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समाचार पत्रों से चयित अंश Newspapers Clippings

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Ministry of Defence

Fri, 29 Oct 2021 5:34PM

DRDO & IAF jointly flight test Long-Range Bomb successfully

Defence Research and Development Organisation (DRDO) and Indian Air Force (IAF) team jointly flight tested indigenously developed Long-Range Bomb (LRB) successfully from an aerial platform on October 29, 2021. The LR Bomb, after release from the IAF fighter aircraft, guided to a land-based target at a long range with accuracy within specified limits. All the mission objectives were successfully met. The flight of the bomb and the performance was monitored by a number of range sensors including Electro Optical Tracking System (EOTS), Telemetry and radar deployed by the Integrated Test Range, Chandipur in Odisha.

The LR Bomb has been designed and developed by Research Centre Imarat (RCI), a DRDO laboratory located at Hyderabad in coordination with other DRDO laboratories.

Raksha Mantri, Shri Rajnath Singh has congratulated DRDO, IAF and other teams associated with successful flight trial and stated that this will prove to be a force multiplier for the Indian Armed Forces.

Secretary DDR&D and Chairman DRDO, Dr G Satheesh Reddy in his message to the teams said that successful flight test of Long-Range Bomb has marked an important milestone in indigenous development of this class of systems.

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पत्र सूचना कार्यालय
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डीआरडीओ और भारतीय वायुसेना ने संयुक्त रूप से लंबी दूरी के बम का सफल परीक्षण किया

रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) और भारतीय वायुसेना (आईएएफ) की टीम ने संयुक्त रूप से दिनांक 29 अक्टूबर, 2021 को एक एरियल प्लेटफॉर्म से स्वदेशी रूप से विकसित लॉन्ग-रेंज बम (एलआरबी) का सफलतापूर्वक परीक्षण किया। भारतीय वायुसेना के लड़ाकू विमान से दागे जाने के बाद एलआर बम को निर्दिष्ट सीमाओं के भीतर सटीकता के साथ लंबी दूरी पर स्थित भूमि-आधारित लक्ष्य के लिए निर्देशित किया गया। इस मिशन के सभी उद्देश्यों को सफलतापूर्वक पूरा किया गया। उड़ीसा में एकीकृत परीक्षण रेंज, चांदीपुर द्वारा तैनात इलेक्ट्रो ऑप्टिकल ट्रैकिंग सिस्टम (ईओटीएस), टेलीमेट्री और रडार सहित कई रेंज सेंसर द्वारा बम की फ्लाइट और प्रदर्शन की निगरानी की गई थी।

एलआर बम को अन्य डीआरडीओ प्रयोगशालाओं के समन्वय में हैदराबादस्थित डीआरडीओ प्रयोगशाला, रिसर्च सेंटर इमारत द्वारा डिजाइन और विकसित किया गया है।

रक्षा मंत्री श्री राजनाथ सिंह ने डीआरडीओ, भारतीय वायुसेना और सफल उड़ान परीक्षण से जुड़ी अन्य टीमों को बधाई दी है और कहा है कि यह भारतीय सशस्त्र बलों के लिए एक फ़ोर्स मल्टीप्लायर साबित होगा।

डीडीआर एंड डी के सचिव और डीआरडीओ के अध्यक्ष डॉ. जी. सतीशरेड्डी ने टीमों को अपने संदेश में कहा कि लंबी दूरी के बम के सफल उड़ानपरीक्षण ने इस वर्ग की प्रणाली के स्वदेशी विकास में एक महत्वपूर्ण मील का पत्थर हासिल किया है।

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రక్షణ మంత్రిత్వ శాఖ

Fri, 29 Oct 2021 5:34PM

లాంగ్-రేంజ్ బాంబును సంయుక్తంగా విజయవంతంగా పరీక్షించిన - డి.ఆర్.డి.ఓ. మరియు ఐ.ఎ.ఎఫ్.

రక్షణ పరిశోధన, అభివృద్ధి సంస్థ (డి.ఆర్.డి.ఓ) మరియు భారత వైమానిక దళానికి చెందిన బృందం సంయుక్తంగా దేశీంగా అభివృద్ధి చేసిన లాంగ్-రేంజ్ బాంబ్ (ఎల్.ఆర్.బి.)ని వైమానిక వేదిక నుండి అక్టోబర్ 29, 2021న విజయవంతంగా పరీక్షించింది. ఐ.ఎ.ఎఫ్. యుద్ధ విమానం నుండి, ఎల్.ఆర్. బాంబును, విడుదల చేసిన తర్వాత, నిర్దిష్ట పరిమితుల్లో ఖచ్చితత్వంతో సుదూర పరిధిలో ఉన్న భూ-ఆధారిత లక్ష్యానికి మార్గనిర్దేశం చేశారు. ఈ మిషన్ లక్ష్యాలన్నీ విజయవంతంగా నెరవేరాయి. బాంబు యొక్క ఫ్లైట్ మరియు పనితీరును, ఒడిశాలోని చాందీపూర్ లోని ఇంటిగ్రేటెడ్ సెస్ట్ రేంజ్ ద్వారా నియోగించబడిన ఎలక్ట్రో ఆప్టికల్ ట్రాకింగ్ సిస్టమ్ (ఈ.ఓ.టి.ఎస్), సెలిమెట్రీ, రాడార్ లతో సహా అనేక రేంజ్ సెన్సార్ లు పర్యవేక్షించాయి.

ఎల్.ఆర్. బాంబు ను ఇతర డి.ఆర్.డి.ఓ. ప్రయోగశాలల సమన్వయంతో హైదరాబాద్లో ఉన్న డి.ఆర్.డి.ఓ. ప్రయోగశాల - రీసెర్చ్ సెంటర్ ఇమారత్ (ఆర్.సి.ఐ.) రూపొందించి, అభివృద్ధి చేసింది.

డి.ఆర్.డి.ఓ., ఐ.ఎ.ఎఫ్. తో పాటు ఈ ఫ్లైట్ ట్రయల్స్ విజయవంతం కావడానికి సహకరించిన ఇతర బృందాలను రక్షణ మంత్రి, శ్రీ రాజ్ నాథ్ సింగ్ అభినందించారు. ఇది భారత సాయుధ దళాల బలాన్ని పెంపొందించే శక్తిగా నిరూపిస్తుందని, ఆయన పేర్కొన్నారు.

విజయవంతమైన ఈ లాంగ్-రేంజ్ బాంబు ఫ్లైట్ సెస్ట్ ఈ తరహా వ్యవస్థల స్వదేశీ అభివృద్ధి లో ఒక ముఖ్యమైన మైలురాయి గా గుర్తించబడిందని, ఈ బృందాలను అభినందిస్తూ, డి.డి.ఆర్. & డి. కార్యదర్శి మరియు డి.ఆర్.డి.ఓ. చైర్మన్ డాక్టర్ జి. సతీష్ రెడ్డి, తమ సందేశంలో పేర్కొన్నారు.

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Ministry of Earth Science

Fri, 29 Oct 2021 5:44PM

Union Minister Dr Jitendra Singh launches India's first and unique manned Ocean Mission Samudrayan at Chennai

India joins the elite club of nations such as USA, Russia, Japan, France and China to have such underwater vehicles for carrying out subsea activities: Dr Jitendra Singh

Union Minister of State (Independent Charge) Science & Technology; Minister of State (Independent Charge) Earth Sciences; MoS PMO, Personnel, Public Grievances, Pensions, Atomic Energy and Space, Dr Jitendra Singh today launched India's First Manned Ocean Mission Samudrayan at Chennai. He said, with the launch of this Unique Ocean Mission, India joins the elite club of nations such as USA, Russia, Japan, France and China to have such underwater vehicles for carrying out subsea activities.

Dr Jitendra Singh said, this niche technology shall facilitate Ministry of Earth Sciences, MoES in carrying out deep ocean exploration of the non-living resources such as polymetallic manganese nodules, gas hydrates, hydro-thermal sulphides and cobalt crusts, located at a depth between 1000 and 5500 meters. He said, the preliminary design of the manned submersible MATSYA 6000 is completed and realization of vehicle is started with various organization including ISRO, IITM and DRDO roped-in to support the development.

The Minister informed that sea trials of 500 metre rated shallow water version of the manned submersible are expected to take place in the last quarter of 2022 and the MATSYA 6000, the deep water manned submersible will be ready for trials by the second quarter of 2024. He said, the advancing technologies in metallurgy, energy storage, underwater navigation and manufacturing facilities provides opportunity for developing more efficient, reliable and safe manned submersible.

Dr Jitendra Singh said that the underwater vehicles are essential for carrying out subsea activities such as high resolution bathymetry, biodiversity assessment, geo-scientific observation, search activities, salvage operation and engineering support. He said, even though unmanned underwater vehicles have improved manoeuvring and excellent vision systems resembling direct observation, manned submersible provides a feel of direct physical presence for researchers and has better intervention capability. With the advancing subsea technologies, the recent Fendouzhe manned submersible developed by China in 2020 has touched ~11000m water depths, the Minister added.

MoES officials explained that based on the experience gained over two decades in the development of unmanned robotic vehicles and systems for 6000 m operational capability, MoES-NIOT is indigenously developing a manned submersible with a depth capability of 6000 meters under the aegis of Deep Ocean Mission. The manned submersible is designed to carry three persons in 2.1 meter diameter Titanium Alloy Personnel Sphere with an operational endurance of 12h and systems to support emergency endurance up to 96h.

Some of the critical subsystems of the manned submersibles are development of Ti Alloy Personnel Sphere, Human support and safety system in enclosed space, low density buoyancy modules, Ballast and Trim System. Pressure compensated batteries and propulsion system, control and communication systems and Launching and Recovery System. System design, concept of operation, subcomponents functionality and integrity, emergency rescue, failure mode analysis are

reviewed and certified as per the rules of International Association of Classification and Certification Society for man-rated usage of manned submersible at a depth of 6000 meters.



