Oct
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समाचार पत्रों से चयित अंश
Newspapers Clippings

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Successful Flight Test of SMART

Supersonic Missile Assisted Release of Torpedo (SMART) has been successfully flight tested today 5th Oct 2020 at 1145 hrs from Wheeler Island off the coast of Odisha. All the mission objectives including missile flight upto the range and altitude, separation of the nose cone, release of Torpedo and deployment of Velocity Reduction Mechanism (VRM) have been met perfectly.

The tracking stations (Radars, Electro Optical Systems) along the coast and the telemetry stations including down range ships monitored all the events.

SMART is a missile assisted release of lightweight Anti-Submarine Torpedo System for Anti-Submarine Warfare (ASW) operations far beyond Torpedo range.This launch and demonstration is significant in establishing Anti-Submarine warfare capabilities.

A number of DRDO laboratories including DRDL, RCI Hyderabad, ADRDE Agra, NSTL Visakhapatnam have developed the technologies required for SMART.

Raksha Mantri Shri Rajnath Singh congratulated the DRDO Scientists for the important feat.

Secretary DD R&D & Chairman DRDO Dr G Satheesh Reddy, said that SMART is a game changer technology demonstration in the Anti-Submarine Warfare.

https://www.pib.gov.in/PressReleasePage.aspx?PRID=1661707

Press Information Bureau
Government of India

रक्षा मंत्रालय

Mon, 05 Oct 2020 1:26PM

एसएसएआरटी का सफलतापूर्वक परीक्षण किया गया

ओडिशा तट से दूर व्हीलर द्वीप से आज पांच अक्टूबर 2020 को सुबह 11:45 बजे सुपरसोनिक मिसाइल असिस्टेंट रिलीज आफ टॉरपीडो (एसएमएआरटी) का सफलतापूर्वक परीक्षण किया गया। इसमें रेंज और ऊंचाई तक मिसाइल की उड़ान, आगे शंकु के आकार के नकीले भाग का पृथक्करण, टारपीडो का अलग होना और वेग न्यूनीकरण तंत्र (वीआरएम) की तैनाती सहित सभी मिशन उद्देश्यों का पूरी तरह से पालन किया गया है।

समुद्र तट के अलावा ट्रैकिंग स्टेशन (रडार, इलेक्ट्रो ऑप्टिकल सिस्टम) और डाउन रेंज जहाजों सहित दूरमापी स्टेशनों ने सभी घटनाओं की निगरानी की।

एसएमआरटीए, टॉरपीडो रेंज से परे एक मिसाइल पनडुब्बी रोधी युद्ध क्षमता (एएसडब्ल्यू) ऑपरेशन के लिए हल्के एंटी-सबमरीन टॉरपीडो सिस्टम की एक मिसाइल असिस्टेड रिलीज है। यह प्रक्षेपण और प्रदर्शन पनडुब्बी रोधी युद्ध क्षमता स्थापित करने में महत्वपूर्ण है।

डीआरडीएल, आरसीआई हैदराबाद, एडीआरडीई आगरा, एनएसटीएल विशाखापत्तनम सहित कई डीआरडीओ प्रयोगशालाओं ने एसएमएआरटी के लिए आवश्यक तकनीकों का विकास किया है।

रक्षा मंत्री राजनाथ सिंह ने महत्वपूर्ण उपलब्धि के लिए डीआरडीओ के वैज्ञानिकों को बधाई दी है।

डीडी आरएंडडी के सचिव और डीआरडीओ के अध्यक्ष जी सतीश रेड्डी ने कहा कि एसएमएआरटी पनडुब्बी रोधी युद्ध क्षमता स्थापित करने में महत्वपूर्ण तकनीक है।

https://pib.gov.in/PressReleasePage.aspx?PRID=1661728

Press Information Bureau
Government of India

రక్షణ మంత్రిత్వ శాఖ

Mon, 05 Oct 2020 1:26PM

'స్మార్ట్' ప్రయోగం విజయవంతం

'సూపర్‌సోనిక్ మిస్సైల్ అసిస్టెడ్ రిలీజ్ ఆఫ్ టోర్పెడో' (స్మార్ట్) ప్రయోగం విజయవంతమైంది. ఒడిశాలోని వీలర్ ద్వీపం నుంచి ఉదయం 11.45 గం.కు ప్రయోగం జరిగింది. క్షిపణి పరిధి, ఎగిరిన ఎత్తు, ముందు భాగం విడుదల, టోర్పెడో విడుదల, వేగ నియంత్రణ వ్యవస్థ సహా ప్రయోగంలోని అన్ని దశలు అంచనాలకు తగ్గట్లుగా సమర్థంగా పని చేశాయి.

తీరం వెంబడి ఉన్న పర్యవేక్షక కేంద్రాలు (రాడార్లు, ఎలెక్ట్రో ఆప్టికల్ వ్యవస్థలు), తక్కువ పరిధి ఓడలు, టెలిమెట్రీ కేంద్రాలు ప్రయోగంలోని అన్ని దశలను పర్యవేక్షించాయి.

స్మార్ట్ అనేది క్షిపణి సాయంతో విడుదలయ్యే తేలికపాటి జలాంతర్గామి విధ్వంసక టోర్పెడో వ్యవస్థ. టోర్పెడో పరిధికి మించివున్న జలాంతర్గామి విధ్వంసక యుద్ధ కార్యకలాపాల్లో వినియోగిస్తారు. జలాంతర్గామి విధ్వంసక యుద్ధ కార్యకలాపాల్లో మన దేశ సత్తాను ఈ ప్రయోగం చాటింది.

డీఆర్‌డీఎల్, ఆర్‌సీఐ హైదరాబాద్, ఏడీఆర్‌డీఈ ఆగ్రా, ఎన్ఎస్‌టీఎల్ విశాఖపట్నం కలసి, స్మార్ట్‌కు అవసరమైన సాంకేతికతలను అభివృద్ధి చేశాయి.

ప్రయోగాన్ని విజయవంతం చేసిన డీఆర్‌డీవో శాస్త్రవేత్తలను రక్షణ మంత్రి శ్రీ రాజ్‌నాథ్ సింగ్ అభినందించారు.

జలాంతర్గామి విధ్వంసక యుద్ధ కార్యకలాపాల తీరును మార్చే సాంకేతికతగా స్మార్ట్‌ను డీఆర్‌డీవో ఛైర్మన్ డా.జి. సతీష్ రెడ్డి అభివర్ణించారు.

https://pib.gov.in/PressReleasePage.aspx?PRID=1661725

THE NEW INDIAN EXPRESS

Tue, 06 Oct 2020

In major breakthrough, India successfully tests supersonic missile-assisted release of torpedo

SMART is a hybrid missile that incorporates technologies of two different weapon systems making it faster and stealthier. With this, India has got an anti-submarine weapon with much higher range

By Hemant Kumar Rout

Bhubaneswar: In a major technological breakthrough, India on Monday successfully tested the Supersonic Missile Assisted Release of Torpedo (SMART) system for the first time from a defence facility off the Odisha coast.

Developed by the Defence Research and Development Organisation (DRDO), SMART is a missile assisted release of lightweight anti submarine torpedo system for Anti Submarine Warfare (ASW) operations far beyond torpedo range. The launch demonstrated India's anti submarine warfare capabilities.

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

Defence sources said the test was conducted from a ground based platform at the Abdul Kalam Island at about 11.45 am. All the mission objectives including missile flight upto the range and altitude, separation of the nose cone, release of torpedo and deployment of Velocity Reduction Mechanism (VRM) have been met perfectly.

All the tracking stations, radars, electro-optical systems along the coast and the telemetry stations including down range ships monitored the event. "SMART is a game changer technology demonstration in the anti submarine warfare. It is one of the important missile technologies India has developed in recent times," DRDO Chairman Dr G Satheesh Reddy said.

SMART is a hybrid missile that incorporates technologies of two different weapon systems making it faster and stealthier. With this, India has got an anti-submarine weapon having much higher range. While the long range torpedo available in the world is around 50 km and rocket-assisted torpedoes can strike at a range of 150 km, the SMART will have a range of over 600 km.

"Once fired, the weapon system will fly like a supersonic missile in the air at a low altitude and eject the torpedo into water after it comes closer to the target. The torpedo will then move towards the target and destroy it," said a scientist associated with the project.

The technology required for SMART has been developed by a number of laboratories, including the Hyderabad-based Defence Research Development Laboratory (DRDL) and Research Centre Imarat (RCI), Agra-based Aerial Delivery Research and Development Establishment (ADRDE) and Visakhapatnam-based Naval Science and Technological Laboratory (NSTL).

Defence Minister Rajnath Singh has congratulated the DRDO scientists for the significant achievement. "This will be a major technology breakthrough for stand-off capability in anti-submarine warfare," he said.

https://www.newindianexpress.com/nation/2020/oct/05/in-major-breakthrough-india-successfully-tests-supersonic-missile-assisted-release-of-torpedo-2206076.html

THE ECONOMIC TIMES

Tue, 06 Oct 2020

India successfully tests indigenously developed "game changer" SMART torpedo system

Synopsis

SMART is a missile assisted release of lightweight anti-submarine torpedo system for anti-submarine warfare (ASW) operations far beyond the torpedo range. This launch and demonstration is significant in establishing anti-submarine warfare capabilities, a defence statement said.

Balasore: India on Monday successfully flight tested its indigenously developed SMART torpedo system, which the DRDO said will be a "game changer" in anti-submarine warfare, marking yet another milestone in strengthening the country's maritime strategic capabilities, defence sources said.

Defence Minister Rajnath Singh

The Supersonic Missile Assisted Release of Torpedo (SMART) was tested at 1145 hours from the APJ Abdul Kalam Island, earlier known as Wheeler Island, off the Odisha coast.

It met all the objectives "flawlessly".

SMART is a missile assisted release of lightweight anti-submarine torpedo system for anti-submarine warfare (ASW) operations far beyond the torpedo range. This launch and demonstration is significant in establishing anti-submarine warfare capabilities, a defence statement said.

Defence Minister Rajnath Singh congratulated Defence Research and Development Organisation scientists on the successful conduct of the test which marks a major breakthrough for stand-off capability in anti-submarine warfare, a DRDO official said.

The flight testing of SMART follows the successful test firing on Saturday of its indigenously developed nuclear capable hypersonic missile 'Shaurya' with a strike range of around 1,000 km from the test range.

"All the mission objectives (of SMART) including missile flight upto the range and altitude, separation of the nose cone, release of torpedo and deployment of velocity reduction mechanism (VRM) have been met perfectly," the statement said.

Tracking stations, including radars and electro optical systems along the coast and telemetry stations, also involving down range ships, monitored all the events.

A number of DRDO laboratories including DRDL, RCI Hyderabad, ADRDE Agra and NSTL Visakhapatnam have developed the technologies required for SMART, the sources said.

Secretary to the department of defence R&D and Chairman DRDO Dr G Satheesh Reddy said that SMART is a "game changer" technology demonstration in anti-submarine warfare.

The test encompasses hybrid technology which helps to upgrade the present system and also increase the striking range, the defence statement said.

SMART, when launched from warship or a truck-based coastal battery, takes off like a regular supersonic missile. It covers most of its flight in the air at lower altitudes with two-way data link from the warship or an airborne submarine target detection system and provides the exact location of the hostile submarine to correct its flight path midway, it said.

Just when it approaches close enough to the submerged submarine, the missile will eject the torpedo system into the water and the autonomous torpedo will start moving towards its target to take out the submarine, it added.

https://economictimes.indiatimes.com/news/defence/drdo-successfully-flight-tests-supersonic-missile-assisted-release-of-torpedo/articleshow/78489822.cms

NEWS 18

Tue, 06 Oct 2020

India successfully flight-tests indigenous 'SMART' missile off Odisha coast

SMART is a missile assisted release of lightweight anti-submarine torpedo system for anti-submarine warfare (ASW)operations far beyond torpedo range

Balasore: India on Monday successfully flight-tested its indigenously developed Supersonic Missile Assisted Release of Torpedo (SMART) from a test range off Odisha coast, defence sources said. The trial, conducted at 1145 hrs from the APJ Abdul Kalam Island, earlier known as Wheeler Island, met all the objectives flawlessly, the sources said.

SMART is a missile assisted release of lightweight anti-submarine torpedo system for anti-submarine warfare (ASW) operations far beyond torpedo range. This launch and demonstration is significant in establishing anti-submarine warfare capabilities, a defence statement said. Defence Minister Rajnath Singh congratulated the Defence Research and Development Organisation (DRDO) scientists for the feat which marks a breakthrough for stand-off capability in anti-submarine warfare, a DRDO official said.

This launch and demonstration is significant in establishing anti-submarine warfare capabilities, a defence statement said. (Credits: ANI)

The flight testing of SMART follows the successful test firing on Saturday of its indigenously developed nuclear-capable hypersonic missile 'Shaurya' with a strike range of around 1,000 km from the test range. "All the mission objectives (of SMART) including missile flight upto the range and altitude, separation of the nose cone, release of torpedo, and deployment of velocity reduction mechanism (VRM) have been met perfectly, the statement said.

