

July
2021

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

खंड : 46 अंक : 143 22 जुलाई 2021

Vol.: 46 Issue : 143 22 July 2021



रक्षा विज्ञान पुस्तकालय
Defence Science Library
रक्षा वैज्ञानिक सूचना एवं प्रलेखन केंद्र
Defence Scientific Information & Documentation Centre
मेटकॉफ हाउस, दिल्ली - 110 054
Metcalf House, Delhi - 110 054

CONTENTS

S. No.	TITLE	Page No.
DRDO News		1-21
DRDO Technology News		1-19
1.	DRDO successfully flight-tests surface-to-air missile Akash-NG	1
2.	डीआरडीओ ने सतह से हवा में मार करने वाली मिसाइल आकाश-एनजी का सफल परीक्षण किया	2
3.	DRDO successfully flight-tests indigenously developed MPATGM for minimum range	3
4.	डीआरडीओ ने न्यूनतम रेंज के लिए स्वदेश में विकसित एमपी-एटीजीएम का सफलतापूर्वक परीक्षण किया	4
5.	Lighter, deadlier Gen Next Akash Missile flight-tested off Odisha coast	5
6.	DRDO successfully flight-tests surface-to-air missile Akash-NG	6
7.	डीआरडीओ ने जमीन से हवा में मार करने वाली आकाश मिसाइल के नये संस्करण का सफल परीक्षण किया	7
8.	In big boost to Indian Army, DRDO successfully flight tests man-portable anti-tank guided missile	8
9.	DRDO successfully test-fires Anti-tank guided missile; Paves way for production for Army	9
10.	Big boost to Atmanirbhar Bharat as DRDO successfully tests home-grown MPATGM; Know all about it	10
11.	डीआरडीओ ने ऐंटी टैंक गाइडेड मिसाइल का सफल परीक्षण किया	11
12.	DRDO successfully tests anti-tank and new surface-to-air missile systems	12
13.	DRDO ने किया नई पीढ़ी के आकाश समेत दो स्वदेशी मिसाइलों का सफल परीक्षण, बढ़ेगी वायुसेना की ताकत	13
14.	DRDO's Dehradun lab to develop coastal and harbour surveillance system	14
15.	HAL is all set to respond to Royal Malaysian Air Force's RfP for LCA	15
16.	BrahMos-II Missile program to greatly benefit from the successful test of Russian Zircon hypersonic missile	17
17.	Independence Day: Delhi Police Coordinating With IAF, NSG & DRDO; Vigilant About Drones	19
DRDO on Twitter		20-21
Defence News		22-25
Defence Strategic: National/International		22-25
18.	Why Army Chief General M.M. Naravane visited Italy: India Today Insight	22
19.	Three more Rafale jets arrive in India from France	24
20.	रूस के नए मिग-29 से मजबूत होगी भारतीय वायु सेना, नए विमानों की जरूरत होगी पूरी	25
Science & Technology News		26-31
21.	Researchers discover a 'layer hall effect' in a 2D topological Axion antiferromagnet	26
22.	Nanostructures enable record high-harmonic generation	28
23.	Glass sponges reveal important properties for the design of ships, skyscrapers and planes of the future	29
COVID-19 Research News		31-31
24.	New method predicts COVID-19 severity, could help with hospital triage	31



Press Information Bureau
Government of India

Ministry of Defence

Wed, 21 July 2021 5:39PM

DRDO successfully flight-tests surface-to-air missile Akash-NG

- **New Generation surface-to-air Missile**
- **High manoeuvrability to neutralise aerial threats**
- **Boost to Air Defence capabilities of Indian Air Force**
- **Raksha Mantri congratulates DRDO**

Defence Research & Development Organisation (DRDO) successfully flight-tested the New Generation Akash Missile (Akash-NG), a surface-to-air Missile from Integrated Test Range (ITR) off the coast of Odisha on July 21, 2021. The flight trial was conducted at around 12:45 PM from a land-based platform with all weapon system elements such as Multifunction Radar, Command, Control & Communication System and launcher participating in deployment configuration.

The missile system has been developed by Defence Research & Development Laboratory (DRDL), Hyderabad in collaboration with other DRDO laboratories. The launch was witnessed by the representatives of Indian Air Force. In order to capture flight data, ITR deployed a number of Range stations like, Electro Optical Tracking System, Radar and Telemetry. The flawless performance of the entire weapon system has been confirmed by complete flight data captured by these systems. During the test, the missile demonstrated high manoeuvrability required for neutralising fast and agile aerial threats.

Once deployed, the Akash-NG weapon system will prove to be a force multiplier for the air defence capability of the Indian Air Force. Production agencies Bharat Electronics Limited (BEL) and Bharat Dynamics Limited (BDL) also participated in the trials.

Raksha Mantri Shri Rajnath Singh has congratulated DRDO, BDL, BEL, Indian Air Force and the Industry for the successful test.

Secretary Department of Defence R&D and Chairman DRDO applauded the efforts of the team and said the missile will strengthen the Indian Air Force.





डीआरडीओ ने सतह से हवा में मार करने वाली मिसाइल आकाश-एनजी का सफल परीक्षण किया

- नई पीढ़ी की सतह से हवा में मार करने वाली मिसाइल
- हवाई खतरों को बेअसर करने के लिए उच्च स्तरीय गतिशीलता
- भारतीय वायु सेना की हवाई सुरक्षा क्षमताओं को बढ़ावा
- रक्षा मंत्री ने डीआरडीओ को बधाई दी

रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) ने दिनांक 21 जुलाई, 2021 को ओडिशा के तट के करीब एकीकृत परीक्षण रेंज (आईटीआर) से सतह से हवा में मार करने वाली नई पीढ़ी आकाश मिसाइल (आकाश-एनजी) का सफलतापूर्वक परीक्षण किया। उड़ान का परीक्षण भूमि आधारित प्लेटफॉर्म से दोपहर करीब 12:45 बजे किया गया, जिसमें मल्टीफंक्शन रडार, कमांड, कंट्रोल एंड कम्युनिकेशन सिस्टम और तैनाती विन्यास में भाग लेने वाले लांचर जैसी सभी हथियार प्रणालियां थीं।

मिसाइल प्रणाली को रक्षा अनुसंधान एवं विकास प्रयोगशाला (डीआरडीएल), हैदराबाद द्वारा अन्य डीआरडीओ प्रयोगशालाओं के सहयोग से विकसित किया गया है। इस प्रक्षेपण को भारतीय वायु सेना के नुमाइंदों ने देखा। उड़ान डेटा को हासिल करने के लिए आईटीआर ने इलेक्ट्रो ऑप्टिकल ट्रैकिंग सिस्टम, रडार और टेलीमेट्री जैसे कई रेंज स्टेशनों को तैनात किया। इन प्रणालियों द्वारा कैप्चर किए गए संपूर्ण उड़ान डेटा से संपूर्ण हथियार प्रणाली के दोषरहित प्रदर्शन की पुष्टि की गई है। परीक्षण के दौरान, मिसाइल ने तेज और फुर्तीले हवाई खतरों को बेअसर करने के लिए आवश्यक उच्चस्तरीय गतिशीलता का प्रदर्शन किया।

एक बार तैनात होने के बाद आकाश-एनजी हथियार प्रणाली भारतीय वायु सेना की हवाई सुरक्षा क्षमता में शानदार इज़ाफ़ा करने वाली साबित होगी। उत्पादन एजेंसियों भारत इलेक्ट्रॉनिक्स लिमिटेड (बीईएल) और भारत डायनेमिक्स लिमिटेड (बीडीएल) ने भी परीक्षणों में भाग लिया।

रक्षा मंत्री श्री राजनाथ सिंह ने सफल परीक्षण के लिए डीआरडीओ, बीडीएल, बीईएल, भारतीय वायु सेना और उद्योग को बधाई दी है।

रक्षा विभाग के सचिव अनुसंधान एवं विकास विभाग और डीआरडीओ के अध्यक्ष ने टीम के प्रयासों की सराहना करते हुए कहा कि यह मिसाइल भारतीय वायु सेना को मजबूत करेगी।





DRDO successfully flight-tests indigenously developed MPATGM for minimum range

- *Low weight, fire and forget Man Portable Anti-tank Guided Missile*
- *Miniaturised Infrared Imaging seeker*
- *Major boost to Army and AatmaNirbhar Bharat*
- *Raksha Mantri congratulates DRDO*

In a major boost towards AatmaNirbhar Bharat and strengthening of Indian Army, Defence Research and Development Organisation (DRDO) successfully flight-tested indigenously developed low weight, fire and forget Man Portable Antitank Guided Missile (MPATGM) on July 21, 2021. The missile was launched from a man portable launcher integrated with thermal site and the target was mimicking a tank. The missile hit the target in direct attack mode and destroyed it with precision. The test has validated the minimum range successfully. All the mission objectives were met. The missile has already been successfully flight tested for the maximum range.

The missile is incorporated with state-of-the-art Miniaturized Infrared Imaging Seeker along with advanced avionics. The test brings the development of indigenous third generation man portable Anti-Tank Guided Missile close to completion.

Raksha Mantri Shri Rajnath Singh has congratulated DRDO and the Industry for the successful test. Secretary Department of Defence R&D and Chairman DRDO Dr G Satheesh Reddy congratulated the team for the successful test.



