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समाचार पत्रों से चयित अंश Newspapers Clippings

A Daily service to keep DRDO Fraternity abreast with DRDO Technologies, Defence Technologies, Defence Policies, International Relations and Science & Technology

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CONTENT

S. No.	TITLE	Page No.
DRDO News		1-12
DRDO Technology News		1-12
1.	BrahMos missile featuring indigenous booster successfully flight tested	1
2.	स्वदेशी बूस्टर से युक्त ब्रह्मोस मिसाइल का सफल परीक्षण	1
3.	స్వదేశీ బూస్టర్ కుడిన బ్రహ్మోస్ క్షిపణి ప్రయోగం విజయవంతం	2
4.	India successfully test-fires BrahMos cruise missile with extended strike range of 450 km	3
5.	India successfully test-fires BrahMos supersonic cruise missile from Chandipur ITR in Odisha	4
6.	DRDO tests BrahMos missile with extended range to hit targets over 400km away	5
7.	सुपरसोनिक ब्रह्मोस मिसाइल के एक्सटेंड रेंज वर्जन का सफल परीक्षण, 400 किमी तक कर सकता है वार	6
8.	भारत ने किया ब्रह्मोस सुपरसोनिक क्रूज मिसाइल का सफल परीक्षण, 400 किमी तक है मारक क्षमता	7
9.	BrahMos missile launch showcases enhanced operational capabilities: PM	8
10.	BrahMos: Another deterrent against the ever-aggressive neighbour China	8
11.	IAF may get indigenous jet engine for its 5th gen fighter aircraft as DRDO plans big move under Rafale offset	10
12.	When Cdr Abhilash Tomy celebrated rounding Cape Horn with DFRL chicken biryani	11
Defence News		13-21
Defence Strategic National/International		13-21
13.	Change of guards at Army's 14 Corps in Ladakh: Lt Gen Menon to replace Lt Gen Harinder Singh	13
14.	LAC विवाद देख रहे ले. जनरल हरिंदर सिंह को IMA भेजा, कोर कमांडर की पांच बैठकों में किया था देश का नेतृत्व	14
15.	These are the challenges Indian Army will face in Ladakh this winter, besides the Chinese	15
16.	Defence Ministry's Revocation of CQB Carbines Tender Leaves Indian Army in the Lurch	17
17.	Indian Navy takes to seas with Russia and QUAD countries	19
18.	Ex-DRDO technological expert to develop Defense Robotics in UP	20
Science & Technology News		21-35
19.	ISRO marks 5 years of Space Observatory - AstroSat; more science missions in anvil	21
20.	ISRO to launch its Venus mission in 2025, France to take part: CNES	22
21.	इसरो का शुक्र मिशन 2025 में, फ्रांस भी होगा शामिल, अंतरिक्ष एजेंसी सीएनईएस ने जानकारी दी	23
22.	Superconductivity with a twist explained	24
23.	Scientists capture candid snapshots of electrons harvesting light at the atomic scale	25
24.	Colloidal quantum dot light emitters go broadband in the infrared	27
25.	New detector breakthrough pushes boundaries of quantum computing	28
26.	Researchers use amino acids to grow high-performance copper thin films	30
27.	Researchers develop dual-wavelength ocean lidar for ocean detection	31

COVID-19 Research News**32-35**

- | | | |
|-----|---|----|
| 28. | AI can detect COVID-19 in the lungs like a virtual physician, new study shows | 32 |
| 29. | Common cold in past may provide protection from COVID-19: Study | 34 |
| 30. | Moderna COVID-19 vaccine well-tolerated, generates immune response in older adults: Study | 35 |



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Ministry of Defence

Wed, 30 Sept 2020 2:28PM

BrahMos missile featuring indigenous booster successfully flight tested

BrahMos surface-to-surface supersonic cruise missile featuring indigenous Booster and Airframe Section along with many other 'Made in India' sub-systems was successfully flight tested for designated range at 1030 hours today on September 30, 2020 from ITR, Balasore in Odisha. It is one more major step in enhancing the indigenous content.

The BrahMos Land-Attack Cruise Missile (LACM) was cruising at a top speed of Mach 2.8.

Raksha Mantri Shri Rajnath Singh congratulated all the personnel of DRDO and team BrahMos for the spectacular mission. Dr G Satheesh Reddy, Secretary DD R&D and Chairman DRDO congratulated the scientific community and industry for this feat.

Today's successful launch has paved the way for the serial production of the indigenous booster and other indigenous components of the powerful BrahMos Weapon System realising Atmanirbhar Bharat pledge.

<https://www.pib.gov.in/PressReleasePage.aspx?PRID=1660288>



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रक्षा मंत्रालय

Wed, 30 Sept 2020 2:28PM

स्वदेशी बूस्टर से युक्त ब्रहमोस मिसाइल का सफल परीक्षण

स्वदेशी बूस्टर और एयरफ्रेम सेक्शन के साथ ही कई अन्य 'मेड इन इंडिया' उप प्रणालियों से युक्त सतह से सतह तक मार करने वाली सुपरसोनिक क्रूज मिसाइल ब्रहमोस का ओडिशा में आईटीआर, बालासोर से आज 30 सितंबर, 2020 को पूर्वाह्न 10.30 बजे निर्धारित रेंज के लिए सफलतापूर्वक परीक्षण किया गया। यह स्वदेशीकरण के विस्तार की दिशा में एक अन्य महत्वपूर्ण कदम है।

ब्रहमोस लैंड-अटैक क्रूज मिसाइल (एलएसीएम) की अधिकतम गति मैक 2.8 रही थी।

रक्षा मंत्री राजनाथ सिंह ने इस शानदार मिशन के लिए डीआरडीओ के सभी कर्मचारियों और टीम ब्रह्मोस को बधाई दी। डीडी आरएंडडी सचिव और डीआरडीओ चेयरमैन डॉ. जी सतीश रेड्डी ने इस उपलब्धि के लिए वैज्ञानिक समुदाय और उद्योग को शुभकामनाएं दीं।

आज के सफल लॉन्च से आत्म निर्भर भारत के संकल्प को साकार करते हुए शक्तिशाली ब्रह्मोस वीपन सिस्टम के लिए स्वदेशी बूस्टर और अन्य स्वदेशी कम्पोनेंट्स के श्रृंखलाबद्ध उत्पादन का मार्ग प्रशस्त हुआ है।

<https://pib.gov.in/PressReleasePage.aspx?PRID=1660304>



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రక్షణ మంత్రిత్వ శాఖ

Wed, 30 Sept 2020 2:28PM

స్వదేశీ బూస్టర్తో కూడిన బ్రహ్మోస్ క్షిపణి ప్రయోగం విజయవంతం

ఉపరితలం నుంచి ఉపరితలానికి ప్రయోగించే బ్రహ్మోస్ సూపర్సోనిక్ క్రూయిజ్ క్షిపణి ప్రయోగం మరోమారు విజయతమైంది. స్వదేశీ బూస్టర్, ఎయిర్ప్రైమ్ సెక్షన్, ఇంకా అనేక 'భారత్లో తయారీ' ఉప వ్యవస్థలను కలిగివుండడం ప్రస్తుత ప్రయోగంలోని విశేషాలు. ఒడిశాలోని బాలాసోర్ ఐటీఆర్ నుంచి ఉదయం 10.30 గంటలకు ప్రయోగం నిర్వహించారు. దేశీయ సత్తా వృద్ధిలో ఈ విజయం మరో అడుగుగా మారింది. బ్రహ్మోస్ క్షిపణి గరిష్టంగా 2.8 మాక్ వేగంతో దూసుకెళ్లగలదు.

అద్భుతమైన విజయం సాధించారంటూ; డీఆర్డీవో, బ్రహ్మోస్ బృందాన్ని రక్షణ శాఖ మంత్రి శ్రీ రాజ్ నాథ్ సింగ్ అభినందించారు. డీఆర్డీవో చైర్మన్ డా.జి.సతీష్ రెడ్డి కూడా శాస్త్రవేత్తల బృందాన్ని, పరిశ్రమను ప్రశంసించారు.

ఆత్మనిర్భర్ భారత్ ప్రతిజ్ఞను నిజం చేస్తూ, శక్తిమంత బ్రహ్మోస్ వ్యవస్థ కోసం దేశీయ బూస్టర్, విడిభాగాలను తయారు చేయడానికి ఈ ప్రయోగ విజయం బాటలు పరిచింది.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1660370>

India successfully test-fires BrahMos cruise missile with extended strike range of 450 km

The extended-range version of BrahMos was developed after India's full membership to the Missile Technology Control Regime (MTCR), which removed caps on the range of the cruise missile

By Hemant Kumar Rout

Bhubaneswar: India on Wednesday successfully test-fired the surface-to-surface supersonic cruise missile BrahMos with indigenous components for an extended range from a land based platform off the Odisha coast.

The missile deployed in full operational configuration blasted off from launching complex-III of the Integrated Test Range (ITR) at about 10.30 am and met all mission parameters as expected.

Defence sources said the missile -- an Indo-Russian joint venture -- was put to trial with indigenous booster, airframe section, propulsion system, power supply and many other major components.

The test jointly conducted by DRDO and BrahMos Aerospace for an extended range of 450 km has paved the way for the serial production of the indigenous booster and other indigenous components of the powerful weapon system realising the Atmanirbhar Bharat pledge.

"It is one more major step in enhancing the indigenous content. The BrahMos land-attack cruise missile was cruising at a top speed of Mach 2.8. The missile has proved its prowess once again as the best supersonic cruise system in the world," said a senior defence official.

Although the land-attack version of the missile has been operationalised in the Indian Army since 2007, this test validated the indigenous components incorporated to achieve higher strike range.

The extended-range version of BrahMos was developed after India's full membership to the Missile Technology Control Regime (MTCR), which removed caps on the range of the cruise missile. The strike range of the missile has been enhanced from 290 km to 450 km.

"The changes in the engine and fuel system give it additional capabilities of going much beyond its earlier range of 290 km. We are testing the capabilities of flying the missile at a higher altitude so that it can achieve more range as the friction in air is much less," the official informed.

The nine-metre long two-stage missile is capable of carrying a conventional warhead weighing up to 300 kg. The BrahMos missile has three versions - land, ship and air. It can effectively engage targets from an altitude as low as 10 metres for surgical strikes at terror training camps across the border without causing collateral damage.

"With an extended range, the world's best cruise missile in its class can now change the dynamics of conventional warfare. Its range, speed and stealth capabilities can be enhanced further as per the requirement of the armed forces," the official added.

Defence Minister Rajnath Singh and DRDO Chairman Dr G Satheesh Reddy congratulated DRDO personnel, team BrahMos and the industry for the spectacular mission.

<https://www.newindianexpress.com/nation/2020/sep/30/india-successfully-test-fires-brahmos-cruise-missile-with-extended-strike-range-of-450-km-2203923.html>



Brahmos missile (Photo | Twitter/ANI)B

India successfully test-fires BrahMos supersonic cruise missile from Chandipur ITR in Odisha

The launch of the state-of-the-art missile from the Integrated Test Range (ITR) at Chandipur near here was successful, Defence Research and Development (DRDO) sources said

New Delhi/Balasore: India on Wednesday successfully test fired a new version of the surface-to-surface supersonic cruise missile BrahMos having a range of around 400 km from an integrated test range at Balasore in Odisha, officials said. The missile, featuring a number of indigenously developed sub-systems, was flight tested from a land based mobile launcher for a designated range at 10:30 am from the integrated test range in Balasore.

The range of the new land attack version of the missile has been extended to 400 km from the original 290 km, the officials said, adding its speed has been maintained at Mach 2.8 which is nearly three times that of sound. India has already deployed a sizeable number of the original BrahMos missiles and other key assets in several strategic locations along the de-facto border with China in Ladakh and Arunachal Pradesh. The test firing of the missile comes at a time India and China are locked in a bitter border standoff in eastern Ladakh.



On September 30, 2019 a shorter range land version of BrahMos was successfully test fired from Chandipur ITR. (Twitter)

"BrahMos surface-to-surface supersonic cruise missile featuring indigenous booster and airframe section along with many other 'Made in India' sub-systems was successfully flight tested for designated range at 1030 hours today," the defence ministry said. In a statement, it also said the successful launch has paved the way for the serial production of the indigenous booster and other indigenous components of the powerful BrahMos weapons system.

Defence Minister Rajnath Singh congratulated all the team members of Defence Research and Development Organisation and BrahMos for the mission. "Congratulations to Team @DRDO_India and @BrahMosMissile for the successful flight testing of #BRAHMOS Supersonic Cruise Missile with Indigenous Booster and Air Frame for designated range. This achievement will give a big boost to India's #AtmaNirbharBharat Pledge," he tweeted.