Tracking stations including radars and electro optical systems along the coast and telemetry stations, including downrange ships monitored all the events. Several Defence Research and Development (DRDO) laboratories including DRDL, RCI Hyderabad, ADRDE Agra and STL Visakhapatnam have developed the technologies required for SMART, the sources said.

Secretary to the department of defence R&D and chairman DRDO Dr G Satheesh Reddy said that SMART is a gamechanger technology demonstration in anti-submarine warfare. The test encompasses hybrid technology which helps to upgrade the present system and also increases the striking range, the defence statement said.

SMART when launched from a warship or a truck- based coastal battery, takes off like a regular supersonic missile. It covers most of its flight in the air at lower altitudes with two-way data link from the warship or an airborne submarine target detection system and provides the exact location of the hostile submarine to correct its flight path midway, it said.

Just when it approaches close enough to the submerged submarine, the missile will eject the torpedo system into the water and the autonomous torpedo will start moving towards its target to take out the submarine, it added.

https://www.news18.com/news/india/india-successfully-flight-tests-indigenous-smart-missile-off-odisha-coast-2935063.html

Hindustan Times

Tue, 06 Oct 2020

India conducts successful flight test of SMART; 'Game-changer,' says DRDO Chief

SMART stands for 'Supersonic Missile Assisted Release of Torpedo.'
Its flight test was conducted from Wheeler Island off the coast of Odisha
Edited By Karan Manral

New Delhi: India on Monday conducted a successful flight test of the Supersonic Missile Assisted Release of Torpedo (SMART) from Wheeler Island off the coast of Odisha.

All mission objectives, including missile flight upto the range and altitude, separation of the nose cone, the release of Torpedo and deployment of Velocity Reduction Mechanism (VRM), were met perfectly in the flight test, the Press Information Bureau, the government's nodal agency, noted in a release.

SMART successfully fight tested (Image credit: ANI)

"The tracking stations (Radars, Electro Optical Systems) along the coast and telemetry stations including down range ships monitored all the events," the release further noted.

Congratulating the Defence Research and Development Organisation (DRDO), defence minister Rajnath Singh tweeted, "The DRDO has successfully flight tested the Supersonic Missile assisted release of Torpedo, SMART. This will be a major technology breakthrough for stand-off capability in anti-submarine warfare. I congratulate DRDO and other stakeholders for this significant achievement."

SMART is a missile assisted release of lightweight Anti-Submarine Torpedo System for anti-submarine warfare (ASW) operations for far beyond torpedo range. This launch and demonstration are significant in establishing ASW capabilities.

Dr G Satheesh Reddy, Chairman, DRDO, described SMART as a 'game-changer' technology demonstration in anti-submarine warfare.

Monday's test comes after the DRDO successfully tested Laser-Guided Anti Tank Guided Missile on September 23 in Ahmednagar, Maharashtra. (With agency inputs)

https://www.hindustantimes.com/india-news/drdo-successfully-flight-tests-supersonic-missile-assisted-release-of-torpedo/story-W9pJlC9KtQiXslItHoRt9K.html

अमर उजाला

Tue, 06 Oct 2020

चीन से युद्ध के खतरे के बीच 'स्मार्ट' का सफल परीक्षण, पनडुब्बी रोधी जंग में कई गुना बढ़ जाएगी नौसेना की ताकत

नई दिल्ली: चीन और पाकिस्तान की ओर से जंग के खतरे के बीच भारत ने सोमवार को सुपरसोनिक मिसाइल असिस्टेड रिलीज ऑफ टॉरपीडो (स्मार्ट) का सफलतापूर्वक परीक्षण किया। यह परीक्षण ओडिशा के समुद्री तट पर व्हीलर आइलैंड पर किया गया। यह एक ऐसी प्रणाली है जिसमें टॉरपीडो के साथ मिसाइल भी होती है। पनडुब्बी रोधी जंग में यह तकनीक नौसेना की ताकत को कई गुना बढ़ा सकती है।

सुपरसोनिक मिसाइल - फोटो: ANI

परीक्षण के दौरान रेंज और अल्टीट्यूड (ऊंचाई) तक मिसाइल की उड़ान, नोज कोन को अलग करने, टारॅपीडो के रिलीज और वेलोसिटी रिडक्शन मैकेनिज्म के फैलाव (वीआरएम) समेत मिशन के सभी लक्ष्य हासिल किए गए। स्मार्ट के बारे में, डीआरडीओ के अध्यक्ष डॉ. जी सतीश रेड्डी ने कहा कि पनडुब्बी रोधी जंग (एएसडब्ल्यू) में स्मार्ट एक गेंमचेंजर तकनीक डेमोस्ट्रेशन है। परीक्षण के दौरान की घटनाओं की निगरानी ट्रैकिंग स्टेशनों (रडार, इलेक्ट्रो ऑप्टिकल सिस्टम्स) द्वारा तट के जरिए और डाउन रेंज शिप के साथ टेलीमेट्री स्टेशनों द्वारा की गई। स्मार्ट के लिए आवश्यक तकनीक को तैयार करने में डीआरडीओ की विभिन्न लैब जैसे डीआरडीएल, आरसीआई हैदराबाद, एडीआरडीई आगरा, एनएसटीएल विशाखापट्टनम ने अहम भूमिका निभाई।

क्या है स्मार्ट

यह एक तरह की सुपरसोनिक एंटी-शिप मिसाइल है। इसके साथ एक कम वजन का टॉरपीडो लगा है जो पेलोड की तरह इस्तेमाल होता है। दोनों मिलकर इसे एक सुपरसोनिक एंटी-सबमरीन मिसाइल बना देते हैं यानी इसमें मिसाइल के फीचर्स भी मिलेंगे और पनडुब्बी नष्ट करने की क्षमता भी। पूरी तरह तैयार होने पर इस हथियार प्रणाली की रेंज 650 किलोमीटर होगी। इतनी ज्यादा रेंज वाली प्रणाली की मौजूदगी नौसेना को दुनिया की सबसे खतरनाक नौसेनाओं की सूची में और ऊपर पहुंचा देगी।

जीपीएस से लक्ष्य खोजने वाला वरुणास्त्र पहले से

देश के पास वरुणास्त्र नामक एक पनडुब्बी रोधी टॉरपीडो पहले से है जो जीपीएस की मदद से अपने लक्ष्य को भेद सकता है। स्मार्ट इसकी तुलना में काफी हल्का है। एक टन से अधिक वजनी वरुणास्त्र अपने साथ 250 किलो तक का वॉरहेड ले जा सकता है। उसका गाइडेंस सिस्टम भी उन्नत है। भारत के पास ब्रह्मोस सुपरसोनिक एंटी-शिप और लैंड-अटैक क्रूज मिसाइल भी है।

एलएसी पर तनाव के बीच डीआरडीओ अति सक्रिय

चीन के साथ पूर्वी लद्दाख में वास्तविक नियंत्रण रेखा (एलएसी) पर तनाव को देखते हुए डीआरडीओ अति सक्रिय हो गया है। पिछले कुछ हफ्तों से वह लगातार परीक्षण कर रहा है। शौर्य मिसाइल के नए वर्जन का भी शनिवार को सफल परीक्षण किया गया। यह मिसाइल 800 किलोमीटर दूर तक लक्ष्य को निशाना बनाने में सक्षम है। इसके लिए पिछले महीने एमबीटी अर्जुन टैंक से लेज गाइडेड एंटी टैंक गाइडेड मिसाइल का परीक्षण किया गया था। एजीटीएम हर तरह के टैंक को नष्ट करने में सक्षम होगा। इसके अलावा 'अभ्यास' हाई स्पीड एक्सपेंडेबल एरियल टारगेट (हीट) का भी सफलतापूर्वक परीक्षण हुआ।

रक्षा मंत्री ने दी डीआरडीओ को बधाई

रक्षामंत्री राजनाथ सिंह ने इस सफलता के लिए रक्षा अनुसंधान और विकास संगठन (डीआरडीओ) को बधाई दी है। उन्होंने ट्वीट किया कि डीआरडीओ ने सफलतापूर्वक सुपरसोनिक मिसाइल असिस्टेड रिलीज ऑफ टारपीडो, स्मार्ट का परीक्षण किया है। यह पनडुब्बी रोधी युद्ध में स्टैंड ऑफ क्षमता के लिए एक प्रमुख तकनीकी सफलता होगी। वह इस महत्वपूर्ण उपलब्धि के लिए डीआरडीओ और अन्य स्टेकहोल्डरों को बधाई देते हैं।

https://www.amarujala.com/india-news/drdo-successfully-flight-tested-supersonic-missile-assisted-release-of-torpedo-smart-defence-minister-congratulate-it

TIMES NOW हिंदी

Tue, 06 Oct 2020

सुपरसोनिक मिसाइल के क्षेत्र में भारत का एक और कारनामा, SMART का हुआ सफल परीक्षण

SMART : इस परीक्षण के दौरान SMART मिसाइल अपने सभी मानकों एवं अभियानगत प्रक्रियाओं पर खरी उतरी और निर्धारित लक्ष्य को सफलतापूर्वक भेद दिया।

मुख्य बातें

- ***सुपरसोनिक मिसाइल के क्षेत्र में भारत ने बढ़ाया एक और बड़ा कदम***
- ***सुपरसोनिक असिस्टेड रिलीज ऑफ टॉरपीडो का हुआ सफल परीक्षण***
- ***इस उपलब्धि के लिए रक्षा मंत्री राजनाथ सिंह ने वैज्ञानिकों को दी बधाई***

नई दिल्ली: सुपरसोनिक मिसाइल के क्षेत्र में भारत ने एक और छलांग लगाई है। भारत ने सोमवार को ओडिशा तट के ह्वीलर द्वीप से सुपरसोनिक असिस्टेड रिलीज ऑफ टॉरपीडो (एसएमएआरटी) का सफल परीक्षण किया। इस परीक्षण के दौरान मिसाइल अपने सभी मानकों एवं अभियानगत प्रक्रियाओं पर खरी उतरी और निर्धारित लक्ष्य को सफलतापूर्वक भेद दिया। इस सफलता पर रक्षा मंत्री राजनाथ सिंह ने रक्षा अनुसंधान विकास संगठन (डीआरडीओ) के वैज्ञानिकों को बधाई दी है।

रक्षा मंत्री ने वैज्ञानिकों को दी बधाई

रक्षा मंत्री ने अपने एक ट्वीट में कहा, 'डीआरडीओ ने सुपरसोनिक असिस्टेड रिलीज ऑफ टॉरपीडो (एसएमएआरटी) का सफल परीक्षण किया है। एंटी सब-मरीन युद्ध में स्टैंड ऑफ क्षमता बनाने की दिशा में यह एक और महत्वपूर्ण तकनीक साबित होगी। मैं इस उपलब्धि के लिए डीआरडीओ के वैज्ञानिकों एवं अन्य हितधारकों को बधाई देता हूं।'

सुपरसोनिक मिसाइल के क्षेत्र में भारत का एक और कारनामा, SMART का हुआ सफल परीक्षण। | तस्वीर साभार: ANI

एंटी सबमरीन वॉरफेयर क्षमता बढ़ी

टॉरपीडो के रेंज से बाहर एंटी सबमरीन वॉरफेयर (एएसडब्बल्यू) अभियान में यह मिसाइल काफी उपयोगी साबित होगी। मिसाइल के इस परीक्षण की निगरानी अलग-अलग तंत्रों (समुद्र स्थित पोतों, तट एवं टेलिमेट्री स्टेशनों) से की गई। इस महीन के शुरुआत में डीआरडीओ ने लेजर गाइडेड एंटी टैंक मिसाइल का सफल परीक्षण किया। इस मिसाइल का परीक्षण एमबीटी अर्जुन टैंक से हुआ।

भारत कर रहा मिसाइलों का लगातार परीक्षण

चीन के साथ जारी तनाव के बीच भारत लगातार अपनी मिसाइलों का परीक्षण कर रहा है। गत शनिवार को भारत ने सतह से सतह पर मार करने वाली एवं परमाणु हथियारों को अपने साथ जे जान में सक्षम शौर्य मिसाइल के उन्नत संस्करण का परीक्षण किया। यह मिसाइल 800 किलोमीटर की दूरी तक लक्ष्य को भेद सकती है। शौर्य का यह उन्नत संस्करण वजन में हल्का है और इसका संचालन पहले से आसान है।

https://www.timesnowhindi.com/india/article/drdo-successfully-flight-tests-supersonic-missile-assisted-release-of-torpedo/315719

THE WEEK

Tue, 06 Oct 2020

Explainer: DRDO's SMART missile could be trump card against China's submarines

SMART would be a quantum leap for the Indian Navy's anti-submarine warfare

The ministry of defence announced that the DRDO has tested a new weapon system called the Supersonic Missile-Assisted Release of Torpedo (SMART) on Monday from its test facility at Wheeler Island off the coast of Odisha.

