JUNE
2022

समाचार पत्रों से चयित अंश
Newspapers Clippings

A Daily service to keep DRDO Fraternity abreast with DRDO Technologies, Defence Technologies, Defence Policies, International Relations and Science & Technology

खंड : 47 अंक: 121 28 जून 2022

Vol. : 47 Issue : 121 28 June 2022

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

CONTENTS

DRDO News

DRDO Technology News

The Statesman

Mon, 27 Jun 2022

DG DRDO Briefs Northern Army Commander on Upgrades in Missile Systems, Torpedoes

Dr. Chandrika Kaushik, an outstanding scientist and Director General (PC & SI), Defence Research Development Officer (DRDO), on Monday in an interaction with officers at Army's Northern Command at Udhampur briefed them about the upgrades in missile systems, torpedoes and various types of ammunition. She visited Udhampur to interact with Lieutenant General Upendra Dwivedi, GOC-in-C, Northern Command and other Officers of the Command and gave a holistic view on DRDO to include role, organisation, charter, interface of DRDO with academia and industry, R&D contribution and major initiatives of technology infusion undertaken by DRDO.

The address helped the Officers to understand the scope of DRDO and update them on the latest technologies that DRDO is working on. Dr Kaushik explained at length about the amalgamation of DRDO with Tri-services, fusion of latest technological advances and transformation from 'Make in India' to 'Made in India'. She also briefed about the upgrades in missile systems, torpedoes & various types of ammunition. A considerable portion of the lecture was focussed on the future technologies and way ahead. DRDO has been the bedrock of country's indigenous defence production industry. Army Commander, Lieutenant General Upendra Dwivedi, commended the hard work, dedication and the contributions made by DRDO.

https://www.thestatesman.com/india/dg-drdo-briefs-northern-army-commander-upgrades-missile-systems-torpedoes-1503084861.html

Mon, 27 Jun 2022

पानी की तेज धार से बम को निष्क्रिय कर देता है ये भारतीय रोबोट, बचाता है जवानों की जान

भारत के पास एक ऐसा स्वदेशी रोबोट है जो हमारे उन जवानों की जान बचाएगा जो बम स्क्वॉड में काम करते हैं. जो अपनी जान खतरे में डालकर बम खोजते हैं उन्हें निष्क्रिय करते हैं. पतली और संकरी जगह पर बम को खोजना और उसे निष्क्रिय करना बेहद मुश्किल होता है. इसलिए इस रोबोट को बनाया गया है. इसका नाम है मिनी दक्ष मिनी दक्ष (Mini Daksh) रोबोट की खासियत ये है कि ये प्लेन, बस, ट्रेन के अंदर जाकर बम खोजकर, उसे बाहर लाकर या बम स्क्वॉड को दे देगा. या फिर उसे खुद ही निष्क्रिय कर देगा. इसे रिमोट स्क्रीन के जरिए 100 मीटर दूर से संचालित किया जा सकता है. यानी बिना किसी इंसान के हस्तक्षेप के यह रोबोट यह सारा काम कर सकता है. इससे समय थोड़ा जरूर लगता है लेकिन सुरक्षा पूरी रहती है.

मिनी दक्ष (Mini Daksh) का वजन 100 किलोग्राम है. यह 25 किलोग्राम वजन तक उठा सकता है. इसका आर्म 2.5 मीटर की लंबाई तक फैल सकता है. पतली जगह में जा सकता है. इसके आर्म में आगे एक क्लचर, एक एक्सरे कैमरा, एक वाटर जेट डिसरप्टर गन लगी रहती है. क्लचर सामान को पकड़ता है. उसे लेकर बाहर आता है. इसके बाद एक्सरे से स्कैन करके विस्फोटक की जांच की जाती है. फिर वाटर जेट डिसरप्टर गन से बम को निष्क्रिय कर दिया जाता है. मिनी दक्ष (Mini Daksh) की मांग एयरपोर्ट अथॉरिटी ऑफ इंडिया (AAI), नेशनल सिक्योरिटी गार्ड (NSG) और जम्मू और कश्मीर पुलिस (J&K Police) ने की है इस रोबोट को गुरुग्राम स्थित द हाइटेक रोबोटिक्स सिस्टम्स लिमिटेड ने भारतीय रक्षा अनुसंधान एवं विकास संगठन (DRDO) के साथ मिलकर बनाया है.

AAI ने इसे बनाने वाली कंपनी से 18 मिनी दक्ष (Mini Daksh) रोबोट्स की मांग की है. NSG ने 10 रोबोट्स मांगे हैं. वहीं, जम्मू और कश्मीर पुलिस ने पांच मिनी दक्ष रोबोट का ऑर्डर दिया है. इन सभी रोबोट्स को शहरी और सीमाई इलाकों में तैनात किया जाएगा. ताकि विस्फोटकों की जांच के दौरान या उन्हें निष्क्रिय करते समय बम स्क्वॉड के किसी जवान को नुकसान न पहुंचेमिनी दक्ष (Mini Daksh) 40 डिग्री एंगल पर किसी भी जगह चढ़ सकता है. यह प्लेन सतह या सीढ़ियों पर भी चढ़ सकता है. इसकी गति 2 किलोमीटर प्रतिघंटा है. द हाइटेक रोबोटिक्स सिस्टम्स के अधिकारियों ने बताया कि ये रोबोट डिफेंस की दुनिया में एकदम नया प्रोडक्ट है. इससे हमारे जवानों की जान बचाना आसान होगा साथ ही विस्फोटकों से किसी प्रकार का नुकसान नहीं होगा. मिनी दक्ष (Mini Daksh) रोबोट NSG द्वारा उपयोग किए जा रहे दक्ष (Daksh) रोबोट का छोटा वर्जन है. दक्ष रोबोट भारी है. इसका वजन 500 किलोग्राम है. जबकि मिनी दक्ष सिर्फ 100 किलोग्राम का है. दक्ष की सफलता को देखते हुए मिनी दक्ष बनाने की मांग आई थी. इसलिए डीआरडीओ और द हाइटेक रोबोटिक्स सिस्टम्स लिमिटेड ने मिलकर इसे बनाया.

