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CONTENTS

DRDO News

DRDO Technology News

Press Information Bureau
Government of India

Ministry of Defence

Thu, 17 Dec 2020 5:25PM

Big boost to Make in India: Defence Acquisition Council headed by Raksha Mantri Shri Rajnath Singh approves proposals to procure equipment worth Rs 27,000 cr from domestic industry

The Defence Acquisition Council (DAC) in its meeting, today held under the Chairmanship of Raksha Mantri Shri Rajnath Singh approved Capital Acquisition proposals of various Weapons/Platforms/Equipment/Systems required by the Indian Army, the Indian Navy and the Indian Air Force at an approximate overall cost of Rs. 28,000 Cr.

This is the first meeting of the DAC under the new regime of Defence Acquisition Procedure 2020 and these are the first set of Acceptance of Necessity (AoNs) accorded with majority AoNs being accorded in the highest categorization of Buy Indian (IDDM). 6 of the 7 proposals, that is, Rs 27,000 Cr out of Rs 28,000 cr for which AoNs were granted will be sourced from the Indian industry to give a boost to the "Make in India" and "Atmanirbhar Bharat" initiatives of the Government.

Acquisition proposals approved today include the DRDO designed and developed Airborne Early Warning & Control (AEW&C) Systems for the Indian Air Force, Next Generation Offshore Patrol Vessels for the Indian Navy and Modular Bridges for the Indian Army.

https://www.pib.gov.in/PressReleasePage.aspx?PRID=1681456

Press Information Bureau
Government of India

रक्षा मंत्रालय

Thu, 17 Dec 2020 5:25PM

मेक इन इंडिया को बड़ा बढ़ावा: रक्षा मंत्री श्री राजनाथ सिंह की अध्यक्षता वाली रक्षा अधिग्रहण परिषद ने घरेलू उद्योग से 27,000 करोड़ रुपये के उपकरण की खरीद के प्रस्तावों को मंजूरी दी

रक्षा मंत्री श्री राजनाथ सिंह की अध्यक्षता में रक्षा अधिग्रहण परिषद (डीएसी) ने आज अपनी बैठक में भारतीय सेना, भारतीय नौसेना और भारतीय वायु सेना के लिए आवश्यक विभिन्न हथियारों/प्लेटफॉर्मों/उपकरणों/प्रणालियों की खरीद के लिए कुल अनुमानित लागत 28,000 करोड़ रुपये के पूंजी अधिग्रहण प्रस्तावों को मंजूरी दी।

रक्षा अधिग्रहण प्रक्रिया- 2020 की नई व्यवस्था के तहत यह डीएसी की पहली बैठक है। इसके अलावा ये आवश्यकता की स्वीकृति (एओएनएस) का पहला समूह है, जिसमें से अधिकांश एओएनएस को भारतीय (आईडीडीएम- स्वदेशी रूप से विकसित और निर्मित) खरीद के उच्चतम श्रेणी में स्थान दिया गया है। 28,000 करोड़ रुपये की कुल सात में से छह प्रस्तावों, जिनके लिए एओएनएस की मंजूरी दी गई है, इन्हें सरकार के 'मेक इन इंडिया' और 'आत्मनिर्भर भारत' पहल को बढ़ावा देने के लिए भारतीय उद्योग से प्राप्त किए जाएंगे। इन छह प्रस्तावों के लिए कुल अनुमानित लागत 27,000 करोड़ रुपये है।

आज स्वीकृत प्रस्तावों में भारतीय वायु सेना के लिए डीआरडीओ द्वारा डिजाइन की गई और विकसित एयरबोर्न अर्ली वार्निंग एंड कंट्रोल (एईडब्ल्यू एंड सी) प्रणाली, भारतीय नौसेना के लिए अगली पीढ़ी के अपतटीय गश्ती पोत और भारतीय सेना के लिए मॉड्यूलर पुलें शामिल हैं।

https://pib.gov.in/PressReleasePage.aspx?PRID=1681562

Press Information Bureau
Government of India

రక్షణ మంత్రిత్వ శాఖ

Thu, 17 Dec 2020 5:25PM

'మేక్ ఇన్ ఇండియా ' కు అతిపెద్ద ప్రోత్సాహం

- దేశీయ రక్షణ పరిశ్రమ నుండి రూ.27000 కోట్ల విలువైన రక్షణ పరికరాలను సేకరించే ప్రతిపాదనలకు.. రక్షణ మంత్రి శ్రీ రాజనాథ్ సింగ్ నేతృత్వంలోని డిఫెన్స్ అక్విజిషన్ కౌన్సిల్ ఆమోదం

కేంద్ర రక్షణ మంత్రి శ్రీ రాజనాథ్ సింగ్ అధ్యక్షతన ఈ రోజు సమావేశమైన 'డిఫెన్స్ అక్విజిషన్ కౌన్సిల్' (డీఏసీ) 'మేక్ ఇన్ ఇండియా'కు అతిపెద్ద ప్రోత్సాహం ఇచ్చేలా గొప్ప నిర్ణయం తీసుకుంది. దేశీయంగా భారత సైన్యం, నావికాదళం, భారత వైమానిక దళానికి అవసరమైన దాదాపు రూ.28,000 కోట్ల విలువైన వివిధ ఆయుధాలు/ వేదికలు / సామగ్రి/ వ్యవస్థల మూలధన సముపార్జన ప్రతిపాదనలకు ఆమోదం తెలిపింది. డిఫెన్స్ అక్విజిషన్ ప్రొసీజర్ 2020 యొక్క కొత్త విధానంలో ఇది డీఏసీ యొక్క మొదటి సమావేశం. ఇవి బై ఇండియన్ (ఐడీడీఎం) యొక్క అత్యధిక వర్గీకరణలో మెజారిటీ ఏఓఎన్‌లతో ఆమోదించబడిన మొట్టమొదటి అంగీకారం (ఏఓఎన్ఎస్) ఇది. మొత్తం ఏడు ప్రతిపాదనలలో ఆరు, అంటే ఏఓఎన్ లు మంజూరు చేయబడిన రూ.28,000 కోట్లలో 27,000 కోట్ల రూపాయల సముపార్జనం భారత పరిశ్రమ నుండి "మేక్ ఇన్ ఇండియా" మరియు "ఆత్మనిర్భర్ భారత్" కార్యక్రమాలకు ప్రోత్సాహాన్ని ఇస్తుంది. ఈ రోజు ఆమోదించబడిన సముపార్జన ప్రతిపాదనలలో భారత వైమానిక దళం కోసం డీఆర్‌డీఓ రూపొందించిన మరియు అభివృద్ధి చేసిన వైమానిక ప్రారంభ హెచ్చరిక & నియంత్రణ(ఏఈడబ్ల్యూ&సి) వ్యవస్థలు, భారత నావికా దళానికి చెందిన తదుపరి తరం ఆఫ్‌షోర్ గస్తీ వెసెల్స్ మరియు భారత సైన్యంకు సంబంధించిన మాడ్యులర్ వంతెనలు ఉన్నాయి.

https://pib.gov.in/PressReleasePage.aspx?PRID=1681618

THE TIMES OF INDIA

Fri, 18 Dec 2020

MoD approves new AWACS project & acquisitions worth Rs 28,000 crore

By Rajat Pandit

New Delhi: The defence ministry on Thursday accorded initial approvals to military acquisition plans worth Rs 28,000 crore, including the major indigenous project to develop six airborne warning and control system (AWACS) aircraft to boost surveillance capabilities along the China and Pakistan borders.

The Rajnath Singh-led Defence Acquisitions Council also gave the "acceptance of necessity (AoN)" for 11 next-generation offshore patrol vessels (around Rs 9,000 crore), 38 extended 400-km range BrahMos supersonic cruise missiles (Rs 1,800 crore) and ship-borne unmanned aerial systems for the Navy as well as around 40 new modular bridges for the Army.

Phalcon AWACS

"Majority of the AoNs were in the `Buy Indian-IDDM (indigenously designed, developed and manufactured)' category. Six of the seven proposals, that is Rs 27,000 crore out of Rs 28,000 crore, will be sourced from Indian industry to give a boost to the `Make in India' and `Atmanirbhar Bharat' initiatives," said an official.

The clear takeaway was the Rs 10,990 crore DRDO project to build the six AWACS or AEW&C (airborne early-warning and control) aircraft, which act as powerful "eyes in the sky" to look deep into enemy territory. India is behind Pakistan, leave alone China, in this critical arena.