In a press release, DRDO described SMART as a system meant to conduct anti-submarine warfare operations (ASW) "far beyond" torpedo range.

DRDO announced that all mission objectives for the SMART system had been fulfilled. Defence Minister Rajnath Singh congratulated DRDO for the test, describing it as a "significant achievement". Rajnath tweeted, "This will be a major technology breakthrough for stand-off capability in anti-submarine warfare."

The test of the SMART missile | Via Twitter

Plaudits aside, what exactly is SMART?

SMART has been a seemingly 'mysterious' project for the DRDO with few details available on what the system was, unlike the programme to build ballistic missiles or a stealth fighter.

One of the first details of what SMART is came from the ministry of defence's annual report for 2018 to 2019. In the report, the ministry of defence noted, "DRDO has taken up a project to develop and demonstrate a missile-assisted release of light weight anti-submarine torpedo system for ASW operations far beyond torpedo range (50-650 km)." The ministry of defence also noted that ejection trials had been conducted with a Torpedo Advanced Light (TAL), an indigenously developed torpedo, which is also called the Shyena.

From the available information, it is clear the SMART is a rocket system that carries an anti-submarine torpedo as its payload. Such rocket systems fly to a designated point over water, before releasing their torpedoes.

Why rocket-assisted torpedoes matter

Surface warships, particularly in western navies, have typically carried light-weight torpedoes as their primary weapon for anti-submarine warfare as heavy-weight torpedoes are significantly larger in diameter, meaning fewer can be carried.

However, light-weight torpedoes also have shorter range. For example, the Shyena is estimated to have a range of around 20km. The short range of light-weight torpedoes makes them, effectively, defensive weapons against enemy submarines.

This would pose a significant disadvantage particularly if an enemy has a large number of submarines, in particular, nuclear-powered vessels that have much higher submerged speed than conventional diesel-electric submarines.

Rocket-assisted torpedoes, effectively, extend a torpedo's range and also help it cover a larger distance in a shorter period of time.

Rocket-assisted torpedoes are not new, per se; both the US Navy and the Soviet Union developed rocket-assisted torpedoes. For example, the US Navy still operates the ASROC (Anti-Submarine Rocket), a rocket-propelled torpedo system that was first designed in the 1950s.

Current versions of the ASROC in service with the US Navy are estimated to have a range of over 25km and travel at subsonic speed before releasing the torpedo. China has also been developing and deploying rocket-assisted torpedo systems for decades.

SMART, on paper, would be a quantum leap for the Indian Navy's anti-submarine warfare capabilities, given the very-long range that DRDO has specified and its supersonic speed. The Indian Navy would need to modernise and expand its range of ship-borne and airborne anti-submarine surveillance and detection capabilities to take full advantage of the SMART missile.

Defence analyst Saurav Jha tweeted the SMART had "no analogue" in the world today. Jha tweeted, "No exact analogue to the SMART exists in the world today. You can argue the Russian 91RE1 & 91RTE2 (from the club family) and the American cancelled RUM-125 (sea lance) (plus ASROC etc) are similar in concept. But nothing has ever targeted submarines like this 650 km away."

The development of the SMART missile comes as China continues its near-relentless development of both nuclear-powered and conventional submarines. A report on China's naval modernisation by the US Navy's Office of Naval Intelligence noted that by 2030, China could have as many as 76 submarines: Eight nuclear-powered ballistic missile submarines, 13 nuclear-powered attack submarines and 55 diesel-electric submarines. China's rivals such as India and the US have warily watched Beijing's attempts to develop bases in nations such as Pakistan and Cambodia, which would give this large submarine fleet a springboard. SMART could turn out to be a major factor in how India will counter China's submarine menace.

https://www.theweek.in/news/india/2020/10/05/explainer-drdo-smart-missile-could-be-trump-card-against-china-submarines.html

NDTV

Tue, 06 Oct 2020

India Working On Directed Energy Weapons, Swarm Drones: IAF Chief

Air Chief Marshal RKS Bhadauria said the Defence Research and Development Organisation has set a target of 2027 to roll out an advanced medium combat aircraft (AMCA).

New Delhi: Air Chief Marshal RKS Bhadauria on Monday said India has initiated the process for indigenous development of futuristic military systems like directed energy weapons, optionally manned combat platforms and swarm drones to bolster the country's defence prowess.

Addressing a press conference ahead of Air Force Day on October 8, Mr Bhadauria also said the Defence Research and Development Organisation has set a target of 2027 to roll out an advanced medium combat aircraft (AMCA).

IAF Chief RKS Bhadauria was addressing a press conference ahead of Air Force Day. (File)

India is working on the ambitious USD 5 billion project to develop the fifth-generation medium weight deep penetration fighter jet to significantly bolster its air power capability.

"For the future, we have initiated processes for developing indigenous combat systems with sixth generation technologies including directed energy weapons, smart wingman concept, optionally manned combat platforms, swarm drones, hypersonic weapons etc," Mr Bhadauria said.

The directed energy weapons are futuristic solutions that use high-energy lasers and microwaves to carry out targeted strikes. The swarm drones are a set of unmanned aerial vehicles (UAVs) or aerial robots which can carry out attacks on specific targets.

The optionally manned platforms are next generation combat vehicles that operate on artificial intelligence-enabled navigational systems, providing for performing high-precision missions.

Mr Bhadauria also said the IAF is looking at acquiring midair refuellers on lease as per provision of the new Defence Acquisition Procedure (DAP).

Earlier, the IAF planned to acquire at least six midair refuellers.

The Chief of Air Staff also touched upon the IAF's ambitious modernisation drive and said its position as a credible combat ready force is vital given the role it will play towards ensuring victory in any future conflict.

"The IAF is transforming at a rapid pace and over the years we have grown from being a tactical force to a strategic one with trans-oceanic reach," he said.

Talking about future challenges, the IAF chief also said the space domain is likely to dominate in times to come and it is being given the required thrust.

"Overall, I would say we are moving in the right direction at the required pace and would continue to be counted amongst the top Air Forces of the world in the time to come," he said.

On the AMCA project, Mr Bhadauria said the IAF is fully supporting it.

"We would like to have the fifth generation aircraft with sixth generation technology," he said.

The Chief of Air Staff also said the IAF has placed its trust on indigenously developed Light Combat Aircraft (LCA) Tejas.

"We have placed our trust in the LCA. In the next five years we will commence induction of 83 LCA Mark 1A. We are supportive of DRDO and HAL"s effort at their indigenous production and you will soon see the contract of HTT 40 aircraft and Light Combat Helicopter (LCH)," he said

He said the IAF is planning to digitise its older air defence systems and seamlessly integrate them along with its latest acquisitions.

"We have already achieved a major milestone in network centric operations through the IACCS (Integrated Air Command and Control System). Building on that, we are further upgrading and hardening our networks to counter cyber threats and ensure robust and redundant Command and Control, decision making structures that can handle any air battle," he said.

As part of modernisation of the IAF, Mr Bhadauria said a leading Indian IT firm has developed an electronic maintenance management system (e-MMS) which has details of all flying platforms of the IAF "Virtually this is the world's largest such maintenance monitoring system and this has been a huge achievement with the private sector. Now, we intend to achieve enhanced automation and paperless work flow by year end through projects on nearly all operational, administrative and maintenance related activities," he said.

https://www.ndtv.com/india-news/air-chief-marshal-rks-bhadauria-india-working-on-directed-energy-weapons-swarm-drones-2305607

onmanorama

Tue, 06 Oct 2020

We have placed our trust in Tejas: IAF Chief

New Delhi: Chief of Air Staff Air Chief Marshal RKS Bhadauria said on Monday that complete trust has been put on desi fighter Tejas and its future variants.

Addressing his annual press conference here ahead of the 89th IAF Day on October 8, the CAS said that IAF is scaling up combat capability and credibility through modernisation and operational training in addition to increasing indigenous equipment to achieve self-reliance and strategic autonomy.

Chief of Air Staff Air Chief Marshal RKS Bhadauria.

“We have placed our trust in the LCA (Tejas). In the next five years we will commence induction of 83 LCA Mk1As. We are supportive of DRDO and HAL’s effort at their indigenous production and you will soon see the contract of HTT-40 and LCH,” the IAF Chief said.

He said the second half of this decade will see IAF leapfrog to the induction of next generation platforms.

“Be it the future LCA versions, the AMCA or unmanned combat enablers, and which include combat, manned and unmanned platforms. We are committed to the indigenous development of fifth generation AMCA which will be the mainstay of the IAF fighter fleet after a decade or so,” the IAF Chief said.

He said, in the emerging security scenario in the neighbourhood and beyond mandates a robust capability to fight across the entire spectrum of warfare.

“In the year gone by, the IAF has continued its stride on the path of comprehensive enhancement of capabilities and sustained modernisation. IAF is transforming at a rapid pace and over the years we have grown from being a tactical force to a strategic one with trans-oceanic reach,” he said.

He said IAF's offensive strike capability has been honed with up-gradations and new inductions of weapons and platforms, ably supported by combat enablers and a networked decision making environment, including an integrated approach to handle incoming threats.

"We have the largest strategic air lift capability in our region comprising of IL-76, C-17 & C-130 platforms. We have significantly enhanced our heli-lift capabilities with our helicopter inductions. Our immediate offensive deployment of combat ready units in response to the stand-off along the LAC in the North is indicative of our operational state today," he said.

On Rafales, the IAF Chief said it is a platform armed with weapons, sensors and technologies way ahead giving an operational and technological edge. "Combined with upgraded capabilities of our current fighter fleet, it gives us the ability to shoot first and strike deep and hard, even in contested airspace," he said.

On the joint command structures, he said that deliberations are on for a solution that will fit IAF's unique environment and the need to maximise its resources.

Tri-Services study teams have been formed which are looking and deliberating to arrive at the most optimum solution and the contours of such a joint structure that will come up in the near future. The core competence of each service is being effectively synergised to attain the desired capability and generate the desired effect in operations," Bhadauria said.

He said modernisation is an ongoing priority area to enhance operational potential in keeping with the desired combat capability in the years to come.

"This includes induction of state-of-the-art modern equipment as well as simultaneously up-grading existing systems to boost their capabilities and ensure operational relevance. Time-frames for such activities are planned to ensure an operational edge over the adversaries in the coming years," he said.

https://www.onmanorama.com/news/nation/2020/10/05/iaf-chief-on-desi-fighter-jet-tejas-future-variants.html

अमर उजाला

Tue, 06 Oct 2020

हम दोनों मोर्चों पर जंग समेत किसी भी संघर्ष के लिए तैयार, हमारी क्षमताओं ने विरोधियों को चौंकाया: वायुसेना प्रमुख

नई दिल्ली: लद्दाख सीमा पर चीन के साथ जारी तनाव के बीच वायुसेना प्रमुख आरकेएस भदौरिया का बड़ा बयान सामने आया है। वायुसेना प्रमुख ने कहा है कि भारत दोनों फ्रंट पर युद्ध करने के लिए तैयार है। वायुसेना प्रमुख के इस बयान से यह स्पष्ट हो गया है कि चीन और पाकिस्तान की ओर से तनाव की स्थिति को लेकर भारत पूरी तरह मुस्तैद है।

एयर चीफ मार्शल आरकेएस भदौरिया - फोटो: ANI

वायुसेना प्रमुख ने कहा, हमारे पड़ोस में और आस-पास के क्षेत्रों में उभरते हुए खतरे के परिदृश्य में युद्ध लड़ने की एक मजबूत क्षमता होने की आवश्यकता है। मैं आपके साथ विश्वास के साथ साझा कर सकता हूं कि ऑपरेशनली, हम सर्वश्रेष्ठ हैं।

राफेल के आने से वायुसेना की ताकत बढ़ी

आरकेएस भदौरिया ने कहा, हमने राफेल, चिनूक, अपाचे का परिचालन किया है और उन्हें रिकॉर्ड समय में संचालन की हमारी अवधारणा के साथ एकीकृत किया

है। अगले 3 साल में हम राफेल और एलसीए मार्क 1 स्क्वाड्रन को पूरी ताकत के साथ चालू करेंगे। साथ ही अतिरिक्त मिग-29 का ऑर्डर दिया जाएगा, जो वर्तमान बेड़े में शामिल होगा।

उन्होंने कहा, राफेल के आने से वायुसेना की ताकत बढ़ी है और ये हमें आगे तक मजबूत करेगा। इसकी मदद से हम जल्दी और ठोस कार्रवाई कर पाएंगे। अगले पांच साल में तेजस, कॉम्बैट हेलिकॉप्टर, ट्रेनर एयरक्राफ्ट समेत कई अन्य ताकतवर हथियार वायुसेना की ताकत बनेंगे।

