Partnership project by the French embassy in India plans to document these scientific collaborations between the two countries.

Two French scientists — Luc de Golbery and Anne Chhapuis — had earlier worked extensively with the erstwhile Andhra Pradesh government on various projects. "They conducted first generation data driven documentation during the then AP chief minister NT Rama Rao's tenure. The French connection in visual analytics has been very strong in Hyderabad," said Pranav Sharma, curator of the Indo-French Scientific Partnership project, which is fully funded by the French embassy in India.

Work by the two French scientists included a visual tool to monitor school infrastructure, performance, building and location as well as developing visual dashboards for watershed programme among many others. Not just this, the French scientists also worked in space sciences.

"Earth observations were conducted via National Remote Sensing Centre which was then known as the National Remote Sensing Agency in collaboration with French scientists. There have been other ties with Defence Research and Development Laboratory, Nuclear Fuel Complex etc.," said Sharma.

To document many such alliances systematically, the Indo-French Scientific Partnership project now plans to revisit and reinvestigate the scientific history of India and France. Focus would be on themes such as astronomy, space science, aviation, visual analytics, medicine, epidemiology etc., where both the countries have collaborated, especially after India attained independence from British rule.

"The idea is to document 300-400 years of active scientific partnership between India and France. We would be writing blogs, producing a book, hold exhibitions and a planetarium in cities such as Hyderabad, Delhi, Kolkata, Bengaluru as part of this project," said Sharma.

https://timesofindia.indiatimes.com/city/hyderabad/french-connection-recalling-over-300-yrs-of-scientific-ties-with-india/articleshow/86276028.cms

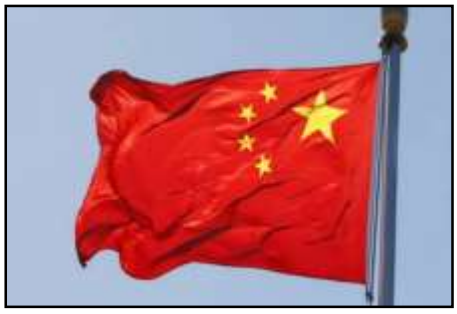
FINANCIAL EXPRESS
Read to Lead

Fri, 17 Sept 2021

Countries in South Asia should make efforts for peace: China

It condemned the nuclear tests conducted by India and by Pakistan and asked the two countries to refrain from further nuclear tests

China said on Thursday that all countries in South Asia should make efforts to maintain peace, security and stability in the region as it reacted to media reports on India's plan to test nuclear-capable ICBM Agni-V ballistic missile, which has a range of 5,000 kms.



China has come up with similar reactions during past tests of Agni-V by India. (File)

"Maintaining peace, security and stability in South Asia means the common interest of all," Chinese Foreign Ministry spokesman Zhao Lijian told a media briefing here, replying to a question about reports that India plans to test Agni-V missile.

"We hope all parties will make constructive efforts towards this," he said. The missile, with a strike range of 5,000 kms, could reach several Chinese cities and was expected to significantly bolster India's military prowess. The missile, which is capable of carrying a nuclear warhead, has been successfully tested five times and is in the process of induction into the Army. All the five trials were successful.

Very few countries, including the US, China, Russia, France and North Korea, have intercontinental ballistic missiles.

"As for whether India can develop ballistic missiles capable of delivering nuclear weapons, the UNSC Resolution 1172 already has clear stipulations," he said.

The UNSC resolution of 1172 is related to 1998 nuclear tests by both India and Pakistan.

It condemned the nuclear tests conducted by India and by Pakistan and asked the two countries to refrain from further nuclear tests. It also urged India and Pakistan to cease development of ballistic missiles capable of delivering nuclear weapons.

China has come up with similar reactions during past tests of Agni-V by India.

https://www.financialexpress.com/defence/countries-in-south-asia-should-make-efforts-for-peace-china/2331544/

Defence News

Defence Strategic: National/International

Press Information Bureau
Government of India

Ministry of Defence

Thu, 16 Sept 2021 5:51PM

Simplified procedure for confirmation of bank guarantees of foreign banks in capital acquisitions under Defence Acquisition Procedure (DAP)-2020

The Acquisition wing of Ministry of Defence has promulgated a Standard Operating Procedure (SOP) to facilitate clarity in procedure to be followed by the Buyer in respect of Bank Guarantees (BGs) submitted by the bidders from international banks. This will facilitate timely conclusion of contracts in procurement cases involving BGs from foreign banks.

For BGs from international banks, DAP provides right to the Buyer to seek confirmation of the BG from an Indian Bank, where required, at bidder's cost. A SOP has been issued on the steps to be followed by the Buyer for seeking advice of SBI, Parliament Street Branch, New Delhi with regard to the requirement of confirmation of such BGs. If required, the confirmation of foreign bank's Bank Guarantees will be through a counter-guarantee by an Indian Public or Private Scheduled Commercial Bank at the bidder's cost.

The Defence Acquisition Procedure (DAP) 2020 provides for submission of various Bank Guarantees (BGs) viz. Advance Payment Bank Guarantee (APBG), Additional Bank Guarantee (ABG), Performance cum Warranty Bank Guarantee (PWBG) etc by the Sellers for discharge of various contractual obligations. These BGs can be from any Indian Public or Private Scheduled Commercial Bank (as notified by RBI) or First Class banks of international repute.

https://pib.gov.in/PressReleasePage.aspx?PRID=1755498

पत्र सूचना कार्यालय
भारत सरकार

रक्षा मंत्रालय

Thu, 16 Sept 2021 5:51PM

रक्षा अधिग्रहण प्रक्रिया (डीएपी)-2020 के तहत पूंजी अधिग्रहण में विदेशी बैंकों की बैंक गारंटी की पुष्टि के लिए सरलीकृत प्रक्रिया

रक्षा मंत्रालय के अधिग्रहण विंग ने अंतर्राष्ट्रीय बैंकों से बोली लगाने वालों द्वारा जमा की गई बैंक गारंटी (बीजी) के संबंध में क्रेता द्वारा अपनाई जाने वाली प्रक्रिया में स्पष्टता की सुविधा के लिए एक मानक संचालन प्रक्रिया (एसओपी) की घोषणा की है। इससे विदेशी बैंकों से बीजी से जुड़े खरीद मामलों में अनुबंधों को समय पर पूरा करने में सुविधा होगी।

