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Raksha Mantri Shri Rajnath Singh visits Terminal Ballistics Research Laboratory of DRDO in Chandigarh

Lauds DRDO for developing crucial defence technologies at par with international standards

Key Highlights:

- ***Products developed by TBRL, such as Multi-Mode Hand Grenade, reflect Government's vision to modernise Armed Forces***
- ***Active private sector participation advancing the country's military & economic strength towards self-reliance***
- ***Need to strengthen technology forecasting & invest in cutting edge manufacturing & testing capabilities***
- ***India is a peace-loving nation, but is fully prepared to face any challenge***

Raksha Mantri Shri Rajnath Singh visited Terminal Ballistics Research Laboratory (TBRL) of Defence Research and Development Organisation (DRDO) in Chandigarh on October 28, 2021. During the visit, Director, TBRL Shri Prateek Kishore briefed Shri Rajnath Singh about the products developed by the laboratory and many critical technologies on which the work is in process. Chief of Defence Staff General Bipin Rawat, Secretary, Department of Defence R&D and Chairman DRDO Dr G Satheesh Reddy and other senior civil & military officials of Ministry of Defence were also present.

Addressing over 500 scientists & officials of DRDO, the Raksha Mantri lauded TBRL, which started as a two-room facility, for becoming an important R&D establishment which is providing crucial defence technologies. He commended the role of the laboratory in design and development of Multi-Mode Hand Grenade (MMHG), the first munition manufactured by the private sector for the Armed Forces, which was handed over to the Indian Army in the presence of Shri Rajnath Singh in August this year. The grenade achieved a functional reliability of more than 99.5 per cent in production. The Raksha Mantri termed MMHG as world class which reflects the capabilities of TBRL and the scientists.

Lauding DRDO for developing systems at par with international standards, Shri Rajnath Singh also mentioned about the Bund Blasting Device Mark II, designed and developed by TBRL, which was handed over to the Indian Army in his presence earlier this month. The device is used to reduce the height of Ditch-cum-Bund obstacles to enhance the mobility of mechanised infantry during wartime. He appreciated the fact that the first phase of the production model has been successfully completed and the production of the system will also be done by the private sector through Transfer of Technology in the coming times.

The Raksha Mantri described these developments as indicators to the country's growing capability in products and technologies required to meet the operational requirements of the Armed Forces. He added that these developments reflect the Government's vision to equip the Armed Forces with indigenously developed and state-of-the-art weapons/ equipment/system through active participation of the private sector. This, he stated, is advancing the country's military and economic strength towards self-reliance.

Shri Rajnath Singh also listed out other achievements of TBRL, including reaching an advanced level of development of 4th generation electronic fuses which will be contemporary as well as safer and more reliable and development of Baffle Range of just 20 acres from 500 acres that will provide full training of the troops using less land.

The Raksha Mantri added that many reforms have been undertaken by the Government to increase the participation of the private sector. These include introduction of new provisions under Defence Acquisition Procedure 2020; DRDO's initiative to involve the industry from the initial stages of development of systems; free of cost Transfer of Technology by DRDO and availability of its patents to the industry.

While stressing on the need to develop Indian Standards, Shri Rajnath Singh appreciated the fact that Indian Standard has been promulgated for the testing of Bullet Resistant Jacket, with TBRL playing a key role in its manufacturing. "Indian Standards for design, development and methodology are being developed for other protective systems and gears. Test methodologies have been standardised for evaluation of Boot Anti-Mine Infantry, Boot Anti-Mine Engineers, Mine Protected Vehicles and Gears etc. Such Indian standards will certainly help the Indian industry to not only benchmark the product against threats, but also help them compete with foreign manufacturers," he added.

Sharing his insights on the fast-changing geopolitical scenario around the world, Shri Rajnath Singh said, increase in scientific capabilities and new inventions have made a big impact on security. He stressed on the need to be equipped and ready at all times to deal with any challenge arising out of such a situation. He reiterated that India is a peace-loving nation and initiating any kind of conflict is against its values. He, however, assured the Nation that "our country is fully prepared to face any challenge, if the need arises." He remembered former President of India Dr APJ Abdul Kalam and his famous quote *'In this world, fear has no place. Only strength respects strength.'*

Emphasising on the increased use of technology in the dynamic warfare strategies of the present, Shri Rajnath Singh exhorted all stakeholders involved in defence manufacturing to keep an eye on the latest technological developments and prepare themselves to stay contemporary with indigenous capabilities. To achieve this, he said, there is a need to strengthen technology forecasting and invest in cutting edge manufacturing & testing capabilities. He called for making academic institutions as long-term partners to stay abreast with latest technologies, with focus on building a strong theoretical foundation.

"A research and development institution like TBRL should aim to develop partnerships with academic institutions on a long-term basis. On the one hand, the academic institution will get to work on the core technological problems and scientists and technologists will be prepared for better employability. On the other hand, R&D institutions will get the emphasis on conversion into the actual product by moving from the theoretical analysis. It will be a win-win situation for both and will boost the defense ecosystem of the country," the Raksha Mantri said. He called upon all the stakeholders to increase their preparedness and assured all possible support of the Government in their efforts.

Shri Rajnath Singh also inaugurated the Augmented Environmental Test facility. Transfer of Technology for TRBL-developed warhead for Man-Portable Anti-Tank Guided Missile (MPATGM) Mk-II was handed over to Economic Explosives Limited, Nagpur on the occasion.

https://pib.gov.in/PressReleasePage.aspx?PRID=1767199

पत्र सूचना कार्यालय
भारत सरकार

रक्षा मंत्रालय

Thu, 28 Oct 2021 4:12PM

रक्षा मंत्री श्री राजनाथ सिंह ने चंडीगढ़ में डीआरडीओ की टर्मिनल बैलिस्टिक्स अनुसंधान प्रयोगशाला का दौरा किया

श्री राजनाथ सिंह ने अंतरराष्ट्रीय मानकों के अनुरूप महत्वपूर्ण रक्षा प्रौद्योगिकियों को विकसित करने के लिए डीआरडीओ की सराहना की

मुख्य बिंदु:

- ***टीबीआरएल द्वारा विकसित उत्पाद जैसे मल्टी-मोड हैंड ग्रेनेड सशस्त्र बलों के आधुनिकीकरण के लिए सरकार के दृष्टिकोण को दर्शाते हैं।***
- ***निजी क्षेत्र की सक्रिय भागीदारी देश की सैन्य और आर्थिक शक्ति को आत्मनिर्भरता की तरफ ले जा रही है।***
- ***प्रौद्योगिकी पूर्वानुमान को मजबूत करने तथा अत्याधुनिक विनिर्माण और परीक्षण क्षमताओं में निवेश करने की आवश्यकता है।***
- ***भारत एक शांतिप्रिय देश है, लेकिन किसी भी चुनौती का सामना करने के लिए पूरी तरह से तैयार है।***

रक्षा मंत्री श्री राजनाथ सिंह ने 28 अक्टूबर 2021 को चंडीगढ़ में रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) की टर्मिनल बैलिस्टिक्स अनुसंधान प्रयोगशाला (टीबीआरएल) का दौरा किया। रक्षा मंत्री की इस यात्रा के दौरान उन्हें टीबीआरएल के निदेशक श्री प्रतीक किशोर ने प्रयोगशाला द्वारा विकसित उत्पादों और कई महत्वपूर्ण तकनीकों के बारे में जानकारी दी, जिन पर फिलहाल काम जारी है। चीफ ऑफ डिफेंस स्टाफ जनरल बिपिन रावत, रक्षा अनुसंधान एवं विकास विभाग के सचिव और डीआरडीओ के अध्यक्ष डॉ. जी सतीश रेड्डी तथा रक्षा मंत्रालय के अन्य वरिष्ठ असैन्य एवं सैन्य अधिकारी भी उपस्थित थे।

रक्षा मंत्री ने डीआरडीओ के 500 से अधिक वैज्ञानिकों और अधिकारियों को संबोधित करते हुए टीबीआरएल की सराहना की। उन्होंने कहा कि कभी दो कमरों से शुरू हुई यह प्रयोगशाला आज देश में एक महत्वपूर्ण रक्षा प्रतिष्ठान बन चुकी है और यह सामरिक महत्व की रक्षा प्रौद्योगिकियां प्रदान कर रही है। श्री सिंह ने मल्टी-मोड हैंड ग्रेनेड (एमएमएचजी) के डिजाइन और विकास में प्रयोगशाला की भूमिका की सराहना की, जो सशस्त्र बलों के लिए निजी क्षेत्र द्वारा निर्मित पहला हथियार है, जिसे इस वर्ष अगस्त में रक्षा मंत्री की उपस्थिति में भारतीय सेना को सौंपा गया था। इस ग्रेनेड ने उत्पादन में 99.5 प्रतिशत से अधिक की कार्यात्मक विश्वसनीयता हासिल की। रक्षा मंत्री ने मल्टी-मोड हैंड ग्रेनेड को विश्व स्तरीय करार दिया, जो टीबीआरएल और वैज्ञानिकों की क्षमताओं को दर्शाता है।

अंतरराष्ट्रीय मानकों के अनुरूप प्रणाली विकसित करने के लिए डीआरडीओ की सराहना करते हुए श्री राजनाथ सिंह ने टीबीआरएल द्वारा डिजाइन तथा विकसित किए गए बंड ब्लास्टिंग डिवाइस मार्क-II का भी उल्लेख किया, जिसे इस महीने की शुरुआत में उनकी उपस्थिति में भारतीय सेना को सौंप दिया गया था। युद्ध के दौरान यांत्रिक पैदल सेना की गतिशीलता को बढ़ाने के लिए इस डिवाइस का उपयोग डिच-कम-बंड जैसी बाधाओं को दूर करने और ऊंचाई को कम करने के लिए किया जाता है। उन्होंने इस तथ्य की सराहना की कि उत्पादन मॉडल का पहला चरण सफलतापूर्वक पूरा कर लिया गया है और प्रणाली का उत्पादन भी आने वाले समय में प्रौद्योगिकी हस्तांतरण के माध्यम से निजी क्षेत्र द्वारा किया जाएगा।

रक्षा मंत्री ने इस प्रगति को सशस्त्र बलों की परिचालन आवश्यकताओं को पूरा करने के लिए आवश्यक उत्पादों एवं प्रौद्योगिकियों में देश की बढ़ती क्षमता के संकेतक के रूप में वर्णित किया। उन्होंने कहा कि ये घटनाक्रम निजी क्षेत्र की सक्रिय भागीदारी के माध्यम से सशस्त्र बलों को स्वदेशी रूप से विकसित और अत्याधुनिक हथियारों / उपकरणों / प्रणाली से लैस करने के लिए सरकार के दृष्टिकोण को दर्शाते हैं। श्री सिंह ने कहा कि यह कदम देश की सैन्य और आर्थिक ताकत को आत्मनिर्भरता की ओर ले जा रहा है।

श्री राजनाथ सिंह ने टीबीआरएल की अन्य उपलब्धियों को भी सूचीबद्ध किया, जिसमें चौथी पीढ़ी के इलेक्ट्रॉनिक फ्यूज के विकास के उन्नत स्तर तक पहुंचना भी शामिल है, जो समकालीन होने के साथ-साथ सुरक्षित और अधिक

विश्वसनीय है। 500 एकड़ से सिर्फ 20 एकड़ के बैफल रेंज का विकास होगा जो कम भूमि का उपयोग करने वाले सैनिकों को पूर्ण प्रशिक्षण प्रदान करेगा।

रक्षा मंत्री ने कहा कि निजी क्षेत्र की भागीदारी बढ़ाने के लिए सरकार द्वारा कई सुधार किए गए हैं। इनमें रक्षा अधिग्रहण प्रक्रिया 2020 के तहत प्रणाली के विकास के प्रारंभिक चरणों से उद्योग को शामिल करने के लिए डीआरडीओ की पहल; डीआरडीओ द्वारा प्रौद्योगिकी का मुफ्त हस्तांतरण और उद्योग को इसके पेटेंट की उपलब्धता जैसे नए प्रावधान शामिल किये गए हैं।

