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समाचार पत्रों से चयित अंश Newspapers Clippings

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CONTENTS

S. No.	TITLE	Page No.
DRDO News		1-6
DRDO Technology News		1-6
1.	IAF contingent inducts for the Dubai air show 2021	1
2.	दुबई एयर शो 2021 के लिए भारतीय वायुसेना के दल को शामिल किया गया	2
3.	IAF's Tejas Fighters land in UAE for Dubai Air Show	3
4.	Dubai Air Show to witness heavy Indian presence from Nov 14-18. Details here	4
5.	Dubai AirShow में दिखेगा Indian Airforce का हवाई युद्धाभ्यास, ये फाइटर जेट होंगे हिस्सा	5
6.	DRDO centre in UoH gets process patent for industrial burn rate enhancer	6
7.	Patent granted to DRDO CoE	6
Defence News		7-15
Defence Strategic: National/International		7-15
8.	Air Force Commanders' Conference Nov 2021	7
9.	वायु सेना कमांडरों का सम्मेलन नवंबर 2021	8
10.	Admiral Karambir Singh, CNS on farewell visit to ENC	9
11.	Goa Maritime Conclave – 2021	10
12.	भारतीय नौसेना की 'समुद्री सुरक्षा और संबंधों पर संवाद' के लिए आउटरीच पहल	11
13.	India & US hold 11th Defence technology & trade initiative group meeting virtually	12
14.	भारत और अमेरिका ने 11वीं रक्षा प्रौद्योगिकी और व्यापार पहल समूह की बैठक वर्चुअली आयोजित की	13
15.	Volatile situation on borders, forces must be prepared: Rajnath	14
16.	India promotes submarine rescue mechanism for IOR	15
Science & Technology News		16-21
17.	Adding sound to quantum simulations	16
18.	Preventing data leak with dual-band metahologram	18
19.	Laser light used to modulate free electrons into qubits	19
COVID-19 Research News		20-21
20.	Certain sleep disorders may increase your risk of a worse outcome if you contract COVID-19: study	20



Press Information Bureau
Government of India

Ministry of Defence

Wed, 10 Nov 2021 5:20PM

IAF contingent inducts for the Dubai air show 2021

The Indian Air Force (IAF) Contingent has inducted for participation in the biennial Dubai Air Show to be held at the Al Maktoum International Airport from 14th to 18th November 21. The IAF has been invited by the Government of UAE to participate with the Sarang and Suryakiran Aerobatics Teams. These teams will be performing along with some of the best aerobatics and display teams in the world, including the Saudi Hawks, Russian Knights and the UAE's Al Fursan. In addition, the IAF's Light Combat Aircraft (LCA) Tejas shall be part of the aerobatics and static displays during the show.

The induction of five Advanced Light Helicopters (ALH) Dhruvs of the Sarang Team, 10 BAE Hawk 132s of the Suryakiran Team and the three LCA Tejas was completed by 09th November 21. The induction was supported by the IAF's C-17 Globemaster IIIs and C-130J Super Hercules. On arrival, the contingent received a warm welcome by H. E. Staff Maj Gen Staff Pilot Ishaq Saleh Mohammed al-Balushi of the UAE Armed Forces and other officers of the UAE Air Force. The teams are now preparing for the opening ceremony on 14th November 21.

While the Sarang Team has previously participated in the Al Ain Grand Prix in UAE in 2005, the Dubai Air Show will be the first occasion for the Suryakirans and the Tejas to show off their swashbuckling aerial manoeuvres here.



<https://pib.gov.in/PressReleasePage.aspx?PRID=1770593>



पत्र सूचना कार्यालय
भारत सरकार
रक्षा मंत्रालय

Wed, 10 Nov 2021 5:20PM

दुबई एयर शो 2021 के लिए भारतीय वायुसेना के दल को शामिल किया गया

भारतीय वायु सेना (आईएएफ) की टुकड़ी को अल मकतूम अंतर्राष्ट्रीय हवाई अड्डे पर 14 से 18 नवंबर तक आयोजित होने वाले द्विवार्षिक दुबई एयर शो में भाग लेने के लिए शामिल किया गया है। आईएएफ को संयुक्त अरब अमीरात-यूएई सरकार द्वारा सारंग और सूर्य किरण एरोबेटिक्स टीमों के साथ भाग लेने के लिए आमंत्रित किया गया है। ये टीमें दुनिया की कुछ बेहतरीन एरोबेटिक्स और प्रदर्शन टीमों के साथ प्रदर्शन करेंगी, जिनमें सऊदी हॉक्स, रशियन नाइट्स और यूएई के अल फुरसान शामिल हैं। इसके अलावा, आईएएफ का लाइट कॉम्बैट एयरक्राफ्ट (एलसीए) तेजस शो के दौरान एरोबेटिक्स और स्टैटिक डिस्प्ले का हिस्सा होगा।

सारंग टीम के पांच उन्नत हल्के हेलीकॉप्टर (एएलएच) ध्रुव, सूर्यकिरण टीम के 10 बीएई हॉक 132 और तीन एलसीए तेजस को शामिल करने का काम 09 नवंबर 21 तक पूरा कर लिया गया था। इस सम्मिलन को आईएएफ के सी-17 ग्लोबमास्टर III और सी-130जे सुपर हरक्यूलिस द्वारा समर्थित किया गया था। दल के आगमन पर, संयुक्त अरब अमीरात सशस्त्र बलों के एच.ई. स्टाफ मेजर जनरल स्टाफ पायलट इशाक सालेह मोहम्मद अल-बलूशी और संयुक्त अरब अमीरात वायु सेना के अन्य अधिकारियों द्वारा गर्मजोशी से स्वागत किया गया। टीमें अब 14 नवंबर को उद्घाटन समारोह की तैयारी कर रही हैं।

सारंग टीम ने इससे पहले 2005 में संयुक्त अरब अमीरात में अल ऐन ग्रांड प्रिक्स में भाग लिया था। दुबई एयर शो में सूर्यकिरण और तेजस के लिए अपने तेजतर्रार हवाई युद्धाभ्यास दिखाने का पहला अवसर होगा।



<https://pib.gov.in/PressReleasePage.aspx?PRID=1770681>

Thu, 11 Nov 2021

IAF's Tejas Fighters land in UAE for Dubai Air Show

Snapshot

- ***Five Advanced Light Helicopters Dhruvs of the Sarang Team and 10 BAE Hawk 132s of the Suryakiran Team will also be taking part in the Dubai Air Show.***

Three Tejas fighters of the Indian Air Force (IAF) landed in the UAE earlier today to participate in the biennial Dubai Air Show scheduled to be held at the Al Maktoum Airport from 14 to 18 November.

The three Final Operational Clearance or FOC Tejas fighter jets belong to No. 18 Squadron 'Flying Bullets' of the IAF based at the Sullur Air Force Station in Tamil Nadu. Flying Bullets, the second squadron of the Light Combat Aircraft (LCA) in the IAF, was formed in May 2020.

The No. 18 Squadron, originally formed in April 1965, saw active combat during the 1971 war. Flying Officer Nirmal Jit Singh Sekhon, the only Param Vir Chakra (highest military decoration) awardee from the IAF, belonged to the No. 18 Squadron of the IAF. The squadron was made operational at Sullur on 27 May last year with the induction of Tejas fighters.

The first LCA Tejas squadron, No 45 'Flying Daggers', was operationalised with Initial Operating Capability standard fighters in July 2016.

In the past, Tejas fighters of the IAF have participated in the Langkawi International Maritime and Aerospace Exhibition (2019) in Malaysia and the Colombo Air Show (2021) in Sri Lanka.

Apart from Tejas fighters, five Advanced Light Helicopters Dhruvs of the Sarang Team and 10 BAE Hawk 132s of the Suryakiran Team will also be taking part in the Air Show. C-17 Globemaster IIIs and C-130J Super Hercules aircraft are also in the UAE for induction of the aircraft and members of the crew.