अंतर्राष्ट्रीय बैंकों के बीजी के लिए, डीएपी खरीदार को बोलीदाता की कीमत पर, जहां आवश्यक हो, भारतीय बैंक से बीजी की पुष्टि प्राप्त करने का अधिकार प्रदान करता है। ऐसे बीजी की पुष्टि की आवश्यकता के संबंध में एसबीआई, संसद मार्ग शाखा, नई दिल्ली से सलाह लेने के लिए खरीदार द्वारा अनुसरण किए जाने वाले कदमों पर एक एसओपी जारी किया गया है। यदि आवश्यक हो, तो विदेशी बैंक की बैंक गारंटी की पुष्टि एक भारतीय सार्वजनिक या निजी अनुसूचित वाणिज्यिक बैंक द्वारा बोली लगाने वाले की कीमत पर प्रति-गारंटी के माध्यम से की जाएगी।

रक्षा अधिग्रहण प्रक्रिया (डीएपी) 2020 में विभिन्न बैंक गारंटी (बीजी) जमा करने का प्रावधान है।विभिन्न संविदात्मक दायित्वों के निर्वहन के लिए विक्रेताओं द्वारा अग्रिम भुगतान बैंक गारंटी (एपीबीजी), अतिरिक्त बैंक गारंटी (एबीजी), प्रदर्शन सह वारंटी बैंक गारंटी (पीडब्ल्यूबीजी) आदि। ये बीजी किसी भी भारतीय सार्वजनिक या निजी अनुसूचित वाणिज्यिक बैंक (आरबीआई द्वारा अधिसूचित) या अंतर्राष्ट्रीय ख्याति के प्रथम श्रेणी के बैंकों से हो सकते हैं।

https://pib.gov.in/PressReleasePage.aspx?PRID=1755536

Press Information Bureau
Government of India

Prime Minister's Office

Thu, 16 Sept 2021 12:56PM

PM inaugurates the Defence Offices Complexes at Kasturba Gandhi Marg and Africa Avenue

India has taken another step in developing the nation's capital according to needs and aspirations of a new India in the 75th year of India's independence: PM

A big step towards the construction of a modern defense enclave in the capital: PM

The capital of any country is a symbol of the thinking, determination, strength and culture of that country: PM

India is the mother of democracy, the capital of India should be such, in which there are citizens, people at the center: PM

Modern infrastructure has a big role in the government's focus on ease of living and ease of doing business:PM

When policies and intentions are clear, will power is strong and efforts honest, everything is possible: PM

Before-time Completion of the projects is a manifestation of changed approach and thinking: PM

Prime Minister Shri Narendra Modi inaugurated the Defence Offices Complexes at Kasturba Gandhi Marg and Africa Avenue in New Delhi today. He also visited the Defence Office Complex at Africa Avenue and interacted with Army, Navy, Air Force and Civilian Officers.

Addressing the gathering, the Prime Minister said that in today's inauguration of complexes, India has taken another step in developing the nation's capital according to needs and aspirations of a new India in the 75th year of India's independence. He lamented the fact that for a very long time the defence related work was being conducted from hutments constructed during the second World War which were made keeping in mind horse stable and barracks needs. "This new defence office complex will strengthen the efforts of making the working of our defence forces convenient and effective", he said.

The Prime Minister said these modern offices built at KG Marg and Africa Avenue, will go a long way in effectively carrying out all the work related to the security of the nation. This is a big step towards the construction of a modern defense enclave in the capital. He appreciated the inclusion of attractive artefacts by Indian artists in the complexes as symbols of AaatmNirbhar Bharat. "The complexes reflect the modern form of diversity of our culture while preserving the vitality of Delhi and environment", he said.

The Prime Minister remarked when we talk about the capital, it is not just a city. The capital of any country is a symbol of the thinking, determination, strength and culture of that country. India is the mother of democracy. Therefore, the capital of India should be such, in which there are citizens, people in the center.

The Prime Minister stressed the role of modern infrastructure in the government's focus on ease of living and ease of doing business. "The ongoing construction work of Central Vista is going on with this thought only", said the Prime Minister. Enumerating the efforts of new constructions as

per the aspirations of the capital, the Prime Minister said that many constructions like residences for people's representatives, Efforts to preserve Baba Saheb Ambedakar's memories,, many bhawans, memorials for our martyrs are enhancing the glory of the capital today.

The Prime Minister said the work of the Defense Office Complex which was to be completed in 24 months has been completed in a record time of just 12 months. That too when all the other challenges ranging from labor were to the fore in the circumstances created by Corona. Hundreds of workers got employment in this project during the Corona period. The Prime Minister credited this to a new thinking and approach in the government's functioning. " When policies and intentions are clear, will power is strong and efforts honest, everything is possible", said the Prime Minister.

The Prime Minister said that these defence office complexes are the manifestation of changing work culture and priorities of the government. Optimal and proper use of available land with various departments of the government is one such priority, he said. Illustrating thi, the Prime Minister informed that these defence office complexes are constructed in 13 acre land parcels unlike earlier times when five times more land was used for similar complexes. The Prime Minister also highlighted that in next 25 years i.e. 'Azadi ka Amrit Kaal' productivity and efficiency of the government system will be supported by such efforts. Availability of a common central Secretariat, connected conference hall, easy connectivity like metro etc will help a great deal in making the capital people-friendly, the Prime Minister concluded.

https://pib.gov.in/PressReleasePage.aspx?PRID=1755379

NewsOnAIR

Fri, 17 Sept 2021

HAL, Rolls Royce join hands to take Made-in-India 'Adour Engine' spares to the world

Taking India's vision of 'Make-in-India' for the world, Defence PSU Hindustan Aeronautics Limited (HAL) has entered into an agreement with Rolls-Royce to manufacture "Adour Engine" parts for Rolls-Royce's international defence customer base.

Notably, different variants of the Adour engine power the Indian Air Force's (IAF) Jaguar fighters and a fleet of Hawk advanced jet trainers (AJT). Interestingly, the Indian Air Force operates the world's largest serving fleets of both these aircraft, which are equipped with HAL manufactured & supported Adour engine variants under the license of Rolls-Royce.

With this partnership, Rolls-Royce aims to boost the ecosystem for Adour engines in India with HAL's existing capabilities for manufacturing and support for the Jet engines. The agreement was signed and exchanged between Mr. B Krishna Kumar, Executive Director (Engine & IMGT), HAL, and Mr. Abhishek Singh, Senior Vice President – Defence, India and Southeast Asia, Rolls Royce.

"With over 30 years experience of supporting repair and maintenance services for the Adour engines in India, HAL has the capability and capacity to support a large defence customer base. This is the first order for the supply of spares for the Adour Global Supply chain. We plan to be a key player in the supply chain of Adour engines and expect more orders to follow. We look forward to working with Rolls-Royce to build on this capability to serve the global market for the supply of spares and MRO of Adour engines. This new partnership will create avenues for the two

companies to expand the defence sourcing footprint in India," Mr R Madhavan, Chairman and Managing Director (CMD), HAL asserted on the occasion.