श्री राजनाथ सिंह ने भारतीय मानकों को विकसित करने की आवश्यकता पर बल देते हुए इस तथ्य की भी सराहना की कि भारतीय मानक बुलेट प्रतिरोधी जैकेट के परीक्षण को प्रारम्भ किया गया है और टीबीआरएल इसके निर्माण में महत्वपूर्ण भूमिका निभा रहा है। अन्य सुरक्षात्मक प्रणालियों और गियर के लिए डिजाइन, विकास तथा कार्यप्रणाली के लिए भारतीय मानक विकसित किए जा रहे हैं। उन्होंने कहा कि बूट एंटी-माइन इन्फैंट्री, बूट एंटी-माइन इंजीनियर्स, माइन प्रोटेक्टेड व्हीकल और गियर्स आदि के मूल्यांकन के लिए परीक्षण पद्धतियों को मानकीकृत किया गया है। रक्षा मंत्री ने कहा कि इस तरह के भारतीय मानक निश्चित रूप से भारतीय उद्योग को न केवल खतरों के खिलाफ उत्पाद को बेंचमार्क करने में मदद करेंगे, बल्कि उन्हें विदेशी निर्माताओं के साथ प्रतिस्पर्धा करने में भी सहायता पहुचायेंगे।

दुनिया भर में तेजी से बदलते भू-राजनीतिक परिदृश्य पर अपनी अंतर्दृष्टि साझा करते हुए श्री राजनाथ सिंह ने कहा कि वैज्ञानिक क्षमताओं में वृद्धि और नए आविष्कारों ने सुरक्षा पर बड़ा प्रभाव डाला है। उन्होंने ऐसी स्थिति से उत्पन्न होने वाली किसी भी चुनौती से निपटने के लिए हर समय सुसज्जित और तैयार रहने की आवश्यकता पर बल दिया। उन्होंने दोहराया कि भारत एक शांतिप्रिय देश है और किसी भी तरह का संघर्ष शुरू करना इसके मूल्यों के खिलाफ है। हालांकि, उन्होंने राष्ट्र को आश्वासन दिया कि यदि आवश्यक हुआ तो हमारा देश किसी भी चुनौती का सामना करने के लिए पूरी तरह से तैयार है। रक्षा मंत्री ने भारत के पूर्व राष्ट्रपति डॉ एपीजे अब्दुल कलाम और उनके प्रसिद्ध उद्धरण को याद किया कि *'इस दुनिया में, डर का कोई स्थान नहीं है। ताकत ही ताकत का सम्मान करती है।'*

श्री राजनाथ सिंह ने वर्तमान की सक्रिय युद्ध रणनीतियों में प्रौद्योगिकी के बढ़ते उपयोग पर जोर देते हुए रक्षा निर्माण में शामिल सभी हितधारकों को नवीनतम तकनीकी विकास पर नजर रखने तथा स्वदेशी क्षमताओं के साथ समकालीन रहने के लिए खुद को तैयार करने का आह्वान किया। इस लक्ष्य को हासिल करने के लिए उन्होंने कहा कि प्रौद्योगिकी पूर्वानुमान को मजबूत करने और अत्याधुनिक विनिर्माण व परीक्षण क्षमताओं में निवेश करने की आवश्यकता है। रक्षा मंत्री ने एक मजबूत सैद्धांतिक नींव के निर्माण पर ध्यान देने के साथ ही नवीनतम तकनीकों के साथ बने रहने के लिए शैक्षणिक संस्थानों को दीर्घकालिक साझेदार बनाने का आह्वान किया।

श्री सिंह ने कहा कि टीबीआरएल जैसे अनुसंधान एवं विकास संस्थान को दीर्घकालिक आधार पर शैक्षणिक संस्थानों के साथ साझेदारी विकसित करने का लक्ष्य रखना चाहिए। एक ओर जहां अकादमिक संस्थान को मुख्य तकनीकी समस्याओं पर काम करने का मौका मिलेगा और वैज्ञानिकों एवं प्रौद्योगिकीविदों को बेहतर रोजगार के लिए तैयार किया जाएगा। दूसरी ओर, अनुसंधान एवं विकास संस्थान सैद्धांतिक विश्लेषण से हटकर वास्तविक उत्पाद में रूपांतरण पर जोर देंगे। रक्षा मंत्री ने कहा कि यह दोनों के लिए फायदे की स्थिति होगी और देश के रक्षा पारिस्थितिकी तंत्र को बढ़ावा देगी। उन्होंने सभी हितधारकों से अपनी तैयारी बढ़ाने का आह्वान किया और उनके प्रयासों में सरकार के हर संभव समर्थन का आश्वासन दिया।

श्री राजनाथ सिंह ने संवर्धित पर्यावरण संबंधी परीक्षण सुविधा का भी उद्घाटन किया। इस अवसर पर मैन-पोर्टेबल एंटी-टैंक गाइडेड मिसाइल (एमपीएटीजीएम) एमके-II के लिए टीआरबीएल द्वारा विकसित वारहेड की प्रौद्योगिकी का हस्तांतरण इकोनॉमिक एक्सप्लोसिव्स लिमिटेड नागपुर को सौंपा गया।

https://pib.gov.in/PressReleasePage.aspx?PRID=1767318

REPUBLICWORLD.COM

Fri, 29 Oct 2021

Rajnath Singh hails DRDO & TBRL for manufacturing crucial world-class defence technologies

Discoursing with more than 500 scientists and DRDO officials, Singh praised TBRL, which started as a two-room facility, for becoming a pivotal R&D centre

By Deepan Chattopadhyay

As the Centre continues to augment the capabilities of India's indigenous Defence industry, Union Defence Minister Rajnath Singh on Thursday marked his presence at the Terminal Ballistics Research Laboratory (TBRL) of the Defence Research and Development Organisation (DRDO) in Chandigarh, Punjab. Singh met with scientists and hailed them for developing systems at par with international standards.

Image: Twitter/@DRDO

TBRL Director Prateek Kishore briefed the Defence Minister about the products developed by the laboratory and regarding the several critical technologies on which the work is in process.

Defence Minister Rajnath Singh was accompanied by Chief of Defence Staff General Bipin Rawat, Secretary, Department of Defence Research and Development, and Chairman DRDO Dr G Satheesh Reddy along with senior civil and military officials of the Ministry of Defence.

Defence Minister hails DRDO for providing crucial defence technologies

Discoursing with more than 500 scientists and officials of the DRDO, Singh praised TBRL, which became operational as a two-room facility, for becoming a pivotal Research and Development establishment that is providing crucial defence technologies.

Singh appreciated the role of the laboratory in the design and development of Multi-Mode Hand Grenades (MMHG), the first munition manufactured by the private sector for the Armed Forces, which was handed over to the Indian Army in the presence of Union Minister Rajnath Singh in August this year.

The grenades achieved functional reliability of more than 99.5% in production. Rajnath Singh termed MMGH, which reflects the capabilities of TBRL and the scientists, as 'world-class'.

Commending the DRDO for developing an international standard defence mechanism, the Defence Minister noted about the Bund Blasting Device Mark II, which has been designed and developed by TBRL. The device was handed over to the Indian Army earlier this month.

'Indicator of the country's growing capability'

Union Defence Minister Rajnath Singh called these development indicators of India 'the indicator of the country's growing capability' in products and technology required to meet the operational requirement of the Armed Forces.

"These developments reflect the Government's vision to equip the Armed Forces with indigenously developed and state-of-the-art weapons/equipment/systems through active participation of the private sector. This is advancing the country's military and economic strength towards self-reliance."

Singh noted the achievements of TBRL, including reaching an advanced level of development of fourth-generation electronic fuses which will be contemporary as well as safer and more reliable, and the development of Baffle Range of just 20 acres from 500 acres that will enable training troops using less land.

Prepared to face any challenge if the need arises: Rajnath Singh

Singh reaffirmed that India is a peace-loving country and initiating any kind of violence or conflict is against its values. He subsequently gave people assurance, stating, "Our country is fully prepared to face any challenge if the need arises."

While emphasising the increased use of dynamic warfare strategies in the present day, Union Minister Rajnath Singh exhorted all stakeholders involved in defence manufacturing to keep a close look at the newest technological developments while preparing themselves to stay contemporary with indigenous capabilities.

The Defence Minister called the TBRL to form long-term partnerships with academic institutions to make them stay abreast with the latest technologies while focussing on building a strong theoretical foundation.

Chief of Army Staff Bipin Rawat, too, lauded the efforts made by TBRL to make the Armed Forces "capable".

The Defence Minister also inaugurated the Augmented Environmental Test facility. Also, the TRBL-developed warhead for Man-Portable Anti-Tank Guided Missile (MPATGM) Mk-II, was handed over to Economic Explosives Limited, Nagpur on the occasion.

https://www.republicworld.com/india-news/general-news/rajnath-singh-hails-drdo-and-tbrl-for-manufacturing-crucial-world-class-defence-technologies.html

Hindustan Times

Fri, 29 Oct 2021

India ready for any challenge, only strong respected: Defence Minister

Rajnath Singh opens test facility at Terminal Ballistic Research Lab in Panchkula; CDS Rawat says adversaries using tech in warfare, so need to match them

By Munieshwer A Sagar

Defence Minister Rajnath Singh on Thursday said that India is a peace-loving country but is ready to face any challenge and the nation's scientific community is producing the finest defence technology in this endeavour.

Addressing staff at the Terminal Ballistic Research Laboratory (TBRL) in Panchkula after inaugurating an augmented environmental test facility, Rajnath Singh said, "It is against our values to start a conflict. But if need be, our country is ready to face any challenge. Only the strong are respected."

Chief of defence staff General Bipin Rawat, who accompanied the defence minister, said, "We have challenges at our borders and to meet them, we need technology. Our adversaries are using technology in warfare. We also need to do so."

Defence minister Rajnath Singh addressing the staff at the Terminal Ballistic Research Laboratory (TBRL) in Panchkula on Thursday. He was accompanied by chief of defence staff General Bipin Rawat and DRDO chairman G Satheesh Reddy. (HT Photo)

Besides General Rawat, Dr G Satheesh Reddy, the secretary in the Department of Defence R&D and chairman, Defence Research and Development Organisation (DRDO); Air Marshal Sandeep Singh, the vice-chief of air staff; Dr BHVS Narayana Murthy, director general, missile and strategic system; and Dr Tessy Thomas, director general, Aero, also accompanied the defence minister.

Milestone to make India self-reliant

Rajnath Singh recalled that in August 2021, he had handed over the indigenously developed and produced multi-mode hand grenade to the Indian Army. This grenade, designed and developed by TBRL, was the first munition that was produced by a private industry, a transfer of technology (TOT) holder of DRDO and inducted into the Indian armed forces.

"The safety and performance parameters of this grenade make it truly world class and it has achieved the functional reliability of more than 99.5% in production. This is a clear demonstration of capabilities of our scientists and the production agency," Singh said.

He appreciated the role TBRL and DRDO for this achievement and mentioned that it is an important milestone to make India self-reliant in defence production. He also indicated that indigenous systems would keep getting inducted regularly. "Moreover, the active participation of industry, specifically the private sector, in manufacturing these products with DRDO technologies is the strength, both military and economic, that would make our country aatmanirbhar (self-reliant)," said Singh.

TBRL one-stop solution for trials

He said that the test facilities at TBRL are being extended to Indian industries, R&D institutions and academia to support the Make in India initiative. He stressed that the TBRL can provide one-stop solution for static and dynamic trials of all munitions and warheads in addition to its core capability of design and development of warheads, munitions and its sub-systems.

On this occasion, transfer of technology for the TBRL developed warhead for MPATGM Mk-II was handed over to Economic Explosive Ltd, Nagpur.

https://www.hindustantimes.com/cities/chandigarh-news/india-ready-for-any-challenge-only-strong-respected-defence-minister-101635418846275.html

Hindustan Times

Fri, 29 Oct 2021

UT, DRDO officials discuss developing Chandigarh as hub of anti-drone technology

UT officials held a high-level meeting with senior representatives of the DRDO on making Chandigarh as a hub of anti-drone technology and regional cyber security centre

Chandigarh: The city beautiful will be developed as a hub of anti-drone technology and regional cyber security centre.

On Thursday, UT officials held a high-level meeting with senior representatives of the Defence Research and Development Organisation (DRDO) on the subject.