<https://swarajyamag.com/news-brief/in-pictures-iafs-tejas-fighters-land-in-uae-for-dubai-air-show>



Tejas in the UAE

Dubai Air Show to witness heavy Indian presence from Nov 14-18. Details here

Indian Air Force has been invited by the UAE government to perform along with some of the best aerobatics and display teams in the world, including the Saudi Hawks, Russian Knights, and the UAE's Al Fursan

Edited By Vivek Punj

The Indian Air Force (IAF) has sent an aircraft contingent, including its Sarang and Suryakiran aerobatics team, to participate in the Dubai Air Show scheduled for later this month. The event will be held from November 14 to November 18 at the Al Maktoum International Airport in Dubai.

The IAF has been invited by the UAE government to perform along with some of the best aerobatics and display teams in the world, including the Saudi Hawks, Russian Knights, and the UAE's Al Fursan, a government official told PTI.

The Indian contingent inducted at the Dubai Air Show on November 9 includes five Dhruvs, the advanced light helicopters (ALH) of the Sarang Team, 10 BAE Hawk 132 aircraft of the Suryakiran Team, and three LCA Tejas aircraft, the official said.

The induction was supported by the IAF's C-17 Globemaster IIIs and C-130J Super Hercules, the official further added.

On arrival, the IAF contingent was received with a warm welcome by Major General Staff Pilot Ishaq Saleh Mohammed al-Balushi of the UAE Armed Forces and other officers of the UAE Air Force, they noted.

The IAF teams are now preparing for the opening ceremony on November 14, they said.

While the Sarang Team has previously participated in the Al Ain Grand Prix in UAE in 2005, Suryakirans and the Tejas will be showing off their swashbuckling aerial maneuvers for the first time in the gulf nation, the official added.

<https://www.livemint.com/news/world/dubai-air-show-to-witness-heavy-indian-presence-from-nov-14-18-details-here-11636545657617.html>



Indian Air Force aircrafts prepare to participate in the biennial Dubai Air Show to be held at the Al Maktoum International Airport from November 14 to 18, in Dubai on Wednesday. (ANI)

Dubai AirShow में दिखेगा Indian Airforce का हवाई युद्धाभ्यास, ये फाइटर जेट होंगे हिस्सा

भारतीय वायुसेना की सारंग और सूर्य किरण एरोबेटिक्स टीम दुबई में होने वाले एयरो शो (Dubai AirShow) में शामिल होने के लिए पहुंच गई हैं।

By नीरज राजपूत

यूएई सरकार (UAE Government) के आमंत्रण पर भारतीय वायुसेना (Indian Airforce) की सारंग और सूर्य किरण एरोबेटिक्स टीम दुबई में होने वाले एयरो शो (Dubai AirShow) में शामिल होने के लिए पहुंच गई हैं। 14 नवंबर से दुबई एयरो शो में शामिल होने के लिए वायुसेना के तीन एलसीए तेजस फाइटर जेट भी पहुंच गए हैं।

द्विवार्षिक दुबई एयरो शो अल मकतूम अंतरराष्ट्रीय हवाई अड्डे पर 14 से 18 नवंबर तक आयोजित होगा। वायुसेना की सारंग हेलीकॉप्टर टीम और सूर्यकिरण एयरक्राफ्ट टीम को संयुक्त अरब अमीरात-यूएई सरकार द्वारा के साथ भाग लेने के लिए आमंत्रित किया गया था। ये टीमों दुनिया की कुछ बेहतरीन एरोबेटिक्स टीमों के साथ प्रदर्शन करेंगी, जिनमें सऊदी हॉक्स, रशियन नाइट्स और यूएई के अल फुरसान शामिल हैं। भारत का स्वदेशी लाइट कॉम्बेट एयरक्राफ्ट (एलसीए) तेजस शो के दौरान एरोबेटिक्स और स्टैटिक डिस्प्ले दोनों में हिस्सा होगा।



दुबई एयर शो में हिस्सा ले रही भारतीय वायुसेना

सारंग टीम के पांच उन्नत हल्के हेलीकॉप्टर (एएलएच) ध्रुव, सूर्यकिरण टीम के 10 बीएई हॉक-132 और तीन एलसीए तेजस बुधवार को वायुसेना के ही सी-17 ग्लोबमास्टर और सी-130जे सुपर हरक्यूलिस एयरक्राफ्ट्स के जरिए दुबई पहुंचे। वायुसेना की टुकड़ी के आगमन पर संयुक्त अरब अमीरात सशस्त्र बलों के मेजर जनरल स्टाफ पायलट इशाक सालेह मोहम्मद अल-बलूशी और संयुक्त अरब अमीरात वायु सेना के अन्य अधिकारियों द्वारा गर्मजोशी से स्वागत किया गया।

टीमें अब 14 नवंबर को उद्घाटन समारोह की तैयारी कर रही हैं। सारंग टीम ने इससे पहले 2005 में संयुक्त अरब अमीरात में अल ऐन ग्रांड प्रिक्स में भाग लिया था। दुबई एयर शो में सूर्यकिरण और तेजस के लिए अपने तेजतर्रार हवाई युद्धाभ्यास दिखाने का पहला अवसर होगा।

<https://www.abplive.com/news/india/indian-airforce-in-dubai-air-show-on-the-invitation-of-uae-government-1995744>

Thu, 11 Nov 2021

DRDO centre in UoH gets process patent for industrial burn rate enhancer

Hyderabad: The Advanced Centre of Research in High Energy Materials (ACRHEM), a DRDO Centre of Excellence in University of Hyderabad (UoH), has been granted a patent for process for synthesis of an industrial burn rate enhancer derivative.

The present patent entitled “Process for the Synthesis of 4-(dimethylsilane)-alkylferrocene” deals with the invention of a cost effective, simple and efficient synthetic process for the synthesis of 4-(dimethylsillane) butylferrocene, the UoH said on Wednesday.



It also offers a process for the synthesis of structural variants of 4-(dimethylsilyl) alkylferrocene which can be easily scalable up to industrial scale, the University said.

The inventors of patent were Prof. Tushar Jana of School of Chemistry, UoH and adjunct faculty in ACRHEM, and Dr. Bikash Kumar Sikder, who worked as a post-doctoral fellow in ACRHEM with Prof. Jana.

<https://telanganatoday.com/drdo-centre-in-uoh-gets-process-patent-for-industrial-burn-rate-enhancer>



Thu, 11 Nov 2021

Patent granted to DRDO CoE

Hyderabad: Advanced Centre of Research in High Energy Materials (ACRHEM), a DRDO Centre of Excellence at the University of Hyderabad (UoH), has been granted a patent titled “Process for the Synthesis of 4-(dimethylsilane)-alkylferrocene”.

Ferrocene and its derivatives have been found important for use in catalysis, nanomaterials, pharmaceutical industries etc. The inventors of this patent are Tushar Jana (School of Chemistry, UoH and adjunct faculty in ACRHEM) and Bikash Kumar Sikder, who worked as a post-doctoral fellow in ACRHEM with Prof. Jana.

The present patent deals with the invention of a cost-effective, simple and efficient synthetic process for the synthesis of 4-(dimethylsillane) butylferrocene. It also offers a process for the synthesis of structural variants of 4-(dimethylsilyl) alkylferrocene which can be easily expanded to industrial scale, said an official release.

<https://www.thehindu.com/news/cities/Hyderabad/patent-granted-to-drdo-coe/article37428977.ece>



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Wed, 10 Nov 2021 4:01PM

Air Force Commanders' Conference Nov 2021

The Second bi-annual IAF Commanders' Conference was inaugurated by Hon'ble Raksha Mantri on 10 Nov 21 at Air Headquarter (Vayu Bhawan). Chief of the Air Staff, Air Chief Marshal VR Chaudhari PVSM AVSM VM ADC, welcomed Hon'ble Raksha Mantri Shri Rajnath Singh, CDS General Bipin Rawat PVSM UYSM AVSM YSM SM VSM ADC and Secretary Defence Production Shri Raj Kumar. CAS introduced the IAF Commanders to the Hon'ble Raksha Mantri.