https://www.aajtak.in/india/news/photo/drdo-mini-daksh-robot-bomb-squad-nsg-aai-the-hi-tech-robotics-systems-tstrd-1489015-2022-06-27-1

Mon, 27 Jun 2022

Made in India Infantry Combat Vehicles Inducted in Indian Army: What it is, Check Features and Other Details

In a bid to boost the capabilities of the Indian Army, made-in-India Infantry Combat Vehicles have been inducted into the forward areas in Ladakh. Northern Army Commander Lt General Upendra Dwivedi, who personally tested the new vehicle, said that one can easily be driven on the harsh terrain of the region through these combat vehicles. "One can easily drive the vehicle and the driver can see 1,800 metres away from it. The weapon mounted on it can be controlled from inside," Northern Army Commander Lt General Upendra Dwivedi said, as quoted by ANI.

About the IPMVs The combat vehicles, named Infantry Protected Mobility Vehicles (IPMVs), have been jointly developed by the Defence Research and Development Organisation (DRDO) and the Tata group. The Tata Advanced Systems Limited (TASL) handed over the first lot of the indigenously developed Infantry Protected Mobility Vehicles (IPMVs) to then Chief of the Army Staff General Manoj Mukund Naravane at a ceremony in Pune in April this year. With this, the TASL became the first private sector company across the nation to produce and deliver wheeled armoured combat-ready vehicles for the armed forces. These Infantry Protected Mobility Vehicles have been tried and tested in the mountainous terrain of the Ladakh region. The vehicles include quick reaction fighting vehicle medium, infantry protected mobility vehicle, ultra-long-range observation system developed by the TASL and monocoque hull multi-role mine-protected armoured vehicle developed by Bharat Forge. TASL's in-house designed and

developed remote-controlled weapon station with thermal sights and external add-on armour protection panels developed by the Defence Metallurgical Research Laboratory of the DRDO have also been fitted into the vehicle.

The vehicles are based on the strategic 8x8 Wheeled Armoured Platform (WhAP), indigenously designed and developed by the TASL along with the Vehicles Research and Development Establishment (VRDE), a unit of the DRDO. What is an Infantry Mobility Vehicle An Infantry Mobility Vehicle (IMV) is a wheeled Armored Personnel Carrie (APC) used by the military as a patrol, reconnaissance, or security vehicle. The IMVs were developed in response to the dangers posed by contemporary combat, with a focus on crew safety and mine resistance. Similar vehicles existed long before the term IMV was coined. For example the French VAB and South African Buffel. These vehicles were initially discovered during the Rhodesian Bush War. Following the rising threat of mines, a number of Mine Ambush Protected vehicles were produced in an improvised manner for Rhodesian government forces in unit workshops and national steel working firms from about 1972. These vehicles generally feature a v-hull-shaped underbelly with additional crew protection features such as four-point seat belts and seats suspended from the roof or sides of the vehicle. IMVs have been designed to resist small arms and explosives, but they cannot defeat heavy machine guns and cannon fires, or shaped charge attacks. Many of these vehicles feature a machine gun on the roof, either on a ring mount or a remote weapon system.

https://www.news9live.com/knowledge/made-in-india-infantry-combat-vehicles-inducted-in-indian-army-what-it-is-check-features-and-other-details-178960?infinitescroll=1

DRDO On Twitter

Defence News

Defence Strategic: National/International

THE ECONOMIC TIMES

Tue, 28 Jun 2022

India, Malaysia Defence Minister-Level Talks Focus on LCA and Su30 MKM Fleet

India and Malaysia held top defence-level talks on Monday, with a focus on the Tejas Light Combat Aircraft (LCA) offer as well as sustenance of the Russian origin Su30 MKM fleet of the Malaysian Air Force. The talks took place via video conferencing between defence minister Rajnath Singh and Malaysia's senior defence minister YB Dato 'Seri HishammuddinTun Hussein. It is learnt that the Indian offer for 18 of the Tejas fighter jets to meet a Malaysian requirement was discussed at length. As reported, India has offered a dual package for the indigenous fighter jets as well as maintenance of the Su30 MKM aircraft being operated by Malaysia.

While several rounds of technical discussions on the Indian aircraft have already taken place with the Tejas emerging as the frontrunner in a competition with South Korean and Chinese origin jets, a government-to-government deal could also be in the offing. "The defence minister highlighted the areas in which Indian defence industries could assist Malaysia. He suggested a visit of senior officers from Malaysia to India to get a first-hand experience of the facilities and products of the Indian defence industry," the Indian defence ministry spokesperson said.

Singh also extended an invitation to Hussein to visit India at an early convenient date to discuss closer and strategic defence ties. "A wide range of issues concerning bilateral, regional and defence industrial cooperation were discussed during the meeting," said the spokesperson. The Indian offer of an attractive financial package for its Tejas and commitment to keep Malaysia's fleet of Su30 jets flightworthy, has placed it as a frontrunner for a Malaysian competition to acquire new combat aircraft. Other contenders for the deal are unable to offer this package as they do not have backend contracts with Russian manufacturers to work on the Sukhois.