<https://pib.gov.in/PressReleasePage.aspx?PRID=1767579>



पत्र सूचना कार्यालय
भारत सरकार
रक्षा मंत्रालय

Fri, 29 Oct 2021 5:44PM

केन्द्रीय मंत्री डॉ. जितेंद्र सिंह ने भारत का पहला और अनूठा मानव युक्त समुद्र मिशन 'समुद्रयान' चेन्नई से लॉन्च किया

भारत भी अब संयुक्त राज्य अमेरिका, रूस, जापान, फ्रांस और चीन के उस विशिष्ट समूह में शामिल हो गया है जिनके पास समुद्र के अंदर की गतिविधियों के लिए मानव युक्त मिशन चलाने की क्षमता है: डॉ. जितेंद्र सिंह

केन्द्रीय विज्ञान एवं प्रौद्योगिकी राज्य मंत्री (स्वतंत्र प्रभार); पृथ्वी विज्ञान राज्य मंत्री (स्वतंत्र प्रभार); प्रधानमंत्री कार्यालय में राज्य मंत्री; लोक शिकायत एवं पेंशन, परमाणु ऊर्जा और अंतरिक्ष मंत्री डॉ. जितेंद्र सिंह ने आज चेन्नई से भारत के पहले मानव युक्त समुद्र मिशन 'समुद्रयान' का शुभारंभ किया। डॉ. जितेंद्र सिंह ने कहा कि अमेरिका, रूस, जापान, फ्रांस और चीन के बाद भारत भी उस विशिष्ट समूह में शामिल हो गया है जिनके पास समुद्र के अंदर की गतिविधियों के लिए मानव युक्त मिशन चलाने की क्षमता है।

इस अवसर पर डॉ. जितेंद्र सिंह ने कहा कि यह विशिष्ट प्रौद्योगिकी पृथ्वी विज्ञान मंत्रालय को समुद्र में 1000 से 5500 मीटर की गहराई में पाए जाने वाले पॉलिमेटेलिक मैंगनीज नोड्यूलस, गैस हाइड्रेट्स, हाइड्रो-थर्मल सल्फाइड्स और कोबाल्ट क्रस्ट जैसे निर्जीव संसाधनों के अन्वेषण की दिशा में सुविधा प्रदान करेगी। उन्होंने कहा कि मानवयुक्त पनडुब्बी 'मत्स्य 6000' का प्रारंभिक डिजाइन तैयार कर लिया गया है और इसरो, आईआईटीएम तथा डीआरडीओ सहित विभिन्न संगठनों के साथ इसको मूर्त रूप देने की प्रक्रिया शुरू हो गई है।

केन्द्रीय मंत्री ने बताया कि 500 मीटर तक की गहराई में जाने में सक्षम इस मानवयुक्त पनडुब्बी के प्रारम्भिक संस्करण का समुद्री परीक्षण 2022 की अंतिम तिमाही में होने की संभावना है और मत्स्य 6000, के गहरे पानी में जाने में सक्षम संस्करण के 2024 की दूसरी तिमाही तक परीक्षण के लिए तैयार हो जाने की उम्मीद है। उन्होंने कहा कि अधिक कुशल, विश्वसनीय और सुरक्षित मानवयुक्त पनडुब्बी विकसित करने में धातु विज्ञान, ऊर्जा भंडारण, पानी के भीतर नेविगेशन और विनिर्माण सुविधाओं में उन्नत प्रौद्योगिकियां महत्वपूर्ण होती हैं।

डॉ. जितेंद्र सिंह ने कहा कि पानी के अंदर अन्वेषण के लिए भेजे जाने वाले वाहनों को हाई रिजोल्यूशन बैथीमेट्री, जैव विविधता का आकलन, भू-वैज्ञानिक अवलोकन, खोज गतिविधियों के साथ-साथ बचाव अभियान और इंजीनियरिंग सहायता जैसी गतिविधियों को पूरा करने में सक्षम होना आवश्यक है। उन्होंने कहा कि समुद्री खोज में भले ही मानव रहित वाहनों की क्षमता में उल्लेखनीय वृद्धि हुई है और उत्कृष्ट दृश्यता प्रणालियों से उन्हें सुसज्जित किया जा सका है परंतु मानवयुक्त पनडुब्बी की मदद से शोधकर्ताओं को प्रत्यक्ष उपस्थित होकर खोज का विशिष्ट अनुभव प्राप्त करने का मार्ग प्रशस्त होगा। केन्द्रीय मंत्री ने कहा कि समुद्र के भीतर की प्रौद्योगिकियों के उन्नयन से चीन द्वारा 2020 में विकसित की गई मानवयुक्त पनडुब्बी फेंडोज़े ने हाल ही में 11000 मीटर की गहराई तक गोता लगाया था।

पृथ्वी विज्ञान मंत्रालय के अधिकारियों ने बताया कि मानव रहित रोबोटिक वाहनों और 6000 मीटर की गहराई तक जाने में सक्षम सिस्टम के विकास में दो दशकों से अधिक के अनुभव के आधार पर, मंत्रालय -एनआईओटी, डीप ओशन मिशन के अंतर्गत 6000 मीटर की गहराई क्षमता के साथ स्वदेशी मानवयुक्त सबमर्सिबल विकसित कर रहे हैं। मानवयुक्त सबमर्सिबल को 2.1 मीटर व्यास वाले टाइटेनियम मिश्र धातु कार्मिक क्षेत्र में तीन व्यक्तियों को ले जाने के लिए डिज़ाइन किया गया है, जिसकी सामान्य परिचालन क्षमता 12h की होगी और आपातकालीन स्थिति में इसकी परिचालन क्षमता को 96h तक किया जा सकेगा।

मानवयुक्त सबमर्सिबल के कुछ महत्वपूर्ण उप-प्रणालियों में टीआई मिश्र धातु कार्मिक क्षेत्र का विकास, संलग्न स्थान में मानव सहायता और सुरक्षा प्रणाली, कम घनत्व वाले मॉड्यूल, गिट्टी और टिम सिस्टम शामिल हैं। यह प्रेशर कम्पेनसेटेड बैटरीज और प्रॉपल्सन सिस्टम, नियंत्रण और संचार प्रणाली और लॉन्चिंग और रिकवरी सिस्टम से भी लैस होंगे। इसे सिस्टम डिजाइन, संचालन की अवधारणा, उप-घटकों की कार्यक्षमता और अखंडता, आपातकालीन स्थिति में बचाव, असफलता की स्थिति का विश्लेषण इत्यादि के साथ साथ 6000 मीटर की गहराई पर मानवयुक्त पनडुब्बी के मानवीय उपयोग हेतु इसकी इंटरनेशनल एसोसिएशन ऑफ क्लासिफिकेशन एंड सर्टिफिकेशन सोसाइटी के नियमों के अनुसार समीक्षा की गई है और प्रमाणित किया गया है।



<https://pib.gov.in/PressReleasePage.aspx?PRID=1767765>

DRDO, IAF successfully flight-test indigenous Long Range Bombs; Defence Minister Rajnath Singh lauds feat

The LR bomb, after being released from a fighter aircraft of the IAF, was guided to a land-based target at a long range “with accuracy within specified limits,” the defence ministry said.

New Delhi: The Defence Research and Development Organisation (DRDO) and the Indian Air Force (IAF) on Friday successfully flight tested an indigenously developed Long-Range Bomb (LRB) from an aerial platform, the ministry of defence said in a statement.

Further, the ministry also said that the LR bomb, after being released from a fighter aircraft of the IAF, was guided to a land-based target at a long range “with accuracy within specified limits.” The ministry also noted that all the objectives of the mission were successfully met during the test-flight.



The Long Range Bomb was released from a fighter aircraft of the Indian Air Force.(ANI | Representational image)

“All the mission objectives were successfully met. The flight of the bomb and the performance was monitored by a number of range sensors including Electro Optical Tracking System (EOTS), Telemetry and radar deployed by the Integrated Test Range, Chandipur in Odisha,” the ministry said.

The bomb was designed and developed by the Research Centre Imarat (RCI), a DRDO laboratory in Hyderabad, Telangana, in coordination with other DRDO laboratories. The RCI lab is involved in the research and development (R&D) of avionics systems.

Meanwhile, Union defence minister Rajnath Singh has conveyed his congratulations to the DRDO, the IAF and the other teams involved in the trial flight, the ministry said. Singh said that the feat will prove to be a “force multiplier for the Indian Armed Forces.”

Also, G Satheesh Reddy, chairman of the DRDO, said that the successful test flight of the indigenously developed LR Bomb has “marked an important milestone” in the indigenous development of this class of weapon systems.

The development came a few days after the country successfully test fired the Agni-5 missile, from the APJ Abdul Kalam Island off the coast of Odisha. The ministry said that the missile was capable of hitting targets at ranges upto 5,000kms “with very high degree of accuracy.”

“The successful test of Agni-5 is in line with India’s stated policy to have ‘credible minimum deterrence’ that underpins the commitment to ‘No First Use’,” the ministry said earlier in a statement.

<https://www.hindustantimes.com/india-news/drdo-iaf-successfully-flight-tests-indigenous-long-range-bombs-defence-minister-rajnath-singh-lauds-feat-101635520444746.html>

India's 1st long-range 1 ton guided bomb test-fired, hits target 100 km away

Designed and developed by DRDO's Research Centre Imarat (RCI), the LR Bomb can carry a warhead of 1000 kilograms

By Shishir Gupta

An Indian Air Force (IAF) team and Defence Research and Development Organisation (DRDO) on Friday successfully flight-tested the country's first indigenously developed Long-Range Bomb (LRB) from a Sukhoi-30 fighter jet over Balasore, Odisha.

The LR Bomb, with a range of 100 kilometres, was fired from the IAF fighter aircraft flying at an altitude of 10 kilometres. Designed and developed by DRDO's Research Centre Imarat (RCI), the LR Bomb can carry a warhead of 1000 kilograms.

Using laser guidance, the bomb hit a target range inside the sea around 11.00am, meeting all mission objectives successfully.

From the Kargil war to Operation Bandar in Balakot in 2019, India in the past has been using Israeli laser-guided bombs. The successful test of the LR Bomb makes India capable of staying well within its territory and hitting enemy targets at 100 kilometres with high accuracy.

The successful flight test of the LR Bomb comes a day after India tested DRDO Smart Anti-Airfield Weapon (SAAW) from the Pokhran range. It is capable of hitting ground targets up to a range of 100 kilometres. Designed to disable airfield runways, SAAW can carry a warhead of 125 kg. DRDO had last tested the anti-airfield weapon in January.

The successful tests can prove to be a force multiplier and major boost to the Indian Armed Forces, especially at a time China has been posturing aggressively in the region.

Defence minister Rajnath Singh congratulated DRDO, IAF and other teams associated with successful flight tests.

Last Friday, the DRDO successfully flight-tested Abhyas High-speed Expendable Aerial Target (HEAT) from the Integrated Test Range in Chandipur, Odisha. The defence ministry said that the indigenous unmanned aerial vehicle will meet the requirements of HEAT for the armed forces.

<https://www.hindustantimes.com/india-news/indias-1st-long-range-1-ton-guided-bomb-test-fired-hits-target-100-km-away-101635521080880.html>



The LR Bomb was flight tested from a Sukhoi-30 fighter jet.(AP / Representational)

India successfully flight tests long-range bomb from a fighter aircraft

An IAF fighter that took off from the Kalaikunda base in Bengal released the bomb that was guided to a land-based target at a long-range with accuracy within specified limits

By Hemant Kumar Rout

Bhubaneswar: India's strategic defence preparedness received a boost on Friday when the country successfully flight-tested a Long-Range Bomb (LRB) released from an aerial platform off the Odisha coast.

The indigenously-developed guided bomb covered the desired range and hit the land-based target with precision. The bomb was tested by a joint team of Defence Research and Development Organisation (DRDO) and the Indian Air Force (IAF).

Defence sources said an IAF fighter aircraft that took off from the Kalaikunda airforce base in West Bengal released the bomb that was guided to a land-based target at a long-range with accuracy within specified limits.

The flight of the bomb and the performance was monitored by a number of range sensors including an electro-optical tracking system, telemetry and radar deployed by the Integrated Test Range (ITR).

Secretary of Department of Defence R&D and DRDO Chairman Dr G Satheesh Reddy said all the mission objectives have been successfully met. "The successful flight test of LRB has marked an important milestone in indigenous development of this class of systems," he said.

The long-range bomb has been designed and developed by Research Centre Imarat (RCI), a DRDO unit at Hyderabad in coordination with other DRDO laboratories.

Defence Minister Rajnath Singh has congratulated DRDO, IAF and other teams associated with the successful flight trials. He said the long-range guided bomb will prove to be a force multiplier for the Indian Armed Forces.