डीआरडीओ और एचएएल के शुक्रगुजार

वायुसेना प्रमुख ने कहा, हमने लाइट कॉम्बैट एयरक्राफ्ट पर अपना भरोसा रखा है और अगले 5 वर्षों में हम 83 एलसीए मार्क 1 ए को वायुसेना में शामिल करेंगे। हम डीआरडीओ और एचएएल के स्वदेशी उत्पादन के प्रयास के समर्थक हैं और आपको जल्द ही इस क्षेत्र में एचटीटी-40 और लाइट कॉम्बैट हेलीकाप्टर के लिए अनुबंध देखने को मिलेगा।

दोनों फ्रंट पर युद्ध के लिए तैयार है भारत

आरकेएस भदौरिया ने कहा कि वायुसेना भारत और चीन के साथ दोनों फ्रंट पर एक साथ जंग के लिए पूरी तरह से तैयार है। उन्होंने कहा कि चीन की हरकत के बारे में मई में ही पता लग गया था, तभी से ही भारतीय सेना और वायुसेना की ओर से कदम उठाए गए।

उन्होंने कहा, भारतीय वायुसेना तेज गति से बदल रही है। देश के सामने फिलहाल जो चुनौतियां हैं, वे जटिल हैं। उभरती चुनौतियों ने हमें भारतीय वायुसेना की क्षमताओं को मजबूत करने के लिए अधिकृत किया है। हमारी क्षमताओं ने हमारे विरोधियों को चौंकाया है।

चीन की चाल को नाकाम करने के लिए ईस्टर्न फ्रंट पर वायुसेना मुस्तैद

वायुसेना प्रमुख ने कहा, ईस्टर्न फ्रंट पर वायुसेना मुस्तैद है और ऐसा कोई सवाल ही नहीं होता कि चीन हमसे किसी भी तरह से बेहतर स्थिति में हो। उन्होंने कहा कि वक्त के साथ वायुसेना ने बहुत तेजी से बदलाव किए हैं और अब काफी हद तक कमियों को दूर कर लिया गया है।

विरोधी को कमतर कर नहीं आंक रहे

सीमा गतिरोध को लेकर चीन की तैयारी पर वायुसेना प्रमुख ने कहा, विरोधी को कमतर आंकने का कोई सवाल ही नहीं है। हमनें सभी प्रासंगिक इलाकों में तैनाती की है, लद्दाख एक छोटा हिस्सा है। आश्वस्त रहिए, किसी भी चुनौती का सामना करने के लिए हम मजबूती से तैनात हैं।

जब चीन के साथ गतिरोध के दौरान लद्दाख में वायुसेना की तैनाती के बारे में पूछा गया तो वायुसेना प्रमुख ने कहा, हमने इस क्षेत्र में पहुंचने के लिए सभी प्रासंगिक परिचालन स्थानों पर तैनाती की है। निश्चिंत रहें, हमने किसी भी आकस्मिकता को संभालने के लिए दृढ़ता से तैनाती की है।

83 एलसीए तेजस, 114 एमआरएफए की खरीद के भी दिए संकेत

वायुसेना प्रमुख ने साथ ही 83 हल्के लड़ाकू विमान (एलसीए) तेजस (मार्क 1ए), 114 एमआरएफए विमान की खरीद के भी संकेत दिए। राफेल खरीद से जुड़े सवाल के जवाब में वायुसेना प्रमुख ने लड़ाकू विमानों की और खरीद की बात को नकारे बिना कहा, यह वक्त की जरूरत पर तय होगा। अभी इसका जवाब देना जटिल है। राफेल के आने से वायुसेना की ताकत और अधिक बढ़ गई है। ऐसे में जरूरत पड़ने पर इसकी खरीद से पीछे नहीं हटा जाएगा। उन्होंने कहा, हम भविष्य में वायुसेना की ताकत और बढ़ाने का प्रयास करेंगे। हमारे पास कई विकल्प हैं और उनमें जो सबसे जरूरी होगा उसका चयन होगा और खरीद की जाएगी। उन्होंने कहा, विमानों की खरीद को लेकर चर्चा जारी है। भदौरिया ने कहा, राफेल विमानों की पहली खेप से हमारी युद्धक क्षमताएं बहुत अधिक बढ़ी हैं। हम हवा में पहले से भी मजबूत

हुए हैं और दुश्मन की कैसी भी हरकत का पहले से अधिक तेजी और ताकत के साथ जवाब देने में सक्षम हुए हैं।

सीमा पर जारी है गतिरोध, 12 अक्तूबर को होगी सैन्य वार्ता

भारत और चीन के बीच पूर्वी लद्दाख में पांच महीने से गतिरोध बना हुआ है जिससे दोनों के रिश्तों में महत्वपूर्ण रूप से तनाव आया है। विवाद के हल के लिए दोनों पक्षों ने कई दौर की कूटनीतिक और सैन्य वार्ता की हैं। हालांकि गतिरोध को दूर करने में कोई कामयाबी नहीं मिली।

दोनों देशों के सैन्य अधिकारियों के बीच 12 अक्तूबर को एक और दौर की बातचीत होनी है जिसका एजेंडा खास तौर पर विवाद वाले बिंदुओं से सैनिकों की वापसी की रूपरेखा तय करना है। किसी भी चुनौती से निपटने के लिए भारत ने पहले ही ऊंचाई वाले इस क्षेत्र में हजारों सैनिकों और सैन्य साजो-सामान की तैनाती की है।

भारतीय वायुसेना ने भी पूर्वी लद्दाख और वास्तविक नियंत्रण रेखा से लगे अन्य स्थानों पर सुखोई 30 एमकेआई, जगुआर और मिराज 2000 जैसे अपनी अग्रिम पंक्ति के लड़ाकू विमानों को पहले ही तैनात कर रखा है। हाल में वायुसेना के बड़े में शामिल किए गए पांच राफेल लड़ाकू विमान भी पूर्वी लद्दाख में नियमित रूप से उड़ान भर रहे हैं।

वायुसेना रात में भी पूर्वी लद्दाख क्षेत्र में युद्धक हवाई गश्त कर रही है जिससे चीन को यह संदेश दिया जा सके कि वह इस पहाड़ी क्षेत्र में किसी भी चुनौती का सामना करने के लिए तैयार है।

दोनों देशों के बीच 21 सितंबर को हुई आखिरी सैन्य वार्ता के दौरान दोनों सेनाओं ने सीमा पर और सैनिकों को नहीं भेजने, जमीनी स्तर पर एकपक्षीय तौर पर स्थिति को बदलने से बचने और मामले को और जटिल बनाने वाले किसी भी कदम से बचने जैसे उपायों की घोषणा की थी।

https://www.amarujala.com/india-news/rks-bhadauria-iaf-is-ready-for-a-two-front-war-with-pakistan-and-china-for-any-possible-conflict?src=story-related&pageId=1

the pioneer

Tue, 06 Oct 2020

UP govt to rope in DRDO to promote pharma industry

Lucknow: The Uttar Pradesh government, for promoting the Pharmaceutical Industry as per the UP Pharmaceutical Industry Policy 2018 (amended), has decided to rope in the Defence Research and Development Organisation (DRDO) as knowledge partner.

The DRDO is an organisation under the Ministry of Defence.

The UP government will soon sign an MoU with the DRDO. UP Chief Minister Yogi Adityanath has given in-principle approval to the venture. The promotion of pharmaceutical industry in UP will lead to fresh investments and creation of fresh job opportunities.

The UP government, during the lockdown period in May, had identified the pharma industry as an important sector for investment in the state. Chief minister Yogi Adityanath had then directed the Industry department to start work on the project as there were immense opportunities in the field of pharmaceutical, medical equipment and herbal medicines in the state.

He had also directed the officials to prepare a policy for the pharma sector after consulting all the stake holders. In May last, a presentation was made before the chief minister on Pharma Park

and Medical Device Park. The UP government also identified well-known scientific research institutions in the state like CDRI and CIMAP in Lucknow.

The chief minister had directed the officials to ensure maximum utilisation of the infrastructure of the research institutions and also connect these with Pharma Park and Pharma Device Park.

The UP government had also taken up the matter with the Union government for facilitating the setting up of the Pharma Park and Medical Device Park.

A senior government official said there was no dearth of land in the state. The Revenue department alone has a land bank of 1.66 lakh acres. This land is available in all the nine climatic zones of the state.

The government will also provide skill development incentives and other concessions to the investing companies as per the requirement. While making any proposal, Bundelkhand will also be kept in focus.

https://www.dailypioneer.com/2020/state-editions/up-govt-to-rope-in----drdo-to-promote--pharma-industry.html

Live हिन्दुस्तान .com

Tue, 06 Oct 2020

यूपी में फार्मा सेक्टर को बढ़ावा देने के लिए डीआरडीओ होगा नॉलेज पार्टनर: मुख्यमंत्री

लखनऊ: मुख्यमंत्री ने डीआरडीओ के साथ एमओयू करने के प्रस्ताव को दी मंजूरी--फार्मा सेक्टर को बढ़ावा देने के लिए डीआरडीओ होगा नॉलेज पार्टनर: मुख्यमंत्रीप्रमुख संवाददाता- राज्य मुख्यालयमुख्यमंत्री योगी आदित्यनाथ ने उत्तर प्रदेश में फार्मा सेक्टर को बढ़ावा देने के लिए रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) को नॉलेज पार्टनर बनाने संबंधी प्रस्ताव को मंजूरी दे दी है।

डीआरडीओ के साथ जल्द ही एमओयू भी होगा। इसके आधार पर यूपी में उत्तर प्रदेश फार्मास्युटिकल उद्योग नीति के तहत बनने वाले फार्मा पार्क में यह सहयोग करेगा।रोजगार के खुलेंगे नए द्वारराज्य सरकार फार्मा सेक्टर के उन्नयन के लिए उप्र फार्मास्युटिकल उद्योग नीति-2018 (यथा संशोधित) के लक्ष्यों को प्राप्त करना चाहती है। इसके लिए ललितपुर में बल्क ड्रग पार्क व गौतमबुद्धनगर में मेडिकल डिवाइस पार्क की स्थापना से संबंधित प्रस्ताव पर सहमति पहले ही दी जा चुकी है।

बुंदेलखंड के ललितपुर में 2060 एकड़ में प्रस्तावित इस पार्क की स्थापना से करीब 24 हजार करोड़ का निवेश होगा और 31 हजार लोगों को रोजगार के अवसर मिलेगा।दवा के साथ चिकित्सीय उपकरण बनेंगेमेडिकल डिवाइस पार्क की स्थापना यमुना एक्सप्रेस-वे औद्योगिक विकास प्राधिकरण (यीडा) कराएगा। इसके लिए 350 एकड़ में प्रस्तावित इस पार्क के लिए सेक्टर-28 में जमीन चिह्नित कर ली गई है।

मेडिकल डिवाइस और फार्मा के क्षेत्र में असीम संभावनाएं हैं। कोविड-19 और अन्य रोगों के मद्देनजर दवाइयों व मेडिकल उपकरणों की मांग काफी बढ़ी है। ऐसे में राज्य को बल्क ड्रग एवं मेडिकल डिवाइस पार्कों की स्थापना से दवाओं और चिकित्सकीय उपकरणों के उत्पादन को बढ़ावा मिलेगा।

https://www.livehindustan.com/uttar-pradesh/lucknow/story-drdo-to-be-knowledge-partner-to-boost-pharma-sector-in-up-chief-minister-3538718.html

AKIpress

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How India's Defence Research & Development Organisation got India on global stage in defence technology?

AKIPRESS.COM - The Defence Research & Development Organisation (DRDO) has strengthened India's defence capabilities by successfully conducting the country's first anti-satellite (ASAT) missile test apart from other projects like Light Combat Aircraft for Indian Navy, Beyond Visual Range Air-to-Air Missile (BVRAAM) Astra from Su-30 MKI platform off the coast of Chandipur in Odisha, EurAsian Times reported.

About DRDO

DRDO is the R&D wing of Ministry of Defense, Government of India formed in 1958. It has the vision to empower India with cutting-edge defence technologies and a mission to achieve self-reliance in critical defence technologies and systems. It also aims at equipping India's armed forces with state-of-the-art weapon systems. DRDO chief set an ambitious target of achieving self-reliance in missiles, radars, sonars, torpedoes, armaments, and early warning systems in 5 years. This becomes important because even after 60 years of the DRDO formation, India still imports a large share of its defence equipment. In the year 2018-19, India became the world's second-largest importer of Defense equipment, accounting for 13 per cent of the global total, according to the Stockholm International Peace Research Institute.