Deciphering Adour Engine

Adour is a twin-spool, counter-rotating turbofan engine whose defence segment is a market pioneer in aero engines for defence transport and patrol aircraft. The Jet engine meets the dual requirements of both ground attack and advanced training, for either land-based or carrier operations with strong positions in combat and helicopter applications.

The turbofan engine can deliver thrust in the range of 5,000 to 8,000 lb, which enables the operator increased thrust, increased life leading to reduced life cycle costs, and greater performance. The evolution of Adour engines has resulted in the continuous introduction of new technology in each engine variant. For example, the Adour Mk 951 features a Full Authority Digital Engine Control (FADEC).

India's Jaguar aircraft is powered by two Adour MK 804 / MK 811 Engines. With two-stage low pressure and five-stage high-pressure axial flow Compressors, the Adour engine is driven by separate, single-stage high pressure and low-pressure turbines.

Main Characteristics:

Intake Diameter (m): 0.564

Length (m): 2.90

Weight (kg): 794

Thrust: 2500 (dry), 3737 (wet)

Specific Fuel Consumption(kg / kg-hr): 0.80

Make-in-India for the world

"Since the Adour engines would continue to serve in India for the longest time, we want to ensure that we build a supply chain that is self-sufficient so that it can support older engines that will continue to fly in India," said Abhishek Singh, who heads Rolls-Royce's regional defence business.

He further added that several Adour engines variants are in service in Southeast Asia and in western countries such as the US, UK, and others. The engine spares manufactured in India will find their way into our supply chains and from there to the operators around the globe.

Additionally, during Aero India 2021, Rolls-Royce and HAL inked a pact to establish an Authorized Maintenance Centre for Adour at HAL to support international military customers and operators.

The three-point initiative

In collaboration with HAL, Rolls-Royce aims a three-point initiative. The first is to equip Indian manufacturers with the know-how, experience, and processes to manufacture complex parts that require a lot of high-technology processes. This will enhance current capabilities and make India Atmanirbhar (self-reliant).

Secondly, expanding India's export portfolio would enhance supply chain efficiency. Lastly, since the Adour engines will continue to fly in India for the longest time, a self-sufficient supply chain would be in place to support those older engines.

https://newsonair.com/2021/09/16/hal-rolls-royce-join-hands-to-take-made-in-india-adour-engine-spares-to-the-world/

Hindustan Times

Fri, 17 Sept 2021

IAF to bolster fighter fleet with 24 second-hand Mirages

IAF's 35-year old Mirage fleet, which performed exceptionally during the 2019 Balakot operation, is undergoing a mid-life upgrade, the people said – with the trigger for the acquisition of the second-hand aircraft being the immediate need for 300 critical spares

By Shishir Gupta

The Indian Air Force (IAF) is set to acquire 24 second-hand Mirage 2000 fighters, made by Dassault Aviation, in an attempt to strengthen its ageing fleet of the fourth-generation fighters and also secure parts for its two existing squadrons of the aircraft, people familiar with the matter said on condition of anonymity. IAF has initialled a contract worth 27 million euros to buy the fighters, eight of which are in ready-to-fly condition, the people cited above added. That works out to a per-aircraft acquisition cost of 1.125 million euros. The people cited above said the aircraft will soon be shipped to India in containers.

IAF's 35-year old Mirage fleet, which performed exceptionally during the 2019 Balakot operation, is undergoing a mid-life upgrade, the people said – with the trigger for the acquisition of the second-hand aircraft being the immediate need for 300 critical spares. The aircraft is becoming obsolete in France, they added, and IAF chief Air Chief Marshal RKS Bhaduaria decided to go in for the purchase.

Out of the 24 Mirage fighters, 13 are in complete condition with engine and airframe intact with eight of them ready to fly after servicing. (File Photo)

Out of the 24 fighters, 13 are in complete condition with engine and airframe intact with eight of them (nearly half a squadron) ready to fly after servicing. The remaining 11 fighters are partially complete but with fuel tanks and ejection seats, which will be scavenged to secure parts for IAF's two existing squadrons of the fighter.

IAF purchased around 50 fourth-generation Mirage 2000 C and B fighters way back in 1985 with a maintenance contract that expired in 2005. It signed another contract in 2015-2016 with the French original equipment manufacturer.

The purchase highlights the importance of shifting spare parts and engine supply chains to India for future acquisitions as fighters abroad reach obsolescence much faster than in India. Until the Narendra Modi government took the decision of acquiring the 4.5 generation Rafale fighters (also from Dassault), the Mirage 2000 was India's front-line fighter, a position it has held since the Kargil war. The new Aatmanirbhar Bharat campaign should ensure that original equipment and spares are now manufactured in India so that there is no shortage of spares till the time the fighter is decommissioned, the people cited above said.

The other issue that flows out of this last-minute acquisition is that the IAF and the Indian Navy should plan their fighter acquisition so that there is synergy between the two forces and coherence is maintained in the supply of spare parts, experts said. It also points to the need for the defence ministry to accelerate decisions on replenishing the country's fighter fleet, especially because China has already moved to fifth-generation fighters and armed drones.

https://www.hindustantimes.com/india-news/iaf-to-bolster-fighter-fleet-with-24-second-hand-mirages-101631836620386.html

R. REPUBLICWORLD.COM

Fri, 17 Sept 2021

Indian Army contingent welcomed at 6th edition of SCO's 'peaceful mission' exercise

The Indian Army contingent participates in the sixth edition of the 'Peaceful MIlitary' exercise organised by the Shanghai Cooperation Organization (SCO)

By Akansha Tandon

The Indian Army contingent participating in the sixth edition of the 'Peaceful MIlitary' exercise organised by the Shanghai Cooperation Organization (SCO) was welcomed by Major General Ivan Tereschenko, Chief of Staff, Central Military District, Russian Armed Forces on Thursday, September 16.

The Indian Army had participated in the sixth edition of the 'Peaceful Mission' military exercise on Thursday to foster close relations between SCO member states in Orenburg, Russia.

The sixth edition of SCO's 'Peaceful Mission' exercise

From September 13 to 25, Russia is hosting the 6th iteration of the exercise Peaceful Mission in the Orenburg Region. The exercise's goal is to strengthen links between SCO member states and to improve military chiefs' ability to command multi-national military contingents. The exercise was held to allow the Armed Forces of the SCO members to share best practices.

The exercise also gave the Armed Forces of the SCO Nations a chance to practise counter-terrorism operations in an urban setting in a multinational and combined setting. Professional engagement, mutual knowledge of exercises and procedures, the construction of collaborative command and control structures, and the eradication of terrorist threats are all part of the exercise's scope.

Indian Army also participated in ZAPAD-2021 hosted by Soviet Union & Russian Federation

Prior to this, the Indian Army also participated in the ZAPAD-202 Multilateral 'Joint Strategic Exercise' held by the Soviet Union and the Russian Federation for a week. The seven-day long joint strategic exercise ended on Wednesday. This edition of Zapad saw participation from seven nations. ZAPAD 2021 was held at Mulino in the Novgorod Region of Russia. The Indian military, which was also among the participants in the exercise, carried out intense operations during ZAPAD 2021.

