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समाचार पत्रों से चयित अंश Newspapers Clippings

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Thu, 15 Oct 2020

Within India, we can make any type of missile that armed forces want: DRDO Chief Satheesh Reddy

By Ajit K Dubey

New Delhi: Buoyed up by the strength of successful missile test in last 40 days, DRDO Chief G Satheesh Reddy on Wednesday said India has achieved self-reliance in the field of missile systems and can produce whatever is required by the armed forces within the country itself.

The Defence Research and Development Organisation (DRDO) has conducted around 10 successful missile tests over the last five weeks including that of the Shourya hypersonic missile, BrahMos extended-range missile, Prithvi nuclear-capable ballistic missile, Hypersonic missile technology development vehicles, Rudram I anti-radiation missile and the Supersonic Missile Assisted Release Torpedo weapon system.

"I would like to say one thing, the way the country has evolved itself in the missile system and particularly in the last five to six years...the various developments which are gone through in various tests which are gone through, India has actually gained complete self-reliance in the area of missiles," Reddy told in an exclusive interview.

"We are now able to develop any type of missile system what armed forces want," he added when asked if there was no need for the armed forces to stop imports of missile systems.

The DRDO chief said the private sector industry has also come up to a very good stage as "They are able to partner with us, they are able to develop with us, they are able to develop the system as per our specifications."

Asked about the strength of successful missile tests at a time when India was engaged in a conflict with China in Eastern Ladakh, Reddy said the DRDO was striving itself hard to develop the state of art weapon systems to equip our armed forces.

"As part of that responsibility, DRDO has been working on many weapon systems. Even during the COVID-19 period, scientists have been continuously working on that. All have matured and hence whenever a system is ready, we are going further developmental trials," Reddy said.

He added that as part of that effort, a number of systems have become mature today and they all have been tested in the last one and half month period. "The maturity level of many technologies is such that, we had very successful flights of them," Reddy said.

Asked about DRDO's contribution to the Aatmanirbhar Bharat campaign launched by Prime Minister Narendra Modi, DRDO Chief said the organisation has started working in many areas to make indigenous system and "now I can very confidently tell that we are strong and we are



Within India, we can make any type of missile that armed forces want: DRDO Chief Satheesh Reddy

completely self-reliant in the areas of missiles, radars, electronic warfare systems, torpedos, guns, and communication systems and so on."

He said DRDO scientists are continuously looking at various systems which are being imported now and trying to make indigenous system and a lot of emphases is there to develop system indigenously.

"We are helping the industry in a big way and lifting them up with various systems which they need to develop on their own," he said.

Reddy said that DRDO has "given 108 items completely designed and developed by the industry. We have instituted technology fund to support such industries and we have given our test facilities open to them. Now, we are taking industry partners right from the beginning of the projects."

He said the premier defence research organisation is now focusing on more advance and complex technologies. "We want to make India an advance technology nation meeting the Prime Minister's dream of Aatmnirbhar Bharat," he said.

<https://www.aninews.in/news/national/general-news/within-india-we-can-make-any-type-of-missile-that-armed-forces-want-drdo-chief-satheesh-reddy20201014105620/>



Thu, 15 Oct 2020

India can have complete hypersonic cruise missile system in four-five years: DRDO

The DRDO testfired the HSTDV on September 7 which is expected to lay the foundation for the development of a hypersonic cruise missile system

New Delhi: In a major boost for India's missile strike capabilities, the Defence Research and Development Organisation (DRDO) has said that it can develop a complete hypersonic cruise missile system in the next four to five years which will have the capability to strike its targets at speeds at least double than that of world's present fastest BrahMos supersonic cruise missile.

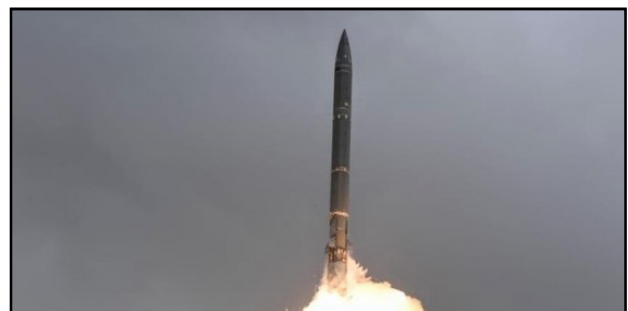
The DRDO testfired the Hypersonic Technology Demonstrator Vehicle (HSTDV) on September 7 which is expected to lay the foundation for the development of a hypersonic cruise missile system.

Giving details of the HSTDV testfiring to ANI, DRDO Chief Dr G Satheesh Reddy said the cruise missiles are the one which flies at a lower altitude.

"In that cruise missile, we have varieties called Subsonic cruise missile, Supersonic cruise missile and then hypersonic cruise missiles. The hypersonic cruise missiles are the one which actually travels at six times, seven times..eight times..more than that the speed of sound which is approximate about 300+ metre per second on the surface of the earth," he said.

"This one what we have attempted has got a scramjet engine, which works at the hypersonic speed breathing the air in the atmosphere, taking the oxygen in the atmosphere and then burns it and that happens at the hypersonic speed," he added.

Reddy said the scramjet engine developed by the DRDO has been tested for a specific time to see how it is working.



Supersonic Missile Assisted Release of Torpedo (SMART) being tested from Abdul Kalam Island off the Odisha coast. (File Photo)

"It has been scramjet vehicle which is the hypersonic cruise vehicle, has been taken to a designated height and released at the specific Mach number and then the engine has been ignited and the engine has been tested," he said.

The DRDO Chief said this was the first time that India's premier defense research agency has done such an experiment for a good amount of time and "it has successfully worked and hence it paves the way for us to work on these technologies for longer ranges."

Asked how long will take for a hypersonic cruise missile system to be fully developed, Reddy said, "It will take probably about four to five years for us to work on all these things and realise a complete missile system working for some good amount of range."

On the comparison with the speeds of the further hypersonic cruise missile with the existing BrahMos supersonic cruise missile system, he said it will be at least double of that speed at around six to seven Mach.

The BrahMos supersonic cruise missile is considered to be the world's fastest cruise missile at the moment with speeds of around 2.8 Machs.

Asked about the successful test of the BrahMos on September 30, he said the missile was tested with heightened indigenous content and it has proved itself.

The BrahMos Extended Range Missile can be launched at targets beyond 400 kms and can strike its targets at longer ranges than before. It was earlier used for striking targets slightly less than 300 kms.

Reddy also said India has achieved self-reliance in the field of missile systems and can produce whatever is required by the armed forces within the country itself.

The organization has already conducted around 10 successful missile tests in the last over five weeks including that of the Shaurya hypersonic missile, BrahMos extended-range missile, Prithvi nuclear-capable ballistic missile, Hypersonic missile technology development vehicles, Rudram I anti-radiation missile and the Supersonic Missile Assisted Release Torpedo weapon system.

"I would like to say one thing, the way the country has evolved itself in the missile system and particularly in the last five to six years...the various developments which are gone through in various tests which are gone through, India has actually gained complete self-reliance in the area of missiles," Reddy told ANI in an exclusive interview.

"We are now able to develop any type of missile system what armed forces want," he added when asked if there was no need for the armed forces to stop imports of missile systems.

The DRDO chief said the private sector industry has also come up to a very good stage as "They are able to partner with us, they are able to develop with us, they are able to develop the system as per our specifications."

Asked about the strength of successful missile tests at a time when India was engaged in a conflict with China in Eastern Ladakh, Reddy said the DRDO was striving itself hard to develop the state of art weapon systems to equip our armed forces.