Light Combat Aircraft (LCA)

The first Light Combat Aircraft Tejas Mk-1 was formally inducted into Indian Air Force in May 2020. The Tejas has a maximum speed of Mach 1.8 (2222 kmph) and can travel 500 km with drop tanks. The Tejas can carry laser guided bombs, air-to-air and air-to-surface missiles, anti-ship missiles, and has Israel's Elta EL/M-2032 multi-mode fire control radar on board. The name Tejas means sharp, brilliance, an Indian name. The LCA (Navy) is the naval version of indigenously developed Tejas fighter aircraft developed for the Indian Air Force by DRDO. In this context, DRDO successfully neutralized manoeuvring targets to establish the end-game capability of the missile. For instance, the first-ever arrested landing of Light Combat Aircraft at INS Hansa was done in Goa.

Netra

Another indigenously built achievement has been the airborne early warning and control system-Netra- which the DRDO handed over to the Indian Air Force. The system played a 'behind the scene' role in the much talked about Balakot surgical strikes in February 2019. "India is only the fourth country in the world to have developed this advanced system, popularly known as the 'Eye-in-the-sky', for its ability to detect enemy aircraft soon after they are airborne with the help of a radar onboard the aircraft although it is akin to looking for a needle in a haystack".

Mission Shakti

Mission Shakti is the country's first anti-satellite (ASAT) missile test. By launching Mission Shakti, India has entered the elite group of nations (consisting of the US, China, Russia) that have the ASAT weapon. It becomes an important step towards strengthening Outer-space warfare capability. To be specific, it can help in targeting and destroying satellites of the enemy which can completely halt communication systems of a country and during a conflict, this would mean the

enemy could fail to use its missiles or drones. In the test, India targeted a Low Earth Orbit (LEO), thereby achieving the capability to protect itself in outer space. The operation was conducted by using Light Combat aircraft Tejas MK I for Indian Air Force.

Inertial Guided Bomb

India successfully test-fired an indigenously-made 500-kg class "inertial guided bomb" from a Sukhoi jet at the Pokhran test range in Rajasthan. The test has been pegged as a major achievement for the Defence Research and Development Organisation (DRDO) as the guided bomb achieved the desired range and also hit its target with precision. This 500-kg class precision bomb allows precision targeting from long distances even under adverse visibility conditions. The inertial guidance system is an electronic system that continuously monitors the position, velocity and acceleration of a vehicle, usually a submarine, missile, or aeroplane, and provides navigational data or control without the need for communicating with a base station.

Such achievements of the DRDO speaks of its great role in 2019 to enhance Indian defence capabilities.

https://akipress.com/news:649061:How_India_s_Defence_Research_&_Development_Organisation_got_India_on_global_stage_in_defence_technology?/

Defence News

Defence Strategic: National/International

Hindustan Times

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'China can't get the better of India in conflict scenario': Air force Chief

The IAF Chief said there was no question of underestimating the capabilities of the People's Liberation Army Air Force (PLAAF) as it had made huge investments in "technology, systems and numbers"

By Rahul Singh

New Delhi: China can't get the better of India in any conflict and the air force, with its capability and intent serving as a deterrent for the adversary, is ready to handle any contingency, Indian Air Force Chief RKS Bhadauria said on Monday, even as he acknowledged the strengths of the Chinese air force and gave a broad overview of how the IAF would counter it.

Asked if the IAF was ready to take on China in the Ladakh theatre, Air Chief Marshal Bhadauria said, "Of course, we are. There is no question of not taking on the threat there. We are very well positioned there and China can't get the better of us in any conflict scenario there." He said India was fully prepared for a two-front war with China and Pakistan. The air force chief was responding to questions from reporters during his annual press conference ahead of the IAF Day on October 8.

The IAF Chief said there was no question of underestimating the capabilities of the People's Liberation Army Air Force (PLAAF) as it had made huge investments in "technology, systems and numbers". He also spoke about the IAF's assessment of the Chinese J-20 fifth-generation fighter aircraft, calling it "work in progress".

"Their strength lies in the number of surface-to-air systems they have deployed in that area and air-launched long-distance weapons. All that we cater to in our matrix and ensure we are in a position to not only take on their strong points but also deploy our offensive action accordingly," Bhadauria said, responding to a question from Hindustan Times.

"What we do is we integrate our systems and we train to handle such threats based on our assessment. It's all a combination of training, systems and integration and then the area that we are going to get deployed in," he said.

Indian Air Force (IAF) Chief Rakesh Kumar Singh Bhadauria addresses a press conference, in New Delhi, Monday, Oct. 5, 2020. (PTI)

He added that the PLAAF's J-20 was a fifth-generation fighter, with advanced sensors and latest technologies but its engine technology was still not fifth-generation.

The IAF chief --- short of giving operational details --- has explicitly stated that the IAF is well deployed to meet any threat, said Air Vice Marshal Manmohan Bahadur (retd), additional director general, Centre for Air Power Studies.

"That no adversary can be taken lightly was also acknowledged by him and that indicates a professional approach to a serious challenge that can come our way," Bahadur added.

Asked if the IAF had come close to launching airstrikes against Chinese targets after the June 15 Galwan Valley skirmish in which 20 Indian soldiers were killed, Bhadauria said, "No. But we were prepared for it."

The IAF chief said how things unfold in the Ladakh sector would depend on the outcome of the ongoing talks that were currently progressing slowly.

"What we see is an increase in effort to dig in for the winter in terms of forces on ground, and the deployment of air assets. We hope that the talks will progress in the right direction," he said.

Responding to a question on the DBO airstrip in eastern Ladakh, the IAF chief said it was a "big threat" to the Chinese as India had the capability to operate aircraft so close to the Line of Actual Control (LAC).

On China using air bases in Pakistan-occupied Kashmir, including Skardu, and the possibility of a two-front war, the IAF chief said, "Whether China will use Skardu is an open-ended question. But if China needs Pakistan's help to confront us, I have nothing to say. If Skardu gets used by China and we are in conflict with China, then it's a collusive threat. And we will deal with it accordingly," Bhadauria said. He said the IAF was prepared for any kind of conventional conflict, including a two-front war. "We have full capability for a two-front war," he said.

Earlier in his opening address, the IAF chief said the integration of Rafale fighter jets brought in a platform armed with advanced weapons, sensors and technologies that gave the IAF an operational and technological edge.

"Combined with upgraded operational capabilities of our current fighter fleet, it gives us the ability to shoot first and strike deep and hard, even in contested airspace," the IAF chief said.

India ordered 36 Rafale jets from France in a deal worth Rs 59,000 crore in September 2016, of which five jets have arrived. The IAF is operating its Rafale fighter jets in the Ladakh theatre where the military is on high alert.

"Our immediate offensive deployment of combat-ready units in response to the stand-off along the LAC in the north is indicative of our operational state. We are determined to handle any contingency --- undoubtedly our capability and intent would deter. Our airlift capability was also brought into focus as we supported the Indian Army in rapid mobilisation of troops and equipment to operational areas at a pace which our adversary didn't expect," Bhadauria said.

https://www.hindustantimes.com/india-news/china-can-t-get-the-better-of-india-in-conflict-scenario-air-force-chief/story-AdJJIbyGRJEWxrINbaCuLJ.html

THE ECONOMIC TIMES

Tue, 06 Oct 2020

India in advanced talks with Russia to acquire Sprut light tanks for use in high altitude areas

By Manu Pubby

Synopsis

The need for such tanks was felt after increased Indian deployments at the LAC following border hostilities with China, which has also fielded a range of equipment, including its Type 15 light tanks.

New Delhi: India is in advanced talks with Russia to acquire a newly developed light tank that could be useful in high altitude areas like the Line of Actual Control (LAC) in eastern Ladakh.

Talks to buy the Sprut SDM1 light tanks were initiated late in July under a fast-track, government-to-government process, sources told ET.

Representative image

The need for such tanks was felt after increased Indian deployments at the LAC following border hostilities with China, which has also fielded a range of equipment, including its Type 15 light tanks.

The new tanks are under trial in Russia, but sources said they could be inducted in India as well for a series of rigorous field tests before the deal is finalised.

India could acquire almost two dozen such tanks in the first tranche. The procurement is likely to cost less than ₹500 crore, which falls within the emergency financial powers given to service chiefs after the Galwan clash. The expenditure is expected to be within the emergency financial powers given to the Army following the clash with Chinese troops in Ladakh's Galwan valley in June.

ET was the first to report in July that the government had given approvals for emergency procurement of lightweight tanks for deployment in high-altitude conditions, amid the ongoing border standoff with China. Final discussions on the contract are expected to conclude this year.

The Sprut SDM1 light tank, transportable by air, has commonalities with the T72 and T90s operated by India and would require minimal crew training to become operational. It is armed with a 125 mm gun, similar to the one on the T90, and fires all types of ammunition with the T72/90 fleet available with the Army.

India has a robust tank force, but all of them are heavy main battle tanks — T72s, T90s and the indigenously developed Arjun — considered more suitable for operations in the plains. While these tanks have been sent to the Himalayan border as well, navigating them on difficult border terrain has been an issue.

The Sprut SDM1 is designed to be airdropped from an aircraft with its crew of three sitting inside the tank. India has operated light tanks in the past and it has come in handy during the 1947-48 Kashmir operations as well as the 1962 war with China, but these have been slowly phased out.

https://economictimes.indiatimes.com/news/defence/india-russia-in-talks-for-sprut-light-tanks/articleshow/78481716.cms

THE WIRE

Tue, 06 Oct 2020

After Chinese aggression, India goes on fast-track defence equipment import spree

The government has invoked the fast track procedure for military procurements worth Rs 10,000 crore in the recent months, primarily from France, Israel, Russia and the United States, to prepare for any eventuality

By Rahul Bedi

Chandigarh: The enduring military challenge India faces from China's People's Liberation Army (PLA) in Ladakh has led to fast-tracking of importing varied material, especially assorted ammunition, missiles and ordnance worth over Rs 10,000 crore, to meet long-term deficiencies in its military's armoury.

An Indian Army convoy moves along a highway leading to Ladakh, at Gagangeer in Kashmir's Ganderbal district June 18, 2020. Photo: Reuters/Danish Ismail

To execute a large proportion of these buys, primarily from France, Israel, Russia and the United States, the Ministry of Defence (MoD) has invoked its Fast Track Procedure (FTP) for military procurements. The increase, in June, of the respective service vice-chief's financial powers to undertake acquisitions worth Rs 300 crore – with no limit to the number of such procurements – with minimal MoD approval has further effected swifter buys via the FTP route. So has the earlier upping, in late 2018, of the vice-chief's fiscal threshold to Rs 500 crore of similarly acquiring stores, ammunition and ordnance under their respective revenue allocations.

Initiated after the 1999 Kargil war with Pakistan, when emergency 155 mm ammunition imports from Israel and South Africa were hastily executed at great cost to make good the army's depleted stocks, the FTP is aimed at meeting the military's critical operational needs in a compressed time frame. The MoD mandates the entire FTP acquisition process, including requests for proposal (RfPs), trials, cost negotiations and equipment deliveries have to be completed within 18-19 months.

Over years, the FTP was intermittently invoked for numerous tenders, mostly for the army procurement worth Rs 11,500 crore between January 2014 and late 2016 that mostly included ammunition, radars and mines. Much like now, the FTP was forcefully resorted to in the run up to, and after, the army's cross-border raid into Pakistan-administered Kashmir across the LoC in September 2016. And, once again for Israeli Smart, Precise, Impact, Cost-Effective (SPICE)-2000 bomb guidance kits and other munitions in February 2019 following the Indian Air Force's (IAF's) strike inside Pakistan's northwest Pakhtunkhwa province on an Islamist militant training camp in the mountains.

Procedural delays and fast track procurement

But the FTP has also been plagued with failure, due largely to procedural delays by both the services, especially the army, and the MoD. The import of some 1,000 sniper rifles for the army's special forces in 2009-10, for instance, dragged on for several years before it was scrapped, whilst the more recent purchase of 93,895 carbines, initiated under the FTP in March 2018, too is in the process of being revoked.

"The MoD activates itself only when faced with calamity of the kind presented by the PLA in Ladakh," says former Major General Sheru Thapliyal, who served in the area. Once the crisis

abates, the situation, going by past precedence, is likely to slide back to inertia and inactivity, he cautions.

Official sources say the immediate FTP purchases under process for the army after the PLA challenge came up in early May, and mostly includes a range of missiles — antitank and shoulder fired— GPS-enabled M982 Excalibur rounds for the army's newly acquired 155 mm M777 lightweight howitzers, loitering munition systems, 40 mm grenades and 7.62 mm small arms rounds.

Brisk buying for a range of ammunition

From Russia the army is looking to urgently acquire Igla-S very shortrange air defence systems (VSHORADS), rockets for SMERCH multi-barrel rocket launchers and 125 mm Mango armour-piercing fin-stablised discarding sabot (APFSDS) ammunition for T72M T90S tanks, deployed in large numbers across Ladakh. The MoD is also in advanced talks with Moscow to import an unspecified number of Sprut SDM1 light tanks to supplement its fleet of T72M and T90S manin battle tanks or MBTs to counter the PLA's Type 15 armoured assets. These Sprut tanks too are likely to be procured via the FTP route.