The DRDO officials made a presentation on the prospects of drone attacks and how to proceed to deal with these.

"Even though the city has no specific threat from the drone technology, the region has been facing dangers of the drone technology in the recent past. We want to lead the way in the region in developing anti-drone technologies," said UT adviser Dharam Pal.

Chandigarh will be developed as a hub of anti-drone technology and regional cyber security centre. This was decided at a meeting between UT officials and senior representatives of the DRDO. (AFP File Photo/ Representational image)

The administration is also working on setting a cyber-security headquarters in Chandigarh to deal with any kind of cyber-crimes. "We are in touch with the ministry of home affairs on establishing the cyber security headquarters in Chandigarh," Pal said.

https://www.hindustantimes.com/cities/chandigarh-news/ut-drdo-officials-discuss-developing-chandigarh-as-hub-of-anti-drone-technology-cyber-security-centre-101635454793677.html

THE ECONOMIC TIMES

Fri, 29 Oct 2021

Sleeker Brahmos missile set to power up Uttar Pradesh's defence corridor

Synopsis

The sleeker 'NG' version of the Brahmos missile, which is designed to be integrated on indigenous platforms like the Light Combat Aircraft (LCA) as well as other fighter jets in operation by the air force, is currently under development, with first tests likely to take place by the end of next year.

A new, lighter version of the Brahmos supersonic cruise missile could power up the Uttar Pradesh defence corridor, with production set to start within three years and a host of facilities, including a main production unit and ancillary companies likely to come up by next year.

The sleeker 'NG' version of the Brahmos missile, which is designed to be integrated on indigenous platforms like the Light Combat Aircraft (LCA) as well as other fighter jets in operation by the air force, is currently under development, with first tests likely to take place by the end of next year.

While the initial investment into setting up facilities is around ₹300 crore, officials aware of the plans say that after two years, expected orders from the Indian armed forces itself are expected to be in 'tens of thousands of crores'.

Sources said the production units for the NG version will be set up in the defence corridor and work on manufacturing will start concurrently, with a target date for 2023.

Being pegged as the future ground attack system of the Indian armed forces, the NG version will be significantly lighter than the current missile and will be able to perform precision strike missions at a range of over 300 km.

This, sources said, would not only reduce dependence on expensive foreign missiles currently in service but would also have a significant export potential, given that it is likely to cost lesser than comparable systems available in the global market.

The Brahmos NG is likely to be integrated with Su 30 MKI fighter jets as well and is being designed to take down slow-moving 'force multipliers' deep within enemy territory.

This would make the missile an 'AWACS killer' that could take down an enemy early warning and control system even after being fired from the Indian side of the border. Similarly, it can target enemy refuelling aircraft and transporters. It will also have an anti-ship role as well, besides ground attacks deep into enemy territory.

The decision by Brahmos to set up a facility in the defence corridor is the latest in a series of plans by both private and public sector entities to set shop in UP, taking advantage of simplified land procurement and incentives by the defence ministry.

According to defence ministry records, ₹1236 crore has already been invested by defence and aerospace companies in the corridor, with the target set at ₹10,000 crore by 2024. In addition, several large companies have pledged investments but are yet to present detailed plans for allocation of land.

Officials said the Brahmos facility - likely to be set up at a cost of close to ₹300 crore - could be a lynchpin for further investments as it requires a large ancillary industry for support.

The Brahmos project itself is likely to generate 500 direct and over 5,000 indirect jobs in the coming years.

According to official UP government data, in the last three years 65 companies have submitted requests for land in the corridor, out of which 19 have already been allotted 55.4 hectares to set up production facilities. This includes a diverse set of companies that propose to manufacture a range of systems from drones, ammunition, safety equipment, aviation parts to repair and maintenance units.

https://economictimes.indiatimes.com/news/elections/assembly-elections/uttar-pradesh/sleeker-brahmos-missile-set-to-power-up-uttar-pradeshs-defence-corridor/articleshow/87335424.cms

The Indian EXPRESS

Fri, 29 Oct 2021

Explained: Agni (ICBM) vs China's Hypersonic missile

Agni-5 Vs China Hypersonic Missile: A look at the importance of Agni 5, the global concerns about China's hypersonic missile, and the difference between ICBM and the new hypersonic technology

By Krishn Kaushik , Sushant Kulkarni

New Delhi/Pune: Agni-5 ballistic missile, with 5,000-km range, successfully tested in India: Though inducted over three years ago, India's foremost Agni 5 ballistic missile was tested for the first time by the user agency, the Strategic Forces Command, on Wednesday evening. The nuclear-capable missile is India's contender for the Intercontinental Ballistic Missile (ICBM) with a range of 5,000 km.

The latest test comes at a time when the relations between India and China are at a nadir, and after reports that China had tested a new hypersonic missile in August.

A look at the importance of Agni 5, the global concerns about China's hypersonic missile, and the difference between ICBM and the new hypersonic technology.

India successfully test-fires Agni-5 missile: Agni 5 is India's long-range surface-to-surface ballistic missile, which can hit a target with a precision that is 5,000 km away.

What is the Agni 5 missile?

Agni 5 is India's long-range surface-to-surface ballistic missile, which can hit a target with a precision that is 5,000 km away. This range puts almost the entire China within the missile's target range. Though officially an ICBM needs a missile to have a range of at least 5,500 km, the Agni 5 is India's closest contender for an ICBM, as it can reach countries across other continents, including parts of Africa and Europe.

Though the government has claimed that it has a maximum range of around 5,000 km, several reports suggest that it can hit targets as distant as 8,000 km. The nuclear capable missile can carry a warhead of around 1,500 kg and has a launch weight of 50,000 kg, making it one of the most potent missiles in the country.

What is the history of Agni missiles?

India began testing the Agni series of missiles in 1989 with the first test for Agni 1, an Intermediate Range Ballistic Missile, with a range of around 1,000 km. At that time only the US, the erstwhile Soviet Union, China, France and Israel, had IRBM technology.

Since then, Defence Research and Development Organisation (DRDO) labs have continued to work on it, bringing the latest available Agni 5 to its present capability. In addition to the IRBM-capable nations, only North Korea and the UK have ICBM technology at the moment.

Why is it important for India?

The government said in a statement on Wednesday, after the test, which was the first to be done independently by the user agency—the Strategic Force Command, which is a joint tri-services command, responsible for India's nuclear weapons—that the test's success "is in line with India's stated policy to have 'credible minimum deterrence' that underpins the commitment to 'No First Use'."

What makes Agni 5 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 (arguably) ICBM capability, the next generation of the missile, Agni VI, under development, is expected to have a range of around 8,000 km.

Regarding hypersonic missile technology (tested by China recently), India is among a select few serious contenders working towards it, even though it is behind China, the US and Russia.

Chief of Defence Staff General Bipin Rawat had mentioned in September that India is mulling a rocket force for missiles. However, senior defence establishment sources said that it is still an idea that is being considered.

What is a Hypersonic Glide Vehicle that China tested?

About 10 days ago, *The Financial Times* reported that China had in August tested a new hypersonic missile, which is nuclear capable, which circled the earth before moving towards its target, missing it by two dozen miles. While China denied the report claiming it to be a "spacecraft" and not a missile, it demonstrated the capability in hypersonic glide vehicle technology, which raises strategic concerns not just for its neighbours like India, but even its rivals like the US.

A hypersonic glide vehicle is launched by a rocket which moves in the Earth's lower orbit, at more than five times to 25 times the speed of sound. The vehicle is capable of carrying nuclear payloads, which gives the launching country the strategic capacity to attack almost any target across the world.

The Financial Times reported that the test by China had caught the US intelligence agencies by surprise. Though many of the targets that a hypersonic missile can hit are already reachable through the ICBMs, China's almost successful test has given rise to a lot of anxiety to military powers world over.

How is it different from an ICBM?

Intercontinental Ballistic Missiles, which have a range of over 5,500 km, have existed since around World War II. These missiles, meant to carry nuclear payloads, have the capacity to carry several warheads.

While an ICBM follows a parabolic trajectory, which mean it goes up and then comes down in a high arc—like when you throw up a ball, only much higher, further and faster—a hypersonic glide vehicle orbits the earth at a lower height, and is manoeuvrable. The ability to change track or target, mid-trajectory, along with the speed, makes them tougher to track and defend against.

According to a report in 2017 by Rand Corporation, the global policy think tank specialising in defence, hypersonic missiles can travel approximately at 5,000 to 25,000 km per hour, which makes them six to over 25 times faster than modern commercial aircraft. They fly at the heights of a few tens and 100 km. The mix of the high altitude, high speed and the ability to be manoeuvred makes them, Rand said, "both challenging to the best missile defenses now envisioned and, until the last minutes of flight, unpredictable as to their targets".

According to the report hypersonic missile's capability gives them both offensive and defensive advantages. The manoeuvrability of such missiles can potentially provide them to use "in-flight

updates to attack a different target than originally planned" and the "ability to fly at unpredictable trajectories, these missiles will hold extremely large areas at risk throughout much of their flights".

But, according to Joshua Pollack, who edits *The Nonproliferation Review*, ICBM would remain the preferred choice, because they are more efficient. He called the hypersonic glide vehicle "exotic".

Which countries have hypersonic technology?

Apart from China, the US and Russia are working on the technology. While this would be China's first such test for the capability, Pollack stated on Twitter that the "US military often flies an unarmed orbiter-glider, the X-37B 'space plane'".

According to the Rand Corporation's 2017 report, France and India "are the most committed" about gaining the capability, and "both draw to some extent on cooperation with Russia". It noted that Australia, Japan, and European entities are also working towards it.

The report stated that hypersonic technology has a dual-use character, as it can be used for non-military purposes like space launch and spacecraft retrieval, but "once a nation acquires hypersonic technology, its intentions can change".

"The current situation, with hypersonic research openly disseminated and widely spread among governments, industries, and universities, presents challenges for nonproliferation," it said.

What are the main concerns about China developing such technology?

America's topmost military officer Gen Mark Milley, Chairman of the Joint Chiefs of Staff stopped just short of comparing it to Russia taking the lead in space technology with the launch of the Sputnik satellite in 1957, hinting that China might have left the US behind in hypersonic capability.

Bloomberg reported Milley saying, on Wednesday, "What we saw was a very significant event of a test of a hypersonic weapon system. And it is very concerning… I don't know if it's quite a Sputnik moment, but I think it's very close to that. It has all of our attention." According to *Bloomberg*, Milley continued saying that China is "expanding rapidly—in space, in cyber and then in the traditional domains of land, sea and air".

China developing hypersonic missile capability would mean that it, potentially, would have weapons to overwhelm America's aerial defence systems. Though China already has ICBM missiles to attack the US, the unpredictability of hypersonic glide vehicles would give them an advantage. (Though Pollack mentioned on Twitter that "none of the weapons are good for surprise attacks against the US, which has exceptional detection capabilities" and though ICBMs are easier to predict, even hypersonic vehicles "will be detected at launch and tracked in flight".)

A major concern for the US is that all its defences are aimed at protecting any threats from north and west, and it remains vulnerable to a threat coming from the south, as the hypersonic missile can potentially fly over Antarctica.

But globally the main concern is that once the technology is successfully established by even one country, it would lead to a larger race for the capability and its eventual proliferation. Rand noted in its report that "major powers are also threatened by the proliferation of hypersonic missiles and the crises they can exacerbate. The more that hypersonic missiles proliferate into the hands of additional nations, the more paths develop for crises".

It also stated that there are "strategic considerations" for limiting the technology's proliferation. "Hypersonic missiles do not necessarily increase the vulnerability of nations that do not have missile defenses; they are already vulnerable to current types of missiles. However, an increasing number of nations are acquiring missile defenses that could be penetrated by hypersonic missiles. A hypersonic attack could occur with very little warning time; this factor and the unpredictability of the targets of a hypersonic attack compress the timeline for response by the party being attacked."

What kind of long-range ballistic capabilities does China have?

The Pentagon said in a report last year that for land-based conventional ballistic and cruise missiles, China may have either achieved parity, or may have even exceeded the US. It noted that China has over 1,250 ground-launched ballistic missiles and ground-launched cruise missiles with ranges between 500 and 5,500 kilometers, while the US has one type of conventional GLBM with a range of 70 to 300 kilometers and no GLCM.