"As part of that responsibility, DRDO has been working on many weapon systems. Even during the COVID-19 period, scientists have been continuously working on that. All have matured and hence whenever a system is ready, we are going further developmental trials," Reddy said.

He added that as part of that effort, a number of systems have become mature today and they all have been tested in the last one and half month period. "The maturity level of many technologies is such that, we had very successful flights of them," Reddy said.

Asked about DRDO's contribution to the Aatmanirbhar Bharat campaign launched by Prime Minister Narendra Modi, DRDO Chief said the organisation has started working in many areas to make indigenous system and "now I can very confidently tell that we are strong and we are completely self-reliant in the areas of missiles, radars, electronic warfare systems, torpedos, guns, and communication systems and so on."

He said DRDO scientists are continuously looking at various systems which are being imported now and trying to make indigenous system and a lot of emphases is there to develop system indigenously.

"We are helping the industry in a big way and lifting them up with various systems which they need to develop on their own," he said.

Reddy said that DRDO has "given 108 items completely designed and developed by the industry. We have instituted technology fund to support such industries and we have given our test facilities open to them. Now, we are taking industry partners right from the beginning of the projects."

He said the premier defence research organisation is now focusing on more advance and complex technologies. "We want to make India an advance technology nation meeting the Prime Minister's dream of Aatmnirbhar Bharat," he said.

Rudram missile will give Air Force capability to detect and attack enemy radars: DRDO

The Rudram -1 anti-radiation missile launched from a fighter aircraft would require a few more tests to be completely proven and will provide Indian Air Force with the capability to strike enemy radars including surveillance and air defence systems, said Reddy on Wednesday.

The Rudram-I missile system was successfully testfired recently from a Sukhoi-30MKI fighter aircraft near the East coast and it hit its intended target successfully there.

"It (Rudram-I) is basically anti-radiation missile launched from an aircraft and when you release it, it will be able to detect any emitting elements and then you will be able to lock on to that emitting element and then it will be able to go on to act on them," DRDO chairman Dr G Satheesh Reddy told ANI.

"So, this is what was being attempted in the trial what we have done. It has been released from aircraft and it could detect the emitting elements and that's what it tested. So, that proves the total capability of the air-launch anti-radiation missile and so we need to do a couple of more trials to prove the complete system, technologies under various conditions," he added.

Asked what capability it would provide to the Air Force, he said, "Once it goes to IAF, it will strengthen the force attacking the enemies emitting elements (Radars)."

Asked about the Nirbhay Missile testfiring which did not succeed, the DRDO Chief the Missile has been fire tested earlier and has been successfully completed all the development trial it has gone through.

"We only wanted to increase the indigenous content by incorporating many things including the engine and various other things. So the missile has actually gone off very well, it took off very well.. the separation and many other things. The engine also started functioning very well. After that some snag has come," he said.

Reddy said DRDO scientists are looking into the snag and that must be some one element malfunctioning or something like that.

"Right now, I am not very sure today, a team is looking into it and we should be able to come out of it and will be going ahead with the programme in a very accelerated way," he said.

Nirbhay is a subsonic cruise missile with ranges of around 1,000 km.

DRDO Chief on SMART Weapon

Once fully developed, the Supersonic Missile Assisted Release Torpedo (SMART) weapon system would boost the Navy's anti-submarine warfare capability and allow it to engage enemy submarines from far off distances, Reddy said on Wednesday.

The SMART weapon system was successfully testfired for the first time on October 5 where a supersonic missile was used to launch a torpedo against a simulated submarine as a target and the test was fully successful.

"A torpedo has a limited range capability. The range of torpedo is enhanced through many mechanisms. One of the mechanisms is a supersonic missile assisted release of the torpedo, that is

how it is called SMART," Reddy told ANI in an exclusive interview while explaining the capabilities of different missiles tested successfully by India in the last few weeks.

He said a torpedo has been incorporated in the front sections of a missile and it carried the torpedo to the designated point and then opened it up.

"All these operations have very successfully functioned in the very first attempt itself. So, this enhances the capability of the Indian Navy once the system gets fully proven and inducted into the armed forces. The Navy's capability to engage submarines at far of distances is also feasible," Reddy added.

The test was carried out on October 5 from the APJ Abdul Kalam Island in Balasore off the coast of Odisha.

<https://www.newindianexpress.com/nation/2020/oct/14/india-can-have-complete-hypersonic-cruise-missile-system-in-four-fiveyears-drdo-2210190.html>



Thu, 15 Oct 2020

DRDO Chief says India can have complete missile system in 4-5 years

India has tested 10 missiles in the last two months with indigenously developed Rudram-1 being the latest

Edited by Shankhyaneel Sarkar

New Delhi: Defence Research and Development Organisation (DRDO) Chief G Satheesh Reddy on Wednesday expressed hope that within the next 4-5 years, the agency can help the Indian armed forces by developing a complete missile system.

Speaking to ANI, Reddy said, "It will take probably about 4-5 years for us to work on all these things and realise a complete missile system, working for some good amount of range."

India has tested 10 missiles in the last two months with indigenously developed Rudram-1 being the latest. Rudram-1 is an anti-radiation missile that can detect enemy radars and specifically target them which helps in breaking down the first wave of resistance and creating space for more damage.

Along with Rudram, the DRDO has also tested extended-range BrahMos missile, supersonic missile-assisted release of torpedo anti-submarine warfare, hypersonic nuclear-capable Shaurya and hypersonic technology demonstrator vehicle (HSTDV).

These missile tests come at a time when India is engaged in a bitter row with China at the Line of Actual Control (LAC). The DRDO chief said that the organisation can now accommodate the needs of the armed forces. He said, "We are now able to develop any type of missile system that the armed forces want."

The assurance made by the DRDO chief also reflects that the defence sector is also focussing on developing indigenous weapons systems giving the Atmanirbhar Bharat (self-reliant India) drive a push.

Reddy also pointed out that the missiles are a part of DRDO's effort to develop modern weapons for the armed forces when they are engaged in a conflict with China. He said, "DRDO has been working on many weapon systems. Even during the Covid-19 period, scientists have been



DRDO Chairman G Satheesh Reddy. (ANI)

continuously working on that. All have matured and hence whenever a system is ready, we are going further developmental trials.”

He further added, “The maturity level of many technologies is such that we had very successful flights.”

<https://www.hindustantimes.com/india-news/drdo-chief-says-india-can-have-complete-missile-system-in-4-5-years/story-rbH4aZJyKZw0vSgQ40n3OP.html>

नवभारत टाइम्स

Thu, 15 Oct 2020

मिसाइलों के मामले में पूरी तरह आत्मनिर्भर हुआ भारत, सेना जिस तरह की भी मिसाइल मांगेगी, हम बनाने में सक्षम: डीआरडीओ चीफ

उन्होंने कहा कि डीआरडीओ वैज्ञानिक लगातार अलग-अलग तरह के सिस्टम पर रिसर्च कर रहे हैं जिनका अब तक आयात होता रहा है। हमारे वैज्ञानिक अब देसी सिस्टम नवीन कुमार पांडे

हाइलाइट्स:

- डीआरडीओ चीफ के मुताबिक भारत ने मिसाइल के क्षेत्र में पूरी आत्मनिर्भरता हासिल कर ली है
- अब भारतीय सेना जिस तरह की भी मिसाइल मांगेगी, उसे देश में ही बना लिया जाएगा: रेड्डी
- कई प्राइवेट कंपनियां भी रक्षा उपकरण बनाने में हाई लेवल की कर्पेसिटी हासिल कर ली है