The project envisages mounting indigenous 360-degree coverage AESA (active electronically scanned array) radars on six A-320 aircraft, which will be acquired from the existing Air India fleet, as was earlier reported by TOI.

The new project, which will involve cost-sharing between the IAF and DRDO, is actually a recast of an earlier plan to mount the AESA radars on two new A-330 wide-body jets, which was hanging fire for well over five years.

The airframes of six smaller A-320 variants will be modified, with the help of European multinational company Airbus, to equip them with the AESA radars. "This project will be much more cost-effective than the earlier one of acquiring two new A-330s. DRDO has promised to deliver the six AWACS or AEW&C aircraft in four to seven years," said a source.

IAF currently has just three Israeli Phalcon AWACS, with a 400-km range and 360-degree radar coverage, and two indigenous "Netra" AEW&C aircraft. The latter have indigenous 240-degree coverage radars, with a 250-km range, fitted on smaller Brazilian Embraer-145 jets.

The acute operational need for additional AWACS was felt during the Balakot strikes and the subsequent aerial skirmish with Pakistani fighters in February last year. It has been further reinforced by the ongoing military confrontation with China in eastern Ladakh.

Pakistan has 8-10 Chinese Karakoram Eagle ZDK-03 AWACS and Swedish Saab-2000 AEW&C. China, in turn, has around 30, including Kong Jing-2000 "Mainring", KJ-200 "Moth" and KJ-500 aircraft.

Though the IAF needs at least 10 AWACS, repeated attempts to acquire more have not yet fructified due to the high costs involved. The long-pending IAF case for two more Israeli Phalcons mounted on Russian A-50 aircraft, worth over $1.5 billion, for instance, is yet to be cleared by the Cabinet Committee on Security.

AWACS can detect incoming fighters, cruise missiles and drones much before ground-based radars, direct friendly fighters during air combat with enemy jets, and keep tabs on enemy troop build-ups and warships.

https://timesofindia.indiatimes.com/india/mod-approves-new-awacs-project-acquisitions-worth-rs-28000-crore/articleshow/79781335.cms

Outlook

Fri, 18 Dec 2020

Defence ministry approves acquisition of military hardware worth Rs 28,000 crore

New Delhi: The defence ministry on Thursday approved procurement of weapons and military equipment worth Rs 28,000 crore including six airborne warning and control system aircraft for the Indian Air Force, official sources said.

The procurement proposals were cleared by the Defence Acquisition Council (DAC) headed by Defence Minister Rajnath Singh.

The proposals approved by the DAC also include procurement of 11 next-generation offshore patrol vessels for the Indian Navy at a cost of Rs 9,000, the sources said, adding another proposal to acquire 38 naval versions of the Brahmos supersonic cruise missile was also cleared.

In a statement, the defence ministry said the DAC approved capital acquisition proposals for various weapons, platforms and equipment required by the Indian Army, the Indian Navy and the Indian Air Force at an approximate cost of Rs 28,000 crore.

The Indian Air Force (IAF) currently has three Phalcon airborne warning and control system aircraft (AWACS). Last year, the IAF conveyed to the government the need for speeding up procurement of more AWACS to plug the gaps in the air defence mechanism.

Under the proposal approved by the DAC, six AWACS will be acquired at a cost of Rs 10,990 crore and the project will be implemented by the DRDO.

"Six of the seven proposals, that is, Rs 27,000 crore out of Rs 28,000 crore for which AoNs (Acceptance of Necessity) were granted will be sourced from the Indian industry to give a boost to the "Make in India" and "Atmanirbhar Bharat" initiatives," the ministry said.

The acquisition proposals approved also include a batch of modular bridges for the Indian Army.

"This is the first meeting of the DAC under the new regime of Defence Acquisition Procedure 2020 and these are the first set of AoNs accorded with majority AoNs being accorded in the highest categorisation of Buy Indian (IDDM)," the ministry said. PTI MPB ZMN

(Disclaimer: This story has not been edited by Outlook staff and is auto-generated from news agency feeds. Source: PTI)

https://www.outlookindia.com/newsscroll/defence-ministry-approves-acquisition-of-military-hardware-worth-rs-28000-crore/1995085

REPUBLICWORLD.COM

Fri, 18 Dec 2020

Defence Ministry to procure Rs 27,000 crore worth of equipment from Indian manufacturers

Out of the 7 proposals, 6 valued at Rs 27,000 Cr were granted to the Indian industry in a boost to both the 'Make in India' and 'Atmanirbhar Bharat' initiative

By Ananya Varma

In another major boost to the indigenous Defence Industry, the Defence Acquisition Council (DAC) headed by Raksha Mantri Rajnath Singh on Thursday approved proposals worth Rs 27,000 cr centred at procuring defence equipment from Indian manufacturers.

In the meeting, Capital Acquisition proposals of various Weapons, Platforms, Equipment and Systems required by the Indian Army, the Indian Navy and the Indian Air Force were approved at an approximate overall cost of Rs. 28,000 Cr. Out of the 7 proposals worth Rs 28,000 cr, 6 proposals valued at Rs 27,000 Cr were granted to the Indian industry in a boost to both the 'Make in India' and the 'Atmanirbhar Bharat' initiative.

As per an official statement of the Ministry of Defence, "this is the first meeting of the DAC under the new regime of Defence Acquisition Procedure 2020 and these are the first set of Acceptance of Necessity (AoNs) accorded with majority AoNs being accorded in the highest categorization of Buy Indian (IDDM). "

Acquisition proposals approved include the DRDO designed and developed Airborne Early Warning & Control (AEW&C) Systems for the Indian Air Force, Next Generation Offshore Patrol Vessels for the Indian Navy and Modular Bridges for the Indian Army, as per the Ministry.

Centre's steps to boost indigenous defence industry

Back in October, the Defence Minister had approved the new DRDO Procurement Manual-2020 to facilitate the indigenous Defence Industry. While releasing the manual, Singh had stated that it would simplify the processes in the Defence Industry and boost its participation in design and development activities. He added that Prime Minister Narendra Modi's vision for an 'Aatmanirbhar Bharat' would also get a push through the changes that were introduced in DRDO PM-2020.

In August, Rajnath Singh in a massive statement had announced that the Ministry of Defence would embargo imports of 101 items to boost indigenous defence production. The Defence Minister added that the Ministry's decision would prove to be a great opportunity for Indian defence manufacturers to develop their capabilities and technologies.

https://www.republicworld.com/india-news/general-news/defence-ministry-to-procure-rs-27000-crore-worth-of-equipment-from-indian-manufacturers.html

livemint

Fri, 18 Dec 2020

Defence Min clears 11 advance warships for Navy, 6 surveillance planes for IAF

- ***It said that in the first meeting of the DAC under the new regime of Defence Acquisition Procedure 2020, the highest priority was accorded to giving the approval to Buy Indian proposals***

After scrapping orders given to the Pipavav shipyard, the Indian Navy has got the approval now to issue a tender worth over ₹9,000 crore for acquiring 11 next-generation Offshore Patrol Vessels for its surface fleet.

The Defence Ministry had recently approved the scrapping of a tender for acquiring five Naval Offshore Patrol Vessels from Anil Ambani-owned Pipavav Shipyards after long delays in the delivery schedule. The numbers have now been added to the Next Generation Offshore Patrol Vessels project and instead of six, 11 of them would be acquired through a tender process under Make in India, defence sources said here.

"Acquisition proposals approved today include the DRDO designed and developed Airborne Early Warning & Control (AEW&C) Systems for the Indian Air Force, Next Generation Offshore Patrol Vessels for the Indian Navy and modular bridges for the Indian Army," Defence Ministry said in a release.

It said that in the first meeting of the Defence Acquisition Council under the new regime of Defence Acquisition Procedure 2020, the highest priority was accorded to giving the approval to Buy Indian proposals.

"Six of the seven proposals, that is, ₹27,000 crore out of ₹28,000 crore for which Acceptance of Necessities was granted will be sourced from the Indian industry to give a boost to the 'Make in India' and 'Atmanirbhar Bharat' initiatives of the Government," it said.

In the projects cleared today, the major one was to approve the development of six Airborne Early Warning and Control (AEWC) Block-2 aircraft on the Airbus aircraft to be procured from Air India fleet.

