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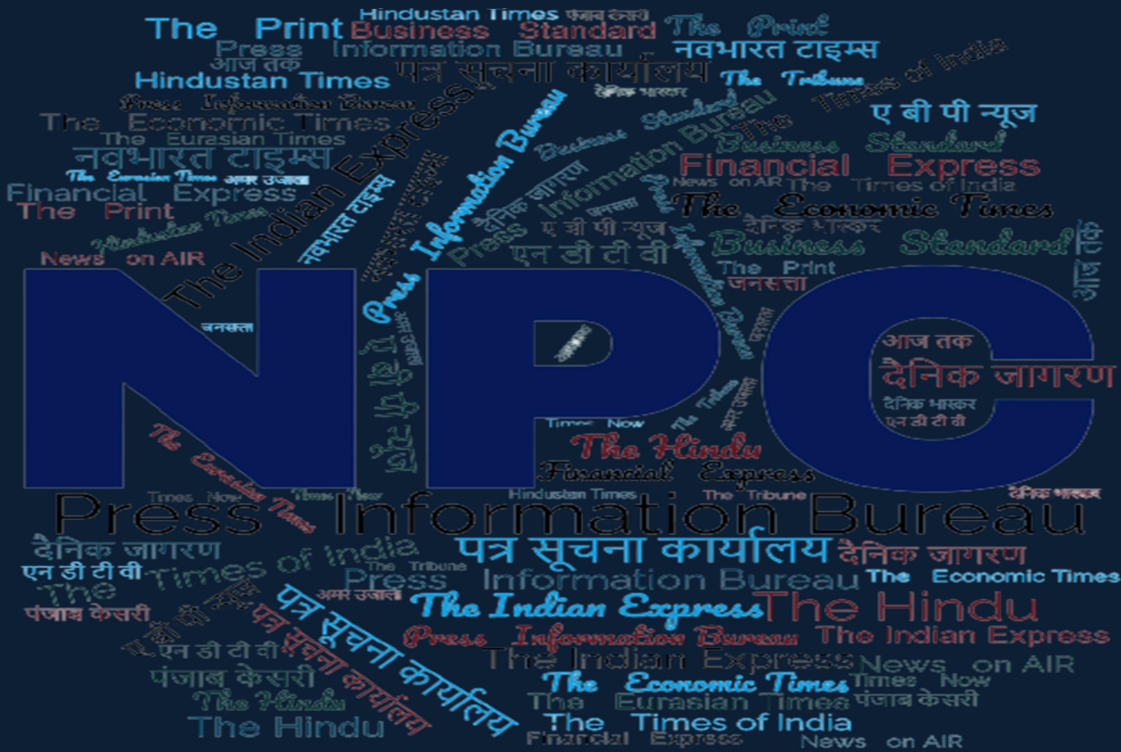
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समाचार पत्रों से चयित अंश Newspapers Clippings

डीआरडीओ समुदाय को डीआरडीओ प्रौद्योगिकियों, रक्षा प्रौद्योगिकियों, रक्षा नीतियों, अंतर्राष्ट्रीय संबंधों और विज्ञान एवं प्रौद्योगिकी की नूतन जानकारी से अवगत कराने हेतु दैनिक सेवा

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DRDO News

DRDO Technology News



Tue, 03 Jan 2023

राष्ट्र की सुरक्षा के लिए जरूरी अत्याधुनिक प्रौद्योगिकियों का होगा विकास

भारतीय प्रौद्योगिकी संस्थान मद्रास (आइआईटी मद्रास) रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) के साथ मिल कर रक्षा प्रौद्योगिकियों के लिए समर्पित एक अनुसंधान केंद्र का संचालन कर रहा है जो राष्ट्र की रक्षा और सुरक्षा के लिए जरूरी अत्याधुनिक प्रौद्योगिकियों का विकास करेगा।

इस केंद्र का आरंभ डीआरडीओ ने किया हालांकि अब आइआईटी मद्रास ने इसका अधिग्रहण कर लिया है और इसे 'सेंटर ऑफ एक्सीलेंस' का दर्जा दे दिया है। यह परस्पर संबद्ध विषयों का अनुसंधान समूह है जो ट्रांसलेशनल शोध संबंधी अनुसंधान के लिए विभिन्न विभागों के शिक्षकों और शोधकर्ताओं को एकजुट करता है।

केंद्र का नाम 'डीआरडीओ इंडस्ट्री एकेडेमिया- रामानुजन सेंटर ऑफ एक्सीलेंस (डीआईए-आरसीओई) है। इसकी स्थापना रक्षा और सुरक्षा के लिए जरूरी अत्याधुनिक तकनीकों को लक्षित अनुसंधान में प्रत्यक्ष शोध और अत्याधुनिक तकनीक विकसित करने वाले एक विश्व स्तरीय अनुसंधान केंद्र बनाने के लिए की गई है। यह रक्षा क्षेत्र में आत्मनिर्भर भारत बनाने में भी एक बड़ा योगदान देगा।

डीआरडीओ इंडस्ट्री एकेडेमिया- रामानुजन सीओई के दूरदर्शी परिणामों के बारे में आइआईटी मद्रास के निदेशक प्रो. वी. कामकोटि ने कहा शिक्षा, उद्योग जगत और डीआरडीओ को इस तरह एकजुट करना और इस माध्यम से देश की अहम जरूरतों के लिए आत्मनिर्भरता की प्रौद्योगिकियां विकसित करना एक बड़ी उपलब्धि होगी। खास कर स्टार्ट-अप और एमएसएमई के

लिए राष्ट्र निर्माण के अहम कार्य में भाग लेने का यह पहला अवसर होगा। भारत सरकार के रक्षा मंत्रालय की 'दीर्घकालिक निर्देशित अनुसंधान नीति' के अनुसार यह केंद्र निम्नलिखित अनुसंधान क्षेत्रों में परस्पर संबद्ध विभिन्न विषयों के अंतर्गत निर्देशित मौलिक और अनुप्रयुक्त अनुसंधान करेगा।