As part of the Exercise, strategic planning, tactical actions and manoeuvres were rehearsed and executed jointly in conventional operational scenarios. The Joint Strategic Exercise included defensive & offensive manoeuvres by the Coalition Forces to restore territorial integrity under simulated combat conditions. New generation weapon systems and equipment were also demonstrated by the Russian Armed Forces during the exercise.

The ZAPAD closing ceremony was chaired by the Deputy Defence Minister of the Russian Federation, Lieutenant-General Yunus-Bek Evkurov. While speaking at the ceremony LG Yunus-Bek Evkurov expressed his gratitude to all the participating contingents and observers. Among the countries participating in this exercise include Mongolia, Armenia, Kazakhstan, Tajikistan, Kyrgyzstan, Serbia, Russia, India and Belarus.

https://www.republicworld.com/india-news/general-news/indian-army-contingent-welcomed-at-6th-edition-of-scos-peaceful-mission-exercise.html

Vanguard

Fri, 17 Sept 2021

Indian military seeks to strengthen ties with Nigerian Army

A delegation of Indian Defence Scoping has expressed the readiness of the Indian Armed Forces to strengthen defence ties with the Nigerian Army in furtherance of the existing relationship between India and Nigeria.

The leader of the delegation, retired Lt.-Gen. Vinod Khandare, made the call when he led the team on courtesy visit to the Chief of Army Staff, Lt.-Gen. Faruk Yahaya, on Thursday in Abuja.

Khandare said them members of the delegation comprised representatives from the Indian Army, Navy and Air Force, as well as National Security Council Secretariat and Indian ministries of defence and external affairs.

He said that both Indian and Nigerian armies had maintained cordial relationship in the area of training of officers and their defence colleges over a long time.

Khandare said visit was borne out of the desire to see how the trajectory for cooperation between the two countries could be taken further ahead.

He said that the direction of the relationship had to be enhanced towards capacity enhancement capability development in a direction that both the armies would benefit from each other.

"We have many spheres and domain that we need to cooperate because the future of warfare is changing very rapidly.

"While we may all agree that we are masters of conventional warfare but simultaneously we are also engaged in sub-conventional and both India and Nigeria are faced with similar challenges.

Khandare said that the military had to look at cyberspace, special forces, and realise that technology would enable them and empowers them to deliver faster, better and accurate.

He said if Indian and Nigerian armies could also work together in the area of medical security, adding that Nigerian army would achieve more in many spheres.

"Beyond the military cooperation, there are think tanks within the army and within the armed forces that is yet another place where we can also collaborate," he said.

Responding, the Chief of Army Staff, Lt.-Gen. Yahaya, said that India and Nigeria had been cooperating in the area of training.

He said that Nigerian Army could also explore other areas like medical, saying that a number of wounded Nigerian troops were currently receiving medical attention in India for certain degree of injuries.

According to him, Nigerian army will also consider sending army medical personnel to India for training.

He commended the delegation for the visit, saying the visit had demonstrated the commitment of both countries to collaborate further.

https://www.vanguardngr.com/2021/09/indian-military-seeks-to-strengthen-ties-with-nigerian-army/

FINANCIAL EXPRESS
Read to Lead

Fri, 17 Sept 2021

AUKUS—new military alliance to deal with China's expansion in Indo-Pacific

Both the UK and the UK are already members of NATO, and now with a new military alliance announced, they will be working together to deal with the emerging threats in the region

By Huma Siddiqui

Ahead of the QUAD Leaders summit in Washington DC next week, to counter China, on Thursday (Sept 16, 2021) Australia, the UK, and the US (AUKUS) have announced a defence and security partnership.

Under this new military alliance, the first initiative is going to be a collaboration on future nuclear-powered submarines for the Royal Australian Navy. This means that the contract that Australia had for building submarines with the French company has been scrapped. The nuclear powered submarines are expected to help in the stability in the Indo-Pacific.

Under this new military alliance, the first initiative is going to be a collaboration on future nuclear-powered submarines for the Royal Australian Navy.

Once the project of the nuclear-powered submarines is completed, Australia will become the 7th country in the world to have such submarines.

According to reports, the Australian side has cancelled an estimated Aus $ 90 (USD 66 billion) deal with the French Company Naval Group. The two sides had signed an agreement for 12 nuclear-powered submarines in 2016.

The French Naval Group is making six `Scorpene' class submarines for the Indian Navy under Transfer of Technology to Mumbai based MDL shipyard.

The three countries will play a very important role in the Indo-Pacific Region and ensure a peaceful and rules-based international order. And, this new partnership among the three countries will strengthen the Integrated Review commitment to reinforce alliances with like-minded allies and deepen ties in the Indo-Pacific.

What has the UK Prime Minister Boris Johnson said about AUKUS?

Terming them as natural allies, according to an official statement issued by the government of the UK on this new military alliance, the British PM has said, "For defending our interests in the Indo-Pacific region and protecting our people, this partnership will become very important."

Both the UK and the UK are already members of NATO, and now with a new military alliance announced, they will be working together to deal with the emerging threats in the region.

As reported earlier, the UK's HMS Queen Elizabeth Carrier has been deployed to the Indo-Pacific region alongside personnel and equipment from the US. It has engaged with 40 countries including India and the main aim of this engagement is to build interoperability with like-minded partners.

What is AUKUS?

Under the 'AUKUS' alliance, the three partners are jointly going to further increase the development of joint capabilities and technology sharing. And will towards keeping all safe and ensuring our people are kept safe from harm and support the shared goals.

The focus of AUKUS will be on integrating all defence and security related science, supply chains, industrial bases and technology.

The three countries are already sharing extensive intelligence through the Five Eyes alliance.

The UK & Nuclear-powered submarines

The country has an expertise in building and operating nuclear-powered submarines for over six decades. The Royal Australian submarines project will offer its expertise through the work carried out by Rolls Royce located near Derby and the UK based BAE Systems in Barrow.

And will involve highly skilled scientific and engineering will be involved in the design and build roles across the UK. And will also attract investment in some high-tech sectors.

The submarines project will involve all the three countries and the focus will be on interoperability, commonality, and mutual benefit.

The UK & Australia Ties

The Royal Australian Navy is procuring up to 9 of the UK's Type 26 frigates, from the UK. Also, the militaries of both countries, including the Royal Gurkha Rifles, have been undertaking joint training exercises.

A joint statement issued by the three countries has stated that under AUKUS, the initial efforts are going to be on artificial intelligence, quantum technologies, cyber capabilities, and additional undersea capabilities.