The Hon'ble Raksha Mantri addressed the Air Force Commanders on the inaugural day of the conference. In his address, the Raksha Mantri appreciated the IAF for maintaining a high level of preparedness, ability to respond on a short notice and displaying high standards of professionalism in carrying out operational and peace time tasks. The Raksha Mantri remarked on the volatile situation on our borders and said that the Armed Forces need to be prepared to respond at a short notice for any contingency. He brought out that the role of IAF in future conflicts is crucial and it needs to harness the capabilities and opportunities offered by AI, Big Data Handling and Machine Learning. He also mentioned that the efforts in the field of indigenization through 'Make in India' initiative of Govt of India is showing results and the orders of LCA Mk 1A and C-295 will open new opportunities in the indigenous aerospace sector. Expounding on theaterisation, he mentioned that enhancing jointness is essential and the structure should be evolved after closely examining various options, and inputs from all stake holders would be taken into consideration. The RM concluded by exhorting the commanders to brainstorm to evolve viable solutions towards the conference theme of, "Ensuring Certainty amidst Uncertainties". The CAS thereafter briefed the Raksha Mantri on the current status of the IAF.



The CAS addressed all Commanders and emphasized on the need to develop multi-domain capability in order to give a swift and befitting response to any misadventures by our adversaries. He also emphasized on the need for joint training with the Indian Army and Indian Navy to enable synergized application of combat power in future conflicts. The CAS complimented all the commanders for maintaining a high state of readiness despite challenges posed by the pandemic.

The Commanders' Conference is being conducted from 10 Nov 21 to 12 Nov 21. Uncertainty in the geo-political landscape makes it an imperative for the armed forces to train, equip and adapt to rapid changes. During the Conference, commanders will discuss and brainstorm situations which may affect National Security and focus on measures to enhance operational capability. Issues

pertaining to strengthening training and optimising HR policies for effective utilization of manpower will also be discussed.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1770535>



पत्र सूचना कार्यालय
भारत सरकार
रक्षा मंत्रालय

Wed, 10 Nov 2021 4:01PM

वायु सेना कमांडरों का सम्मेलन नवंबर 2021

भारतीय वायु सेना कमांडरों के दूसरे अर्द्धवार्षिक सम्मेलन का उद्घाटन रक्षा मंत्री द्वारा 10 नवंबर 21 को वायु सेना मुख्यालय (वायु भवन) में किया गया। वायु सेना प्रमुख एयर चीफ मार्शल वी.आर. चौधरी पीवीएसएम एवीएसएम वीएम एडीसी ने रक्षा मंत्री श्री राजनाथ सिंह, चीफ ऑफ डिफेंस स्टाफ जनरल बिपिन रावत पीवीएसएम यूवाईएसएम एवीएसएम वाईएसएम एसएम वीएसएम एडीसी और रक्षा उत्पादन सचिव श्री राज कुमार का स्वागत किया। वायु सेना प्रमुख ने रक्षा मंत्री से कमांडरों का परिचय करवाया।



सम्मेलन के उद्घाटन अवसर पर रक्षा मंत्री ने वायु सेना कमांडरों को संबोधित किया। रक्षा मंत्री ने अपने संबोधन में उच्च स्तर की तैयारियों को बनाए रखने, अल्प सूचना पर त्वरित कार्रवाई की क्षमता और परिचालन तथा शांति काल के कर्तव्यों को पूरा करने में व्यावसायिकता के उच्च मानकों को प्रदर्शित करने के लिए भारतीय वायुसेना की सराहना की। रक्षा मंत्री ने देश की सीमाओं पर अस्थिर स्थिति के बारे में चर्चा की और कहा कि सशस्त्र बलों को किसी भी आकस्मिकता के लिए अल्प सूचना पर त्वरित कार्रवाई करने के लिए तैयार रहने की आवश्यकता है। उन्होंने बताया कि भविष्य के युद्धों में भारतीय वायुसेना की भूमिका महत्वपूर्ण है और इसे कृत्रिम बुद्धिमत्ता- एआई, बिग डेटा हैंडलिंग तथा मशीन लर्निंग द्वारा प्रदान की जाने वाली क्षमताओं एवं अवसरों का उपयोग करने की जरूरत है। उन्होंने यह भी उल्लेख किया कि भारत सरकार की 'मेक इन इंडिया' पहल के माध्यम से स्वदेशीकरण के क्षेत्र में किये गए प्रयास अब अच्छे परिणाम दिखा रहे हैं और एलसीए एमके 1ए और सी-295 के ऑर्डर्स से स्वदेशी एयरोस्पेस क्षेत्र में नए अवसर खुलेंगे। थिएटराईजेशन का जिक्र करते हुए उन्होंने कहा कि संयुक्तता बढ़ाना आवश्यक है तथा विभिन्न विकल्पों की बारीकी से जांच करने के बाद संरचना विकसित की जानी चाहिए और सभी हितधारकों के इनपुट को ध्यान में रखा जाएगा। रक्षा मंत्री ने कमांडरों को "अनिश्चितताओं के बीच निश्चितता सुनिश्चित करना" के सम्मेलन विषय पर व्यवहार्य समाधान विकसित करने हेतु कमांडरों को विचार-मंथन करने का आह्वान करते हुए निष्कर्ष निकालाने के लिए प्रेरित किया। इसके बाद वायु सेना प्रमुख ने रक्षा मंत्री को भारतीय वायुसेना की वर्तमान स्थिति के बारे में जानकारी दी।



वायु सेना प्रमुख ने भी सभी कमांडरों को संबोधित किया और देश के शत्रुओं द्वारा किसी भी दुस्साहस का त्वरित तथा मुंहतोड़ जवाब देने के लिए मल्टी-डोमेन क्षमता विकसित करने की आवश्यकता पर बल दिया। उन्होंने भारतीय सेना और नौसेना के साथ संयुक्त प्रशिक्षण की आवश्यकता पर भी जोर दिया ताकि भविष्य के संघर्षों में युद्ध शक्ति के समन्वित उपयोग को सक्षम बनाया जा सके। सीएस ने महामारी से उत्पन्न चुनौतियों के बावजूद उच्च स्तर की तत्परता बनाए रखने के लिए सभी कमांडरों की सराहना की।

कमांडरों का सम्मेलन 10 नवंबर से 12 नवंबर, 2021 तक आयोजित किया जा रहा है। भू-राजनीतिक परिदृश्य में अनिश्चितता सशस्त्र बलों के लिए प्रशिक्षण, लैस और तेजी से परिवर्तनों के अनुकूल होने के लिए अनिवार्य बनाती है। सम्मेलन के दौरान, कमांडर उन स्थितियों पर चर्चा और विचार-मंथन करेंगे जो राष्ट्रीय सुरक्षा को प्रभावित कर सकती हैं तथा परिचालन क्षमता बढ़ाने के उपायों पर भी ध्यान केंद्रित किया जायेगा। जनशक्ति के प्रभावी उपयोग के लिए प्रशिक्षण क्षमता को मजबूत करने और मानव संसाधन नीतियों को अनुकूलित करने से संबंधित मुद्दों पर भी चर्चा की जाएगी।

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Wed, 10 Nov 2021 4:42PM

Admiral Karambir Singh, CNS on farewell visit to ENC

Admiral Karambir Singh, PVSM, AVSM, ADC, Chief of the Naval Staff (CNS) interacted with Vice Adm Ajendra Bahadur Singh, Flag Officer Commanding-in-Chief, Officers, Sailors and Defence Civilians of the ENC and also paid homage to the naval personnel who made the supreme sacrifice, in the line of duty to the nation at the 'Smaran Sthal' Memorial in Naval Dockyard on 10 Nov 21. The CNS arrived at Visakhapatnam on Tuesday on a two-day farewell visit to the Eastern Naval Command (ENC) and was received by Vice Adm Ajendra Bahadur Singh, Flag Officer Commanding-in-Chief ENC.



Admiral Karambir Singh retires from the Navy on 30 Nov 21 after over four decades of distinguished service. Admiral Karambir Singh is an alumnus of the National Defence Academy, Khadakwasla. Commissioned into the Indian Navy in July 1980, he earned his wings as a helicopter pilot in 1981 and has flown extensively on the Chetak (Alouette) and Kamov helicopters. He is a graduate of the Defence Services Staff College, Wellington; College of Naval Warfare, Mumbai and has served as Directing Staff in both these institutions.