The Malaysian air force has been looking for 18 new light fighter jets with several nations, including South Korea, Pakistan, China and Sweden, making a pitch. The Indian offer is for the LCA Mk1A version, 83 of which are on order by the Indian Air force. The aircraft is equipped with a modern AESA radar, latest avionics and the capability to integrate a variety of western as well as Russian-origin air-to-air and air-to-ground weapons. India also has the indigenous Astra beyond visual range air-to-air missile that will be integrated on the fighter.

https://economictimes.indiatimes.com/news/defence/india-malaysia-defence-minister-level-talks-focus-on-lca-and-su30-mkm-fleet/articleshow/92500618.cms?from=mdr

IDN INDIAN DEFENCE NEWS
Global Defence, Aerospace & Security

Tue, 28 Jun 2022

US Revives Offer to Co-Develop AMCA Fighter Jet Engine With India

The US has revived an offer to cooperate with India on the development of jet engine technology which could be used to power India's futuristic Advanced Medium Combat Aircraft (AMCA). General Electric (GE) of the US, one of the world's leading manufacturers of jet engines, has submitted a proposal for the co-development of a 110 kn thrust engine with Indian agencies. Top military sources have confirmed that GE is being considered along with Safran of France and Rolls Royce of the UK for collaboration on the AMCA engine. "The options for a tie-up are open from among the three contenders. The Defence Research and Development Organisation (DRDO) is the lead agency and a private Indian entity is also likely to be involved in the program," sources disclosed. The revival of US interest in the fighter engine program is significant. An earlier proposal for collaboration on jet engine technology under the India-US Defence Trade and Technology Initiative (DTTI) was suspended in October 2019 on account of American reluctance to share core or hot engine technology. A joint working group on jet engine technology under the DTTI framework was thereafter disbanded. The suspension of cooperation on jet engines was announced in New Delhi by Ellen Lord, the then US Under Secretary of Defence for Acquisition and Sustainment who was the co-chair of the India-US DTTI.

"We did run into challenges in terms of US export controls," she had then acknowledged. Lord said the two sides could not come to an understanding of what exportable technologies would be useful to India. There's been simultaneous interest expressed by Safran and Rolls Royce for the engine co-development program. These bids are energetically supported by their respective Governments. Industry watchers read the US turnaround as a bid to retain its lead in powering India's indigenous fighter jet program, a position it does not wish to cede to European engine makers. The Light Combat Aircraft (LCA) TEJAS is powered by the GE-F404 engine, which has an 85kn thrust. India's Aeronautical Development Agency (ADA)'s plans for the LCA Tejas Mk-2, AMCA Fifth Generation Fighter Aircraft and the Twin Engine Deck-Based Fighter (TEDBF) are also closely woven around the 98 kn thrust GE-F414 engine. Several hundred of these aircraft will be produced.

Only when the AMCA program matures to the MK-2 level does the ADA envisage switching from a GE-F414 to an indigenous engine with a higher 110kn thrust. It is for the development of that engine that India is seeking foreign collaboration. The AMCA MK-2 production timelines commence around 2035. ADA also plans powering subsequent batches of the 26-ton TEDBF with the same indigenous engine as the AMCA's. The revival of the GE bid to co-develop the AMCA engine coincides with the development of an "Enhanced Performance Engine" or "EPE" variant of the GE-F414 for the US Navy. "The Enhanced Performance Engine includes a new core and a redesigned fan and compressor. It offers up to a 20 per cent thrust boost, increasing it to 26,400 pounds (120kN), giving an almost 11:1 thrust/weight ratio," it's been stated. This matches or slightly exceeds the requirement for the AMCA MK-2. Hence, GE will be ready with technologies required for a 110kn engine required by India.

Sources also disclosed that the EPE will have the same dimensions as the original GE-F414 variant. Hence, no modifications will be required to the air frame for fitment or retro-fitment on the initial variants of the AMCA, the TEDBF and even the Tejas Mk-2. India, of course, doesn't seek a hand-me-down solution but wants to gain knowhow and know why through this program to design, develop and produce jet engines on its own in the future.

http://www.indiandefensenews.in/2022/06/us-revives-offer-to-co-develop-amca.html?m=1

IDN INDIAN DEFENCE NEWS
Global Defence, Aerospace & Security

Tue, 28 Jun 2022

Polish 'Warmate' Loitering Munitions Delivered to Indian Army

Polish firm WB Electronics has completed delivery of Warmate loitering munitions to the Indian Armed Forces. This was reported by Vayu Aerospace Review, a leading Indian defence magazine. Warmate joins a number of Indian and Israeli unmanned systems purchased by the Indian armed forces in recent months. In March 2020, the Indian Army had released a Request for Information (RfI) to procure about 100 man portable loitering munitions. The RfI mandated a minimum range of 15kms, endurance of 30 minutes and a total maximum weight of 20 kg. A Request for Proposal (RfP) was released later that year. The order had to be completed within 18 months from signing. Warmate is likely to have been selected for this requirement. WB Electronics had started an Indian subsidiary named WB Electronics India Private Limited in October 2020. WB Electronics and the Indian entity did not respond to requests for comments.

Warmate, which is propelled by an electric motor, can be used as a self-contained system, which can be transported or carried by land or special forces units. The system design also permits its installation on vehicles. The munition is marketed as an alternative for anti-tank guided missiles. Optionally the system can be equipped with a laser-seeking warhead, other than the choice of high explosive and thermobaric warheads. The system is compatible with three different interchangeable warheads and can be equipped with either a daylight or infrared camera. An air-launched version of Warmate is also under development. Warmate has been ordered by Poland and multiple export customers.