इन क्षेत्रों में होगा अनुसंधान

इलेक्ट्रॉनिक्स और कम्प्यूटेशनल सिस्टम,

नौसेना प्रणाली और नौसेना प्रौद्योगिकी

उन्नत लड़ाकू वाहन प्रौद्योगिकियां

हाई पावर सीडब्ल्यू लेजर सोर्स

नेक्स्ट-जेनरेशन संचार और नेटवर्किंग प्रौद्योगिकियां

अनुसंधान केंद्र के दूरदर्शी परिणामों के बारे में विस्तार से बताते हुए डॉ. ओ.आर. नंदगोपन, निदेशक, डीआरडीओ इंडस्ट्री एकेडेमिया - रामानुजन सेंटर ऑफ एक्सीलेंस (डीआईए-आरसीओई) ने कहा यह केंद्र फैकल्टी के सदस्यों और उद्योग जगत के अपने भागीदारों की क्षमता का आकलन करेगा और हमारे सशस्त्र बलों के लिए अत्याधुनिक प्रौद्योगिकियों और प्रणालियों का विकास करेगा। डीआईए-आरसीओई आईआईटी मद्रास के प्रोफेसरों और शोधकर्ताओं के ज्ञान भंडार का उपयोग कर मौलिक और अनुप्रयुक्त अनुसंधान की सुविधा प्रदान करेगा और देश के अन्य शैक्षणिक संस्थानों और प्रौद्योगिकी केंद्रों को भी इसमें शामिल करेगा।

<https://www.patrika.com/chennai-news/iit-madras-centre-of-excellence-working-with-drdo-on-advanced-defence-7957425/>



Tue, 03 Jan 2023

Boot Anti Mine Infantry: Special Boots for the Indian Army, all you Want to Know

The vast majority of anti-personnel mines across the globe are pressure mines, which are triggered to explode when the weight of a person is walking on top of them. Design and mathematics have established that the majority of the soldier's weight should be distributed across a large portion of the shoe's platform to avoid these mines. As a consequence of this, the pressure that is exerted per unit area drops to a level that is insufficient to trigger the bulk of the mines.

Despite the fact that many people around the world are striving for the total removal of anti-personnel mines, the number of mines still in existence has not decreased. In every armed conflict, thousands of anti-personnel mines are laid down, rendering not only military men but also civilians incapable of moving. The Treaty of Ottawa, which has been in effect for almost 30 years, did not actually have any effect on anything. Under these conditions, there is just one course of action left to take, and that is to protect oneself from a mine as much as is humanly possible. This is especially true for infantry, who are responsible for work that is performed on a daily basis that is unnoticed yet is detailed and necessary.

As an efficient foot protection system against anti-personnel mine blasts, the Boot Anti Mine Infantry (BAMI) for assault operations has been devised by the Defence Research and Development Organisation (DRDO). It has a lower mass, which makes it easier to walk without experiencing weariness. Because chrome-tanned leather has the ability to both retain heat in the winter and release moisture and heat in the summer, this product offers the additional benefit of shielding the wearer's foot from extremes of temperature.

An anti-personnel mine containing 35 grams of high explosive will produce a peak pressure of roughly 45,000 kg/cm² when it detonates. This pressure will be generated by the mine's explosion. If this level of pressure were to come into direct contact with the heel of a human, the bones in the leg would be completely shattered. The explosive overpressure is reduced by these Boot Anti Mine Infantry to a value that is less than 100 kg/cm², which is a safe pressure that will be conveyed to the heel of the wearer. These Boot Anti Mine Infantry can resist the blast of a 35-gram CE (composite explosive) pellet, which has a weight that is comparable to that of a human. And, tests related to this were done by an independent lab. The largest amount of overpressure that may be transferred from these boots is, on average, less than one hundred kilograms per square centimeter.

The upper of this BAMI is made of chrome-tanned leather, which shields the wearer's foot from the elements as well as the debris that can be generated by an anti-personnel mine explosion. There are two different kinds of configurations for the heel (rear) side of the Boot Anti Mine Infantry sole, and there are two different kinds of configurations for the ball (front) side of the sole. Both combinations are possible. Deflectors made of fibre reinforced polymer (FRP) have been included in the design of the ball sides. Because of the plastic deformation and delamination of the FRP deflectors, some of the total blast energy that is provided to these FRP deflectors in the form of kinetic energy will be lost, and some of the remaining energy will be redirected toward the ground.

Ceramic honeycomb material has been inserted in between these FRP deflectors so that it can function as a stress-absorbing material. This material is available in a wide variety of different shapes that are designed to be a direct match to the contours of the FRP deflectors. The ceramic honeycomb material inserts are subjected to a process that involves crushing and grinding, which causes a considerable amount of the available energy to be used. Because of this, the user's foot will receive transmission of a very minute amount of the energy released by the explosion of the anti-personnel mine. Consequently, the user will feel a slight feeling.

The ball (back) side configuration of the ball shape is made up of woollen felt and ceramic honeycomb material. This felt has a lighter overall weight and is more comfortable to wear because of it. The configurations on the ball side and the heel side of the foot have both been

incorporated into the polyurethane sole of the shoe. The polyurethane material on the sole of this shoe is not only flexible but also wear-resistant.

Obviously, all such footwear is “strengthened” to neutralise pressure mines. These shoes are unlikely to safeguard the wearer from directed anti-personnel mines, which are activated by the operator’s command or a blown fuse. In spite of this, anti-mine shoes have prevented serious injuries to a number of soldiers, indicating that, albeit not always, they accomplish their purpose. As for the future, robotic mine-clearing equipment is experiencing rapid improvement, and their use will increase as time passes.

For the Indian Army

These special boots are for the soldiers in Northern as well as Eastern Command – deployed on the Line of Control (LOC) and also along the Line of Actual Control (LAC) in eastern Ladakh as well as in Arunachal Pradesh.