Does India have nuclear-powered subs?

Not yet. There are plans which are awaiting clearance by the Cabinet Committee on Security (CCS) six nuclear-powered attack submarines (SSNs). These are expected to be built indigenously and are expected to cost around Rs 96,000 crore.

According to sources the Australian Defence Minister had called his Indian counterpart Rajnath Singh informing him about the new alliance.

https://www.financialexpress.com/defence/aukus-new-military-alliance-to-deal-with-chinas-expansion-in-indo-pacific/2331714/

theguardian

Fri, 17 Sept 2021

What are nuclear-powered submarines, anyway? A guide to Australia's looming military addition

The prime minister, Scott Morrison, announced on Thursday morning that Australia would be ripping up its multi-billion dollar contract with the French shipbuilder Naval Group and sign a new deal with the US and UK to acquire nuclear-powered submarines.

The US Navy's Virginia-class nuclear-powered submarine USS Illinois. Australia is proposing to obtain variants of the Virginia-class submarine in a deal with the US and UK. Photograph: Petty Officer 1st Class Michael B Zingaro/AP

The surprise decision announced this morning means Australia will become only the second country (after the UK) to receive the technology from the US.

Naturally, the reaction to Thursday's news has been divided, and while there are many questions remaining, here is an introductory guide to the basics of nuclear-powered submarines.

What are they and what design might Australia get?

It is not clear which submarine the Australian government will obtain, but the US navy's latest design is the Virginia-class submarine. Manufactured by American aerospace and defence company General Dynamics, this submarine has gone through several iterations but is generally powered by a single nuclear reactor and can travel at more than 25 knots. Its crew includes 15

officers and 117 enlisted personnel, and the subs are used both in anti-submarine warfare and intelligence gathering operations.

The vessel is powered by a 210MW pressurised water nuclear reactor, inside of which the enriched uranium fuel is sealed. The reactor does not have to be refuelled over its 30-year lifespan.

How do they work?

The submarines are powered by onboard nuclear reactors. These produce energy by splitting atoms to create heat, which is then used to make steam for turbines that generate electricity to power propulsion and its internal systems. To create the steam, the sub draws in seawater and purifies it through a desalination process. Some of this clean water is also used for drinking, the creation of oxygen through hydrolysis and for scrubbing CO2 or other contaminants from the air.

What are the advantages of nuclear?

Diesel-powered submarines, the kind that Australia was initially going to build in partnership with French company Naval Group, tend to be smaller and run more quietly. They can easily slip into shallow waters along coasts or in river estuaries where they are harder to detect.

While this has certain advantages, the main drawback is endurance. Diesel-powered submarines need to resurface regularly in order to take on oxygen, vent exhaust and charge their batteries. As a result, they can't operate in the open ocean for long periods and careful thought needs to be given about where, when and how they can refuel.

Nuclear submarines, on the other hand, are built for endurance. With abundant power, some builds can run almost indefinitely, or at least until something breaks down or the crew runs out of tinned food. The only real limitations are the needs of the crew, who can only last so long in a confined space.

What are the drawbacks of nuclear?

Because nuclear submarines tend to be larger, one downside is they can't move into shallow waters, making them more easily detectable. During one war game in 2015, a Russian-built, Kilo-class diesel-powered submarine used by the Indian navy "sank" a US nuclear-powered sub – although the US navy has never acknowledged the sinking.

Traditionally Australia's diesel-powered submarines are thought to have been complementary to US powered nuclear subs used by the US, making the recent announcement a surprise.

Nuclear submarines are also more complicated to maintain and service. Unlike the US and UK, Australia does not have a domestic nuclear power industry, which could provide a highly skilled workforce of engineers and nuclear physicists. Much of the work on the subs will probably have to be done overseas.

It is also not clear what plans are being made to handle the spent uranium. The Australian government has been working to build a controversial nuclear waste storage facility in Kimba in South Australia, but this proposal has so far been limited to low-level and intermediate waste from 100 sites around the country.

Are nuclear subs quieter?

It depends. Diesel-electric subs are quieter while running in electric mode, but must at some point surface or pop up a snorkel to run their diesel engines and recharge the batteries. When the diesel engines are running, these noisier than nuclear-powered subs. Nuclear subs also generate noise from the reactor, including the coolant pipes, turbines and steam generation.

What fuel do they use?

The US Virginia-class submarines typically use highly enriched uranium (HEU) that does not need replacing during the lifecycle of each submarine. Across the world, the US, Britain, Russia and India are the only countries to use HEU in naval reactors. Other countries like France use high-density, low-enriched uranium that will occasionally require swapping out with a replacement source.

HEU is one of the most dangerous metals on earth and also one of the simplest nuclear materials to work with. These twin traits also make it a security risk over fears rogue states or terrorists

might develop a nuclear weapon, or mishaps trigger a serious accident. It is also why it has been targeted under non-proliferation treaties to reduce its use.

Will it be able to launch nukes?

If there is one thing the Australian government has been very clear about, it's that the subs will not be armed with nuclear weapons and that Australia is not seeking to obtain nuclear weapons capability.

That's not to say the submarine won't be capable of doing so. Using the Virginia-class as an example, the build comes equipped with 12 vertical missile launch tubes and four 533mm torpedo tubes. It is capable of launching 16 Tomahawk cruise missiles in one salvo but can be modified to mount heavier weapons systems. While these missiles could potentially be built to carry a nuclear warhead, as of 2019 the only variations of the Tomahawk missile in operation were non-nuclear.

What happens when things go wrong?

Serving on a naval submarine has not always been a pleasant experience. For example, German U-boat crews in the second world war suffered devastating losses and many were killed not just in combat but from catastrophic mechanical failures, including asphyxiation from diesel exhaust or explosive decompression after flushing a toilet.

When it comes to nuclear subs, radiation adds a new dimension, although there have been no known reactor meltdowns in the sinkings that have occurred to date.

The most recent nuclear sub disaster involved the Russian Kursk, which sank after a faulty weld on a torpedo caused an explosion that then detonated other torpedos. All of the 118 crew members died. Many were instantly killed in the initial blasts, although failsafes in the nuclear reactor shut it down without incident. The 23 sailors who survived the blasts spent six hours awaiting a rescue that did not come, and were killed in a desperate attempt to create oxygen.

https://www.theguardian.com/australia-news/2021/sep/16/what-are-nuclear-powered-submarines-anyway-a-guide-to-australias-looming-military-addition

ZEENEWS

Fri, 17 Sept 2021

ISRO to experiment vertical landing of rockets, aims to make GSLV Mk3 reusable

ISRO is aiming to recover the first two rocket stages of the GSLV Mk3 as this would imply a huge cost-advantage and savings, owing to reusability

By Sidhartm MP, Edited By Saurabh Sinha

Highlights

1. ***ISRO will experiment vertical landing of rockets***
2. ***It aims to make GSLV Mk3 reusable***
3. ***The move could have huge cost-advantage and savings***

Chennai: The Indian Space Research Organisation (ISRO) is conducting studies and mini-projects to enable the vertical landing of its rockets. According to senior officials, this possibility is being explored primarily with regards to the heavy-lift rocket GSLV Mk3, which is powered by three stages of engines - solid-fuel, liquid-fuel and cryogenic fuel.