For the Indian Army, Warmate joins a small but growing list of drones and loitering munitions ordered over the past couple of years. In 2021, the Army had placed orders for 100 Elbit Skystriker loitering munitions, which would involve manufacturing in India. A similar quantity of swarm-capable armed drones made by Indian firm NewSpace Research and Technologies were also ordered. Multiple other Army requirements for loitering munitions are also known. Indian defence manufacturer Solar Group has tested loitering munitions in association with Z Motion Autonomous Systems, a start-up. This included Trinetra, a loitering munition in the same category as Warmate. With focus being given to indigenous equipment by India's Ministry of Defence, securing further orders for Warmate may prove elusive.

http://www.indiandefensenews.in/2022/06/polish-warmate-loitering-munitions.html?m=1

IDN INDIAN DEFENCE NEWS
Global Defence, Aerospace & Security

Tue, 28 Jun 2022

PM Modi Holds Talks During G7 Summit with Indonesia President, Discusses Comprehensive Strategic Partnership

On the sidelines of the G7 Summit on Monday, Prime Minister Narendra Modi held talks with Indonesian President Joko Widodo to strengthen the Comprehensive Strategic Partnership between both countries. "PM @narendramodi and President @jokowi had a productive meeting. Their talks will add strength to the Comprehensive Strategic Partnership between India and Indonesia, "The office of the Prime Minister said today. "Both leaders also discussed ways to boost connectivity and business linkages," it added. Indonesia is the first country with which India has adopted a shared vision of maritime cooperation in the Indo-Pacific.

A Comprehensive Strategic Partnership was established in May 2018 during PM Modi's visit to Indonesia. President Widodo was among one of the Chief Guests invited for India's Republic Day celebrations in Delhi in 2018. Both leaders last met on the sidelines of the G20 Rome Summit in 2021. Indonesia is the second-largest trading partner of India in ASEAN region. The Bilateral trade of over USD 26 billion between 2020 to 2021. India and Indonesia also share cultural civilizational linkages. The 9th century Borobudur Buddhist temple and Prambanan Shiva temple are examples of the shared cultural heritage. Ramayana and Mahabharata are key inspirations for Indonesian folk art. Around 8,500 Indians in Indonesia engaged in qualified professions like Chartered Accountants, Software Professionals, Teachers, Engineers. Prime Minister Modi is attending this year's summit being held under the German Presidency. India is among the five partner countries invited to attend the G7 Summit. German Chancellor Olaf Scholz today welcomed the Prime Minister at Schloss Elmau, ahead of the G7 Summit. Before the start of the second day of the G7 Summit, leaders of the member and partner countries gathered for a group photograph.

Besides Biden, PM Modi was seen interacting with the prominent leaders of the group including French President Emmanuel Macron and Canadian Prime Minister Justin Trudeau. PM Modi was also seen having a tete-tete with French President Emmanuel Macron. "Friendship at the highest level: President @EmmanuelMacron and Prime Minister @narendramodi at a crucial #G7 summit for collective decisions on global challenges and world stability," the French ambassador to India Emmanuel Lenain tweeted.

On the second day of the summit in Elmau, the main focus of the G7 heads of state and government will be continued support for Ukraine. On Sunday the Chancellor welcomed the heads of state and government of the G7 to the summit under the German presidency. The economically strong democracies come together in Schloss Elmau for three days. "We are united by our view of the world. We are also united by our belief in democracy and the rule of law," said Chancellor Scholz at the beginning of the summit. That will play a major role in the deliberations.

In a first working session on Sunday, the heads of state and government of the G7 discussed global economic issues. All G7 countries are concerned about the crises that are currently to be overcome - falling growth rates in some countries, rising inflation, shortages of raw materials

and disruption to supply chains. These are no small challenges and it is therefore important to share responsibility, said Scholz. "The G7 is a good community to develop joint responses to the challenges of our time. It is important that we act decisively and also as a unit. Both belong together," said the Chancellor. PM Modi arrived in Munich on Sunday to attend the G7 summit. Besides the G7 event, PM Modi will hold bilateral meetings with leaders of some of the participating countries on the sidelines of the Summit. On Sunday, Prime Minister Modi addressed and interacted with the Indian community in Germany at the Audi Dome, Munich. Thousands of members of the vibrant Indian community in Germany participated in the event.

http://www.indiandefensenews.in/2022/06/pm-modi-holds-talks-during-g7-summit.html?m=1

Tue, 28 Jun 2022

PM Modi Meets Biden, Macron and Trudeau at G7 Summit in Germany

PM Modi arrived at the G7 summit, where he was welcomed by German chancellor Olaf Scholz. The Group of Seven (G7) rich democracies will commit to a new package of coordinated actions meant to raise pressure on Russia over its war in Ukraine, and will finalise plans for a price cap on Russian oil, a senior US official said on Monday. On Sunday, PM Modi held a productive meeting with Argentinian President Alberto Fernandez here on the sidelines of the G7 summit and reviewed the full range of bilateral ties. This was the first bilateral meeting between the two leaders. During the meeting, the two leaders discussed various issues like trade and investment, defence cooperation, agriculture, climate action and food security.“Reviewed the full range of the India-Argentina friendship during the very productive meeting with President @alferdez in Munich. Stronger cooperation between our nations will greatly benefit our people,” PM Modi tweeted. Reviewed the full range of the India-Argentina friendship during the very productive meeting with President @alferdez in Munich. Stronger cooperation between our nations will greatly benefit our people.

PM Modi In G7 Summit

PM Modi is on a two-day visit to Germany to attend the G7 summit on June 26 and 27. "I will be exchanging views with the G7 countries, G7 partner countries and guest international organisations on topical issues such as the environment, energy, climate, food security, health, counter-terrorism, gender equality and democracy. I look forward to meeting leaders of some of the participating G7 and guest countries on the sidelines of the summit," the Prime Minister had said in an official statement. As per a release by the MEA, PM Modi will also hold bilateral meetings with leaders of some of the G7 countries on the sidelines of the summit.