Union Home Minister Amit Shah also complimented the DRDO for the successful test-firing of the BrahMos supersonic cruise missile. "India is extremely proud of @DRDO_India for successfully testing the indigenously developed extended range BrahMos supersonic cruise missile. This state-of-the-art weapon is a testimony of India's defence potential and PM @NarendraModi ji's resolve towards an #AatmaNirbharBharat," Shah tweeted.

BrahMos Aerospace, an India-Russian joint venture, produces the supersonic cruise missile that can be launched from submarines, ships, aircraft, or from land platforms. In May last year, the Indian Air successfully test fired the aerial version of the BrahMos missile from a Su-30 MKI fighter aircraft. The BrahMos missile provides the IAF a much-desired capability to strike from large stand-off ranges on any target at sea or on land with pinpoint accuracy by day or night and in all weather conditions.

<https://www.news18.com/news/india/india-successfully-test-fires-brahmos-supersonic-cruise-missile-from-chandipur-ittr-in-odisha-2921679.html>

DRDO tests BrahMos missile with extended range to hit targets over 400km away

The DRDO successfully tested an 'extended range' variant of the BrahMos supersonic cruise missile, news agency ANI reported on Thursday.

ANI reported the extended-range variant was fitted with an indigenously built rocket booster. The BrahMos was developed as a joint venture by India and Russia and was first tested in 2001. The BrahMos was initially developed to have a range of 290km and maximum speed of 2.8 Mach, that is 2.8 times the speed of sound. The BrahMos is capable of striking both ships and targets on land.

While the BrahMos was inducted by the Indian Navy and Army, DRDO had also launched work on an extended-range variant. An extended-range variant would not only enable Indian Navy ships and Army launchers to hit targets at longer distances, it would also enable them to stay at 'stand-off' distances to reduce possibility of enemy attack. The BrahMos missile is already deployed with Army units along the border with China.



(File) A BrahMos missile being fired | PTI

In March 2017, the extended-range variant of the BrahMos was test-fired at the DRDO's test facility in Balasore, Odisha, for the first time. At the time, the DRDO had said the 'BrahMos-ER' would empower the armed forces to "knock down enemy targets far beyond 400km".

In July 2019, BrahMos Aerospace CEO S.K. Mishra told *Doordarshan* a version of the BrahMos with a range of up to 500km was ready. He had noted it was possible to increase the range of the BrahMos as India was now a signatory to the Missile Technology Control Regime.

Mishra had told *Doordarshan* then, "We can take on any ship at sea up to 300 to 400 km (far) and after some time, may be longer; we can take on land targets up to hundreds of km and with the test that we have conducted some time back (from Sukhoi 30), ranges up to thousands of km..."

The BrahMos is a derivative of a Russian missile, the Oniks. In September last year, Russia's TASS news agency reported the country was developing a variant of the Oniks with a range of 800km.

<https://www.theweek.in/news/india/2020/09/30/drdo-tests-brahmos-missile-with-extended-range-to-hit-targets-over-400km-away.html>

सुपरसोनिक ब्रह्मोस मिसाइल के एक्सटेंड रेंज वर्जन का सफल परीक्षण, 400 किमी तक कर सकता है वार

पूर्वी लद्दाख में चीन की रोज नई पैंतरेबाजी और अतीत में उसकी धोखेबाजी की नीयत ने भारत को पूरी तरह सतर्क रहने की सीख दी है। यही वजह है कि चीन की ओर से मिलने वाली किसी प्रकार की चुनौती से निपटने के लिए चौतरफा रणनीति पर तेजी से काम हो रहा है।

By Naveen Kumar Pandey

नई दिल्ली: पूर्वी लद्दाख में वास्तविक नियंत्रण रेखा (LAC) पर चीन के साथ जारी गतिरोध के बीच भारत ने ब्रह्मोस मिसाइल का परीक्षण किया है जो पूरी तरह सफल रहा है। ब्रह्मोस सुपरसोनिक क्रूज मिसाइल की रेंज मारक क्षमता बढ़ाकर 400 किमी की गई और इस परीक्षण में यह बिल्कुल खरा उतरा। रक्षा अनुसंधान एवं विकास संगठन (DRDO) ने यह परीक्षण अपने पीजे-10 प्रॉजेक्ट की तहत की है। इस टेस्ट के लिए मिसाइल को देसी बूस्टर से लक्ष्य पर दागा गया। यह ब्रह्मोस सुपरसोनिक मिसाइल के एक्सटेंडेड रेंज वर्जन का दूसरा सफल परीक्षण है।

आवाज के करीब तीन गुना रफ्तार

यह मिसाइल मैच 2.8 स्पीड से दूरी तय करता है जो आवाज की रफ्तार के करीब तीन गुना के बराबर है। डीआरडीओ ने इस मिसाइल की टेस्टिंग ओडिशा के बालासोर समुद्र तट से की। भारत और रूस का जॉइंट वेंचर ब्रह्मोस एयरोस्पेस ऐसी सुपरसोनिक मिसाइलें बनाता है जो पनडुब्बियों, नौकाओं, विमानों या जमीन से लक्ष्य के लिए छोड़ी जा सकती हैं।



सुपरसोनिक ब्रह्मोस मिसाइल का सफल परीक्षण।
(फाइल फोटो)

लद्दाख में सीमा पर तैनात हुई ब्रह्मोस और निर्भय मिसाइलें

ध्यान रहे कि भारत ने सीमा पर ब्रह्मोस और निर्भय क्रूज मिसाइल के अलावा जमीन से हवा में मार करने वाली आकाश मिसाइल को भी तैनात कर दिया है। दरअसल, पूर्वी लद्दाख में चीन की रोज नई पैंतरेबाजी और अतीत में उसकी धोखेबाजी की नीयत ने भारत को पूरी तरह सतर्क रहने की सीख दी है। यही वजह है कि चीन की ओर से मिलने वाली किसी प्रकार की चुनौती से निपटने के लिए चौतरफा रणनीति पर तेजी से काम हो रहा है। यहां तक कि भारत युद्ध की स्थिति से निपटने की तैयारी में जुट गया है।

<https://navbharattimes.indiatimes.com/india/india-successfully-test-fires-the-extended-range-brahmos-supersonic-cruise-missile/articleshow/78401017.cms>

भारत ने किया ब्रह्मोस सुपरसोनिक क्रूज मिसाइल का सफल परीक्षण, 400 किमी तक है मारक क्षमता

नई दिल्ली: पूर्वी लद्दाख में चीन से जारी गतिरोध के बीच भारत ने बुधवार को ब्रह्मोस सुपरसोनिक क्रूज मिसाइल का सफल परीक्षण किया, जो 400 किलोमीटर से ज्यादा दूरी तक टारगेट को ध्वस्त कर सकती है। रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) ने ओडिशा के बालासोर में जमीन से पीजे-10 प्रोजेक्ट के तहत मिसाइल का परीक्षण किया और मिसाइल को स्वदेशी बूस्टर के साथ लॉन्च किया गया।

यह ब्रह्मोस सुपरसोनिक मिसाइल के उन्नत वर्जन का दूसरा सफल परीक्षण है, जो स्वदेश में विकसित एअरफ्रेम और बूस्टर से लैस है। डीआरडीओ के चेयरमैन डॉ. जी सतीश रेड्डी ने सफल परीक्षण पर वैज्ञानिकों की टीम को बधाई देते हुए कहा, इससे सुपरसोनिक क्रूज मिसाइल में ज्यादा स्वदेशी सामग्री को शामिल किया जाएगा।

ब्रह्मोस एक रैमजेट सुपरसोनिक क्रूज मिसाइल है, जिसे पनडुब्बी, युद्धपोत, लड़ाकू विमानों और जमीन से भी लॉन्च किया जा सकता है। ब्रह्मोस मिसाइल को भारत और रूस के संयुक्त उपक्रम के तहत विकसित किया गया है। शुरुआत में इसकी रेंज 290 किलोमीटर थी।

हालांकि इसकी क्षमता को बढ़ाकर 400 किलोमीटर से ज्यादा किया गया है। कुछ अनुमानों के मुताबिक, सुपरसोनिक क्रूज मिसाइल 450 किलोमीटर से अधिक दूरी तक दुश्मन के टारगेट को तबाह कर सकती है।

2005 में सेना में किया गया था शामिल

ब्रह्मोस को भारतीय सेना में पहली बार 2005 में शामिल किया गया था और इसे नौसेना के युद्धपोत आईएनएस राजपूत को तैनात किया गया था। जहाज और जमीन से मार करने वाली ब्रह्मोस मिसाइल सेवा में हैं, जबकि हवा से मार करने वाली मिसाइल का सफल परीक्षण किया जा चुका है।

<https://www.amarujala.com/india-news/india-successfully-test-fires-brahmos-supersonic-cruise-missile-which-can-hit-targets-at-over-400-km-range>



भारत ने ब्रह्मोस सुपरसोनिक क्रूज मिसाइल का परीक्षण किया - फोटो: ANI

BrahMos missile launch showcases enhanced operational capabilities: PM

The missile was fired from an integrated test range at Balasore in Odisha

Prime Minister Narendra Modi on Wednesday congratulated scientists and engineers after India successfully test fired a new version of the surface-to-surface supersonic cruise missile BrahMos having a range of around 400 km.

"Brahmos Supersonic Cruise Missile has achieved yet another milestone with successful test launch showcasing enhanced operational capabilities and additional indigenous technologies.

Congratulations to all the scientists and engineers. @DRDO_India @BrahMosMissile," he tweeted.

The missile was fired from an integrated test range at Balasore in Odisha.

The missile, featuring a number of indigenously developed sub-systems, was flight tested from a land based mobile launcher for a designated range at 10:30 am from the integrated test range in Balasore.

(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/brahmos-missile-launch-showcases-enhanced-operational-capabilities-pm-120093001641_1.html



The missile, featuring a number of indigenously developed sub-systems, was flight tested from a land based mobile launcher for a designated range at 10:30 am from the integrated test range in Balasore



BrahMos: Another deterrent against the ever-aggressive neighbour China

Edited By Gravitas desk

Story highlights

For more than 140 days now, China has been promising a de-escalation with India at the Line of Actual Control (LAC)

New Delhi: For more than 140 days now, China has been promising a de-escalation with India at the Line of Actual Control (LAC).

Now, Beijing has come up with a new logic to justify its military assertiveness. Beijing says that it is following the LAC, which was proposed way back in 1959.

India has rejected their position for more than 60 years now. Naturally, New Delhi is strengthening its defences, and rolling out missiles to counter the Chinese threat.

On September 30, India tested the BrahMos missile. Two more missiles have been deployed to counter 'the Dragon'. The city of Balasore in India's Odisha was buzzing today as a supersonic cruise missile roared through the skies. It is capable of travelling nearly three times faster than the speed of sound.

BrahMos has been in India's arsenal for a while. Now, the scientists at India's Defence Research and Development Organisation or DRDO have extended its range. The missile can now travel up to 400 kilometres. It has the potential to hit targets deep inside enemy lines. The BrahMos is part of a line up of three missiles that would serve as deterrents against China.

As the border stand-off continues, India is now positioning these missiles close to counter the Chinese build-up. The BrahMos, along with the Nirbhay and Akash are guarding India on the front. The Nirbhay has a range of 800 kilometres. While the Akash which is a surface-to-air missile can hit targets that are 40 kilometres away.



BrahMos in comparison to other missiles Photograph: (AFP)

These missiles have very specific roles to play in case China decides to

escalate the situation. Reports say the BrahMos can be used to target Chinese airstrips in Tibet and Xinjiang. It can also be used to take out a warship in the Indian Ocean.

The Nirbhay is a long range, all-weather missile, and can be launched from multiple platforms, and it can carry conventional and nuclear warheads. The Akash can be used to counter any People's Liberation Army aircraft intrusion across the Line of Actual Control in Ladakh.

Why this is necessary

Boosting India's defences against china is the need of the hour because China isn't pulling back its troops. PLA soldiers are stationed close to the LAC, and India has been expanding its border infrastructure to track their movements.

The Chinese aggression is an attempt to change the status-quo on the ground. Recently, Beijing said that it is abiding by the line of control proposed 61 years ago in 1959.

This was proposed by Chinese Premier Zhou Enlai to India's then prime minister Jawaharlal Nehru in a letter. The Chinese proposal was instantly rejected by India. Zhou wanted forces on both sides to withdraw 20 kilometres from the McMahon line in the east.