नई दिल्ली: रक्षा अनुसंधान एवं विकास संगठन (DRDO) के प्रमुख जी. सतीश रेड्डी (G. Satheesh Reddy) ने देश को आश्वस्त किया कि अब संगठन के पैसा इतनी क्षमता हो गई है कि हमारे सशस्त्र बल जिस तरह की भी मिसाइल चाहेंगे, उन्हें बनाकर दे दिया जाएगा। उन्होंने कहा कि देश में किसी भी तरह की मिसाइल तैयार करने की क्षमता हासिल हो चुकी है। ध्यान रहे कि पिछले 40 दिनों में एक के बाद एक, करीब 10 मिसाइलों का सफल परीक्षण किया गया है।

पांच हफ्ते में 10 मिसाइल टेस्ट

डीआरडीओ ने पिछले पांच हफ्तों में जिन मिसाइलों की टेस्टिंग की, उनमें हाइपरसॉनिक मिसाइल शौर्य, बड़े हुए रेंज की ब्रह्मोस, परमाणु क्षमता युक्त बलिस्टिक मिसाइल पृथ्वी, हाइपरसॉनिक मिसाइल टेकनॉलजी डिवेलपमेंट वीडक्लस, एंटी-रेडिएशन मिसाइल रुद्रम 1 और सुपरसॉनिक मिसाइल असिस्टेड रिलीज टॉरपीडो वेपन सिस्टम शामिल हैं।

5-6 साल में आत्मनिर्भर बना भारत

रेड्डी ने कहा, 'मैं एक बात कहना चाहूंगा कि भारत खासकर पिछले पांच-छह सालों में मिसाइल सिस्टम के क्षेत्र में जितना आगे बढ़ा है, उससे हमें मिसाइलों को क्षेत्र में संपूर्ण आत्मनिर्भरता हासिल हो चुकी है।' जब उनसे पूछा गया कि क्या अब सेना को विदेशों से मिसाइल सिस्टम का आयात नहीं करने की जरूरत है तो उन्होंने आगे कहा, 'सशस्त्र बलों को जरूरत के मुताबिक हम अब किसी भी तरह की मिसाइल विकसित करने में सक्षम हैं।' उन्होंने कहा कि मिसाइल



डीआरडीओ चीफ जी सतीश रेड्डी।

निर्माण क्षेत्र की प्राइवेट कंपनियां भी उच्चस्तरीय हो चुकी हैं। उन्होंने कहा, 'वो अब हमारे साथ साझेदारी करने में सक्षम हो गई हैं। वो हमारे से मिसाइल बना सकती हैं और हमारी जरूरतों के मुताबिक बना सकती हैं।'

“अब मैं पूरे विश्वास के साथ कह सकता हूं कि हम काफी सशक्त हैं और मिसाइल, रेडार, इलेक्ट्रॉनिक वारफेयर सिस्टम, टॉरपीडो, गन तथा कम्यूनिकेशन सिस्टम समेत तमाम सैन्य उपकरणों के क्षेत्र में पूरी तरह आत्मनिर्भर हो चुके हैं। जी सतीश रेड्डी, डीआरडीओ चीफ”

कोविड-19 में भी नहीं रुके DRDO के वैज्ञानिक

जब उनसे पूर्वी लद्दाख में वास्विक नियंत्रण रेखा (LAC) पर चीन की पीपल्स लिबरेशन आर्मी (PLA) की हरकतों के बारे में पूछा गया तो उन्होंने कहा कि डीआरडीओ भारत की सेना को अत्याधुनिक हथियारों से लैस करने की दिशा में कठिन परिश्रम कर रहा है। रेड्डी ने कहा, 'हम इसे अपना दायित्व समझते हैं, इसलिए डीआरडीओ कई वेपन सिस्टम पर काम कर रहा है। उन पर कोविड-19 के दौरान भी हमारे वैज्ञानिक लगातार काम करते रहे। सभी सिस्टम पर अच्छा काम हुआ है और जैसे ही ये तैयार हो जाएंगे, हम इनका ट्रायल कर लेंगे।' उन्होंने कहा कि कई सिस्टम तो बन चुके हैं और पिछले डेढ़ महीने में उनकी टेस्टिंग भी हो चुकी है। रेड्डी ने कहा, 'कई टेक्नॉलजी का मैच्योरिटी लेवल वहां तक पहुंच गया कि हमने इसका सफलतापूर्वक परीक्षण भी कर लिया।'

हर क्षेत्र में आत्मनिर्भरता की तरफ बढ़े कदम

प्रधानमंत्री नरेंद्र मोदी के आत्मनिर्भर भारत अभियान में डीआरडीओ के योगदान के बारे में पूछे जाने पर रेड्डी ने कहा कि संगठन ने देसी सिस्टम तैयार करने के लिए कई मोर्चों पर आगे बढ़ रहा है। उन्होंने कहा, 'अब मैं पूरे विश्वास के साथ कह सकता हूं कि हम काफी सशक्त हैं और मिसाइल, रेडार, इलेक्ट्रॉनिक वारफेयर सिस्टम, टॉरपीडो, गन तथा कम्यूनिकेशन सिस्टम समेत तमाम सैन्य उपकरणों के क्षेत्र में पूरी तरह आत्मनिर्भर हो चुके हैं।'

“प्राइवेट कंपनियां अब हमारे साथ साझेदारी करने में सक्षम हो गई हैं। वो हमारे से मिसाइल बना सकती हैं और हमारी जरूरतों के मुताबिक बना सकती हैं। जी सतीश रेड्डी, डीआरडीओ चीफ”

प्राइवेट इंडस्ट्री के साथ बढ़ रही साझेदारी

उन्होंने कहा कि डीआरडीओ वैज्ञानिक लगातार अलग-अलग तरह के सिस्टम पर रिसर्च कर रहे हैं जिनका अब तक आयात होता रहा है। हमारे वैज्ञानिक अब देसी सिस्टम बनाने का प्रयास कर रहे हैं। रेड्डी ने कहा कि डीआरडीओ ने देसी कंपनियों में पूरी तरह तैयार 108 आइटम सेना को मुहैया कराए हैं। हमने ऐसे उद्योगों की सहायता के लिए टेक्नॉलजी फंड बना रखा है और हमने अपनी टेस्ट फसिलिटीज को उनके लिए खोल दिया है। अब तो हम किसी प्रोजेक्ट की बिल्कुल शुरुआत से ही इंडस्ट्री पार्टनर्स को साथ ले लेते हैं। डीआरडीओ चीफ ने कहा कि संस्था अब ज्यादा उन्नत और पेचीदा तकनीक पर आधारित सैन्य उपकरण बनाने पर फोकस कर रही है। उन्होंने कहा, 'हम भारत को एक उन्नत तकनीक से युक्त राष्ट्र बनाना चाहते हैं ताकि प्रधानमंत्री के आत्मनिर्भर भारत के सपने को साकार किया जा सके।'

<https://navbharattimes.indiatimes.com/india/drdo-can-make-any-type-of-missile-that-armed-forces-will-demand-says-satheesh-reddy/articleshow/78655048.cms>

Rudram missile will give IAF capability to detect, attack enemy radar: DRDO

The Rudram -1 anti-radiation missile launched from a fighter aircraft would require a few more tests to be completely proven and will provide IAF with the capability to strike enemy radars

The Rudram -1 anti-radiation missile launched from a fighter aircraft would require a few more tests to be completely proven and will provide Indian Air Force with the capability to strike enemy radars including surveillance and air defence systems, said DRDO chairman Dr G Satheesh Reddy on Wednesday.