<https://pib.gov.in/PressReleasePage.aspx?PRID=1737529>



पत्र सूचना कार्यालय
भारत सरकार

रक्षा मंत्रालय

Wed, 21 July 2021 5:19PM

डीआरडीओ ने न्यूनतम रेंज के लिए स्वदेश में विकसित एमपी-एटीजीएम का सफलतापूर्वक परीक्षण किया

- एमपी-एटीजीएम एक कम वज़नी, फायर एंड फॉरगेट मैन पोर्टेबल एंटी टैंक गाइडेड मिसाइल है
- मिनीएचराइज्ड इन्फ्रारेड इमेजिंग सीकर
- सेना और आत्मनिर्भर भारत के लिए बड़ा प्रोत्साहन
- रक्षा मंत्री ने डीआरडीओ को बधाई दी

आत्मनिर्भर भारत को बढ़ावा देने और भारतीय सेना को मजबूत करने की दिशा में रक्षा अनुसंधान और विकास संगठन (डीआरडीओ) ने 21 जुलाई, 2021 को स्वदेशी रूप से विकसित कम वजन वाली, फायर एंड फॉरगेट मैन पोर्टेबल एंटीटैंक गाइडेड मिसाइल (एमपी-एटीजीएम) का सफल परीक्षण किया। मिसाइल को एक मैन पोर्टेबल लॉन्चर थर्मल साइट के साथ एकीकृत कर लॉन्च किया गया था और लक्ष्य एक टैंक की तरह बनाया गया था। मिसाइल ने सीधा हमला किया और लक्ष्य को सटीक रूप से पहचाना। इस परीक्षण ने न्यूनतम रेंज को सफलतापूर्वक सत्यापित किया। मिशन ने अपने सभी उद्देश्यों को पूरा किया। मिसाइल का अधिकतम रेंज के लिए पहले ही सफलतापूर्वक उड़ान परीक्षण किया जा चुका है।

मिसाइल को उन्नत एवियोनिक्स के साथ अत्याधुनिक मिनीएचराइज्ड इन्फ्रारेड इमेजिंग सीकर के साथ रखा गया है। इस परीक्षण के बाद देश स्वदेशी तीसरी पीढ़ी के मैन पोर्टेबल एंटी टैंक गाइडेड मिसाइल निर्मित करने के अंतिम चरण में पहुंच गया है।

रक्षा मंत्री श्री राजनाथ सिंह ने सफल परीक्षण के लिए डीआरडीओ और उद्योग जगत को बधाई दी है। रक्षा अनुसंधान एवं विकास विभाग के सचिव और डीआरडीओ के अध्यक्ष डॉ. जी सतीश रेड्डी ने टीम को सफल परीक्षण के लिए बधाई दी।



<https://pib.gov.in/PressReleasePage.aspx?PRID=1737589>

Lighter, deadlier Gen Next Akash Missile flight-tested off Odisha coast

The missile will be offered for export; possibility of sales to east Asian and African countries

By Ajai Shukla

New Delhi: The Defence Research & Development Organisation (DRDO) successfully flight-tested the “New Generation Akash Missile” (Akash-NG) on Wednesday at the Integrated Test Range (ITR) at Balasore in Odisha.

“The flight trial was conducted at 12:45 PM from a land-based platform with all weapon system elements such as multifunction radar, command, control and communication system and launcher participating in deployment configuration,” announced the Ministry of Defence (MoD).

The Indian Air Force (IAF) and the army already operate nine batteries of the old Akash missile. This is now being improved into the Akash-NG, which is engineered to shoot down extremely high-performing fighter aircraft — or high-manoeuving, low radar cross-section aerial threats, as the IAF calls them.

Two key improvements to the current Akash missile have transformed it into the Akash-NG. The first is a brand new, two-pulse, solid rocket motor that replaces the old ramjet on the legacy Akash missile. The new motor not just reaches out to 30 kilometres (km), but also generates a high terminal velocity to strike even the fastest and most agile enemy fighters.

The second major change in the Akash-NG is its new seeker head, which has been developed by the DRDO laboratory, Research Centre Imarat (RCI). At the terminal phase of engagement, the seeker locks onto the enemy aircraft and continuously guides the Akash-NG to impact with the target.



Photo: PIB

Akash factfile		
<ul style="list-style-type: none">■ New-generation surface-to-air missile with 30 km range■ High manoeuvrability to strike fast moving aircraft■ Has a brand new, two-	<ul style="list-style-type: none">■ pulse, solid rocket motor that replaces the old ramjet on the legacy Akash missile■ The new motor generates a high terminal velocity to strike even the fastest and most agile enemy fighters	<ul style="list-style-type: none">■ Rocket has been re-engineered and brought down from the legacy Akash's 700 kg to a sleek 350 kg■ Missile a boost to air defence capabilities of Indian Air Force

The phases of engagement are measured in seconds. The Akash-NG detects enemy fighters at ranges out to 80 km and initiates the launch sequence. By the time the enemy aircraft is 50 km away, the Akash-NG's computers have calculated the launch trajectory and impact point and launched the missile. In just over a minute, the missile blazes its way to the impact point 30 km away and destroys the target.

The Akash-NG rocket has been re-engineered comprehensively and brought down from the legacy Akash's 700 kg to a sleek 350 kg. This not just increases range, but also lets the Akash-NG launcher and replenishment vehicle carry more missiles.

“Once deployed, the Akash-NG weapon system will prove to be a force multiplier for the air defence capability of the IAF,” stated the MoD.

The IAF earlier inducted seven units of the Akash missile, while the army has inducted two and has another two on order. Bharat Electronics Limited builds the Akash missile system for the IAF, while Bharat Dynamics Limited is the prime integrator for the army.

The MoD earlier announced that indigenisation levels in the Akash are above 96 per cent. The IAF has part-funded the development of the Akash-NG. The cost of the system would reduce, were foreign governments to buy the economically priced, hardy missile.

In December, the Union Cabinet approved exporting the Akash missile system and, in January, the missile was on display in the Republic Day parade. There is a possibility of sales to east Asian countries, such as Vietnam and the Philippines, that are wary of Chinese aggression. There is also interest from several African countries.

https://www.business-standard.com/article/current-affairs/lighter-deadlier-gen-next-akash-missile-flight-tested-off-odisha-coast-121072101365_1.html

The Statesman

Thu, 22 July 2021

DRDO successfully flight-tests surface-to-air missile Akash-NG

The missile system has been developed by Defence Research & Development Laboratory (DRDL), Hyderabad in collaboration with other DRDO laboratories

New Delhi: Defence Research & Development Organisation (DRDO) successfully flight-tested the New Generation Akash Missile (Akash-NG), a surface-to-air Missile from Integrated Test Range (ITR) off the coast of Odisha on July 21, 2021. The flight trial was conducted at around 12:45 PM from a land-based platform with all weapon system elements such as Multifunction Radar, Command, Control & Communication System and launcher participating in the deployment configuration.

The missile system has been developed by Defence Research & Development Laboratory (DRDL), Hyderabad in collaboration with other DRDO laboratories. The launch was witnessed by the representatives of the Indian Air Force.



(PIB)

In order to capture flight data, ITR deployed a number of Range stations like Electro Optical Tracking System, Radar and Telemetry. The flawless performance of the entire weapon system has been confirmed by complete flight data captured by these systems. During the test, the missile demonstrated the high manoeuvrability required for neutralising fast and agile aerial threats.

Once deployed, the Akash-NG weapon system will prove to be a force multiplier for the air defence capability of the Indian Air Force. Production agencies Bharat Electronics Limited (BEL) and Bharat Dynamics Limited (BDL) also participated in the trials.

Defence Minister Rajnath Singh has congratulated DRDO, BDL, BEL, Indian Air Force and the Industry for the successful test. Secretary Department of Defence R&D and Chairman DRDO applauded the efforts of the team and said the missile will strengthen the Indian Air Force.

<https://www.thestatesman.com/india/drdo-successfully-flight-tests-surface-to-air-missile-akash-ng-1502984817.html>

डीआरडीओ ने जमीन से हवा में मार करने वाली आकाश

मिसाइल के नये संस्करण का सफल परीक्षण किया

नयी दिल्ली: रक्षा अनुसंधान और विकास संगठन (डीआरडीओ) ने ओडिशा के समेकित परीक्षण रेंज से जमीन से हवा में मार करने वाली मिसाइल प्रणाली आकाश के नये संस्करण का बुधवार को सफल परीक्षण किया है।

रक्षा मंत्रालय ने कहा कि सभी प्रकार की हथियार प्रणाली से लैस मिसाइल का परीक्षण दोपहर करीब पौने एक (12:45) बजे जमीन आधारित मंच से किया गया और परीक्षण के दौरान मिसाइल की उड़ान से प्राप्त आंकड़ों के आधार पर सभी हथियार प्रणाली के सफल, बिना किसी गड़बड़ी के काम करने की पुष्टि हुई है।

आकाश मिसाइल का नया संस्करण 60 किलोमीटर की दूरी तक की मारक क्षमता रखता है और यह मैक 2.5 की गति से उड़ान भरने में सक्षम है।

मंत्रालय ने कहा, “डीआरडीओ ने ओडिशा तट पर स्थित समेकित परीक्षण केन्द्र से आकाश मिसाइल के नये संस्करण का 21 जुलाई को सफल परीक्षण किया।”

उन्होंने एक बयान में कहा, “सफल परीक्षण दोपहर करीब पौने एक बजे (12:45) जमीन पर स्थित मंच से किया गया, इस दौरान मिसाइल बहुदेशीय राडार, कमांड, कंट्रोल और संचार प्रणाली और लांचर आदि हथियार प्रणाली से जुड़े सभी तत्वों से लैस था।”

आकाश मिसाइल को डीआरडीओ के हैदराबाद स्थित प्रयोगशाला ने अनुसंधान संगठन की अन्य शाखाओं के साथ मिलकर विकसित किया है।

मिसाइल की उड़ान से जुड़े आंकड़े रिकॉर्ड रखने के लिए आईटीआर ने कई निगरानी प्रणाली, जैसे एलेक्ट्रो-ऑप्टिकल ट्रैकिंग प्रणाली, राडार और टेलीमेट्री का उपयोग किया।

मंत्रालय ने कहा, “प्रणालियों द्वारा एकत्र आंकड़ों/डेटा के आधार पर पूरी हथियार प्रणाली में कोई गड़बड़ी नहीं होने की पुष्टि हुई है।”

बयान में कहा गया है, “तैनात किए जाने पर आकाश-एनजी हथियार प्रणाली भारतीय वायुसेना की हवाई रक्षा क्षमता को कई गुना बढ़ाने वाला साबित होगा।”

रक्षा मंत्री राजनाथ सिंह ने डीआरडीओ, भारतीय वायुसेना और विनिर्माण एजेंसियों भारत इलेक्ट्रॉनिक्स लिमिटेड (बीईएल) और भारत डायनेमिक्स लिमिटेड (बीडीएल) को मिसाइल के सफल परीक्षण के लिए बधाई दी।

डीआरडीओ के अध्यक्ष जी. सतीश रेड्डी ने मिसाइल के सफल परीक्षण के लिए उसमें शामिल टीम के प्रयासों की सराहना की। उन्होंने कहा कि यह मिसाइल भारतीय वायुसेना को मजबूती प्रदान करेगा।

<https://navbharattimes.indiatimes.com/india/drdo-successfully-test-fires-new-variant-of-akash-surface-to-air-missile/articleshow/84618078.cms>

In big boost to Indian Army, DRDO successfully flight tests man-portable anti-tank guided missile

“The missile was launched from a man-portable launcher integrated with thermal site and the target was mimicking a tank. The missile hit the target in direct attack mode & destroyed it with precision. The test has validated the minimum range successfully,” the DRDO said in a statement

Edited By Ritesh K srivastava

Highlights

- 1. DRDO has successfully flight-tested man-portable anti-tank guided missile**
- 2. The induction of anti-tank guided missiles will further strengthen the Indian Army**

New Delhi: In a major boost to Prime Minister Narendra Modi’s clarion call for ‘Atmanirbhar Bharat’ and strengthening the Indian Army, the Defence Research and Development Organisation (DRDO) successfully flight-tested indigenously the developed low-weight, fire-and-forget Man-Portable Anti-Tank Guided Missile (MPATGM) on Wednesday (July 21, 2021).