For the first time in this standoff, China has made its position on the border clear. It wants India to accept the proposal made in 1959. India has responded with another rejection. A statement from New Delhi called China's claims unilateral.

<https://www.wionews.com/india-news/brahmos-another-deterrent-against-the-ever-aggressive-neighbour-china-331507>

IAF may get indigenous jet engine for its 5th gen fighter aircraft as DRDO plans big move under Rafale offset

India may finally get its first indigenous jet engine which may power the country's fifth generation advanced medium combat aircraft (AMCA).

As per an *Economic Times* report, the DRDO is planning a new fighter jet engine complex under the offset clause of the Rafale fighter deal with France.

DRDO is said to be in advanced discussions to build a brand new a 110 kilo newton engine for India's future fighter jets, which will be able to power the future class of advanced medium combat aircraft (AMCA). The engine may be ready seven years after development begins.

This plan to power India's 5th generation fighter jet with an indigenous engine is in line with the Indian Air Force's (IAF) demand to ensure self-reliance.

French jet engine manufacturer Safran has reportedly agreed to provide a complete technology transfer to aid the engine development. The engine complex planned by DRDO will cater to high-end fighter jet engines.

Safran is also tying up with HAL to provide the technology for high thrust engine manufacturing.

"We are signing an agreement related to the technology needed for high thrust engine manufacturing. The technology will be common to the Rafale engines that can be supported by us and would also be useful for the 110 kn engine project", the HAL Chairman R Madhavan has been quoted as saying.

<https://swarajyamag.com/insta/iaf-may-get-indigenous-jet-engine-for-its-5th-gen-fighter-aircraft-as-drdo-plans-big-move-under-rafale-offset>



GTX-35VS Kaveri Engine - representative image (Jagan Pillariseti/Wikipedia)

When Cdr Abhilash Tomy celebrated rounding Cape Horn with DFRL chicken biryani

By Anantha Krishnan M

Bengaluru: Seven years after he first undertook a solo, non-stop circumnavigation of the world under sail, Cdr Abhilash Tomy of the Indian Navy reveals a bit of what kept him inspired, appetite-wise.

Did food give him the magical boost when the going got tough? In an interview with Onmanorama, Cdr Abhilash Tomy was all praise for the Mysuru-based Defence Food Research Laboratory (DFRL), pioneers in developing ready-to-eat (RTE) meals for the armed forces.

He said food had a definite psychological impact during missions, and he often celebrated various milestones by opening a DFRL food packet, which was delicious and different. All this was during his historic Sagar Parikrama-II mission, onboard sailboat INSV Mhadei.

The Sagar Parikrama-II saga started from the Gateway of India on November 1, 2012, and ended on April 6, 2013, making Cdr Abhilash the first Indian to undertake an unassisted and non-stop sea mission. Incidentally, he crossed the Equator twice during this voyage. Variety of food

Cdr Abhilash said he took a variety of food with him on the mission. "There was fresh food that lasted for about a month. This included fruits, and vegetables such as potatoes, tomatoes and onions. There was no refrigeration on the boat. I used to cook and eat food such as rice. Pickles came handy," he said.

In addition, he carried a lot of snacks in the form of potato wafers, peanuts, popcorn and cakes. There were freeze-dried foods, powdered milk, muesli, rusk and biscuits as well. He also had a choice of canned food such as sardines, fruits and corn.

"The RTE food from DFRL was exceptional. They were kind enough to give me 150 packets of their food gratis for the voyage. I can vouch for the DFRL stuff. It is tasty," Cdr Abhilash said.

During the voyage that lasted 151 days (the initial plan was for 180 days), he wasn't allowed to pick up stocks or any other stuff on the way.

"The voyage was supposed to be a non-stop, unassisted circumnavigation, and there were several rules at play," he said.

Recalling the DFRL menu, the top sailor said the chicken biryani, rotis, chicken and vegetable curries, pulao and sweets were exceptional.

"What really stood out in the DFRL platter was the taste—which was very Indian. Freeze-dried food that I carried was very lightweight, packed more calories and was long-lasting, but it was difficult to get used to the taste. On the other hand, the DFRL dishes kept me going due to the taste. Imagine having chicken biryani after 86 days at sea! That's how I celebrated rounding Cape Horn," Cdr Abhilash, a recipient of Kirti Chakra, said.

Milestone Moments

He used DFRL food at various points to celebrate milestones. "As I told you, I opened a packet of chicken biryani right after rounding Cape Horn. That was after having sailed 12,000 nautical miles. Everything was delicious. I don't have any complaints about anything except the rasam, which was too spicy and gave me stomach upsets," he said.

In addition to the DFRL stock, Cdr Abhilash thrived on snacks, energy bars, canned tuna, sardines and fruits. He generally had the canned tuna and sardines with rice which he cooked on board.

“I also had shark pickles from my grandfather’s village. My brother sent across 100 packets of freeze-dried food from New Zealand, which was developed for astronauts. It is very light weight and one needs to just add some warm water to make it edible,” he said.

From his mother’s kitchen, the sailor carried a lot of banana chips and pickles during both Sagar Parikrama-II and the famous Golden Globe Race (GGR) of 2018.

However, the sailor missed carrying DFRL food during the GGR.

When asked about the food and hunger patterns during solo missions, Cdr Abhilash said while sailing solo the body needs about 4,000 calories every day.

“It is difficult to eat that much, but one somehow needs to push all that food into the body every day. It is difficult, and you don’t feel hungry so often because the act of eating food is a social activity. When one has people around, it is easy to eat a lot. Coupled with the fact that the motion of the boat in the sea causes a lot of discomfort and nausea, it gets even more difficult to eat. One needs to be intelligent about it and keep snacking all day so that the body meets its energy requirements,” he said.

He recalled losing about one kilogram on an average every three days and said finally his weight stabilized close to 72-73 kg.

Psychological Impact Does food have a psychological impact on you? Do the smell and taste of it lift your spirits?

“Yes it does!” agreed Cdr Abhilash. “Food has a psychological effect. DFRL food had a huge positive impact on psychology because of its taste. In fact, I used to save some of my favourite DFRL foods to celebrate even after some heavy work.”

The ace sailor provided food for thought on a few areas which Indian scientists need to work upon to improve the quality, taste and shelf life of RTE meals.

“Other than DFRL food, all MRE (Meal, Ready-to-Eat) packets made in India have a distinct taste of preservatives that puts you off after having them a few times. Maybe they should work on that. Also, it would be nice to see more non-vegetarian options as well,” he said.

Finally, what’s cooking Cdr Abhilash Tomy? Is he planning another mission?

“Well... Wait and SEA,” he laughed.

(The writer is an independent aerospace and defence journalist, who blogs at Tarmak007 and tweets @writetake).

<https://www.onmanorama.com/food/foodie/2020/09/30/abhilash-tomy-cape-horn-dfml-chicken-biryani.html>



Thu, 01 Oct 2020

Change of guards at Army's 14 Corps in Ladakh: Lt Gen Menon to replace Lt Gen Harinder Singh

Lt Gen Harinder Singh will be taking charge of the Indian Military Academy in Dehradun while Lt Gen Menon would be moving in from the Army headquarters in New Delhi

By Abhishek Bhalla

New Delhi: Lt Gen Harinder Singh the current 14 Corps Commander in Leh will be moving to the Indian Military Academy, Dehradun as Commandant. He will be replaced by Lt Gen PGK Menon, who was part of the recent Corps Commander-level meet between India and China.

Six round of talks have been held between the two sides so far to discuss a resolution in the nearly five-month long standoff and military tussle in Ladakh.

Prior to this appointment, Lt Gen Menon has commanded a division that was responsible to guard the India-China border and had a stint in 14 Corps as Brigadier earlier. Sources say he is considered to be a good hand on China.

In the previous Corps Commander-level meeting, it was the first time that the Indian delegation had two Lt Generals, along with a representative from the Ministry of External Affairs as Joint Secretary Navin Srivastava attended the talks.

After the talks on September 21, India and China agreed not to send additional troops to forward areas at the Line of Actual Control in Ladakh.

"The two sides agreed to earnestly implement the important consensus reached by the leaders of the two countries, strengthen communication on the ground, avoid misunderstandings and misjudgements, stop sending more troops to the frontline, refrain from unilaterally changing the situation on the ground, and avoid taking any actions that may complicate the situation," a joint statement had said.

The two sides have also decided to hold the seventh Corps Commander-level meet on the Ladakh border crisis soon, but a date is still to be finalised.

It will be interesting to see if Lt Gen Menon, who is currently posted in the Army HQ in Delhi, will head the Indian delegation in the next meet or not. Sources say if he takes charge by the time the next meeting takes place, he will be head the Indian delegation.

Speaking about the 6th Corps Commander-level meeting held on September 21, the joint statement had said, "The two sides had candid and in-depth exchanges of views on stabilising the situation along the LAC in the India-China border areas."

<https://www.indiatoday.in/india/story/change-of-guards-at-army-s-14-corps-in-ladakh-lt-gen-menon-to-replace-lt-gen-harinder-singh-1726898-2020-09-30>



Lt Gen Harinder Singh (centre). (File photo)

LAC विवाद देख रहे ले. जनरल हरिंदर सिंह को IMA भेजा, कोर कमांडर की पांच बैठकों में किया था देश का नेतृत्व

चीन से तनाव के बीच लेह में तैनात रहे भारतीय सेना के सर्वोच्च कमांडर लेफ्टिनेंट जनरल हरिंदर सिंह को अब देहरादून स्थित इंडियन मिलिट्री एकेडमी में कमांडेंट बनाकर भेज दिया गया है। हरिंदर सिंह का स्थान अब लेफ्टिनेंट जनरल पीजीके मेनन लेंगे।

By Krishna Bihari Singh

नई दिल्ली: चीन से एलएसी पर तनाव के दौरान लेह में तैनात रहे भारतीय सेना के कमांडर लेफ्टिनेंट जनरल हरिंदर सिंह को अब इस तैनाती से देहरादून स्थित इंडियन मिलिट्री एकेडमी (आइएमए) में कमांडेंट बनाकर भेज दिया है। सूत्रों के अनुसार मौजूदा समय में लेह में तैनात 14 कोर कमांडर लेफ्टिनेंट जनरल हरिंदर सिंह का स्थान अब लेफ्टिनेंट जनरल पीजीके मेनन (PGK Menon) लेंगे। मेनन नया कार्यभार अक्टूबर मध्य में संभाल लेंगे।

मेनन (PGK Menon) मौजूदा समय में सेना मुख्यालय में शिकायत सलाहकार बोर्ड (Complaints Advisory Board, CAB) के अतिरिक्त महानिदेशक पद पर हैं। वह सेना में शिकायत प्रणाली के प्रभारी हैं और सीधे तौर पर सेना प्रमुख जनरल मनोज मुकुंद नरवणे (Army Chief General Manoj Mukund Naravane) को रिपोर्ट करते हैं। मेनन हाल ही में हुई भारतीय और चीनी सेना की कोर कमांडर स्तर की बातचीत का भी हिस्सा थे।



दूसरी ओर, लेह में तैनात 14 कोर कमांडर लेफ्टिनेंट जनरल हरिंदर सिंह एक अक्टूबर से बतौर कमांडेंट देहरादून स्थित इंडियन मिलिट्री एकेडमी (आइएमए) से कामकाज संभाल रहे हैं। लेफ्टिनेंट जनरल सिंह ही पहले दिन से ही वास्तविक नियंत्रण रेखा (एलएसी) पर सेना की हरेक गतिविधि पर नजर रखते रहे हैं। सिंह ही अकेले दम पर भारत और चीन की कोर कमांडर स्तर की लगातार पांच बैठकों का नेतृत्व कर चुके हैं।

21 सितंबर को भारत और चीन के कोर कमांडरों की छठी बैठक में ही मेनन ने बातचीत में शिरकत शुरू की। इस बातचीत का मकसद पिछले पांच महीनों से सीमा पर दोनों देशों के बीच जारी तनाव को कम करना था। इस दौरान चीन ने भारत को पेंगॉंग झील के दक्षिणी तटों से लगी सामरिक चोटियों को खाली करने को कहा है। चीन ने भारत पर दबाव डालने की नाकाम कोशिश की है। पिछले चार महीनों में दोनों देशों के बीच युद्ध जैसे हालात बन गए हैं।

<https://www.jagran.com/news/national-indian-army-general-harinder-singh-involved-in-lac-dispute-to-head-ima-20816057.html>

These are the challenges Indian Army will face in Ladakh this winter, besides the Chinese

Temperatures have already dipped below minus-5 degrees Celsius in the upper reaches, and the Army is still procuring items for the thousands of troops deployed

By Amrita Nayak Dutta

New Delhi: Limited road infrastructure, shortage of drinking water, higher chances of injuries and cold-related ailments, paucity of medical facilities, avalanches and the fact that a large number of troops will stay in areas no one has lived in since 1962. These are just some of the massive challenges the Indian Army will face in eastern Ladakh all through this winter due to the ongoing standoff with China's People's Liberation Army along the Line of Actual Control.