The Rudram-I missile system was successfully testfired recently from a Sukhoi-30MKI fighter aircraft near the East coast and it hit its intended target successfully there.

"It (Rudram-I) is basically anti-radiation missile launched from an aircraft and when you release it, it will be able to detect any emitting elements and then you will be able to lock on to that emitting element and then it will be able to go on to act on them," DRDO chairman Dr G Satheesh Reddy told ANI.

"So, this is what was being attempted in the trial what we have done. It has been released from aircraft and it could detect the emitting elements and that's what it tested. So, that proves the total capability of the air-launch anti-radiation missile and so we need to do a couple of more trials to prove the complete system, technologies under various conditions," he added.

Asked what capability it would provide to the Air Force, he said, "Once it goes to IAF, it will strengthen the force attacking the enemies emitting elements (Radars)."

Asked about the Nirbhay Missile testfiring which did not succeed, the DRDO Chief the Missile has been fire tested earlier and has been successfully completed all the development trial it has gone through.

"We only wanted to increase the indigenous content by incorporating many things including the engine and various other things. So the missile has actually gone off very well, it took off very well.. the separation and many other things. The engine also started functioning very well. After that some snag has come," he said.

Reddy said DRDO scientists are looking into the snag and that must be some one element malfunctioning or something like that.

"Right now, I am not very sure today, a team is looking into it and we should be able to come out of it and will be going ahead with the programme in a very accelerated way," he said.

Nirbhay is a subsonic cruise missile with ranges of around 1,000 km.

(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/defence/rudram-missile-will-give-iaf-capability-to-detect-attack-enemy-radar-drdo-120101400709_1.html

ब्रह्मोस पर बोले डीआरडीओ प्रमुख, मिसाइल के परीक्षण का उद्देश्य स्वदेशी सामग्री को बढ़ाना

भारत ने हाल ही में ब्रह्मोस सुपरसोनिक क्रूज मिसाइल का सफल परीक्षण किया, जो 400 किलोमीटर से ज्यादा दूरी तक टारगेट को ध्वस्त कर सकती है। वहीं, रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) के प्रमुख जी सतीश रेड्डी ने बताया है कि परीक्षण का मुख्य उद्देश्य मिसाइल में स्वदेशी सामग्री को बढ़ाने के लिए किया गया।

डीआरडीओ प्रमुख जी सतीश रेड्डी ने कहा, ब्रह्मोस सुपरसोनिक क्रूज मिसाइल है। परीक्षण मुख्य रूप से मिसाइल में स्वदेशी सामग्री को बढ़ाने के लिए किया गया है। ब्रह्मोस मिसाइल प्रणाली में शामिल कई स्वदेशी प्रणालियों का विस्तारित रेंज के साथ उड़ान परीक्षण किया गया है।

उन्होंने कहा, यह एक सफल मिशन था। अब सम्मिलित की गई अधिकांश स्वदेशी प्रणालियों ने पूर्ण संतुष्टि के साथ काम करना शुरू कर दिया है और स्वदेशी सामग्री अब ब्रह्मोस में बढ़ गई है।

बता दें कि, पूर्वी लद्दाख में चीन से जारी गतिरोध के बीच भारत ने 30 सितंबर 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।

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।

<https://www.amarujala.com/india-news/drdo-chief-g-satheesh-reddy-brahmos-is-supersonic-cruise-missile-enhance-indigenous-content-in-missile>

Thu, 15 Oct 2020

Brahmos Missiles! Here’s why this deadly attack weapon is India’s indispensable deterrence

Deployed in huge numbers along India’s frontier land and maritime border positions, the supersonic BrahMos has deftly prepared the Indian Armed Forces to undertake intense, complex combat operations on the ground, sea and air in a multi-domain battle environment

By Huma Siddiqui

By deploying BrahMos – world’s deadliest, most versatile, state-of-the-art precision attack weapon – India has unprecedentedly bolstered up its defence preparedness and deterrence posture to counter any adversary in the current times of high regional volatility. Deployed in huge numbers along India’s frontier land and maritime border positions, the supersonic BrahMos has deftly prepared the Indian Armed Forces to undertake intense, complex combat operations on the ground, sea and air in a multi-domain battle environment.

“By deploying BrahMos, the Indian Defence Forces have displayed an unflinching trust and reliance on this incredible weapon that has massively galvanised India’s security posture,” says Dr Sudhir K Mishra, Director General, BrahMos, DRDO and CEO & MD of BrahMos Aerospace. The BrahMos Aerospace is the India-Russia Joint Venture that is manufacturing the BrahMos Weapon System.

“Our continued efforts to indigenise the state-of-the-art missile has been hugely successful which has not only reinvigorated our ‘Make-In-India’, ‘Design-In-India’ and ‘Make-for-India’

goals but also reinforced our commitment to an “Atma Nirbhar Bharat’,” Dr Mishra says.

Versatile BrahMos

After undergoing a record number of successful test firings, the versatile BrahMos has been fielded in surface-to-surface, surface-to-sea, sea-to-surface, sea-to-sea, air-to-sea and air-to-surface configurations in the Indian Army, Navy and Air Force. The formidable weapon has also been successfully tested in subsea-to-land configuration from an underwater platform, thus proving its capability to arm conventional attack submarines of the Navy.

Salvo Test

It has validated its ‘salvo’ attack capability as well to detect and engage single or different targets in various trajectories in the quickest possible time, thus enabling the Indian military to launch joint, back-to-back, surprise attacks on strongly fortified enemy positions from standoff ranges.



The formidable weapon has also been successfully tested in subsea-to-land configuration from an underwater platform, thus proving its capability to arm conventional attack submarines of the Navy. (Photo source: BrahMos Aerospace)



Indigenous Missile

It has emerged as India's most credible indigenous tactical weapon, incorporating domestically developed critical technologies and components over the years of its evolution and growth. The indigenous content in the missile system has reached over 60 per cent, thus enhancing national security manifold.

Test on September 30

The recent successful test firing of the surface-to-surface BRAHMOS conducted on September 30 from ITR, Chandipur featured major indigenous systems, including booster and airframe.

By possessing and fielding such an invincible weapon like BRAHMOS, India has acquired a decisive capability to completely outmanoeuvre its adversary in any military conflict.

<https://www.financialexpress.com/defence/brahmos-missiles-heres-why-this-deadly-attack-weapon-is-indias-indispensable-deterrence/2105320/>

THE ECONOMIC TIMES

Thu, 15 Oct 2020

SMART weapon system will help Navy in engaging enemy submarines from far-off distances: DRDO

Synopsis

"A torpedo has a limited range capability. The range of torpedo is enhanced through many mechanisms. One of the mechanisms is a supersonic missile assisted release of the torpedo, that is how it is called SMART," Reddy told in an exclusive interview while explaining the capabilities of different missiles tested successfully by India in the last few weeks.

New Delhi: Once fully developed, the Supersonic Missile Assisted Release Torpedo (SMART) weapon system would boost the Navy's anti-submarine warfare capability and allow it to engage enemy submarines from far off distances, Defence Research and Development Organisation (DRDO) chairman Dr G Satheesh Reddy said here on Wednesday.

The SMART weapon system was successfully test fired for the first time on October 5 where a supersonic missile was used to launch a torpedo against a simulated submarine as a target and the test was fully successful.

"A torpedo has a limited range capability. The range of torpedo is enhanced through many mechanisms. One of the mechanisms is a supersonic missile assisted release of the torpedo, that is how it is called SMART," Reddy told in an exclusive interview while explaining the capabilities of different missiles tested successfully by India in the last few weeks.