“The missile was launched from a man-portable launcher integrated with the thermal site and the target was mimicking a tank. The missile hit the target in direct attack mode & destroyed it with precision. The test has validated the minimum range successfully,” the DRDO said in a statement.



It said that all the mission objectives were met during the flight test.

“All the mission objectives were met. The missile (Man-Portable Anti-Tank Guided Missile) has already been successfully flight-tested for the maximum range. The missile is incorporated with state-of-the-art Miniaturized Infrared Imaging Seeker along with advanced avionics,” the DRDO said.

The man-portable missile is launched using a tripod is designed for a maximum range of 2.5 km with a launch weight of less than 15 Kg, Control Flight Tests have been successfully carried out and Guided Flight Tests (with IIR Seeker) are planned.

The DRDO had last month successfully test-fired the enhanced range versions of indigenously developed Pinaka rockets and 122mm Caliber Rockets from Chandipur in Odisha.

In a series of other missile tests, the DRDO also successfully test-fired the Agni-Prime missile in June, with a strike range of 2000 km, off Odisha coast.

The Agni-Prime missile is part of India's most ambitious Agni series developed by the DRDO. The new Agni missile has been developed with the cutting-edge technologies used in 4000-km range Agni-IV and 5000-km Agni-V missiles.

<https://zeenews.india.com/india/in-big-boost-to-indian-army-drdo-successfully-flight-tests-man-portable-anti-tank-guided-missile-2377751.html>

DRDO successfully test-fires Anti-tank guided missile; Paves way for production for Army

The defence ministry described the successful trial of the missile as a major boost for the government's 'Aatmanirbhar Bharat' (self-reliant India) campaign

The Defence Research and Development Organisation (DRDO) on Wednesday successfully flight-tested an indigenously developed low weight man-portable anti-tank guided missile, paving way for its production for the Army. The defence ministry described the successful trial of the missile as a major boost for the government's 'Aatmanirbhar Bharat' (self-reliant India) campaign.

The missile is being developed to strengthen the combat capabilities of the Indian Army. "In a major boost towards 'Aatmanirbhar Bharat' and strengthening of Indian Army, the DRDO successfully flight-tested indigenously developed low weight, fire and forget Man-Portable Antitank Guided Missile (MPATGM) on July 21," the ministry said in a statement.



The defence ministry described the successful trial of the missile as a major boost for the government's 'Aatmanirbhar Bharat' (self-reliant India) campaign.

It said the missile was launched from a man-portable launcher integrated with a thermal site and the target was mimicking a tank. "The missile hit the target in direct attack mode and destroyed it with precision. The test has validated the minimum range successfully. All the mission objectives were met," the ministry said in a statement.

It said that the missile has already been successfully flight-tested for the maximum range. "The test brings the development of indigenous third-generation man-portable anti-tank guided missile close to completion," the ministry said.

Defence Minister Rajnath Singh congratulated the DRDO and other stakeholders involved in the missile project.

<https://www.news18.com/news/india/drdo-successfully-test-fires-anti-tank-guided-missile-paves-way-for-production-for-army-3990572.html>

Big boost to Atmanirbhar Bharat as DRDO successfully tests home-grown MPATGM; Know all about it

The missile, the DRDO said, is "incorporated with state-of-the-art Miniaturised Infrared Imaging Seeker along with advanced avionics".

New Delhi: With an aim to make the all crucial defence sector 'Atmanirbhar', the Defence Research and Development Organisation (DRDO) on Wednesday successfully tested indigenously developed low weight and fire and forget Man-Portable Anti-Tank Guided Missile (MPATGM).

In a statement, the DRDO said that test met all its objectives, adding that it has been successfully flight-tested for the maximum range. The missile, the DRDO said, is "incorporated with state-of-the-art Miniaturised Infrared Imaging Seeker along with advanced avionics".

"The missile was launched from a man-portable launcher integrated with thermal site and the target was mimicking a tank. The missile hit the target in direct attack mode and destroyed it with precision. The test has validated the minimum range successfully," it said, as reported by news agency ANI.



(pic credits: ANI)

What is an MPATGM?

The DRDO, along with VEM Technologies Private Limited, is developing the MPATGM, which is a third generate fire-and-forget anti-tank guided missile derived from Nag ATGM. The missile has a length of around 1,300 mm and weighs about 14.5 kg. It also has an advanced imaging infrared (IIR) sensor and integrated avionics.

The DRDO had conducted its first trial on September 15, 2018. A day later, it conducted another successful trial of the missile. On March 13, 2019, the MPATGM was successfully tested in Rajasthan. It was again tested on September 11, 2019, using a man-portable tripod launcher.

The DRDO, meanwhile, has been testing missiles over the past few months in a strong single to China and Pakistan amid the heightened tensions. Last month, it had successfully tested a new missile of the Agni series known as Agni-Prime. It said that Agni-Prime is a new generation advanced variant of the Agni class of missiles.

"It is a canisterised missile with a range capability between 1000 and 2000 kilometres. Various telemetry and radar stations positioned along the eastern coast tracked and monitored the missile. It has followed textbook trajectory, meeting all mission objectives with a high level of accuracy," DRDO officials had said.

<https://english.jagran.com/india/big-boost-to-atmanirbhar-bharat-as-drdo-successfully-tests-homegrown-mpatgm-know-all-about-it-10029562>

डीआरडीओ ने ऐंटी टैंक गाइडेड मिसाइल का सफल परीक्षण किया

Edited by अनुराग कुमार

नयी दिल्ली: रक्षा अनुसंधान और विकास संगठन (डीआरडीओ) ने बुधवार को स्वदेश में विकसित कम वजन वाले ऐंसी टैंक रोधी गाइडेड मिसाइल का परीक्षण किया जिसे व्यक्ति के कंधे पर रख कर चलाया जा सकता है। इस सफल परीक्षण के साथ ही सेना द्वारा इसके निर्माण का रास्ता साफ हो गया है। रक्षा मंत्रालय ने मिसाइल के सफल परीक्षण को सरकार के 'आत्मनिर्भर अभियान' की दिशा में बड़ा कदम बताया।



DRDO News: डीआरडीओ ने ऐंटी टैंक गाइडेड मिसाइल का सफल परीक्षण किया

इस मिसाइल का विकास भारतीय सेना की लड़ाकू क्षमता विकसित करने के लिए किया जा रहा है। मंत्रालय ने एक बयान में कहा, 'आत्मनिर्भर भारत की दिशा में बड़ा कदम उठाते हुए और भारतीय सेना को मजबूत करने के लक्ष्य से डीआरडीओ ने स्वदेश में विकसित कम वजन वाली, दागो और भूल जाओ, मैन पोर्टेबल टैंक रोधी गाइडेड मिसाइल (एमपीएटीजीएम) का 21 जुलाई को सफल परीक्षण किया।'

बताया गया है कि मिसाइल को थर्मल साइट से जुड़े मैन-पोर्टेबल लांचर से दागा गया और निशाना एक टैंक जैसी वस्तु को बनाया गया। मंत्रालय के बयान के अनुसार, 'मिसाइल ने उसपर सीधे-सीधे सटीक निशाना लगाया और उसे नष्ट कर दिया। न्यूनतम दूरी तक हमले का सफल परीक्षण हुआ। मिशन के सभी लक्ष्य पूरे हुए।' बताया जा रहा है कि अधिकतम दूरी की मारक क्षमता के लिए मिसाइल का पहले ही सफल परीक्षण हो चुका है। रक्षा मंत्रालय राजनाथ सिंह ने डीआरडीओ और मिसाइल परियोजना में शामिल अन्य पक्षों को बधाई दी।

<https://navbharattimes.indiatimes.com/india/drdo-successfully-test-fires-anti-tank-guided-missile/articleshow/84617373.cms>

DRDO successfully tests anti-tank and new surface-to-air missile systems

In a major boost towards 'Aatm Nirbhar Bharat' and strengthening of Indian Army, the DRDO successfully flight-tested indigenously developed low weight, fire and forget Man-Portable Antitank Guided Missile (MPATGM)," the defence ministry said

By Sushant Kulkarni

Pune: The Defence Research and Development Organisation tested two missile systems Wednesday, which included a Man Portable Anti-Tank Guided Missile (MPATGM) for the Indian Army and a new variant of the Akash Surface-to-Air Missile — Akash-NG — for the Indian Air Force, the Ministry of Defence (MoD) said. In both tests, the mission objectives were successfully met by the missile systems.

In the case of Akash-NG, the system was flight tested from the Integrated Test Range (ITR) off the coast of Odisha at 12:45 pm on Wednesday from a land-based platform. During the test, the weapon system elements such as Multifunction Radar, Command, Control and Communication System and launcher functioned in deployment configuration.