ISRO is aiming to recover the first two rocket stages of the GSLV Mk3 as this would imply a huge cost-advantage and savings, owing to reusability.

At present, all of ISRO's rockets are expendable, which means that the rocket stages separate from the vehicle and fall into the sea after their stipulated burn time. Reusability involves recovering the rocket's stages at sea or on land (vertical landing) and refurbishing, servicing, testing and qualifying them before flying again.

Dr. VT Baskar, Project Director of ISRO's GSLV Mk3 had outlined the work on reusable rocket projects during an interaction helmed by Dr. S. Unnikrishnan Nair, Director of ISRO's Human Spaceflight Centre. Themed 'Human Spaceflight and Space exploration missions', this session was part of a 3-day virtual conference organised by the Confederation of Indian Industry and ISRO. On the cost-cutting measures ISRO was undertaking with regards to rocket launches, Dr. Baskar said that recovering the first and second stages (S200 solid-fuel rocket boosters, and L-110 liquid-fuel stage respectively) would offer a lot of cost advantage.

"Studies and Centre-level mini-projects are approved for landing experiments. We have to develop enabling technologies such as the capability to safely land a winged-body or large-body," he said. More importantly, he added that the critical experiment to land rockets on their legs (vertical landing) would be carried out this year or in the next year (2022).

Elaborating on the major modifications that are in store for the GSLV Mk3 rocket, Dr. Baskar said that the vehicle's L110 stage would be replaced with a semi-cryogenic engine and its C25 cryogenic engine would be replaced by the C32 engine. Besides replacing the existing engines with powerful counterparts, ISRO would also be working on mini and microelectronics to reduce the avionics mass and also use high-strength composite materials for the rocket motor casing.

On the timelines for the upgrade, he said that mini electronics and C32 Cryo engine were immediate targets, whereas the semi-cryogenic engine and composite material rocket casing were expected in 2-3 years.

Throwing light on ISRO's upcoming exploratory and science missions, Dr. S. Unnikrishnan Nair, Director, Human Spaceflight Centre said that two missions - Xposat and Aditya L1 were likely to be launched in the second and third quarter of 2022, respectively.

"Aditya L1 is a space-based observatory that will be placed in a halo orbit near the Lagrange point which is an ideal place to observe the Universe being 1.5 million km from earth. Xposat is X-Ray Polarimeter satellite to study the Polarization of Cosmic X-Rays. It is going to be launched by SSLV, which is a small rocket that will have a development flight by this year-end," he said. He added that Chandrayaan 3 - India's third Lunar mission - was also getting realised.

https://zeenews.india.com/india/isro-to-experiment-vertical-landing-of-rockets-aims-to-make-gslv-mk3-reusable-2394455.html

PHYS.ORG

Fri, 17 Sept 2021

Ultrasound at the nanometer scale reveals the nature of force

By Jane Icke

Researchers have developed a new method to measure force and atomic bonds at the nanoscale that reveals that the speed of sound depends on the structure it is traveling through.

Scientists from the University of Nottingham and Loughborough University used a measurement method called picosecond ultrasonics, similar to medical ultrasound, to measure the strength of atom bonding within material. Their research has been published in *Advanced Functional Materials*.

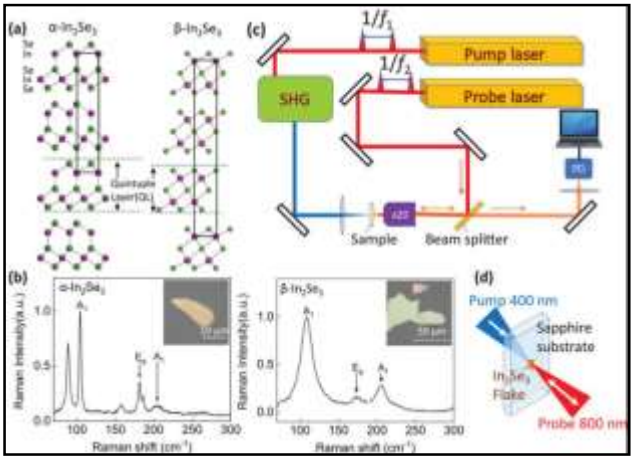


Figure 1. Samples and experimental setup. a) Crystal structure of α- and β-In2Se3.[20, 31] The solid boxes mark the unit cells of α- In2Se3 (2H) and β-In2Se3 (3R). b) Raman spectra for α- and β-In2Se3 flakes; insets—optical images of the flakes. c) Schematic diagram of the pump-probe setup for measuring the sound velocity: PD—photodetector; SHG—second harmonic generator; f1 and f2 are repetition rates of pulses from pump and probe lasers, respectively. Here, f1, f2 ≈ 80 MHz and a small difference f1 – f2 = 800 Hz results in a slow temporal scanning of the probe pulses relative to the pump pulses, providing a temporal resolution ≈1 ps. The dotted arrows show the direction of light. d) The zoomed fragment of the sample space in the PU experiments with 400 nm pump and 800 nm probe. Credit: DOI: 10.1002/adfm.202106206

Force is fundamental to everything in daily life. From as large-scale as gravitational force that underlines the operation of the whole universe, to as small-scale as electron-electron interaction that can be hair raising. Force is very difficult to measure especially when the forces are too big or too small, this is especially the case when we enter the nanoworld, for example in the so-called two-dimensional van der Waals (2D-vdW) materials where objects have length scales in the range of 10^{-9} meters.

These materials are called 2D materials because their geometrical, physical and chemical properties are confined in two dimensions within a thin sheet of material. Within the sheet, atoms are tightly bonded to each other through strong covalent or ionic bonds, whereas the layers themselves are held together by weak van der Waals force. The utterly different nature and coexistence of these vastly different strength forces allow scientists to "peel" the material from bulky mined crystals to perfect single atomic layers and discover amazing phenomena including room temperature superconductivity. Drawing on a piece of paper using pencils for example, is in fact a scientific experiment to make single atomic layers of carbon atoms (graphene), something we all have been doing for centuries without realizing. Despite intensive investigation of vdW materials by many research groups around the world, there are barely any

experimental techniques to measure the strength of atomic bonds and vdW forces without destroying the materials.