He said a torpedo has been incorporated in the front sections of a missile and it carried the torpedo to the designated point and then opened it up.

"All these operations have very successfully functioned in the very first attempt itself. So, this enhances the capability of the Indian Navy once the system gets fully proven and inducted into the armed forces. The Navy's capability to engage submarines at far of distances is also feasible," Reddy added.

The test was carried out on October 5 from the APJ Abdul Kalam Island in Balasore off the coast of Odisha.

<https://economictimes.indiatimes.com/news/defence/smart-weapon-system-will-help-navy-in-engaging-enemy-submarines-from-far-off-distances-drdo/articleshow/78655975.cms>



Wed, 14 Oct 2020

India-Nepal relations getting back on track: Army Chief to visit Kathmandu next month

Indian Army Chief Gen MM Naravane is set to visit Nepal next month to attend a traditional ceremony where he will be accorded the honorary rank of General in the Nepalese Army

By Abhishek Bhalla

Despite the diplomatic row over a new map issued by Nepal, Indian Army Chief Gen MM Naravane will visit the country next month to attend a traditional ceremony where he will be accorded the honorary rank of General in the Nepalese Army. He is also likely to be part of bilateral discussions during the visit.

The development is a signal that relations between India and Nepal could be back on track.

The visit was approved by the Nepal government in February this year but was postponed due to the lockdown in both countries after the outbreak of the Covid-19 pandemic.

President of Nepal Vidya Devi Bhandari will confer the honorary rank of General of the Nepalese Army upon General Naravane, a statement from the Ministry of Nepal said.

Earlier this year, relations between India and Nepal took a hit after India's construction of a new strategic 80 km road in Uttarakhand connecting to the Lipulekh pass at 17,000 feet on the India-Nepal-China trijunction.

The road will make travel to Kailash Mansarovar smoother and also aid troops serving at the Line of Actual Control on the India-China frontier.

Unhappy with the road construction claiming it was on its land, Kathmandu protested and issued new maps of the area.

Indian Army Chief Gen M M Naravane had earlier hinted at China's role in pushing Nepal to protest against India's road construction at Leipulekh pass at 17,000 feet close to the India-China-Nepal trijunction.

"There is reason to believe that they must have raised these problems, these issues at the behest of someone else. That is very much a possibility," the army Chief had said.

<https://www.indiatoday.in/india/story/india-nepal-relations-getting-back-on-track-army-chief-to-visit-kathmandu-next-month-1731589-2020-10-14>



Indian Army Chief Gen MM Naravane | PTI

Drones to be the future of warfare? India needs more code writers, data analysts

Using armed drones in military operations no longer raises eyebrows, thanks to their widespread use in the on-going conflict in Afghanistan; or as seen in the ongoing conflict in Armenia-Azerbaijan (Nagorno Karabakh)

By Huma Siddiqui

India has 15,106.7 km of land border and a coastline of 7,516.6 km including island territories and securing the borders against hostile forces is critical to the country's security. Using armed drones in military operations no longer raises eyebrows, thanks to their widespread use in the on-going conflict in Afghanistan; or as seen in the ongoing conflict in Armenia-Azerbaijan (Nagorno Karabakh).

According to C4I expert Milind Kulshrestha, "With their unprecedented reconnaissance capabilities and the ability to trace a target for hours, the drone is the favourite word with all militaries. For the future of the Indian Military, the Unmanned Combat Aerial Vehicles (UCAVs) are important as they are capable of stealthily penetrating the enemy air space with an explosive payload and missiles."

These come with the capability of engaging with air to surface (land/water) or air to air targets too, and with high optical day and night vision sensors they have an advanced navigation/control feature.

According to the C4I expert when deployed in a defence role a swarm of weaponised drones can create an impenetrable screen against incoming targets, including a missile. "With the potency in a combat drone, the military operations are going to witness huge change and the impact of UCAVs shall not only be seen in the conventional warfare but, even more so, in asymmetric tactical response to the asymmetric threat of armed militant networks and other non-conventional targets."

What are the advantages of using drones?

As has been reported by Financial Express Online, the UAVs or Drones are going to replace 80 per cent of the operations presently carried out by the manned aircraft.

India first got a UAV back in 1996 when the Indian Army had acquired an Israeli Searcher MkI. According to the Stockholm International Peace Research Institute (SIPRI), out of the 22.5 per cent of the global UAV imports, India tops the list, as its own market is still at a nascent stage.

"Most of the videos pertaining to the use of Unmanned Aerial Vehicles (UAVs) that have been released by either Azerbaijan or Armenia are inconclusive. For instance, Azerbaijan released a video of an Armenian S-300 SAM system that was apparently destroyed by Azerbaijani drone/UAVs. However, if you observe the video closely you will realize that the radars destroyed are not a part of the S-300 system. S-300 uses a PESA solid-state antenna, but the image of the destroyed radar shows a parabolic antenna and not an S-300 radar. UAVs/drones are certainly playing a role but not a major role in striking enemy positions. Furthermore, unlike India's adversary like China, neither Armenia nor Azerbaijan has a dense, overlapping Air Defense



It has to be a combination of precision and surprise play a critical role, which essentially means ground and air surveillance together until the operation is over. (Photo source: Reuters)

network that can intercept these drones,” observes Debajit Sarkar, an expert in Smart Weapons, Artificial Intelligence & Aerospace.

“Indian Army and Air force face a bigger challenge with respect to intercepting enemy UAVs/drones that routinely enter Indian airspace from either Pakistan and China. Pakistan & China are probably sending in UAVs/drones inside Indian airspace to determine reaction time of the Indian Army and Air Force. The precision engagement of mobile, non-cooperative targets like drones, requires a reduced “sensor-to-shooter” kill chain. And this can be achieved through real-time ISR and real-time targeting,” Mr Sarkar explains.

“In fact, the Indian Army should strive to acquire SIGINT specific ISR data from a wide variety of airborne sensors, both manned and unmanned, that operate at safe stand-off distances from ground threats. Apart from this, major investments in Electronic Warfare (EW) will have to be made to effectively target drones especially a swarm drone attack. EW systems that can disrupt short wave radio channels, guidance channels of standoff weapons and ISR aircraft and even interrupt satellite functions of the adversaries will help the Indian armed forces to effectively repel a swarm drone attack. The Indian Army’s design lab, as well as DRDO, can also start working on Automatic Target Recognition (ATR) technology.”

“This technology in its barebone essence already exists but needs a man in the loop who has to analyze or process an image of the target with available 3D models of red and blue forces and determine what the actual target is. This process can be fully automated where a computer replaces the man in the loop and thereby shortens the sensor to shooter kill chain,” Mr Sarkar concludes.

What is the key to a drone attack?

It has to be a combination of precision and surprise play a critical role, which essentially means ground and air surveillance together until the operation is over. And for this, as Kulshreshtha, explains “For a planned strike, the human intelligence (HUMINT) on the ground is very important as it helps in tracking the target for days and sometimes for weeks. So, for covert drone strikes, human intelligence and digital espionage mechanism is very important.”

Are the Indian Armed Forces ready for drone strikes?

Not really. So far the Indian services have been using the fixed-wing drones just for ISR (Intelligence, Surveillance, and Reconnaissance) purposes. However, weaponised drones have not been used by India and this is now emerging to be an essential technology in the context of today’s asymmetric warfare. And for drone launched missiles, there would be a requirement for Indian HUMINT operatives in the area of interest. And this would be a new effective warfare tactic, something similar to what the US is using.