<https://www.newindianexpress.com/nation/2021/oct/29/india-successfully-flight-tests-long-range-bomb-from-a-fighter-aircraft-2377343.html>



The Long-Range Bomb after it was released from the aerial platform. (Photo | Special arrangement)

Long Range Bomb successfully flight-tested by Air Force, Defence Body DRDO

The Long-Range Bomb after release from the Indian Air Force fighter aircraft was guided with accuracy to a land-based target at long range within specified limits

Balasure: The Defence Research and Development Organisation (DRDO) and the Indian Air Force (IAF) team successfully flight-tested the indigenously developed Long-Range (LR) Bomb from an aerial platform in Odisha's Balasure on Friday, Defence sources said.

The LR Bomb after release from the IAF fighter aircraft was guided with accuracy to a land-based target at long range within specified limits. All the mission objectives were successfully met, they said.

The flight of the bomb and the performance was monitored by a number of range sensors, including the Electro-Optical Tracking System, telemetry and radar deployed by the Integrated Test Range at Chandipur in Odisha, the sources said.

The LR Bomb has been designed and developed by Research Centre Imarat (RCI) in Hyderabad in coordination with other DRDO laboratories.

Defence Minister Rajnath Singh has congratulated the DRDO, the IAF and other teams associated with the successful flight trial and stated that this will prove to be a force multiplier for the Indian Armed Forces.

Secretary DDR&D and Chairman DRDO G Satheesh Reddy in his message to the teams said that the successful flight test of Long-Range Bomb is an important milestone in the development of this class of systems indigenously.

<https://www.ndtv.com/india-news/long-range-bomb-successfully-flight-tested-by-air-force-defence-body-drdo-2592688>



The Long Range Bomb was released from a Air Force fighter aircraft (Representational)

स्वदेशी: भारतीय वायुसेना और डीआरडीओ ने संयुक्त रूप से लंबी दूरी के बम का किया सफल परीक्षण

हाईलाइट

• स्वदेशी भारत की सफल उड़ान

नई दिल्ली: रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) और भारतीय वायुसेना (आईएएफ) की टीम ने शुक्रवार को संयुक्त रूप से एक एरियल प्लेटफॉर्म से स्वदेशी रूप से विकसित लॉन्ग-रेंज बम का सफलतापूर्वक परीक्षण किया। डीआरडीओ की ओर से जारी एक बयान के अनुसार भारतीय वायुसेना के लड़ाकू विमान से दागे जाने के बाद बम को निर्दिष्ट सीमाओं के भीतर सटीकता के साथ लंबी दूरी पर स्थित भूमि-आधारित लक्ष्य के लिए निर्देशित किया गया।

इस मिशन के सभी उद्देश्यों को सफलतापूर्वक पूरा किया गया। उड़ीसा में एकीकृत परीक्षण रेंज, चांदीपुर द्वारा तैनात इलेक्ट्रो ऑप्टिकल ट्रैकिंग सिस्टम (ईओटीएस), टेलीमेट्री और रडार सहित कई रेंज सेंसर द्वारा बम की फ्लाइंग और प्रदर्शन की निगरानी की गई थी। एलआर बम को अन्य डीआरडीओ प्रयोगशालाओं के समन्वय में हैदराबाद स्थित डीआरडीओ प्रयोगशाला, रिसर्च सेंटर इमारत द्वारा डिजाइन और विकसित किया गया है।

रक्षा मंत्री राजनाथ सिंह ने डीआरडीओ, भारतीय वायुसेना और सफल उड़ान परीक्षण से जुड़ी अन्य टीमों को बधाई दी है और कहा है कि यह भारतीय सशस्त्र बलों के लिए एक फोर्स मल्टीप्लायर साबित होगा। डीडीआर एंड डी के सचिव और डीआरडीओ के अध्यक्ष डॉ. जी. सतीश रेड्डी ने टीमों को अपने संदेश में कहा कि लंबी दूरी के बम के सफल उड़ान परीक्षण ने इस वर्ग की प्रणाली के स्वदेशी विकास में एक महत्वपूर्ण मील का पत्थर हासिल किया है। बता दें कि दो दिन पहले ही भारत ने परमाणु-सक्षम सतह से सतह पर मार करने वाली बैलिस्टिक मिसाइल अग्नि-5 का सफलतापूर्वक परीक्षण किया था।



<https://www.bhaskarhindi.com/national/news/indian-air-force-and-drdo-jointly-test-fire-long-range-bombs-307608>

लंबी दूरी तक मार करने वाले स्वदेशी बम का सफल परीक्षण, DRDO ने दी जानकारी

अब दुश्मन देशों की खैर नहीं है। ये स्वदेशी बम दुश्मनों के घर में घुसकर वार करने में सक्षम है।

भारत ने शुक्रवार को एक लंबी दूरी तक मार करने वाले स्वदेशी बम का सफल हवाई परीक्षण किया है। ये बम पूरी तरह से स्वदेशी है। ये टेस्ट DRDO और भारतीय वायुसेना ने मिलकर एक एरियल प्लेटफॉर्म के जरिए किया गया है। कहा जा रहा है कि अब दुश्मन देशों की खैर नहीं है। ये स्वदेशी बम दुश्मनों के घर में घुसकर वार करने में सक्षम है।

इससे पहले भारत ने बुधवार को एपीजे अब्दुल कलाम द्वीप से परमाणु सक्षम और सतह से सतह पर 5,000 किलोमीटर रेंज तक मार करने वाली बैलिस्टिक मिसाइल अग्नि-5 का सफल परीक्षण किया था। रक्षा मंत्रालय ने एक बयान में कहा, "मिसाइल, जो तीन चरणों वाले ठोस ईंधन वाले इंजन का उपयोग करती है, बहुत उच्च सटीकता के साथ 5,000 किलोमीटर तक की दूरी पर लक्ष्य को भेदने में सक्षम है।" अग्नि-5 को डीआरडीओ और भारत डायनेमिक्स लिमिटेड द्वारा विकसित किया गया है और इसका वजन करीब 50,000 किलोग्राम है।



प्रतीकात्मक तस्वीर

मिसाइल 1.75 मीटर लंबी है, जिसका व्यास 2 मीटर है। यह 1500 किलोग्राम का वारहेड तीन चरणों वाले रॉकेट बूस्टर के शीर्ष पर रखा जाएगा जो ठोस ईंधन द्वारा संचालित होते हैं। वैज्ञानिकों ने कहा है कि भारतीय अंतरमहाद्वीपीय बैलिस्टिक मिसाइल अपने सबसे तेज गति से 8.16 किलोमीटर प्रति सेकेंड की रफ्तार से चलने वाली ध्वनि की गति से 24 गुना तेज होगी और 29,401 किलोमीटर प्रति घंटे की उच्च गति हासिल करेगी। यह सटीक निशाना लगाने में भी सक्षम है। इसे मोबाइल लॉन्चर से लॉन्च किया जा सकता है।

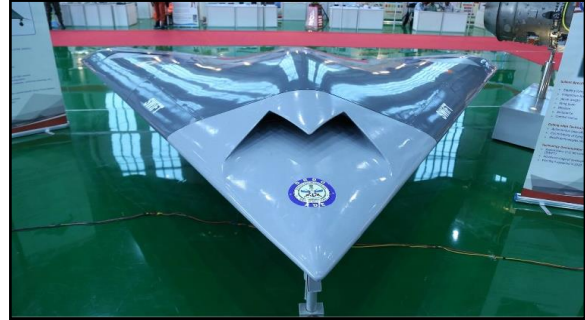
<https://www.abplive.com/news/india/indigenously-developed-long-range-bomb-successfully-flight-tested-by-drdo-iaf-team-from-an-aerial-platform-today-1989521>

DRDO's stealth attack UAV back in focus as footage of demonstrator emerges

The existence of a UCAV project was first revealed over a decade ago

Over the past week, social media handles following Indian defence developments have been abuzz after footage emerged of a UAV developed by the DRDO.

Twitter users shared images and video of the Stealth Wing Flying Testbed (SWiFT), a UAV developed by the DRDO's Aeronautical Development Establishment. The SWiFT is being developed as a technology demonstrator for the DRDO's secretive programme to create an unmanned combat aerial vehicle (UCAV). The images and video showed the aircraft conducting taxi trials, a precursor to flight tests.



Early model of the SWiFT | Via Twitter

To a layperson, the SWiFT resembles the US B-2 stealth bomber in layout as both having a 'flying wing' configuration. The flying wing configuration allows an aircraft to carry more fuel and weapons and also reduces its radar cross-section as the design has no definite fuselage. However, flying wing designs typically have more complicated flight control systems.

Various reports estimated the SWiFT has a weight of about 1 tonne and is powered by a small turbofan engine from Russia.

DRDO had previously indicated that SWiFT was a project to demonstrate technologies for controlling the flying wing configuration and flight characteristics at high-subsonic speed.

Ground trials of the SWiFT were reported to have begun around June this year.

Earlier this year, *onmanorama* reported that a go-ahead from the cabinet for full-scale development of the UCAV was expected later this year, based on the success of the SWiFT.

The existence of a UCAV project was first revealed over a decade ago, with the project being known by various names such as AURA (autonomous unmanned combat air vehicle) and Ghatak.

Reports in recent years have claimed the DRDO UCAV could fly by 2025. The final UCAV design is expected to be several times larger in size than the SWiFT and would be powered by an engine derived from the Kaveri power-plant that was meant for the Tejas fighter.

A jet-powered, stealthy UAV would provide several advantages over existing drones that can carry weapons. This includes having higher speed and capacity to carry more weapons and advanced sensors, thanks to a more powerful engine and lesser probability of detection as payloads are carried internally.

This would make such a UCAV suitable for attacking targets in areas defended by anti-aircraft guns and surface-to-air missiles.

<https://www.theweek.in/news/india/2021/10/29/drdo-stealth-attack-uav-back-in-focus-as-footage-of-demonstrator-emerges0.html>

Successful test of Agni 5 and its strategic importance

The test conducted is being looked at strong strategic posturing towards China in the context of a 17-month long stand-off that started from April last year

By Sushant Kulkarni

Pune: The successful test of Agni-5, the long-range surface-to-surface Nuclear Capable Ballistic missile, on Wednesday is significant from two aspects — one, as strong strategic signalling to China amid ongoing stand-off in Eastern Ladakh sector and two, it was the first time that the missile was fired at night, thus proving the versatility of the already operational system. Here is a quick explainer.

The Test on Wednesday

The successful launch of Agni-5, which uses a three-stage solid-fuelled engine, was carried out on Wednesday at around 7.50 pm. The missile is capable of carrying nuclear warheads and can strike targets at ranges up to 5,000 km with a high degree of accuracy. After the test, the Ministry of Defence said, “The successful test of Agni-5 is in line with India’s stated policy to have ‘credible minimum deterrence’ that underpins the commitment to ‘No First Use’.”



Agni-5 was test-fired from the Abdul Kalam Island. (Express Photo)

Developed by the Defence Research and Development Organisation (DRDO), the missile is already inducted into services and is operated by the Strategic Forces Command (SFC). SFC is a key tri-services formation that manages and administers all the strategic forces and falls under the purview of the Nuclear Command Authority of India. The test on Wednesday was carried out and monitored by the SFC.

In December 2018, a successful test of Agni-5 was carried out by the SFC. Earlier that year, two more tests of Agni-5 were conducted in January and June.

A senior DRDO scientist said, “Every test of such complex system is an opportunity for the user — the SFC in this case and the developer — the DRDO, to study and track the performance of the system in different settings and with different parameters. The test on Wednesday was conducted at night, thus proving the versatility of this complex system. It is yet another proof of its all-weather capabilities.”

Like all other tests, the flight performance of the missile was tracked and monitored by radars, range stations and tracking systems all through the mission.