In his career spanning over 41 years, Admiral KB Singh has spent nearly 12 years at Visakhapatnam which included his formative years in Flying Kamov helicopters with INAS 333, Command of Indian Coast Guard Ship Chandbibi, Guided Missile Destroyer Rana, and was also as the Chief of Staff and the CinC ENC from 31 Oct 2017 to 31 May 2019, before taking over the helm of the Indian Navy as the 24th Chief of the Naval Staff.

Other important appointments in the Western Seaboard include the Commands of Missile Corvette INS Vijaydurg, Guided Missile Destroyer INS Delhi. He has also served as the Fleet Operations Officer of the Western Fleet.

On promotion to flag rank, the Admiral was appointed as the Chief of Staff, ENC. His other important flag appointments include Chief of Staff of the Tri-Services Unified Command at Andaman and Nicobar Islands and Flag Officer Commanding Maharashtra and Gujarat Naval Area (FOMAG). In the rank of Vice Admiral, he has been Director General Project Seabird, in-charge of infrastructure development of the Navy's expansive and modern base at Karwar. At the Integrated Headquarters Ministry of Defence (Navy), the Admiral has been the Deputy Chief of Naval Staff, the Vice Chief of Naval Staff, and subsequently as the FOC-in-C ENC.

During the last two and half years as CNS, Admiral KB Singh brought about a complete operational focus to ensure 'Combat Ready, Credible and Cohesive Navy' across all echelons of the Navy. He led the Navy during one of the most challenging phases that the Navy has seen in several decades – the combination of Galwan Crisis and COVID Pandemic and ensured that the frontline naval assets remained Mission Deployed to meet all challenges in the maritime domain.

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Goa Maritime Conclave – 2021

IN's outreach initiative for 'Harnessing Maritime Thought'

The 3rd edition of Goa Maritime Conclave, successfully conducted from 07 to 09 November 2021 at Goa, brought together the Chiefs of Navy/ Heads of Maritime Agencies of IOR littorals, namely, Bangladesh, Comoros, Indonesia, Madagascar, Malaysia, Maldives, Mauritius, Myanmar, Seychelles, Singapore, Sri Lanka and Thailand. The theme for GMC-21, “*Maritime Security and Emerging Non-Traditional Threats: A Case for Proactive Role for IOR Navies*”, was derived keeping in mind the necessity of ‘*winning everyday peace*’ in the maritime domain.

Delivering the Conclave Address, Shri Ajay Kumar, Defence Secretary highlighted GMC's symbolism of India's constructive engagement in the IOR and that the Maritime Security and Economic prosperity are inter-related and inter-dependent since time immemorial. He also stressed on the role played by constructive engagements such as IONS, IORA, BIMSTEC, Colombo Security Conclave, etc towards promoting pluralistic cooperation for Maritime Security. Shri Harsh Vardhan Shringla, Foreign Secretary, during his Keynote Address reiterated maritime transport and logistics as major components of Blue Economy and its significance to IOR littorals. He laid emphasis on

institutional dialogues between maritime security agencies, towards building relationships and processes that contribute to improvement of security related outcomes.

The various panel discussions saw enriching contribution from eminent scholars, subject matter experts and veteran Naval officers wherein relevant insights, thought provoking ideas and possible solutions were put forth on the GMC-21 theme. A ‘*Make in India*’ Defence and Shipyard Pavilion was also inaugurated by the Chief of the Naval Staff, wherein DPSUs/ private shipyards viz M/s MDL, GSL, L&T and Chowgule Global, Goa, showcased their shipbuilding capabilities. The visiting delegations were also provided with a first-hand demonstration of Indian Navy's Deep Submergence and Rescue Vessel (DSRV) capabilities towards promoting a submarine rescue mechanism for IOR, along with a tour onboard Guided Missile Destroyer INS Kochi, to showcase India's indigenous shipbuilding prowess.

In his Closing Remarks, Admiral Karambir Singh, Chief of the Naval Staff brought out that GMC should move beyond dialogue and focus on cogent outcomes. He proposed four guiding principles for future editions, viz., iterative and incremental gains, harnessing complementarities, synchronisation and focussed operations, and lastly up-skilling and up-scaling existing capabilities.

The Conclave also saw declaration of ‘Common Maritime Priorities’, which had been identified during the Goa Maritime Symposium 21, earlier this year.



With the culmination GMC 21, all Nations agreed to endeavour, to work together on the deliverables and take forward further constructive activities in the future editions.

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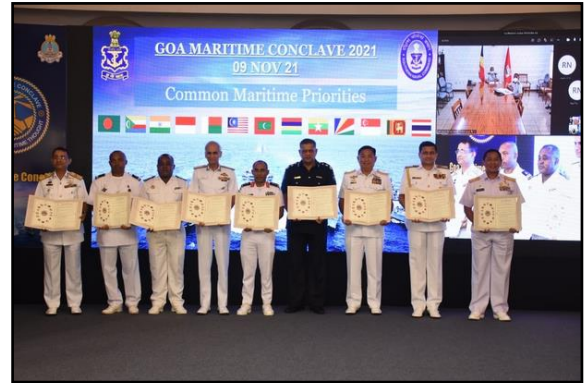


पत्र सूचना कार्यालय
भारत सरकार
रक्षा मंत्रालय

Wed, 10 Nov 2021 4:19PM

भारतीय नौसेना की 'समुद्री सुरक्षा और संबंधों पर संवाद' के लिए आउटरीच पहल

गोवा मैरीटाइम कॉन्क्लेव (जीएमएस-21) का तीसरा संस्करण, गोवा में 7-9 नवंबर 2021 तक सफलतापूर्वक आयोजित किया गया। इसमें आईओआर तटवर्ती देशों, बांग्लादेश, कोमोरोस, इंडोनेशिया, मेडागास्कर, मलेशिया, मालदीव, मॉरीशस, म्यांमार, सेशेल्स, सिंगापुर, श्रीलंका और थाईलैंड के नौसेना प्रमुखों/समुद्री एजेंसियों के प्रमुखों को एक साथ लाया गया। जीएमएस-21 के लिए विषय, "समुद्री सुरक्षा और उभरते गैर-पारंपरिक खतरे: आईओआर नौसेनाओं के लिए सक्रिय भूमिका के लिए एक केस", समुद्री क्षेत्र में 'रोजमर्रा की शांति जीतने' की आवश्यकता को ध्यान में रखते हुए तैयार किया गया था।



कॉन्क्लेव को संबोधित करते हुए, रक्षा सचिव, श्री अजय कुमार ने आईओआर में भारत के रचनात्मक जुड़ाव को मजबूत करने के लिए जीएमसी के महत्व पर प्रकाश डाला और कहा कि समुद्री सुरक्षा और आर्थिक समृद्धि अनादि काल से परस्पर संबंधित हैं। उन्होंने समुद्री सुरक्षा के लिए बहुलवादी सहयोग को बढ़ावा देने की दिशा में आईओएनएस, आईओआरए, बिस्स्टेक, कोलंबो सुरक्षा सम्मेलन आदि रचनात्मक कार्यों द्वारा निभाई गई भूमिका पर भी जोर दिया। श्री हर्षवर्धन श्रृंगला, विदेश सचिव ने अपने मुख्य भाषण के दौरान समुद्री परिवहन और लॉजिस्टिक्स को ब्लू इकॉनमी के प्रमुख घटकों के रूप में और आईओआर के समुद्र तटों के लिए इसके महत्व को दोहराया। उन्होंने समुद्री सुरक्षा एजेंसियों के बीच संस्थागत संवादों पर बल दिया, ताकि सुरक्षा संबंधी परिणामों में सुधार के लिए योगदान देने वाले संबंध और प्रक्रियाएं बनाई जा सकें।