<https://www.financialexpress.com/defence/boot-anti-mine-infantry-special-boots-for-the-indian-army-all-you-want-to-know/2935643/>



Tue, 03 Jan 2023

Empowering DRDO for Aatmanirbharta in Defence Technologies

By Dr W Selvamurthy

When India is celebrating Azadi ka Amrit Mahotsav, it can look back with pride on having achieved a considerable level of self-reliance in critical Defence Technology. During the last six decades of yeoman service to Nation Building, Defence Research and Development Organisation (DRDO) has evolved from a Defence Science Organisation, initially making small arms and ammunitions to now building complex systems including Missiles, Fighter Aircrafts, Radars, Sonars, Electronic warfare systems, CBRN Defence technologies and life support technologies.

It has been an arduous journey undertaking development of such complex weapon systems in the global environment of technology control regimes, restricting the flow of know-how and tacit knowledge to build complex weapon systems. The developed nations who are selling their arms to our country have always wanted India to be dependent on them as a largest weapon importer.

At the national level, domestic industries were comfortable doing their trade or at the maximum licensed production using technology transfer and were not focusing on investing in R&D as it has a long gestation for its return on investment (RoI). Academia was focusing more on blue sky research, most of the time having no relevance to Indian Defence Technology requirements.

This was the scenario in which DRDO began its journey towards building self-reliance capability in Defence. This organization was required to carry out activities right from conceptualization, design, development, test & evaluation, trials with users, documentation of engineering drawings

for manufacturing, quality control & assurance parameters formulation and ultimately transfer of technology to mostly PSUs or Ordnance factories for manufacturing.

With a limited number of human resources and financial input, DRDO has been able to deliver many complex systems both in the strategic sector as well as in the tactical sector. In the strategic sector, DRDO has developed and installed the credible second-strike capability from land, air, water and underwater, the nation being a responsible nuclear power with self moratorium of no-first-use. 30% of R&D endeavours in DRDO are silently dedicated to the Strategic Force Command requirement.

In the missile sector, technologies including materials, propulsion, control & guidance, navigation, weapon integration and separation and seeker technologies to increase accuracy of target attack were developed. With these complex technologies a family of missiles including long range, medium range, short range, surface to air, air to air missiles for operational requirement have been developed and inducted into the services. Today DRDO has given the country the capability of striking a target with a range of more than 5000 KM with 1.5 ton strategic payload. For the Akash missile alone the services have placed orders worth close to Rs. 40,000 crores.

India has been able to develop the fastest supersonic cruise missile today in the world as a joint venture with Russia. Interceptor missiles of DRDO have paved the way for Ballistic Missile Defence (BMD) for interception of adversary missiles both at exo-atmospheric and endo-atmospheric level. Anti-satellite Missile Shakti is certainly a deterrent technology demonstrator for protecting our space based assets.

Light Combat Aircraft (LCA) christened as Tejas, is a very advanced light weight manoeuvrable fighter aircraft of 4+ Generation with modern avionics, digital cockpit, fly-by-wire technology, integration of radars, sensors and weapons. A country that could not make a car of its own design till Tata Indica came could make its signature on the sky flying Tejas at supersonic speed.

The Airborne Early Warning & Control system (AEW&C) has been delivered to the Air Force for air defence. Though a gas turbine engine (Kaveri) originally developed for LCA could not be integrated with the aircraft due to increase in the weight of LCA as well as the desired thrust required to fly LCA could not be achieved on time, tacit knowledge to build fighter aircraft engine in the country is a major achievement. This will certainly help in making engines for Advanced Medium Combat Aircraft (AMCA) with partnership from a friendly country that may be willing to share this expertise.

Main Battle Tank (MBT) Arjun has already been inducted with the first order of 124 tanks from the Army and subsequent orders have also been received for an upgraded version. Besides Arjun, DRDO has delivered a family of combat vehicles including armoured amphibious vehicles, armoured ambulance, bridge layer tanks, NBC recce vehicles and advance infantry combat vehicle. A family of radars right from Indira PC radar have been developed and inducted by DRDO into the services and some of them have been exported to friendly countries. Rajendra phase array radar, central acquisition radar, battlefield surveillance radar and weapon locating radar and some other radars developed by DRDO have been inducted in the Armed forces.

In the electronic warfare (EW) sector, Samyukta for Army, Sangraha for Navy and aerial mounted EW system radars have also been inducted into tri services for operations. DRDO has

enabled the country to achieve self-reliance in underwater sensor technologies by developing a family of sonars including Humsa, Nagan, Panchendriya and others.

In the materials domain, some advanced materials including titanium sponge, Kanchan Armour, Mareech steel for Navy and Smart materials including shape memory alloy, nano-materials for defence etc. have also been developed. DRDO Developed and productionized special steel for ship building have been used in India's Aircraft carrier bringing self-reliance in this critical area.

A large number of NBC Defence technologies for early detection, personal and collective protection, decontamination and medical management developed by DRDO have been inducted in Army, Navy and Air Force in large volume and numbers. Recently more than 100 equipment useful for low intensity conflict operations have been procured by Central Armed Police Forces (CAPF) and value of these orders is more than Rs. 10,000 crores.

To keep soldiers fighting fit in extreme climatic and operational environment such as high altitude, cold, desert, underwater, aerospace and low intensity conflict (LIC) environment, DRDO has developed a wide spectrum of life support technologies for personnel selection, placement, nutrition, clothing, personal protective equipment, adaptation to environment, human factors for man-machine interface and military motivation.

Cumulative production value of DRDO inducted/ cleared by Defence Acquisition Council of the DRDO equipment has crossed over Rs 4 lakh crores. This wide canvas of Defence Systems and equipment have been developed by a limited number of scientific and technical staff with minimal financial resources.