But when it comes to long-range ballistic missiles, China has created a People's Liberation Army Rocket Force (PLARF), which takes care of China's strategic land-based nuclear and conventional missile forces. The Pentagon said in its report that China is "developing new intercontinental ballistic missiles (ICBMs) that will significantly improve its nuclear-capable missile forces" and the number of warheads that China's land-based ICBMs, which are capable of threatening the US "is expected to grow to roughly 200 in the next five years". It is "expanding its inventory of the multi-role DF-26, a mobile, ground-launched intermediate-range ballistic missile system capable of rapidly swapping conventional and nuclear warheads".

China's robust ground-based conventional missile forces, the Pentagon report said, "complement the growing size and capabilities of its air- and sea-based precision strike capabilities".

According to the report, China's DF-26 has a range of around 4,000 km, DF-31 can reach over 11,200 km while DF-41 can hit targets within a range of 12,000 km.

https://indianexpress.com/article/explained/agni-ballistic-missile-vs-china-hypersonic-missile-7595125/

The EurAsian Times

Fri, 29 Oct 2021

Agni-5 ICBM: Why India's conventional 'Fire Breathing' Ballistic Missile should worry Beijing despite its hypersonic arsenal?

By Aritra Banerjee

With the Agni-5 missile, India has bolstered its nuclear deterrence capability by successfully testing its "most formidable" Agni (fire) series of ballistic missiles at a time when China is rapidly scaling up its hypersonic missile programs.

Developed by India's Defence Research and Development Organisation (DRDO), Agni-5 Intercontinental ballistic missile was test-fired from APJ Abdul Kalam Island off the coast of Odisha on Wednesday evening. The Angi-5 ballistic missile (ICBM) was successfully tested for its entire range of more than 5,000 km, The Times of India reported.

Why Agni-5 Missile Test Is Significant?

According to India's Defense Ministry, the latest missile test is in line with India's stated policy to have "credible minimum deterrence that underpins the commitment to no-first-use".

The Agni-5 is slated for induction into the Strategic Forces Command (SFC), also known as the Strategic Nuclear Command and forms a part of India's Nuclear Command Authority. This command is responsible for the management and administration of the country's tactical and strategic nuclear weapons stockpile.

Wednesday's missile test marked the first user-test by the tri-services SFC. With a range of over 5,000 km, the Agni-5 can carry out strikes deep within Chinese territory, covering even the northernmost part of the country, including its national capital Beijing.

"Yes, India is committed to a no-first-use policy. But let's not forget that Agni-5 can hit China where it hurts the most," a top Indian analyst who does not wish to be named told The EurAsian Times.

The Agni-5 uses a three-stage solid-fueled engine which is likely to be able to eliminate strategic targets at ranges as far as 5,000 km with pinpoint accuracy. The Agni-5's nuclear trial had wrapped up in 2018 and coincided with the time Indian Navy Ship Arihant had undergone its maiden deterrence patrol.

India's Nuclear Triad

India's 'nuclear triad' comprises nuclear missiles that can be fired from land, air-borne and sea/undersea platforms. The Agni-series ballistic missiles are fired from land. Fighter jets such as the Rafale, Sukhoi-30, and the Mirage 2000s are also capable of launching nuclear missiles. INS

Arihant, a strategic strike nuclear submarine, would carry Sagarika B-05 missile.

"This is also a big boost for DRDO as their decades of hard work in the development of core missile-related technologies are proven one more time. Reliability and precision are the essence of counter-strike capability. Lastly, it is a message to those for whom it is essential to keep reminding them often."

Former Indian Air Force vice-chief, Air Marshal Bhushan Gokhale (Retd) the EurAsian Times- "Agni-5 indicates India's technological capabilities on one hand and as a deterrence on the other. With a range of 5,000 km plus it is for adversaries to take note even if we do not wish to name them."

Missile Arsenal: India Vs China

In recent months, China seems to have achieved major breakthroughs in hypersonic missile technology. Recently, The Financial Times reported that "China tested a nuclear-capable hypersonic missile in August that circled the globe before speeding towards its target, demonstrating an advanced space capability that caught US intelligence by surprise."

However, China dismissed the report that it tested a nuclear-capable missile in August, clarifying that the test was a "routine spacecraft experiment."

China has been aggressively developing hypersonic weapons. It currently has two lethal hypersonic missiles – the Dong Feng-17 (DF-17) and the DF-ZF Hyper Glide Vehicle (HGV).

Commenting on India's Agni-5 test-launch and China's hypersonic missiles, Dr. Guruprasad said, "Agni-5 is a strategic nuclear deterrent weapon. It is not a tactical weapon. It is not with the armed forces. The decision to use a strategic weapon comes from the topmost political leadership. The LAC conflict [with China] will be within some regions unless it will blow out as an all-out War. The Kargil war was also limited to a region. Hypersonic weapons are difficult to counter with ballistic missile defense."

This view was echoed by defense analyst, Major General VK Madhok (Retd). "This development is undoubtedly a step in the right direction. It is a feature on the cap for India's nuclear capabilities and will complement its existing nuclear triad. The capabilities as reported in the public domain are indicative of its deep-strike capacities and the intent with which it was developed," he said.

According to Maj. Gen. Madhok, comparing India's ICBM with China's hypersonic missiles is not appropriate as they are two different platforms.

"Despite the potency of the Agni-5 missile, comparisons with Beijing's hypersonic developments are not fair. They are different tools for different jobs and cannot be compared. The technologies are far too premature to make such an assertion at this juncture. However, it is well known that hypersonic missiles are not easily countered by ballistic missile defenses. Nonetheless, this development is indeed a step in the right direction," he noted.

Author and National Security analyst, Manan Bhatt said, “The successful launch of nuke-capable intercontinental ballistic missile Agni-5 has a declared range of 5000 km and a very high degree of accuracy.

However, it is believed to have an effective range of 8000 km, covering entire China and could hit targets far into the Pacific as well. This is India’s response to the heavy Chinese build-up along the LAC. This launch has raised the stakes as credible nuclear deterrence is now added to the Indo-China standoff. One can feel the anxiety among the Chinese now.”

Veteran defense journalist and author Shashwat Gupta Ray ruled out the possibility of a full-scale war between the two neighbors. “There won’t be any full-scale war. Missiles of such long-range will act as a deterrent. It’s unlikely China will engage in a full-scale war that too with multiple fronts already open… It can engage in limited theater conflict like Galwan to divert the attention of its people.

“In this scenario, India needs to deploy Prithvi missile systems along with Akash and Brahmos. India should acquire the S-400 ASAP and deploy to Ladakh. Secure the skies, we will be good on the ground. Secure Tawang as they will surely open up Tawang and Ladakh simultaneously to thin out our deployment.

“We need strong air defense mechanisms that would involve advanced radar systems and anti-aircraft and anti-missile systems. We have to deploy short and medium-range missile systems like Pinaka Mk I and II. Brahmos and Prithvi. AGNI won’t have any direct role to play, except for acting as a deterrent. India must have plans for securing Ladakh and Arunachal,” he added.

The US Spooked By Chinese Hypersonic Missiles?

The Associated Press reported that China has conducted a “very concerning” test of a hypersonic weapon system as part of its new-age strategic arsenal. This has been confirmed by top US Military commanders who have cited their concerns and addressed the clear and present danger the development poses, the AP report said.

The Guardian reported that General Mark Milley, chairman of the joint chiefs of staff, was the first Pentagon official to confirm the nature of a test this year by the Chinese military.

While he could not reveal specifics owing to the classified nature through which the intelligence was gathered, he was quoted by Bloomberg Television as saying, “What we saw was a very significant event of a test of a hypersonic weapon system, and it is very concerning.”

He was further quoted as saying, “I think I saw in some of the newspapers, they used the term Sputnik moment,” he added. “I don’t know if it’s quite a Sputnik moment, but I think it’s very close to that. So it’s a very significant technological event that occurred, or a test that occurred, by the Chinese. And it has all of our attention.”

Moscow-based Political analyst Andrew Korybko shared his assessment of these developments looking from a geostrategic perspective.

“Agni-5 has been in development for a while so the latest test wasn’t too surprising. It seems to have been a coincidence that it occurred shortly after China’s reported hypersonic missile, one that Beijing claims was just a space vehicle.

In any case, the Chinese test prompted the US to treat the development with serious concern due to the potential dual-use nature of this hybrid space-military technology.

“As for India, it’s surely monitoring Chinese military developments but doesn’t really have much to fear. The most likely nature of a possible ‘hot war’ with China is that it will probably be geographically contained along their disputed frontier and might not escalate whereas a possible Chinese-US one would be more geographically diverse and have much larger stakes.

“With this observation in mind, any progress that China makes on hypersonic missiles would most immediately be of concern to the US. When it comes to India, its Agni-5 is thus far sufficient for ensuring that any potential conflict with China doesn’t escalate due to the possibility of this missile hitting anywhere inside its neighbor’s territory.

"There are of course scenarios where China and India might engage in missile saber-rattling during the course of a potential hot conflict, but each of their respective missile advancements — China's reported hypersonic one and India's Agni-V — will likely serve to prevent that. For these reasons, observers shouldn't expect either of these two to play a role during any possible LAC conflict.

"That said, if India gets more militarily involved in the South China Sea through the QUAD and somehow becomes connected with a Chinese-US war there, then the missile card might come into play between these neighboring nations due to the qualitatively different nature of the conflict that they might be in or at least approaching in that scenario.

"If that happens, then all bets are off since both missiles (Chinese's reported hypersonic one and India's Aagni-5) are formidable, but China's missiles cannot be shot down while there's a chance — however slight — that India's missile might be due to their different technologies, speed, trajectories, etc. In any case, thus far, their missiles succeed in deterring an uncontrollable escalation along the LAC even if they might not serve that purpose in the vague South China Sea scenario that was just described," the analyst concluded.

Apart from conventional missiles and ICBMs, India has also tested hypersonic missiles. A US report has indicated that India could potentially deploy hypersonic missiles earliest by 2025 and are likely to be modeled on Russian Zircon.

A subsequent analysis written by The EurAsian Times Consulting Editor Prakash Nanda said India's hypersonic missile program may receive a major boost from Russian technology. These are indicative of India's commitment to join the new-age hypersonic arms race, however, whether it will be able to pick up the pace remains to be seen.

https://eurasiantimes.com/agni-5-missile-indias-ballistic-missile-should-worry-beijing/

TIMESNOWNEWS.COM

Fri, 29 Oct 2021

India successfully test-fires Agni-5 missile: All you need to know about the nuclear-capable ICBM with a range of over 5,000 km

With a launch mass of 50,000 kg, a length of 17.5 meters and spanning 2 meters in diameter, development of the Agni-5 missile began in 2008 with the Defence Research and Development Organisation (DRDO) spearheading the project.

Key Highlights

- ***The Agni-5 is, reportedly, an evolution of the Agni-3 missile and was originally referred to as Agni-3+ before being rebranded as Agni-5 in 2010***
- ***With a range of between 5,000 and 5,800 km, the Agni-5 qualifies as an intercontinental ballistic missile, propelling India into an elite club of nations with the technology that also includes the US, Russia, China, France and Britain***
- ***The Agni-5 is the fifth and most advanced variant of the Agni series of medium to long-range missiles***

In yet another display of the progress the armed forces is making in boosting the nation's defence capabilities, India successfully test-fired the surface-to-surface Agni-5 ballistic missile from the APJ Abdul Kalam Island in Odisha on Wednesday, revealed defence ministry sources.

"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,' a statement from the defence ministry read.

History and features of Agni-5

With a launch mass of 50,000 kg, a length of 17.5 meters and spanning 2 meters in diameter, development of the Agni-5 missile began in 2008 with the Defence Research and Development Organisation (DRDO) spearheading the project.

The Agni-5 is, reportedly, an evolution of the Agni-3 missile and was originally referred to as Agni-3+ before being rebranded as Agni-5 in 2010.

India first flight-tested the Agni-5 on April 19, 2012, when the missile travelled more than 5,000km reaching an altitude of 600m. A second test took place on September 15, 2013. The DRDO conducted a final ground test of the Agni-5's canister ejection system in mid-2014, and in January the next year, the first flight test of a canister-launched, road-mobile Agni-5 missile was carried out.