(This story has been published from a wire agency feed without modifications to the text. Only the headline has been changed.)

https://www.livemint.com/news/india/defence-min-clears-11-advance-warships-for-navy-6-surveillance-planes-for-iaf-11608219016472.html

abp LIVE

Fri, 18 Dec 2020

दुश्मन की निगरानी के लिए रक्षामंत्री ने दी 6 टोही विमानों को मंजूरी, एयर इंडिया की मदद से डीआरडीओ करेगा तैयार

रक्षा मंत्रालय ने अपने बयान में ये नहीं बताया है कि वायुसेना के लिए कितने एवैक्स एयरक्राफ्ट्स के लिए मंजूरी दी गई है और इनकी कितनी कीमत है। लेकिन एबीपी न्यूज को मिली जानकारी के मुताबिक, ऐसे छह एवैक्स विमानों को मंजूरी दी गई है। इस प्रोजेक्ट कई कुल कीमत करीब 10 हजार करोड़ रूपये है।

By नीरज राजपूत

नई दिल्ली: चीन और पाकिस्तान से चल रही तनातनी के बीच, गुरूवार को रक्षा मंत्रालय ने आसमान में दुश्मन की गतिविधियों पर पैनी निगाहें रखने के लिए वायुसेना के लिए 06 एवैक्स कट्रोंल एयरक्राफ्ट्स के लिए मंजूरी दे दी। ये टोही विमान डीआरडीओ एयर इंडिया की मदद से तैयार करेगा। रक्षा मंत्री राजनाथ सिंह की अगुवाई वाली डिफेंस एक्युजिशन कॉउंसिल (डीएसी) ने गुरूवार को एक खास मीटिंग में इसकी मंजूरी दी।

रक्षा मंत्रालय के मुताबिक, डीएसी यानि रक्षा खरीद कमेटी ने गुरूवार को सशस्त्र-सेनाओं (थलसेना, वायुसेना और नौसेना) के लिए करीब 28 हजार करोड़ के प्लेटफॉर्म (एयरक्राफ्ट और युद्धपोत), हथियार और दूसरे सैन्य साजो सामान के लिए कुल सात (07) प्रस्तावों को मंजूरी दी। इनमें से छह 'प्रपोज़ल' मेक इन इंडिया के तहत हैं।

लेकिन इन प्रस्तावों में सबसे खास हैं एयरबोर्न अर्ली वार्निंग एंड कंट्रोल सिस्टम (एवैक्स) हैं। हालांकि, रक्षा मंत्रालय ने अपने बयान में ये नहीं बताया है कि वायुसेना के लिए कितने एवैक्स एयरक्राफ्ट्स के लिए मंजूरी दी गई है और इनकी कितनी कीमत है। लेकिन एबीपी न्यूज को मिली जानकारी के मुताबिक, ऐसे छह एवैक्स विमानों को मंजूरी दी गई है। इस प्रोजेक्ट कई कुल कीमत करीब 10 हजार करोड़ रूपये है।

वायुसेना के इस एवैक्स प्रोग्राम के लिए डीआरडीओ एयर इंडिया से छह ए-320 विमान लेगा और उन्हें टोही विमान में तब्दील करेगा। इसके लिए इन पर 360डिग्री एरै रडार लगेगी होगी जो आसमान में देश की एयर-स्पेस पर कड़ी निगरानी रखेगा ताकि दुश्मन के एयरक्राफ्ट्स, हेलीकॉप्टर्स और ड्रोन्स पर नजर रखी जा सके।

बालाकोट एयर-स्ट्राइक के बाद पाकिस्तान से हुई डॉग-फाइट और तनातनी के दौरान भारतीय सेना को इन एवैक्स विमानों की बेहद कमी खली थी। हालिया एलएसी पर चल रहे चीन के साथ विवाद के दौरान वायुसेना ने नौसेना के टोही विमानों को लद्दाख से लेकर हिमाचल प्रदेश की एयर स्पेस में तैनात किया था।

आपको बता दें कि फिलहाल वायुसेना को पास इजरायल से लिए दो (02) एवैक्स एयरक्राफ्ट ('फाल्कन') हैं और दो ही डीआरडीओ द्वारा तैयार स्वदेशी एवैक्स हैं।

रक्षा खरीद कमेटी (डीएसी) ने गुरूवार को नौसेना के लिए ऑफसोर पैट्रोल वैसल और थलसेना के लिए मॉडियूलर-ब्रिज के लिए भी मंजूरी दी। आपको बता दें कि डीएसी में रक्षा मंत्री के अलावा चीफ ऑफ डिफेंस

स्टाफ, तीनों सेनाओं के प्रमुख और रक्षा सचिव होते हैं। गुरूवार को ही डीएसी की मीटिंग इसी साल बनाई गई रक्षा खरीद प्रक्रिया-2020 के बाद पहली बैठक थी।

https://www.abplive.com/news/india/indian-air-force-to-get-06-awecs-aircrafts-drdo-will-develop-it-ann-1683834

R. REPUBLICWORLD.COM

Fri, 18 Dec 2020

Indian Navy to enhance its firepower by acquiring 38 BrahMos Supersonic Cruise Missiles

In a bid to enhance its firepower, the Indian Navy will soon acquire 38 extended-range BrahMos supersonic cruise missiles having a range of around 450 km

By Shivani Sharma

Moving ahead in its endeavour to be the mightiest, Indian Navy will soon acquire 38 extended-range BrahMos supersonic cruise missiles, which have a range of around 450 kilometres. The missiles are to be fitted on the under-construction Vishakhapatnam class warships of the Navy, which are going to join active service in the near future. A ₹ 1,800 crore proposal for acquiring 38 extended range BrahMos supersonic cruise missile is with the Defence Ministry and is expected to be approved soon.

Indian Navy to enhance its firepower

The BrahMos supersonic cruise missiles would be the main strike weapon of the warships and are already installed on several ships of the maritime force. The Navy had also carried out the test firing of the BrahMos missile from its warship INS Chennai to showcase its capability to strike targets at ranges more than 400 km in high seas. The government is also working on finding export markets for the supersonic cruise missile which is thought to be among the most lethal in its class..

After the launch of the joint venture between India and Russia in the late 90s, the BrahMos supersonic cruise missile has become a potent weapon for all three-armed forces. India has been test-firing various versions of BrahMos Missiles in last few months. Early this month the anti-ship version of BrahMos missile was fired near the Andaman and Nicobar Islands territory by the Indian Navy as a part of its scheduled trial. This came after a surface-to-surface supersonic cruise missile test near the same territory in November.

The Anti-ship versions of DRDO-developed missile were fired from different Indian Navy ships. Last anti-ship missile test was done from Rajput-class destroyer INS Ranvijay. The missile successfully hit its target ship near the Car Nicobar Islands in the Bay of Bengal with pinpoint accuracy. The BrahMos anti-ship missile has a range of 300 kilometres. Additional sources further stated that the strike range of BrahMos has been enhanced to over 400 km.

The multiple missile tests come amid the prevailing border crisis with China. India has showcased the massive firepower of the BrahMos supersonic cruise missile. All three defence arms of India have been carrying out the tests. The BrahMos missile is the world's fastest operational system in its class and recently DRDO has extended the range of the missile system from the existing 298 km to around 450 km.

Earlier in October, the Indian Air Force (IAF) had successfully test-fired an air-launched version of BrahMos supersonic cruise missile developed by DRDO, from a Sukhoi-30 fighter aircraft.

Sukhoi-30 fighter aircraft of the IAF was deployed to accomplish the crucial task as it flew from Halwara airbase to hit a ship in the Bay of Bengal.

https://www.republicworld.com/india-news/general-news/indian-navy-to-enhance-its-firepower-by-acquiring-38-brahmos-supersonic-cruise-missiles.html

INDUS DICTUM

Fri, 18 Dec 2020

DRDO, SIDM, FICCI, L&T to be part of webinar series in run-up to Aero India 2021: Defence Ministry

New Delhi: Aero India 2021, the biennial air show and defence exhibition organised by the Ministry of Defence (MoD), is scheduled to be held from 3rd to 7th February 2021 at Air Force Station, Yelahanka, Bengaluru. In the run-up to Aero India, a series of webinars will be conducted beginning from 17th December 2020 onwards. The webinars will be conducted by luminaries and themed on contemporary defence and aerospace topics. The webinars will be streamed worldwide, said the Defence Ministry in a press communication on Wednesday, 16th December.