DRDO has been able to maximise the output because of their strategies, dedication and active partnership with Armed Forces, industry and Academia with wholehearted support coming from political leadership right from Hon'ble Prime Minister Narendra Modi, Defence Minister Rajnath Singh and bureaucratic support being received from MoD, MoF and other stakeholders.

In addition, Secretary, Department of Defence R&D who is also Chairman, DRDO provide valuable support to Aeronautical Development Agency (ADA) for developing fighter aircrafts, helicopters and other aerial platforms; Advance Technology Vessel programme (ATVP) of Navy for building submarines and also Defence Institute of Advance Technology (DIAT) for capacity building for the services.

This empowerment of Chairman DRDO with the post of Secretary, Department of Defence (R&D) ensures proper coordination of ADA, ATVP and DIAT with all the DRDO labs for their R&D input into those strategic endeavours.

One person holding both these positions also enables quick decision making on executive and financial matters resulting in valuable outcomes. This is the rationale for all S&T departments including Department of Space, Department of Atomic Energy, CSIR, ICMR, ICAR, a scientist who has grown with that ecosystem and has complete understanding of the long term vision of the organization adequately and appropriately with administrative skills having been the Director of a Lab or DG of cluster of Labs is selected to occupy this combined position.

Recently an article was published by India Today dated December 13, 2022 which is titled "Why the Modi govt wants to lighten the DRDO chief's workload". The article says that – "The Government is considering relieving the DRDO chairman of additional responsibilities as

secretary (R&D) in the defence ministry to boost the premier defence research agency's efficiency through bifurcation of the post of DRDO chairman and Secretary-Research and Development in the Ministry of Defence (MoD) with an aim to achieving better efficiency and ease of functioning of the DRDO.

The author being a scientist, who has grown in this organization, served 40 years in DRDO during the prime early part of its growth and development vouches for the sanctity of the logic for both posts being held by one individual to steer the canvas of mission of our Prime Minister's Aatmanirbharta in Defence. As Chairman, DRDO only, the administrative and executive powers are limited, while the Secretary, DOD (R&D) to Govt of India has full empowerment of DRDO as well constituent bodies of DOD (R&D).

The two positions together has worked very well because technocrat who belong to DRDO understands the whole mechanics, ecosystem, people and programmes very well and this is the reason that one of DRDO scientists is always chosen for the position of both Chairman DRDO and Secretary, DOD (R&D). Bifurcating the post will bring dissonance in the existing well-coordinated system. To attribute delays and perceived poor performance of the organisation is not due to assumed overloading of Secretary and Chairman DRDO and the reasons are largely outside DRDO. The press reports regarding the separation of these posts are likely to lead to demotivation of the DRDO fraternity which I hope the Government will put to rest by taking appropriate decisions in this regard.

Self-reliance in Defence technology has to be a national mission with DRDO playing the pivotal role and ably supported by bureaucratic and administrative system and whole-hearted support of Armed Forces to use indigenously developed systems while the production agencies both in PSU as well as in Private sector according priorities for manufacturing of such home grown technologies for domestic use as well as for export.

Academia including IITs, NITs, Central, State and Private Universities should seed futuristic idea for India to assume leadership position in several niche areas; to mention a few: Quantum technologies, Artificial Intelligence, Machine Learning, Deep learning, Virtual reality.

The initiative of DRDO to launch M.Tech (Defence Technology) in the University system is yet another important initiative to develop human resource to meet the emerging demands for Make-in-India and Aatmanirbhar Bharat. Government of India initiative to have Defence corridors will certainly attract many more Indian industries and the foreign investors to augment their efforts to contribute to Aatmanirbhar Bharat and to the Mission of Prime Minister for building \$5 trillion economy. These achievements can also be projected to G-20 nations as India has the presidency position of this prestigious global organization just now.

<https://www.financialexpress.com/defence/empowering-drdo-fornbspaatmanirbhartanbspin-defence-technologies/2935230/>

Defence News

Defence Strategic : National/International



Press Information Bureau
Government of India

Ministry of Defence

Tue, 03 Jan 2023

Raksha Mantri Dedicates to the Nation 28 BRO Infrastructure Projects, Including Bridges & Roads, worth Rs 724 crore, in Seven Border States/UTs during an event in Arunachal Pradesh

Three VSAT-based telemedicine nodes in Ladakh & Mizoram also inaugurated

“These projects are testament to Government’s resolve towards border area development for enhanced defence preparedness & socio-economic progress”

India does not believe in war, but if forced we’re ready to fight: Shri Rajnath Singh

Raksha Mantri Shri Rajnath Singh dedicated to the nation 28 infrastructure projects of Border Roads Organisation (BRO), worth Rs 724 crore, during an event organised at Siyom Bridge on Along-Yinkiong Road in Arunachal Pradesh on January 03, 2023. The projects comprise 22 bridges, including Siyom bridge; three roads and three other projects in seven border States/Union Territories of Northern & North-Eastern regions. Eight of these projects are in Ladakh; five in Arunachal Pradesh; four in Jammu & Kashmir; three each in Sikkim, Punjab & Uttarakhand and two in Rajasthan. In addition, three telemedicine nodes - two in Ladakh & one in Mizoram – were inaugurated. The Raksha Mantri, in his address, described the projects as a testament to the concerted efforts of the Government and the BRO towards the development of border areas in order to enhance the operational preparedness of the Armed Forces and ensure socio-economic development of the far-flung regions. He asserted that it is the top priority of the Government, led by Prime Minister Shri Narendra Modi, to connect the border areas and ensure the development of its residents.