The invitation to the G7 summit is in keeping with the tradition of close partnership between India and Germany. After attending the summit, the prime minister will be travelling to the United Arab Emirates (UAE) on June 28.

What Is The G7 Summit?

The G7 summit is an annual meeting of the seven countries which form the Group of Seven (G7). The discussion typically focuses on global security, economic, and climate concerns. This year, UK Prime Minister Boris Johnson, German Chancellor Olaf Scholz, Canadian Prime Minister Justin Trudeau, French President Emmanuel Macron, Italian Prime Minister Mario Draghi, Japanese Prime Minister Yoshihide Suga, and US President Joe Biden are taking part in this year's summit. India is participating in the summit as an observer.

http://www.indiandefensenews.in/2022/06/pm-modi-meets-biden-macron-and-trudeau.html?m=1

the pioneer

Tue, 28 Jun 2022

Seoul Urges China, Russia to Prevent North Korean Nuke Test

A top South Korean official said Monday that North Korea is increasingly targeting the South with its nuclear arms programme, and urged China and Russia to persuade the North not to conduct a widely expected nuclear test. Unification Minster Kwon Youngse's comments came after North Korean leader Kim Jong Un re-emphasised his nuclear ambitions in a key military meeting last week and approved unspecified new operational duties for front-line army units. Experts say North Korea could be planning to deploy battlefield nuclear weapons along its tense border with South Korea. During a prolonged stalemate in nuclear diplomacy, North Korea has spent much of the past three years expanding its arsenal of short-range solid-fuel missiles that are potentially capable of evading missile defences and striking targets throughout South Korea, including US bases there.

US and South Korean officials say that North Korea has all but finished preparations for its first nuclear test since September 2017, when it claimed to have detonated a thermonuclear warhead designed for intercontinental ballistic missiles. North Korea may use its next nuclear test to claim that it has acquired the ability to build small nuclear warheads that can be placed on short-range missiles or other new weapons systems it has demonstrated in recent months, analysts say. Kwon, who oversees South Korea's relations with North Korea, said at a news conference that the North is exploiting a favourable environment to push ahead with weapons development and overturn the regional status quo as the US-led West remains distracted over Russia's invasion of Ukraine. He said North Korea's nuclear ambitions pose a "very serious and fundamental threat" to South Korea and that Seoul is preparing stern countermeasures in response to a possible North Korean nuclear test. He didn't elaborate. "North Korea's transition in weapons development from long-range ballistic missiles to short-range ballistic missiles, from strategic nuclear weapons to tactical nuclear weapons, is obviously targeted toward South Korea," Kwon said. "It seems clear

that North Korea is simultaneously pursuing an ability to attack the United States and to attack South Korea," he said. Kwon said North Korea could go ahead with a nuclear test at "any time".

While the US government has vowed to pursue additional sanctions against North Korea if it conducts another nuclear test, the possibility of meaningful new punitive measures remains unclear because Russia's war in Ukraine has deepened divisions among permanent members of the UN Security Council. China and Russia have vetoed US-sponsored proposals that would have increased sanctions on North Korea over some of its recent ballistic missile tests. Kwon, who served as South Korea's ambassador to China from 2013 to 2015, expressed hope that Beijing and Moscow will react differently to a North Korean nuclear test since both have maintained public support for a denuclearised Korean Peninsula.

"If North Korea goes ahead with a nuclear test at a time when the global security situation is as instable as it is now, the country will face enormous criticism from international society, and the response will be more than just words," Kwon said. North Korea has conducted more ballistic tests in the first half of 2022 than it has in any previous entire year, firing around 30 missiles, including its first tests of ICBMs in nearly five years. Kim has punctuated the tests with repeated comments that North Korea would use nuclear weapons proactively if threatened or provoked, which experts say is an escalation in its nuclear doctrine. The US government has reaffirmed its commitment to defending allies South Korea and Japan with its full range of military capabilities, including nuclear, but there are concerns in Seoul that North Korea's ICBMs could make Washington hesitant in the event of another war on the Korean Peninsula.

Experts say North Korea's unusually heavy testing activity this year underscores Kim's intent to advance his arsenal as well as pressure the United States into accepting North Korea as a nuclear power, thereby strengthening its position in negotiating economic and security concessions. Talks have stalled since early 2019 because of disagreements over a relaxation of crippling US-led sanctions against North Korea in exchange for North Korean disarmament steps.

http://www.dailypioneer.com/2022/world/seoul-urges-china--russia-to-prevent-north-korean-nuke-test.html

The Indian EXPRESS

Tue, 28 Jun 2022

Explained: What is the Iskander-M missile system Russia has promised to arm Belarus with?

Russia has promised its ally Belarus delivery of nuclear- capable missiles in the coming months to take on an “aggressive” West. Russian President Vladimir Putin made the announcement as Belarusian leader Alexander Lukashenko arrived in Moscow. In a televised broadcast, Putin said:

"In the coming months, we will transfer to Belarus Iskander-M tactical missile systems, which can use ballistic or cruise missiles, in their conventional and nuclear versions."

What is the Iskander-M missile system, and what is Russia trying to achieve by offering them to Belarus?

What is the Iskander-M missile system?

Codenamed "SS-26 Stone" by NATO, Iskander-M is a term used by Russia to define both the transporter-erector launch system and the short-range ballistic missile (SRBM) it fires. The system can also fire ground-launched cruise missiles (GLCMs) – the SSC-7 and the SSC-8. The Iskander-M system has been exclusively used by the Russian military, whereas Iskander-E is the one meant for export. What is the missile's capability and range? The Iskander-M missile has a range of 500 km and it can carry a payload of up to 700 kg. It is capable of carrying both conventional and nuclear warheads. The conventional warheads can be equipped with include cluster bombs, electromagnetic pulse (EMP) warheads and bunker-buster munitions, according to US-based Missile Defence Advocacy Alliance (MDAA). The export variant, Iskander-E, has a range of 280 km with a reduced 480 kg payload. When was it inducted and first used in combat?