The strategic signalling

Test conducted on Wednesday is being looked at strong strategic posturing towards China in the context of a 17-month long stand-off that started from April last year. In a similar strategic messaging effort in September and October last year, India had conducted a flurry of missile tests, in one of the most action-packed months of the DRDO’s history. The missiles tested during this period were crucial for the capabilities of land attack, air defence and maritime warfare.

The test also needs to be looked at in the context of a test of nuclear-capable hypersonic glide vehicle conducted by China in August this year that circled the globe before speeding towards its target, as first reported by the Financial Times earlier this month. The report stated that the Chinese military had launched a rocket that carried a hypersonic glide vehicle, which flew through low-orbit space before cruising down towards its target.

“India has been working towards strengthening its nuclear triad and such tests are a strong reminder to the adversaries about our capabilities,” said a senior Army officer.

The Agni Missile Family

The name Agni originates from the Sanskrit word for fire and is taken in the context of Agni being one of the five primary elements of Panch Mahabhutas. Others are Prithvi (Earth), Aapa (Water), Vayu (Air), Akash (Space). Of these names, Prithvi and Akash have been given to missiles developed by the DRDO.

The development of Agni missiles started in early 1980 under the Integrated Guided Missile Development Programme spearheaded by Dr APJ Abdul Kalam, the central figure in India's missile and space programmes, who also served as the 11th President of India.

Medium to Intercontinental versions of Agni missiles systems 1 to 5 have varying ranges, starting from 700 km from Agni-1 to 5,000 km and above for Agni-5. In June this year, the DRDO, successfully tested the new generation nuclear-capable ballistic missile Agni P, which is an advanced variant of the Agni class of missiles. Agni P is a canisterised missile with a range capability between 1,000 and 2,000 km.

While the DRDO has not officially declared, Agni-6 is also said to be under development with a much longer range starting 8,000 km and has multiple independently targetable re-entry vehicle (MIRV) carrying capabilities.

No First Use posture and India's nuclear doctrine

After the Wednesday's test, the MoD highlighted the posture of 'credible minimum deterrence' and 'No First Use' which are pivotal points of India's nuclear doctrine, first published in 2003.

The pointers from the doctrine are: Building and maintaining a credible minimum deterrent. The posture of 'No First Use', meaning nuclear weapons will only be used in retaliation against a nuclear attack on Indian territory or Indian forces anywhere. The nuclear retaliation to a first strike will be massive and designed to 'inflict unacceptable damage.'

The doctrine also states that nuclear retaliatory attacks can only be authorised by the civilian political leadership through the Nuclear Command Authority. While India maintains the 'Non-use of nuclear weapons against non-nuclear-weapon states', the doctrine states that 'in the event of a major attack against India, or Indian forces anywhere, by biological or chemical weapons, India will retain the option of retaliating with nuclear weapons.'

<https://indianexpress.com/article/india/agni-5-test-strategic-importance-7596504/>

Editorial: Power of Agni

At a time when tensions are rising with China along the Line of Actual Control (LAC), the successful test-firing of Agni-V, the nuclear-capable intercontinental ballistic missile (ICBM) with a range of over 5,000 km, comes as a big confidence booster and demonstrates India's prowess in defence technology. The high-precision surface-to-surface missile will equip India better for a potential Chinese offensive as it has the capability to reach almost every part of China. The development comes just months after India test-fired the 'Agni Prime', the next generation nuclear-capable ballistic missile in the nuclear arsenal. While the Agni Prime and the rest of the Agni series is focused primarily on Pakistan, Agni-V is a much larger strategic weapon, capable of striking at much longer ranges. With Agni-V, India has joined an exclusive club of countries, with the others being China, the US, Russia, Britain and France, to have ICBMs. The Agni-V missile, which uses a three-stage solid-fuelled engine, carries enormous strategic significance for India and is also in tune with the country's stated policy to have credible minimum deterrence that underpins the commitment to 'No First Use'. The missile is programmed in such a way that after reaching the peak of its trajectory, it will turn towards Earth to continue its journey towards the intended target with an increased speed due to Earth's gravitational pull. Additionally, it has a launch weight of 50,000 kg, and can carry a warhead of about 1,500 kg.

Agni-V is India's most potent ICBM that is capable of not only repelling any adventure by the adversaries in the region but also retaliating forcefully in the event of an armed conflict. India's missile technology capabilities will help achieve strategic balance and stability in South Asia in view of aggressive posturing by China. What makes this missile unique and agile is that it is a 'canisterised' missile. It means that the missile can be launched from road and rail platforms, making it easier for it to be deployed and launched at a quicker pace. The canisterisation, which is an encapsulated system in which the missile is stored and launched from, also gives the missile a longer shelf life, protecting it from the harsher climatic conditions. While India is among the handful of nations with ICBM capability, the next generation of the missile under development — Agni VI — is expected to have a range of around 8,000 km. There are reports that China had tested a new hypersonic missile in August, though Beijing has denied them. India too is reportedly working towards mastering the technology. Hypersonic missiles have the ability to change track or target, mid-trajectory, along with the speed, and this makes them tougher to track and defend against.

<https://telanganatoday.com/editorial-power-of-agni>

Nowhere in the world is such a commitment of 450 Aircraft and this depicts IAF's plan for capability building: IAF Chief VR Chaudhari

By Manish Kumar Jha

Air Chief Marshal VR Chaudhari, the Chief of Air Staff takes over the baton in the midst where the combat readiness of IAF is of the highest degree. It is pertinent to map out as how the IAF--and air forces around the world are playing the unprecedented role and critical missions in the conflicts. The next generation technological breakthroughs in aerial warfare are already unfolding in sheer magnitude and in the shape of unmanned systems, hypersonic combat aircraft and laser energy weapon. It is almost redefining the concept of modern warfare in air and in space. In an exclusive interaction, Air Chief Marshal Chaudhari speaks with Manish Kumar Jha of BW Businessworld on building and acquiring such capabilities. He spells out his thoughts on such national projects in aerospace and defence—LCA Tejas, AMCA, MRFA, HTT-40, and LCH—projecting the sheer commitment of 450 aircrafts. While he puts new direction and thrust on UAV, CUAS with Laser -Energy Weapon, IAF is not only going to change the contours of war but it could also lay ground for aerospace manufacturing base to be the key driver of defence economy and national growth. During the talks, the CAS also put spotlight on the criticality of aero engine; aim to leapfrog in the advancement in material science with complex core engine system. Chief also spoke about the phasing out of MiG 21 Bison.



Manish K Jha: A look at the geopolitics and global conflicts gives the clear indication that aerial dimension of the warfare has established unprecedented superiority. How does IAF embrace such shift in terms of evolving threats and capability?

CAS: IAF is prepared for any conflict, conventional or otherwise. Our focus remains on building operational capability against prevailing threats. The IAF CONOPS (Concept of Operations), policies, force structure and operational training are designed to handle all envisaged and emerging threats on any front.

IAF has currently planned for 83 LCA, 70 HTT-40, two Sqns of AMCA Mk-I and five Sqns of AMCA MK-II. Additionally, the order for LCH and other developments in the helicopter fleet will provide for 400/450 aircraft.

"In the long term IAF will have LCA version AMCA and MRFA in its flight line along with 56 C-295 for tactical airlift. Nowhere in the world is such a commitment of 450 aircraft made. This depicts IAF's plan for capability building."

Manish K Jha: Recent drones attack at the IAF base in Jammu is the indication that IAF must build capability for advance UAV, CUAS and air defence mechanism. What is that we are building and how is IAF collaborating or acquiring such air defence/ anti-drone systems? The IAF has floated RFI to purchase 10 CUASs with Laser Directed Energy Weapon (Laser-DEW) from Indian vendors. What has been the response from the industry on such advance tech?

CAS: We are seeking to operationalize capability under unmanned combat enablers and the entire spectrum ranging from armed UAVs to UCAVs in the coming decade. Our trials on swarm

drone technology in HADR roles has been proven by start-ups and Indian universities through the 'Meher Baba competition'. Procurement of these systems for operational use is under progress.

The acquisition of C-UAS technology is being undertaken through indigenous route. We are also involving start-ups in the Design and Development of counter measures as part of Defence India Start Up Challenge-2 (DISC-2) under iDEX framework of Defence Innovation Organisation (DIO).

Manish K Jha: Could you please share the IAF's projected roadmap for having 42 squadron as defined under the possible two front war? It is speculated that IAF will not be able to achieve the strength of 42 squadrons as planned.

CAS: IAF has planned for a steady build-up of its fighter fleet over the coming two decades. This includes 83 LCA MK1A, 12 Su-30 MKI, 21 Mig 29s, 114 MRFA, and the seven Squadrons of AMCA. The plan caters to a force build up along with filling of gaps when older types and squadrons are phased out.

Manish K Jha: Future conflict even in battle spaces like the LAC, LoC and the deep maritime spaces of the IOR and Indo-Pacific, is actually driven by the air strikes in all likelihood -- in fact any tactical offensive response in recent times from Balakot to troops deployment in Ladakh has been led by IAF. In such scenario, how does then the concept of leading the Theatre Command work for IAF? In light of that how jointness (operational capability & resource optimization) among forces can better be achieved?

CAS: Success in conflicts will depend on how well the three services are integrated. Joint Planning and execution is the cornerstone of integrated war fighting.

The three services have demonstrated this in the recent Eastern Ladakh impasse. Synergistic application of military power is necessary irrespective of the military structure that a nation adopts. Thus, IAF looks forward to evolve a future ready and capable system with this reform.

Manish K Jha: Besides IAF, Army and navy do have aviation wing. Though much smaller in size, they have an independent procurement process. Should there be a common ground for such acquisition across the services as it works for the cost optimization and technological gains by doing so for the Army and the Navy?

CAS: This is already being done. Similar requirements of the services for platforms, systems and weapons are procured jointly with nomination of a lead service by the MOD.

Manish K Jha: Could you talk about LCA Tejas Mk1 and Mk1A production timeline which is also expected to be powered by General Electric F404-GE-IN20 engines of 80-85 KN thrust. Has the work started on Mk1A as HAL is yet to deliver all FOC versions of Tejas? Could you elaborate on the weapons and combat systems to be integrated?

CAS: Tejas Mk1 FOC version aircraft are under delivery by HAL. The production of LCA Mk 1A is likely to commence shortly. The LCA Mk-1A will have better capabilities with indigenous technologies such as AESA Radar, Integrated Electronic Warfare (EW) Suite, Long Range Beyond Visual Range (BVR) missile, Air to Air Refuelling with better maintainability and avionics suite.

Manish K Jha: You have spoken about the possibility of developing aero engine with international collaboration. IAF needs 500 jets down the line so the need for engine. Could you throw light on this? So far, there is no such collaboration taken place?

CAS: There is no doubt that it is important to develop aero engine technology indigenously. Since we still have some way to go in this regard, one option would be to collaborate with a foreign partners to imbibe this technology. The specifics have to be worked out by the R&D and manufacturing agencies.

Manish K Jha: Could you throw light on the development stage of AMCA? It is through SPV with HAL as lead. Has the project AMCA been funded? Do you think, we get that crucial NGTD-1 by 2024? What is needed to boost project AMCA? Does IAF see AMCA as the flagship combat jet in the making?

CAS: "A joint review of the AMCA program by DRDO and IAF was conducted in Aug 2020, while the Critical Design Review is planned tentatively in Dec this year. Defence Research and Development Organisation (DRDO) along with active support of IAF, is working towards development of Next Generation Technology Demonstrator."