Shri Rajnath Singh emphasised that the aim is to build a strong and self-reliant ‘New India’ to effectively deal with future challenges which may arise due to the constantly-evolving global scenario. “The world is witnessing a number of conflicts today. India has always been against war. It is our policy. Recently, Prime Minister Shri Narendra Modi drew the world’s attention to that resolve when he said ‘this is not the era of war’. We do not believe in war, but if it is forced

upon us, we will fight. We are ensuring that the Nation is protected from all threats. Our Armed Forces are ready and it is heartening to see that the BRO is walking shoulder-to-shoulder with them,” he said. The Raksha Mantri further highlighted the crucial role played by the BRO in bolstering the country’s security through infrastructure development in border areas. “Recently, our forces effectively countered the adversary in the Northern sector and dealt with the situation with bravery & promptness. This was made possible due to adequate infrastructural development in the region. This motivates us even more for the progress of far-flung areas,” he said.

Terming infrastructure development as a game changer for the people residing in border areas, Shri Rajnath Singh lauded the BRO for ensuring socio-economic development in far-flung regions. He stressed that the government is paying special attention to the development of the North-Eastern region, which has strengthened the country’s security system. For the Organisation’s relentless efforts to support the Armed Forces and the local people, Shri Rajnath Singh coined a new phrase “BRO is the nation’s bro (brother)”. Quoting a famous phrase ‘It’s not the destination, it’s the journey’, he said the construction of road infrastructure in border areas is a journey for BRO and a strong and prosperous India should be its destination.

Speaking at the inaugural ceremony of Siyom Bridge in Arunachal Pradesh and 27 other projects built across India. <https://t.co/4o5gKNr1MY>

— Rajnath Singh (@rajnathsingh) January 3, 2023

The event at Along-Yinkiong Road witnessed the physical inauguration of the strategically-important Siyom Bridge, while the other projects were dedicated to the nation virtually. The Siyom Bridge is a state-of-the-art 100-meter long, Class 70 Steel Arch Superstructure Siyom Bridge over Siyom River in Arunachal Pradesh.

The three telemedicine nodes e-inaugurated by the Raksha Mantri will be connected with Service hospitals through VSAT (Very Small Aperture Terminal) satellite communications system. It will provide prompt medical intervention for medical & surgical emergencies through Telemedicine consultation with specialists at Service hospitals using SATCOM VSAT communication. This is one of the unique achievements for BRO in providing medical services to its personnel in remote border locations through use of space technology. The Raksha Mantri expressed hope that these nodes will prove to be helpful for the health-related needs of the local people.

With the inauguration of these 28 projects, which were completed in 2022, a total of 103 infrastructure projects of BRO were dedicated to the nation in the year at a total cost of Rs 2,897 crore. In October last year, 75 projects, worth Rs 2,173 crore, were inaugurated by the Raksha Mantri from Shyok village in Ladakh. In 2021, 102 such projects of the BRO were dedicated to the nation at a cost of Rs 2,229 crore. Shri Rajnath Singh commended the dedication and fast pace with which the BRO has carried out development works in the last few years despite challenging weather conditions at tough locations.

On the occasion, the Raksha Mantri also released a Compendium on New Technologies. It incorporates the latest technologies being adopted by the BRO in construction of roads, bridges, airfields and tunnel infrastructure to negate the effects of remote and hostile terrain with adverse weather condition, which unduly affects the quality of civil engineering works and meeting the completion timelines. Arunachal Pradesh Chief Minister Shri Pema Khandu, MP Arunachal East

Shri Tapir Gao, GOC-in-C Eastern Command Lieutenant General RP Kalita and GOC Spear Corps Lieutenant General RC Tiwari were among those who attended the event.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1888274>



Press Information Bureau
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Ministry of Defence

Tue, 03 Jan 2023

Agnipath is a Game Changer Scheme for the Armed Forces, Raksha Mantri Shri Rajnath Singh during MoU Exchange Ceremony ‘Outreach Programme with MoE & MoSDE’ in New Delhi

'Agniveers' are not only 'Surakshaveers' of Nation, but also 'Samriddhiveers' contributing to the Nation's prosperity: RM

RM calls upon other Ministries, State Governments and private sector to provide new opportunities to Agniveer

Agnipath is a game changer scheme for the Armed Forces which is going to act as force multiplier in making Indian military as one of the best in the world with youthful, high-tech and ultra-modern outlook. This was stated by Raksha Mantri Shri Rajnath Singh during his virtual address at the MoU Exchange Ceremony ‘Outreach Programme with Ministry of Education (MoE) & and Ministry of Skill Development and Entrepreneurship (MoSDE)’ in New Delhi on January 03, 2023. He elaborated on the paradigm shifting changes the Agnipath scheme is going to make in transforming the Armed Forces into a tech-savvy, well-equipped and combat ready unit to face future challenges.

During the event, Ministry of Defence (MoD), Ministry of Education (MoE), Ministry of Skill Development and Entrepreneurship (MoSDE) and all the three Services signed/exchanged MoUs/ Agreements with various stakeholders to facilitate continued education of Agniveers while serving in the Armed Forces and award of appropriate skill certificates in accordance with their expertise/experience. Under these MoUs with National Institute of Open School (NIOS) and Indira Gandhi National Open University (IGNOU), suitable 12th Class certificates and Bachelor’s degree will be awarded to the Agniveers respectively.

The Job Roles/Skill Sets of Agniveers, while being trained and deployed with the Armed Forces, have been mapped with National Occupational Standards (NOS), in coordination with National Skill Development Corporation (NSDC) and Sector Skill Councils (SSCs). Based on these qualifications, market-ready and industry-accepted, ‘Kaushal Praman Patra’ will be issued to Agniveers at the time of their exit from the Armed Forces.

To seamlessly facilitate the process, various departments of MoSDE have extensively collaborated in the Armed Forces and awarded Dual Category recognition as the Awarding Body

(AB) and Assessment Agency (AA) by the National Council of Vocational Education and Training (NCVET). In addition, Directorate General of Training (DGT) under MoSDE would also facilitate award of National Trade Certificate (NTC) to Agniveers.

Shri Rajnath Singh stated that with the signing of these MoUs, Agniveers will be able to complete their education in a timely manner and develop additional qualities and skills. When Agniveers return to the society after being equipped with all these qualities, they will contribute to nation building, he said.