Wenjing Yan was one of the lead researchers from the School of Physics and Astronomy at University of Nottingham, she explains: "We used picosecond ultrasonics to measure both the strong covalent bonds and weak vdW forces without damaging the material. The technique is similar to medical ultrasound but with a much higher frequency (terahertz) and thus non-invasive. The study shines 120 femtosecond (0.00000000000012 second) "pump" laser pulses on flakes of 2D materials, generating phonons which are quantised sound waves. As phonons travel through the material, they feel and interact with the atoms and the bonds within the material. The properties of these phonons, which reflect the strength of the atomic bonds, is then measured by a second "probe" laser pulse. We found that sound travels at very different speeds in different phases (structures) of the same substance."

Alexander Balanov and Mark Greenaway from Loughborough University expand: "Whilst traveling through the vdW material, the ultrasonic acoustic wave does not destroy the crystal, only slightly deforms it, which means the structure can be thought of as a system of "springs." By knowing the speed of sound from measurements and how these springs respond to the deformation, we can extract the relative strength of the covalent forces between the atoms and the vdW forces between the layers. If we apply so-called density function theory with the help of high performance computers we can numerically estimate these forces for different stacking configurations and suggest how to tune the elastic, electric and even chemical properties of different polymorphs of vdW materials."

"A good analogy for our findings can be made by thinking about pancake and Yorkshire pudding! Both foods are made from the same mixture: egg, flour and milk, but their different cooking processes give them different structures and properties. Although this is obvious in the macroscopic world, finding such differences in nanostructured materials due to subtle differences in vdW forces is surprising and exciting," says Wenjing Yan. "This research opens possibilities to tune vdW forces by stacking materials in different ways and at the same time non-destructively monitor the properties of these forces and their correlation with the physical and chemical properties of the multilayer structure. By doing this, we will be able to design the material for purpose just like building Lego blocks as proposed by the Nobel Prize laureates Andre Geim and Konstantin Novoselov."

More information: Wenjing Yan et al, Nondestructive Picosecond Ultrasonic Probing of Intralayer and van der Waals Interlayer Bonding in α- and β-In 2 Se 3, *Advanced Functional Materials* (2021). DOI: 10.1002/adfm.202106206

https://phys.org/news/2021-09-ultrasound-nanometer-scale-reveals-nature.html

PHYS.ORG

Fri, 17 Sept 2021

New technology makes it possible to see clearly through murky water

Researchers have developed a new method that can automatically produce clear images through murky water. The new technology could be useful for searching for drowning victims, documenting submerged archaeological artifacts and monitoring underwater farms.

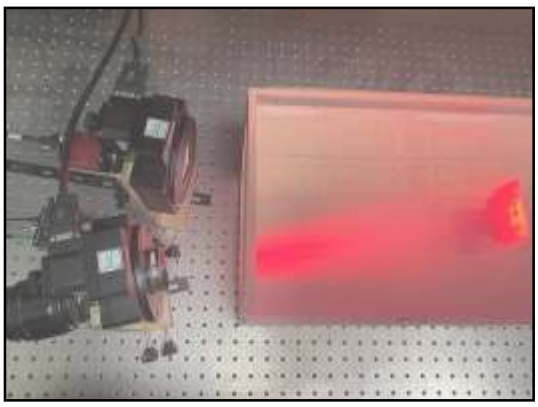
Imaging clearly underwater is extremely challenging because the water and the particles in it tend to scatter light. But, because scattered light is partially polarized, imaging using a camera that is sensitive to polarization can be used to suppress scattered light in underwater images.

"Our new method overcomes the limitations of traditional polarimetric underwater imaging, laying the groundwork for taking this method out of the lab and into the field," said research team

leader Haofeng Hu from Tianjin University in China. "Unlike previous methods, there's no requirement for the image to include a background area to estimate the backscattered light."

In The Optical Society (OSA) journal *Optics Express*, the researchers demonstrate their method's ability to enhance image contrast while preserving image details without introducing considerable noise. The new method even works in dense turbid water, which is so cloudy it is almost impossible to see through.

"Our polarimetric imaging method can improve the image quality in various scattering media, not just turbid water," said Hu. "We think the principle we used might be extendable to imaging through other scattering media such as fog, haze and smoke."



The researchers used a traditional polarization imaging setup to image various objects submerged in the turbid water. Combining this simple setup with a new algorithm produced clear underwater images without prior knowledge or a background region. Credit: Haofeng Hu, Tianjin University

Practical underwater imaging

Traditional approaches to underwater imaging use either prior knowledge of the imaging area or the background of an image to calculate and remove scattered light. These methods have limited utility in the field because they typically require manual processing, images do not always have visible backgrounds, and prior information is not always available.

To overcome these challenges, the researchers combined a traditional polarized imaging setup with a new algorithm that automatically finds the optimal parameters to suppress the scattering light. This not only significantly improves image contrast to achieve clear imaging but can be used without any prior knowledge of the imaging area and for images with or without background regions.

"Our approach represents a distinct improvement that could enable practical application of underwater polarimetric imaging beyond the 'ideal' underwater environment found in the laboratory," said Hu. "It could be adapted for a variety of applications in which clear vision is critical but where image quality is usually poor due to turbid water."

Seeing through murky water

The researchers tested their new technique by acquiring images in turbid liquid mixtures in the laboratory. They started with a transparent tank filled with water and then blended in different amount of milk to mimic an underwater environment with different turbidities. They imaged various objects made from a variety of materials, such as wood, plastic and ceramic.

"Our experimental results show that our method has distinct advantages in terms of suppressing scattering, recovering details and reducing noise when imaging different objects in water with various turbidities," said Hu. "While background regions are often not visible in dense turbid water, our method was able to accomplish clear vision in this environment."

Now that the method has been demonstrated in the lab, the researchers plan to test it in a practical underwater environment such as in the ocean. They also plan to improve the imaging distances to make it more useful in a real-world underwater environment.