IAF envisages AMCA to encompass state of the art design and better multi role capability with infusion of 6th Gen technologies. The experience of producing LCA will influence the design of AMCA to suit operational requirements of the future.

Manish K Jha: Does IAF plan to have in-house design/research bureau (similar to naval design bureau) that participates in conjunction with DRDO or other research and development agency from the stage of conceptualizing to developing the prototype?

CAS: The Directorate of Aerospace Design (DAD) has been formed at Air HQs. It is the nodal directorate tasked to meet technology requirements of the IAF in liaison and coordination with R&D labs, industry and academic institutions. The service has been involved in the LCA and indigenous helicopter programmes project through flight test crew and project management teams since the very inception of the programmes.

Manish K Jha: What is current status of IAF's plan for 114 fighter jets under MMRCA/MRFA 2.0? Do you see this as a giant opportunity to build up world class defence and aerospace industrial ecosystem that could, in fact, be the key economic drivers for growth?

CAS: IAF plans to induct 114 MRFA in phased manner for which Qualitative Requirements are being finalised. The program would be progressed under 'Make in India' initiative of DAP-2020 focusing on transfer of key technologies to Indian Production Partners.

"This [MRFA] is a major opportunity for partnership between the public and private sectors, both in design, development and manufacturing subsequently."

Manish K Jha: How keen is the IAF for medium transport aircraft which will replace Avro-748? Will such acquisition entail the full TOTS for Make in India?

CAS: IAF is augmenting its medium tactical airlift capability with the procurement of 56 C-295 MW aircraft under the 'Buy and Make' category. While 16 aircraft will be delivered in a flyaway condition, 40 are to be manufactured in India by the TATA consortium.

Manish K Jha: When do we expect 5 Almaz-Antei S-400 Triumf self-propelled surface-to air missile systems?

CAS: "The delivery of the first Unit of S-400 Missile System is scheduled to commence shortly."

<http://www.businessworld.in/article/Nowhere-In-The-World-Is-Such-A-Commitment-Of-450-Aircraft-And-This-Depicts-IAF-s-Plan-For-Capability-Building-IAF-Chief-VR-Chaudhari/30-10-2021-410569/>

Research, innovation, quality to make India knowledge superpower, says Tessa Thomas

Missile Woman says efforts of scientists and technologists have propelled India to elite club of nations in space, defence, and nuclear technologies

Kozhikode: Tessa Thomas, renowned scientist and Director General of Aeronautical Systems at the Defence Research and Development Organisation (DRDO), has said that “research, innovation, and quality” will be the three pillars on which India will become a knowledge superpower.

Delivering the convocation address of the National Institute of Technology, Calicut (NIT-C) on Saturday, Dr. Thomas said the DRDO’s efforts positioned the nation among the top few countries in the world with multilevel strategic capability. These include the Agni series, underwater weapon systems, anti-ballistic missile programmes, main battle tanks, electronic warfare, multi-range radar systems, fighter aircraft, Light Combat Aircraft and its variants, and airborne early warning and control systems.

“India with its strong position in terms of advanced technology in the field of science and engineering and in-house research with academic institutions are churning out qualified and trained manpower,” said the ‘Missile Woman of India’, a moniker she earned for being the first woman scientist to head a missile project in India.

She said the sustained efforts of scientists and technologists had propelled India to the elite club of nations in space, defence, and nuclear technologies. “New strategies need to be developed to induct, nurture and retain the young talents in the engineering stream. We need to have a fresh look at the linkages between our national laboratories and the university system. We must renew our commitments fostering a scientific temper among the students so that we are able to deal with the challenges in a scientific way,” said Dr. Thomas.

With the current trend of automation and data exchange in manufacturing technologies which included cyber-physical systems, cloud computing, and cognitive computing, she said that ‘Industry 4.0’ is going to revolutionise the industry sector. “Today is the world of digitisation and networking is the prime factor, with Artificial Intelligence and the use of advanced materials for manufacturing,” added Dr. Thomas.

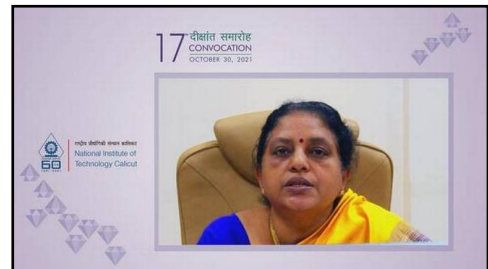
Gajjala Yoganand, Chairperson, NIT-C Board of Governors, addressed the fresh graduands and NIT-C Director Prasad Krishna presented the annual report, highlighting the achievements of the institute in the academic year 2020-21.

V. Manjunath of the Electrical and Electronics Engineering branch secured the highest CGPA (9.75/10) among all the outgoing B. Tech students. He was awarded the Bapana Gold Medal and the Prof. Allesu Kanjirathinkal Memorial Award.

Among postgraduate students, Sana Shahul Hameed from the M.Tech Structural Engineering stream of Civil Engineering and S. Bala Murugan from the M. Tech. Manufacturing Technology stream of Mechanical Engineering bagged the Bapana Gold Medal with CGPA of 9.93 out 10.

Toppers of the 10 B. Tech, 25 M. Tech, 3 M. Sc, MCA, and MBA programmes were also awarded gold medals for their outstanding performance in the respective specialisations. Registrar (in-charge) Jeevamma Jacob, Dean (Academic) Saly George and the heads of various departments administered the convocation ceremony in the virtual mode.

<https://www.thehindu.com/news/cities/kozhikode/research-innovation-quality-to-make-india-knowledge-superpower-says-tessa-thomas/article37256281.ece>



Israel, India to build 10-year defense cooperation plan

Israel has been supplying India with various weapons systems, missiles, and unmanned aerial vehicles over the last few years, making India one of Israel's largest buyers of military hardware

By Anna Ahronheim

Israel and India have agreed to form a task force that will build a 10-year cooperation plan to identify new areas in defense cooperation between the two countries.

The plan, which will include defense procurement, production and research and development, was agreed upon last week during a visit last week by Ajay Kumar, the director-general of the Indian ministry of defense.

Kumar met with his Israeli counterpart, director-general of the defense ministry Maj.-Gen. (ret.) Amir Eshel at the Kirya military headquarters in Tel Aviv for the 15th meeting of the Joint Working Group on defense cooperation.

According to *The Times of India*, during the meeting, the two officials discussed bilateral military-technological cooperation as well as strategic challenges in the Middle East and Indo-Pacific regions.

“The two sides reviewed the progress made in military-to-military engagements, including exercises and industry cooperation,” an Indian official was quoted by the report, adding that “it was also decided to form a new sub-working group on defense industry cooperation.”

India recently participated in the Blue Flag international air drill, sending for the first time a Mirage fighter squadron to Israel. India also participated in Blue Flag 2017.

Israel has been supplying India with various weapons systems, missiles and unmanned aerial vehicles over the last few years, making India one of Israel's largest buyers of military hardware.

A 2020 report by the Stockholm International Peace Research Institute found that Israel's arms exports over the past four years have been the highest ever and accounted for three percent of the global total.

The Jewish state was found to be the world's eighth-largest arms supplier and its arms exports were 77% higher than between 2010 to 2014.

According to the report, the top three customers of Israeli arms were India (45% of the total amount), Azerbaijan (17%), and Vietnam (8.5%). Weapons sales to India have consistently totaled over \$1 billion per year.

In September, India purchased four [Heron MK II](#) from Israel Aerospace Industries in a deal worth some \$200 million as part of the country's plans to upgrade the military amid its ongoing border strife with China.

The Indian Air Force already operates more than 180 Israeli-made UAVs, including IAI-made Searchers and 68 unarmed Heron 1s, for surveillance and intelligence gathering, as well as a fleet of IAI-produced Harpy UAVs, which carry a high-explosive warhead and self-destructs to take out targets such as radar stations.

Last year the Indian cabinet approved an order of two Phalcon AWACs from Israel in a deal reportedly about \$1b. that had been in the works for the past few years.



Indian Minister of External Affairs Dr. Subrahmanyam Jaishankar (L) and Israeli Foreign Minister Yair Lapid (R). October 18, 2021. (credit: AVI HAYUN/FOREIGN MINISTRY)

Mounted on a Russian Ilyushin-76 heavy-lift aircraft the system has Active Electronic Steering Array (AESA), L-Band radar with 360° coverage and can detect and track incoming aircraft, cruise missiles and drones before ground-based radars.

The first three Phalcon AWACS were obtained by the Indian Air Force in 2009 after a \$1.1b. deal was signed between India, Israel, and Russia in 2004.

The two countries have also signed contracts to manufacture and supply BARAK 8/MRSAM missile kits for the Indian Army and Air Force.

The MR-SAM system, jointly developed by India's Defence Research and Development Organisation (DRDO) in close collaboration with Israel's Israel Aircraft Industry, is a land-based configuration of the long-range surface-to-air missile (LRSAM) or Barak-8 naval air defense system.

Able to shoot down enemy aircraft at a range of 50 to 70 km., it will help to protect India from enemy aircraft and will replace the country's aging air defense systems.

<https://www.jpost.com/israel-news/israel-india-to-build-10-year-defense-cooperation-plan-683591>



Sun, 31 Oct 2021

NEP will transform education in country: Union Minister

'Idea behind policy is to ensure affordable, equitable education for all'

Chennai: The National Education Policy (NEP), once implemented, will transform the educational landscape of the country, Union Minister for Education, Skill Development and Entrepreneurship Dharmendra Pradhan said on Saturday.

Addressing the 17th convocation of the SRM Institute of Technology virtually, he said NEP focused on the close linkage between academic institutions and industry. He said the idea behind NEP was to ensure affordable, accessible, equitable and quality education for all. Highlighting the role played by technology in changing people's lives on a large scale, he said COVID-19 had made the country realise this even more. He said it was important for the education sector to keep itself updated, in tune with the changing dynamics of the contemporary world.

In his convocation address, delivered virtually, G. Satheesh Reddy, Secretary of the Department of Defence Research and Development and chairman of the Defence Research and Development Organisation, stressed the need for academic institutions to be the drivers of innovation. He said if the country had to become a net exporter of technology, academic institutions should focus on cutting-edge research that could in turn be put to use by the country's research organisations, like the DRDO, and the industry. He said the government was implementing a number of initiatives to encourage innovations and appealed to the youngsters to make use of such opportunities.

T.R. Paarivendhar, MP and founder-chancellor of SRMIST, presided over the convocation and awarded the degrees. C. Muthamizhchelvan, Vice-Chancellor, SRMIST, presented the annual report.

<https://www.thehindu.com/news/national/tamil-nadu/nep-will-transform-education-in-country-union-minister/article37260713.ece>

DRDO on Twitter

 **रक्षा मंत्री कार्यालय/ RMO India** ✓ @DefenceMinIndia · Oct 30 ...

DRDO, Air Force successfully test India's first indigenously developed long-range bomb
[@DRDO_India](#)
[@IndianExpress](#)



indianexpress.com
DRDO, Air Force successfully test India's first indigenously developed ...
The bomb is part of the class of weapons with a range of 50 to 150 km.

 **PRO Defence Pune** @PRODefPune · Oct 29 ...

Defence Research and Development Organisation (DRDO) and Indian Air Force (IAF) team jointly flight tested indigenously developed Long-Range Bomb (LRB) successfully from an aerial platform on October 29, 2021.
Press Release : pib.gov.in/PressReleasePa...