The Raksha Mantri added that helping 'Agniveers' would be a win-win situation for all as they will not only become 'Surakshaveers' for the nation by rendering their services in the Armed Forces, but also become 'Samriddhiveers' by contributing to the nation's prosperity. They will be beneficial for the whole society contributing to the nation building through their education, skill, discipline and other qualities. In addition to it, they would inspire the youth to become Agniveer, he said.

Complimenting the Ministry of Defence, Ministry of Home Affairs, Ministry of Railways, state governments and the private sector for extending support to Agniveers in various services, the Raksha Mantri called upon the rest of the Ministries, State Governments and the corporate sector to come forward with more enthusiasm and provide new opportunities to the Agniveers as far as possible. He termed it as the responsibility of the system to provide newer opportunities to the Agniveers who dedicate their life in the service of the nation.”

In a video message, Education Minister Shri Dharmendra Pradhan said, this MoUs/Agreements would empower the serving Agniveers to get maximum benefit from their academic education and skill development. He added that NOS will help them to pass 10th and 12th exam, while enrolled Agniveer in university could complete 50% syllabus of general higher studies, the rest credit could be earned through skill development training provided by defense institutions. They could get bachelor degree from IGNOU and with two year completed with necessary credit they could get Agniveer diploma. These degree would help Agniveer to get employment and higher education at national and international level.

The Government had launched Agnipath scheme on June 15, 2022 to recruit both male and female aspirants into 'below the officer's rank' cadre of the three services for a period of four years as Agniveers. Candidates between the age group of 17.5 to 21 years are eligible to apply for the scheme. These Agniveers would undergo optimised basic military training and specialised trade training followed by up-skilling courses, as required.

The scheme provides a unique opportunity for transforming the Yuva Shakti into Agniveers and facilitates potential youth to realise their dream of serving the Nation through the Armed Forces. Exposure through Agnipath Scheme and fostered allegiance to Naam, Namak and Nishan, would shape Agniveers into Nation Builders.

There has been a whole of nation approach to empower the Agniveers with suitable Academic Qualifications & Skills, while serving in the Armed Forces, to help those Agniveers who wish to start a second career option outside, with other Governmental organisations, Industry or even as Startup Entrepreneurs.

The ceremony was attended by senior officials of Ministry of Defence, various ministries, including Chief of Defence Staff and also Chiefs of all three Services.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1888329>

Indian Army Plans to buy 300 Rough Terrain Vehicles for High Altitude

The Indian Army is planning to buy 300 indigenous logistics rough terrain vehicles that can be used for transportation of loads and evacuation of casualties in medium to high-altitude areas, officials familiar with the matter said on Tuesday. The army will invoke the fast-track procedure under emergency procurement to buy the highly-mobile, multi-configurable, wheeled vehicles, the officials said. The development comes amid the lingering standoff with the Chinese army along the Line of Actual Control (LAC) in the Ladakh sector and tensions spilling over into the eastern sector too.

In a request for proposal (RFP) seeking the participation of prospective bidders, the army on Tuesday said these vehicles should be helicopter transportable and be able to operate at an altitude of 16,000 feet. “Their ability to operate in snow-covered undulating terrain with long endurance makes them ideally suitable for last-mile delivery (LMD) tasks,” the RFP said.

The army plans to operate these vehicles in areas in temperatures ranging from minus 20 degrees to plus 45 degrees. An inbuilt cold engine start system is another key army requirement. Also, the engine power and operating range of these vehicles should not be less than 30 HP and 100 Km, respectively. These vehicles are expected to be deployed in Ladakh and the eastern sector too, the officials said.

The army is swiftly upgrading its capability along the border with China with a variety of weapons and systems including artillery guns, swarm drone systems that can carry out offensive missions in enemy territory, longer-range rockets, remotely piloted aerial systems and high-mobility protected vehicles, while also pursuing the development of light tanks for mountain warfare and futuristic infantry combat vehicles (FICVs).

The new logistics rough terrain vehicles should have a rollover protection system, and service life should be at least nine years or 80,000 km, the RFP said. It also details the product support, engineering support package, spares and training package for the operators. The vehicles have to be delivered within 12 months of the signing of the contract.

The army’s focus on building combat capability along the contested border with China is part of an overarching plan to steadily enhance its operational readiness to counter any challenge presented by the People’s Liberation Army (PLA). The border standoff between India and China erupted in May 2020. While the two sides have had partial success in disengaging rival soldiers from some friction areas on LAC in Ladakh, talks are still on to end the deadlock that has derailed the bilateral relationship. Disengagement of soldiers from all friction points is essential before de-escalation of the conflict can take place, and, finally, de-induction of troops and weapons. Corps commanders of the two armies held talks on the Chinese side of the Chushul-Moldo border meeting point on December 20, just 11 days after several Indian and Chinese soldiers were injured in a clash along LAC at Yangtse, located near Tawang in Arunachal

Pradesh. However, there was no indication of forward movement in addressing the border row in the Ladakh sector during the 17th round of military talks.

<https://www.hindustantimes.com/india-news/indian-army-plans-to-buy-300-rough-terrain-vehicles-for-high-altitude-101672757381774.html>



Tue, 03 Jan 2023

India Eyes Bangladesh as Market for Range of Military Hardware

India is eyeing Bangladesh as a market for a range of military hardware, from specialist vehicles to helicopters, and maintenance of Russian-origin equipment following the operationalisation of a \$500-million line of credit for defence purchases, people familiar with the matter said.

Among the items that Bangladesh has shown an interest in are specialist vehicles from Tata and Mahindra, Tejas combat aircraft and Dhruv light helicopter, the people said. Several vehicles were provided by the two Indian firms to the Bangladesh Army for testing over an extended period of time in different terrains and seasons, including during military exercises, the people added.