DRDO scientists said the missile system has a range of close to 60 km and can travel 2.5 times the speed of sound (2.5 Mach).

The missile system has been developed by Defence Research and Development Laboratory (DRDL), Hyderabad in collaboration with several other DRDO laboratories. The launch was witnessed by representatives of the Indian Air Force. In order to capture flight data, ITR deployed a number of range stations like the electro-optical tracking system, radar and telemetry components. "The flawless performance of the entire weapon system has been confirmed by complete flight data captured by these systems. During the test, the missile demonstrated high manoeuvrability required for neutralising fast and agile aerial threats. Once deployed, the Akash-NG weapon system will prove to be a force multiplier for the air defence capability of the Indian Air Force," a press statement from the MoD said.

Production agencies Bharat Electronics Limited (BEL) and Bharat Dynamics Limited (BDL) also participated in the trial.

In the second weapon system trial on Wednesday, the DRDO flight-tested the indigenously developed low weight, 'fire and forget' type MPATGM. The missile was launched from a man portable launcher on a target that was mimicking a tank. The missile hit the target in direct attack mode and destroyed it with precision.

Most modern missiles can be fired in 'top-attack' and 'direct attack' modes. In the top attack mode, the missile is required to climb sharply after launch and travel at a certain altitude then plunge on top of the target. In the direct attack mode, the missile travels at a lower altitude directly striking the target.

In the MPATGM test, the system has been tested for its minimum range successfully. All the mission objectives were met and the missile has already been successfully flight tested for the maximum range of the system, the MoD said.



DRDO successfully flight-tests indigenously developed MPATGM for minimum range. (PTI Photo)

“The missile is incorporated with state-of-the-art miniaturised Infrared Imaging Seeker along with advanced avionics. The test brings the development of indigenous third generation man portable Anti-Tank Guided Missile close to completion,” the MoD said.

Minister of Defence Rajnath Singh and DRDO Chairman Dr G Satheesh Reddy congratulated the DRDO teams and all other stakeholders involved in development, production and testing of both missile systems.

<https://indianexpress.com/article/india/drdo-test-fires-anti-tank-guided-missile-army-7415876/>



Thu, 22 July 2021

DRDO ने किया नई पीढ़ी के आकाश समेत दो स्वदेशी मिसाइलों का सफल परीक्षण, बढ़ेगी वायुसेना की ताकत

आधिकारिक बयान के मुताबिक मैन-पोर्टेबल एंटी-टैंक गाइडेड मिसाइल को थर्मल साइट के साथ एकीकृत मैन पोर्टेबल लांचर से दागा गया और इसने एक टैंक की नकल कर रहे लक्ष्य को सफलतापूर्वक दागा। इसे मनुष्य द्वारा ढो सकने वाले ट्राइपाड से दागा गया।

By Arun Kumar Singh

नई दिल्ली: आत्मनिर्भर भारत को बढ़ावा देते हुए रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) ने बुधवार को दो स्वदेशी मिसाइलों का सफल परीक्षण किया। इनमें से एक जमीन से हवा में मार करने वाली नई पीढ़ी की आकाश मिसाइल (आकाश-एनजी) और दूसरी कम वजन, फायर एंड फॉर्गेट मैन पोर्टेबल एंटी-टैंक गाइडेड मिसाइल (एमपी-एटीजीएम) है।

आकाश-एनजी और मैन पोर्टेबल एंटी-टैंक गाइडेड मिसाइल मिलने से वायु सेना की बढ़ेगी ताकत

आधिकारिक बयान के मुताबिक मैन-पोर्टेबल एंटी-टैंक गाइडेड मिसाइल को थर्मल साइट के साथ एकीकृत मैन पोर्टेबल लांचर से दागा गया और इसने एक टैंक की नकल कर रहे लक्ष्य को सफलतापूर्वक दागा। इसे मनुष्य द्वारा ढो सकने वाले ट्राइपाड से दागा गया। डीआरडीओ ने बताया कि एमपी-एटीजीएम ने सीधे हमले मोड में लक्ष्य को भेदा और उसे सटीक तरीके से नष्ट कर दिया। इसके साथ ही परीक्षण ने न्यूनतम सीमा को सफलतापूर्वक सत्यापित किया।

अत्याधुनिक इन्फ्रारेड इमेजिंग सीकर से लैस है मैन-पोर्टेबल एंटी-टैंक गाइडेड मिसाइल

मिशन के सभी उद्देश्यों को पूरा किया गया। इस मिसाइल का अधिकतम सीमा के लिए सफलतापूर्वक उड़ान परीक्षण किया जा चुका है। पूरी तरह से स्वदेशी रूप में विकसित इस मिसाइल में एक छोटा अत्याधुनिक इन्फ्रारेड इमेजिंग सीकर भी लगाया गया है। इस परीक्षण के साथ ही तीसरी पीढ़ी की इस मिसाइल के विकास का काम लगभग पूरा हो गया है।

नई पीढ़ी की आकाश मिसाइल को डीआरडीओ की प्रयोगशाला के साथ मिलकर हैदराबाद स्थित रक्षा अनुसंधान एवं विकास प्रयोगशाला (डीआरडीएल) द्वारा विकसित किया गया है। इसके परीक्षण के समय भारतीय वायु सेना के प्रतिनिधि भी मौजूद रहे। आकाश-एनजी मिसाइल को शामिल किए जाने के बाद भारतीय वायु सेना की ताकत और बढ़ जाएगी।



इस मिसाइल का निर्माण भारत इलेक्ट्रॉनिक्स लिमिटेड (बीईएल) और भारत डायनैमिक्स लिमिटेड (बीडीएल) द्वारा किया गया है। परीक्षण के दौरान इन दोनों के प्रतिनिधि भी मौजूद हैं। रक्षा मंत्री ने दी बधाई रक्षा मंत्री राजनाथ सिंह ने मिसाइल के सफल परीक्षण पर डीआरडीओ, बीडीएल, बीईएल, भारतीय वायु सेना और इससे जुड़े उद्योग को बधाई दी है। डीआरडीओ के चेयरमैन डा. जी. सतीश रेड्डी ने भी सफल परीक्षण के लिए टीम को बधाई दी है।

<https://www.jagran.com/news/national-drdo-successfully-test-fired-anti-tank-guided-missile-21851283.html>

The Tribune

Thu, 22 July 2021

DRDO's Dehradun lab to develop coastal and harbour surveillance system

The system will comprise thermal imagers and optical cameras to provide requisite inputs for decision-making

By Vijay Mohan

Chandigarh: As part of the ongoing efforts to beef up maritime security, the Defence Research and Development Organisation (DRDO) is developing a new electro-optical system for coastal and harbour surveillance.

The system, being worked upon by Instruments Research and Development Establishment, Dehradun, will comprise thermal imagers and optical cameras to detect and track targets and provide requisite inputs for decision-making.

The all weather, day and night capable system will be installed at strategic locations along the coastline, including vicinity to harbours and ports, to monitor shipping traffic as well as other sea-faring vessels. It will be controlled remotely and will be operated by the Indian Coast Guard.



Photo for representational purpose only. iStock

According to DRDO sources, the electro-optical system's detection range is expected to be up to 25 kilometers or more and it should be able to identify a target at a distance of at least eight kilometers, besides being able to auto-track multiple targets as small as a 5-meter long boat.

India has a coastline of 7,516 km along the mainland and islands covering 13 states and union territories. Besides major densely populated cities, a large number of strategic and commercially vital installations as naval bases, nuclear plants, missile and satellite launch centers, ship building docks, oil refineries, industrial units and harbours are located on or adjacent to the coast. There are 13 major and over 200 minor ports in India that handle 90 per cent of the trade.

India's coastline have always been vulnerable to anti-national activities like smuggling of weapons, explosives, contraband and narcotics as well as infiltration of terrorists. In 1993, the sea route was reportedly used to smuggle explosives for the blasts in Mumbai while in 2008, it was used to infiltrate terrorists for the terror attacks in the same city.

After the 2008 attacks, coastal security was reviewed by the central government and several new measures were recommended that were to be implemented in a phased manner. Some of them are still hanging fire due to administrative, technical or financial issues.

Peacetime coastal security within Indian territorial waters is the responsibility of the Indian Coast Guard. A surveillance mechanism, called Coastal Surveillance Network (CSN), comprising

of a chain of static sensors having radars, automatic identification system, day/night cameras and weather sensors at 46 locations along the coastline and Islands has been established. In addition there are 34 radar stations for surveillance.

The Indian Navy has established four Joint Operations Centres (JOC) at Mumbai, Visakhapatnam, Kochi and Port Blair, from which all coastal security operations are coordinated. These are manned round the clock by naval and coast guard teams and are also networked with state police and other agencies such as the Intelligence Bureau, Customs and ports authorities.

<https://www.tribuneindia.com/news/nation/drdo-dehradun-lab-to-develop-coastal-and-harbour-surveillance-system-286299>



Thu, 22 July 2021

HAL is all set to respond to Royal Malaysian Air Force's RfP for LCA

The Malaysian Air Force has sent out a global request for low-cost light fighter aircraft

By Huma Siddiqui

By the end of September 2021, the state-owned Hindustan Aeronautics Limited (HAL) is expected to respond to a Request for Proposal (RfP) from the Royal Malaysian Air Force (RMAF). The Malaysian Air Force has sent out a global request for low-cost light fighter aircraft.

Speaking on condition of anonymity, a top officer has confirmed to *Financial Express Online* "The Company will be responding to the RfP from RMAF for the Light Combat Aircraft (LCA) 'Tejas'. And it has to be sent at the end of September."

As has been reported earlier this year, on the sidelines of the 13th edition of Aero-India, R Madhavan, chairman of Hindustan Aeronautics Limited (HAL), has told Financial Express Online that "Several Southeast Asian and Middle East countries evinced interest in the indigenous LCA 'Tejas' Mk 1A fighter aircraft."

"At a vanilla price of just Rs 309 crore per aircraft, the export version of the fighters are going to be different from those which are going to be inducted in the Indian Air Force (IAF)," he added.

While the aircraft will be exported at the price of Rs 309 crore (making it the cheapest fighter globally), there will be extra charges for the services to be provided overseas.