Temperatures in the higher reaches of Ladakh have already start dipping below minus 5 degrees Celsius, and the Army has begun a massive purchase of tents, fiberglass huts and special winter clothing for its troops. But the huge procurement could take around a month, increasing chances of hypothermia and other cold-related injuries among the troops.

ThePrint finds out what the life of a soldier is like in these conditions, and what the Army is doing to prepare its troops.



Indian Army soldiers atop a T-90 tank in Ladakh | Representational image: ANI

Very different challenge

Lt Gen. Rakesh Sharma (retd), former commander of the Ladakh-based 14 Corps of the Army, told ThePrint that the challenge is expected to be much different to what Indian troops have faced in previous years.

“They were stationed at bases and used to go patrolling at the LAC and come back. But this year, a large number of troops are staying put in dug trenches (with some overhead shelters), in places where no one ever stayed earlier, since 1962,” Sharma said.

“There will thus be a cultural change of logistics management in bases and on posts and picquets this year. There will be a newer system for sustaining people where nobody stayed earlier. The Zojila (pass) is prone to avalanches, and will get blocked, as will Manali Upshi Road. So, larger winter stocking right up to the forward areas has to be completed at the earliest,” he said.

The former corps commander also talked about the challenge of a high number of troops — nearly 50,000 according to estimates — deployed this time at the LAC.

“Logistically, it will be a massive challenge. There may be three to four battalions deployed in Daulat Beg Oldie, a much higher number than before. Even in Galwan and Hot Springs, there are a large number of troops deployed. Except the Durbuk-Shyok-DBO road that came up last year, there are limited roads for supplying and reinforcing them,” the retired officer said.

“At the same time, you can't lose sight of Kargil and the Line of Control and Siachen Glacier. They will also continue to need the supplies to sustain the winter,” he said.

Sharma further talked about a lack of fresh drinking water for these troops, as rivers freeze and the lake water in the region is not potable.

“So getting drinking water for the troops, and fuel for cooking and to keep them warm, aside from the rations, will be the other challenges in the approaching months,” he said.

Medical consequences

An Army officer who has served in Siachen also told ThePrint about the challenges of low temperatures and rarefied air at these high altitudes, mentioning that a wind chill factor reduces the temperature by 1 degree Celsius for every 3 km/h wind speed.

“Establishing a post in such conditions requires a tremendous amount of logistic planning to avoid tentages being blown or huts being blocked by heavy snowfall,” the officer said.

A consequence of these challenges will be the workload on medical officers — generally, one officer is deployed per unit, but in these circumstances, that number is likely to go up phenomenally.

An Army officer explained that it becomes impossible for one Regimental Medical Officer (RMO) to look after the entire battalion of approximately 900 troops, spread over multiple posts.

“The load is shared by medical nursing assistants and training regular soldiers as battlefield nursing assistants (BFNA),” the officer explained.

Brigadier Dr Arvind Kumar Tyagi (retired), who served in Siachen in 1989, said troops are frequently affected by high altitude and cold-related injuries such as pulmonary and cerebral oedema, hypothermia, chilblains, and frostbite. Usually, affected troops are evacuated on choppers.

Tyagi said this year, with more troops, there is a greater requirement for adequate winter gear so that there are minimal injuries.

How Army is preparing

Estimates show that around 10,000-12,000 assorted habitats are required for the troops. A defence source said this includes arctic tents, which can house three to four people, and two types of fiberglass huts — one that can house four to six troops and another other with a capacity of eight to 10 people — apart from bathing/toilet cubicles and cookhouses. In addition, prefabricated shelters to house around 20 people as well as stores are also being procured.

“Limited deployment spaces and high velocity winds in the high altitude areas preclude the construction of larger structures. Hence, there is a necessity to procure a larger number of smaller structures, which enhances the cost as well as the transportation effort,” the source added.

The Army is also purchasing special clothing on a large scale. Sources said while normal high altitude clothing for use up to 11,000 feet is available, special clothing is needed for higher altitudes, which is in the process of being procured.

“Since the quantity is large and time is limited, they will be procured from multiple sources,” the source said, adding that new estimates show that the earlier plan to procure 15,000 sets won’t be enough.

A second source said around 2,000 sets of previously worn serviceable (PWS) clothing is being issued.

“These are normally issued for troops in Siachen, following which they are recycled for troops stationed in other high-altitude areas,” the second source said.

ThePrint had reported in July that advanced winter stocking for 30,000 troops, amounting to 35,000 tonnes of rations and kerosene oil, had already begun.

“It has been enhanced to cater for the additional troops inducted subsequently,” the officer quoted above said.

On where the items are being procured from, a third source said: “Over the years, special clothing, tents and other equipment has been purchased from Austria, Italy, the Scandinavian countries, Australia and Sri Lanka, among others.”

This source said emergency procurement is being processed and a large number of items will be purchased “commercially off the shelf or COTS”.

COTS means the purchase of items from the open market at commercial rates, either due to limited availability or paucity of time.

<https://theprint.in/defence/these-are-the-challenges-indian-army-will-face-in-ladakh-this-winter-besides-the-chinese/513327/>

Defence Ministry's revocation of CQB Carbines tender leaves Indian Army in the lurch

The continually-deferred fast track procurement of close quarter battle carbines for an estimated \$110 million from Caracal International of the UAE has been called off

By Rahul Bedi

Chandigarh: The recent revocation by India's Ministry of Defence (MoD) of the tender to import 93,895 close quarter battle (CQB) carbines for the Indian Army has further exacerbated operational problems for the force, that has been without this critical weapon system for over three decades.

The Defence Procurement Board (DPB), headed by Defence Secretary Ajay Kumar had, earlier this month, informed the Defence Acquisition Council (DAC) of its intent to call off the continually-deferred fast track procurement (FTP) of the 5.56mmx45mm CQB carbines for an estimated \$110 million from Caracal International of the United Arab Emirates (UAE).



Indian soldiers stand in a formation after disembarking from a military transport plane at a forward airbase in Leh, in the Ladakh region, September 15, 2020. Photo: Reuters/Danish Siddiqui

The import of Caracal's CAR 816 CQB carbines, which were shortlisted in October 2018 over the rival F90 model fielded by Thales of Australia, was mandated to have been concluded within 17-18 months of the request for proposal or RFP for it being issued in March 2018. Consequently, carbine deliveries were scheduled to have been completed by August 2019; instead, the MoD opted to call off the deal for unknown reasons, some 13 months after that delivery deadline expired.

The CA 816 CQB carbines were intended to replace the army's 9mm Sterling 1A1 sub-machine guns, dating back to the 1940's, that were being built by the state-run Ordnance Factory Board, but their production had been discontinued nearly two decades ago.

Meanwhile, the MoD is believed to be readying yet another RfP for around 35,000 CQB carbines, once again via the FTP route, and in all likelihood with the import being executed under the newly enunciated Defence Acquisition Procedure-2020.

The ministry eventually aims to make good the long-pending residual shortfall of some 300,000-odd carbines for the army and paramilitaries by sourcing them locally under the grandiose Atmanirbhar Bharat or self-reliant India initiative. This, however, could take several years to fructify, through local manufacturers entering into collaborative ventures with overseas original equipment manufacturers (OEMs) to make the carbines. This proposal, however, is far from being initiated.

However, in the intervening period, defence industry officials said that to meet the army's urgent requirement for some 35,000 CQB carbines would, even in the best case scenario, take up to early 2022 to acquire. This is so because no RfP for CQB carbines can be issued till the previous contract for CAR 816's has been formally scrapped, but even this can take several months to accomplish by the DAC headed by defence minister Rajnath Singh that initially approved the tender.

Thereafter, once the RfP responses are received by the MoD, a technical evaluation of the rival carbines on offer would follow, succeeded in all likelihood by testing some, if not all weapon systems by an empowered committee – essentially a specialised army team – in the prospective vendors' countries.

Once one or more carbines have been shortlisted, the commercial bids, submitted earlier along with the RfP responses would be opened, and the lowest bidder or L1 declared the winner. Complex discussions by the Contract Negotiation Committee would follow, before a deal for the carbines is eventually signed, with deliveries to be made within 3-12 months subsequently, in accordance with the FTP. Industry officials said this entire process could take 12-14 months to complete, taking most of 2021 and possibly even the first few months of the following year to accomplish.

“It will be a rerun of the lengthy process that the MoD effected when it selected Caracal’s 816 CQB in October 2018 following an extended trails and shortlisting and negotiation procedures, only to eventually cancel the tender,” said a two-star officer, declining to be named. It will be similar to the rerun of a play or movie seen earlier, but with a different cast, he jocularly added.

Senior officers said the absence of carbines has become especially critical in recent months, as the army is increasingly being deployed on counter insurgency (COIN) operations in Kashmir, where Pakistan has stepped up militant infiltration into the restive region ahead of winter.

The army is also deployed cheek-by-jowl against China’s People’s Liberation Army (PLA) along the disputed Line of Actual Control (LAC) in eastern Ladakh, where the lack of a carbine is reportedly being felt and is adversely impacting operations.

Presently, the army is employing assault rifles as a substitute for carbines, which many infantrymen claim reduces operational efficiency. Compared to assault rifles, the smaller sized, relatively lighter carbines are easier to deploy in close quarter battle situations, similar to the ones that prevail on COIN operations and could potentially emerge at the LAC.

Carbines have relatively shorter barrels, and unlike assault rifles have a lesser ricochet when employed in confined spaces. Fired at relatively close range, carbines are even capable of penetrating body armour and headgear and, army officials said, would prove more efficacious under the new rules of engagement or RoE along the LAC that were revised following the death of 20 Indian soldiers after a clash with the PLA in Ladakh’s Galwan region in mid-June. The amended RoE now give local army commanders along LAC-the ‘freedom to initiate adequate and proportionate responses to any hostile acts by the PLA’, in which CQB carbines would prove highly effective, army sources said.

Meanwhile, Infantry-8, the user directorate for the army’s Infantry wing, that has long been pressing for the early procurement of CQB carbines, remains adamant regarding their acquisition. However, inconceivably the DPB too appears equally adamant to terminate their purchase tender, leaving an acute breach in the army’s basic operational requirements for which no one is being held to account.

<https://thewire.in/government/defence-ministry-indian-army-cqb-carbines>

Indian Navy takes to seas with Russia and QUAD countries

The Indian Navy has conducted exercises with Russia and 'Quad' countries - an informal security forum comprising India, the US, Japan and Australia - in a message to China on getting a wider footprint in the Indo-Pacific region.

The Indo-Pacific region is seen from the west coast of India to the US.

The Indian Navy carried out a three-day bilateral maritime exercise with Japan in the north Arabian Sea from September 26, 2020 to September 28, 2020. It was the fourth edition of India-Japan Maritime bilateral exercise JIMEX, which is conducted biennially. The last edition of JIMEX was conducted in October 2018 off Visakhapatnam in India.



Representative image of Indian Navy ships heading out to sea earlier in September BCCL

Naval cooperation between India and Japan has increased in scope and complexity over the years. Advanced level of operations and exercises took place during three days. It is indicative of the continued upswing in Indo-Japanese defence relations and continued efforts by both governments to work closely for a more secure, open and inclusive global commons, in accordance with international regulations.

The helicopter carrier of Japan JS Kaga took part in the recent exercise. The Kaga and its sister ship the Izumo are being converted into aircraft carriers that will carry US-built maritime planes, the F35-B. India, Japan, China and South Korea are the countries now involved in what is seen in strategic circles as the Asian carrier race.

The Australian Navy and Indian Navy carried out passage exercise in the East Indian Ocean Region from September 23 to September 24. The exercise involved participation of HMAS Hobart from the Australian side and Indian naval ships Sahyadri and Karmuk. In addition, an Indian maritime patrol aircraft and helicopters from both sides carried out coordinated exercise.

The exercise, aimed at enhancing interoperability, improving understanding and imbibing best practices from each other, involved advanced surface and anti-air exercises including weapon firings, seamanship exercises, naval manoeuvres and cross deck flying operations.