Tentative Webinar Schedule Aero India 2021

	Dates	Conducting Organisation / Speaker	Topic
1.	17th Dec'20 (0930hrs – 1245hrs IST)	DDP / FICCI	Joint Indo Maldives High-Level Defence Engagement
2.	18th Dec'20 (0900 hrs – 1130 hrs IST)	Indian Army & CENJOWS	Changing Dynamics of the India Ocean Region
3.	6th Jan'21	SIDM: JD Patil , L&T & President SIDM	India: The Emerging Defence Manufacturing and Export Hub.
4.	7th Jan'21	MoCA	Making India Self Reliant (Aatmanirbhar Bharat) in Aircraft Manufacturing
5.	13th Jan'21	Bharat Shakti, Moderator: Nitin Gokhale	Consolidating Defence Capabilities of IOR Countries for Security of Global Commons'
6.	18th Jan'21	DDP	Highlights of Aero India 21Recent Policy Initiatives
7.	21st Jan'21	Chairman DRDO	'AtmaNirbhar Bharat'
8.	Dec '20 / Jan'21	DDP with SIDM & FICCI Country Webinars	Series of Country webinars are scheduled in Dec'20 / Jan'21.

The Ministry of Defence has revealed that the topics of the webinars would be of academic interest and relevance to the defence, aerospace and security industries, and also to the academia and student fraternity. The details of the webinars, schedule, and link for participation for each session will be available on the Aero India 2021 website. The webinars will also be streamed live on Twitter, YouTube Channel etc. The recordings of the Webinars will also be available on the Aero India 2021 website.

Aero India is the largest air show in Asia and attracts exhibitors from the world's leading industries in the fields of military and civil aviation, aerospace, airport infrastructure, and defence engineering. The show includes both air displays and static exhibitions of a large array of military platforms from the aerospace sector, said the Defence Ministry.

https://indusdictum.com/2020/12/17/drdo-sidm-ficci-lt-to-be-part-of-webinar-series-in-run-up-to-aero-india-2021-defence-ministry/

Defence News

Defence Strategic: National/International

TIMESNOWNEWS.COM

Fri, 18 Dec 2020

India's goodwill comes with no strings attached, says CDS Rawat; tells Nepal to be wary of China

CDS Bipin Rawat has warned Nepal to be wary of China and learn from Sri Lanka

Key Highlights

- ***'India's goodwill comes with no strings attached'***
- ***'Nepal is free to act independently in international affairs'***
- ***'Nepal must be vigilant and learn from Sri Lanka and other nations which have also signed agreements with other countries in the region'***

New Delhi: India's goodwill comes with no strings attached, said CDS Bipin Rawat and warned Nepal to be wary of China.

Speaking at an event, CDS Rawat said that Nepal is free to act independently in international affairs but must be vigilant and learn from Sri Lanka and other nations which have also signed agreements with other countries in the region.

This statement from the CDS comes after three back-to-back high-level visits from New Delhi to Kathmandu in the last two months.

CDS Bipin Rawat

Nepal must be vigilant, learn from Sri Lanka: CDS

Indian Army Chief General Manoj Mukund Naravane, Foreign Secretary Harsh Vardhan Shringla and Research and Analysis Wing (RAW) chief Samant Kumar Goel had visited the Himalayan nation in the last two months.

From Nepal, Foreign Minister Pradeep Kumar Gyawali is set to embark on a trip to India this month. The great game between the dragon and the elephant for strategic influence in the Himalayas has escalated with both sides trying to woo the landlocked nation.

Concerned with China expanding its military and economic might through the multi-billion infrastructure project under the Belt and Road Initiative in its backyard, India is also bolstering link not only with Nepal but also with Bhutan and Bangladesh under the Bangladesh-Bhutan-India Nepal (BBIN) initiative.

China's debt-trap diplomacy

Earlier this month, Nepal agreed to fast-track a rail connection from their capital Kathmandu to the Indian mainland. China is making a similar effort to link the Nepalese capital with Tibet.

In 2017, Maithripala Sirisena-led government handed over Hambantota port to a state-run Chinese firm in 2017 for a lease of 99 years. This transfer was part of a debt swap totalling USD 1.2 billion.

Recently, Sri Lankan President Gotabaya Rajapaksa rejected reports that Sri Lanka was lured into a "debt trap" by China after Beijing financed the strategic southern port of Hambantota.

https://www.timesnownews.com/india/article/indias-goodwill-comes-with-no-strings-attached-says-cds-rawat-asks-nepal-to-be-wary-of-china/695663

THE TIMES OF INDIA

Fri, 18 Dec 2020

Move afoot to shift IML from Kamptee

By Shishir Arya

Nagpur: The Institute of Military Law (IML), a 30-year-old establishment said to be one of its kind in Asia, is set to be shifted from the Kamptee cantonment to Delhi.

This follows shifting of the 118 Territorial Army battalion, which had been at city's Sitabuldi fort for nearly 80 years, to Bhusawal.

IML, which trains officers of judge advocate general (JAG) branch of the armed forces, was established in 1990 at Kamptee, one of the British time cantonments of the country. JAG officers form the legal branch of three services. They are trained here recruited after being recruited in the cadre. IML has also conducted courses for foreign officers.

IML is learnt to be spread on an area of 30 to 40 acres. There are no immediate plans to replace it with any other defence establishment, said a source.

There are plans to take IML to Delhi, that the top brass thinks is a more suitable with modern facilities and better exposure for trainees. The move has, however, raised concerns about city losing one more important defence establishment.

Union transport minister Nitin Gadkari, who is also the MP from Nagpur, said he had no official information about any such move. However, in case any such move is happening he would certainly oppose it, he said.

IML was brought to Nagpur from Shimla in 1990, considering the city's better accessibility from different parts of the country. In between there were plans to take it to Kolkata that were eventually dropped.

The land at Kamptee cantonment was provided to IML on a temporary basis for more than two decades. It was only in 2016-17 that it was granted permanent status. Hence, the move to shift in less than four years after that is baffling, said sources. For all these years the training was conducted in old buildings. In fact, it was expected the Institute could now go ahead with developing proper infrastructure.

IML is headed by an officer of Brigadier rank as the commandant. There was no reply from the commandant's office to TOI's query on the move to shift it. Sources though said even as there have been no final orders, the process of shifting IML was at an advanced stage.

IML held an auction of its old items last week. A TOI team was present during the auction. It was a routine auction of unserviceable items but before it began, a staff member had mentioned to the bidders that the establishment was shifting and so the old items were being disposed of. There was no reply when the commandant was contacted by TOI on this.

Sources said Kamptee was seen as rather cut-off place that guest faculties found difficult to travel to. They said being in Delhi will improve training standards as would be access to the

supreme court, parliament and the armed forces tribunal (AFT). Even the headquartes of JAG branch is at Delhi.

Those questioning the move said Kamptee's central location was primary consideration for bringing IML here, so how did it become isolated all of a sudden. Trainings have successfully been conducted here. Besides, being well connected Nagpur too has High Court and an active Bar from where a legal experts have been invited as guest speakers. Courses have been conducted for officers from Iran, African countries and even US, a source said.

Major (retd) MB Deshpande said he had also attended courses at IML and none of the other officers ever faced any inconvenience. He said the entire batch enjoyed stay at Kamptee especially due to its serene environment. All the requirements including availability of guest faculty were met.

Major General Achyut Deo, who was the general manager of BrahMos' Aerospace's Nagpur unit, said may be army has other considerations for being in Delhi. He said IML could make space for other units as Kamptee was an ideal location as a peace station for fighting units.

Over the years, key officers that Nagpur has lost include National Savings Institute (NSI), Western regional office of NTPC, Survey of India. There were also plans to shift the headquarters of Central Board of Workers Education to Delhi that were dropped later.

https://timesofindia.indiatimes.com/city/nagpur/move-afoot-to-shift-iml-from-kamptee/articleshow/79785022.cms

NAVALNEWS

Thu, 17 Dec 2020

Beijing upgrading naval bases to strengthen grip on South China Sea

New Satellite Imagery Shows Progress on a Major Dry Dock, Large Enough for Aircraft Carriers

A few days ago the Chinese Navy, formally known as the PLAN (People's Liberation army Navy), conducted a live fire exercise over the South China Sea. Harbin Z-9 helicopters took off from a base at Sanya on the southern tip of Hainan and fired anti-ship missiles at simulated targets. The Z-9, a license built variant of the Eurocopter AS365 Dauphin, is a standard shipboard helicopter of the PLAN. The exercise itself sends a signal, but more critical is the base where they took off. That has been massively improved over the past year.

The South China Sea (SCS) is a strategically important, and hotly contested, area of water. China claims virtually all of it and has been strengthening its navy's bases in the region. The airbase is not the only facility which could make a difference to the balance of power there. The aircraft carrier base a few miles along the coast is also being strengthened.