The DRDO-developed Agni-5 ICBM. | Photo Credit: PTI

Further tests of the production-ready iteration of the missile were carried out in 2016 and 2018 and the armed forces, reportedly, began inducting the first batch of these weapons in 2019.

With a range of between 5,000 and 5,800 km, the Agni-5 qualifies as an intercontinental ballistic missile, propelling India into an elite club of nations with the technology that also includes the US, Russia, China, France and Britain. The missile has a payload capacity of 1,500 kg and can carry both conventional and nuclear payloads.

As per some reports, the missile is designed in such a way where, upon reaching the peak of its trajectory, it then gradually returns to the Earth at increased speeds spurred on by Earth's gravitational pull. An onboard computer and inertial navigation system facilitate improved manoeuvrability, allowing the missile to find its target with great precision.

The Agni-5 is the fifth and most advanced variant of the Agni series of medium to long-range missiles. Agni-1, reportedly, has a range of 700 km and Agni-2 has a range of 2,000 km. Agni-3 and Agni-4 have ranges of 2,500 km and 3,500 km respectively.

The latest launch of the three-stage missile has taken place at a moment when India is currently engaged with an enduring standoff at the Line of Actual Control (LAC) with Chinese armed forces.

The launch is widely being touted as a response to recent revelations of China test-firing a hypersonic missile in August this year.

A Financial Times report noted that China's test had caught US intelligence agencies by surprise. Besides China, it is believed that the US, Russia, France and India are also committed to developing hypersonic technology.

https://www.timesnownews.com/india/article/india-successfully-test-fires-agni-5-missile-all-you-need-to-know-about-the-nuclear-capable-icbm-with-a-range-of-over-5000-km/827418

THE FEDERAL

Fri, 29 Oct 2021

How the Agni 5 missile testing fires up India's defence capabilities

The high-precision missile with 5,000-km ranges leaves India better prepared for a potential Chinese offensive

In what is viewed as a strong message to China, India on Wednesday successfully test-fired the Agni 5, a surface-to-surface ballistic missile capable of striking targets, with precision, from a distance of 5,000 km. The missile had, in fact, been inducted about three years ago, but it's only now that the elite Strategic Forces Command (SFC) has tested it.

The Agni 5, categorised as an Intercontinental Ballistic Missile (ICBM), took off from the APJ Abdul Kalam Island, off the Odisha coast. Why is the missile of critical importance to India, and what does it mean to relations with China?

The Agni 5, categorised as an Intercontinental Ballistic Missile, took off from the APJ Abdul Kalam Island, off the Odisha coast. File photo

What Agni 5 offers

India's latest missile can accurately strike targets 5,000 km away. This means almost all of China is within its target range. It is considered India's closest contender for an ICBM, since its range could also help it reach countries across continents such as Africa and Europe.

Also, while the Centre has stated that Agni 5's range is 5,000 km, media reports suggest that it can even reach targets 8,000 km away. Additionally, it has a launch weight of 50,000 kg, and can carry a warhead of about 1,500 kg. What also makes it a potent missile is that it uses a three-stage solid fuelled engine and can hit targets with great precision.

Agni missiles, from 1 to 5, are designed and developed by the Defence Research and Development Organisation (DRDO). While Agni 1 offers a 700 km range, versions 2, 3 and 4 offer 2,000 km, 2,500 km and 3,500 km, respectively.

The latest version of Agni is a canisterised missile, in that it can be launched from road and rail platforms. This renders launch and deployment easier and quicker. Plus, the missile enjoys a longer shelf life and can operate in harsher climatic conditions.

The Chinese offensive

Wednesday's testing of Agni 5 is seen as New Delhi's response to Beijing for a few of reasons. First, India-China relations are at a fresh low amid frequent border skirmishes. An escalation of threats may require India to retaliate.

Second, China is said to have tested a new hypersonic missile in August. It was reported to be a nuclear capable missile that circled the earth before moving towards its target (which it missed by around 25 miles). China flat out denied the development, calling it a spacecraft and not a missile. But media reports said the country had demonstrated its capability in hypersonic glide vehicle technology. The move raised hackles not just in India, but also in the US, which has also seen its relations with China sour in recent years.

The Agni 5 test's success "is in line with India's stated policy to have 'credible minimum deterrence' that underpins the commitment to 'No First Use'", said the Centre. This means while India won't launch an offensive against China, it is fully geared to defend itself.

Bipin Rawat, Chief of Defence Staff General, was quoted as saying last month that India is looking at a rocket force for missiles. It is not clear how much shape that proposal has taken.

How do the other nations fare?

China aside, the US and Russia are said to be developing ICBM technology. A Rand Corporation report named France and India as the 'most committed' nations in terms of gaining the capability. "Both draw to some extent on cooperation with Russia," it added. Australia, Japan and European entities are engaged in ICBM research, said media reports citing the Rand study.

https://thefederal.com/explainers-2/how-the-agni-5-missile-testing-fires-up-indias-defence-capabilities/

AsiaNews.it
PIME
"L'Asia: ecco il nostro comune compito per il terzo millennio!"
(Giovanni Paolo II, da "Alzatevi, andiamo!")

Fri, 29 Oct 2021

Delhi tests ballistic missile that can hit almost all of China's territory

The Agni-V has a range of over 5 thousand km. A possible signal to Beijing, while the two countries face off on the Himalayan border. Chinese and Indians very active in missile development. Beijing worries Washington with its hypersonic launchers; India wants to sell supersonic missiles to China's adversaries in the South China Sea.

Delhi (AsiaNews) - India has successfully tested an intercontinental ballistic missile with nuclear capability according to the Indian Ministry of Defense. The launch took place yesterday in the Bay of Bengal. The Agni-V has a range of over 5 thousand km and a high degree of accuracy: it means that it can hit almost all of mainland China, according to the Ministry.

Delhi has entered the restricted club of nations armed with intercontinental carriers: the others are the United States, China, Russia, France and Great Britain. However, the Indian Defense Department has stressed that the missile experiment is part of the official orientation of the state to have a "credible minimum deterrence". Delhi's policy is to "not use first" nuclear devices, but only in response to an attack.

For several Indian observers and commentators, the Agni-V test is intended instead to send a strong signal to China. The Indians carried out the test in the midst of a dispute with Beijing over the provisional border (Line of Actual Control) that divides the two countries in the Himalayas. Since June 2020, there have been repeated skirmishes between the Indian and Chinese armies, resulting in dozens of casualties. *AsiaNews* has reported the Indian military expects new Chinese incursions in the spring as weather conditions improve.

Tensions between the two Asian giants remain high. Delhi has criticized China's passage of a new law on border territories. Adopted Oct. 24 by the Standing Committee of the National People's Congress, the measure states that China's sovereignty and territorial integrity are "sacred and inviolable." For Indians, these are statements contrary to China's commitment to finding a "fair" and "mutually acceptable" agreement to resolve border disputes.

India and China are very active in missile development. The Stockholm International Peace Research Institute notes, in contrast with the reductions made by the Russians and the U.S., in the last year Delhi has added six nuclear warheads to its arsenal (in total it has 156 devices); China 30, reaching 320 atomic bombs.

While the U.S. military expresses concern over recent Chinese tests of hypersonic missiles, capable on paper to overcome Washington's defenses, China must face the potential threat of the Brahmos: supersonic cruise missiles developed by India in collaboration with Russia. Besides being weapons to be used in a possible direct conflict with Beijing, the Indian authorities are engaged in advanced negotiations for the sale of the Brahmos to Vietnam, Philippines and

Indonesia. The three countries dispute Beijing's territorial claims over almost the entire South China Sea. In recent years, China's increasing militarization of the region has led to repeated incidents with navies in Hanoi, Manila and Jakarta.

What hinders the export of BrahMos to the countries of Southeast Asia is not so much the assessment of the regional geopolitical balance, but the risk that India might incur US sanctions. With the Countering America's Adversaries Sanctions Act (CAATSA), passed by the US Congress in 2017, the US government can impose punitive measures on countries that engage in "significant transactions" militarily with Moscow.

http://www.asianews.it/news-en/Delhi-tests-ballistic-missile-that-can-hit-almost-all-of-Chinas-territory-54383.html

DRDO on Twitter

Rajnath Singh @rajnathsingh · 18h

Speaking at Terminal Ballistics Research Laboratory (TBRL), Chandigarh. Watch

> **Rajnath Singh** @rajnathsingh
> Speaking at Terminal Ballistics Research Laboratory (TBRL), Chandigarh. Watch

Rajnath Singh @rajnathsingh · 13h

Visited TBRL, a DRDO lab in Chandigarh. The products developed by TBRL, such as Multi-Mode Hand Grenade, reflect Govt's vision to modernise Armed Forces.

Reforms have been undertaken by the Government to increase the participation of the private sector. bit.ly/3CrdtI9

ANI @ANI

We're very proud of TBRL (Terminal Ballistics Research Laboratory) because the kind of work you're doing will help our armed forces become capable. Right now there's a necessity,we have challenges before us at borders: CDS General Bipin Rawat addresses staff of TBRL in Chandigarh

1:23 PM · Oct 28, 2021

रक्षा मंत्री कार्यालय/ RMO India @DefenceMinIndia · 16h

आप लोगों के साथ मेरी बातचीत, और TBRL में आज मैंने जो कुछ advanced technical trials देखे हैं, उससे मुझे पूरा विश्वास है कि DRDO भारत की Armed Forces के लिए सभी required technologies को indigenously विकसित करने में पूरी तरह capable और ready है: रक्षा मंत्री

रक्षा मंत्री कार्यालय/ RMO India @DefenceMinIndia · 16h

TBRL जैसे Research और Development institution का लक्ष्य निकटवर्ती academic institution के साथ long-term basis पर साझेदारी विकसित करनी चाहिए। इससे core technological problems पर काम करने को मिलेगा और scientists और technologists को बेहतर employability के लिए तैयार किया जा सकेगा: RM

रक्षा मंत्री कार्यालय/ RMO India @DefenceMinIndia · 16h

मुझे यह जानकर खुशी हो रही है कि TBRL द्वारा developed Baffle Range, सुरक्षा से समझौता किए बिना क्षेत्र को 500 एकड़ से घटाकर 20 एकड़ या उससे कम कर देती है। इससे यह ensure हुआ है कि practice firing ranges के लिए कम जमीन इस्तेमाल करते हुए भी हमारे troops पूरी तरह से trained होंगे:RM

रक्षा मंत्री कार्यालय/ RMO India @DefenceMinIndia · 16h

TBRL 4th generation के Electronic Fuzes के development के advanced level पर पहुंच गया है, जो contemporary होने के साथ-साथ बेहतर safety और reliability प्रदान करेगा। मुझे प्रसन्नता है कि यहां warhead development में industry partners की भागीदारी पर पूरा ध्यान दिया जा रहा है: RM

रक्षा मंत्री कार्यालय/ RMO India @DefenceMinIndia · 16h

DRDO ने missile, radar, electronics, sonar, fighter aircraft, tank, gun और torpedoe आदि में ऐसे systems develop किए हैं जो international level पर comparable हैं। साथ ही कई ऐसे warhead systems, और munitions विकसित किए गए हैं, जो अपने आप में बिलकुल अलग प्रकार के हैं: रक्षा मंत्री

रक्षा मंत्री कार्यालय/ RMO India @DefenceMinIndia · 16h

हमारी Armed forces में indigenous systems regularly induct होती रहेंगी। इसके अलावा, DRDO technologies के साथ इन products की manufacturing में industry का active participation, हमारी military और economic strength को आत्मनिर्भरता की ओर आगे बढ़ा रही है: रक्षा मंत्री

रक्षा मंत्री कार्यालय/ RMO India @DefenceMinIndia · 16h

मुझे बताया गया है कि इस Production Model की First phase को successfully complete कर लिया गया है। ये सफलताएं हमारी stringent quality control, और operational requirements को पूरा करने वाले products और technologies में हमारी बढ़ती हुई क्षमता का संकेत हैं: रक्षा मंत्री