विभिन्न पैनल चर्चाओं में प्रख्यात विद्वानों, विषय विशेषज्ञों और अनुभवी नौसेना अधिकारियों के समृद्ध योगदान को देखा गया, जिसमें प्रासंगिक अंतर्दृष्टि, विचारोत्तेजक संवाद और संभावित समाधान जीएमएस-21 विषय पर सामने रखे गए। नौसेना प्रमुख द्वारा एक 'मेक इन इंडिया' रक्षा और शिपयार्ड पवेलियन का भी उद्घाटन किया गया, जिसमें डीपीएसयू/निजी शिपयार्ड जैसे मैसर्स एमडीएल, जीएसएल, एलएंडटी और चौगुले ग्लोबल, गोवा ने अपनी जहाज निर्माण क्षमताओं का प्रदर्शन किया। आने वाले प्रतिनिधिमंडलों को आईओआर के लिए पनडुब्बी बचाव तंत्र को बढ़ावा देने की दिशा में भारतीय नौसेना की डीप सबमर्जेस एंड रेस्क्यू वेसल (डीएसआरवी) क्षमताओं के प्रत्यक्ष प्रदर्शन के साथ-साथ गाइडेड मिसाइल डिस्टॉयर आईएनएस कोच्चि में भारत के स्वदेशी जहाज निर्माण कौशल का प्रदर्शन करने के लिए एक दौरे के साथ प्रदान किया गया था।

अपने समापन संबोधन में नौसेनाध्यक्ष एडमिरल करमबीर सिंह ने कहा कि जीएमसी को बातचीत से आगे बढ़ना चाहिए और ठोस परिणामों पर ध्यान केंद्रित करना चाहिए। उन्होंने भविष्य के संस्करणों के लिए चार मार्गदर्शक सिद्धांतों का प्रस्ताव रखा, जैसे- पुनरावृत्त और वृद्धिशील लाभ, पूरकता का दोहन, सिंक्रनाइज़ेशन और फोकस्ड ऑपरेशन और अंत में मौजूदा क्षमताओं की अप-स्किलिंग और अप-स्केलिंग।

कॉन्क्लेव में 'कॉमन मैरीटाइम प्रायोरिटीज' की घोषणा भी की गई, जिसकी पहचान इस साल की शुरुआत में गोवा मैरीटाइम सिम्पोजियम 21 के दौरान की गई थी।

जीएमसी 21 के समापन के साथ, सभी राष्ट्र प्रयास करने, डिलिवरेबल्स पर एक साथ काम करने और भविष्य के संस्करणों में और रचनात्मक गतिविधियों को आगे बढ़ाने के लिए सहमत हुए।

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Press Information Bureau
Government of India

Ministry of Defence

Wed, 10 Nov 2021 11:03AM

India & US hold 11th Defence technology & trade initiative group meeting virtually

Key highlights:

- ***Co-chairs agree on revised Statement of Intent to strengthen dialogue on defence technology cooperation***
- ***First Project Agreement for Air-Launched Unmanned Aerial Vehicle under Joint Working Group Air Systems signed since last meeting***
- ***Defence Industry Collaboration Forum Virtual Expo conducted to further encourage development of niche technologies***
- ***DTTI Group aims to create opportunities for co-production & co-development of defence equipment***

The 11th Defence Technology and Trade Initiative (DTTI) Group meeting between India and the United States (US) was held virtually on November 09, 2021. The meeting was co-chaired by Secretary (Defence Production) Shri Raj Kumar from Ministry of Defence, Government of India and PTDO (Performing the Duties of) Under Secretary of Defence for Acquisition and Sustainment from US Department of Defence Mr Gregory Kausner.

The DTTI Group meetings are normally held twice a year, alternating between India and the US. However, this DTTI meeting was held via Video Teleconferencing consecutively for a second time on account of the COVID-19 pandemic.

The aim of the DTTI Group is to bring sustained leadership focus to the bilateral defence trade relationship and create opportunities for co-production and co-development of defence equipment. Four Joint Working Groups focused on land, naval, air and aircraft carrier technologies have been established under DTTI to promote mutually agreed projects within their domains. The groups reported to the co-chairs on ongoing activities and collaborative opportunities, including a number of near-term projects targeted for completion on priority.

As evidence of their commitment to demonstrating the success of DTTI, the co-chairs agreed on a revised Statement of Intent (SOI) that declares their intent “to strengthen our dialogue on defence technology cooperation by pursuing detailed planning and making measurable progress” on several specific DTTI projects.

The co-chairs were also pleased to note that since the last DTTI Group meeting in September 2020, the first Project Agreement for Air-Launched Unmanned Aerial Vehicle under the Joint Working Group Air Systems was signed which is a major accomplishment for DTTI.

To further encourage US and Indian industries to develop niche technologies under the DTTI Group, the Defence Industry Collaboration Forum (DICF) Virtual Expo was conducted on November 08, 2021. The DICF was convened by Joint Secretary (Defence Industries Promotion) Shri Anurag Bajpai and Deputy Assistant Secretary of Defence for Industrial Policy and Mr Jesse Salazar. This forum offers an opportunity for Indian and US industries to be directly involved in

DTTI and facilitates dialogue between government and industry on issues that impact industrial collaboration. The results of the discussion were briefed to the DTTI Group co-chairs.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1770443>



पत्र सूचना कार्यालय

भारत सरकार

रक्षा मंत्रालय

Wed, 10 Nov 2021 11:03AM

भारत और अमेरिका ने 11वीं रक्षा प्रौद्योगिकी और व्यापार पहल समूह की बैठक वर्चुअली आयोजित की

प्रमुख बिंदु:

- रक्षा प्रौद्योगिकी सहयोग पर बातचीत को मजबूत करने के इरादे के संशोधित वक्तव्य पर सह-अध्यक्षों ने सहमति व्यक्त की
- पिछली बैठक के बाद से हस्ताक्षरित संयुक्त कार्य समूह के तहत एयर-लॉन्च मानवरहित हवाई वाहन के लिए पहला परियोजना समझौता
- बेहतरीन प्रौद्योगिकियों के विकास को और प्रोत्साहित करने के लिए रक्षा उद्योग सहयोग मंच द्वारा वर्चुअल एक्सपो आयोजित करने पर सहमति बनी
- डीटीटीआई समूह का उद्देश्य रक्षा उपकरणों के सह-उत्पादन और सह-विकास के लिए अवसर पैदा करना है

भारत और संयुक्त राज्य अमेरिका (यूएस) के बीच 11वीं रक्षा प्रौद्योगिकी और व्यापार पहल (डीटीटीआई) समूह की बैठक 9 नवंबर, 2021 को वर्चुअली आयोजित की गई। बैठक की सह-अध्यक्षता, रक्षा मंत्रालय, भारत सरकार के सचिव (रक्षा उत्पादन) श्री राज कुमार और अमेरिकी रक्षा विभाग से अवर रक्षा सचिव, अधिग्रहण और धारणीयता, पीटीडीओ (कर्तव्यों का निर्वहन) श्री ग्रेगरी कौसनर ने की।

डीटीटीआई समूह की बैठकें आम तौर पर भारत और अमेरिका के बीच बारी-बारी से साल में दो बार आयोजित की जाती हैं। हालांकि, यह डीटीटीआई बैठक कोविड-19 महामारी के कारण लगातार दूसरी बार वीडियो टेलीकॉन्फ्रेंसिंग के माध्यम से आयोजित की गई थी।

डीटीटीआई समूह का उद्देश्य द्विपक्षीय रक्षा व्यापार संबंधों में निरंतर नेतृत्व पर ध्यान केंद्रित करना और रक्षा उपकरणों के सह-उत्पादन और सह-विकास के लिए अवसर पैदा करना है। डीटीटीआई के तहत थल, नौसेना, वायु और विमान वाहक प्रौद्योगिकियों पर केंद्रित चार संयुक्त कार्य समूहों की स्थापना की गई है ताकि उनके डोमेन के भीतर परस्पर सहमत परियोजनाओं को बढ़ावा दिया जा सके। समूह ने सह-अध्यक्षों को चल रही गतिविधियों और सहयोगी अवसरों पर सूचना दी, जिसमें प्राथमिकता पर पूरा करने के लिए लक्षित कई निकट अवधि की परियोजनाएं शामिल हैं। डीटीटीआई की सफलता का प्रदर्शन करने के लिए अपनी प्रतिबद्धता के प्रमाण के रूप में, सह-अध्यक्षों ने एक संशोधित आशय के वक्तव्य (एसओआई) पर सहमति व्यक्त की, जो कई विशिष्ट डीटीटीआई परियोजनाएं पर विस्तृत योजना बनाकर और तेजी से प्रगति करके "रक्षा प्रौद्योगिकी सहयोग पर हमारे संवाद को मजबूत करने के लिए" उनके इरादे की घोषणा करता है।