While the Iskander system was inducted by Russia in 2006, its development picked pace in the late 1980s after the "Oka" SRBM or the OTR-23 was banned under the Intermediate Nuclear Forces Treaty. The Oka was Russia's first attempt to replace the Soviet Scud missiles. Iskander was the second. Russia first used the Iskander in combat in Georgia in 2008. US-based think tank, the Center for Strategic and International Studies (CSIS), says that the Iskander missiles are designed to confuse missile defences by flying on a low trajectory and manoeuvring in flight to strike targets within 2 to 5 metres accuracy.

What does its proposed delivery to Belarus mean?

Russia has made the announcement at the time when the G-7 meets in Germany. It is also one more time that Putin has raised nuclear weapons as a sort of warning to the West against climbing the escalation ladder in the Ukraine war. In the past too, Russia has used the Iskander system to project power against Europe, more so because of its ability to be fitted with tactical nuclear warheads. In 2012, Moscow said that the weapon could be used to target Europe's missile defences. The Iskander system has already been deployed in Kaliningrad, a Russian exclave, from where it can be fired to target NATO forces in Poland, the Baltic States, and Sweden.

https://indianexpress.com/article/explained/explained-what-is-iskander-m-missile-system-russia-belarus-7992721/

THE ECONOMIC TIMES

Mon, 27 Jun 2022

NATO Allies to Boost High Readiness Forces to 300,000

NATO allies will boost high readiness forces to "well over 300,000" troops as they strengthen their defences in response to Russia's war on Ukraine, alliance chief Jens Stoltenberg said Monday. Leaders from the US-led military alliance will meet in Madrid this week for what Stoltenberg said would be a "transformative" summit as it grapples with the fallout of Moscow's

invasion of its pro-Western neighbour. Stoltenberg said allies would bolster some of their battle group deployments along NATO's eastern flank "up to brigade level" -- tactical units of several thousand troops -- and ratchet up high readiness numbers to "well over 300,000".

In addition, more heavy weaponry, including air defence systems, would be shifted forwards and forces pre-assigned to defend specific NATO members on the alliance's exposed eastern edge. "This constitutes the biggest overhaul of our collective defence and deterrence since the Cold War," Stoltenberg said. Stoltenberg did not give further details of the additional high readiness forces or how they could be deployed by the alliance. NATO currently has a high readiness force of around 40,000 troops under its command. The more than 300,000 troops are expected to form a larger pool that the alliance could tap into in the case of an emergency. Stoltenberg also said that leaders would agree to bolster NATO's essential support to embattled Ukraine, whose President Volodymyr Zelensky is set to call in via video link. That package would include "substantial deliveries" of gear like secure communications, anti-drone systems and fuel, and help Ukraine over the longer term to pivot to using more advanced NATO-standard arms. That support is separate from weaponry that NATO members -- spearheaded by the United States -- are already funnelling to Ukraine, including anti-tank rockets, artillery and air defence to help it hold back Russia's onslaught.

https://economictimes.indiatimes.com/news/international/world-news/nato-allies-to-boost-high-readiness-forces-to-300000/articleshow/92495745.cms

Science & Technology News

IDN INDIAN DEFENCE NEWS
Global Defence, Aerospace & Security

Tue, 28 Jun 2022

ISRO's Optical Imaging System Technology Transferred to Paras Defence and Space

The draft of the agreement has been handed over by NSIL to Paras. The New Space India Limited (NSIL) on June 27 signed a letter of intent with Paras Defence and Space Technologies Limited for handing over the 'Optical Imaging System' technology that was developed by the Indian Space Research Organisation (ISRO). The technology will be transferred by way of Technology Transfer Agreement for the development, manufacturing, and sale of Optical Imaging System in India and abroad. The draft of the agreement has been handed over by NSIL to Paras. The company said in a press release that it will inform its stakeholders about the execution of the agreement, upon finalisation of the commercials. In an interview, Director - Technical & R&D, Paras Defence and Space Technologies Ltd, Amit Mahajan said that he sees huge potential in the optics and electronics segment. "Around 40-50 percent revenue growth expected in FY23. India has the potential to become a defence export hub," he added.

http://www.indiandefensenews.in/2022/06/isros-optical-imaging-system-technology.html?m=1

Mon, 27 Jun 2022

MIT Engineers Boost Signals from Fluorescent Sensors – Offering Unique Glimpse Inside Living Cells

Engineering advance allows particles to be placed deeper within biological tissue, which could aid with cancer diagnosis or monitoring. Fluorescent sensors, which can be used to label and image a wide variety of molecules, provide a unique glimpse inside living cells. However, they typically can only be used in cells grown in a lab dish or in tissues close to the body's surface, since their signal is lost when they are implanted too deeply.

MIT engineers have now devised a solution to overcome that limitation. Using a novel photonic technique they invented for exciting any fluorescent sensor, they were able to significantly improve the fluorescent signal. With this approach, the scientists showed they could implant sensors as deep as 5.5 centimeters (2.2 inches) in tissue and still get a strong signal. According to the researchers, this type of technology might allow fluorescent sensors to be used to track specific molecules inside the brain or other tissues deep within the body, for medical diagnosis or monitoring drug effects. "If you have a fluorescent sensor that can probe biochemical information in cell culture, or in thin tissue layers, this technology allows you to translate all of those fluorescent dyes and probes into thick tissue," says Volodymyr Koman, an MIT research scientist and one of the lead authors of the new study. Naveed Bakh SM '15, PhD '20 is also a lead author of the paper, which was published on May 30, 2022, in *Nature Nanotechnology*. Michael Strano, the Carbon P. Dubbs Professor of Chemical Engineering at MIT, is the senior author of the study.