A report by Patrick Tucker on an American web portal Defence One talks about massive tests carried out by the US Army of its future warfare plans. The US Army had linked together experimental drones, ground robots, satellites, and the goal was to show that the weapons and tools linked by AI can be used by humans to target, designate and strike from the air. And this is possible not only from a distance, by using any weapon, but in a fraction of the time, it takes to destroy the target.

At the end of that experiment, it emerged that in such a future warfare scenario, more people writing and analyzing code and data in real-time, closer to the action are required.

There will be a need for a new type of soldier who will be trained in AI, data science, software development and should be able to work and re-work algorithms closer to the front lines, or nearer to the area of conflict.

Why?

In the conflict, even the enemy will be changing tactics in using the same technology, therefore the code-writers will be playing a critical role as the algorithm will be changed to move the data faster.

30 Armed Drones from the US

Meanwhile, during the forthcoming India-US 2+2, Ministerial Dialogue expected to be at the end of October, an announcement regarding the \$ 3 billion deal for 30 drones from the US-based General Atomics is expected.

Financial Express Online has reported earlier that the deal is 10+10+10 for the Indian Army, Navy and Air Force and that the deal is expected by year-end. And due to the ongoing tensions between India and China along the Line of Actual Control (LAC), India is keen on getting these armed drones soon, as the sale of these to India has already been approved by the Trump administration.

Sources have told Financial Express Online, “Until the Acceptance of Necessity (AoN) is not issued, nothing else can move. Once that is received that everything will move faster.”

<https://www.financialexpress.com/defence/drones-to-be-the-future-of-warfare-india-needs-more-code-writers-data-analysts/2105166/>



Thu, 15 Oct 2020

A long, fragile winter in Ladakh | HT Editorial

The China of 2020 is different from the China of the late 1980s and early 1990s. India will have to come up with more creative ways than just wait for a solution to present itself

With the seventh round of talks between Indian and Chinese military commanders failing to yield a breakthrough, yet again, over the impasse in Ladakh, it is now clear that the confrontation in the region will persist through the winter, and perhaps, even beyond. The standoff — caused entirely by Chinese aggression across the Line of Actual Control (LAC) and its violation of border pacts — has posed the most serious national security challenge to India in recent years.

New Delhi has deployed a range of diplomatic, economic, and military tools to enhance the pressure on China to pull back. This has involved dialogue; deepening international partnerships, particularly through Quad; announcing economic measures against Chinese companies; keeping the eligibility of Huawei for 5G trials hanging in balance; boosting Indian counter-mobilisation at the border; and taking pre-emptive steps, including occupying the heights on the southern banks of Pangong Tso. All of this has ruffled Beijing — but not enough to withdraw, for China now sees this as a battle of prestige symbolically and an attempt to gain a strategic advantage in a key geopolitically significant location substantively.



Citing past standoffs which went on for years, Indian officials believe that the challenge is not to blink first and signal determination(ANI)

This means that Beijing is not going to behave responsibly. This also means that just like Galwan, the possibility of a military standoff escalating into a clash is alive. Citing past standoffs which went on for years, Indian officials believe that the challenge is not to blink first and signal determination. This, indeed, must be the case and India must not let its guard down. But do remember that the China of 2020 is different from the China of the late 1980s and early 1990s. India will have to come up with more creative ways than just wait for a solution to present itself.

<https://www.hindustantimes.com/editorials/a-long-fragile-winter-in-ladakh-ht-editorial/story-rz2BTpN05OZFRu2t8VNE7H.html>

New commanders' message for strategic 14 & 16 Corps is to be combat ready

The change of guard comes at a time when the Indian Army has said that it is ready to deal with the twin threats posed by China and Pakistan at the same time

By Ravi Krishnan Khajuria, Edited By Abhinav Sahay

Jammu: Amid a protracted Sino-India stand-off in eastern Ladakh and spike in ceasefire violations by Pakistan along the Line of Control (LoC) south of Pir Panjal, two strategic corps of the Indian Army—Leh based Fire & Fury Corps (14 Corps) and Nagrota based White Knight Corps (16 Corps) witnessed a change of guard.

Lt Gen PGK Menon took over the command of 'Fire & Fury Corps' from Lt Gen Harinder Singh on Tuesday.

"The General Officer has had a distinguished career in the Indian Army, tenating a number of important command and staff appointments. He is also The Colonel of the Sikh Regiment. The officer commanded a Rashtriya Rifles unit in Kashmir valley, an Infantry Brigade along the Line of Control in Jammu and Kashmir and an Infantry Division in the Eastern Sector. Prior to assuming Command of Fire & Fury Corps, he was tenating the appointment of Director General Recruiting at New Delhi," said a Defence spokesman.



Indian Army has made it clear that it is ready for a long haul in eastern Ladakh despite the winter to thwart China's designs.(AP Photo/Representative)

In his farewell message, Lt Gen Harinder Singh conveyed his gratitude and deep appreciation to all ranks of the 'Fire & Fury Corps' for their professionalism and steadfast dedication in the service of the nation, even in the most hostile terrain, weather and altitude challenges faced by any Army in the world.

On taking over, Lt Gen PGK Menon exhorted all ranks of 'Fire & Fury Corps' to continue to discharge their duties with the same commitment and zeal and always be prepared to deal with any threat to national security.

He urged them to continue to keep 'Nation First' in all their endeavours.

Lt Gen M V Suchindra Kumar took over command of the White Knight Corps from Lt Gen Harsha Gupta.

"Lt Gen Harsha Gupta on relinquishing the command of the White Knight Corps laid wreath for the brave soldiers, who have made supreme sacrifice for the nation, at Ashwamedh Shaurya Sthal at Nagrota Military Station and called upon all ranks to continue on the path to strive for excellence," said the Defence spokesman .

On assuming command of the White Knight Corps, Lt Gen M V Suchindra Kumar said that it was an honour to command such an elite formation with a rich history of J&K.

He exhorted all ranks to continue working with utmost zeal and enthusiasm and always remain combat ready to thwart the nefarious designs of India's adversaries and inimical forces while being in complete synergy with civil administration and paramilitary forces, he added.

White Knight Corps is the first line of defence along the LoC south of Pir Panjal range.

Right from Akhnoor in Jammu district to the twin border districts of Rajouri and Poonch, 16 Corps has the operational responsibility for the nearly 300 km long de-facto border with Pakistan.

Amid Sino-India stand-off in eastern Ladakh since April this year, Pakistan has intensified ceasefire violations along the LoC in Jammu region.

On the other hand Indian Army anticipates a “hot” winter and a long haul along the LAC in Ladakh this year.

<https://www.hindustantimes.com/india-news/new-commanders-message-for-strategic-14-16-corps-is-to-put-nation-1st/story-ZSHMeUXDPBi8Ve6beDXuSK.html>

Science & Technology News



Thu, 15 Oct 2020

Machine learning model helps characterize compounds for drug discovery

Now, Purdue University innovators have created a new method of applying machine learning concepts to the tandem mass spectrometry process to improve the flow of information in the development of new drugs. Their work is published in *Chemical Science*.

"Mass spectrometry plays an integral role in drug discovery and development," said Gaurav Chopra, an assistant professor of analytical and physical chemistry in Purdue's College of Science. "The specific implementation of bootstrapped machine learning with a small amount of positive and negative training data presented here will pave the way for becoming mainstream in day-to-day activities of automating characterization of compounds by chemists."



Credit: CC0 Public Domain

Chopra said there are two major problems in the field of machine learning used for chemical sciences. Methods used do not provide chemical understanding of the decisions that are made by the algorithm, and new methods are not typically used to do blind experimental tests to see if the proposed models are accurate for use in a chemical laboratory.