The two countries are also exploring the prospect of India's role in maintaining Russian-origin equipment, especially aircraft such as the Mi-17-1V helicopter, Antonov An-32 transport aircraft and MiG-29 jets. India also operates these aircraft and has long-established facilities for their maintenance. During recent visits to India, Bangladesh Air Force personnel visited facilities where such aircraft are maintained, the people said. Bangladesh Air Force chief, Air Chief Marshal Shaikh Abdul Hannan, toured facilities in Chandigarh and Mumbai during a visit to India in December 2021. Hannan also visited a helicopter unit in West Bengal during his latest visit to India last December. "Bangladesh has purchased protective gear such as bulletproof jackets and helmets. Now both sides are looking at big ticket items," one of the people cited above said.

While India offered the \$500-million line of credit for defence purchases to Bangladesh in 2019, it was finally operationalised in September 2022 with a contract for what was described at the time by foreign secretary Vinay Kwatra as a "modest amount". Briefing the media after a visit to India by Bangladesh Prime Minister Sheikh Hasina, Kwatra said this contract was "an important first step" that will open up the path for further engagement in defence.

During Hasina's visit, she and Prime Minister Narendra Modi expressed satisfaction at the "intensification" of defence ties and agreed on early finalisation of projects under the line of credit for defence, a joint statement said. India also "welcomed the finalisation of initial procurement plans for vehicles for the Bangladesh Armed Forces", the joint statement added.

These developments come at a time when India has sharpened its focus on getting a toehold in foreign markets, setting a target of defence exports of \$5 billion by 2025, and putting in place a raft of policy measures to boost indigenous defence manufacturing.

In November 2022, Indian defence firm Kalyani Strategic Systems Limited won an export order of \$155.5 million for supplying artillery guns to a friendly foreign country, the first order by a local company for the weapon system.

That order came on the back of the Philippines ordering BrahMos missiles and Armenia buying Pinaka multi-barrel rocket launchers from India. India has clocked defence exports of more than ₹30,000 crore since 2014 after the Modi government came to power.

India's efforts also come at a time when China has been seeking to increase its role as a supplier of defence equipment, ranging from combat aircraft to warships and radars. In this context, the people noted that India has been pressing Bangladesh to implement a memorandum of understanding (MoU) inked in 2019 for providing a coastal radar system for maritime security.

India's defence exports reached its highest level during 2021-22, hitting ₹13,000 crore and the private sector accounted for 70% of exports. Military hardware exported by India includes missiles, the Dhruv light helicopter, offshore patrol vessels, protective gear, surveillance systems and radars.

India has also imposed a phased import ban on 411 weapons and systems over the past two years to boost indigenous defence manufacturing. These weapons and platforms are to be indigenised over the next five to six years. "India has a good strategy and action plan in place, backed by forward-looking policies, to ensure self-reliance in defence, and boost the country's status as a net exporter of weapons in the coming years," military affairs expert Lt Gen (retd) Vinod Bhatia earlier said.

<https://www.hindustantimes.com/india-news/india-eyes-bangladesh-as-market-for-range-of-military-hardware-101672753197985.html>

BW BUSINESSWORLD

Tue, 03 Jan 2023

US & Canada to Invest Big in Defence, Aerospace and Healthcare in UP

Following several delegations of state ministers and seniors officials from UP to various countries, Uttar Pradesh is now witnessing investments from across the globe. Ahead of the Global Investors Summit scheduled for February 2023, the Uttar Pradesh government has signed MoUs worth Rs 19,265 crores with investors from US and Canada.

The most favoured sectors for investors from these countries were logistics, defence and aerospace, owing to the fact that UP is one of the two nodes of the Centre's flagship project Defence Corridor. According to official information, Mobility Infrastructure Group will be investing Rs 8200 crores in this sector within the state. At the same time, QSTC Inc company will also invest Rs 8200 crore in defence and aerospace.

Healthcare is another sector where a large-scale investment can be seen. MoUs totalling Rs 2055 crore were signed between the state government and health care sector companies. Under this, My Health Center and ZMQ Companies will invest Rs 2050 crores and Rs 5 crores respectively. On the other hand, Dezero Labs Inc company will invest Rs 10 crores in medical devices.

Apart from these, MoUs were also signed for investment in customer durables, hospitality and electronic manufacturing sectors. Akuwa Technology will invest Rs 100 crore in these sectors, Opulence Management Corp will invest Rs 500 crore in the hospitality sector, whereas Virtubox has signed an MoU for investment of Rs 200 crore in the electronic manufacturing sector.

The MoUs were signed recently in the presence of a delegation led by UP Assembly Speaker Satish Mahana and Animal Husbandry Minister Dharampal Singh. The delegation visited several cities in various countries, held about 51 Government to Government (G2G) and Business to Business (B2B) meetings in the span of three days, receiving 27 letters of intent worth more than Rs 41,000 crores, out of which eight proposals were converted into MoUs. Of these MoUs, 4 of strategic partnership were signed. The MoUs on the remaining 19 proposals is expected to be signed before GIS-23.

<https://www.businessworld.in/article/US-Canada-To-Invest-Big-In-Defence-Aerospace-And-Healthcare-In-UP-/03-01-2023-460295/>

Outlook

Tue, 03 Jan 2023

Meet Captain Shiva Chauhan, First Indian Army Woman Officer to be Posted at Siachen Glacier

Captain Shiva Chauhan has become the first Indian Army woman officer to be posted at a frontline post on the Siachen Glacier.

The Siachen Glacier is the world's highest battlefield where temperature drops to up to -50°C. Indian and Pakistani militaries faced off each other at Siachen in 1984 when India won control of key peaks under Operation Meghdoot. Chauhan is posted at Siachen's Kumar Post, located at an altitude of around 15,600 feet in Siachen. Hailing Chauhan's deployment, Defence Minister Rajnath Singh called it "an encouraging sign" and conveyed his best wishes to her.

Meet Indian Army's Captain Shiva Chauhan

Captain Shiva Chauhan is the first woman officer of the Indian Army to be posted at the Siachen Glacier. She is from Rajasthan.