To boost mutual confidence and cooperation, a bilateral maritime exercise between Indian Navy and Russian Navy took place in the Bay of Bengal on between September 4 and September 5.

"The exercise was aimed at imbibing best practices between the two navies," Indian Navy spokesperson Commander Vivek Madhwal told IANS.

He also said that the exercise helped to further boost mutual confidence and cooperation between the two Navies and would reinforce the longstanding bond of friendship between the two countries.

The exercise is known as 'Indra Navy' and is the 11th edition. It is a biennial bilateral maritime exercise between Indian Navy and Russian Navy.

Indian Navy units undertook Passage Exercise (PASSEX) with units of US Navy - Nimitz Carrier Strike Group as they transited through Indian Ocean Region on July 20.

<https://www.businessinsider.in/defense/news/indian-navy-takes-to-seas-with-russia-and-quad-countries/articleshow/78406868.cms>

Ex-DRDO technological expert to develop Defense Robotics in UP

Noida/Lucknow: Subsequent to MoU done with the U.P. Govt. for developing its first 'Robotics Technology Park' at Greater Noida, Innogress, The Park promoter, has nominated Col Sanjay Vaidya (Retd), Senior Technological Expert, whose last stint includes serving as an Additional Director in DRDO, as an advisor in its Advisory Board. With his vast assets of Tech. expertise, he would be leading the development of Defence Robotics in the proposed 'Greater Noida Robotics Technology Park' (GNRTP).

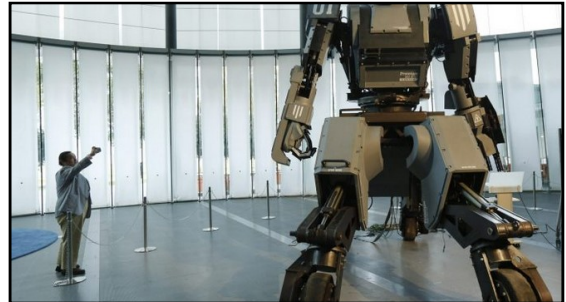
Joining in as an advisor on in GRTPS's advisory board, Col Vaidya would be closely working in the development of the proposed Robotics tech park, specifically overlooking the defence related fields of robotic technology.

On his nomination in the 'Advisory Board' of GNRTP, Col Vaidya expressed his thoughts on how there is a huge potential in the field of Robotics and A.I. (Artificial Intelligence) Technology which could be resourcefully deployed in the Indian Defence Organizations. He further stressed on the requirement of creating a holistic environment for research and development, which would further ignite young minds to actively innovate and create better solutions for tomorrow.

Col Vaidya has commended on this platform and said, "Working for the development of Defence Robotics at GNRTP is a creative and constructive opportunity. I hope, as a team we shall be utilizing this opportunity for developing the very first ecosystems of Defence Robotics in Uttar Pradesh. This will prove to be strengthening the defence automation fields, minimising human casualties and assisting the forces to their advantage in tactical operational fronts."

Welcoming Col. Vaidya in Advisory Board of 'GNRTP', Sumant Parimal, GNRTP Promoter and Partner and Chief Analyst of Innogress said "our endeavours in the development of Defence Robotics, should prove fruitful on the front line, ultimately leading to a robust system to minimise casualties and maximise the potential of our armed forces. I am ardent about the proposed segment of GNRTP where technological advancements would surely create a foundation for the development and manufacturing of defence related robotics technology." Parimal expressed his gratitude on Col Vaidya's on-boarding. He further added "Col Vaidya has an extensive pool of knowledge and experience in the fields of technology and its application in the defence fields. His tenure with Indian army includes working in challenging fields which looks at technical and mechanical advancements of the fleet. He has even worked with the United Nations and successfully carried out multiple tech. related tasks during peace keeping missions ensuring a smooth functioning of the organisation. It is indeed a great opportunity to be mentored by him in the area of defence robotics in Uttar Pradesh."

Parimal has envired GNRTP, which is the first robotics tech. park of India and for which a detailed road map has been laid out for successful development. This would create an ecosystem for world class robotics research, advancement and manufacturing. To achieve this, Parimal's team has been working on establishing a Defence Robotics Centre of Excellence (CoE), which would open up opportunities to collaborate with various technological firms and paving ways for a possible partnership.



It has been envisaged by Innogress to capture up to 5% of the Global Market share of Robotics and 'AI' Technology through proposed 'GNRTP' ecosystem at Gr. Noida with yearly trade output value potentials up to \$10 B in collaboration with partners and Tech. investors.

At this stage 'GNRTP' project has opened its doors to national and international investors for investing in this strategic project through equity route.

Recently, premier B-School of India, XLRI Jamshedpur has also decided to give its mentorship to GNRTP project and Dr Ashish K. Pani, Dean of XLRI has been also nominated as Advisor by promoter Innogress in GNRTP's Advisory Board.

<https://www.avenuemail.in/india/ex-drdo-technological-expert-to-develop-defense-robotics-in-up/153789/>

Science & Technology News



Wed, 30 Sept 2020

ISRO marks 5 years of Space Observatory - AstroSat; more science missions in anvil

By Sidhartm MP

Story highlights

The Indian Space Research Organization (ISRO) marked five years of the launch of AstroSat, which is India's first multi-wavelength mission, which was launched from Sriharikota spaceport on 28th September 2018

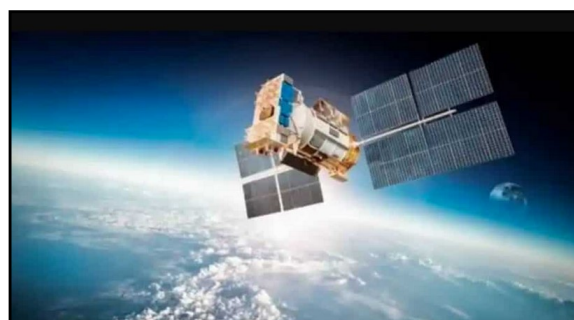
Chennai: The Indian Space Research Organization (ISRO) marked five years of the launch of AstroSat, which is India's first multi-wavelength mission, which was launched from Sriharikota spaceport on 28th September 2018. The satellite is being operated as a proposal-based observatory, covering a wide band ranging from Ultraviolet (UV) to high energy X-rays.

While a vast majority of ISRO's satellites are meant to serve purposes like communication, surveillance, imagery, remote sensing etc. A handful of missions/satellites are purely for exploring and helping understand unexplored sciences. Such missions are Chandrayaan, Mangalyaan and AstroSat.

ISRO says that the unique observation capability of AstroSat in this wide band makes it one of the major space science observatories in the world. According to the Indian Space agency, AstroSat was also the mission which led to the discovery of one of the earliest galaxies in extreme Ultraviolet light, marking a major breakthrough. Called AUDFs01, this galaxy is said to be 9.3 billion light years away from earth.

The discovery was made by an international team of astronomers led by Dr. Kanak Saha, at the Inter-University Centre for Astronomy and Astrophysics (IUCAA), Pune. This team was comprised of scientists from India, Switzerland, France, USA, Japan and Netherlands.

Speaking at a virtual event, to mark five years of AstroSat, R. Umamaheswaran, Scientific Secretary, ISRO said that the data generated from the AstroSat mission has been shared with over 1500 users across 43 countries, hailing the mission as an 'international success'. "AstroSat was



AstroSat is India's first multi-wavelength satellite
Photograph: (Twitter)

launched into a unique circular orbit, with low incline of 6 degrees and five of its payloads can function simultaneously” he said.

Chairman ISRO, DR. K.Sivan said that, the study of the universe played a major role in defining research of ISRO and AstroSat has brought us into the big league of space astronomy and provided excellent results. He added that the satellite had served its mission life of five years, with all five on-board equipment in ‘very fine’ condition and that it would continue to serve for years to come.

Referring to AstroSat as a multi-agency mission, Dr.Sivan elaborated that academia and R&D institutions had worked in the engineering and testing phase of this project.

Speaking of ISRO’s ‘big future plans’ in space exploration and science, he said, that Exosat and Aditya L-1 were upcoming missions which would open exciting possibilities. While Exosat was meant to study X-ray polarisation from cosmic sources, it would also be the first polarimetric mission after half a century, Sivan added. Aditya L-1 is a mission that was slated for launch by mid-2020, the scientific objective of the mission was to study the Sun.

“There are exciting possibilities - missions to detect Elettromagnetic counterparts of gravitational events, to study atmospheric composition of rocky planets and discovery of all life forms outside our solar system” he said. He urged the scientific community to use the scientific data and research to the maximum extent and also indicate the importance of generating future Human Resources by involving school students.

Thus far, in 2020 ISRO has not had any launches owing to the pandemic-induced lockdowns and logistical challenges etc. ISRO officials have said that 4 satellites are ready for launch, namely - GISAT-1, Microsat 2-A, GSAT-12R and RISAT-2BR2.

<https://www.wionews.com/india-news/isro-marks-5-years-of-space-observatory-astrosat-more-science-missions-in-anvil-331170>

Business Standard

Thu, 01 Oct 2020

ISRO to launch its Venus mission in 2025, France to take part: CNES

*ISRO chairman K Sivan and CNES president Jean-Yves Le Gall held talks
and reviewed the areas driving cooperation between France and India in space*

New Delhi: ISRO is scheduled to launch its Venus mission in 2025 and France will participate in it, French space agency CNES said on Wednesday.

The VIRAL (Venus Infrared Atmospheric Gases Linker) instrument co-developed with the Russian federal space agency Roscosmos and the LATMOS atmospheres, environments and space observations laboratory attached to the French national scientific research centre CNRS has been selected by the ISRO after a request for proposals, it said in a statement.

ISRO chairman K Sivan and CNES president Jean-Yves Le Gall held talks and reviewed the areas driving cooperation between France and India in space.

"In the domain of space exploration, France will be taking part in ISRO's mission to Venus, scheduled to launch in 2025. CNES will coordinate and prepare the French contribution, the first time a French payload will be flown on an Indian exploration mission," CNES said in a statement.

However, there was no comment from ISRO.

After the Mars Orbiter Mission (Mangalyaan) and Moon missions Chandrayaan-1 and 2, ISRO has set its eyes on Venus for carrying out its inter-planetary mission.

France and India share a robust collaboration in arena of the space. It is one of the three nations with whom India collaborates in the strategic sectors of nuclear, space and defence -- the other two being the US and Russia.

In March 2018, the two countries also issued a 'Joint Vision for Space Cooperation'.

India and France are also working on ISRO's human space mission Gaganyaan project, which aims to send three Indians to space by 2022.

Since September 2018, CNES and ISRO have set up a working group focused on cooperation in the field of human spaceflight, the French agency said.

"The two nations are pooling their expertise, notably in the domains of space medicine, astronaut health monitoring and life support. Initial exchanges have concentrated on training for India's flight physicians and technical teams and the supply of CNES flight systems," it added.