The RMAF had first expressed interest in 'Tejas' LCA from HAL in 2019. For the first time ever 'Tejas' showcased its might during the Langkawi International Maritime and Aerospace Exhibition (LIMA) in Malaysia.

The South Asian country has invited proposals from various competitors including: FA-50 light attack aircraft developed by Korea Aerospace Industries (KAI); M-346FA Fighter Attack aircraft variant developed by Leonardo, of Italy; Yak-130 combat trainer aircraft developed by United Aircraft Corporation of Russia; and JF-17 of China.

India's 'Tejas' had its first international exposure during the Bahrain International Air Show back in 2016.



Tejas is an advanced Fly-by-wire (FBW) fighter which has been designed, developed, and manufactured by the Aeronautical Development Agency (ADA) and HAL. (Image: HAL)

More about the LCA Programme

Because of the government's efforts, the Tejas program has received a major shot in the arm in boosting the Atamanirbhar drive in the aerospace and aeronautics.

According to a top officer, "The production rate for this increased requirement by IAF is being augmented by HAL from 8 to 16 aircraft every year through the creation of a state-of-the-art new facility in Bengaluru."

Tejas would have the highest level of indigenisation in comparison to any programme of this scale with progressive indigenisation of critical technologies, thereby making India a technologically self-reliant nation. The programme would check out the developing technologies indigenously.

"LCA-Tejas program follows the system integrator model and has created a national aerospace ecosystem with the participation of more than 560 companies from large to SMEs which encompass all the facets of aircraft design and manufacturing. It is estimated that once the LCA MK1A program in India kicks-off, primary jobs to a tune of 5000 are expected to be generated across the country. The programme will foster local industry and drive skill development of young Indian workforce."

"More than 200 Indian companies are involved in tooling, GSEs, and GHEs supplies for the program. Till date the LCA program is estimated to have produced 50,000 primary and secondary jobs across the nation. And, in the country's aerospace history, the LCA-program enabled partnership with Indian private players manufacturing aircraft fuselage and wings. Some of the major companies contributing in the LCA programme from the private sector are VEMv technologies, L&T, DTL, Alpha Tocol, TAML, Data Patterns, Pendios, Compupower and many others," said the officer quoted above.

What is Malaysia looking at?

The country is planning to buy 36 light combat aircraft (LCA) which will be added to its existing fleets in the Air Force.

According to reports, Malaysia is assessing India's Tejas, Chinese JF-17 and F/A 50 of South Korea.

If and when the LCA gets exported, the whole programme will get a much-needed boost and HAL will get international recognition in the global market for its design capabilities and the product will also get validated.

Tejas specifications & Speed:

It is an advanced Fly-by-wire (FBW) fighter which has been designed, developed, and manufactured by the Aeronautical Development Agency (ADA) and HAL.

It is a 4+ generation fighter and comes with a glass cockpit with Satellite aided Inertial Navigation System.

It is capable of firing Beyond Visual Range (BVR) missiles, can carry air-to-surface, air-to-air, precision-guided and standoff bombs and precision-guided munitions. It can hit targets over land or sea.

The aircraft can be refuelled mid-air which will increase its combat radius.

The Made in India aircraft has a height 4.40 metre, wingspan of 8.20 metre, and length of 13.20 metre, and maximum speed is supersonic at all altitudes. It has a service ceiling of 50,000 feet and 'g' limits +8/-3.5.

<https://www.financialexpress.com/defence/hal-is-all-set-to-respond-to-royal-malaysian-air-forces-rfp-for-lca/2295082/>

BrahMos-II Missile program to greatly benefit from the successful test of Russian Zircon hypersonic missile

By Prakash Nanda

Russia's successful test launch of a new Zircon hypersonic cruise missile on July 19 has many strategic implications. One of these could be termed as good news for India as it will hasten the development of the delayed BrahMos-II hypersonic cruise missile, a joint India-Russia project.

The BrahMos-II is very similar to the Zircon. As a winged, anti-ship hypersonic cruise missile, Zircon is a tactical weapon, designed to be carried by frigates of the Russian Navy as well as submarines.

The missile reportedly has a maximum range of 1,000 kilometers, with a flight speed of nearly Mach 7 (and as has been tested, it can go up to Mach 8). It is also spelled as Tsirkon and known as 3M22 in Russia and as the SS-N-33 by the NATO countries.



A model of BrahMos-II hypersonic missile.

If the information that in one of the trials it gathered the speed of Mach 8 is correct, the Zircon missile is the fastest in the world, making it nearly impossible to defend against due to its speed alone.

Another valuable aspect of the missile is its plasma cloud. During its flight, the missile is completely covered by a plasma cloud that absorbs any rays of radio frequencies and makes the missile invisible to radars. This allows the missile to remain undetected on its way to the target.

Prelude to BrahMos-II

Although India test-fired its first indigenous Hypersonic Technology Demonstrator Vehicle (HSTDV), developed by the Defence Research and Development Organisation (DRDO), in August last year, knowledgeable sources say that this is related to the making of the BrahMos-II, which is supposed to succeed the Indian Navy's BrahMos anti-ship missile.

BrahMos is also supersonic, flying at 3 times the speed of sound, known as Mach 3. But BrahMos II, like Zircon, will be about twice as fast, flying at speeds in excess of Mach 6. Though expected to have a range of 600 km, BrahMos II can develop the range to 1,000 km and the speed of Mach 8, it is said. However, its scheduled testing was to be held in 2020. Things have been delayed.

The BrahMos series is being developed by the BrahMos Aerospace Private Limited, the joint collaboration of India's DRDO and Russia's NPO Mashinostroyenia (NPOM). The Zircon has been designed by none other than the NPOM.

What is noteworthy is that though it is supposed to carry conventional warheads, Zircon can be fitted with nuclear warheads if the need arises. Whether BrahMos II will be allowed to carry nuclear warheads remains unclear.

Hypersonic Weapons

It is said that if hypersonic weapons are to be conventionally armed, they need to require greater accuracy for having the greatest impact on the enemy and will be thus more technically challenging to develop than a nuclear-armed system. A nuclear-armed glider is believed to be effective if it

were 10 or even 100 times less accurate [than a conventionally-armed glider] due to nuclear blast effects.

The importance of the likes of Zircon lies in the fact that they could enable “responsive, long-range, strike options against distant, defended, and/or time-critical threats [such as road-mobile missiles] when other forces are unavailable, denied access, or not preferred.”

Secondly, they could challenge detection and defense due to their speed, maneuverability, and low-altitude of flight. And by the time they are detected, they would have already covered such a big distance because of their speed, the interceptor missiles will not be able to fly fast enough to catch up.

Thirdly, analysts point out that developing defense systems against hypersonic missiles will prove to be very costly.

As physicist and nuclear expert James Acton explains, “Point-defense systems, and particularly [Terminal High-Altitude Area Defense (THAAD)], could very plausibly be adapted to deal with hypersonic missiles. The disadvantage of those systems is that they can only defend small areas. To defend the whole of the continental United States, you would need an unaffordable number of THAAD batteries.”

However, all told, the analysts also caution that hypersonic cruise missiles may not be used against countries possessing intercontinental ballistic missiles (ICBM) in their heartlands. For instance, if Russia manages to use a missile such as Zircon against the United States, the latter can retaliate massively with ICBMs.

This, perhaps, explains, why the US has not developed, as of now, a known hypersonic system, though its three services and the Defense Advanced Research Projects Agency (DARPA) of the Department of Defense are working on their respective hypersonic programs.

Threat To American Carriers?

The US Navy is requesting \$1.4 billion in FY2022. The US Army wants \$301 million for the program in FY2022. The US Air Force has requested similarly \$691 million for the various segments of the program. DARPA’s demand for similar purposes \$411 million.

All these organizations are being funded by the Department of Defense for a number of hypersonic weapons programs, the US has not established any program of record, leading experts to suggest that the US may not have approved requirements for hypersonic weapons or long-term funding plans.

There is a school of thought which argues that Russia has developed Zircon as a means of contending with American superiority in size, technology, and the sheer number of aircraft carriers. At the moment, the US Navy has 12 nuclear-powered aircraft carriers, whereas Russia has only one.

Therefore, it is said that “while at sea, any of Russia’s 15 Buyan-class corvettes will be able to carry up to 25 Zircon hypersonic missiles. It would take fewer than a half-dozen of those missiles to sink even the most advanced American aircraft carrier, such as the USS Gerald R. Ford”.

In fact, aircraft carriers are believed to be the principal targets of hypersonic missiles like Zircon. It is argued that these missiles may not be actually applied against carriers, but their possession creates such apprehensions about their vulnerability in the minds of nations with carriers that they do not use these huge platforms assertively and effectively.

The huge value or costs of the carriers may become their greatest weakness against these much cheaper missiles. No nation will like the loss of the carriers (many cannot afford to lose them), so they are forced to remain effectively on the sidelines “in case of high-intensity, peer-competitor conflict.”

This is not to suggest that aircraft carriers will become obsolete in the face of hypersonic missiles but to underline the dangers they face from advanced military technology. And this brings to one’s attention how important the BrahMos II could be for India in meeting the challenge of the rising naval capabilities of China in the Indo-Pacific, particularly the Indian Ocean region.

China is about to have at least three aircraft carriers and a host of large destroyers, frigates, and submarines. India's hypersonic anti-ship missiles will be effective counters in that regard.

<https://eurasianimes.com/brahmos-ii-missile-program-to-greatly-benefit-from-the-successful-test-of-russian-zircon-hypersonic-missile/>

R. REPUBLICWORLD.COM

Thu, 22 July 2021

Independence Day: Delhi Police Coordinating With IAF, NSG & DRDO; Vigilant About Drones

The Delhi Police said they have been coordinating training sessions with the IAF, NSG and the DRDO to combat any possible terror strike or security threat

By Deepan Chattopadhyay

Keeping in view security arrangements at the Red Fort in Delhi prior to the Independence Day celebration, the Delhi Police on Wednesday said that there will be a '360-degree' drone coverage to counter any unpleasant happenings at the Red Fort on the day.