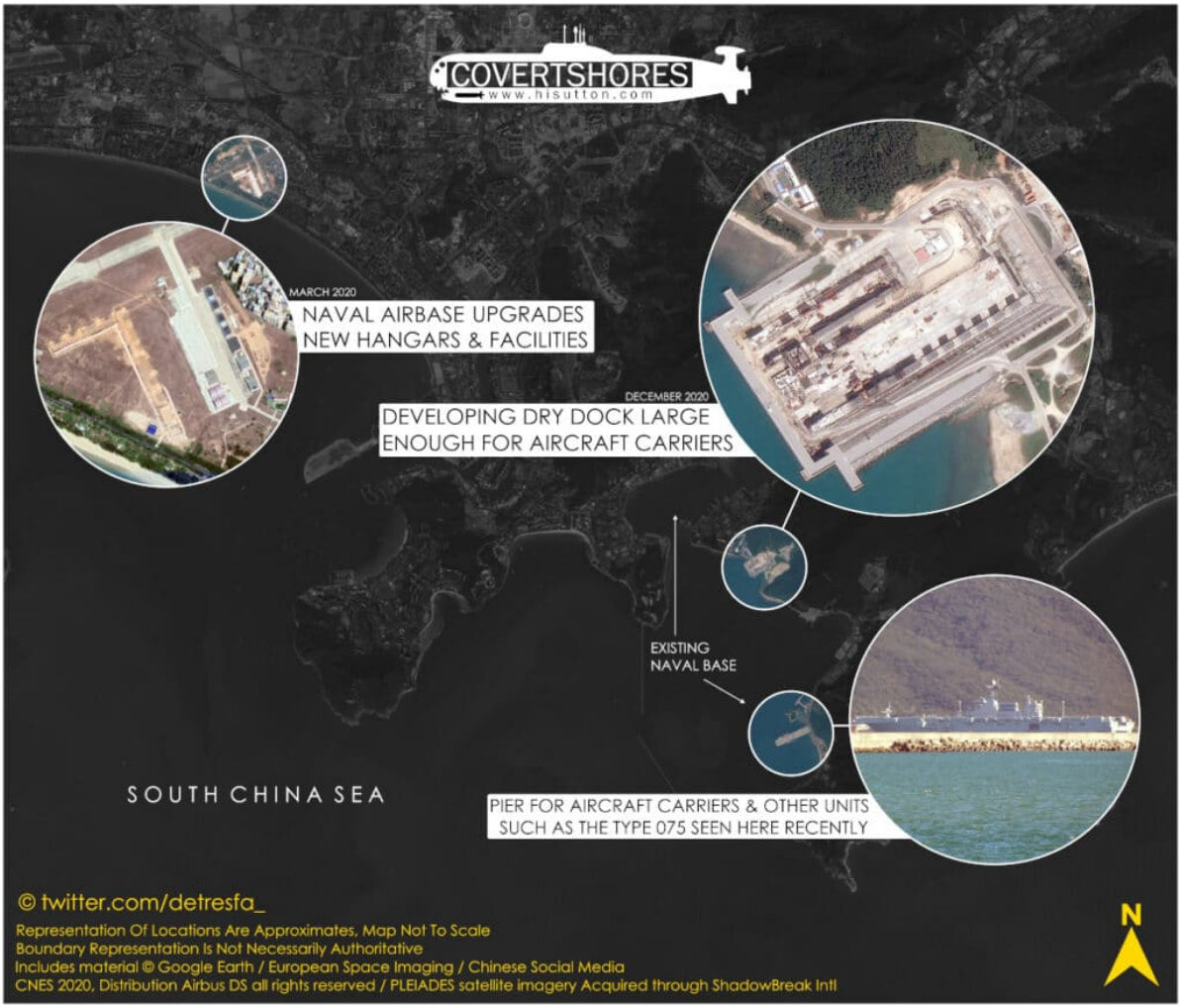
New satellite images show steady progress building a new dry dock there. It will large enough for China's new Type-003 super carrier.

Construction of the dock started in 2016 and now appears close to completion. As with any new structure only observed in satellite imagery, there is a degree of uncertainty in assessing its purpose. However we are as confident as we can be at this stage that this is indeed a massive dry dock.

Having a dry dock on Hainan will greatly strengthen the naval presence there. It indicates that aircraft carriers will be permanently based on the island. Nearby, a pier which has already been used by carriers, currently has a brand new **Type-075 assault carrier** parked alongside. This can accommodate two full-size carriers.

This recent satellite image shows how the new facility, believed to be a dry dock, will be large enough for China's new Aircraft Carriers

The new dry dock is part of a larger naval base expansion. There are also submarine bases nearby, Image **analysis by d-atis**



China is building a fleet of aircraft carriers and the largest to date, the Type-003, is **currently under construction** in Shanghai. The Type-003 will be significantly larger than the first two carriers which were based on the Russian Kuznetsov Class design. They used a ski-jump like the Kuznetsov, but the third ship is expected to have an electromagnetic catapult similar to the U.S. Navy's Ford class. In U.S. Navy terminology these are known as EMALS (Electromagnetic Aircraft Launch System).

EMALs will allow heavier aircraft to be launched, such as the Xi'an KJ-600 carrier-based early warning aircraft. This is similar to the E-2D Advanced Hawkeye. New classes of fighter and uncrewed combat air vehicles (UCAVs) are also expected.

Returning to the airbase, its new facilities may be directly related to the basing of aircraft carriers there. Long range uncrewed air vehicles (UAVs) have also been observed there.

The new facilities must be viewed in the context of the existing naval bases on Hainan. Assets include nuclear submarines, conventional submarines and a large surface fleet. So the new facilities are part of a shift toward the South China Sea. The PLAN's Southern Fleet increasingly seems to get the best vessels. With an aircraft carrier (or two) permanently stationed there China's military grip ion the South China Sea will only get stronger.

https://www.navalnews.com/naval-news/2020/12/beijing-upgrading-naval-bases-to-strengthen-grip-on-south-china-sea/

Science & Technology News

नवभारत टाइम्स

Fri, 18 Dec 2020

भारत की 42वीं कम्यूनिकेशन सैटलाइट लेकर ISRO का PSLV-C50 अंतरिक्ष में रवाना, ये है खासियत

भारतीय अंतरिक्ष अनुसंधान संस्थान (ISRO) ने अपनी 42वीं कम्यूनिकेशन सैटलाइट सीएमएस-01 का सफलता पूर्वक प्रक्षेपण किया है।श्रीहरिकोटा के स्पेस सेंटर से PSLV-C50 के साथ कम्युनिकेशन सैटलाइट सीएमएस-01 को लॉन्च किया गया है, जो कि 2011 में लॉन्च हुए जीसैट-11 सैटलाइट की जगह लेगा।

By Shreyansh Tripathi

हाइलाइट्स:

- ***इसरो ने सतीश धवन स्पेस सेंटर से 42वीं कम्यूनिकेशन सैटलाइट सीएमएस-01 का प्रक्षेपण किया***
- ***श्रीहरिकोटा के स्पेस सेंटर से सफलतापूर्वक लॉन्च किया गया कम्यूनिकेशन सैटलाइट***
- ***सैटलाइट सीएमएस-01 के लॉन्च के लिए बीते कई दिनों से इंतजार किया जा रहा था***

श्रीहरिकोटा/अमरावती: भारतीय अंतरिक्ष अनुसंधान संस्थान (ISRO) ने गुरुवार को साल 2020 के लिए अपने आखिरी स्पेस मिशन को सफलता पूर्वक लॉन्च किया। श्रीहरिकोटा के स्पेस सेंटर से PSLV-C50 के साथ कम्युनिकेशन सैटलाइट सीएमएस-01 का सफल प्रक्षेपण किया गया है। इस सैटलाइट लॉन्च के लिए बीते कई दिनों से इंतजार किया जा रहा था, लेकिन मौसम की मुश्किलों के कारण वैज्ञानिक इसकी इजाजत नहीं दे रहे थे।

आंध्र प्रदेश के नेल्लोर जिले स्थित सतीश धवन अंतरिक्ष केंद्र (एसडीएससी) को एसएचएआर भी कहा जाता है। सीएमएस-01, इसरो का 42 वां संचार उपग्रह है और इसे भारत की मुख्य भूमि, अंडमान निकोबार और लक्षद्वीप को कवर करने वाले फ्रीक्वेंसी स्पेक्ट्रम के विस्तारित सी-बैंड में सेवाएं मुहैया करने के लिए तैयार किया गया है।