सह-अध्यक्षों को यह जानकर भी प्रसन्नता हुई कि सितंबर 2020 में डीटीटीआई समूह की पिछली बैठक के बाद से, संयुक्त कार्य समूह एयर सिस्टम के तहत मानव रहित हवाई वाहन के लिए परियोजना समझौते पर हस्ताक्षर किए गए थे। यह डीटीटीआई के लिए एक बड़ी उपलब्धि है।

डीटीटीआई समूह के तहत विशिष्ट प्रौद्योगिकियों को विकसित करने के लिए अमेरिकी और भारतीय उद्योगों को और प्रोत्साहित करने के लिए, रक्षा उद्योग सहयोग मंच (डीआईसीएफ) वर्चुअल एक्सपो 8 नवंबर, 2021 को आयोजित किया गया था। डीआईसीएफ का आयोजन संयुक्त सचिव (रक्षा उद्योग संवर्धन) श्री अनुराग बाजपेयी और औद्योगिक नीति के लिए उप सहायक रक्षा सचिव और श्री जेसी सालाजार ने किया था। यह मंच भारतीय और अमेरिकी उद्योगों को सीधे डीटीटीआई में शामिल होने का अवसर प्रदान करता है और औद्योगिक सहयोग को प्रभावित करने वाले मुद्दों पर सरकार और उद्योग के बीच संवाद की सुविधा प्रदान करता है। चर्चा के परिणामों के बारे में डीटीटीआई समूह के सह-अध्यक्षों को जानकारी दी गई।

<https://pib.gov.in/PressReleasePage.aspx?PRID=1770493>

Volatile situation on borders, forces must be prepared: Rajnath

Citing the volatile situation on the borders, Defence Minister Rajnath Singh on Wednesday said that the armed forces "need to be prepared to respond at a short notice for any contingency".

New Delhi: Citing the volatile situation on the borders, Defence Minister Rajnath Singh on Wednesday said that the armed forces "need to be prepared to respond at a short notice for any contingency".

Addressing the second bi-annual Indian Air Force Commanders' Conference at the air headquarters, he stressed that the role of IAF in future conflicts is crucial and it needs to harness the capabilities and opportunities offered by Artificial Intelligence, Big Data Handling, and Machine Learning.

Rajnath Singh also mentioned that the efforts in the field of indigenisation through 'Make in India' initiative of the government are showing results and the orders of LCA Mk 1A and C-295 will open new opportunities in the indigenous aerospace sector.

Expounding on theaterisation, he noted that enhancing jointness is essential and the structure should be evolved after closely examining various options, and inputs from all stake holders would be taken into consideration.

He exhorted the commanders to brainstorm to evolve viable solutions towards the conference theme of "Ensuring Certainty amidst Uncertainties".

The minister also appreciated the IAF for maintaining a high level of preparedness, ability to respond on a short notice and displaying high standards of professionalism in carrying out operational and peace time tasks.

Indian Air Force chief Air Chief Marshal V.R. Chaudhari briefed him on the current status of the force.

Addressing all commanders, the IAF chief emphasised the need to develop multi-domain capability in order to give a swift and befitting response to any misadventures by our adversaries.

Air Chief Marshal Chaudhari also emphasised on the need for joint training with the Indian Army and Indian Navy to enable synergised application of combat power in future conflicts.

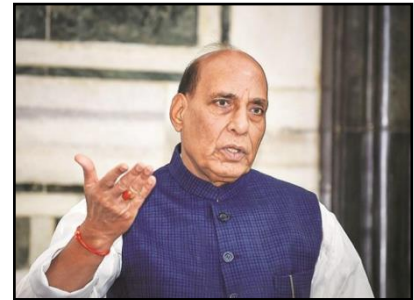
The Commanders' Conference is being conducted from November 10 to November 12.

As uncertainty in the geo-political landscape makes it an imperative for the armed forces to train, equip and adapt to rapid changes, top commanders will, during the Conference, discuss and brainstorm situations which may affect national security and focus on measures to enhance operational capability.

Issues pertaining to strengthening training and optimising human resource policies for effective utilisation of manpower will also be discussed.

(Only the headline and picture of this report may have been reworked by the Business Standard staff; the rest of the content is auto-generated from a syndicated feed.)

https://www.business-standard.com/article/current-affairs/volatile-situation-on-borders-forces-must-be-prepared-rajnath-12111001270_1.html



India promotes submarine rescue mechanism for IOR

GMC should move beyond dialogue and focus on cogent outcomes, says Navy Chief

By Dinakar Peri

Panaji: The Indian Navy demonstrated its submarine rescue capability, available with very few countries in the Indian Ocean Region (IOR), to Navy chiefs and delegations of Indian Ocean countries during the Goa Maritime Conclave (GMC) 2021.

“We have an MoU with Singapore, under which we support each other. Its helps understand each other’s system,” said Cdr V.K. Singh, pilot of the DSRV (deep-submergence rescue vehicle) on the west coast. “We can provide support in the entire IOR. We are looking for MoUs with other countries too.”

In his closing remarks at the GMC on Tuesday, Chief of the Naval Staff Admiral Karambir Singh stressed that the GMC should move beyond dialogue and focus on cogent outcomes. He proposed “four guiding principles for the future editions - iterative and incremental gains, harnessing complementarities, synchronisation and focussed operations, and lastly upskilling and upscaling the existing capabilities.”

The conclave also saw the declaration of ‘Common Maritime Priorities’, which had been identified during the Goa Maritime Symposium 21 held earlier this year.

Exchanging practices

India and Singapore, which also has the capability, have signed a Memorandum of Understanding (MoU) to exchange practices on submarine rescue and discussions were on with more countries to have arrangements for them to utilise this mechanism, Navy officials said.

The Navy has procured two DSRVs from the U.K., of which the first one was operationalised end-2018 in Mumbai and the second at Visakhapatnam in early 2019.

The system can go to a maximum depth of 650 metres and rescue 14 people in one go.

Because submarine accidents could occur far that cannot be predetermined, the DSRVs are designed to be agile and easily transportable to far-off places, said Capt Koushik Hota, Officer in Charge, Submarine Rescue Unit (West).

For this purpose, the entire system has been divided into 24 components, with each having a footprint of a standard container that could be easily transported by road, sea or air, he explained.

The DSRV, attached to mother ship INS *Sabarmati*, could be transported by heavy transport aircraft like IL-76 and C-17. “From the time of distress to the time of first rescue, we are considering between 72-96 hours,” stated Cdr Singh.

The Navy was also looking to participate in international submarine rescue exercises to further hone their skills. In April, India dispatched the two DSRVs to locate the missing Indonesian submarine KRI *Nanggala* but were called back mid-way after the Indonesian Navy declared that it had located the debris of the missing submarine.

During trials in 2018, the DSRV dived upto 666 metres, setting a record for deepest submergence by a ‘manned vessel’ in Indian waters. The DSRV crew has also carried out Remotely Operated Vehicle (ROV) operations at over 750 metres and Side Scan Sonar operations at over 650 metres.

<https://www.thehindu.com/news/national/india-promotes-submarine-rescue-mechanism-for-ior/article37425953.ece>



File photo for representation. | Photo Credit: K.R. Deepak

Adding sound to quantum simulations

By Taylor Kubot

When sound was first incorporated into movies in the 1920s, it opened up new possibilities for filmmakers such as music and spoken dialogue. Physicists may be on the verge of a similar revolution, thanks to a new device developed at Stanford University that promises to bring an audio dimension to previously silent quantum science experiments.

In particular, it could bring sound to a common quantum science setup known as an optical lattice, which uses a crisscrossing mesh of laser beams to arrange atoms in an orderly manner resembling a crystal. This tool is commonly used to study the fundamental characteristics of solids and other phases of matter that have repeating geometries. A shortcoming of these lattices, however, is that they are silent.

"Without sound or vibration, we miss a crucial degree of freedom that exists in real materials," said Benjamin Lev, associate professor of applied physics and of physics, who set his sights on this issue when he first came to Stanford in 2011. "It's like making soup and forgetting the salt; it really takes the flavor out of the quantum 'soup.'"