Delhi Police under training to counter anti-drone challenges

Delhi Police's Additional DCP (North) Anita Roy said that the police have been training on ways to counter anti-drone challenges and any other unpleasant or unfriendly objects that disturb the pivotal celebration. "We have been training our staff to counter anti-drone challenge. They are also being instructed on ways to combat any distressing or displeasing happening on the important day," she said.



ANI

They are also being instructed on ways to combat any distressing or displeasing happening on the important day," she said.

Police coordinating with IAF, NSG, DRDO

Roy added that they have been coordinating training sessions with the Indian Air Force (IAF), National Security Guards (NSG), Defence Research and Development (DRDO). 'We will be conducting a 360-degree anti-drone coverage on the day of the Independence of the country at the Red Fort.'

She further added that deployment of staff for security checks has been in force for two months now and that Internal checks at Markets near Chandni Chowk area and inside Red Fort are being done.

Speaking about the visitors' count for Independence Day, Roy said, "The traditional arrangement with the presence of school students. invitees, over 10,000 general public will be scaled down by 50 percent for August 15."

Triple-layer security setting to be executed

When asked about the security plan at the Red Fort on Independence Day, ADCP Roy said that there will be a triple-layer arrangement for security, wherein along with the state borders, all roads leading to Red Fort and the close vicinity of the heritage monument will be barricaded and blocked from the point of view of being breached by any protest, as was the case on Republic Day. "The barricading will continue till late in the evening, even after the event is over," she said.

Archaeological Survey of India in the meantime has notified that the Red Fort would be shut for the public from July 21 to August 15 till the Independence Day celebrations.

<https://www.republicworld.com/india-news/general-news/independence-day-delhi-police-coordinating-with-iaf-nsg-and-drdo-vigilant-about-drones.html>

DRDO on Twitter





All the mission objectives were met. The missile (Man-Portable Anti-Tank Guided Missile) has already been successfully flight-tested for the maximum range. The missile is incorporated with state-of-the-art Miniaturized Infrared Imaging Seeker along with advanced avionics: DRDO



4:16 PM · Jul 21, 2021



Naveen Patnaik @Naveen_Odisha · 17h

Congratulate [@DRDO_India](#) on the successful flight testing of the New Generation Akash Missile (Akash-NG) from the Integrated Test Range (ITR) off the coast of [#Odisha](#).



Thu, 22 July 2021

Why Army Chief General M.M. Naravane visited Italy: **India Today Insight**

The Army Chief's visit underlines a growing convergence of interests between India and Italy
By Sandeep Unnithan

New Delhi: The voice that rang out on the hillside in the Italian countryside caused the small group of Allied soldiers to stop dead in their tracks. It was 1943, and the soldiers were POWs (prisoners of war) who had escaped German captivity. The voice, fortunately, belonged to a friendly resident of the town of Luco Ne Marsi. He was one among several locals from the central-eastern Italian town who wanted to help the escapees. Two locals who sheltered the POWs at great risk to their lives were Guiseppe Ivale and his wife Maria Iuvale. They plied the POWs with food and sheltered them in small huts dotting the vineyards on the mountains. Among the POWs was a young officer, Captain A.S. Naravane of the Indian Army's 2nd field artillery regiment.

Naravane, who retired as Major General from the Indian Army in the 1970s, recounted this adventure in his 2004 autobiography *A Soldier's Life in War and Peace*. He had been captured in the bloody battle of Bir Hachiem in North Africa and transported to a POW camp in Italy.

On July 8, 78 years later, Major General Naravane's nephew, Indian Army Chief General Manoj Mukund Naravane, made a trip of his own to Italy, visiting the historic town of Cassino, 80 km south of Luco Ne Marsi. Cassino was scene of some of the bloodiest battles of the Italian campaign in 1943. General Naravane and his wife Veena Naravane met with Filomena Fatato, the grand-daughter of the Iuvalles. Fatato told the Naravanes of how her grandfather often and very fondly spoke of the Indian POWs and the bond and friendship they had.

The Army Chief was on the second leg of a four-day two-nation tour of the UK and Italy to further defence and strategic ties with the two countries. In Rome, he met with Italy's Chief of Army Staff and Chief of Defence Staff before driving down to Cassino. Over 50,000 Indian soldiers fought in the Italian campaign that started with the Allied landings in Salerno in September 1943 and ended in April 1945 with the surrender of German forces in the peninsula.

General Naravane's tour of the UK and Italy comes at a time when India is increasingly looking westwards to forge new partnerships to balance a belligerent China. India is now an active member of the Quadrilateral of democracies or the Quad—the US, Japan and Australia.

“Recently, Italy has also begun to signal its intention to enter the Indo-Pacific geography. It has done so by seeking to join India and Japan in a trilateral partnership,” says Professor Harsh V. Pant, Director of Studies and Head of the Strategic Studies Programme at the Observer Research



Chief of Army Staff General M.M. Naravane (left) with local Italian historian Pino Valente as he explains the significance of the 'Roorkee Road' in Cassino

Foundation, New Delhi. “This initiative comes after years of Rome’s relative absence from geopolitical affairs of the region as it sought to concentrate more on the Atlantic and European dimensions while maintaining good, albeit well below potential, bilateral relations with India.”

Speaking at an India-Japan-Italy trilateral webinar organised last month, Riva Ganguly Das, Secretary (East) in the MEA, said the forum would provide a springboard for India-Italian cooperation. The G20 summit in Rome in October this year will be another opportunity for both countries to take the relationship forward. Symbolically, there was thus no better place to recall ties than one associated with the campaign that liberated Italy from the clutches of Nazi Germany.

General Naravane’s delegation was received by Enzo Salera, the mayor of Cassino, Barbara Di Rollo, president of the council and Generale Fambrini of the Italian Army. The Rector of the University of Cassino, Giovanni Betta, and students Dongre Yashasvi and Urmil Bambharoliya represented 235 Indian students studying at the university. The General presented mementos to the mayor, members of the city council and to local historian Pino Valente, who was instrumental in bringing up the monument, and to an Indian researcher living in Italy.

General Naravane also inaugurated a memorial dedicated to the soldiers of the Indian Army who fought in the battle of Cassino and placed a wreath at the Commonwealth War Graves cemetery. He thanked the city council for renaming a road in the town ‘Roorkee Road’, after a vital lifeline for the Allied war effort built under heavy enemy artillery fire. The road was named after the Indian city in Uttarakhand, the headquarters of the Bengal Engineers Group. Incidentally, National Security Adviser Ajit Doval’s World War 2 veteran father Major Gunanand Doval was a Bengal sapper—another small but not so insignificant detail in the bilateral relationship.

<https://www.indiatoday.in/india-today-insight/story/why-army-chief-general-m-m-naravane-visited-italy-1830973-2021-07-21>

Three more Rafale jets arrive in India from France

Three more Rafale fighter jets arrived in India on Wednesday after flying non-stop from France. The aircraft were provided mid-air refuelling by the air force of the United Arab Emirates

By Manjeet Negi

New Delhi: In a major boost for the Indian Air Force (IAF), three more Rafale fighter jets arrived in India after flying non-stop from France on Wednesday.

The aircraft were provided mid-air refuelling by the air force of the United Arab Emirates (UAE), the IAF said.

"Three Rafale aircraft arrived in India a short while ago, after a direct ferry from Istres Air Base, France. IAF deeply appreciates the support by UAE Air Force for in-flight refuelling during the non-stop ferry," the IAF said in a tweet.

The new batch of the aircraft will be part of the IAF's second squadron of the Rafale jets.

The second squadron will start operations by July-end at Hashimara Air Force Base in West Bengal, with the Rafale aircraft that have already arrived in Ambala flying there from next week, government sources told India Today TV.

The first Rafale squadron is based in the Ambala air force station. It had already started patrolling the borders with China in eastern Ladakh and other areas.

The squadron in Hashimara would give a major boost to air preparedness against the Chinese Air Force as it will bring a number of Chinese airfields in close range of the Indian aircraft.

In 2016, India signed an inter-governmental agreement with France to procure 36 Rafale jets at a cost Rs 59,000 crore.

India is now going to place orders for 114 multirole fighter aircraft along with the indigenously developed stealth fighters Advanced Medium Combat Aircraft whose seven squadrons would join the Air Force in the next 15-20 years.

The twin-engine Rafale jets are capable of carrying out a variety of missions such as ground and sea attack, air defence and air superiority, reconnaissance, and nuclear strike deterrence.

<https://www.indiatoday.in/india/story/three-more-rafale-jets-arrive-in-india-from-france-1830952-2021-07-21>



File photo of the Rafale fighter aircraft. (Photo credit: Reuters)

रूस के नए मिग-29 से मजबूत होगी भारतीय वायु सेना, नए विमानों की जरूरत होगी पूरी

भारतीय वायु सेना के बेड़े में जल्द ही रूस के ताकतवर मिग-29 लड़ाकू विमान शामिल हो सकते हैं। 21 विमानों की 2021 में सप्लाई के लिए टेंडर आवेदन मिल चुका है। रूस ने फरवरी में कहा था कि भारत सरकार ने भी विमान खरीदने के पक्ष में फैसला किया है।

By Ramesh Mishra

माँस्को: भारतीय वायु सेना के बेड़े में जल्द ही रूस के ताकतवर मिग-29 लड़ाकू विमान शामिल हो सकते हैं। भारतीय वायु सेना को 21 विमानों की 2021 में सप्लाई के लिए टेंडर आवेदन मिल चुका है। मामले की जानकारी देते हुए रूस के फेडरल सर्विस फॉर मिलिट्री टेक्निकल कोआपरेशन के प्रवक्ता वलेरिया रेशेत्निकोवा ने कहा कि रूस ने 21 मिग-29 विमानों की सप्लाई करने के संबंध में भारत को एक कमर्शियल प्रस्ताव भी सौंपा है।

प्रवक्ता वलेरिया ने कहा कि रूस की ओर से भारत को प्रस्ताव भेजा जा चुका है। इस पर अब भारत को विचार करना है। रूस की सरकारी समाचार एजेंसी स्पूतनिक ने बताया कि रेशेत्निकोवा ने ये बातें अंतरराष्ट्रीय एयर शो के इतर कही हैं। पिछले साल भारत की रक्षा खरीद परिषद ने रूस के 21 मिग-29 लड़ाकू विमानों के अधिग्रहण को मंजूरी दी थी। रूसी संघीय सेवा ने फरवरी में कहा था कि भारत सरकार ने भी विमान खरीदने के पक्ष में फैसला किया है।