सात साल तक चलेगा कार्यक्रम

इसरो की ओर से तैयार किया गया ये मिशन अंतरिक्ष में सात साल तक काम करेगा। ये सैटलाइट जीसैट-12 की जगह लेगा, जो कि साल 2011 में लॉन्च किया गया था। सीएमएस-सी50 का लॉन्च साल 2020 के लिए इसरो का आखिरी स्पेस प्रोग्राम है। बताया जा रहा है कि इसरो लंबे वक्त से इस प्रोग्राम की तैयारी कर रहा था। हालांकि बंगाल की खाड़ी में तूफान का पूर्वानुमान होने के कारण वैज्ञानिक इसकी इजाजत नहीं दे रहे थे।

https://navbharattimes.indiatimes.com/state/other-states/other-cities/isro-launches-communication-satelite-from-sriharikota/articleshow/79778136.cms

THE TIMES OF INDIA

Fri, 18 Dec 2020

ISRO'S PSLV-C50/CMS-01 mission successful; communication satellite placed in orbit

By U Tejonmayam

Chennai: The Indian Space Research Organisation (ISRO) on Thursday marked its second successful mission of the year by launching country's 42nd communication satellite CMS-01. PSLV-C50 carrying CMS-01 lifted off into the cloudy skies over Sriharikota at 3.41pm.

It was PSLV's 52nd flight from the Sriharikota spaceport and the rocket's 22nd flight with an XL variant of strap-ons. Around 20 minutes after lifting off from the second launch pad at the Satish Dhawan Space Centre, PSLV-C50 successfully injected the satellite into a sub-geosynchronous transfer orbit (GTO).

Congratulating the team, Isro chairman K Sivan said PSLV-C50 had injected the satellite into the precise sub-GTO orbit. "Solar panels were successfully deployed, and the satellite is doing well," he said.

He said the satellite would be moved to its specific orbit on December 21 after a series of manoeuvres using its propulsion system. This satellite would perform the functions of GSAT-12 launched 11 years ago, he added.

CMS-01, which has a lifespan of seven years, is envisaged to provide services in the extended-C band of the frequency spectrum. The extended-C band coverage

would include the Indian mainland and Andaman-Nicobar and Lakshadweep islands, Isro said.

Thursday's launch was the 77th launch vehicle mission from Sriharikota spaceport. It is also the second launch this year after the launch of PSLV-C49, which placed all-weather earth imaging satellite EOS-01 and nine other foreign satellites in orbits on November 7.

Sivan said the next launch -- PSLV-C51 – would be the first to carry satellite 'Anand' belonging to a space technology startup Pixxel and two others 'Satish' by SpaceKidz India and 'Univsat' by University Consortium.

"The activities for Chandrayaan-3, Aditya L1 and Gaganyaan are going on. We have a series of missions, including GSLV and SSLV," he added.

Sivan said the next launch -- PSLV-C51 – would be the first to carry satellite 'Anand' belonging to a space technology startup Pixxel and two others 'Satish' by SpaceKidz India and 'Univsat' by University Consortium.

https://timesofindia.indiatimes.com/india/isros-pslv-c50/cms-01-mission-successful-communication-satellite-placed-in-orbit/articleshow/79777937.cms

Hindustan Times

Fri, 18 Dec 2020

Next PSLV launch to carry 3 satellites made by Indian start-ups

This comes just six months after the government announced the opening up of the space sector to private players with the inception of Indian National Space Promotion and Authorisation Centre (IN-SPACe)

By Anonna Dutt

New Delhi: After the Polar Satellite Launch Vehicle (PSLV-C50) successfully placed the communications satellite CMS 01 in orbit on Thursday, ISRO chairperson K Sivan announced that the next mission of the dependable rocket would carry satellites developed by Indian space start-ups and companies.

File photo: Polar Satellite Launch Vehicle (PSLV) C-50 ahead of launch of CMS-01 communication satellite on Thursday. (PTI)

This comes just six months after the government announced the opening up of the space sector to private players with the inception of Indian National Space Promotion and Authorisation Centre (IN-SPACe).

"The next PSLV mission is special for the entire country. Recently, we have brought the space reform and unlocked India's potential in the space sector initiated by the government of India. Now, the first satellite by a start-up called Pixxel India called Anand which is an Earth Observation Satellite will be launched on PSLV C51. Along with Anand, two more satellites under the space reform are going to be launched – one by Space Kidz India and another by a university consortium called UnitySat," said Sivan after the launch of CMS 01.

The satellite by Pixxel India is the first in a series of constellation of Earth Observation Satellites that will provide global coverage every 24-hour; enabling organisations to detect and monitor global phenomenon in near real-time. The data will be available on an Artificial Intelligence-based platform, making the extraction of the data easy. It will have uses in agriculture, forestry, urban monitoring, and climate.

As for Space Kidz India, this will be their second satellite to be launched by ISRO. Their first KalamSat was the first student-made satellite to be launched by ISRO using the fourth stage of the PSLV as the platform for the first time.

Apart from the PSLV-C51 mission, the Indian Space Research Organisation is also gearing up for the maiden flight of the small satellite launch vehicle. The SSLV will have the capacity to launch a light 500-kilogram satellite in the lower Earth orbit.

The new rocket will cost about Rs 30 crore, compared to the Rs1 20 crore it costs to manufacture the currently used PSLV. It can also be assembled by a team of six within seven days, in comparison to a team of 600 people and a few months that takes to assemble a PSLV. The SSLV has been developed by ISRO mainly for commercial launches.

The chairman also assured that work was ongoing on the big-ticket missions.

"We have lot of work on hand; there are missions like Chandrayaan 3, Aditya L1 and Gaganyaan for which activities are going on. We will have the missions at the earliest. As usual, team ISRO will rise to the occasion and do the needful to meet the demand by the Indian government," said Sivan.

Chandrayaan 3 would be just a lander-rover mission which will use the existing India orbiter from Chandrayaan 2 mission to communicate with Earth. The Chandrayaan 3 mission was announced after the failure of the previous mission to attempt a soft-landing. It was to take place in late 2020 or early 2021, a deadline ISRO is likely to miss due to the pandemic.

Aditya-L1 is India's first solar mission which will see a satellite travel 1.5 million kilometres away from Earth to the L1 point. The L1 or Lagrangian point, between the Earth and the Sun, is where the gravitational pull of both the bodies on the satellite is equal to centripetal force needed to keep it in orbit.

As for Ganganyaan mission, which aims to place Indian astronauts in low earth orbit, the first of the two planned unmanned mission was to take place in December 2020.

https://www.hindustantimes.com/india-news/next-pslv-launch-to-carry-3-satellites-made-by-indian-start-ups/story-EFd5k8XIht3jjgXJy2qM8O.html

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Fri, 18 Dec 2020

Molecular probes require highly precise calculations

Catalysts are indispensable for many technologies. To further improve heterogeneous catalysts, it is required to analyze the complex processes on their surfaces, where the active sites are located. Scientists at Karlsruhe Institute of Technology (KIT), together with colleagues from Spain and Argentina, have now reached decisive progress: As reported in *Physical Review Letters*, they use calculation methods with so-called hybrid functionals for the reliable interpretation of experimental data.

Credit: Pixabay/CC0 Public Domain

Many important technologies, such as processes for energy conversion, emission reduction, or the production of chemicals, work with suitable catalysts only. For this reason, highly efficient materials for heterogeneous catalysis are gaining importance. In heterogeneous catalysis, the material acting as a catalyst and the reacting substances exist in different phases as a solid or gas, for instance. Material compositions can be determined reliably by various methods. Processes taking place on the catalyst surface, however, can be detected by hardly any analysis method. "But it is these highly complex chemical processes on the outermost surface of

the catalyst that are of decisive importance," says Professor Christof Wöll, Head of KIT's Institute of Functional Interfaces (IFG). "There, the active sites are located, where the catalyzed reaction takes place."

Precise Examination of the Surface of Powder Catalysts

Among the most important heterogeneous catalysts are cerium oxides, i.e. compounds of the rare-earth metal cerium with oxygen. They exist in powder form and consist of nanoparticles of controlled structure. The shape of the nanoparticles considerably influences the reactivity of the catalyst. To study the processes on the surface of such powder catalysts, researchers recently started to use probe molecules, such as carbon monoxide molecules, that bind to the nanoparticles. These probes are then measured by infrared reflection absorption spectroscopy (IRRAS). Infrared radiation causes molecules to vibrate. From the vibration frequencies of the probe molecules, detailed information can be obtained on the type and composition of the catalytic sites. So far, however, interpretation of the experimental IRRAS data has been very difficult, because technologically relevant powder catalysts have many vibration bands, whose exact allocation is challenging. Theoretical calculations were of no help, because the deviation from the experiment, also in the case of model systems, was so large that experimentally observed vibration bands could not be allocated precisely.