(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/pti-stories/isro-to-launch-its-venus-mission-in-2025-france-to-take-part-french-space-agency-120093001371_1.html



Thu, 01 Oct 2020

इसरो का शुक्र मिशन 2025 में, फ्रांस भी होगा शामिल, अंतरिक्ष एजेंसी सीएनईएस ने जानकारी दी

फ्रांस की अंतरिक्ष एजेंसी सीएनईएस का कहना है कि इसरो साल 2025 में शुक्र ग्रह से संबंधित अपने मिशन को अंजाम देगा। सीएनईएस की मानें तो इसरो के इस अभियान में फ्रांस भी शामिल होगा। पहली बार है जब भारत के अन्वेषण मिशन में किसी फ्रांसीसी उपकरण का इस्तेमाल होगा।

By Krishna Bihari Singh

नई दिल्ली: फ्रांस की अंतरिक्ष एजेंसी सीएनईएस ने बुधवार को बताया कि भारतीय अंतरिक्ष अनुसंधान संगठन (इसरो) 2025 में शुक्र ग्रह से संबंधित अपने मिशन को अंजाम देगा और फ्रांस इसमें शामिल होगा। सीएनईएस ने एक बयान में कहा कि इसरो ने आग्रह प्रस्तावों के बाद मिशन के लिए रूसी अंतरिक्ष एजेंसी 'रॉस्कॉसमस' और फ्रांस के राष्ट्रीय वैज्ञानिक अनुसंधान केंद्र सीएनआरएस से संबंधित फ्रांसीसी अनुसंधान प्रयोगशाला 'लैटमॉस' द्वारा संयुक्त रूप से विकसित 'वाइरल' (वीनस इन्फ्रारेड एटमस्फेरिक गैसेज लिंकर) उपकरण का चयन किया है।

इसरो अध्यक्ष के. सिवन और सीएनईएस अध्यक्ष जीन यवेस ले. गाल ने आपस में बातचीत की और अंतरिक्ष में भारत तथा फ्रांस के बीच सहयोग वाले क्षेत्रों की समीक्षा की। सीएनईएस ने एक बयान में कहा कि अंतरिक्ष खोज क्षेत्र में फ्रांस शुक्र ग्रह से संबंधित इसरो के मिशन में शामिल होगा, जिसका 2025 में प्रक्षेपण निर्धारित है। सीएनईएस फ्रांसीसी योगदान की तैयारी और समन्वय करेगा। यह पहली बार है जब भारत के अन्वेषण मिशन में किसी फ्रांसीसी उपकरण का इस्तेमाल होगा।' हालांकि, इसरो की तरफ से इस बारे में कोई बयान नहीं जारी किया गया है।

बता दें कि शुक्र के वायुमंडल में कार्बन डाइऑक्साइड की अधिकता है। एक अनुमान के मुताबिक यह करीब 96 फीसद तक हो सकती है। यही नहीं शुक्र पर वायुमंडलीय दबाव भी धरती के मुकाबले 90 गुना ज्यादा आंका गया है। शुक्र आकार के मामले में पृथ्वी के काफी समान है। हालांकि सूर्य से नजदीक होने की वजह से इसका तापमान धरती के मुकाबले अधिक होता



फ्रांस की अंतरिक्ष एजेंसी सीएनईएस का कहना है कि इसरो साल 2025 में शुक्र ग्रह से संबंधित अपने मिशन को अंजाम देगा। सीएनईएस की मानें तो इसरो के इस अभियान में फ्रांस भी शामिल होगा। पहली बार है जब भारत के अन्वेषण मिशन में किसी फ्रांसीसी उपकरण का इस्तेमाल होगा

है। चंद्रमा के बाद रात में आकाश में सबसे अधिक चमकने वाला यही ग्रह है।

हाल ही में केंद्रीय मंत्री जितेंद्र सिंह ने बताया था कि भारत का चंद्रयान-3 अगले साल की शुरुआत में रवाना किया जा सकता है। केंद्रीय मंत्री की मानें तो चंद्रयान-3 में ऑर्बिटर नहीं होगा केवल लैंडर और रोवर ही इसका हिस्सा होंगे। यह चंद्रयान-2 के रिपीट मिशन जैसा होगा। बता दें कि चंद्रयान-2 की क्रैश लैंडिंग के बाद इसरो ने इस साल के आखिर तक चंद्रयान-3 को भेजने की योजना बनाई थी लेकिन कोरोना संकट के चलते इसमें देरी हो रही है।

<https://www.jagran.com/news/national-french-space-agency-cnes-said-that-isro-to-launch-its-venus-mission-in2025-20816863.html>



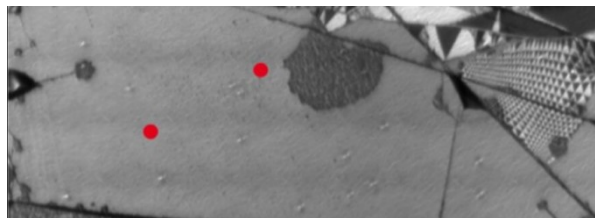
Wed, 30 Sept 2020

Superconductivity with a twist explained

By Bruno Van Wayenburg

Leiden physicists and international colleagues from Geneva and Barcelona have confirmed the mechanism that makes magic-angle graphene superconducting. This is a key step in elucidating high-temperature superconductivity, a decades-old mystery central to physics, which may lead to technological breakthroughs.

Magic-angle materials form a surprising recent physics discovery. "You take a sheet of graphene," says Sense Jan van der Molen, referring to the two-dimensional material made of carbon atoms in a hexagonal pattern, "then you put another layer on top of it and twist the latter by 1 degree. This way, you suddenly get a superconductor."



LEEM image of the sample. The triangles on the right indicate a low angle patch. Credit: Leiden University

At a temperature of 1.7 Kelvin, twisted bilayer graphene (tbG) conducts electricity without resistance. Now, Van der Molen, his Leiden colleague Milan Allan and international colleagues have finally confirmed the mechanism behind these fascinating new superconductors.

In the journal *Nature Physics*, they show that the slight twist in graphene causes the electrons to slow down enough to sense each other. This enables them to form the electron pairs necessary for superconductivity.

Moiré patterns

How can such a small twist make such a big difference? This is connected with moiré patterns, a phenomenon seen in the everyday world. For instance, when two chicken-wire fences are in front of another, one observes additional dark and bright spots, caused by the varying overlap between the patterns. Such moiré patterns (from the french moirer, to crease) generally appear where periodical structures overlap imperfectly.

Twisted bilayer graphene is just such a situation: the interplay between the two hexagonal carbon lattices, slightly twisted, causes a much larger hexagonal moiré pattern to emerge. By creating this new periodicity, the interaction between the electrons changes, yielding these "slow" electrons. In numerous papers, clear signs of the superconductivity have been measured, but the intermediate step of slow electrons has been much harder to pin down.

Looking for patches

"You need to have good samples," Van der Molen explains the success. Fortunately, the co-authors from Barcelona are known to make high-quality samples. "Next, you need to know exactly where to look." Even in a good sample, the correct twist angle is only achieved in small patches of double-layer graphene.

Van der Molen's Low-Energy Electron Microscope (LEEM) and Allan's Scanning Tunneling Microscope (STM) helped find exactly those patches.

Then, a group in Geneva used nano-ARPES, an imaging technique, to demonstrate the slowing down of the electrons. Allan: "Many groups tried hard to do that. Only one other group succeeded, and they have a parallel publication."

Hypersensitive detectors

Elucidating and then optimizing this type of superconductivity could also lead to numerous technological applications, ranging from lossless energy transport to hypersensitive light detectors.

In fact, Michiel de Dood, also at Leiden, is now pioneering such detectors. Van der Molen: "It's fundamental work, but we keep our eyes open for applications too."

More information: Simone Lisi et al. Observation of flat bands in twisted bilayer graphene, *Nature Physics* (2020). DOI: [10.1038/s41567-020-01041-x](https://doi.org/10.1038/s41567-020-01041-x)

Journal information: [Nature Physics](https://phys.org/news/2020-09-superconductivity.html)
<https://phys.org/news/2020-09-superconductivity.html>



Thu, 01 Oct 2020

Scientists capture candid snapshots of electrons harvesting light at the atomic scale

In the search for clean energy alternatives to fossil fuels, one promising solution relies on photoelectrochemical (PEC) cells—water-splitting, artificial-photosynthesis devices that turn sunlight and water into solar fuels such as hydrogen.

In just a decade, researchers in the field have achieved great progress in the development of PEC systems made of light-absorbing gold nanoparticles—tiny spheres just billionths of a meter in diameter—attached to a semiconductor film of titanium dioxide nanoparticles (TiO₂ NP). But despite these advancements, researchers still struggle to make a device that can produce solar fuels on a commercial scale.

Now, a team of scientists led by the Department of Energy's Lawrence Berkeley National Laboratory (Berkeley Lab) has gained important new insight into electrons' role in the harvesting of light in gold/TiO₂ NP PEC systems. The scientists say that their study, recently published in the *Journal of Physical Chemistry Letters*, can help researchers develop more efficient material combinations for the design of high-performance solar fuels devices.

"By quantifying how electrons do their work on the nanoscale and in real time, our study can help to explain why some water-splitting PEC devices did not work as well as hoped," said senior author Oliver Gessner, a senior scientist in Berkeley Lab's Chemical Sciences Division.

And by tracing the movement of electrons in these complex systems with chemical specificity and picosecond (trillionths of a second) time resolution, the research team members believe they have developed a new tool that can more accurately calculate the solar fuels conversion efficiency of future devices.

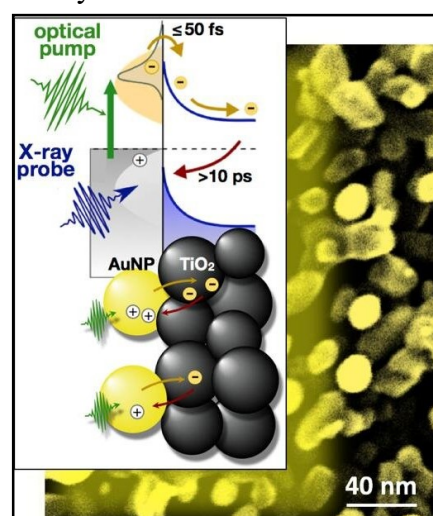


Illustration of a PEC model system with 20-nanometer gold nanoparticles attached to titanium dioxide. Credit: Berkeley Lab

Electron-hole pairs: A productive pairing comes to light

Researchers studying water-splitting PEC systems have been interested in gold nanoparticles' superior light absorption due to their "plasmonic resonance"—the ability of electrons in gold nanoparticles to move in sync with the electric field of sunlight.

"The trick is to transfer electrons between two different types of materials—from the light-absorbing gold nanoparticles to the titanium-dioxide semiconductor," Gessner explained.

When electrons are transferred from the gold nanoparticles into the titanium dioxide semiconductor, they leave behind "holes." The combination of an electron injected into titanium dioxide and the hole the electron left behind is called an electron-hole pair. "And we know that electron-hole pairs are critical ingredients to enabling the chemical reaction for the production of solar fuels," he added.

But if you want to know how well a plasmonic PEC device is working, you need to learn how many electrons moved from the gold nanoparticles to the semiconductor, how many electron-hole pairs are formed, and how long these electron-hole pairs last before the electron returns to a hole in the gold nanoparticle. "The longer the electrons are separated from the holes in the gold nanoparticles—that is, the longer the lifetime of the electron-hole pairs—the more time you have for the chemical reaction for fuels production to take place," Gessner explained.

To answer these questions, Gessner and his team used a technique called "picosecond time-resolved X-ray photoelectron spectroscopy (TRXPS)" at Berkeley Lab's Advanced Light Source (ALS) to count how many electrons transfer between the gold nanoparticles and the titanium-dioxide film, and to measure how long the electrons stay in the other material. Gessner said his team is the first to apply the X-ray technique for studying this transfer of electrons in plasmonic systems such as the nanoparticles and the film. "This information is crucial to develop more efficient material combinations."

An electronic 'count'-down with TRXPS

Using TRXPS at the ALS, the team shone pulses of laser light to excite electrons in 20-nanometer (20 billionths of a meter) gold nanoparticles (AuNP) attached to a semiconducting film made of nanoporous titanium dioxide (TiO₂).

The team then used short X-ray pulses to measure how many of these electrons "traveled" from the AuNP to the TiO₂ to form electron-hole pairs, and then back "home" to the holes in the AuNP.

"When you want to take a picture of someone moving very fast, you do it with a short flash of light—for our study, we used short flashes of X-ray light," Gessner said. "And our camera is the photoelectron spectrometer that takes short 'snapshots' at a time resolution of 70 picoseconds."

The TRXPS measurement revealed a few surprises: They observed two electrons transfer from gold to titanium dioxide—a far smaller number than they had expected based on previous studies. They also learned that only one in 1,000 photons (particles of light) generated an electron-hole pair, and that it takes just a billionth of a second for an electron to recombine with a hole in the gold nanoparticle.

Altogether, these findings and methods described in the current study could help researchers better estimate the optimal time needed to trigger solar fuels production at the nanoscale.

"Although X-ray photoelectron spectroscopy is a common technique used at universities and research institutions around the world, the way we expanded it for time-resolved studies and used it here is very unique and can only be done at Berkeley Lab's Advanced Light Source," said Monika Blum, a co-author of the study and research scientist at the ALS.

"Monika's and Oliver's unique use of TRXPS made it possible to identify how many electrons on gold are activated to become charge carriers—and to locate and track their movement throughout the surface region of a nanomaterial—with unprecedented chemical specificity and picosecond time resolution," said co-author Francesca Toma, a staff scientist at the Joint Center for Artificial Photosynthesis (JCAP) in Berkeley Lab's Chemical Sciences Division. "These findings will be key to gaining a better understanding of how plasmonic materials can advance solar fuels."

The team next plans to push their measurements to even faster time scales with a free-electron laser, and to capture even finer nanoscale snapshots of electrons at work in a PEC device when water is added to the mix.