रक्षा मंत्री कार्यालय/ RMO India @DefenceMinIndia · 16h

Indian Army को TBRL द्वारा designed और developed, एक और System, Bund Blasting Device Mark II सौंपा गया है। आने वाले समय में इस system का Production, 'Transfer of Technology' के माध्यम से Private sector द्वारा भी किया जाएगा: रक्षा मंत्री

रक्षा मंत्री कार्यालय/ RMO India @DefenceMinIndia · 16h

इस grenade की safety और performance parameters इसे वास्तव में world class बनाते हैं। यह हमारे scientists और production agency की capabilities का clear demonstration है। मुझे बताया गया है कि इस grenade ने production में 99.5% से अधिक की functional reliability हासिल की है: RM

रक्षा मंत्री कार्यालय/ RMO India @DefenceMinIndia · 16h

अगस्त 2021 में मैंने भारतीय सेना को multi-mode hand grenade सौंपा था। TBRL द्वारा designed और developed यह grenade, Indian Armed Forces में शामिल Private Sector द्वारा निर्मित पहला munition था: रक्षा मंत्री

रक्षा मंत्री कार्यालय/ RMO India @DefenceMinIndia · 16h

आज TBRL Range की अपनी visit के दौरान, मुझे यहां develop किए जा रहे warheads और weapons से संबंधित विभिन्न technologies के बारे में बताया गया। मुझे यहां उपलब्ध testing और evaluation facilities के बारे में भी बताया गया: रक्षा मंत्री

रक्षा मंत्री कार्यालय/ RMO India @DefenceMinIndia · 16h

पूर्व राष्ट्रपति एवं महान वैज्ञानिक डॉ. APJ अब्दुल कलाम जी कहा करते थे, कि 'इस दुनिया में भय का कोई स्थान नहीं है। एक शक्ति ही दूसरी शक्ति का सम्मान करती है।' कलाम साहब DRDO के एक शीर्ष वैज्ञानिक थे और मैं समझता हूँ हमारा देश पूरी तरह से उनके आदर्शों पर चल रहा है: RM

रक्षा मंत्री कार्यालय/ RMO India @DefenceMinIndia · 16h

मैंने TBRL द्वारा develop की जा रही technologies और products को देखा, और उनके बारे में जाना-समझा, मुझे पूरा विश्वास है कि आने वाले समय में यह देश ही नहीं, बल्कि दुनिया की top Defence technology, और Test and Evaluation Facilities प्रदान करने वाली establishments में से एक बनेगी: RM

Defence News

Defence Strategic: National/International

Press Information Bureau
Government of India

Ministry of Defence

Thu, 28 Oct 2021 3:50PM

Indian Coast Guard Ship 'Sarthak' dedicated to the Nation

In a significant boost to the maritime safety and security of the nation, the indigenously built Indian Coast Guard Ship 'Sarthak' was commissioned and dedicated to the nation on October 28, 2021 at Goa by the Director General of Indian Coast Guard K Natarajan.

ICGS Sarthak will be based at Porbandar in Gujarat and operate on India's Western Seaboard under the Operational and Administrative Control of the Commander, Coast Guard Region (Northwest). ICGS Sarthak is commanded by Deputy Inspector General MM Syed and has complement of 11 Officers and 110 men.

ICGS Sarthak is 4th in the series of five OPVs being built by Goa Shipyard Limited for the ICG. These OPVs are multi-mission platforms capable of undertaking concurrent operations. The 105-meter-long ship displacing 2,450 tons is propelled by two 9,100 kilowatt diesel engines designed to attain a maximum speed of 26 knots.

The ship is fitted with state-of-the-art equipment, machinery, sensors and weapons which enables it to function as a command platform and undertake mandated Coast Guard charter of duties including search & rescue, combating maritime crimes and preserving & protecting the marine environment. Indian Coast Guard is a pioneer in inducting indigenous platforms and ICGS Sarthak is a glowing example of 'Atmanirbhar Bharat'.

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पत्र सूचना कार्यालय
भारत सरकार
रक्षा मंत्रालय

Thu, 28 Oct 2021 3:50PM

भारतीय तटरक्षक का जहाज 'सार्थक' राष्ट्र को समर्पित

राष्ट्र की समुद्री सुरक्षा की दिशा में एक महत्वपूर्ण कदम बढ़ाते हुए स्वदेशी रूप से निर्मित भारतीय तटरक्षक जहाज 'सार्थक' को भारतीय तटरक्षक के महानिदेशक के नटराजन द्वारा दिनांक 28 अक्टूबर, 2021 को गोवा में कमीशन कर और राष्ट्र को समर्पित किया गया।

आईसीजीएस सार्थक गुजरात के पोरबंदर में स्थित रहेगा और कमांडर, तटरक्षक क्षेत्र (उत्तर-पश्चिम) के संचालन और प्रशासनिक नियंत्रण के तहत भारत के पश्चिमी समुद्र तट से संचालित होगा। आईसीजीएस सार्थक की कमान उप महानिरीक्षक एम. एम. सैयद के पास है और इसमें 11 अधिकारी और 110 अन्य कर्मी हैं।

आईसीजीएस सार्थक गोवा शिपयार्ड लिमिटेड द्वारा भारतीय तटरक्षक के लिए बनाए जा रहे पांच ओपीवी की श्रृंखला में चौथा है। ये ओपीवी बहु-मिशन प्लेटफॉर्म हैं जो समवर्ती संचालन करने में सक्षम हैं । 2,450 टन ढोने वाला 105 मीटर लंबा यह जहाज दो 9,100 किलोवाट डीजल इंजन द्वारा संचालित है जिसे 26 समुद्री मील की अधिकतम गति प्राप्त करने के लिए डिज़ाइन किया गया है ।

यह जहाज अत्याधुनिक उपकरणों, मशीनरी, सेंसर और हथियारों से सुसज्जित है जो इसे एक कमांड प्लेटफॉर्म के रूप में कार्य करने में सक्षम बनाते हैं और खोजबीन और बचाव, समुद्री अपराधों का मुकाबला करने और समुद्री संरक्षण और सुरक्षा सहित तटरक्षक चार्टर के अनिवार्य कर्तव्यों को निभाने में सक्षम बनाते हैं । भारतीय तटरक्षक स्वदेशी प्लेटफार्मों को शामिल करने में अग्रणी है और आईसीजीएस सार्थक 'आत्मनिर्भर भारत' का एक ज्वलंत उदाहरण है।

https://pib.gov.in/PressReleasePage.aspx?PRID=1767354

Press Information Bureau
Government of India

Ministry of Defence

Thu, 28 Oct 2021 2:31PM

Chief of Naval Staff, Bangladesh visits Headquarters Western Naval Command

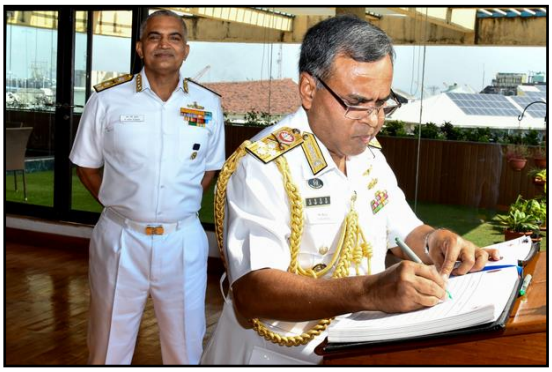
Admiral M Shaheen Iqbal, NBP, NUP, NDC, AFWC, psc, Chief of the Naval Staff, Bangladesh Navy, visited Mumbai and interacted with Vice Admiral R Hari Kumar, PVSM, AVSM, VSM, ADC, Flag Officer Commanding-in-Chief, Western Naval Command on 27 Oct 21. The current visit of the Bangladesh Navy Chief to India from 22 to 29 October 21 is significant as it coincides with the golden jubilee celebration of the Bangladesh Liberation War of 1971.

The two Admirals discussed various issues pertaining to enhancing and strengthening jointmanship, interoperability, training, anti-terrorism collaboration and overall bilateral co-operation as part of the comprehensive strategic partnership between the two nations.

India and Bangladesh are bound by a common history, culture and language. The co-operation between the nations in the War of 1971 is still rejoiced with great pride and fondness by peoples of both nations. Admiral Hari Kumar brought out during the exchange that India is proud to have contributed to the liberation of Bangladesh in 1971 and that as a nation, India has immense respect for the role played and sacrifices made by the proud people of Bangladesh in the war. He also said that Indians are participating enthusiastically in many commemorative events of the golden jubilee of Bangladesh liberation. The C-in-C also assured the visiting CNS that all assistance required for the successful conduct of the International Fleet Review by Bangladesh in 2022 will be extended.

The CNS, being an alumni of the ASW School in Kochi, was also highly appreciative of the training cooperation between the two navies and pointed out how personnel of the two navies often cross-train with each other in courses such as Special Ops, Diving, Aviation Tech, etc.

The CNS and his spouse were also provided a walk around of naval facilities and briefed on a host of NWWA initiatives.



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पत्र सूचना कार्यालय
भारत सरकार

रक्षा मंत्रालय

Thu, 28 Oct 2021 2:31PM

बांग्लादेश के नौसेना प्रमुख का पश्चिमी नौसेना कमान मुख्यालय का दौरा

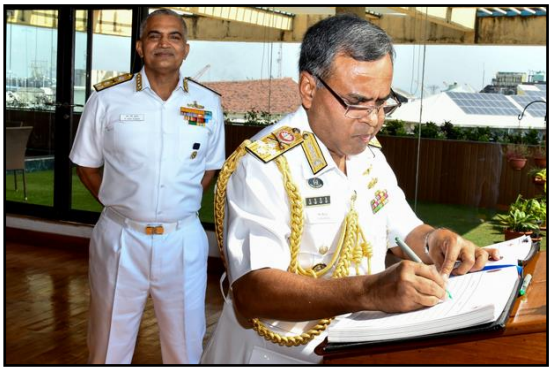
बांग्लादेश नौसेना प्रमुख एडमिरल एम शाहीन इकबाल,एनबीपी, एनयूपी, एनडीसी, एएफडब्ल्यूसी, पीएससी ने मुंबई का दौरा किया और पीवीएसएम, एवीएसएम, वीएसएम, एडीसी एवं पश्चिमी नौसेना कमान फ्लैग के फ्लैग ऑफिसर कमांडिंग-इन-चीफ वाइस एडमिरल आर हरि कुमार के साथ 27 अक्टूबर 2021 को वार्तालाप किया। 1971 के बांग्लादेश मुक्ति संग्राम के स्वर्ण जयंती समारोह को देखते हुए बांग्लादेश नौसेना प्रमुख की 22 से 29 अक्टूबर,2021 तक की वर्तमान भारत यात्रा बेहद अहम है।

दोनों एडमिरलों ने दोनों देशों के बीच व्यापक रणनीतिक साझेदारी के एक अंग के रूप में संयुक्त कौशल, अंतर-संचालन, प्रशिक्षण, आतंकवाद-रोधी सहयोग और समग्र द्विपक्षीय सहयोग को बढ़ाने के साथ-साथ इसे और मजबूत बनाने से संबंधित विभिन्न मुद्दों पर विचार-विमर्श किया।

भारत और बांग्लादेश एक समान इतिहास, संस्कृति और भाषा से बंधे हैं। 1971 के युद्ध में दोनों राष्ट्रों के बीच सहयोग को अभी भी दोनों देशों के लोगों द्वारा बड़े गर्व और स्नेह के साथ स्वीकार किया जाता है। वार्तालाप के दौरान,एडमिरल हरि कुमार ने बताया कि भारत को 1971 में बांग्लादेश की स्वतंत्रता में योगदान देने पर गर्व है और एक राष्ट्र के रूप में, युद्ध में बांग्लादेश के गौरवशाली लोगों द्वारा निभाई गई भूमिका और बलिदान के लिए भारत उनका बेहद सम्मान करता है। उन्होंने कहा कि बांग्लादेश मुक्ति की स्वर्ण जयंती के कई स्मारक कार्यक्रमों में भारतीय उत्साहपूर्वक शामिल हो रहे हैं। एडमिरल हरि कुमार ने दौरे पर आए बांग्लादेश नौसेना प्रमुख को यह भी आश्वासन दिया कि 2022 में बांग्लादेश द्वारा अंतर्राष्ट्रीय फ्लीट रिव्यू के सफल संचालन के लिए सभी आवश्यक सहायता प्रदान की जाएगी।

कोच्चि में एएसडब्ल्यू स्कूल के पूर्व छात्र होने के नाते, सीएनएस ने दोनों नौसेनाओं के बीच प्रशिक्षण सहयोग की भी अत्यंत सराहना करते हुए जानकारी दी कि किस प्रकार दोनों नौसेनाओं के कर्मी अक्सर विशेष अभियानों, डाइविंग,विमानन प्रौद्योगिकी आदि जैसे पाठ्यक्रमों में एक-दूसरे को प्रशिक्षण प्रदान करते हैं।

सीएनएस और उनकी पत्नी को नौसैनिक सुविधाओं का भ्रमण भी कराया गया और एनडब्ल्यूडब्ल्यूए की कई पहलों के बारे में जानकारी दी गई।

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Press Information Bureau
Government of India

Ministry of Defence

Thu, 28 Oct 2021 6:31PM

Indo-UK Tri-Service exercise 'Konkan Shakti 2021' concludes

Key Highlights:

- ***First bilateral tri-service exercise***
- ***Exercise is the result of India-UK 2030 Roadmap announced in May 2021 by the Prime Ministers of both the countries***

The maiden bilateral tri-service exercise, Konkan Shakti 21, between the armed forces of India and the UK culminated in the Arabian Sea on 27 October 2021. Smooth execution of the first edition of the exercise is testimony to the professional abilities, mutual understanding and shared commitment of the two nations and their personnel in uniform.