More information: Hongyuan Wang et al, Automatic underwater polarization imaging without background region or any prior, *Optics Express* (2021). DOI: 10.1364/OE.434398

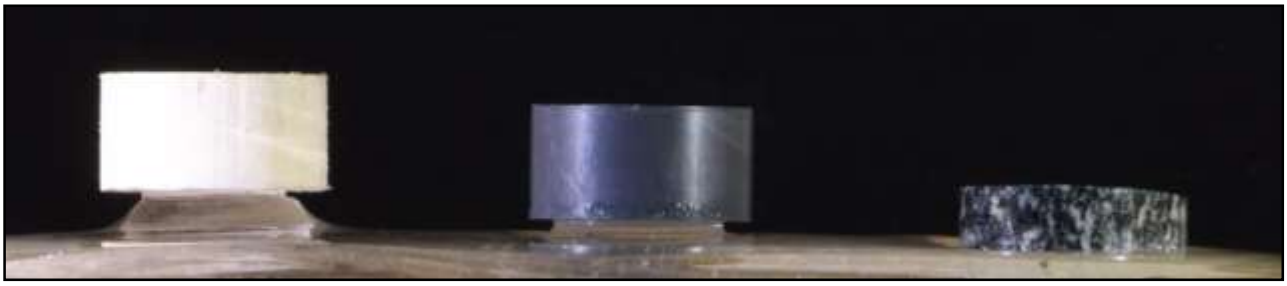
https://phys.org/news/2021-09-technology-murky.html

Fri, 17 Sept 2021

How glacier tables are formed

By Bob Yirka

A trio of researchers at the University of Lyon, has learned via lab experimentation how glacier tables are formed. Marceau Hénot, Nicolas Plihon and Nicolas Taberlet have published their findings in *Physical Review Letters.*



Homemade glacier. To replicate glacier table formation, cylindrical stones made of polystyrene, PVC, and granite were placed on a plate made of ice. As the ice melted, the plastics (polystyrene and PVC) formed tables because they are relatively poor conductors of heat, whereas the granite—a stronger heat conductor—sunk into the ice. Credit: M. Hénot et al.

Glacier tables are large boulders sitting atop columns of ice on glaciers. They are commonly seen around the bases of glaciers and do not occur at higher elevations. How they form has been a matter of opinion for many years. In this new effort, the researchers sought to answer the question.

Glacier tables appear at first sight as unnatural because they seem to balance atop a much thinner column of ice. They also raise the question of why they do not just sink into the glacier as the ice below melts. To find out why they do not, the researchers set up multiple experiments in their lab.

The experiments began with the creation of 3-cm-thick slabs of ice that slant at angles similar to those of glaciers in nature. Each of the slabs was left to sit on a counter to melt, allowing the researchers to understand the factors contributing to their melting. They found it was both the warmth radiating from the lab walls and warmth in the air surrounding them. They noted that water runoff did not appear to have much of an impact on the time it took for their tiny glaciers to melt.

Next, the researchers placed small cylinders made of multiple materials with varying heat conductance atop the ice slabs and once again allowed them to melt. They found that some of the cylinders had formed glacier tables and some had not.

In studying the differences between those cylinders that formed tables and those that did not, the researchers found that heat conductance was the main factor—those that were poor heat conductors formed tables. Polystyrene cylinders, for example, were found to form a blanket of sorts, protecting the ice beneath the cylinder from melting, but only under the cylinder. The ice around it melted, leaving the cylinder sitting atop a column of ice. The researchers also found that shape played a role. Thinner cylinders were more likely to result in glacier tables than thicker cylinders. Thicker cylinders (or boulders), they noted, absorb more heat, which can find its way to the ice below.

More information: Marceau Hénot et al, Onset of Glacier Tables, *Physical Review Letters* (2021). DOI: 10.1103/PhysRevLett.127.108501 . On *Arxiv*: arXiv:2103.09760v3 [physics.flu-dyn], arxiv.org/abs/2103.09760

https://phys.org/news/2021-09-glacier-tables.html

INDIA TODAY

Fri, 17 Sept 2021

Moderna Covid vaccine produces lasting immune response, study finds

Moderna Covid-19 vaccine led to strong immune and antibody responses for at least six months after clinical trial participants were fully vaccinated

Immunity generated by the Moderna Covid-19 vaccine lasts for at least six months, and there is no indicator that vaccinated people will need a booster shot, according to a study.

The research, published in the journal Science, noted that this time point of six months is critical because that is when true immune memory has formed.

While the Moderna Covid-19 vaccine led to strong immune and antibody responses for at least six months after clinical trial participants were fully vaccinated, it is likely that the immune response could last much longer, the researchers said.

They also show that this strong immune memory lasted in all age groups tested, including in people over age 70, a demographic especially vulnerable to severe Covid-19.

"The immune memory was stable, and that was impressive. That's a good indicator of the durability of mRNA vaccines," said Shane Crotty, a professor at La Jolla Institute for Immunology (LJI) in the US. The researchers compared recovered Covid-19 patients to vaccine trial participants who received a 25-microgramme dose of the Moderna vaccine during the phase 1 clinical trials.

"We wanted to see if a quarter of the dose is able to induce any immune response," said study first author Jose Mateus Trivino, a postdoctoral fellow at LJI.

"We had the opportunity to receive the samples from the original Moderna phase 1 trial participants who had received two 25-microgram injections of the vaccine, 28 days apart," Trivino said. This vaccine dose is a quarter of the 100-microgram Moderna dose given emergency authorisation by the US Food and Drug Administration (FDA).

While researchers don't know whether this smaller dose is as effective as the standard dose, the study shows that the T cell and antibody response in the smaller dose group is still strong.

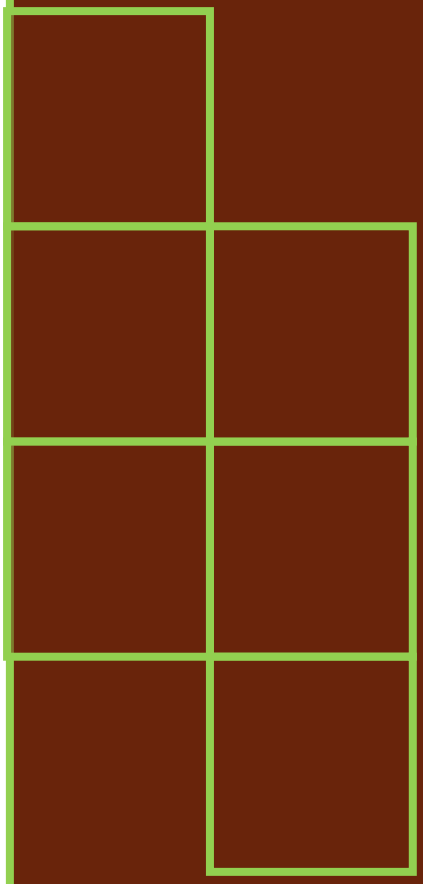
They found that the Moderna vaccine spurs an adaptive immune response to the SARS-CoV-2 spike protein nearly identical to the immune system's response to a natural infection.

The coronavirus uses the spike protein to enter and infect the cells.

"The response is comparable. It's not higher and it's not lower," said LJI Research Assistant Professor Daniela Weiskopf. The study also shows the power of "cross-reactive" T cells, immune cells which trigger a faster and better antibody response.

The researchers found that people with cross-reactive T cells had significantly stronger antibody responses to both doses of the vaccine. "If you have this immune reactivity, your immune system may kick in faster against the virus. And multiple studies have shown that how quickly the immune system reacts is key," the researchers added.

https://www.indiatoday.in/coronavirus-outbreak/story/moderna-covid-vaccine-produces-lasting-immune-response-study-finds-1853301-2021-09-16



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