Enhanced fluorescence

Scientists use many different kinds of fluorescent sensors, including quantum dots, carbon nanotubes, and fluorescent proteins, to label molecules inside cells. These sensors' fluorescence can be seen by shining laser light on them. However, this doesn't work in thick, dense tissue, or deep within tissue, because tissue itself also emits some fluorescent light. This light, called autofluorescence, drowns out the signal coming from the sensor. "All tissues autofluoresce, and this becomes a limiting factor," Koman says. "As the signal from the sensor becomes weaker and weaker, it becomes overtaken by the tissue autofluorescence."

To overcome this limitation, the MIT team came up with a way to modulate the frequency of the fluorescent light emitted by the sensor so that it can be more easily distinguished from the tissue autofluorescence. Their technique, which they call wavelength-induced frequency filtering (WIFF), uses three lasers to create a laser beam with an oscillating wavelength. When this oscillating beam is shined on the sensor, it causes the fluorescence emitted by the sensor to double its frequency. This allows the fluorescent signal to be easily picked out from the background autofluorescence. Using this system, the researchers were able to enhance the sensors' signal-to-noise ratio more than 50-fold. One possible application for this kind of sensing is to monitor the effectiveness of chemotherapy drugs. To demonstrate this potential, the researchers focused on glioblastoma, an aggressive type of brain cancer. Patients with this type

of cancer usually undergo surgery to remove as much of the tumor as possible, then receive the chemotherapy drug temozolomide (TMZ) to try to eliminate any remaining cancer cells. This drug can have serious side effects, and it doesn't work for all patients, so it would be helpful to have a way to easily monitor whether it's working or not, Strano says. "We are working on technology to make small sensors that could be implanted near the tumor itself, which can give an indication of how much drug is arriving at the tumor and whether it's being metabolized. You could place a sensor near the tumor and verify from outside the body the efficacy of the drug in the actual tumor environment," he says.

When temozolomide enters the body, it gets broken down into smaller compounds, including one known as AIC. The MIT team designed a sensor that could detect AIC, and showed that they could implant it as deep as 5.5 centimeters within an animal brain. They were able to read the signal from the sensor even through the animal's skull. Such sensors could also be designed to detect molecular signatures of tumor cell death, such as reaction oxygen species.

"Any wavelength"

In addition to detecting TMZ activity, the researchers demonstrated that they could use WIFF to enhance the signal from a variety of other sensors, including carbon-nanotube-based sensors that Strano's lab has previously developed to detect hydrogen peroxide, riboflavin, and ascorbic acid. "The technique works at any wavelength, and it can be used for any fluorescent sensor," Strano says. "Because you have so much more signal now, you can implant a sensor at depths into tissue that were not possible before."For this study, the researchers used three lasers together to create the oscillating laser beam, but in future work, they hope to use a tunable laser to create the signal and improve the technique even further. This should become more feasible as the price of tunable lasers decreases and they become faster, the researchers say.

To help make fluorescent sensors easier to use in human patients, the researchers are working on sensors that are biologically resorbable, so they would not need to be surgically removed.

Reference: "A wavelength-induced frequency filtering method for fluorescent nanosensors in vivo" by Volodymyr B. Koman, Naveed A. Bakh, Xiaojia Jin, Freddy T. Nguyen, Manki Son, Daichi Kozawa, Michael A. Lee, Gili Bisker, Juyao Dong and Michael S. Strano, 30 May 2022, *Nature Nanotechnology*. DOI: 10.1038/s41565-022-01136-x

https://scitechdaily.com/mit-engineers-boost-signals-from-fluorescent-sensors-offering-unique-glimpse-inside-living-cells/amp/

Mon, 27 Jun 2022

In Non-Volatile Memory Technologies, 2D Materials May Drive a Major Leap Forward

Non-volatile memories—which are able to retain information even when power is removed—are largely employed in computers, tablets, pen drives and many other electronic devices. Among the various existing technologies, magnetoresistive random-access memories (MRAM), currently used only in specific applications, are expected to expand considerably on the market in the

decade to come. The newest MRAMs based on spintronic mechanisms—i.e., phenomena related to the spin, which is an intrinsic property of electrons and other particles—can offer faster operations, lower power consumption and long retention time, with potential applications in wearable devices, automotive industry, and the Internet of Things, among others. In this context, graphene and other 2D materials, which are as thin as one or very few atomic layers, may play a disruptive role. In fact, their peculiar and remarkable characteristics can provide solutions to current technological challenges and performance limitations that prevent further efficient deployment of MRAMs; therefore, they can have a strong impact on the design of next-generation spintronic devices. The expected enhancement and new opportunities that can arise from the introduction of 2D materials into spin-based memory technologies are presented in a perspective article, published last week in *Nature*. This work, led by the Catalan Institute of Nanoscience and Nanotechnology (ICN2) at the Universitat Autònoma de Barcelona (UAB) campus, and the National University of Singapore, provides an overview of the state of the art of the field and of the current challenges being faced in the development of non-volatile memories in general, and specifically, of those employing spintronic mechanisms such as spin-transfer torque (STT) and spin-orbit torque (SOT).