Spanning over four days, the exercise saw the two defence forces work in cohesion through a series of complex multi-service combat drills in all domains of maritime operations - air, surface and sub-surface. Drills undertaken during the exercise involved 'replenishment at sea' practice, Strike Operations by fighter aircrafts, Cross Control of helicopters, simulated induction of army troops, gun shoots on expendable air targets, advanced air and sub-surface exercises, composite helicopter formation fly-past and large force engagement involving fighter aircraft of the UK (F35B), Indian Navy (MiG 29K) and Indian Air Force (SU-30 and Jaguar), all of which reflected high synergy, professionalism and readiness of both nations to conduct joint maritime operations, when required.

The exercise provided both forces the opportunity to share best practices and experiences with each other in a collaborative spirit that is particularly important in the complex and unpredictable global security environment.

The culmination of the exercise was marked by the traditional steam past between ships of the two navies.

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पत्र सूचना कार्यालय
भारत सरकार
रक्षा मंत्रालय

Thu, 28 Oct 2021 6:31PM

भारत-ब्रिटेन त्रि-सेवा युद्धाभ्यास 'कोंकण शक्ति 2021' का समापन

मुख्य बातें:

- ***पहला द्विपक्षीय त्रि-सेवा अभ्यास***
- ***यह अभ्यास दोनों देशों के प्रधानमंत्रियों द्वारा मई 2021 में घोषित भारत-ब्रिटेन 2030 रोडमैप का परिणाम है***

भारत और ब्रिटेन के सशस्त्र बलों के बीच अरब सागर में पहला द्विपक्षीय त्रि-सेवा युद्धाभ्यास, कोंकण शक्ति 21 का 27 अक्टूबर 2021 को समापन हो गया। अभ्यास के पहले संस्करण का सुचारू निष्पादन दोनों देशों और उनकी सेनाओं की पेशेवर क्षमताओं, आपसी समझ और साझा प्रतिबद्धता का प्रमाण है।

चार दिनों तक चलने वाले इस अभ्यास में दोनों देशों के रक्षा बलों ने समुद्री अभियानों के सभी क्षेत्रों- वायु, सतह और अधस्तल में जटिल बहु-सेवा युद्ध अभ्यासों की एक श्रृंखला के माध्यम से एकजुट होकर काम किया। अभ्यास के दौरान किए गए कार्यों में 'समुद्र में पुनःपूर्ति' अभ्यास, लड़ाकू विमानों द्वारा हवाई हमला अभियान, हेलीकॉप्टरों का क्रॉस कंट्रोल, सेना के जवानों को कार्य बाँटना, हवाई लक्ष्यों पर बंदूक चलाना, उन्नत वायु और अधस्तल अभ्यास, समग्र हेलीकॉप्टर परेड शामिल हैं। यूके (एफ35बी), भारतीय नौसेना (मिग 29के) और भारतीय वायु सेना (एसयू-30 और जगुआर) के लड़ाकू विमानों के साथ बड़े पैमाने पर रक्षा बलों को इस अभ्यास में शामिल किया गया। ये सभी जरूरत पड़ने पर संयुक्त समुद्री अभियान चलाने के लिए दोनों देशों के उच्च तालमेल, पेशेवर दक्षता और तत्परता को दर्शाते हैं।

इस अभ्यास ने दोनों देशों के रक्षा बलों को एक सहयोगात्मक भावना से एक दूसरे के साथ अपनी सबसे अच्छी चीजों और अनुभवों को साझा करने का अवसर प्रदान किया जो विशेष रूप से जटिल और अप्रत्याशित वैश्विक सुरक्षा माहौल में महत्वपूर्ण है।

दोनों नौसेनाओं के जहाजों के बीच पारंपरिक स्टीम पास्ट के साथ युद्धाभ्यास का समापन हो गया।

https://pib.gov.in/PressReleasePage.aspx?PRID=1767352

PHYS.ORG

Fri, 29 Oct 2021

Visualising designer quantum states in stable macrocycle quantum corrals

National University of Singapore scientists have devised an on-surface synthetic protocol to construct atomically precise and stable organic quantum corrals (OQCs), which induce a series of new quantum resonance states.

Creating atomically precise quantum architectures with high digital fidelity and desired quantum states represents an important goal in a new era of quantum technology. The intrinsic fidelity offered by these atomically precise quantum nanostructures also makes them excellent candidates for exploring exotic quantum science (for example, quantum confinement, quantum mirage, and quantum holograph effects) and also for potential applications in quantum technologies (for example, quantum information processing). Future technological implementation of these quantum materials has to meet the following key criteria: high digital fidelity, chemical robustness of the artificial quantum architectures, and scalability in the fabrication of the quantum nanostructures. Unfortunately, current approaches and developments, such as atomic manipulation in an atom-by-atom or molecule-by-molecule manner or molecular assembly via non-covalent intermolecular interactions, are unable to meet all of these critical requirements.

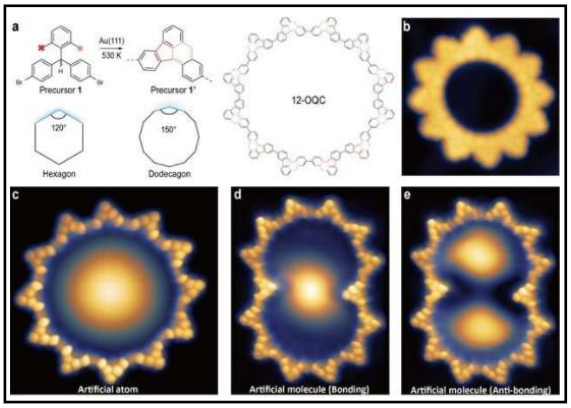


Figure shows the on-surface synthesis of organic quantum corrals and the quantum resonance states inside these corrals. (a) Schematic illustrating the synthetic pathway from precursor (left) to the 12-unit macrocycle molecule (right) with a proposed intermediate (precursor 1′) with embedded pentagonal ring (middle). (b) Scanning tunnelling microscopy (STM) image of one 12-unit macrocycle (12-OQC). (c) Corresponding bond resolved-STM (BR-STM) image of 12-OQC, superimposed with constant-current dI/dV map of quantum resonance states. (d) and (e) BR-STM image of a symmetric Cassini oval-shaped OQC, superimposed with constant-current dI/dV maps of (d) artificial molecular bonding and (e) anti-bonding states, respectively. Credit: *Nature Communications*

A research team led by Prof Jiong Lu from the Department of Chemistry, National University of Singapore (NUS) has devised an on-surface synthetic protocol (Figure a) for the construction of atomically precise and covalently linked organic quantum corrals (OQCs) with dimensions comparable to the wavelength of surface electrons (Figure b) to meet the needs of quantum materials. Quantum corrals are two-dimensional nanoscale structures, which are formed by positioning individual atoms or molecules in specific arrangements that form closed structures. The protocol allows for the precise engineering of quantum states in OQCs with specific designs, which can be used to control the properties of surface electrons.

The molecular precursors, which are specially designed by Prof Chunyan Chi also from the Department of Chemistry, NUS, ensure that the on-surface synthesis results in various OQCs with desired geometries and large dimensions. The research team also used state-of-the-art scanning tunneling microscopy (STM) to directly visualize a series of new quantum resonance states that arise from a collective interference of scattered electron waves inside the nanocavities of the OQCs, corroborated by theoretical studies conducted by Prof Aleksandr Rodin from Yale-NUS College.

The team demonstrated the potential to engineer quantum resonance states in open OQCs, which is achieved by the manipulation of the organic structure using the STM tip. This technique opens up opportunities for engineering desired quantum resonance states in chemically robust OQCs for specific quantum applications.

Prof Lu said, "Our work opens up a new avenue for the fabrication of robust large-sized OQCs with well-defined geometries for the exploration of designer quantum states and their electronic coupling in novel quantum architectures. Atomically precise and covalently linked OQCs synthesized in this work are technologically alluring as they offer both high chemical stability and digital fidelity required for on-chip quantum device operation."

More information: Xinnan Peng et al, Visualizing designer quantum states in stable macrocycle quantum corrals, *Nature Communications* (2021). DOI: 10.1038/s41467-021-26198-8

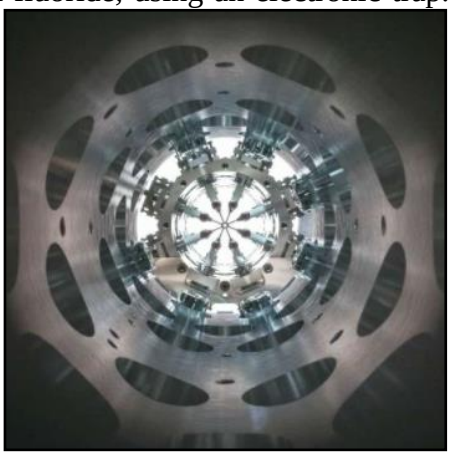
Journal information: Nature Communications

https://phys.org/news/2021-10-visualising-quantum-states-stable-macrocycle.html

Fri, 29 Oct 2021

Trapping molecules to find new physics

The Standard Model of particle physics has been extremely successful in describing how the universe works. However, there are some things that it cannot explain. Physicists have, therefore, been looking for new physics in particle accelerators such as the Large Hadron Collider at CERN. At the University of Groningen, a different approach has been used: in contrast to smashing up matter at high energies, physicists wanted to study molecules that are brought to rest. These physicists set a new record by stopping molecules of strontium fluoride, using an electronic trap. Their results were published on 21 October in *Physical Review Letters*.



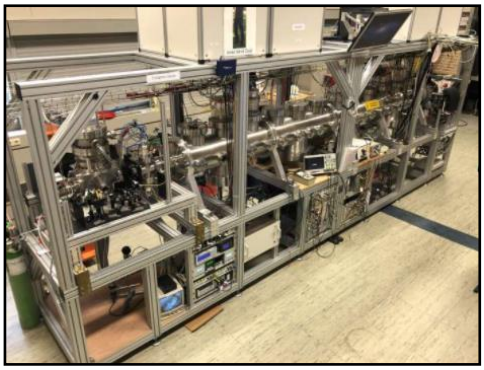
A lengthwise view inside the molecular trap: a series of high-voltage rings creates an electric field. Credit: Steven Hoekstra, University of Groningen

According to the Standard Model of particle physics, when the universe started in what is generally known as the "Big Bang," there should have been equal quantities of matter and anti-matter. And these would have canceled each other out. Yet, we live in a universe that is made of matter. "This shows that the fundamental laws of the universe are not as symmetrical as the Standard Model predicts," says Steven Hoekstra, associate professor of Atomic and Molecular Physics at the Van Swinderen Institute for Particle Physics and Gravity of the University of Groningen, in the Netherlands. "And we would like to investigate this asymmetry in a "table top" experiment."