Long Calculation Time—High Accuracy

Researchers of KIT's Institute of Functional Interfaces (IFG) and Institute of Catalysis Research and Technology (IKFT), in cooperation with colleagues from Spain and Argentina coordinated by Dr. M. Verónica Ganduglia-Pirovano from Consejo Superior de Investigaciones Científicas (CSIC) in Madrid, have now identified and solved a major problem of theoretical analysis.

As reported in *Physical Review Letters*, systematic theoretical studies and validation of the results using model systems revealed that theoretical methods used so far have some fundamental weaknesses. In general, such weaknesses can be observed in calculations using the density functional theory (DFT), a method with which the quantum mechanics basic state of a multi-electron system can be determined based on the density of the electrons. The researchers found that the weaknesses can be overcome with so-called hybrid functionals that combine DFT with the Hartree-Fock method, an approximation method in quantum chemistry.

This makes the calculations very complex, but also highly precise. "The calculation times required by these new methods are longer by a factor of 100 than for conventional methods," says Christof Wöll. "But this drawback is more than compensated by the excellent agreement with the experimental systems." Using nanoscaled cerium oxide catalysts, the researchers demonstrated this progress that may contribute to making heterogeneous catalysts more effective and durable.

More information: Vibrational Frequencies of Cerium-Oxide-Bound CO: A Challenge for Conventional DFT Methods. *Physical Review Letters*, 2020. DOI: 10.1103/PhysRevLett.125.256101

Journal information: *Physical Review Letters*

https://phys.org/news/2020-12-molecular-probes-require-highly-precise.html

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Fri, 18 Dec 2020

Learning about quantum vacuum by studying atoms

By Jörg Schmiedmayer

The Unruh-effect connects quantum theory and relativity. Until now, it could not be measured. A new idea could change this.

Is the vaccum of space really empty? Not necessarily. This is one of the strange results obtained by connecting quantum theory and the theory of relativity: The Unruh effect suggests that if you fly through a quantum vacuum with extreme acceleration, the vacuum no longer looks like a vacuum: rather, it looks like a warm bath full of particles. This phenomenon is closely related to the Hawking radiation from black holes.

A research team from TU Wien, the Erwin Schrödinger Center for Quantum Science and Technology (ESQ) and the University of Nottingham's Black Hole Laboratory in collaboration with University of British Columbia has shown that instead of studying the empty space in which particles suddenly become visible when accelerating, you can create a two-dimensional cloud of ultra-cold atoms (Bose-Einstein condensate) in which sound particles, phonons, become audible to an accelerated observer in the silent phonon vacuum. The sound is not created by the detector, rather it is hearing what is there just because of the acceleration (a non-accelerated detector would still hear nothing).

The vacuum is full of particles

One of the basic ideas of Albert Einstein's theory of relativity is: Measurement results can depend on the state of motion of the observer. How fast does a clock tick? How long is an object? What is the wavelength of a ray of light? There is no universal answer to this, the result is relative—it depends on how fast the observer is moving. But what about the question of whether a certain area of space is empty or not? Shouldn't two observers at least agree on that?

No—because what looks like a perfect vacuum to one observer can be a turbulent swarm of particles and radiation to the other. The Unruh effect, discovered in 1976 by William Unruh, says that for a strongly accelerated observer the vacuum has a temperature. This is due to so-called virtual particles, which are also responsible for other important effects, such as Hawking radiation, which causes black holes to evaporate.

"To observe the Unruh effect directly, as William Unruh described it, is completely impossible for us today," explains Dr. Sebastian Erne who came from the University of Nottingham to the Atomic Institute of the Vienna University of Technology as an ESQ Fellow a few months ago. "You would need a measuring device accelerated to almost the speed of light within a microsecond to see even a tiny Unruh-effect -we can't do that." However, there is another way to learn about this strange effect: using so-called quantum simulators.

Quantum simulators

"Many laws of quantum physics are universal. They can be shown to occur in very different systems. One can use the same formulas to explain completely different quantum systems," says Jörg Schmiedmayer from the Vienna University of Technology. "This means that you can often learn something important about a particular quantum system by studying a different quantum system."

"Simulating one system with another has been especially useful for understanding black holes, since real black holes are effectively inaccessible," Dr. Cisco Gooding from the Black Hole laboratory emphasizes. "In contrast, analog black holes can be readily produced right here in the lab."

This is also true for the Unruh effect: If the original version cannot be demonstrated for practical reasons, then another quantum system can be created and examined in order to see the effect there.

Atomic clouds and laser beams

Just as a particle is a "disturbance" in empty space, there are disturbances in the cold Bose-Einstein condensate—small irregularities (sound waves) that spread out in waves. As has now been shown, such irregularities should be detectable with special laser beams. Using special tricks, the Bose-Einstein condensate is minimally disturbed by the measurement, despite the interaction with the laser light.

Jörg Schmiedmayer explains: "If you move the laser beam, so that the point of illumination moves over the Bose-Einstein condensate, that corresponds to the observer moving through the empty space. If you guide the laser beam in accelerated motion over the atomic cloud, then you should be able to detect disturbances that are not seen in the stationary case—just like an accelerated observer in a vacuum would perceive a heat bath that is not there for the stationary observer."

"Until now, the Unruh effect was an abstract idea," says Professor Silke Weinfurtner who leads the Black Hole laboratory at the University of Nottingham, "Many had given up hope of experimental verification. The possibility of incorporating a particle detector in a quantum simulation will give us new insights into theoretical models that are otherwise not experimentally accessible."

Preliminary planning is already underway to carry out a version of the experiment using superfluid helium at the University of Nottingham. "It is possible, but very time-consuming and there are technical hurdles for us to overcome," explains Jörg Schmiedmayer. "But it would be a wonderful way to learn about an important effect that was previously thought to be practically unobservable."

Provided by Vienna University of Technology

https://phys.org/news/2020-12-quantum-vacuum-atoms.html

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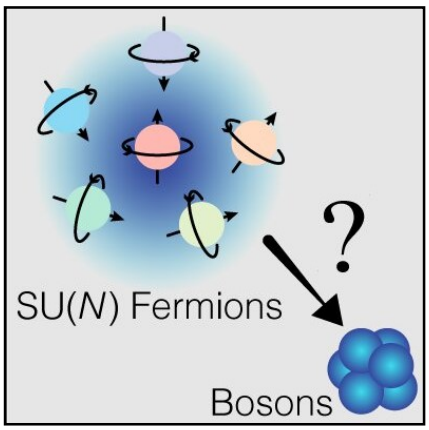
Physicists quantum simulate a system in which fermions with multiple flavors behave like bosons

In the text book of quantum mechanics, it's stated that bosons and fermions, two types of elementary particles that build the universe, behave in a drastically different way. For example, bosons can share the same quantum state while fermions of the same kind cannot but fill available quantum states one by one.



Fermions with different spins (indicated by arrows) behave like bosons in three dimensions when the number of spin components increases. Credit: HKUST

Nevertheless, modern developments in condensed matter physics and high energy physics have suggested that the boundary between bosons and fermions can be blurred. One of such examples is a gas of multi-flavor fermions, each identified by a different spin, in which any two flavors interact with one another by the same interaction. Multi-flavor fermions with such a SU(N) symmetry are expected to behave like an ensemble of spinless bosons when the number of different spins in the system becomes very large. The researchers at the Hong Kong University of Science and Technology (HKUST) and the Purdue university use quantum simulation to explore such a 'bosonization' phenomenon with ultracold fermions in three dimensions.

Bosonization has been explored—theoretically and experimentally—in one-dimensional systems. But it is unclear if bosonization occurs in higher dimensional systems, largely because exact solutions to the interacting many-body system are unknown. Here, the researchers show, for the first time, that it does occur in three-dimensional systems by measuring two-body contacts, the central quantity governing all thermodynamic quantities of dilute quantum gases ranging from the energy to the pressure. Evidence of bosonization in contacts thus demonstrates that all other thermodynamic quantities also approach those of bosons.

During the experiment, the researchers controls the number of fermion spins from 1 to 6, and monitor how the contact of fermions approaches that of bosons.