"We have addressed both of these items for a methodology that is isomer selective and extremely useful in chemical sciences to characterize complex mixtures, identify chemical reactions and drug metabolites, and in fields such as proteomics and metabolomics," Chopra said.

The Purdue researchers created statistically robust machine learning models to work with less training data—a technique that will be useful for drug discovery. The model looks at a common neutral reagent—called 2-methoxypropene (MOP) - and predicts how compounds will interact with MOP in a tandem mass spectrometer in order to obtain structural information for the compounds.

"This is the first time that machine learning has been coupled with diagnostic gas-phase ion-molecule reactions, and it is a very powerful combination, leading the way to completely automated mass spectrometric identification of organic compounds," said Hilikka Kenttämä, the Frank Brown Distinguished Professor of Analytical Chemistry and Organic Chemistry. "We are now introducing many new reagents into this method."

The Purdue team introduces chemical reactivity flowcharts to facilitate chemical interpretation of the decisions made by the machine learning method that will be useful to understand and interpret the mass spectra for structural information.

More information: Jonathan Fine et al, Graph-based machine learning interprets and predicts diagnostic isomer-selective ion–molecule reactions in tandem mass spectrometry, *Chemical Science* (2020). DOI: [10.1039/D0SC02530E](https://doi.org/10.1039/D0SC02530E)

Journal information: [Chemical Science](#)

<https://phys.org/news/2020-10-machine-characterize-compounds-drug-discovery.html>



Wed, 14 Oct 2020

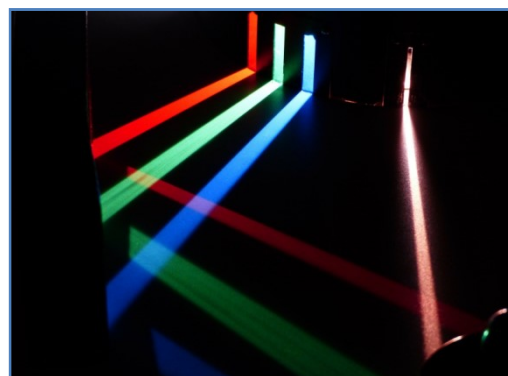
New method uses noise to make spectrometers more accurate

By Andy Fell

Optical spectrometers are instruments with a wide variety of uses. By measuring the intensity of light across different wavelengths, they can be used to image tissues or measure the chemical composition of everything from a distant galaxy to a leaf. Now researchers at the UC Davis Department of Biomedical Engineering have come up with a new, rapid method for characterizing and calibrating spectrometers, based on how they respond to "noise."

Rendering of prism and spectrum

Spectral resolution measures how well a spectrometer can distinguish light of different wavelengths. It's also important to be able to calibrate the spectrometer so that different instruments will give reliably consistent results. Current methods for characterizing and calibrating spectrometers are relatively slow and cumbersome. For example, to measure how the spectrometer responds to different wavelengths, you would shine multiple lasers of different wavelengths on it.



Credit: Pixabay/CC0 Public Domain

Noise is usually seen as being a nuisance that confuses measurements. But graduate student Aaron Kho, working with Vivek Srinivasan, associate professor in biomedical engineering and ophthalmology, realized that the excess noise in broadband, multiwavelength light could also serve a useful purpose and replace all those individual lasers.

"The spectrometer's response to noise can be used to infer the spectrometer's response to a real signal," Srinivasan said. That's because the excess noise gives each channel of the spectrum a unique signature.

Faster, more accurate calibration

Instead of using many single-wavelength lasers to measure the spectrometer's response at each wavelength, the new approach uses only the noise fluctuations that are naturally present in a light source with many wavelengths. In this way, it's possible to assess the spectrometer's performance in just a few seconds. The team also showed that they could use a similar approach to cross-calibrate two different spectrometers.

Kho and Srinivasan used the excess noise method in Optical Coherence Tomography (OCT), a technique for imaging living eye tissue. By increasing the resolution of OCT, they were able to discover a new layer in the mouse retina.

The excess noise technique has similarities to laser speckle, Kho said. Speckle—granular patterns formed when lasers are reflected off surfaces—was originally seen as a nuisance but turns out to be useful in imaging, by providing additional information such as blood flow.

"Similarly, we found that excess noise can be useful too," he said.

These new approaches for characterization and cross-calibration will improve the rigor and reproducibility of data in the many fields that use spectrometers, Srinivasan said, and the insight that excess noise can be useful could lead to the discovery of other applications.

The work was published Oct. 6 in *Light Science & Applications*.

More information: Aaron M. Kho et al, *Incoherent excess noise spectrally encodes broadband light sources*, *Light: Science & Applications* (2020). DOI: [10.1038/s41377-020-00404-6](https://doi.org/10.1038/s41377-020-00404-6)

Journal information: [Light: Science & Applications](https://light.scienceandapplications.com)

<https://phys.org/news/2020-10-method-noise-spectrometers-accurate.html>



Wed, 14 Oct 2020

Record high values of peak power with picosecond generators

Powerful picosecond generators are in demand in various fields of experimental electrophysics to produce ultrashort electron beams and X-ray pulses in vacuum diodes and to form runaway electron flows in gases.

They also have applications in high-power microwave electronics, but researchers are constantly striving to obtain shorter and more powerful pulses.

In *Review of Scientific Instruments*, by AIP Publishing, scientists showed compact solid-state pulse generators could generate electrical pulses of less than one-billionth of a second in duration and up to 50 billion watts in power.

"For comparison, the most powerful hydroelectric power plant in China has an output power of 22.5 billion watts," said Sergei Rukin, one of the authors.

Improving picosecond generators and mastering higher peak power levels in the picosecond range sets the groundwork for new applications in the coming years.

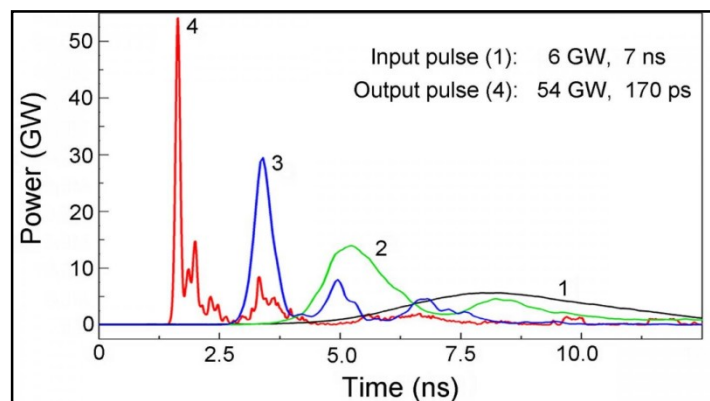
"This also happened with the development of powerful nanosecond pulsed devices during the last 60 years," said Rukin.

At first, generators with unique parameters were developed and then, application areas appeared, such as high-power microwave electronics and X-ray imaging devices for medical and engineering applications.

An input pulse of a nanosecond duration from a solid-state semiconductor opening switch generator was amplified in power and reduced in duration by a three-stage magnetic compressor on ferrite gyromagnetic lines.

The line of each stage operated in the magnetic compression line mode, which occurs at close values of the input pulse duration and the period of oscillations generated in the line.

In the picosecond range of pulse duration, record high values of peak power and rate of rise of the output voltage and power were achieved.



Compression of the pulse over time (1 to 4) with an increase in peak power as the pulse travels along the magnetic compression lines
Credit: Sergei Rukin

A surprising feature was that neither closing nor opening switches were required in the pulse compression system. The pulse amplification in power and its compression in time occurred automatically during the passage of the pulse among magnetic compression lines.