Asymmetry

Other physicists are trying to do the same using particle accelerators such as CERN, in Switzerland. "They smash particles together and study the debris for signs of new physics. We are using a low-energy approach, bringing molecules to a standstill and studying them in detail." The aim of Hoekstra and his research group is to measure the electric dipole moment of an electron. We may think of the electron as just a negative charge, but according to theory, there is a minute asymmetry in its charge when the electron interacts with other particles. "This breaks the symmetry ever so slightly. And we want to investigate this; to see if this symmetry breaking is larger than the Standard Model predicts. In that case, we have proof of physics beyond the Standard Model."

The idea is to study a heavy molecule that is also a free radical that contains an unpaired electron while it is standing perfectly still. This should enable the scientists to use the interactions between this electron and its atomic nucleus as a magnifying glass to determine the electron's electric dipole moment. In theory, this could be done. In practice, it takes a lot of work and determination. Hoekstra has already spent a decade on designing and building a setup for this experiment.



The 4.5-meter long experimental setup. On the left, the chamber in which the strontium fluoride molecules are created. Credit: Steven Hoekstra, University of Groningen

Sensitive

In his laboratory, a 4.5-meter-long construction is sitting on a very long table. At one end, the strontium fluoride molecules are created. "The free radicals that we need are unstable, so producing them is part of the experiment." The molecules are ejected from the first chamber at a speed of 190 meters per second. They then enter a tube in which rings carrying high voltages create a moving electric field. "The rings are tuned to create a spherically symmetric field that moves along with the molecules, trapping them as they go along." The molecules rotate in this trap, like marbles in a bowl, and eventually come to a standstill as the trap is brought to rest. "This happens after four meters. In our latest paper, we show that the molecules are really standing still there."

However, stopping the molecules is one thing. Being able to measure the electric dipole moment of the electrons is something else. "The trap that we created with the electric field changes the energy levels in the molecules. We are studying ways to compensate for this." The first step, therefore, will be to eject the molecules at a speed of 30 meters per second, and use those for a sensitive measurement. "At this speed, the molecules still continue in a straight line, instead of falling down. This allows us to measure the electron's properties for over 10 milliseconds." If these measurements are not sensitive enough to detect the electric dipole moment, they will set new limits to its size.

Stamina

A setup for these measurements is also being developed by Hoekstra and his team. It consists of a large cylinder that shields the molecules from interference by the Earth's magnetic field. "We are currently using this for our first measurements, with a fast beam moving at 600 meters per second. We will then use this with the molecules passing through at only 30 meters per second," explains Hoekstra. He expects that this can happen in about two years from now.

Over the past 10 years, it has also become clear that using barium fluoride, which is slightly heavier than strontium fluoride, will give more accurate results. "So, we'll have to adapt the deceleration to barium fluoride molecules, but this is a relatively small step." The entire project takes a lot of patience and stamina. That is how these ultra-sensitive measurements work. "We have to solve one problem after the other." There are, however, plenty of rewards on the way. The team of some twenty scientists and technicians has now managed to stop strontium fluoride molecules, which are three times heavier than the previous world record, using these techniques. "Now that we can stop them, we need to demonstrate that we can make use of this in our measurements."

More information: P. Aggarwal et al, Deceleration and Trapping of SrF Molecules, *Physical Review Letters* (2021). DOI: 10.1103/PhysRevLett.127.173201

Journal information: Physical Review Letters

https://phys.org/news/2021-10-molecules-physics.html

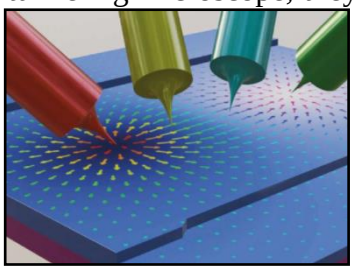
PHYS.ORG

Fri, 29 Oct 2021

Directly measuring electrical properties in ultra-thin topological insulators

By Forschungszentrum Juelich

Physicists at Forschungszentrum Jülich have made a significant step towards the realization of new types of electronic components. Using a special four-tip scanning tunneling microscope, they were able to directly measure the extraordinary electrical properties that exist in ultra-thin topological insulators for the first time. These properties result from the fact that the electron spin is coupled to the direction of the electric current, and enables realization of a topological quantum computer.



Measurement with the four-tip scanning tunneling microscope. Credit: Forschungszentrum Jülich / Vasily Cherepanov

The decoherence quantum bits, or qubits for short, is one of the main hurdles in the construction of practically usable quantum computers. So-called topological quantum computers are considered an elegant and promising solution to this problem. The sensitive quantum information in such a computer is particularly well protected against errors by the choice of certain materials. However, the concept exists so far largely only on paper. The search for a material system with the appropriate properties is still in full swing. One way to realize a topological quantum computer is based on the use of topological insulators, which are a new class of materials with special properties: They behave like an insulator in their interior, i.e. they do not conduct electricity there. Their surface, however, is conductive with the direction of current strictly coupled to the spin of the charge carriers.

Material for quantum computers and spintronics

A special case are the 3D topological insulators discovered only a few years ago. If one imagines them as a cube, they are conductive on all six sides. However, the conductivity on opposite surfaces decreases when the topological insulators cube is made thinner and thinner, as researchers at the Peter Grünberg Institute for Quantum Nanoscience in Jülich have now been able to show. What finally remains is a thin layer, only a few nanometres thick, with four conductive edges at which electric current continues to flow in a spin-directed manner.

Due to their special properties, such ultra-thin topological insulators are interesting materials for applications in spintronics—that is, for the development of components and devices that use the electron spin to process and store information. In combination with superconductors, they are promised to realize further, even more exotic effects that can be used in topological quantum computers.

Experiments with a "nano-multimeter"

For their measurements, the researchers used a special scanning tunneling microscope with four tips. The instrument, which was developed at Forschungszentrum Jülich, makes it possible to carry out electrical measurements under high-purity conditions on extremely small structures. The researchers also used a new method that makes the positioning of the measuring tips even more precise with an accuracy of only a few nanometres.

Using the "nano-multimeter", the researchers were able to demonstrate for the first time that the nanoscale electrical properties of the thin films behave as theoretically predicted. The observation is important for a deeper understanding of topological insulators and crucial for their further development towards potential applications.

More information: Arthur Leis et al, Lifting the Spin-Momentum Locking in Ultra-Thin Topological Insulator Films, *Advanced Quantum Technologies* (2021). DOI: 10.1002/qute.202100083

https://phys.org/news/2021-10-electrical-properties-ultra-thin-topological-insulators.html

The Washington Post

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What is fluvoxamine, the antidepressant drug that shows promise in treating covid-19?

By Marisa Iati and Adela Suliman

A common antidepressant medication often used to treat obsessive compulsive disorder may join a growing arsenal of covid-19 treatments after it showed promise in reducing hospitalizations and deaths from the disease caused by the novel coronavirus.

Because it has already been approved by the Food and Drug Administration for mental health treatment, doctors can begin to prescribe it under certain parameters. The relatively modest cost means it could be highly beneficial in parts of the world with low vaccination rates and few resources.

Here's what you need to know.

What is fluvoxamine?

Fluvoxamine, which is produced by several manufacturers, is generally used to reduce repetitive, unwanted thoughts and ritualized behaviors. It can also be prescribed off-label for major depressive disorder, post-traumatic stress disorder, eating disorders and other conditions.

In use since the 1990s, the drug is a selective serotonin reuptake inhibitor that helps restore the balance of serotonin in the brain. Researchers said they decided to study its possible use in treating covid-19 because of its anti-inflammatory and possibly anti-viral properties. It was also identified early in the pandemic as capable of reducing what's known as cytokine storms, in which the body attacks healthy cells and tissues.

The study, published Wednesday in the Lancet journal, found that giving high-risk covid-19 patients fluvoxamine — 100 mg twice daily for 10 days — early in their treatment reduced the need for hospitalization.

The clinical trial took place from January to August and included roughly 1,500 people at 11 sites in Brazil. The participants were adults who were symptomatic with covid-19 and at heightened risk of severe illness because of other health problems. Their average age was 50, almost 60 percent were women, and most self-identified as mixed race.

About half of the participants received fluvoxamine, while the other half got a placebo. They took their pills for 10 days at home, and scientists tracked them for four weeks.

In the group that took fluvoxamine, 11 percent needed hospitalization or an extended emergency room stay, compared with 16 percent of those who got the placebo.

"For every 20 people in this population you treated, you'd cause benefit for one person, basically," said David Boulware, a professor of medicine at the University of Minnesota who worked on a smaller study of the drug. "That's a pretty darn good number, particularly for outpatient settings for early covid."

Among participants who were 80 percent adherent to the treatment regimen, one person who got fluvoxamine died, compared with 12 who received a placebo.

Angela Reiersen, a psychiatrist at Washington University in St. Louis who originally came up with the idea to study fluvoxamine for covid-19, called the findings "pretty remarkable."

“I think this is enough to convince many physicians to prescribe fluvoxamine for some patients who are early in the course of covid-19, especially for individuals who have a lot of risk factors,” she said. The drug has also shown positive results against covid-19 in smaller studies.

What are the possible side effects?

Common side effects of fluvoxamine include headaches, nausea, diarrhea and dizziness, according to the National Alliance on Mental Illness. Some patients have also reported problems with orgasm or ejaculatory delay. NAMI says these problems will often improve as patients keep taking the medication, with the exception of sexual side effects. In rare cases, fluvoxamine can cause low sodium blood levels, seizures, bleeding and other conditions.

The researchers said questions remain about fluvoxamine’s tolerability, as several participants receiving the drug stopped taking it because of side effects. Two ongoing trials — one funded by the National Institutes of Health and another at the University of Minnesota — are examining the use of a lower dose in covid-19 patients.

People taking fluvoxamine are advised to avoid alcohol or illegal drugs, which can make fluvoxamine less effective and increase side effects. Patients should also limit their coffee intake, since the drug extends the effects of caffeine, Boulware said.

Fluvoxamine interacts with several other medications, so patients should talk with their doctors about what other drugs they take. People who are pregnant or breastfeeding should also consult their physicians.

When will it be available to treat covid-19?

Because fluvoxamine is approved by the Food and Drug Administration as an antidepressant, doctors already can prescribe it off-label — using their clinical judgment — to treat covid-19.

The drug is given as a pill and is relatively inexpensive, costing about $4 for a 10-day course, compared with antibody IV treatments that cost about $2,000 and Merck’s $700-per-course antiviral pill. Study co-author Edward Mills, of McMaster University in Ontario, said fluvoxamine’s cost efficiency could make it a “game-changer” for poorer nations or those with low vaccination rates.

Since most participants in the trial were unvaccinated, the researchers wrote that further evidence was needed to establish its benefit in vaccinated people. Reiersen said she would also be interested in whether fluvoxamine could be effectively combined with other covid-19 treatments.

The Together Trial group, which was responsible for the new research, said it had shared its findings with the World Health Organization and NIH, which publishes treatment guidelines. The FDA does not have to reapprove the drug.

“Given fluvoxamine’s safety, tolerability, ease of use, low cost, and widespread availability, these findings might influence national and international guidelines on the clinical management of mill,” the researchers wrote.

How is fluvoxamine different from other covid-19 drugs?

Fluvoxamine is a familiar drug that has been used for more than two decades and is known to be safe. It and Merck’s drug, molnupiravir, are also distinct from other covid-19 treatments because they can be given as pills and taken at home. Both medications are meant to be started soon after diagnosis.

By contrast, other treatments are harder to administer. Monoclonal antibodies are infused or injected, and medical experts say the treatment is expensive and difficult to deliver. In the new trial, fluvoxamine proved about equally successful at reducing hospitalizations as monoclonal antibodies when taken as prescribed, Boulware said.

Remdesivir is also injected, and while it has been shown to shorten hospital visits, its ability to reduce severe illness and death is unclear. Dexamethasone, a steroid, is frequently used in hospitalized patients who are on ventilators or receiving supplemental oxygen.

https://www.washingtonpost.com/science/2021/10/28/antidepressant-fluvoxamine-coronavirus-lancet/