The authors discuss the advantages that the co-integration of 2D materials in these technologies introduces, giving a panoramic of the improvements already achieved as well as a prospect of the many advances that further research can produce. A possible timeline of progress during the next decade is also traced. "As thoroughly discussed in the paper," comments ICREA professor Stephan Roche, group leader at the ICN2 and leader of the Graphene Flagship Work Package dedicated to Spintronics, "the fundamental properties of 2D materials such as atomically smooth interfaces, reduced material intermixing, crystal symmetries, and proximity effects are the drivers for possible disruptive improvements for spin-based MRAMs. These are emerging as key enabling low-power technologies and are expected to spread over large markets from embedded memories to the Internet of Things." This research was coordinated by ICN2 group leaders and ICREA professors Prof. Stephan Roche and Prof. Sergio O. Valenzuela, and by Prof. Hyunsoo Yang from the National University of Singapore. It was carried out by a collaboration of various members of the Graphene Flagship project consortium, including various institutes of the Centre national de la recherche scientifique (CNRS, France), Imec (Belgium), Thales Research and Technology (France), and the French Atomic Energy Commission (CEA), as well as key industries such as Samsung Electronics (South Korea) and Global Foundries (Singapore), which bring the vision of future market integration. "It is impressive to observe the scientific results achieved by the spintronics work package and the technology activities carried out in the Imec environment, together with SMEs (Singulus Technologies, GRAPHENEA), which pave the way towards future impact on market applications," states Prof. Jari Kinaret, Director of the Graphene Flagship. "There are still challenges to be overcome to fully deploy the potential of 2D materials in real-life applications, but the expected industrial and economic benefits are very high." "Funding efforts made by the European Commission to support the Graphene Flagship activities could position Europe at the lead of innovation spintronic technologies in a decade timescale," adds Prof. Andrea Ferrari, Science and Technology Officer of the Graphene Flagship.

More information: Hyunsoo Yang et al, Two-dimensional materials prospects for non-volatile spintronic memories, *Nature* (2022*). DOI: 10.1038/s41586-022-04768-0*

https://phys.org/news/2022-06-non-volatile-memory-technologies-2d-materials.html

PHYS.ORG

Mon, 27 Jun 2022

Long-Term Liquid Water also on Non-Earth-Like Planets?

Life on Earth began in the oceans. In the search for life on other planets, the potential for liquid water is therefore a key ingredient. To find it, scientists have traditionally looked for planets similar to our own. Yet, long-term liquid water does not necessarily have to occur under similar circumstances as on Earth. Researchers of the University of Bern and the University of Zurich, who are members of the National Centre of Competence in Research (NCCR) PlanetS, report in a study published in the journal *Nature Astronomy*, that favorable conditions might even occur for billions of years on planets that barely resemble our home planet at all. Primordial greenhouses "One of the reasons that water can be liquid on Earth is its atmosphere," study co-author Ravit Helled, Professor of Theoretical Astrophysics at the University of Zurich and a member of the NCCR PlanetS explains. "With its natural greenhouse effect, it traps just the right amount of heat to create the right conditions for oceans, rivers and rain," says the researcher.

Earth's atmosphere used to be very different in its ancient history, however. "When the planet first formed out of cosmic gas and dust, it collected an atmosphere consisting mostly of Hydrogen and Helium—a so-called primordial atmosphere," Helled points out. Over the course of its development, however, Earth lost this primordial atmosphere. Other, more massive planets can collect much larger primordial atmospheres, which they can keep indefinitely in some cases. "Such massive primordial atmospheres can also induce a greenhouse effect—much like Earth's atmosphere today. We therefore wanted to find out if these atmospheres can help to create the necessary conditions for liquid water," Helled says.

Liquid water for billions of years

To do so, the team thoroughly modeled countless planets and simulated their development over billions of years. They accounted not only for properties of the planets' atmospheres but also the intensity of the radiation of their respective stars as well as the planets' internal heat radiating outward. While on Earth, this geothermal heat plays only a minor role for the conditions on the surface, it can contribute more significantly on planets with massive primordial atmospheres.

"What we found is that in many cases, primordial atmospheres were lost due to intense radiation from stars, especially on planets that are close to their star. But in the cases where the atmospheres remain, the right conditions for liquid water can occur," reports Marit Mol Lous, Ph.D. student and lead author of the study. According to the researcher at the University of Bern and the University of Zurich, "in cases where sufficient geothermal heat reaches the surface, radiation from a star like the sun is not even necessary so that conditions prevail at the surface that allow the existence of liquid water." "Perhaps most importantly, our results show that these conditions can persist for very long periods of time—up to tens of billions of years," points out the researcher, who is also a member of the NCCR PlanetS. Broadening the horizon for the search for extraterrestrial life

"To many, this may come as a surprise. Astronomers typically expect liquid water to occur in regions around stars that receive just the right amount of radiation: not too much, so that the water does not evaporate, and not too little, so that it does not all freeze," study co-author

Christoph Mordasini, Professor of Theoretical Astrophysics at the University of Bern and member of the NCCR PlanetS explains. "Since the availability of liquid water is a likely prerequisite for life, and life probably took many millions of years to emerge on Earth, this could greatly expand the horizon for the search for alien lifeforms. Based on our results, it could even emerge on so-called free-floating planets, that do not orbit around a star," Mordasini says.

Yet the researcher remains cautious: "While our results are exciting, they should be considered with a grain of salt. For such planets to have liquid water for a long time, they have to have the right amount of atmosphere. We do not know how common that is." "And even under the right conditions, it is unclear how likely it is for life to emerge in such an exotic potential habitat. That is a question for astrobiologists. Still, with our work we showed that our Earth-centered idea of a life-friendly planet might be too narrow," Mordasini concludes.

More information: Marit Mol Lous, Potential long-term habitable conditions on planets with primordial H–He atmospheres, *Nature Astronomy* (2022). DOI: 10.1038/s41550-022-01699-8. www.nature.com/articles/s41550-022-01699-8

https://phys.org/news/2022-06-long-term-liquid-non-earth-like-planets.html