The researchers are working on an additional stage of energy compression that can be used to generate powerful microwave oscillations and to study the development of electrical discharges in various dielectric media at extremely high electric fields.

More information: E. A. Alichkin et al, Picosecond solid-state generator with a peak power of 50 GW, *Review of Scientific Instruments* (2020). DOI: [10.1063/5.0017980](https://doi.org/10.1063/5.0017980)

Journal information: [Review of Scientific Instruments](https://phys.org/news/2020-10-high-values-peak-power-picosecond.html)
<https://phys.org/news/2020-10-high-values-peak-power-picosecond.html>

COVID-19 Research News

ScienceDaily®

Thu, 15 Oct 2020

New blood test predicts which COVID-19 patients will develop severe infection

Test could inform doctors on best treatment options

Summary:

Scientists have developed a score that can accurately predict which patients will develop a severe form of COVID-19.

Scientists have developed, for the first time, a score that can accurately predict which patients will develop a severe form of Covid-19.

The study, led by researchers at RCSI University of Medicine and Health Sciences, is published in The Lancet's translational research journal *EBioMedicine*.

The measurement, called the Dublin-Boston score, is designed to enable clinicians to make more informed decisions when identifying patients who may benefit from therapies, such as steroids, and admission to intensive care units.

Until this study, no Covid-19-specific prognostic scores were available to guide clinical decision-making. The Dublin-Boston score can now accurately predict how severe the infection will be on day seven after measuring the patient's blood for the first four days.

The blood test works by measuring the levels of two molecules that send messages to the body's immune system and control inflammation. One of these molecules, interleukin (IL)-6, is pro-inflammatory, and a different one, called IL-10, is anti-inflammatory. The levels of both are altered in severe Covid-19 patients.

Based on the changes in the ratio of these two molecules over time, the researchers developed a point system where each 1-point increase was associated with a 5.6 times increased odds for a more severe outcome.

"The Dublin-Boston score is easily calculated and can be applied to all hospitalised Covid-19 patients," said RCSI Professor of Medicine Gerry McElvaney, the study's senior author and a consultant in Beaumont Hospital.

"More informed prognosis could help determine when to escalate or de-escalate care, a key component of the efficient allocation of resources during the current pandemic. The score may also have a role in evaluating whether new therapies designed to decrease inflammation in Covid-19 actually provide benefit."

The Dublin-Boston score uses the ratio of IL-6 to IL-10 because it significantly outperformed measuring the change in IL-6 alone.

Despite high levels in blood, using only IL-6 measurements as a Covid-19 prognostic tool is hindered by several factors. IL-6 levels within the same patient vary over the course of any given day, and the magnitude of the IL-6 response to infection varies between different patients.

The Dublin-Boston score was developed by researchers from RCSI, Harvard University, Beaumont Hospital in Dublin and the Brigham and Women's Hospital in Boston.

Story Source:

[Materials](#) provided by [RCSI](#). Note: Content may be edited for style and length.

Journal Reference:

1. Oliver J McElvaney, Brian D Hobbs, Dandi Qiao, Oisín F McElvaney, Matthew Moll, Natalie L McEvoy, Jennifer Clarke, Eoin O'Connor, Seán Walsh, Michael H Cho, Gerard F Curley, Noel G McElvaney. **A linear prognostic score based on the ratio of interleukin-6 to interleukin-10 predicts outcomes in COVID-19.** *EBioMedicine*, 2020; 61: 103026 DOI: [10.1016/j.ebiom.2020.103026](https://doi.org/10.1016/j.ebiom.2020.103026)
<https://www.sciencedaily.com/releases/2020/10/201014114106.htm>

live**mint**

Thu, 15 Oct 2020

Covid-19 linked to sudden permanent hearing loss in some rare cases: Scientists

- *According to the scientists, the patient had not lost his hearing or had ear problems before, and apart from asthma, he was otherwise fit and well.*
- *While the causes are not very clear, the condition sometimes follows a viral infection, such as flu or herpes*

London: Although uncommon, infection with the novel coronavirus may cause sudden permanent hearing loss in some patients, according to a study which is the first case report linking the disabling condition to COVID-19 in the UK.

According to the scientists, including those from the University College London in the UK, awareness of this possible side effect is important since a prompt course of steroid treatment can reverse the hearing loss.

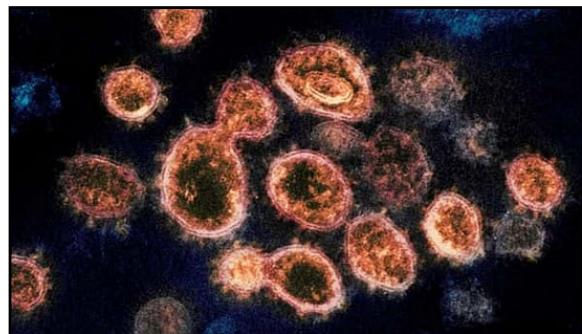
They said while the causes are not very clear, the condition sometimes follows a viral infection, such as flu or herpes.

The research, published in the journal *BMJ Case Reports*, describes the case of a 45 year old man with asthma who was referred to the Royal National Throat Nose and Ear Hospital in the UK after suddenly experiencing hearing loss in one ear while being treated for COVID-19.

According to the scientists, the patient had been admitted to hospital with COVID-19 symptoms which had been going on for 10 days during which he was transferred to intensive care as he was struggling to breathe.

He was put on a ventilator for 30 days, and developed other complications as a result, the study noted.

The researchers noted that he was treated with the antiviral drug remdesivir, intravenous steroids, and a blood transfusion after which he started to get better.



FILE - This 2020 electron microscope image provided by the National Institute of Allergy and Infectious Diseases - Rocky Mountain Laboratories shows SARS-CoV-2 virus particles which causes COVID-19, isolated from a patient in the US (AP)

However, the patient noticed ringing (tinnitus) in his left ear followed by sudden hearing loss in that ear a week after the breathing tube was removed and he left intensive care.

According to the scientists, he had not lost his hearing or had ear problems before, and apart from asthma, he was otherwise fit and well.

On examining his ear canals, they found that there were no blockages or inflammation, but a hearing test showed that he had substantially lost his hearing in the left ear.

He was treated with steroid tablets and injections after which his hearing partially recovered, the study noted.

The scientists said he tested negative for other potential causes, including rheumatoid arthritis, flu and HIV, prompting his doctors to conclude that his hearing loss was associated with COVID-19 infection.

"Despite the considerable literature on COVID-19 and the various symptoms associated with the virus, there is a lack of discussion on the relationship between COVID-19 and hearing," the researchers wrote in the case report.

"Hearing loss and tinnitus are symptoms that have been seen in patients with both COVID-19 and influenza virus, but have not been highlighted," they added.

The scientists assessed similar cases reported since the beginning of the novel coronavirus pandemic, including the the first study of hearing loss mentioning COVID-19 alone in April.

They said the SARS-CoV-2 virus binds to a particular type of cell lining the lungs, and could also infect similar cells lining the middle ear.

According to the scientists, the virus also generates an inflammatory response and an increase in the chemicals that have been linked to hearing loss.

"Given the widespread presence of the virus in the population and the significant morbidity of hearing loss, it is important to investigate this further," the researchers wrote in the study.

"This is especially true given the need to promptly identify and treat the hearing loss and the current difficulty in accessing medical services," they added.

The scientists said doctors should ask patients in intensive care about hearing loss and refer them for urgent treatment.

<https://www.livemint.com/science/health/covid-19-linked-to-sudden-permanent-hearing-loss-in-some-rare-cases-scientists-11602656785699.html>