More information: Mario Borgwardt et al, Photoinduced Charge Carrier Dynamics and Electron Injection Efficiencies in Au Nanoparticle-Sensitized TiO₂ Determined with Picosecond Time-Resolved X-ray Photoelectron Spectroscopy, *The Journal of Physical Chemistry Letters* (2020). DOI: [10.1021/acs.jpcelett.0c00825](https://doi.org/10.1021/acs.jpcelett.0c00825)

Journal information: *Journal of Physical Chemistry Letters*
<https://phys.org/news/2020-09-scientists-capture-candid-snapshots-electrons.html>



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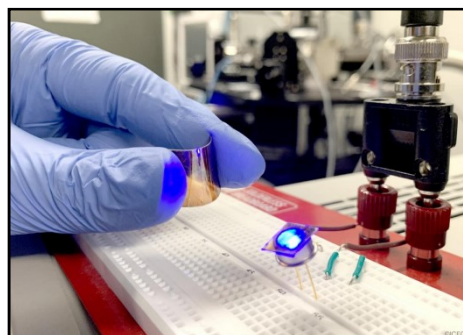
Colloidal quantum dot light emitters go broadband in the infrared

Broadband light emission in the infrared has proven to be of paramount importance for a large range of applications that include food quality and product/process monitoring, recycling, environmental sensing and monitoring, multispectral imaging in automotive as well as safety and security. With the advent of IoT and the increasing demand in adding more functionalities to portable devices (such as smart watches, mobile phones etc.) the introduction of on-chip spectrometers for health monitoring, allergen detection food quality inspection, to name a few, is expected to happen soon. But in order to have such functionalities easily integrated and implemented in mass production consumer electronics, several prerequisites need to be met. More specifically, the light source needs to be compact, highly efficient and ideally CMOS integrated to guarantee low-cost and high volume manufacturing.

So far, broadband light emitters in the shortwave infrared (a portion of the infrared spectrum between 1-2.5 μm) range in which these aforementioned applications work, are based on previous-century technology, which is actually based on incandescent light sources, i.e. black body radiators. Even though their cost of production is low, their functionality is based on the principle of heating, which does not allow miniaturization of those sources, ending up in bulky form factors. Furthermore heat dissipation becomes a major issue when it comes to integration in compact portable systems. What makes matters even worse is the fact that these sources are uncontrollably broadband, emitting across a spectrum that is far broader than usually needed, which means that they are highly inefficient since most of the generated light is essentially useless.

To address this challenge, ICFO researchers Dr. Santanu Pradhan and Dr. Mariona Dalmases led by ICREA Prof. at ICFO Gerasimos Konstantatos, developed a new class of broadband solid state light emitters based on colloidal quantum dot (CQD) thin film technology. The results of their study have been published in the journal *Advanced Materials*.

Now, CQDs offer the advantages of low-cost solution processability, easy CMOS integration and a readily tunable bandgap. By leveraging these properties, ICFO researchers designed and engineered a multi-stack of CQDs of different size, which showed to be capable of emitting light with a spectrum that depends on the size of the emitting QDs. The sequence and thickness of the



The multi-stack of CQDs of different size are built on top of a flexible plastic substrate that is later deposited onto a commercial visible LED to produce broadband IR light. Credit: ICFO

layers was optimized to maximize the photoconversion efficiency of this down-converting nanophosphor type of thin film. The stacks were built on top of a flexible plastic substrate which was then glued on top of a LED that emits in the visible range. This LED emits visible light that is then absorbed and converted by the CQDs to infrared light with a desired spectrum and, more importantly, with an outstanding photon conversion efficiency of 25%. They showed that the shape of the emission spectrum can be tuned by choosing the appropriate populations of CQD sizes. For this particular case, the researchers developed a broadband light source covering an emission range between 1100—1700 nm with a FWHM of 400 nm.

Then, by exploiting the conductive nature of the CQD thin films, the researchers were able to take a step further in their experiment and also construct electrically driven active broadband LEDs with a FWHM in excess of 350 nm and quantum efficiency of 5%. Such achievement represents the first monolithic electrically driven broadband Short Wave Infrared (SWIR) LED that does not need to rely on external light sources for excitation. This is a remarkable discovery since current available technologies based on III-V semiconductors not only are CMOS incompatible, but also require the use of multiple InGaAs chips in the form of an array to deliver a broadband spectrum, which adds complexity, cost and device volume increase.

Finally, to demonstrate how suitable this technology could be for market applications based on spectroscopy techniques, the team of researchers searched for several real case examples that could be good candidates for such technology. They took their CQD light source setup and by putting it together with commercially available spectrometers, they were able to distinguish between different types of plastics, liquids and milks that have distinct spectral signatures in the SWIR. The successful results open a new realm for the field of SWIR spectroscopy since they prove that this technology could definitely be used for applications that range from plastic sorting in recycling process, to health and safety or even food inspection, to name a few.

More information: Santanu Pradhan et al. Solid-State Thin-Film Broadband Short-Wave Infrared Light Emitters, *Advanced Materials* (2020). [DOI: 10.1002/adma.202003830](https://doi.org/10.1002/adma.202003830)

Journal information: [Advanced Materials](https://phys.org/news/2020-09-colloidal-quantum-dot-emitters-broadband.html)
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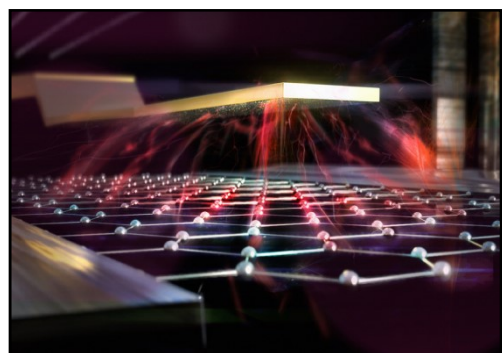


Thu, 01 Oct 2020

New detector breakthrough pushes boundaries of quantum computing

Physicists at Aalto University and VTT Technical Research Center of Finland have developed a new detector for measuring energy quanta at unprecedented resolution. This discovery could help bring quantum computing out of the laboratory and into real-world applications. The results have been published today in *Nature*.

The type of detector the team works on is called a bolometer, which measures the energy of incoming radiation by measuring how much it heats up the detector. Professor Mikko Möttönen's Quantum Computing and Devices group at Aalto has been developing their expertise in bolometers for quantum computing over the past decade, and have now developed a device that can match current state-of-the-art detectors used in quantum computers.



Artistic image of a graphene bolometer controlled by electric field. Credit: Heikka Valja.

"It is amazing how we have been able to improve the specs of our bolometer year after year, and now we embark on an exciting journey into the world of quantum devices," says Möttönen.

Measuring the energy of qubits is at the heart of how quantum computers operate. Most quantum computers currently measure a qubit's energy state by measuring the voltage induced by the qubit. However, there are three problems with voltage measurements: firstly, measuring the voltage requires extensive amplification circuitry, which may limit the scalability of the quantum computer; secondly, this circuitry consumes a lot of power; and thirdly, the voltage measurements carry quantum noise which introduces errors in the qubit readout. Quantum computer researchers hope that by using bolometers to measure qubit energy, they can overcome all of these complications, and now Professor Möttönen's team have developed one that is fast enough and sensitive enough for the job.

"Bolometers are now entering the field of quantum technology and perhaps their first application could be in reading out the quantum information from qubits. The bolometer speed and accuracy seems now right for it," says Professor Möttönen.

The team had previously produced a bolometer made of a gold-palladium alloy with unparalleled low noise levels in its measurements, but it was still too slow to measure qubits in quantum computers. The breakthrough in this new work was achieved by swapping from making the bolometer out of gold-palladium alloys to making them out of graphene. To do this, they collaborated with Professor Pertti Hakonen's NANO group—also at Aalto University—who have expertise in fabricating graphene-based devices. Graphene has a very low heat capacity, which means that it is possible to detect very small changes in its energy quickly. It is this speed in detecting the energy differences that makes it perfect for a bolometer with applications in measuring qubits and other experimental quantum systems. By swapping to graphene, the researchers have produced a bolometer that can make measurements in well below a microsecond, as fast as the technology currently used to measure qubits.

"Changing to graphene increased the detector speed by 100 times, while the noise level remained the same. After these initial results, there is still a lot of optimisation we can do to make the device even better," says Professor Hakonen.

Now that the new bolometers can compete when it comes to speed, the hope is to utilize the other advantages bolometers have in quantum technology. While the bolometers reported in the current work performs on par with the current state-of-the-art voltage measurements, future bolometers have the potential to outperform them. Current technology is limited by Heisenberg's uncertainty principle: voltage measurements will always have quantum noise, but bolometers do not. This higher theoretical accuracy, combined with the lower energy demands and smaller size—the graphene flake could fit comfortably inside a single bacterium—means that bolometers are an exciting new device concept for quantum computing.

The next steps for their research is to resolve the smallest energy packets ever observed using bolometers in real-time and to use the bolometer to measure the quantum properties of microwave photons, which not only have exciting applications in quantum technologies such as computing and communications, but also in fundamental understanding of quantum physics.

Many of the scientists involved in the researchers also work at IQM, a spin-out of Aalto University developing technology for quantum computers. "IQM is constantly looking for new ways to enhance its quantum-computer technology and this new bolometer certainly fits the bill," explains Dr. Kuan Yen Tan, Co-Founder of IQM who was also involved in the research.

More information: R. Kokkonen, J.-P. Girard, D. Hazra, A. Laitinen, J. Govenius, R. E. Lake, I. Sallinen, V. Vesterinen, P. Hakonen, and M. Möttönen, Bolometer operating at the threshold for circuit quantum electrodynamics, *Nature* (2020). [DOI: 10.1038/s41586-020-2753-3](https://doi.org/10.1038/s41586-020-2753-3)

Journal information: [Nature](https://phys.org/news/2020-09-detector-breakthrough-boundaries-quantum.html)
<https://phys.org/news/2020-09-detector-breakthrough-boundaries-quantum.html>

Researchers use amino acids to grow high-performance copper thin films

By Delia Croessmann

For the first time, researchers from Missouri S&T have shown that highly ordered copper thin films can be crystallized directly on a one-molecule-thick layer of organic material rather than on the inorganic substrates that have been used for years.

The copper thin films they've produced are excellent candidates for use as underlying substances for solar cells, LEDs, and high-temperature superconductors, says Dr. Jay Switzer, Chancellor's Professor and Curators' Distinguished Professor emeritus of chemistry, who is principal investigator of the project.

Switzer says that other researchers have previously electroplated thin films onto

self-assembled monolayers (SAMs) of organic molecules, but those films lacked the in-plane and out-of-plane order required for electronic applications.

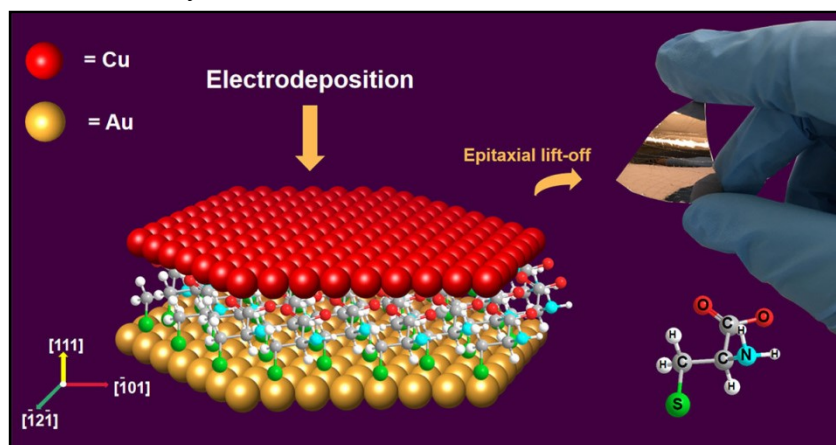
"Like the way seashells, bones or teeth are formed, we've found a way to give the copper films the right level of crystalline order and durability for their applications," says Switzer. "With our process, which mimics biomineralization, we're creating inorganic thin films with superior qualities of single-crystal-like order, high conductivity and flexibility."

In their experiments, the researchers electrodeposited copper on a single layer of L-cysteine, a protein-building amino acid that was placed on ordered layers of gold on silicon. After the copper crystallized into an ordered film, they were able to lift off a single, crystal-like foil simply using adhesive tape. Their process provides an inexpensive route to free-standing metal foils with properties that mimic those of expensive single crystals, the researchers note.

Switzer says their method shows the importance of the cysteine molecule in directing the growth of ordered crystalline structures. As a contribution to science, he notes the method will enable future work on the deposition of ordered films of other important materials such as semiconductors and catalysts onto organic self-assembled monolayers. The method may also prove to minimize the effects of lattice mismatch that sometimes limit epitaxial, or crystalline, growth.