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 **PRO Defence Pune** @PRODefPune · Oct 29 ...

Defence Research and Development Organisation (DRDO) and Indian Air Force (IAF) team jointly flight tested indigenously developed Long-Range Bomb (LRB) successfully from an aerial platform on October 29, 2021.
Press Release : pib.gov.in/PressReleasePa...

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Defence Strategic: National/International



Press Information Bureau
Government of India
Ministry of Defence

Fri, 29 Oct 2021 11:14AM

Launching ceremony of Tushil - P1135.6 follow on Frigate (Ex-Russia)

The 7th Indian Navy Frigate of P1135.6 class was launched on 28 Oct 2021 at Yantar Shipyard, Kaliningrad, Russia in presence of Shri D Bala Venkatesh Varma, Ambassador of India (Moscow) and senior dignitaries of the Russian Federation and officials of the Indian Navy. During the ceremony, the ship was formally named as 'Tushil' by Smt Datla Vidya Varma. Tushil is a Sanskrit word meaning Protector Shield.

Based on an Inter-Governmental Agreement (IGA) between the Government of Republic of India and Government of Russian Federation for construction of two ships of Project 1135.6 ships in Russia and two ships in India at M/s Goa Shipyard Limited (GSL), the contract for construction of two ships was signed between India and Russia in Oct 18.

The construction of these ships is based on Indian Navy's specific requirements to meet the entire spectrum of naval warfare in all three dimensions of Air, Surface and Sub-surface. The ships with a potent combination of state-of-art Indian and Russian Weapons and Sensors are equipped to operate in Littoral and Blue waters, both as a single unit and as consort in a naval task force. They feature "stealth technology" in terms of low radar and under water noise signatures. These ships are being equipped with major Indian supplied equipment such as Surface to Surface Missiles, Sonar system, Surface Surveillance Radar, Communication Suite and ASW system along with Russian Surface to Air Missiles and gun mounts.

Mr Ilya Samarin, Director General, Yantar Shipyard, Kaliningrad, in his address dwelt upon the challenges faced by the Shipyard in executing the complex shipbuilding project. Despite challenges posed by the ongoing pandemic, production of the ships was continued by utilisation of innovative solutions. He thanked the Indian Government for their unstinted support and reiterated shipyard's commitment to deliver the ships as per contractual timelines. Shri D Bala Venkatesh Varma, Ambassador of India (Moscow), highlighted the long standing tradition of Military Technical Cooperation between India and Russia. He acknowledged the efforts put in by the Yantar Shipyard to ensure that the ship was launched as per contractual timelines overcoming the challenges imposed by COVID-19.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1767422>





पत्र सूचना कार्यालय
भारत सरकार
रक्षा मंत्रालय

Fri, 29 Oct 2021 11:14AM

रूस द्वारा प्रदत्त तुशील-पी 1135.6 फ्रिगेट का शुभारंभ समारोह

पी 1135.6 वर्ग के सातवें भारतीय नौसेना फ्रिगेट को 28 अक्टूबर 2021 को रूस के कालिनिनग्राद स्थित यानतर शिपयार्ड में लॉन्च किया गया। उसके शुभारंभ समारोह में मास्को स्थित भारतीय राजदूत श्री डी. बाला वेंकटेश वर्मा, रूसी संघ के वरिष्ठ गणमान्य और भारतीय नौसेना के अधिकारी उपस्थित थे। समारोह के दौरान, श्रीमती दात्ला विद्या वर्मा ने पोत का नाम 'तुशील' रखा। संस्कृत में 'तुशील' का अर्थ 'रक्षात्मक कवच' होता है।

भारत और रूसी संघ की सरकारों के बीच समझौते के आधार पर परियोजना 1135.6 के तहत दो पोत रूस और दो पोत भारत में बनाये जायेंगे। भारत में इन पोतों का निर्माण मेसर्स गोवा शिपयार्ड लिमिटेड (जीएसएल) में किया जायेगा। दो पोतों के निर्माण की संविदा पर रूस और भारत के बीच 18 अक्टूबर को हस्ताक्षर किये गये थे।

इन जलपोतों का निर्माण भारतीय नौसेना की विशेष आवश्यकताओं को ध्यान में रखकर किया जा रहा है, ताकि वायु, सतह और उप-सतह जैसे सभी तीन आयामों में समुद्री जंग के सभी आवश्यकताओं को पूरा किया जा सके। ये जलपोत भारत और रूस के उन्नत हथियारों और संवेदी उपकरणों से लैस होंगे, जो अपनी समुद्री सीमा के भीतर और खुले सागर में अकेले तथा पूरी नौसेना के साथ सक्रिय रूप से हिस्सा लेने में सक्षम होंगे। इनमें "स्टेलथ टेक्नोलॉजी" लगी होगी, जिसके कारण वे निचले स्तर पर काम करने वाले रेडार से बच जायेंगे तथा गहरे पानी के भीतर किसी प्रकार का शोर भी नहीं करेंगे। जहाजों को भारत से प्राप्त प्रमुख उपकरणों से लैस किया जा रहा है, जैसे सहत से सतह पर मार करने वाले मिसाइल, सोनार प्रणाली, सतह की निगरानी करने वाले रेडार, संचार-तंत्र और पनडुब्बी रोधी प्रणाली। इनके अलावा रूस के बने सतह से सतह पर वार करने वाले मिसाइल और तोपें-बंदूकें भी लगाई जा रही हैं।

यानतर शिपयार्ड, कालिनिनग्राद के महानिदेशक श्री इल्या समारिन ने बताया कि शिपयार्ड के सामने जटिल पोत निर्माण परियोजना को पूरा करने का चुनौतीपूर्ण कार्य था। वर्तमान महामारी के हालात की चुनौतियां होने के बावजूद जलपोतों का निर्माण जारी रखा गया और उसके लिये नये तरह के समाधान निकाले गये। उन्होंने कहा कि भारत सरकार का लगातार समर्थन मिलता रहा। उन्होंने भारत सरकार को इसके लिये धन्यवाद दिया और यह प्रतिबद्धता दोहराते हुये कहा कि संविदा में उल्लिखित समय-सीमा के भीतर जलपोतों को सौंप दिया जायेगा। मास्को स्थित भारत के राजदूत श्री डी. बाला वेंकटेश वर्मा ने भारत और रूस के बीच सैन्य तकनीकी सहयोग की लंबी परंपरा का उल्लेख किया। उन्होंने यानतर शिपयार्ड का शुक्रिया अदा किया कि कोविड-19 की चुनौतियों का मुकाबला करते हुये शिपयार्ड ने तय समय-सीमा के भीतर जलपोत सौंप दिया है।



<https://pib.gov.in/PressReleasePage.aspx?PRID=1767452>



Press Information Bureau
Government of India

Ministry of Defence

Fri, 29 Oct 2021 6:16PM

15th India-Israel Joint Working Group meeting in Tel Aviv

India-Israel Joint Working Group (JWG) on Bilateral Defence Cooperation has agreed to form a Task Force to formulate a comprehensive Ten-Year Roadmap to identify new areas of cooperation.

This was decided at the 15th JWG meeting held on October 27, 2021 in Tel Aviv, Israel.

The meeting was co-chaired by Defence Secretary Dr Ajay Kumar and the Director General of the Israel's Ministry of Defence, Maj Gen (Retd) Amir Eshel.

The JWG is the apex body between the Ministry of Defence of India and Israel's Ministry of Defence to comprehensively review and guide all aspects of Bilateral Defence Cooperation.

The two sides reviewed the progress made in Military to Military engagements including exercises and industry cooperation. The Co-chairs were also appraised on the progress made by the Sub Working Groups (SWG) on Defence Procurement & Production and Research & Development.

It was also decided to form a SWG on Defence Industry Cooperation and in this regard a Terms of Reference was signed between the two sides. The formation of this SWG would enable efficient utilisation of bilateral resources, effective flow of technologies and sharing industrial capabilities. It was also decided to schedule the Service level Staff talks in a specific time frame.

It was agreed to hold the next JWG in India on mutually convenient dates.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1767593>



पत्र सूचना कार्यालय

भारत सरकार

रक्षा मंत्रालय

Fri, 29 Oct 2021 6:16PM

भारत-इजराइल संयुक्त कार्य समूह की 15वीं बैठक तल अवीव में आयोजित हुई

द्विपक्षीय रक्षा सहयोग पर भारत-इजराइल संयुक्त कार्य समूह (जेडब्ल्यूजी) ने साथ मिलकर काम करने के नए क्षेत्रों की पहचान हेतु व्यापक दस वर्षीय रोडमैप तैयार करने के लिए एक टास्क फोर्स बनाने पर सहमति व्यक्त की है।

इजराइल के तल अवीव में 27 अक्टूबर 2021 को आयोजित हुई 15वीं संयुक्त कार्य समूह बैठक में यह निर्णय लिया गया।

बैठक की सह-अध्यक्षता भारतीय रक्षा सचिव डॉ. अजय कुमार और इजरायल के रक्षा मंत्रालय के महानिदेशक मेजर जनरल (सेवानिवृत्त) अमीर एशेल ने की।

जेडब्ल्यूजी द्विपक्षीय रक्षा सहयोग के सभी पहलुओं की व्यापक समीक्षा एवं मार्गदर्शन के लिए भारतीय रक्षा मंत्रालय तथा इजरायल के रक्षा मंत्रालय के बीच कार्यरत शीर्ष निकाय है।

दोनों पक्षों ने अभ्यास और रक्षा उद्योग में सहयोग सहित दोनों सेनाओं के बीच संबंधों में हुई प्रगति की समीक्षा की। सह-अध्यक्षों को रक्षा खरीद और उत्पादन तथा अनुसंधान एवं विकास पर उप-कार्य समूहों (एसडब्ल्यूजी) द्वारा की गई प्रगति से भी अवगत कराया गया।

रक्षा उद्योग सहयोग पर एक एसडब्ल्यूजी बनाने का भी निर्णय लिया गया और इस संबंध में दोनों पक्षों के बीच संदर्भ की शर्तों पर हस्ताक्षर किए गए। इस एसडब्ल्यूजी के गठन से द्विपक्षीय संसाधनों के कुशल उपयोग, प्रौद्योगिकियों के प्रभावी प्रवाह तथा औद्योगिक क्षमताओं को साझा करने में मदद मिलेगी। यह भी निर्णय लिया गया कि सेवा स्तर की स्टाफ वार्ता को एक विशिष्ट समय सीमा में निर्धारित किया जाए।

इस बात पर भी सहमति बनी कि अगला जेडब्ल्यूजी पारस्परिक रूप से सुविधाजनक तिथियों पर भारत में आयोजित किया जाएगा।

<https://pib.gov.in/PressReleasePage.aspx?PRID=1767694>



Press Information Bureau
Government of India

Ministry of Defence

Sat, 30 Oct 2021 8:21PM

EX Yudh Abhyas: Closing Ceremony

The 17th Edition of Indo-US joint exercise “Ex Yudh Abhyas 2021”, the joint military training between Indian and the US Armies concluded at Joint Base Elmendorf Richardson, Alaska on 29 October 2021. The aim of this 14 day exercise was to familiarise each other with operational procedures, combat drills and developing inter-operability. The Indian contingent comprised 350 personnel of an Infantry Battallion group of the MADRAS Regiment while the US contingent consisted of 300 soldiers of the First Squadron (Airborne) of the 40th Cavalry Regiment.