Gyu-Boong Jo, Associate Professor of Physics at HKUST, one of the leaders of the research team, said, "Our experimental observation confirms that multi-flavor fermions can bosonize with the increasing number of spins in three dimensions. It is remarkable to quantum simulate a special type of fermionic systems that are hard to be realized in solids and to address an open question".

This work has demonstrated a method of monitoring contacts as a new tool for exploring quantum matter and its underlying symmetries. In particular, this paves the way for the precise investigation of SU(N)-symmetric fermions, in which nonidentical fermions interact identically, that are not easily available in real materials.

More information: Bo Song et al, Evidence for Bosonization in a Three-Dimensional Gas of SU(N) Fermions, *Physical Review X* (2020). DOI: 10.1103/PhysRevX.10.041053

Journal information: *Physical Review X*

https://phys.org/news/2020-12-physicists-quantum-simulate-fermions-multiple.html

PHYS.ORG

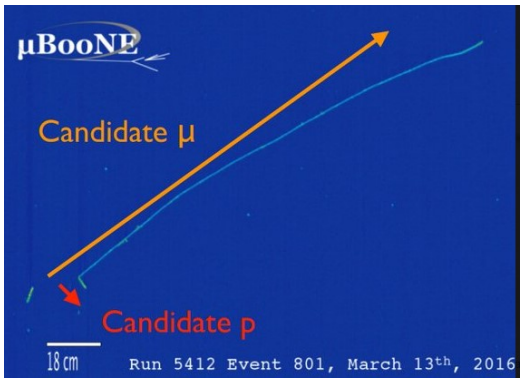
Fri, 18 Dec 2020

First measurement of single-proton interactions with the MicroBooNE detector

By Adi Ashkenazi, Or Hen and Afroditi Papadopoulou

Neutrinos are as mysterious as they are ubiquitous. One of the most abundant particles in the universe, they pass through most matter unnoticed. Their masses are so tiny that so far no experiment has succeeded in measuring them, while they travel at nearly the speed of light.

The MicroBooNE neutrino experiment at the Department of Energy's Fermilab has published a new measurement that helps paint a more detailed portrait of the neutrino. This measurement more precisely targets one of the processes arising from the interaction of a neutrino with an atomic nucleus, one with a fancy name: charged-current quasielastic scattering.



This shows the tracks of particles resulting from a candidate CCQE interaction of a neutrino with an argon nucleus inside the MicroBooNE detector. The long trail of a muon is seen shooting to the upper right, and the shorter trail of a proton is heading to the lower right. Credit: MicroBooNE

Physicists have spent a lot of time exploring the properties of these invisible particles. In 1962, they discovered that neutrinos come in more than one type, or flavor. By the end of the century, scientists had identified three flavors and also discovered that neutrinos could switch flavor through a process called oscillation. This surprising fact represents a revolution in physics: the first known evidence of physics beyond the extremely successful Standard Model.

Given the abundance of unanswered questions related to these elusive particles, neutrino physics is about to enter a new era of high-precision measurements, where forthcoming experiments will try to extract the oscillation parameters with unprecedented accuracy. These experiments will use state-of-the-art detectors to measure neutrino interactions. For the experiments to be a success, accurate modeling of neutrino-nucleus interactions in their simulations is a must.

Liquid-argon time projection chambers are powerful particle detectors that allow us to study neutrino interactions in detail, and these measurements can be used to benchmark the validity of neutrino interaction models in current simulations. The MicroBooNE neutrino experiment is the first large-scale operating experiment at Fermilab to use this novel detector technology. It has already collected a wealth of neutrino scattering events over the course of the past five years.

When a neutrino interacts with a nucleus, it can produce a muon (a cousin of the electron) and a proton through charged-current quasielastic scattering, or CCQE scattering. MicroBooNE published in *Physical Review Letters* the first measurement of CCQE-like interactions on argon for events that produce a single muon and a single proton, but no charged pions—another kind of subatomic particle that often arises from neutrino interactions with matter. This measurement constrains calculations essential for future measurements and identifies regions where improvement of theoretical models is required.

This result is of great importance for all future neutrino oscillation experiments that will use argon-target detectors, such as experiments of the Short-Baseline Neutrino program and the international Deep Underground Neutrino Experiment, both hosted by Fermilab, which will rely on precise modeling of neutrino interactions on argon to reach their projected sensitivities.

More information: P. Abratenko et al. First Measurement of Differential Charged Current Quasielasticlike νμ -Argon Scattering Cross Sections with the MicroBooNE Detector, *Physical Review Letters* (2020). DOI: 10.1103/PhysRevLett.125.201803

Journal information: *Physical Review Letters*

https://phys.org/news/2020-12-single-proton-interactions-microboone-detector.html

COVID-19 Research News

ScienceDaily

Fri, 18 Dec 2020

COVID-19 virus enters the brain, research strongly suggests

A new study shows how spike protein crosses the blood-brain barrier

Summary:
The SARS-CoV-2 virus, like many viruses before it, is bad news for the brain. In a new study, researchers found that the spike protein, often depicted as the red arms of the virus, can cross the blood-brain barrier in mice. The spike proteins alone can cause brain fog. Since the spike protein enters the brain, the virus also is likely to cross into the brain.

More and more evidence is coming out that people with COVID-19 are suffering from cognitive effects, such as brain fog and fatigue.

And researchers are discovering why. The SARS-CoV-2 virus, like many viruses before it, is bad news for the brain. In a study published Dec.16 in *Nature Neuroscience*, researchers found that the spike protein, often depicted as the red arms of the virus, can cross the blood-brain barrier in mice.

This strongly suggests that SARS-CoV-2, the cause of COVID-19, can enter the brain.

The spike protein, often called the S1 protein, dictates which cells the virus can enter. Usually, the virus does the same thing as its binding protein, said lead author William A. Banks, a professor of medicine at the University of Washington School of Medicine and a Puget Sound Veterans Affairs Healthcare System physician and researcher. Banks said binding proteins like S1 usually by themselves cause damage as they detach from the virus and cause inflammation.

"The S1 protein likely causes the brain to release cytokines and inflammatory products," he said.

In science circles, the intense inflammation caused by the COVID-19 infection is called a cytokine storm. The immune system, upon seeing the virus and its proteins, overreacts in its attempt to kill the invading virus. The infected person is left with brain fog, fatigue and other cognitive issues.

Banks and his team saw this reaction with the HIV virus and wanted to see if the same was happening with SARS CoV-2.

Banks said the S1 protein in SARS-CoV2 and the gp 120 protein in HIV-1 function similarly. They are glycoproteins -- proteins that have a lot of sugars on them, hallmarks of proteins that bind to other receptors. Both these proteins function as the arms and hand for their viruses by grabbing onto other receptors. Both cross the blood-brain barrier and S1, like gp120, is likely toxic to brain tissues.

"It was like déjà vu," said Banks, who has done extensive work on HIV-1, gp120, and the blood-brain barrier.

The Banks' lab studies the blood-brain barrier in Alzheimer's, obesity, diabetes, and HIV. But they put their work on hold and all 15 people in the lab started their experiments on the S1 protein in April. They enlisted long-time collaborator Jacob Raber, a professor in the departments of Behavioral Neuroscience, Neurology, and Radiation Medicine, and his teams at Oregon Health & Science University.

The study could explain many of the complications from COVID-19.

"We know that when you have the COVID infection you have trouble breathing and that's because there's infection in your lung, but an additional explanation is that the virus enters the respiratory centers of the brain and causes problems there as well," said Banks.

Raber said in their experiments transport of S1 was faster in the olfactory bulb and kidney of males than females. This observation might relate to the increased susceptibility of men to more severe COVID-19 outcomes.

As for people taking the virus lightly, Banks has a message:

"You do not want to mess with this virus," he said. "Many of the effects that the COVID virus has could be accentuated or perpetuated or even caused by virus getting in the brain and those effects could last for a very long time."

This study was partially supported by a National Institute on Aging-funded COVID-19 supplement to a shared RF1 grant of Banks and Raber.?

Story Source:

Materials provided by **University of Washington Health Sciences/UW Medicine**. *Note: Content may be edited for style and length.*

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1. Elizabeth M. Rhea, Aric F. Logsdon, Kim M. Hansen, Lindsey M. Williams, May J. Reed, Kristen K. Baumann, Sarah J. Holden, Jacob Raber, William A. Banks, Michelle A. Erickson. **The S1 protein of SARS-CoV-2 crosses the blood–brain barrier in mice**. *Nature Neuroscience*, 2020; DOI: 10.1038/s41593-020-00771-8

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