बता दें कि अंतरराष्ट्रीय एयर शो का आयोजन 20-25 जुलाई तक रूस मास्को में हो रहा है। बीते साल जून महीने में समाचार एजेंसी एएनआई से सूत्रों ने कहा था कि भारतीय वायु सेना ने रूस से 21 मिग -29 सहित नए लड़ाकू विमान के लिए सरकार को एक प्रस्ताव भेजा है। भारतीय वायु सेना जिन 21 मिग 29 लड़ाई विमानों को प्राप्त करने की योजना बना रही है, वह रूस में निर्मित हैं और नए लड़ाकू विमानों की आवश्यकता को पूरा करते हैं।

भारतीय वायु सेना के पास मिग-29 के तीन स्कावरडम हैं, जिनमें से एक- दो इंजन वाला सिंगल सीट विमान है। इन्हें काफी कारगर माना जाता है और फिलहाल ये अपग्रेड हो रहे हैं। रूस में आयोजित एयर शो में एक नए लड़ाकू विमान के शुरुआती मॉडल को भी पेश किया गया है। यह कई अत्याधुनिक विशेषताओं से लेस है। विमान निर्माता सुखोई ने नए विमान को हल्के विमान के तौर पर डिजाइन किया है। यह विमान अपनी पहली उड़ान 2023 में भरेगा और 2026 से इसकी आपूर्ति शुरू कर दी जाएगी।

<https://www.jagran.com/world/russia-indian-air-force-will-be-stronger-than-russia-new-mig-29-new-aircraft-will-be-needed-21851387.html>



Thu, 22 July 2021

Researchers discover a 'layer hall effect' in a 2D topological Axion antiferromagnet

Researchers have discovered a "layer" Hall effect in a solid state chip constructed of antiferromagnetic manganese bismuth telluride, a finding that signals a much sought-after topological Axion insulating state, the team reports in the current edition of the journal *Nature*.

Researchers have been trying to find evidence of a topological Axion insulating (TAI) state and developed some candidate materials based on theoretical calculations. The layered Hall effect represents the first clear experimental evidence of the state, a feature bound by the laws of quantum physics, according to Boston College Assistant Professor of Physics Qiong Ma, a senior researcher on the project, which included 36 scientists from universities in the U.S., Japan, China, Taiwan, Germany, and India.

Researchers believe that when it is fully understood, TAI can be used to make semiconductors with potential applications in electronic devices, Ma said. The highly unusual properties of Axions will support a new electromagnetic response called the topological magneto-electric effect, paving the way for realizing ultra-sensitive, ultrafast, and dissipationless sensors, detectors and memory devices.

At the center of this line of inquiry among physicists and materials scientists are Axions, weakly-interacting particles first postulated by theorists more than 30 years ago, Ma said. They are one of the primary candidates for Dark Matter, a mysterious form of matter thought to account for approximately 85 percent of the universe.

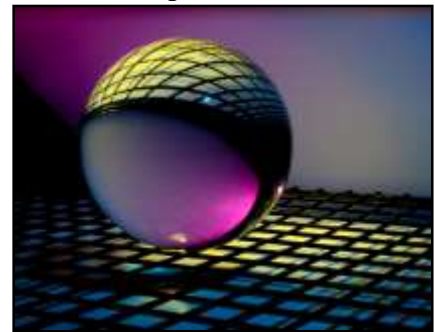
While the search for Axions in high-energy physics is actively ongoing, it has been recently proposed that Axions can be realized as quasi-particles in solid state materials. The prime candidate as the place to locate Axions is in a quantum TAI material, where researchers suggest Axions exist as low-energy electronic excitations, Ma said.

"We set out to search for the topological Axion insulating state in a carefully designed quantum device made of even-number-layered MnBi_2Te_4 —or manganese bismuth telluride," Ma said. "Previous studies have demonstrated the insulating state, namely, very large resistance, which is, however, true for any insulator. We wanted to further demonstrate properties that are unique to Axion insulators and do not exist in regular insulators, such as diamond."

The material forms a two-dimensional layered crystal structure, which allowed Ma and her colleagues to mechanically exfoliate atom-thick flakes using cellophane tape that can be found in most drug stores and supermarkets. Thin flake structures with even numbers of layers were proposed to be an Axion insulator.

Ma worked closely with fellow Boston College physicists Brian Zhou and Kenneth Burch. Zhou used a unique quantum technique to detect the magnetism of MnBi_2Te_4 . Burch has a unique glovebox facility used to process the sample in an inert environment.

"We first characterized the layer number with optical methods and then performed electrical transport measurements, such as measuring the sample resistance under different conditions, including varying electric field, magnetic field and environmental temperature," Ma said.



Credit: Unsplash/CC0 Public Domain

The researchers found the Hall effect, a well known law of physics where electrons travel at an angle from the axis under the influence of an applied magnetic field. But in this case, these electrons were traveling without such assistance, Ma said. The key was the materials' topology, or the quantum characteristics of its electrons and the waves in which they function.

"We observed a novel property for electrons travelling across this material in its Axion insulating state: The electrons do not travel in a straight line; instead, they deflect to the transverse direction. This effect was usually only observed under a large magnetic field, known as the Hall effect," Ma said. "But here, the deflection occurs due to inherent topology of the materials and without external magnetic field. More interestingly, the electrons deflect to opposite sides on the top and bottom layers. Therefore, we coined it as the layer Hall effect. The layer Hall effect serves as a distinct signature of the topological Axion insulating state, which will not happen in regular insulators."

Ma, whose research on the project is supported by the U.S. Department of Energy, said the team was surprised to find that the topological Axion insulating state and the layer Hall effect can be effectively controlled by the so-called Axion field, which is the product of applying both an electric field and a magnetic field.

"This means that whether the electrons deflect to the left or to the right on the top and bottom layers can be switched by the collective application of the electrical and magnetic fields," Ma said. "A single field is not able to switch one situation to the other."

Harvard University Assistant Professor of Chemistry Suyang Xu, a lead author of the report, added, "We are very excited about this work because it demonstrates the first realistic platform for the topological Axion insulator state."

Ma said the identification of the topological Axion insulating state leads to the next step of searching for signatures of the defining Axion dynamics in this system, which is known as the topological magnetoelectric effect (ME).

"The topological ME effect is a fundamentally new mechanism to convert electricity to magnetism, or vice versa, without lost energy, and has great potential to realize ultra-energy-efficient spintronic and memory devices," said Ma.

To demonstrate such will require further optimization of the material quality, the geometry of the device, and expanded experimental capabilities, Ma said.

More information: Layer Hall effect in a 2D topological axion antiferromagnet, *Nature* (2021). DOI: [10.1038/s41586-021-03679-w](https://doi.org/10.1038/s41586-021-03679-w), www.nature.com/articles/s41586-021-03679-w

Journal information: *Nature*
<https://phys.org/news/2021-07-layer-hall-effect-2d-topological.html>

Nanostructures enable record high-harmonic generation

By Syl Kacapyr

Cornell researchers have developed nanostructures that enable record-breaking conversion of laser pulses into high-harmonic generation, paving the way for new scientific tools for high-resolution imaging and studying physical processes that occur at the scale of an attosecond.

High-harmonic generation has long been used to merge photons from a pulsing laser into one, ultrashort photon with much higher energy, producing extreme ultraviolet light and X-rays used for a variety of scientific purposes. Traditionally, gasses have been used as sources of harmonics, but a research team led by Gennady Shvets, professor of applied and engineering physics in the College of Engineering, has shown that engineered nanostructures have a bright future for this application.

The research is detailed in the paper "Generation of Even and Odd High Harmonics in Resonant Metasurfaces Using Single and Multiple Ultra-Intense Laser Pulses," published July 7 in *Nature Communications*. Maxim Shcherbakov, who conducted the research as a Cornell postdoctoral associate before becoming an assistant professor at the University of California, Irvine, is the lead author.

The nanostructures created by the team make up an ultrathin resonant gallium-phosphide metasurface that overcomes many of the usual problems associated with high-harmonic generation in gasses and other solids. The gallium-phosphide material permits harmonics of all orders without reabsorbing them, and the specialized structure can interact with the laser pulse's entire light spectrum.

"Achieving this required engineering of the metasurface's structure using full-wave simulations," Shcherbakov said. "We carefully selected the parameters of the gallium-phosphide particles to fulfill this condition, and then it took a custom nanofabrication flow to bring it to light."

The result is nanostructures capable of generating both even and odd harmonics—a limitation of most other harmonic materials—covering a wide range of photon energies between 1.3 and 3 electron volts. The record-breaking conversion efficiency enables scientists to observe molecular and electronic dynamics within a material with just one laser shot, helping to preserve samples that may otherwise be degraded by multiple high-powered shots.

The study is the first to observe high-harmonic generated radiation from a single laser pulse, which allowed the metasurface to withstand high powers—five to 10 times higher than previously shown in other metasurfaces.

"It opens up new opportunities to study matter at ultrahigh fields, a regime not readily accessible before," Shcherbakov said. "With our method, we envision that people can study materials beyond metasurfaces, including but not limited to crystals, 2D materials, single atoms, artificial atomic lattices and other quantum systems."

Now that the research team has demonstrated the advantages of using nanostructures for high-harmonic generation, it hopes to improve high-harmonic devices and facilities by stacking the nanostructures together to replace a solid-state source, such as crystals.