The exercise was conducted in two phases. The first phase comprised combat conditioning and tactical training by both the contingents. Training received by both contingents in the first phase was put into practice in the validation stage. Both contingents jointly took part in the validation exercise which comprised combat shooting, rappelling and helicopter based mobilisation of quick response teams. The troops were organised into composite companies with mixed platoons of Indian and US Armies and the validation exercise culminated in a raid on an enemy position in mountainous terrain and securing of critical infrastructure.

The two Armies have gained from each other’s expertise and experience in conduct of platoon and company level operations. The exercise has strengthened mutual confidence, inter-operability and enabled sharing of best practices between the two contingents.



<https://pib.gov.in/PressReleasePage.aspx?PRID=1767974>



पत्र सूचना कार्यालय
भारत सरकार
रक्षा मंत्रालय

Sat, 30 Oct 2021 8:21PM

भारत अमेरिका युद्धाभ्यास 2021 का समापन समारोह

भारतीय और अमेरिकी सेनाओं के बीच संयुक्त सैन्य प्रशिक्षण "युद्ध अभ्यास 2021" का 17 वां संस्करण 29 अक्टूबर, 2021 को संयुक्त बेस एल्मेंडॉर्फ रिचर्डसन, अलास्का में संपन्न हुआ। इस 14 दिवसीय अभ्यास का उद्देश्य दोनों सेनाओं को एक दूसरे की अभियानगत प्रक्रियाओं, युद्ध अभ्यासों और अंतर-संचालनीयता एवं अन्य बातों के बारे में परिचित कराना था। भारतीय दल में मद्रास रेजिमेंट के एक इन्फैंट्री बटालियन समूह के 350 कर्मी शामिल थे, जबकि अमेरिकी दल में 40वीं कैवलरी रेजिमेंट के पहले स्काड्रन (एयरबोर्न) के 300 सैनिक शामिल थे।

इस अभ्यास को दो चरणों में आयोजित किया गया था। पहले चरण में दोनों टुकड़ियों द्वारा कॉम्बैट कंडीशनिंग और सामरिक प्रशिक्षण शामिल था। पहले चरण में दोनों दलों द्वारा प्राप्त प्रशिक्षण को सत्यापन चरण में व्यवहार में लाया गया। दोनों टुकड़ियों ने संयुक्त रूप से सत्यापन अभ्यास में भाग लिया जिसमें कॉम्बैट शूटिंग, रैपलिंग और त्वरित प्रतिक्रिया टीमों की हेलीकॉप्टर के माध्यम से तैनाती शामिल थी। सैनिकों को भारतीय और अमेरिकी सेनाओं की मिश्रित प्लाटून के साथ मिली जुली कंपनियों में संगठित किया गया था और सत्यापन अभ्यास का समापन पहाड़ी इलाकों में दुश्मन की स्थिति पर डाली गई रेड और महत्वपूर्ण बुनियादी ढांचे की सुरक्षा में हुआ।

दोनों सेनाओं ने प्लाटून और कंपनी स्तर के अभियानों के संचालन में एक दूसरे की विशेषज्ञता और अनुभव से सीखा है। अभ्यास ने आपसी विश्वास, अंतर-संचालन को मजबूत किया है और दो दलों के बीच सर्वश्रेष्ठ प्रथाओं को साझा करने योग्य बनाया है।



<https://pib.gov.in/PressReleasePage.aspx?PRID=1768024>

HAL delivers the 200th gun bay door for Boeing F/A -18 Super Hornet

HAL looks forward to strengthening its association with Boeing on military and civil programmes, a company official said

Bengaluru: Hindustan Aeronautics Limited has delivered the 200th gun bay door for Boeing F/A-18 Super Hornet.

Bengaluru-headquartered HAL said it has been supplying the aero-structure to Boeing for the last ten years.

"HAL has a long-standing partnership with Boeing and we look forward to strengthening our association on military and civil programmes. We are prepared to collaborate with Boeing to boost manufacturing under the 'Atmanirbhar Bharat' and Make in India programmes," HAL CMD R Madhavan said.

"We see tremendous potential for India to contribute to the global aerospace industry as an industrial and technology partner. This partnership is a testimony to the world class capability of our industrial partners in the country," President, Boeing India, Salil Gupte, was quoted as saying in an HAL statement on Friday.

HAL said its Aircraft Division has been a trusted supplier to Boeing for the last three decades. The Division has supplied various aero-structures for Boeing's military and civil programmes such as the B757 Over-wing Exit Doors, 777 Up-lock Box, F/A-18 Wire Harness and F/A-18 Gun Bay Door, it was stated.

(Only the headline and picture of this report may have been reworked by the Business Standard staff; the rest of the content is auto-generated from a syndicated feed.)

https://www.business-standard.com/article/economy-policy/hal-delivers-the-200th-gun-bay-door-for-boeing-f-a-18-super-hornet-121102900456_1.html





Press Information Bureau
Government of India

Ministry of Science & Technology

Fri, 29 Oct 2021 5:35PM

Low-cost process developed of synthesizing silver Nano-wires at large scale

A team of Indian scientists and research students have developed a process for large-scale manufacturing of nano-materials (Silver nanowires) that can bring down the costs to less than one-tenth of the market price.

Synthesis of one-dimensional nanomaterials like nanowires, nanotubes, and so on in large quantities is a technologically challenging task and hence makes it an expensive material. Secondly, it is necessary to get uniform nanowire diameter range with a narrow variation in the length as it helps achieve uniform coating for touch screens or other conducting coating applications.

A process developed by Dr. Amol A. Kulkarni from CSIR-National Chemical Laboratory, Pune, can produce silver nanowires at the scale of 500 grams per day at the cost of 20\$/gm when compared to 250\$/gm to 400\$/gm of market price.

It is an economical process of continuous flow manufacturing of functional nano-materials (silver nanowires) at a large scale with support from the Advanced Manufacturing Technologies Program of the Department of Science & Technology, Government of India.

The product manufactured consists of silver nanowires possessing excellent conductivity, which can be used in making conducting inks and coatings for display technologies and flexible electronics. A total of 5 national and international patents have also been filed for the novel process.

This is the first-ever continuous process for synthesizing a functional nanomaterial (Silver nanowires) efficiently with excellent product quality (aspect ratio of nanowires >1000) and at a very low cost (~20\$/gm) on a large scale (500 g/day) with a footprint of the pilot plant not more than 6 sq. meters. The process is a simple, cost-effective, and scalable synthesis route when compared to existing batch manufacturing protocols that even generate a large amount of nanoparticles in suspension, which is not easy to separate from nanowires. The developed process has been tested at CSIR-NCL's characterization facility and is in stage 8 of the Technology Readiness Level.

CSIR-NCL has licensed the process technology to Nanorbital Advanced Materials LLP (Ahmedabad) in November 2020 and has signed material transfer agreement with 3 more industries in 2021. Dr. Amol plans to further conduct testing of the developed nanomaterial in different display devices for transparent conducting applications as well as for printing of flexible electronics, including wearable electrodes.

This technology can make the Indian industries enter into the niche area of electronic chemicals and eventually open up new jobs.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1767570>



पत्र सूचना कार्यालय
भारत सरकार

रक्षा मंत्रालय
विज्ञान एवं प्रौद्योगिकी मंत्रालय

Fri, 29 Oct 2021 5:35PM

बड़े पैमाने पर चांदी के नैनो-तारों को संश्लेषित करने की कम लागत वाली प्रक्रिया विकसित की गई

भारतीय वैज्ञानिकों और शोध छात्रों की एक टीम ने नैनो-सामग्री (सिल्वर नैनोवायर) के बड़े पैमाने पर निर्माण के लिए एक प्रक्रिया विकसित की है जो इसके लागत को बाजार मूल्य के दसवें हिस्से से भी कम कर सकती है।

बड़ी मात्रा में नैनोवायर, नैनोट्यूब आदि जैसे एक-आयामी नैनो-मटेरियल्स का संश्लेषण एक तकनीकी रूप से चुनौतीपूर्ण कार्य है और इसलिए इसे एक महंगी सामग्री बना देता है। दूसरा, लंबाई में एक बहुत बारीक अंतर के साथ नैनो वायर की एक समान व्यास रेंज प्राप्त करना आवश्यक है क्योंकि यह टच स्क्रीन या अन्य कंडक्टिंग कोटिंग अनुप्रयोगों के लिए एक समान कोटिंग प्राप्त करने में मदद करता है।

वैज्ञानिक और औद्योगिक अनुसंधान परिषद (सीएसआईआर) - राष्ट्रीय रासायनिक प्रयोगशाला (नेशनल केमिकल लेबोरेटरी), पुणे के डॉ. अमोल ए. कुलकर्णी द्वारा विकसित इस प्रक्रिया से बीस डॉलर प्रतिग्राम की दर से पांच सौ ग्राम सिल्वर नैनो वायर का उत्पादन किया जा सकता है। जबकि इस समय इसका बाजार मूल्य इस समय 250 डॉलर प्रति ग्राम से 400 डॉलर प्रति ग्राम तक है।

यह विज्ञान और प्रौद्योगिकी विभाग, भारत सरकार के उन्नत विनिर्माण प्रौद्योगिकी कार्यक्रम के समर्थन से बड़े पैमाने पर कार्यात्मक नैनो-सामग्री (सिल्वर नैनोवायर) के निरंतर प्रवाह निर्माण की एक किफायती प्रक्रिया है।

निर्मित उत्पाद में उत्कृष्ट चालकता वाले चांदी के नैनोवायर होते हैं जिनका उपयोग प्रदर्शन प्रौद्योगिकियों और लचीले इलेक्ट्रॉनिक्स के लिए स्याही और कोटिंग्स बनाने में किया जा सकता है। इस अनूठी प्रक्रिया के लिए कुल 5 राष्ट्रीय और अंतर्राष्ट्रीय पेटेंट भी दायर किए गए हैं।

उत्कृष्ट उत्पाद गुणवत्ता (नैनोवायर का पहलू अनुपात > 1000) और बहुत कम लागत (~ 20 डॉलर प्रतिग्राम) पर बड़े पैमाने पर (500 ग्राम) के पायलट प्लांट के पदचिह्न के साथ 6 वर्ग मीटर से अधिक नहीं तक एक कार्यात्मक नैनोमटेरियल (सिल्वर नैनोवायर) को कुशलतापूर्वक संश्लेषित करने के लिए यह पहली सतत प्रक्रिया है। मौजूदा बैच निर्माण प्रोटोकॉल की तुलना में यह प्रक्रिया एक सरल, लागत प्रभावी और मापनयोग्य संश्लेषण मार्ग है जो निलंबन में बड़ी मात्रा में ऐसे नैनोकणों को भी उत्पन्न करता है, जिनको नैनोवायर से अलग करना आसान नहीं है। विकसित प्रक्रिया का परीक्षण सीएसआईआर-एनसीएल की लक्षण वर्णन सुविधा में किया गया है और यह प्रौद्योगिकी तैयारी स्तर के आठवें चरण में है।

सीएसआईआर-एनसीएल ने नवंबर 2020 में नैनोरबिटल एडवांस्ड मैटेरियल्स एलएलपी (अहमदाबाद) को प्रक्रिया प्रौद्योगिकी का लाइसेंस दिया है और 2021 में 3 और उद्योगों के साथ सामग्री हस्तांतरण के समझौते पर समझौते पर हस्ताक्षर किए हैं। डॉ अमोल ने पारदर्शिता के लिए विभिन्न डिस्प्ले उपकरणों में अनुप्रयोगों के संचालन के साथ-साथ ही लगाये जाने योग्य इलेक्ट्रोड सहित लचीले इलेक्ट्रॉनिक्स की छपाई के लिए विकसित नैनोमटेरियल के परीक्षण को आगे बढ़ाने की योजना बनाई है।

यह तकनीक भारतीय उद्योगों को इलेक्ट्रॉनिक रसायनों के विशिष्ट क्षेत्र में प्रवेश करा सकती है और अंततः नई नौकरियों के अवसर भी पैदा कर सकती है।

<https://pib.gov.in/PressReleasePage.aspx?PRID=1767698>

Innovative chip resolves quantum headache

Quantum physicists at the University of Copenhagen are reporting an international achievement for Denmark in the field of quantum technology. By simultaneously operating multiple spin qubits on the same quantum chip, they surmounted a key obstacle on the road to the supercomputer of the future. The result bodes well for the use of semiconductor materials as a platform for solid-state quantum computers.