After a decade of engineering and benchmarking, Lev and collaborators from Pennsylvania State University and the University of St. Andrews have produced the first optical lattice of atoms that incorporates sound. The research was published Nov. 11 in *Nature*. By designing a very precise cavity that held the lattice between two highly reflective mirrors, the researchers made it so the atoms could "see" themselves repeated thousands of times via particles of light, or photons, that bounce back and forth between the mirrors. This feedback causes the photons to behave like *phonons*—the building blocks of sound.

"If it were possible to put your ear to the optical lattice of atoms, you would hear their vibration at around 1 kHz," said Lev.

A supersolid with sound

Previous optical lattice experiments were silent affairs because they lacked the special elasticity of this new system. Lev, young graduate student Sarang Gopalakrishnan—now an assistant professor of physics at Penn State and co-author of the paper—and Paul Goldbart (now provost of Stony Brook University) came up with the foundational theory for this system. But it took collaboration with Jonathan Keeling—a reader at the University of St. Andrews and co-author of the paper—and years of work to build the corresponding device.

To create this setup, the researchers filled an empty mirror cavity with an ultracold quantum gas of rubidium. By itself, this is a superfluid, which is a phase of matter in which atoms can flow in swirls without resistance. When exposed to light, the rubidium superfluid spontaneously rearranges into a *supersolid*—a rare phase of matter that simultaneously displays the order seen in crystals and the extraordinary fluidity of superfluids.

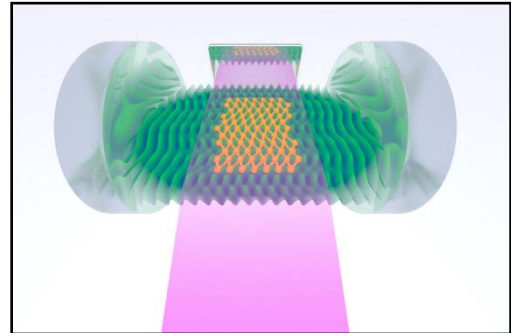


Illustration of a system that produces the first optical lattice with sound. Light is pumped in through three sources—including via a digital mirror device (DMD) – and produces a supersolid of atoms (in orange) that can vibrate. Credit: Lev Lab

What brought sound to the cavity were two carefully spaced concave mirrors that are so reflective that there is a fraction of 1 percent chance that a single photon would pass through them. That reflectivity and the specific geometry of the setup—the radius of the curved mirrors is equal to the distance between them—causes the photons pumped into the cavity to pass by the atoms more than 10,000 times. In doing so, the photons form a special tight bond with the atoms, forcing them to arrange as a lattice.

"The cavity we use provides a lot more flexibility in terms of the shape of the light that bounces back and forth between the mirrors," said Lev. "It's as if, instead of just being allowed to make a single wave in a trough of water, you can now splash about to make any sort of wave pattern."

This special cavity allowed the lattice of superfluid atoms (the supersolid) to move about so that, unlike other optical lattices, it is free to distort when poked—and that creates sound waves. To initiate this launch of phonons through the flexible lattice, the researchers poked it using an instrument called a spatial light modulator, which enables them to program different patterns in the light they inject into the cavity.

The researchers assessed how this affected the contents of the cavity by capturing a hologram of the light that made its way out. The hologram records both the light wave's amplitude and phase, allowing phonons to be imaged. In addition to mediating interesting physics, the high curvature of the mirrors inside the device produces a high-resolution image, like a microscope, which led the researchers to name their creation an "active quantum gas microscope."

Graduate student and lead author Yudan Guo, who received a Q-FARM fellowship to support this work, led the effort to confirm the presence of phonons in the device, which was done by sending in different patterns of light, measuring what came out and comparing that to a Goldstone dispersion curve. This curve shows how energy, including sound, is expected to move through crystals; the fact that their findings matched it confirmed both the existence of phonons and the vibrating supersolid state.

Two-of-a-kind

There are many directions that Lev hopes his lab—and perhaps others—will take this invention, including studying the physics of exotic superconductors and the creation of quantum neural networks—which is why the team is already working to create a second version of their device.

"Open up a canonical textbook of solid-state physics, and you see a large portion has to do with phonons," said Lev. "And, up until now, we couldn't study anything built upon that with quantum simulators employing atoms and photons because we couldn't emulate this basic form of sound."

Stanford graduate students Ronen Kroeze and Brendan Marsh are also co-authors of this research.

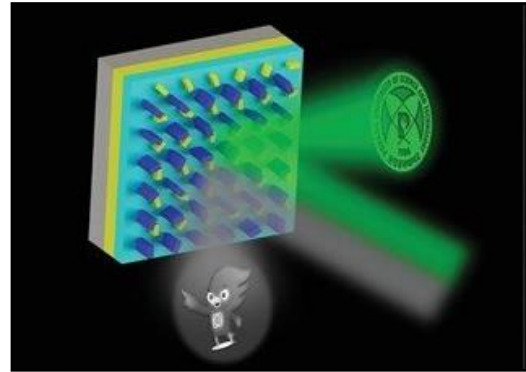
More information: Benjamin Lev, An optical lattice with sound, *Nature* (2021). DOI: [10.1038/s41586-021-03945-x](https://doi.org/10.1038/s41586-021-03945-x). www.nature.com/articles/s41586-021-03945-x

Journal information: *Nature*
<https://phys.org/news/2021-11-adding-quantum-simulations.html>

Preventing data leak with dual-band metahologram

New frontiers have opened in the world of preventing data breaches by using light of two different wavelengths—visible and infrared light. This is achieved by using a new material called a metasurface that makes extreme use of properties of light. Using this technology, security is enhanced by storing information that needs to be concealed separately.

A POSTECH research team led by Professor Junsuk Rho of the Department of Mechanical Engineering and Chemical Engineering, Dr. Inki Kim of the Department of Mechanical Engineering (currently assistant professor of the Department of Biophysics at Sungkyunkwan University), and Ph.D. candidates Heonyeong Jeong and Joohoon Kim of the Department of Mechanical Engineering has developed an anticounterfeit technology that works simultaneously in visible and infrared domains using heterogenous meta-atoms. A meta-atom is the basic unit of a metasurface.



Visible light hologram image (POSTECH emblem) and infrared hologram image (POSTECH mascot PONIX) appearing through the dual-band metahologram. Credit: POSTECH

Until now, most metasurface devices were limited in that they are activated only in one of the narrow wavelength bands of visible or infrared domains. Even multiplexed-metaholograms often require optical setups to observe the encoded visual information.

To solve this problem, the research team used meta-atoms of different materials—specifically silicon and gold—to control the phase of the visible light of 532 nm and infrared light of 980 nm, respectively. As a result, different meta-atoms produced holographic images of each wavelength with high efficiency in both visible and infrared light.

Using this newly developed metasurface device, an infrared holographic image invisible to the naked eye appears along with a green holographic image when visible light and infrared lasers are irradiated. Here, the primary information is encrypted in a holographic image in the visible domain, while the secondary information is stored in the infrared domain. The secondary information can be observed with an infrared sensor card. Using this new technology can further enhance the security of anticounterfeit technologies. Silicon and gold meta-atoms can control a variety of visible and infrared light in addition to wavelengths of 532 nm and 980 nm. Therefore, information that needs to be disclosed can be displayed as a visible light hologram, and information that needs to be hidden can be displayed as an infrared hologram. In other words, this technology can double-protect the information with one security card.

"We have demonstrated a technology that was only possible with two metasurfaces with just one silicon and gold-based metasurface," explained Professor Rho. "It is significant in that this new technology is applicable in advanced anticounterfeit technologies."

This study was conducted with the grant from the Samsung Research Funding & Incubation Center for Future Technology and was recently published as the inside front cover paper of *Advanced Optical Materials*.