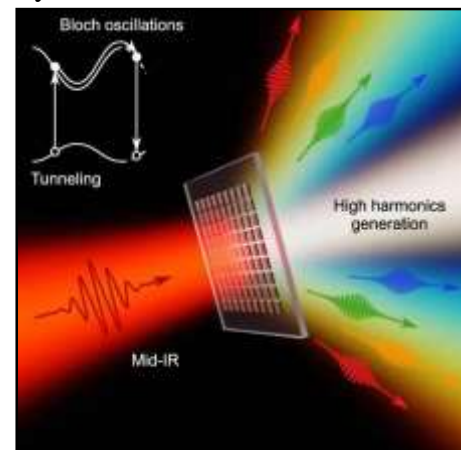


Illustration of an infrared laser hitting a gallium-phosphide metasurface, which efficiently produces even and odd high-harmonic generation. Credit: Daniil Shilkin

More information: Maxim R. Shcherbakov et al, Generation of even and odd high harmonics in resonant metasurfaces using single and multiple ultra-intense laser pulses, *Nature Communications* (2021). DOI: [10.1038/s41467-021-24450-9](https://doi.org/10.1038/s41467-021-24450-9)

Journal information: *Nature Communications*
<https://phys.org/news/2021-07-nanostructures-enable-high-harmonic.html>



Thu, 22 July 2021

Glass sponges reveal important properties for the design of ships, skyscrapers and planes of the future

The remarkable structural properties of the Venus flower basket sponge (*E. aspergillum*) might seem fathoms removed from human-engineered structures. However, insights into how the organism's latticework of holes and ridges influences the hydrodynamics of seawater in its vicinity could lead to advanced designs for buildings, bridges, marine vehicles and aircraft, and anything that must respond safely to forces imposed by the flow of air or water.

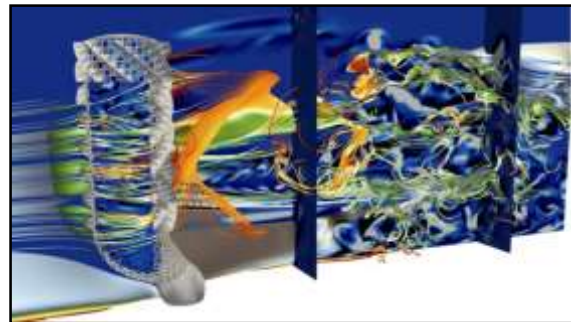
While past research has investigated the structure of the sponge, there have been few studies of the hydrodynamic fields surrounding and penetrating the organism, and whether, besides improving its mechanical properties, the skeletal motifs of *E. Aspergillum* underlie the optimization of the flow physics within and beyond its body cavity.

A collaboration across three continents at the frontiers of physics, biology, and engineering led by Giacomo Falcucci (from the Tor Vergata University of Rome and Harvard University), in collaboration with Sauro Succi (Italian Institute of Technology) and Maurizio Porfiri (Tandon School of Engineering, New York University) applied supercomputational muscle and special software to gain a deeper understanding of these interactions, creating a first-ever simulation of the deep-sea sponge and how it responds to and influences the flow of nearby water.

The work, "Extreme flow simulations reveal skeletal adaptations of deep-sea sponges," published in the journal *Nature*, revealed a profound connection between the sponge's structure and function, shedding light on both the basket sponge's ability to withstand the dynamic forces of the surrounding ocean and its ability to create a nutrient-rich vortex within the body cavity "basket."

"This organism has been studied a lot from a mechanical point of view because of its amazing ability to deform substantially in spite of its brittle, glassine structure," said first author Giacomo Falcucci of Tor Vergata University of Rome and Harvard University. "We were able to investigate aspects of hydrodynamics to understand how the geometry of the sponge offers a functional response to fluid, to produce something special with respect to interaction with water."

"By exploring the fluid flow within and outside the body cavity of the sponge, we uncovered the footprints of an expected adaptation to the environment. Not only does the sponge's structure contribute to a reduced drag, but also it facilitates the creation on low-velocity swirls within the body cavity that are used for feeding and reproduction" added Porfiri, a co-author of the study.



Hydrodynamic field inside and outside the skeletal structure of the *Euplectella aspergillum* glass sponge. The field was reconstructed using CINECA supercomputers. Kinetic methodologies and advanced computational codes have allowed to accurately reconstruct the living conditions of the depth sponges, highlighting their remarkable structural and fluid dynamic properties. Credit: G. Falcucci, Tor Vergata University of Rome

The structure of *E. Aspergillum*, reproduced by co-author Pierluigi Fanelli, of the University of Tuscia, Italy, resembles a delicate glass vase in the form of a thin-walled, cylindrical tube with a large central atrium, siliceous spicules—thus their commonly used appellation, "glass sponges." The spicules are composed of three perpendicular rays, giving them six points. The microscopic spicules "weave" together to form a very fine mesh, which gives the sponge's body a rigidity not found in other sponge species and allows it to survive at great depths in the water column.

To understand how Venus flower basket sponges do this, the team made extensive use of the Marconi100 exascale-class computer at the CINECA high performance computing center in Italy, which is capable of creating comprehensive simulations using billions of dynamic, temporospatial data points in three dimensions.

The researchers also exploited special software developed by study co-author Giorgio Amati, of SCAI (Super Computing Applications and Innovation) at CINECA, Italy. The software enabled super computational simulations based on Lattice Boltzmann methods, a class of computational fluid dynamics methods for complex systems that represents fluid as a collection of particles and tracks the behavior of each of them.

The in-silico experiments, featuring approximately 100 billion virtual particles, reproduced the hydrodynamic conditions on the deep-sea floor where *E. Aspergillum* lives. Results processed by Vesselin K. Krastev at Tor Vergata University of Rome allowed the team to explore how the organization of holes and ridges in the sponge improves its ability to reduce the forces applied by moving seawater (a mechanical engineering question formulated by Falcucci and Succi), and how its structure affects the dynamics of flow within the sponge body cavity to optimize selective filter feeding and gamete encounter for sexual reproduction (a biological question formulated by Porfiri and a biologist expert on ecological adaptations in aquatic creatures, co-author Giovanni Polverino from the Centre for Evolutionary Biology at The University of Western Australia, Perth).

"This work is an exemplary application of discrete fluid dynamics in general and the Lattice Boltzmann method, in particular," said co-author Sauro Succi of the Italian Institute of Technology and Harvard University. Sauro Succi is internationally recognized as one of the fathers of the Lattice Boltzmann Method. "The accuracy of the method, combined with access to one of the top super computers in the world made it possible for us to perform levels of computation never attempted before, which shed light on the role of fluid flows in the adaption of living organisms in the abyss."

"Our investigation of the role of the sponge geometry on its response to the fluid flow, has a lot of implications for the design of high-rise buildings or, really, any mechanical structure, from skyscrapers to low-drag novel structures for ships, or fuselages of airplanes," said Falcucci. "For example, will there be less aerodynamic drag on high-rise buildings built with a similar latticework of ridges and holes? Will it optimize the distribution of forces applied? Addressing these very questions is a key objective of the team."

More information: Extreme flow simulations reveal skeletal adaptations of deep-sea sponges, *Nature* (2021). DOI: [10.1038/s41586-021-03658-1](https://doi.org/10.1038/s41586-021-03658-1) , www.nature.com/articles/s41586-021-03658-1

Journal information: [Nature](https://www.nature.com)
<https://phys.org/news/2021-07-glass-sponges-reveal-important-properties.html>

New method predicts COVID-19 severity, could help with hospital triage

Summary:

Researchers have developed a blood test to predict which people infected with COVID-19 are most likely to experience serious symptoms, which could help health care workers prioritize patients for hospitalization and intensive care.

During the height of the pandemic, some hospitals were overwhelmed with patients seeking treatment for COVID-19. This situation could happen again during future outbreaks, especially with SARS-CoV-2 variants of concern on the rise. Now, researchers reporting in ACS' *Analytical Chemistry* have developed a blood test to predict which people infected with COVID-19 are most likely to experience serious symptoms, which could help health care workers prioritize patients for hospitalization and intensive care.

Although many people who contract COVID-19 have either no symptoms or mild ones, some require intensive care for pneumonia with acute respiratory distress syndrome. Risk factors for severe disease include older age, heart disease, cancer and diabetes, but these characteristics alone are not sufficient to predict which patients will become the sickest. Measuring levels of certain proteins or metabolites in the blood could help, but these tests are often slow, complicated or expensive. For more effective triage of COVID-19 patients at hospitals, Michelle Hill, Sanjeeva Srivastava and colleagues aimed to develop an easy-to-use method that could quickly and cost-effectively predict COVID-19 severity.

To measure changes in blood biochemistry that occur with severe COVID-19, the researchers chose a technique called attenuated total reflectance Fourier transform infrared spectroscopy (ATR-FTIR), which has been tested previously as a COVID-19 diagnostic tool. Two regions of FTIR spectra from 128 patient plasma samples showed small but observable differences between those with severe and non-severe COVID-19. Using these data together with clinical information about patients, the researchers developed a statistical model to predict COVID-19 severity. They found that the best predictor was whether the patient had diabetes, followed by the two regions in the FTIR spectra. Adding the FTIR data to the model improved the sensitivity for detecting severe disease in a different set of 30 patients from 41.2% to 94.1%, but reduced the specificity from 84.6% to 69.2%, compared with the clinical factors alone. This means that the new test was more likely to identify severe cases, but it also had a higher rate of false positives, than the clinical data alone. Although the strategy needs to be tested in larger numbers of patients, it shows promise as a rapid, simple and economic triaging test for hospitals, the researchers say.

The authors acknowledge funding from the Science and Engineering Research Board of the Government of India, the Industrial Research and Consultancy Centre of the Indian Institute of Technology Bombay, the Council of Scientific and Industrial Research, India, the Australian Government Research Training Program and the QIMR Berghofer Medical Research Institute, as well as instrument support from Agilent Technologies.

Journal Reference:

1. Arghya Banerjee, Abhiram Gokhale, Renuka Bankar, Viswanthram Palanivel, Akanksha Salkar, Harley Robinson, Jayanthi S. Shastri, Sachee Agrawal, Gunter Hartel, Michelle M. Hill, Sanjeeva Srivastava. **Rapid Classification of COVID-19 Severity by ATR-FTIR Spectroscopy of Plasma Samples.** *Analytical Chemistry*, 2021; DOI: [10.1021/acs.analchem.1c00596](https://doi.org/10.1021/acs.analchem.1c00596)

<https://www.sciencedaily.com/releases/2021/07/210721120645.htm>