Other Missouri S&T scientists on the team include Dr. Avishek Banik, a post-doctoral researcher in chemistry; Dr. Eric Bohannon, a senior research specialist in S&T's Materials Research Center; and Bin Luo, a doctoral student in chemistry.

The team's findings will be published in the upcoming issue of the American Chemical Society's *Journal of Physical Chemistry C* and are available now online in the study, "Epitaxial Electrodeposition of Cu(111) onto an L-cysteine Self-assembled Monolayer on Au(111) and Epitaxial Lift-off of Single-crystal-like CuFoil for Flexible Electronics."



Copper thin films are created by electrodeposition of copper, Cu(111), on a self-assembled organic monolayer of the amino acid L-cysteine on gold, Au(111). Credit: Bin Luo

More information: Bin Luo et al. Epitaxial Electrodeposition of Cu(111) onto an L-Cysteine Self-Assembled Monolayer on Au(111) and Epitaxial Lift-Off of Single-Crystal-like Cu Foils for Flexible Electronics, *The Journal of Physical Chemistry C* (2020). DOI: [10.1021/acs.jpcc.0c05425](https://doi.org/10.1021/acs.jpcc.0c05425)

Journal information: [Journal of Physical Chemistry C](https://phys.org/news/2020-09-amino-acids-high-performance-copper-thin.html)
<https://phys.org/news/2020-09-amino-acids-high-performance-copper-thin.html>



Thu, 01 Oct 2020

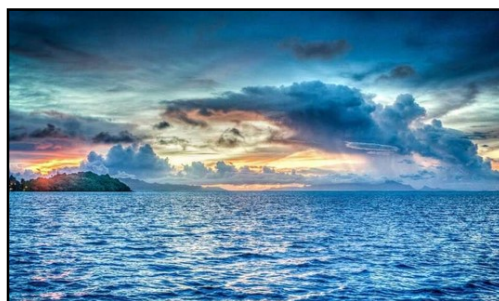
Researchers develop dual-wavelength ocean lidar for ocean detection

By Li Yuan

Ocean water column information profiles are essential for ocean research. Currently, water column profiles are typically obtained by ocean lidar instruments, including spaceborne, airborne and shipborne lidar.

Most lidar instruments are equipped with a 532 nm laser; however, blue wavelength penetrates more for open ocean detection.

A research team from the Shanghai Institute of Optics and Fine Mechanics (SIOFM) of the Chinese Academy of Sciences developed a novel airborne dual-wavelength ocean lidar (DWOL) equipped with a 53-nm and 486-nm lasers that can operate simultaneously. The study was published in *Remote Sensing*.



Credit: CC0 Public Domain

This instrument was designed to compare the performance of 486 and 532 nm lasers in a single detection area and to provide a reference for future spaceborne oceanic lidar (SBOL) design.

The researchers optimized the laser wavelengths of the DWOL system to make it compatible with coastal water and open ocean water. The vertical profiles of returning signals from a depth of approximately 100 m were obtained with the newly designed 486 nm channel.

They conducted a shipborne experiment in the South China Sea. Results showed that for a 500-frame accumulation, the 486 nm channel obtained volume profiles from a depth of approximately 100 m. In contrast, the vertical profiles obtained by the 532 nm channel only reached a depth of 75 m, which was approximately 25% less than that of the 486 nm channel in the same detection area.

In the data processing, they inversed the lidar attenuation coefficient $\alpha(z)$ from the DWOL data; results showed that the maximum value of $\alpha(z)$ ranged from 40 to 80 m, which was consistent with the chlorophyll-scattering layer (CSL) distribution measured by the shipborne instrument. Additionally, $\alpha_{486}(z)$ decreased for depth beyond 80 m, indicating that the 486 nm laser could potentially penetrate the entire CSL.

More information: Kaipeng Li et al. A Dual-Wavelength Ocean Lidar for Vertical Profiling of Oceanic Backscatter and Attenuation, *Remote Sensing* (2020). DOI: [10.3390/rs12172844](https://doi.org/10.3390/rs12172844)
<https://phys.org/news/2020-09-dual-wavelength-ocean-lidar.html>

AI can detect COVID-19 in the lungs like a virtual physician, new study shows

Algorithm can accurately identify COVID-19 cases, as well as distinguish them from influenza
Summary:

New research shows that artificial intelligence can be nearly as accurate as a physician in diagnosing COVID-19 in the lungs. The study also shows the new technique can also overcome some of the challenges of current testing.

A University of Central Florida researcher is part of a new study showing that artificial intelligence can be nearly as accurate as a physician in diagnosing COVID-19 in the lungs.

The study, recently published in Nature Communications, shows the new technique can also overcome some of the challenges of current testing.

Researchers demonstrated that an AI algorithm could be trained to classify COVID-19 pneumonia in computed tomography (CT) scans with up to 90 percent accuracy, as well as correctly identify positive cases 84 percent of the time and negative cases 93 percent of the time.

CT scans offer a deeper insight into COVID-19 diagnosis and progression as compared to the often-used reverse transcription-polymerase chain reaction, or RT-PCR, tests. These tests have high false negative rates, delays in processing and other challenges.

Another benefit to CT scans is that they can detect COVID-19 in people without symptoms, in those who have early symptoms, during the height of the disease and after symptoms resolve.

However, CT is not always recommended as a diagnostic tool for COVID-19 because the disease often looks similar to influenza-associated pneumonias on the scans.

The new UCF co-developed algorithm can overcome this problem by accurately identifying COVID-19 cases, as well as distinguishing them from influenza, thus serving as a great potential aid for physicians, says Ulas Bagci, an assistant professor in UCF's Department of Computer Science.

Bagci was a co-author of the study and helped lead the research.

"We demonstrated that a deep learning-based AI approach can serve as a standardized and objective tool to assist healthcare systems as well as patients," Bagci says. "It can be used as a complementary test tool in very specific limited populations, and it can be used rapidly and at large scale in the unfortunate event of a recurrent outbreak."

Bagci is an expert in developing AI to assist physicians, including using it to detect pancreatic and lung cancers in CT scans.

He also has two large, National Institutes of Health grants exploring these topics, including \$2.5 million for using deep learning to examine pancreatic cystic tumors and more than \$2 million to study the use of artificial intelligence for lung cancer screening and diagnosis.

To perform the study, the researchers trained a computer algorithm to recognize COVID-19 in lung CT scans of 1,280 multinational patients from China, Japan and Italy.

Then they tested the algorithm on CT scans of 1,337 patients with lung diseases ranging from COVID-19 to cancer and non-COVID pneumonia.

When they compared the computer's diagnoses with ones confirmed by physicians, they found that the algorithm was extremely proficient in accurately diagnosing COVID-19 pneumonia in the

lungs and distinguishing it from other diseases, especially when examining CT scans in the early stages of disease progression.

"We showed that robust AI models can achieve up to 90 percent accuracy in independent test populations, maintain high specificity in non-COVID-19 related pneumonias, and demonstrate sufficient generalizability to unseen patient populations and centers," Bagci says.

The UCF researcher is a longtime collaborator with study co-authors Baris Turkbey and Bradford J. Wood. Turkbey is an associate research physician at the NIH's National Cancer Institute Molecular Imaging Branch, and Wood is the director of NIH's Center for Interventional Oncology and chief of interventional radiology with NIH's Clinical Center.

This research was supported with funds from the NIH Center for Interventional Oncology and the Intramural Research Program of the National Institutes of Health, intramural NIH grants, the NIH Intramural Targeted Anti-COVID-19 program, the National Cancer Institute and NIH.

Bagci received his doctorate in computer science from the University of Nottingham in England and joined UCF's Department of Computer Science, part of the College of Engineering and Computer Science, in 2015. He is the Science Applications International Corp (SAIC) chair in UCF's Department of Computer Science and a faculty member of UCF's Center for Research in Computer Vision. SAIC is a Virginia-based government support and services company.

Story Source:

[Materials](#) provided by [University of Central Florida](#). Original written by Robert Wells. *Note: Content may be edited for style and length.*

Journal Reference:

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<https://www.sciencedaily.com/releases/2020/09/200930144426.htm>

Thu, 01 Oct 2020

Common cold in past may provide protection from COVID-19: Study

People who have had a bout of seasonal or common cold in the past may get some protection from COVID-19, according to a study which suggests that immunity to the disease is likely to last a long time -- maybe even a lifetime. The study, published in the journal mBio, is the first to show that the COVID-19-causing virus, SARS-CoV-2, induces memory B cells, long-lived immune cells that detect pathogens, create antibodies to destroy them and remember them for the future. The next time that pathogen tries to enter the body, those memory B cells can hop into action even faster to clear the infection before it starts, according to the researchers from the University of Rochester Medical Center (URMC) in the US.

Because memory B cells can survive for decades, they could protect COVID-19 survivors from subsequent infections for a long time, but further research will have to confirm this. The study is also the first to report cross-reactivity of memory B cells -- meaning B cells that once attacked cold-causing coronaviruses appeared to also recognise SARS-CoV-2.

The researchers believe this could mean that anyone who has been infected by a common coronavirus -- which is nearly everyone -- may have some degree of pre-existing immunity to COVID-19.

"When we looked at blood samples from people who were recovering from COVID-19, it looked like many of them had a pre-existing pool of memory B cells that could recognise SARS-CoV-2 and rapidly produce antibodies that could attack it," said study lead author Mark Sangster, a research professor at URMC.



The findings are based on a comparison of blood samples from 26 people who were recovering from mild to moderate COVID-19 and 21 healthy donors whose samples were collected six to 10 years ago -- long before they could have been exposed to COVID-19.

From those samples, the researchers measured levels of memory B cells and antibodies that target specific parts of the Spike protein, which exists in all coronaviruses and is crucial for helping the viruses infect cells.

The Spike protein looks and acts a little different in each coronavirus, but one of its components, the S2 subunit, stays pretty much the same across all of the viruses.

Memory B cells can't tell the difference between the Spike S2 subunits of the different coronaviruses and attack indiscriminately, the researchers said.

They found that was true for beta-coronaviruses, a subclass that includes two cold-causing viruses as well as SARS, MERS and SARS-CoV-2.

What this study doesn't show is the level of protection provided by cross-reactive memory B cells and how it impacts patient outcomes, according to the researchers said.

<https://timesofindia.indiatimes.com/life-style/health-fitness/health-news/common-cold-in-past-may-provide-protection-from-covid-19-study/articleshow/78408604.cms>

Moderna COVID-19 vaccine well-tolerated, generates immune response in older adults: Study

The study, published in the New England Journal of Medicine, noted that the experimental vaccine, mRNA-1273, was well-tolerated by the older trial participants, who were over 55 years of age

Boston: Results from the Phase 1 trial of an investigational COVID-19 vaccine co-developed by researchers at the US National Institute of Allergy and Infectious Diseases (NIAID), and the American biotech company Moderna have shown that it is well-tolerated and generates a strong immune response in older adults.

The study, published in the New England Journal of Medicine, noted that the experimental vaccine, mRNA-1273, was well-tolerated by the older trial participants, who were over 55 years of age.

According to the researchers from NIAID, older adults are more vulnerable to complications of COVID-19, and are an important population for vaccination.

They said understanding how the vaccine affects this section of the population is a critical part of measuring its safety and efficacy.

The Phase 1 trial began on March 16, 2020, and was expanded to enroll older adults about one month later.

In its expansion, the scientists said the trial enrolled 40 healthy volunteers — 20 adults ages 56 to 70 years, and 20 adults ages 71 years and older.

Ten volunteers in each age group received a lower dose of the vaccine, and 10 participants in each age group received a higher dose.

After approximately one month, the researchers said the volunteers received a second dose of the same vaccine at the same dosage.

They said the volunteers attended clinic visits to track their responses to the vaccine, and assess safety throughout the study.

The research found that the investigational vaccine was well-tolerated in this older age group — although some volunteers experienced transient adverse effects, including fever and fatigue after vaccination.

According to the scientists, the participants exhibited a good immune response to the vaccine, with the blood of vaccinated volunteers containing robust binding and neutralising antibodies against the coronavirus SARS-CoV-2.

They said the immune response to the vaccine seen in older volunteers was comparable to that seen in younger age groups.

The researchers said the study will continue to follow the older volunteers for approximately a year after second vaccination to monitor the long-term effects of the vaccine.

The results from the Phase 1 trial further support testing of the investigational vaccine in older adults in an ongoing large Phase 3 trial, they added.

<https://indianexpress.com/article/coronavirus/moderna-covid-19-vaccine-well-tolerated-generates-immune-older-adults-study-6648465/>



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