And in the recent weeks the MoD has approved a repeat order, once more through the FTP channel for 72,400 7.62×45 mm assault rifles from USA's SIG Sauer, in addition to signing a long-pending deal with Indian Telephone Industries Limited to upgrade the army's communication network along the Line of Actual Control (LAC) and the Line of Control (LOC), with Pakistan in Kashmir. The ministry has also ordered 1 million multi-mode hand grenades from a local private manufacturer for Rs 409 crore to replace the World War II HE-36Mk1 time fused 'Mills' hand and rifle grenades that are still being produced by the state-run Ordnance Factory Board (OFB).

The army has also been shopping briskly for winter clothing and associated high altitude survival equipment, like Arctic tents, to equip and house some 40,000 troops who will be deployed some 300-400 km along Ladakh's LAC, till April 2021 to prevent the PLA from infiltrating further into the Indian territory, than it has already since May.

A large proportion of these kits have been acquired off-the-shelf from Europe at great cost, as winter is fast approaching. Temperatures in the upper reaches of Ladakh, above 13,000 feet, had already dipped below zero degrees Celsius, and over the next few weeks, the mercury is expected to plummet further to around minus 20 degrees Celsius. This will decrease even more to minus 40 degrees Celsius, December onwards, worsened by the daunting wind chill factor in Ladakh's desolate desert region.

Thrust on indigenous capacity building

The Indian Air Force (IAF), for its part, is in extended negotiations under the FTP with Israel for Derby extended range missiles to arm its Sukhoi Su-30MKI multi-role fighter fleet and supplementary SPICE- 2000 bomb guidance kits for its Mirage-2000Hs, Spike anti-tank guided missiles for its light combat helicopter and SPYDER air-defence missiles. Furthermore, the IAF is in the process of acquiring HAMMER precision guided munitions from Frances' Safran Electronics and Defence for its 36 under-induction Rafale medium multi-role fighters and additional MICA anti-air, multi target missiles, amongst other munitions and missile systems.

Separately, the MoD is in advanced negotiations to acquire major platforms like 21 Russian MiG-29 and 12 Su-30MKI fighters, unmanned combat aerial vehicles (UCAVs) and high endurance unmanned aerial vehicles (UAVs) for surveillance for all three services. It is also waiting to finalise the long-deferred deal for 200 Russian Kamov Ka-226T light utility helicopters, 140 of which will be licence-built by the public sector Hindustan Aeronautics Limited at Tumkur near Bangalore, to replace the legacy Chetak and Cheetah models inducted into IAF service in the 1960s and 1970s.

And, early last month, Defence Minister Rajnath Singh is believed to have finalised a contract with Russia to licence-build some 750,000 Kalashnikov assault rifles for the army, the deal for which is likely to be signed imminently. Official sources say the Indo-Russian Private Limited

joint venture will import some 100,000 AK-203 7.62x39mm rifles for $ 1,100 apiece to meet the army's urgent operational needs. Thereafter, it would series build the remaining 650,000-odd units, with collapsible stocks, under a transfer of technology at an ordnance factory board (OFB) facility at Korwa, near Amethi that was inaugurated in early 2019 in anticipation of the rifle contract.

Meanwhile, in the recent weeks Defence Research and Development Organisation (DRDO) has fast-tracked trials for several missile systems, including the nuclear-capable Shaurya with a 750 – 1,000 km strike range, and extended the operational range of the BrahMos cruise missile from 292 to 400 km. Also successfully tested twice in a fortnight was the indigenously developed laser-guided anti-tank missile from the 120 mm rifled gun of the locally developed Arjun MBT. These missiles are likely to eventually arm the army's T90's.

In short, India's military is following Sun Tzu's dictum of not relying on the enemy not coming, but on its own readiness to receive him; not on the chance of his not attacking, but the fact that it has made its own position somewhat unassailable.

https://thewire.in/security/chinese-aggression-india-fast-track-military-procurement

Hindustan Times

Tue, 06 Oct 2020

Indian foreign secretary, Army Chief meet Aung San Suu Kyi

Harsh Shringla and Gen MM Naravane discussed "important bilateral issues" during their meeting with Suu Kyi at the foreign ministry in Naypyitaw

By Rezaul H Laskar

New Delhi: Foreign secretary Harsh Shringla and Indian Army chief Gen MM Naravane met Myanmar's state counsellor Aung San Suu Kyi for talks on taking forward bilateral relations in a wide range of areas.

As part of India's efforts to help Myanmar fight the Covid-19 pandemic, Shringla and Naravane handed over a consignment of 3,000 vials of the drug Remdesivir to Suu Kyi, officials said.

Foreign secretary Harsh Shringla and Indian Army chief Gen MM Naravane with Myanmar's state counsellor Aung San Suu Kyi.(Photo courtesy MEA)

The foreign secretary and the army chief began two-day visit to Myanmar on Sunday, the first time an Indian delegation to the neighbouring country has included both officials. Their meetings with Myanmar's top civil and military leadership are meant to take forward ties in areas ranging from security to connectivity.

Shringla and Naravane discussed "important bilateral issues" during their meeting with Suu Kyi at the foreign ministry in Naypyitaw, the Indian embassy said in a tweet without giving details.

The operationalisation of Myanmar's Sittwe port as part of the Kaladan transit transport project to boost connectivity with India's northeastern states and enhanced security cooperation to counter activities of militant groups, especially along the borders in Manipur and Nagaland are among the key issues on the agenda of the Indian delegation, people familiar with developments said on condition of anonymity.

In August, India provided Myanmar $5 million as the annual contribution under a border area development programme that was started in 2012. The programme was initially meant to last five years, and it was later extended till 2022. It has led to the implementation of around 140 projects in Myanmar's Chin state and Naga Self-Administered Zone.

The safe return of Rohingya refugees from Bangladesh to Myanmar is also expected to figure during the visit. Dhaka has been pressing New Delhi to use its good relations with Naypyitaw to push forward the process, the people said.

https://www.hindustantimes.com/india-news/indian-foreign-secretary-army-chief-meet-aung-san-suu-kyi/story-DMWE8yX5JMV4bqDNEK8bJN.html

Science & Technology News

The Tribune

Tue, 06 Oct 2020

ISRO gearing up for rocket launches with Virtual Launch Control Centre

The first rocket to fly will be the PSLV C49 sometime next month with about 10 satellites

Chennai: Trying to make up for lost time due to the Covid-19 pandemic, the Indian space agency is gearing up for three quick rocket launches carrying domestic and foreign satellites, said a senior official.

The Indian space agency has also developed a Virtual Launch Control Centre to test the rocket systems at the rocket port in Sriharikota in Andhra Pradesh remotely from the Thiruvananthapuram based Vikram Sarabhai Space Centre (VSSC), part of the Indian Space Research Organisation (ISRO), he added.

"With Covid-19 pandemic prevailing, the Indian space agency in order to reduce the number of people travelling to Sriharikota, has developed a Virtual Launch Control Centre at VSSC. As a result, the testing of various rocket systems is being done at VSSC." S. Somanath, Director, VSSC.

The physical launch control centre is located in the building that houses the Mission Control Centre in Sriharikota and the systems there have been replicated at VSSC in the form of a virtual launch control centre.

"Three rockets are getting ready for launch at the rocket port in Sriharikota viz Polar Satellite Launch Vehicle C49 (PSLV C49), PSLV C50 and Geosynchronous Satellite Launch Vehicle (GSLV). The first rocket to fly will be the PSLV C49 sometime next month with about 10 satellites. It will be carrying India's RISAT-2BR2 and other commercial satellites lifting off from the first launch pad," Somanath said.

The next one to fly will be PSLV C50 with the GSAT-12R satellite. The rocket is being assembled at Sriharikota with various systems coming from different centres. It will fly from the second launch pad, he added.

"We are targeting PSLV C50 sometime in December. It needs about 30 days to get ready for another launch after one launch," he said.

Presently four Indian satellites are ready for launch viz GISAT, Microsat-2A, GSAT-12R and, RISAT-2BR2.

The launch of the GISAT-1 satellite slated for March 5, 2020 was postponed due to technical reasons a day before the launch.

"The GISAT-1 satellite will be carried by a GSLV rocket. The GSLV rocket was dismantled after the launch was called off. The rocket is being refurbished. The rocket's cryogenic engine has been brought down and it is being readied again," Somanath said.

According to him, the GSLV carrying GISAT-1 is expected to fly after PSLV C50.

When queried about other countries launching satellites even during the Covid-19 pandemic period, Somanath said they could be having the entire manufacturing set up under one roof or at nearby places.

In the case of India, the ISRO centres making different components for the rocket and made at different centres and logistics was an issue during the Covid-19 period. — *IANS*

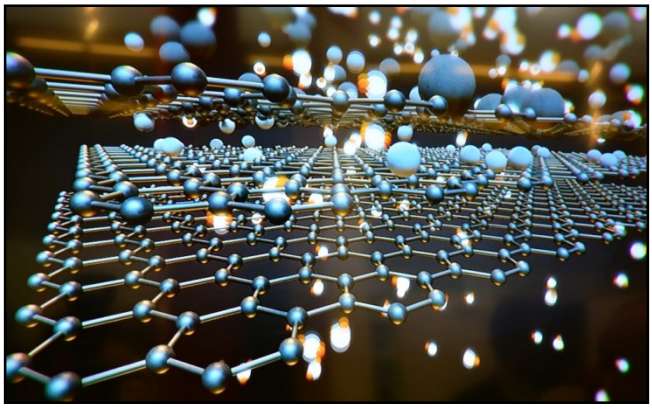
https://www.tribuneindia.com/news/schools/isro-gearing-up-for-rocket-launches-with-virtual-launch-control-centre-151412

PHYS.ORG

Tue, 06 Oct 2020

A new all-2-D light-emitting field-effect transistor

Transition metal dichalcogenides (TMDs), a two-dimensional (2-D) semiconductor, are promising materials for next-generation optoelectronic devices. They can emit strong light due to the large binding energies of excitons, quasiparticles composed of electron-hole pair, as well as an atomically thin nature. In existing 2-D light emitting devices, however, the simultaneous injection of electrons and holes into 2-D materials has been challenging, which results in low light emission efficiency.



Credit: CC0 Public Domain

To overcome these problems, Prof. Gwan-Hyoung Lee's group in Seoul National University and Prof. Chul-Ho Lee's group in Korea University demonstrated all-2-D light-emitting field-effect transistors (LEFETs) by staking 2-D materials. They chose graphene and monolayer WSe_2 as contact electrode and an ambipolar channel, respectively. Typically, a junction between metal and semiconductor has a large energy barrier. It is the same at a junction of graphene and WSe_2.

However, Lee's group utilized the barrier-tunable graphene electrode as a key for the selective injection of electrons and holes. Since the work function of graphene can be tuned by an external electric field, the contact barrier height can be modulated in the graphene-contacted WSe_2 transistor, enabling selective injection of electrons and holes at each graphene contact. By controlling the densities of injected electrons and holes, high efficiency of electroluminescence as high as 6% was achieved at room temperature.

In addition, it was demonstrated that, by modulating the contacts and channel with separate three gates, the polarity and light emission of LEFETs can be controlled, showing great promises of the all-2-D LEFETs in multi-digit logic devices and highly integrated optoelectronic circuitry.

This research is published as a paper entitled "Multi-operation mode light-emitting field-effect transistors based on van der Waals heterostructure" in *Advanced Materials*.

More information: Junyoung Kwon et al. Multioperation-Mode Light-Emitting Field-Effect Transistors Based on van der Waals Heterostructure, *Advanced Materials* (2020). DOI: 10.1002/adma.202003567

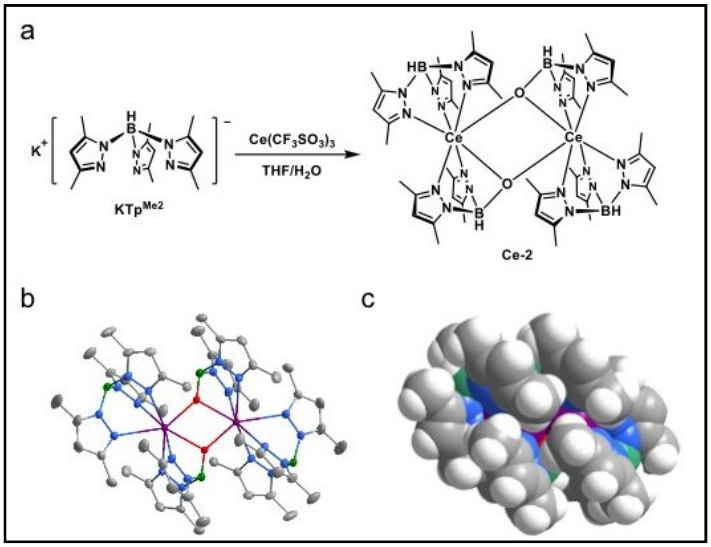
Journal information: *Advanced Materials*
https://phys.org/news/2020-10-all-d-light-emitting-field-effect-transistor.html

Tue, 06 Oct 2020

Light from rare earth: New opportunities for organic light-emitting diodes

Since its birth in the laboratory, organic light-emitting diode (OLED) technology has developed into an industry worth tens of billions of dollars in the past three decades. In industrial applications, the phosphorescent materials with 100% exciton utilization efficiency (EUE) have been able to meet the needs of three-primary red and green OLEDs for display. However, the long excited-state lifetime (usually > 1 μs) and high excited-states energy (> 2.8 eV) make blue phosphorescent OLED poorly stable. Therefore, the blue light-emitting materials currently used are still fluorescent materials with a low EUE but short nanosecond excited-state lifetime.