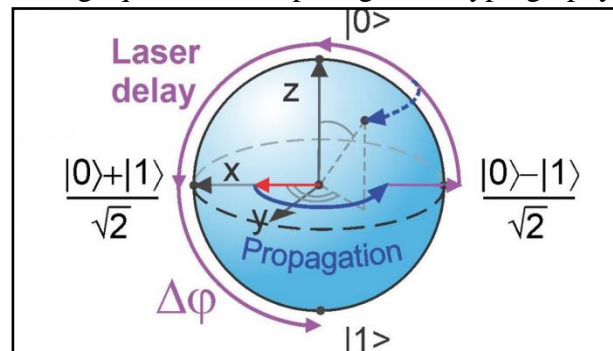
More information: Inki Kim et al, Dual-Band Operating Metaholograms with Heterogeneous Meta-Atoms in the Visible and Near-Infrared, *Advanced Optical Materials* (2021). DOI: [10.1002/adom.202100609](https://doi.org/10.1002/adom.202100609)

Journal information: [Advanced Optical Materials](https://phys.org/news/2021-11-leak-dual-band-metahologram.html)
<https://phys.org/news/2021-11-leak-dual-band-metahologram.html>

Laser light used to modulate free electrons into qubits

The laws of quantum physics are not only extraordinary—they also offer some far-reaching and unique possibilities for advanced information processing, quantum computing and cryptography. So far, the basic building blocks for such quantum operations are electric circuitry in form of superconducting resonators, light in form of photons or atoms in form of ion chains. However, all these quantum systems have their drawbacks, and scientists are therefore continuously searching for useful alternatives.

In their recent publication in *Physical Review Research*, scientists from the Department of Physics at the University of Konstanz have found a way to modulate a free electron in vacuum into a so-called qubit, a two-level quantum bit. Such qubits are the building blocks of information processing in quantum computers. To generate their free-electron qubits, the researchers use the electron beam of a transmission electron microscope and intersect it with the electric field of classical laser light. "The resulting matter-wave interferences create a periodic modulation of the electron energy into discrete, well-defined energy levels, which we use as a resource for the formation of qubits," explains Professor Peter Baum, the leader of the research team.



Representation of the qubits on the Bloch sphere. Credit: University of Konstanz

The physical background

To generate their qubits from free electrons, the researchers use the electron beam of a transmission electron microscope as an electron source and intersect it with the electric field of classical laser light. In the oscillations of the light wave, the beam electrons are periodically accelerated and decelerated in very rapid succession. "This rapid interaction between the electron beam and the optical cycles of the laser light results in a periodic modulation of the electron energy into discrete, well-defined energy levels," explains Professor Peter Baum, the leader of the research team. "We use this quantization, which can be detected with our instruments, as a resource for the formation of qubits."

Attosecond electron microscopy

Interestingly, the intersection of electron and laser beam in the experiment does not only lead to the described phenomena in the energy domain, which are relevant for qubit generation. With the right choice of laser parameters, additional useful phenomena arise in the time domain: the electron beam converts into a sequence of extremely short electron pulses with durations in the attosecond range.

"This corresponds to the millionth of a billionth part of a second and even light covers only the size of a bigger molecule in such a time span," says Peter Baum, illustrating these numbers. Such extremely short electron pulses are useful for ultrafast electron microscopy of complex light-matter interactions, where they enable maximum temporal resolution in addition to an enormous spatial resolution at an atomic level.

Qubits in 'mass production'

Another practical feature of the qubits and attosecond electron pulses in the experiment is their high production rate: about one billion qubits or electron pulses are generated per second. This high flux is achieved by using a continuous, non-pulsed electron source and a continuous, non-

pulsed laser beam. In this way, almost every free electron in the electron beam is modulated, and qubit production is only limited by the performance limit of modern high-energy electron sources.

However, this is not the only reason why laser-shaped free electrons and qubits are an interesting and practical object for further investigations. "In the vacuum of free space, an electron as an elementary particle does not interact with any material. The so-called decoherence—the loss of information to the environment—is therefore rather slow," adds Peter Baum. "In addition, the laser-optical control of electron beams is versatile and can be quickly switched." Free-electron qubits under laser control could therefore play an important role in the future for both fundamental research and applications in quantum information.

Details on the physics of the qubits

When looked at closely, the free electrons from the electron beam used in the experiment are not point particles, but rather wave functions with a finite coherence length that covers multiple light oscillations of the laser beam used. If so, the same final energy is generated coherently by adjacent optical field cycles at multiple instances in time. Consequently, matter-wave interferences create a periodic modulation of the energy spectrum into discrete energy sidebands, which the researchers use as a resource for a two-level quantum system. Quantum operations are performed by simple free-space propagation, where different sidebands acquire nonlinear matter-wave phases due to the rest mass of the electrons, followed by a second laser interaction and sideband generation some centimeters later in the beam. In this way, the researchers can reach almost any point on the Bloch sphere, i.e. the "coordinate system" in which qubit states are geometrically represented as points on the surface of a unit sphere.

More information: M. V. Tsarev et al, Free-electron qubits and maximum-contrast attosecond pulses via temporal Talbot revivals, *Physical Review Research* (2021). [DOI: 10.1103/PhysRevResearch.3.043033](https://doi.org/10.1103/PhysRevResearch.3.043033)
<https://phys.org/news/2021-11-laser-modulate-free-electrons-qubits.html>

COVID-19 Research News



Thu, 11 Nov 2021

Certain sleep disorders may increase your risk of a worse outcome if you contract COVID-19: study

By Alexandra Mae Jones

Toronto -- A new study suggests that people with specific sleep disorders may be at risk of more severe outcomes if they contract COVID-19, with a 31 per cent higher rate of hospitalization and mortality.

The study, conducted by the Cleveland Clinic and published in *JAMA Networks Open*, looked at data from around 5,400 patients at the clinic.

They found that while those with sleep disorders don't contract COVID-19 at higher rates than others, they do have worse outcomes if they catch the virus.

"As the COVID-19 pandemic continues and the disease remains highly variable from patient to patient, it



(Ivan Oboleninov / pexels.com)

is critical to improve our ability to predict who will have more severe illness so that we can appropriately allocate resources," Dr. Mehra, director of Sleep Disorder Research at Cleveland Clinic, said in a press release. "This study improved our understanding of the association between sleep disorders and the risk for adverse COVID-19 outcomes. It suggests biomarkers of inflammation may mediate this relationship."

Researchers looked at the clinic's database of patients who had been tested for COVID-19, focusing on the 5,400 patients for whom the clinic also had sleep data.

The study pointed out that there is "a strong overlap between sleep-disordered breathing (SDB) [...] and comorbidities associated with COVID-19 severity," but that while SDB has been correlated in observational studies with a higher risk for poor COVID-19 outcomes, sleep disorders themselves have not been focused on for a study relating to COVID-19.

SDB is a generalized term that encompasses different breathing difficulties that a person may have while sleeping, including things like sleep apnea.

Researchers looked at patients who had different measures of SDB, as well as patients who had sleep-related hypoxia, which is when there isn't enough oxygen intake to support your tissues.

Out of the 5,400 patients who had sleep data, 1,935, or 35 per cent, had tested positive for COVID-19 at some point. Fifty per cent of them, or 1,018 patients, had SDB.

"Sleep-related hypoxia measures were significantly associated with increasing WHO-designated clinical outcomes COVID-19 ordinal scale scores even after adjusting for patient characteristics, BMI, comorbidities, smoking history, and health care system site," the study stated.

Those with sleep-related hypoxia had a 31 per cent higher risk of hospitalization and mortality.

"Our findings suggest that baseline sleep-related hypoxia is associated with progression of hypoxic insult and hypoxia-related injury in COVID-19 pathophysiology, hence serving as an amplifier," the study stated.

The study added that the reasons for this are likely multi-faceted, as hypoxia can affect all of the tissues of the body to varying degrees in different patients, leading to different outcomes.

Researchers say that further studies should be done to figure out if early treatments such as PAP (positive airway pressure) or the administration of oxygen could improve COVID-19 outcomes in these patients.

"Our findings have significant implications as decreased hospitalizations and mortality could reduce the strain on healthcare systems," Cinthya Pena Orbea, M.D, of Cleveland Clinic's Sleep Disorders Center and first author of the study, said in the release.

"If indeed sleep-related hypoxia translates to worse COVID-19 outcomes, risk stratification strategies should be implemented to prioritize early allocation of COVID-19 therapy to this subgroup of patients."

<https://www.ctvnews.ca/health/coronavirus/certain-sleep-disorders-may-increase-your-risk-of-a-worse-outcome-if-you-contract-covid-19-study-1.5660968>