One of the engineering headaches in the global marathon towards a large functional quantum computer is the control of many basic memory devices—qubits—simultaneously. This is because the control of one qubit is typically negatively affected by simultaneous control pulses applied to another qubit. Now, a pair of young quantum physicists at the University of Copenhagen's Niels Bohr Institute working in the group of Assoc. Prof. Ferdinand Kuemmeth, have managed to overcome this obstacle.

Global qubit research is based on various technologies. While Google and IBM have come far with quantum processors based on superconductor technology, the UCPH research group is betting on semiconductor qubits—known as spin qubits.

"Broadly speaking, they consist of electron spins trapped in semiconducting nanostructures called quantum dots, such that individual spin states can be controlled and entangled with each other," explains Federico Fedele.

Spin qubits have the advantage of maintaining their quantum states for a long time. This potentially allows them to perform faster and more flawless computations than other platform types. And, they are so miniscule that far more of them can be squeezed onto a chip than with other qubit approaches. The more qubits, the greater a computer's processing power. The UCPH team has extended the state of the art by fabricating and operating four qubits in a 2x2 array on a single chip.

Circuitry is 'the name of the game'

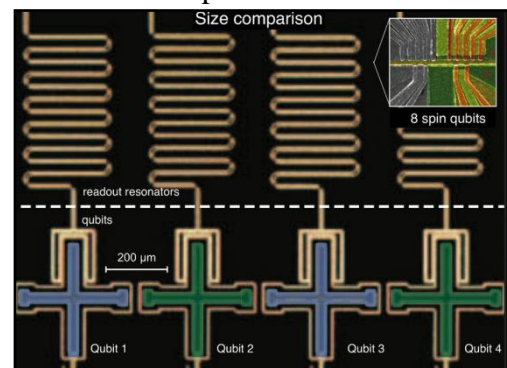
Thus far, the greatest focus of quantum technology has been on producing better and better qubits. Now it's about getting them to communicate with each other, explains Anasua Chatterjee:

"Now that we have some pretty good qubits, the name of the game is connecting them in circuits which can operate numerous qubits, while also being complex enough to be able to correct quantum calculation errors. Thus far, research in spin qubits has gotten to the point where circuits contain arrays of 2x2 or 3x3 qubits. The problem is that their qubits are only dealt with one at a time."

It is here that the young quantum physicists' quantum circuit, made from the semiconducting substance gallium arsenide and no larger than the size of a bacterium, makes all the difference:

"The new and truly significant thing about our chip is that we can simultaneously operate and measure all qubits. This has never been demonstrated before with spin qubits—nor with many other types of qubits," says Chatterjee, who is one of two lead authors of the study, which has recently been published in the journal *Physical Review X Quantum*.

Being able to operate and measure simultaneously is essential for performing quantum calculations. Indeed, if you have to measure qubits at the end of a calculation—that is, stop the system to get a result—the fragile quantum states collapse. Thus, it is crucial that measurement is



The illustration shows the size difference between spin qubits and superconducting qubits. Credit: University of Copenhagen

synchronous, so that the quantum states of all qubits are shut down simultaneously. If qubits are measured one by one, the slightest ambient noise can alter the quantum information in a system.

Milestone

The realization of the new circuit is a milestone on the long road to a semiconducting quantum computer.

"To get more powerful quantum processors, we have to not only increase the number of qubits, but also the number of simultaneous operations, which is exactly what we did" states Professor Kuemmeth, who directed the research.

At the moment, one of the main challenges is that the chip's 48 control electrodes need to be tuned manually, and kept tuned continuously despite environmental drift, which is a tedious task for a human. That's why his research team is now looking into how optimization algorithms and machine learning could be used to automate tuning. To allow fabrication of even larger qubit arrays, the researchers have begun working with industrial partners to fabricate the next generation of quantum chips. Overall, the synergistic efforts from computer science, microelectronics engineering, and quantum physics may then lead spin qubits to the next milestones.

About qubits

The brain of the quantum computer that scientists are attempting to build will consist of many arrays of qubits, similar to the bits on smartphone microchips. They will make up the machine's memory.

The famous difference is that while an ordinary bit can either store data in the state of a 1 or 0, a qubit can reside in both states simultaneously—known as quantum superposition—which makes quantum computing exponentially more powerful.

About the chip

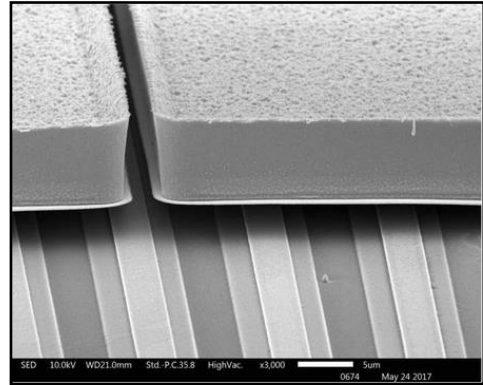
The four spin qubits in the chip are made of the semiconducting material gallium arsenide. Situated between the four qubits is a larger quantum dot that connects the four qubits to each other, and which the researchers can use to tune all of the qubits simultaneously.

More information: Federico Fedele et al, Simultaneous Operations in a Two-Dimensional Array of Singlet-Triplet Qubits, *PRX Quantum* (2021). DOI: [10.1103/PRXQuantum.2.040306](https://doi.org/10.1103/PRXQuantum.2.040306)
<https://phys.org/news/2021-10-chip-quantum-headache.html>

Breaking the supposed accuracy limit for TES detectors

Scientists at SRON Netherlands Institute for Space Research are developing a detection technique (TES) that measures the energy of individual photons, for example in X-rays from the distant universe. Until now, it was assumed that the wiring on the detector chip brings along an inherent whimsicality in accuracy. The research team has now discovered that there is room for improvement after all. They have published their report in *Physical Review Applied*.

X-rays offer us a view of the high-energetic phenomena in the Universe. Hot gas inside clusters of hundreds of galaxies, active black holes, supernovae and binary neutron stars are just a few examples. But to enjoy the view, you usually have to climb to high altitudes. In the case of high-energy phenomena, you have to go all the way to space. The Earth's atmosphere blocks most X-ray light. That is why X-ray telescopes do their job from space. Scientists at SRON are developing a detection technology—Transition Edge Sensors (TES)—for these space telescopes that measures the energy of individual photons to obtain a spectrum of even the most distant X-ray phenomena.



Electron microscope picture of two absorbers on top of superconducting wiring. Credit: SRON

To transfer the energy of a photon to the detectors, TES technology makes use of an absorber—a metal mushroom-shaped roof above the detector—connected via two stems. The SRON research team led by Jian-Rong Gao has now found a way to further improve the design of the coupling between these absorbers and the TES.

TES detectors operate at temperatures near absolute zero, making them superconducting. By keeping them balanced on the edge of superconductivity and the normal conduction state, they can be used as sensitive thermometers. The energy of a single photon is sufficient to heat up the material enough to tip the balance toward the normal state. This is read out as a change in the current flowing through the detectors, proportional to the energy of the incoming photon.

To accurately determine this energy, the detectors should work as neatly as possible. But in practice we often see whimsical behavior, such as oscillating currents depending on where at the superconductive transition the detector operates. Until now it was assumed that the connection points between the TES and the wiring on the detector chip was responsible for this behavior. "But to our surprise, we see that making the absorber stems thinner significantly reduces the oscillations," says first author Martin de Wit.

The discovery means that there is, after all, still room for improvement in the design of the TES. De Wit says that "there is nothing you can do about those connection points, they simply have to be there if you want to work with these detectors. Fortunately, we now discovered that a large part of the unwanted behavior is not due to these connection points, but has to do with how we connect the absorber to the TES. And we do have a way of influencing that."

More information: M. de Wit, L. Gottardi, E. Taralli, K. Nagayoshi, M.L. Ridder, H. Akamatsu, M.P. Bruijn, R.W.M. Hoogeveen, J. van der Kuur, K. Ravensberg, D. Vaccaro, J-R. Gao,[†] and J-W.A. den Herder, 'Impact of the absorber coupling design for Transition Edge Sensor X-ray Calorimeters', *Physical Review Applied* (2021).

<https://phys.org/news/2021-10-accuracy-limit-tes-detectors.html>

COVID-19 breath test effective in study, researchers say

By Pete Grieve

Columbus, Ohio — Ohio State Wexner researchers reported successful results Thursday from a study of a rapid test to detect COVID-19 from patients' breath.

The breath test can identify COVID-19 infections sensing patterns from a patient's "breath print," the makeup of gases in exhaled breath, the researchers said.

According to a research article published in PLOS ONE, the study followed 46 hospitalized patients at Wexner who were receiving mechanical ventilation for respiratory failure, half of whom had COVID-19. The study collected "breath bags" from patients four times during their ICU stays.

The breath test was 88% effective in the study of the hospitalized patients upon admission to the intensive care unit, and the researchers said it showed promise in detecting the virus early in the course of infection.

While further research is planned to evaluate the breath test in patients who may have milder illnesses, the researchers said the breath test offers advantages over other forms of testing because it's quick and noninvasive.

"The use of breathalyzer technology to rapidly diagnose patients with respiratory infections has the potential to greatly improve our ability to rapidly screen both patients and asymptomatic individuals," the authors wrote.

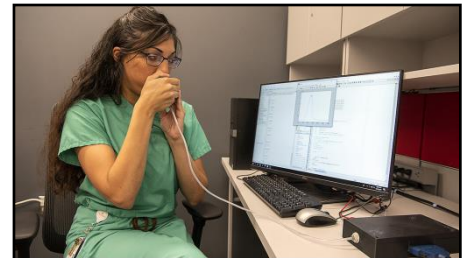
The research team is seeking an emergency-use authorization for the test from the Food and Drug Administration. The handheld electronic device detects infections based on the interaction of oxygen, nitric oxide and ammonia.

Director of Critical Care Dr. Matthew C. Exline, the lead researcher, said the test can identify COVID-19 within 15 seconds.

Pelagia-Irene Gouma, a materials scientist at Ohio State, said the results are the first of their kind.

"This novel breathalyzer technology uses nanosensors to identify and measure specific biomarkers in the breath," Gouma said in a news release. "This is the first study to demonstrate the use of a nanosensor breathalyzer system to detect a viral infection from exhaled breath prints."

<https://spectrumnews1.com/oh/columbus/news/2021/10/29/ohio-state-breath-test-covid19-wexner-medical-center-breathalyzer->



Study results were published in a journal article Thursday. (Courtesy of Ohio State Wexner)