The traditional f-f transition rare earth complexes have the advantages of 100% EUE and highly pure red and green emissions, hence they have been applied to OLED research even earlier than phosphorescent materials. However, the intrinsic millisecond excited-state lifetime of the f-f transition limits the improvement of device performance, making slow progress of rare-earth complex electroluminescence for many years.



Synthetic route and molecular structure of Ce-2 complex. Credit: Science China Press

Recently, a research team from Peking University achieved highly efficient sky-blue OLEDs by introducing a d-f transition rare earth cerium(III) complex Ce-2 with a nanosecond excited-state lifetime. The authors proved that 100% EUE can be achieved in cerium(III) complex based OLEDs. Most importantly, the device stability of Ce-2 is greatly improved as compared to that of the traditional iridium (III) complex with a similar emitting color.

Different from other trivalent rare-earth ions, the single electron in Ce(III) ion can produce spin-allowed and parity-allowed 4f-5d transition, and the excited-state lifetime is only tens of nanoseconds. However, due to the quenching effect of ligands and small molecules in the environment, most Ce(III) complexes are not emissive. The ligand of Ce-2 has multidentate coordination ability and a relatively rigid structure, which can effectively protect the central Ce(III) ion. Therefore, the emission efficiency of Ce-2 in the doped film is 95%, and the excited-state lifetime is measured as 52 ns.

Interestingly, Ce-2 based OLED exhibits a maximum external quantum efficiency of 20.8%. Based on this result, it can be inferred that the EUE of the device is close to 100%. Mostly importantly, Ce(III) complex based OLED showed smaller roll-off, higher maximum luminance, and longer operating lifetime by ~70 times, as compared to an Ir(III) complex based OLED with a similar emitting color. Transient electroluminescence study shows that the excited-state lifetime of Ce-2 in OLED is only 1/16 of that of Ir(III) complex in device. It is the main reason for the improvement of device performance.Since Ce(III) complexes have both 100% EUE and

nanosecond luminescence lifetime, such emitters are promising to fabricate blue OLEDs with both high efficiency and stability. Besides, considering that Ce(III) complexes have adjustable emission spectra and lower costs, such materials are expected to become a new generation of emitters to achieve full-color OLED display and lighting.

More information: Zifeng Zhao et al, Efficient rare earth cerium(III) complex with nanosecond d-f emission for blue organic light-emitting diodes, *National Science Review* (2020). DOI: 10.1093/nsr/nwaa193

https://phys.org/news/2020-10-rare-earth-opportunities-light-emitting-diodes.html

PHYS.ORG

Tue, 06 Oct 2020

New shortcut enables faster creation of spin pattern in magnet

Physicists have discovered a much faster approach to create a pattern of spins in a magnet. This shortcut opens a new chapter in topology research. This discovery also offers an additional method to achieve more efficient magnetic data storage. The research will be published on 5 October in *Nature Materials*.

Credit: CC0 Public Domain

Physicists previously demonstrated that laser light can create a pattern of magnetic spins. Now they have discovered a new route that enables this to be done much more quickly, in less than 300 picoseconds (a picosecond is one millionth of a millionth of a second). This is much faster than was previously thought possible.

Useful for data storage: skyrmions

Magnets consist of many small magnets, which are called spins. Normally, all the spins point in the same direction, which determines the north and south poles of the magnet. But the directions of the spins together sometimes form vortex-like configurations known as skyrmions.

"These skyrmions in magnets could be used as a new type of data storage," explains Johan Mentink, physicist at Radboud University. For a number of years, Radboud scientists have been looking for optimal ways to control magnetism with laser light and ultimately use it for more efficient data storage. In this technique, very short pulses of light are fired at a magnetic material. This reverses the magnetic spins in the material, which changes a bit from a 0 to a 1.

"Once the magnetic spins take the vortex-like shape of a skyrmion, this configuration is hard to erase," says Mentink. "Moreover, these skyrmions are only a few nanometers (one billionth of a meter) in size, so you can store a lot of data on a very small piece of material."

Shortcut

The phase transition between these two states in a magnet—all the spins pointing in one direction to a skyrmion—is comparable to a road over a high mountain. The researchers have discovered that you can take a shortcut through the mountain by heating the material very quickly with a laser pulse. Thereby, the threshold for the phase transition becomes lower for a very short time.

A remarkable aspect of this new approach is that the material is first brought into a very chaotic state, in which the topology—which can be seen as the number of skyrmions in the material—fluctuates strongly. The researchers discovered this approach by combining X-rays generated by the European free electron laser in Hamburg with extremely advanced electron microscopy and spin dynamics simulations. "This research therefore involved an enormous team effort," Mentink says.

New possibilities

This fundamental discovery has opened a new chapter in topology research. Mentink expects that many more scientists will now start to look for similar ways to 'take a shortcut through the mountain' in other materials.

This discovery also enables new approaches to create faster and more efficient data storage. There is an increasing need for this, for example due to the gigantic, energy-guzzling data centers that are required for massive data storage in the cloud. Magnetic skyrmions can provide a solution to this problem. Because they are very small and can be created very quickly with light, a lot of information can potentially be stored very quickly and efficiently on a small area.

More information: Observation of fluctuation-mediated picosecond nucleation of a topological phase, *Nature Materials* (2020). DOI: 10.1038/s41563-020-00807-1 , www.nature.com/articles/s41563-020-00807-1

Journal information: *Nature Materials*

https://phys.org/news/2020-10-shortcut-enables-faster-creation-pattern.html

Tue, 06 Oct 2020

III-V semiconductor photonic integrated circuits go quantum

By Anna Demming

Quantum emitters are key for a range of technologies including LEDs, lasers and, in particular, photonic quantum communication and computation protocols. So far, scientists have turned to diamond and silicon carbide (SiC) to develop single photon sources on account of their wide band gap and excellent optical properties. However, the shortcomings of these semiconductors are highlighted by attempts to manipulate and route this kind of quantum emission in an integrated fashion to create scalable systems.

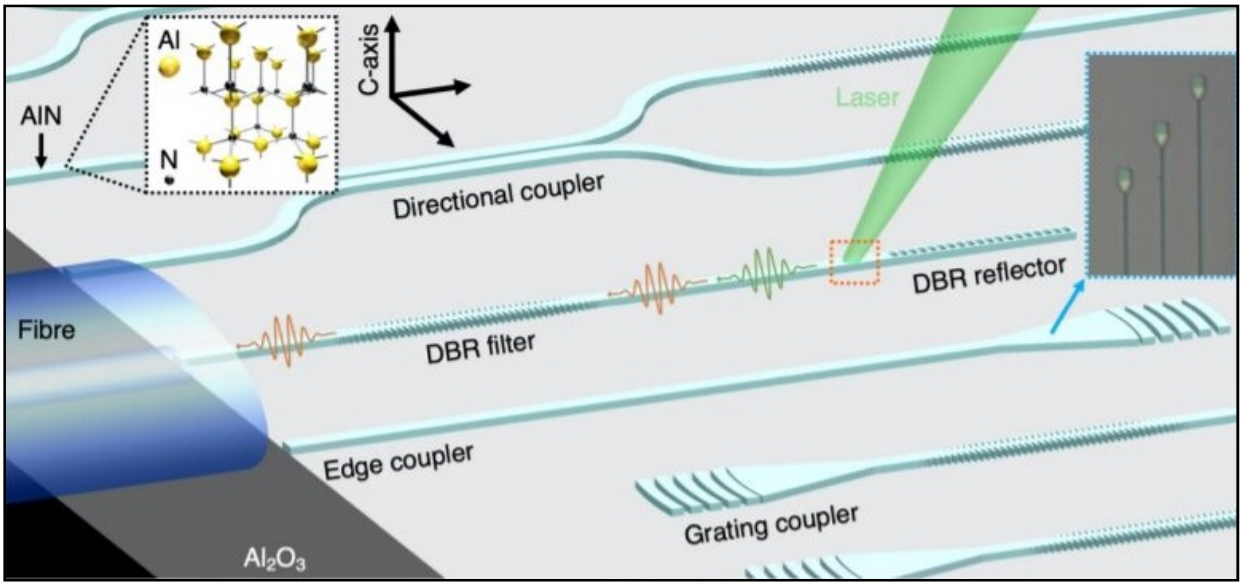
Now Tsung-Ju Lu and Benjamin Lienhard, and a team of researchers at the Massachusetts Institute of Technology (MIT) and City University of New York in the U.S., led by MIT's Dirk Englund, have produced quantum emitters in a III-V semiconductor, aluminum nitride (AlN). AIN is already well established in the optoelectronics and high-voltage electronics industry. By patterning the AlN with the quantum emitters embedded, they were able to integrate the emitters directly into a photonic circuit.

Getting quantum emission

Lu describes quantum emitters as light sources that emit single photons. "They can potentially have electron spin states that can form a quantum bit, or qubit, in which the single particles of light emitted by the quantum emitter carry the qubit's information," he tells Phys.org. It's in routing the qubit's information using photonic integrated circuits that problems arise with quantum emitters produced in diamond or SiC, because researchers can't grow these materials as thin films on a low refractive index substrate, which is needed for the total internal reflection in photonic waveguides.

One promising way around this is to combine these materials with other materials already well established as photonic integrated circuit platforms to re-route the photons produced, but this introduces potential inefficiencies when connecting between different materials. Lu and his colleagues had already developed an AlN-on-sapphire photonics platform for the purpose of interfacing with well-studied quantum emitters in other materials like diamond.

"As AlN has one of the widest bandgaps among all semiconductor materials, it was natural for us to explore whether or not AlN itself can be host to quantum emitters that can be readily integrated and connected to our AlN-on-sapphire photonics platform," he says.



Quantum emitters in aluminium nitride integrated photonics. Scalable AlN-on-sapphire photonic integrated circuits with integrated quantum emitters. Black inset: Wurtzite crystal structure of aluminium nitride (yellow: aluminium atom, black: nitrogen atom). Blue inset: Microscope image of the fabricated QE-integrated waveguides, where the grating couplers are used for visual feedback during fibre edge coupling. Credit: ACS Photonics

Heated to perfection

The researchers started with wafers composed of densely packed hexagonal nanocolumns of AlN grown on top of sapphire and produced quantum emitters in the material by bombarding it with helium ions using a helium ion microscope to produce vacancy-based defects in which one atom in the crystal lattice is missing. The defect centers have an electronic energy level structure akin to that of atoms. As such, the defect center can be stimulated to the excited state by shining a laser on it, and a single photon is emitted when it decays back to the ground state. This single photon emission has an "anti-bunching" characteristic—because the quantum emitter emits only one photon at a time, a finite period of time passes between photon emissions.

Semiconductors typically require high crystallinity in order to host stable quantum emitters. The catch is that when AlN films grow on some other material, for example, sapphire as in the current work, it needs to be quite thick to establish high crystallinity. As a result, when the researchers studied their thin films treated with helium ions followed by annealing at 700 degrees C to form quantum emitters, their photoluminescence measurements were swamped with background noise, hiding the presence of quantum emitters. Fortunately, they found that high-temperature treatment at an even higher temperature of 1000 degrees C could improve the crystallinity to a sufficient degree to resolve single photon emitters.

The researchers measured and characterized the quantum emitters in samples annealed at 1000 degree C, which were shown to have a high emission count rate while maintaining exceptional single-photon purity, all while operating at room temperature. Furthermore, by patterning the sample with elements such as distributed Bragg reflectors, spectral filters, beam splitters and edge or grating couplers, they could directly integrate the quantum emitters into photonic circuits, showing the potential for creating high-quality quantum emitters monolithically integrated in a wide range of AlN-based devices.

Having established the excellent optical properties of the AlN quantum emitters, the researchers next intend to pinpoint their exact origin to gain an insight into whether they have spin states that can be optically controlled to act as qubits.

More information: Tsung-Ju Lu et al. Bright High-Purity Quantum Emitters in Aluminum Nitride Integrated Photonics, *ACS Photonics* (2020). DOI: 10.1021/acsphotonics.0c01259

Journal information: *ACS Photonics*

https://phys.org/news/2020-10-iii-v-semiconductor-photonic-circuits-quantum.html

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Tue, 06 Oct 2020

Beirut explosion was one of the largest non-nuclear blasts in history, new analysis shows

The explosion in the Port of Beirut was one of the biggest non-nuclear blasts in history—releasing enough energy in a matter of milliseconds to power more than 100 homes for a year—according to a new assessment of the disaster by engineers from the University of Sheffield.

Researchers behind the study, from the University's Blast and Impact Engineering Research Group, hope that the new assessment can be used to provide policymakers and the public with more accurate information on the blast, as well as to help first responders prepare for future disasters and save lives.

After analyzing videos of the explosion posted on social media, the team of researchers has been able to estimate the power of the blast by tracking how the explosion's shockwave spread through the city.

The new assessment by the Sheffield engineers, which is published in the journal Shock Waves, found that the size of the explosion was the equivalent of between 500-1100 tons of TNT—around 1/20th of the size of the atomic bomb that was used on Hiroshima on 6 August 1945 and is one of the largest non-nuclear explosions ever recorded.

The explosion also released—in a matter of milliseconds—the equivalent of around 1GWh of energy. This is equal to the hourly energy generated by three million solar panels or 400 wind turbines.

The engineers hope that by releasing a more accurate assessment of the blast, including an insight into how the shockwave traveled, it could be used to help with future disaster response planning. The data could be used by first responders to help predict the likely injuries and structural damage at various distances from a blast in future emergency situations.

Dr. Sam Rigby, senior lecturer in blast and impact engineering at the University of Sheffield, said: "The disaster that hit Beirut this summer was devastating and we hope that nothing like that ever happens again. This was an unprecedented event because never before has such a large explosion been so well documented. The reason why we decided to analyze the explosion is because as engineers it's our jobs to use the skills and resources we have at our disposal to solve problems and ultimately to help people. After seeing the events unfold, we wanted to use our expertise in blast engineering to help understand what had happened in Beirut and provide data that could be used to help prepare for, and save lives in such events should they ever happen again. By understanding more about the power of large scale accidental explosions like the one that occurred in Beirut, we can develop more accurate predictions of how different buildings will be affected, and the types of injuries there are likely to be at different distances from the blast."

The new analysis—"Preliminary yield estimation of the 2020 Beirut explosion using video footage from social media"—is published in *Shock Waves*.

Engineers used footage from 16 videos on social media to estimate the yield of the 2020 Beirut explosion. Credit: Shock Waves

More information: S.E. Rigby et al. Preliminary yield estimation of the 2020 Beirut explosion using video footage from social media, *Shock Waves* (2020). DOI: 10.1007/s00193-020-00970-z

https://phys.org/news/2020-10-beirut-explosion-largest-non-nuclear-blasts.html

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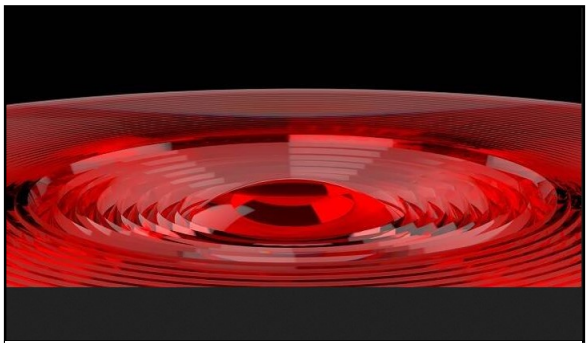
Custom fabricated microscope lens inspired by lighthouse

An optical device that resembles a miniaturized lighthouse lens can make it easier to peer into Petri dishes and observe molecular-level details of biological processes, including cancer cell growth. Developed by KAUST, the new lens is also very cost effective.

Many bioimaging techniques require fluorescent dyes to be added to specific cell targets. But a recently developed method known as stimulated raman scattering (SRS) microscopy can avoid cumbersome labeling steps by using laser pulses to collect molecular vibrational signals from biological samples. The ability of SRS microscopes to produce high-resolution, noninvasive images at real-time speeds has prompted researchers to deploy them also forin vivodisease diagnostic studies.



The thin and cost-effective lens is 3D printed and has the capacity to put live cells under the microscope, which would significantly improve diagnostics. Credit: Andrea Bertoncini

One drawback of SRS microscopes, however, is that the detection system is affected by a background signal, known as cross-phase modulation, which is generated by the intense interactions between laser pulses and the samples.

"This background signal is ubiquitous and reduces the contrast during microscopic observation of complex samples, such as live cells," explains Carlo Liberale from KAUST. "It also makes it difficult to identify target molecules."

To avoid the effects of cross-phase modulation, most SRS microscopes need to use bulky glass objectives capable of collecting wide angles of light. However, these kinds of lenses are nearly impossible to fit into the stage-top incubators that are used to grow live cells for bioimaging.

Andrea Bertoncini, a researcher in Liberale's group, spearheaded work to create an ultrathin SRS lens using laser-based three-dimensional (3-D) printing. Taking their cue from the slender design of lighthouse lenses, the KAUST team printed tiny lens-like and mirror-like features into a transparent polymer only a fraction of a millimeter thick.

"This type of lens design is a very efficient way to collect and redirect light coming from wide-angle sources right to our laser detector," says Bertoncini. "And since it's so thin, it easily fits into the closed chambers of an incubator."

After calibration trials confirmed that their new lens could reject the cross phase modulation background, the researchers turned their sights on human cancer cells cultured in a conventional Petri dish. These experiments revealed that the lens could image the cell's interior components with resolution similar to conventional SRS microscopes, but in a much more convenient and less expensive format.

"The objectives we normally use to collect SRS microscope signals cost a few thousand dollars," says Bertoncini. "Now we have a lens with similar benefits that we can produce for less than a tenth of that price."

https://phys.org/news/2020-10-custom-fabricated-microscope-lens-lighthouse.html

COVID-19 Research News

Hindustan Times

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Bharat Biotech's Covid-19 vaccine to use ViroVax's adjuvant for longer-lasting immunity

Bharat Biotech is currently conducting Phase 2 human trials of its Covid-19 vaccine candidate after receiving approval from the Drugs Controller General of India

By Rhythma Kaul

New Delhi: Vaccines major Bharat Biotech on Monday announced its coronavirus disease (Covid-19) vaccine Covaxin will use adjuvant Alhydroxiquim-II to boost immune response.

An adjuvant is a pharmacological or immunological agent that improves the immune response of a vaccine by producing more antibodies and providing longer-lasting immunity.

Kansas-based ViroVax LLC has licensed their adjuvant for the use of Covaxin, which is currently undergoing advanced stages of clinical trials in India.

Kansas-based ViroVax LLC has licensed their adjuvant for the use of Covaxin, which is currently undergoing advanced stages of clinical trials in India. (Representational Photo/REUTERS)

Covaxin is an inactivated vaccine derived from a strain of the Sars-CoV-2 virus that causes Covid-19, isolated at the Indian Institute of Medical Research-

National Institute of Virology (NIV), Pune.

The inactivated virus has been formulated with ViroVax's adjuvant to produce the vaccine candidate.

Bharat Biotech is currently conducting Phase 2 human trials of its Covid-19 vaccine candidate after receiving approval from the Drugs Controller General of India (DCGI) around the end of June.

"There is a critical need for the development and availability of adjuvants that induce greater antibody responses to vaccine antigens, thus resulting in long-term protection against pathogens. Adjuvants also enhance the sustainability of the global vaccine supply on account of their antigen-sparing effect. Our partnership with ViroVax resonates with Bharat Biotech's relentless efforts towards developing safe and effective vaccines coupled with long-term immunity," said Krishna Ella, chairman and managing director, Bharat Biotech.

"The widely used adjuvant Aluminium hydroxide in the development of Sars-CoV-2 vaccines is known to induce a Th2 based response (which are important for eradication of extracellular parasites and bacterial infection). The Th2 based response has a theoretical risk of vaccine associated enhanced respiratory diseases (VAERD or ADE). We have used Imidazoquinoline class of adjuvants (TLR7/8 agonists), which are known to induce Th1 based response which further reduces the risk of ADE (Anti-Body Dependent Enhancement)," he added.

Sunil David of ViroVax, said, "ViroVax is delighted to partner with Bharat Biotech. This has been possible because of support from the National Institutes of Health."

ViroVax is supported by the National Institute of Allergy and Infectious Diseases (NIAID), part of the National Institutes of Health, medical research centres under US Department of Health.

https://www.hindustantimes.com/health/bharat-biotech-s-covid-19-vaccine-to-use-virovax-s-adjuvant-for-longer-lasting-immunity/story-tl0cD9poJudV9AazlC1eiL.html

livemint

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A coronavirus vaccine is coming, so who gets it first?

Mark Buchanan, Bloomberg

- ***The right strategy for distributing early doses will be a balance of targeting the vulnerable and stopping viral transmission***

After eight months of chaos and more than 1 million deaths worldwide, we might soon have a vaccine for the novel coronavirus. With as many as 150 vaccines in development — nearly 40 in late-stage clinical trials — it could come by the end of this year, although most experts see 2021 as more likely.

Getting a vaccine is one thing, but distributing it is another. There won't be enough doses for everyone, at least early on, raising the delicate matter of who should get the vaccine first. Even if we agree on the goal — say, saving as many lives as possible — there may be no obvious answer. Vaccinating the most vulnerable probably makes sense for this virus, as nearly all fatalities occur in the 65-and-over age group.

Yet epidemics work in counterintuitive ways, with subtle details of how the virus or vaccine affects different people carrying huge weight. Modeling studies suggest that lots of good could also come from focusing resources on who is most likely to be spreading the virus — in this instance, younger people and children. Before we get a vaccine, we need far more research to investigate how it might be best deployed.

Experts have already developed draft guidelines for the deployment of early vaccines. An advisory group of the World Health Organization has proposed focusing on the protection of older

and more vulnerable people, essential health-care workers, and groups in dense urban environments. In a report released on Friday, the U.S. National Academies of Sciences, Engineering and Medicine offered a framework for the equitable distribution of any vaccine; it emphasizes much the same, adding to the WHO group's list of people working in essential industries such as food and public transport.

These guidelines mostly focus on using the vaccine to protect individuals as targets of the virus, as opposed to using vaccination to slow viral transmission. But this also helps: The less prevalent the virus, the less that vulnerable people need protecting. In the right conditions, in fact, some epidemiological research suggests that vaccinating the most vulnerable may not be the right thing to do.

A modeling study published in 2009 looked at vaccination strategies for influenza and concluded that the optimal policy — considering various measures including deaths and economic costs — depended on, well, lots of things. If the vaccine was only somewhat effective, immunizing only around 50% of those vaccinated, then focusing on the most vulnerable was the best strategy. With low vaccine efficacy, even vaccinating most of the population wouldn't prevent continued viral spreading, and so the vulnerable needed direct protection.

In contrast, if a vaccine was very effective, immunizing a higher proportion of those vaccinated, then the best strategy would target vaccinations not at the most vulnerable but at those most likely to spread the virus: healthy younger people, including children, who tend to be more socially active. High vaccine effectiveness makes it possible to greatly curtail viral spread, thereby making the most vulnerable — even unprotected — far less likely to be exposed to the virus.

It also mattered within the study how many doses of the vaccine were available. With few doses available, it's best to vaccinate the most vulnerable. If there were enough doses to vaccinate a decent fraction of the population, then targeting the spreaders was a better idea, as the achieved immunity level could eliminate viral spreading, although the required fraction depended on how easily the virus can be transmitted.

This study was for influenza, not the novel coronavirus, so its conclusions can only be suggestive. Even so, it made comparisons using data from both the 1918 and 1957 influenza epidemics, the latter of which was more coronavirus-like, with fatalities strongly skewed toward older people. In that case, the researchers found that the best strategy targeted the most vulnerable yet also allocated vaccines to younger people and children to reduce viral transmission.

As far as I can tell, no one has published a similar study for the current coronavirus. Yet other studies also suggest that stopping viral transmission should probably be part of any vaccine distribution. For example, physicists in Germany recently argued, using a statistical model, that focusing vaccination efforts in current hot spots — specific cities, for example — could be hugely beneficial. If good testing data were available and used to target vaccinations in places where the virus is spreading rapidly, they estimate that the overall number of deaths in an epidemic outbreak could be cut roughly in half. This is only a mathematical model, of course. But it makes a very similar point to the earlier study on influenza: Stopping transmission matters a lot, whether it focuses vaccinations on physical locations of enhanced spreading or on particular social groups.

Protection is only one part of vaccination. Much will depend on the nature of the early vaccines we have. But it seems likely that the best ways to stop the virus will need to go beyond simply targeting the most vulnerable. We'll need more sophisticated methods to pinpoint those places and groups of people that the virus is finding most useful for multiplying its numbers.

(This column does not necessarily reflect the opinion of the editorial board or Bloomberg LP and its owners.)

https://www.livemint.com/opinion/online-views/a-coronavirus-vaccine-is-coming-so-who-gets-it-first-11601902907619.html