Chauhan belongs to the Indian Army's Corps of Engineers. The Corps is composed of three groups — Bombay Sappers, Bengal Sappers, Madras Sappers. Chauhan belongs to the Bengal Sappers, formally called the Bengal Engineering Group (BEG). Chauhan did her schooling from Rajasthan's Udaipur. She holds a bachelor's degree in civil engineering from NJR Institute of Technology, Udaipur. Chauhan lost her father at a young age of 11 years and her mother took care of her studies. From her childhood, Chauhan was motivated to join the Indian armed forces and showcased unparalleled zeal during training at Officers Training Academy (OTA), Chennai and was commissioned into the Engineer Regiment in May 2021, reported PTI.

Significance of Chauhan's deployment

Captain Shiva Chauhan's deployment at the Siachen is first such operational deployment of a woman officer. Chauhan was posted at the Kumar Post on Monday for a three-month stint after

she underwent rigorous training, said Indian Army officials to PTI. The Siachen glacier at the height of around 20,000 feet in the Karakoram range is known as the highest militarised zone in the world where the soldiers have to battle frostbite and high winds. “It was a proud moment for Indian Army when Captain Shiva Chouhan became the first woman officer to get operationally deployed at the world's highest battlefield, Siachen, after a month's arduous training at Siachen Battle School along with other personnel," said the Indian Army in a statement.

Chauhan was put through rigorous training at the Siachen Battle School where she trained alongside the officers and soldiers of the Indian Army, officials said, adding that the training included endurance training, ice wall climbing, avalanche and crevasse rescue and survival drills.

“In spite of various challenges, Captain Shiva with unflinching commitment successfully completed the training and was all set to be inducted to the Siachen Glacier,” said an official. The Indian Army said the team of Sappers led by Chouhan will be responsible for numerous combat engineering tasks and will be deployed at the post for a duration of three months.

In a tweet, Indian Army's 14 Corps said, “Breaking the Glass Ceiling. Captain Shiva Chauhan of Fire and Fury Sappers became the first woman officer to be operationally deployed in Kumar Post, post completion of arduous training, at the highest battlefield of the world Siachen.”

Sharing the tweet, Defence Minister Rajnath Singh said, “Excellent news! I am extremely happy to see more women joining the armed forces and take every challenge in stride. It is an encouraging sign. My best wishes to Captain Shiva Chauhan.”

What's Siachen Glacier, why it's significant?

Siachen Glacier is at northern-most of India-Pakistan boundary and is not covered in the demarcations of border. It's neither mentioned in Karachi Agreement of 1949 nor in the Shimla Agreement of 1972. Both India and Pakistan have their interpretations that say they should have rightful control of the Siachen Glacier. Today, thanks to Operation Meghdoot, India controls Siachen Glacier.

Brigadier (Retired) Mandip Singh noted in an article for think tank Manohar Parrikar Institute for Defence Studies and Analyses (MP-IDSA) that controlling Saltoro Ridge is critical for securing Kashmir and Ladakh regions. He noted, “Firstly, the Saltoro Ridge overlooks the area of Gilgit-Baltistan of Pakistan Occupied Kashmir (POK) that is under dispute with Pakistan. Secondly, it guards the routes leading to Leh, the principal town and capital of Ladakh. Thirdly, it overlooks and dominates the Shaksgam Valley, which was illegally ceded to China by Pakistan. Fourthly, it is close to the Karakoram Pass through which the Karakoram Highway passes connecting Gilgit-Baltistan to Xinjiang Province of China.”

Of Operation Meghdoot, a government document notes, “Executed in the morning of 13 April 1984 in the highest battlefield in the world, Meghdoot was the first military offensive of its kind. The operation preempted Pakistan's impending Operation Ababeel (which was intended to achieve the same objective as Meghdoot) and was a success, resulting in Indian forces gaining control of the Siachen Glacier in its entirety.”

<https://www.outlookindia.com/national/meet-captain-shiva-chauhan-first-indian-army-woman-officer-to-be-posted-at-siachen-glacier-news-250624>

Series of Surprises Awaits India's Defence Sector in 2023

By Sangeet Kumar Sanu

After the busy and bustling year in 2022, expectations will be super high for this year to fill in the arena of India's military hardware and equipment. India will add some lethal inventories like upgraded AK-203 assault rifles, light tanks to fight at higher altitudes and others to its military forces. The year 2023 is all set to witness a series of surprises in the field of self-reliance or Aatmanirbhar Bharat in defence.

Here are the six very significant items that will arrive this year

First AK-203 rifles

The first Indian AK-203 rifle will be another very significant milestone in 2023. Kalashnikov AK-203 assault rifle will be produced and delivered under the made-in-India programme in Amethi, Uttar Pradesh. Lieutenant Colonel JS Sodhi (Retd) said that the Indian army wants this particular weapon, a pretty worthy successor of the old AK-47 to become a standard assault rifle infantry weapon for the infantry units of the army. One of the special things about this weapon is that it has a special capability barrel. It has retrospective compatibility with many of the systems including the magazines and ammunition of the old AK-47. India's Rashtriya rifle units and infantry regiments are one of the largest users of the Kalashnikov series of rifles, he added. The weapon is a part of a programme to produce over six lakh rifles for the army's infantry regiment. Production machinery and kits have arrived at the Indian facility with top Russian officials saying that manufacture will commence very shortly.

First Zorawar light tank

The Zorawar light tank is a small but extremely important entrant into the Indian Army in 2023. It will be the first indigenous light tank under the project 'Zorawar' by the Defence Research and Development Organisation (DRDO) in collaboration with private sector giant L&T.

The defence ministry recently cleared the procurement of 354 of these tanks being explicitly built in response to an Indian Army requirement in Ladakh when the standoff is going on with China. The People's Liberation Army's (PLA) deployment of more agile light tanks like the ZTZ-4A in the Depsang plains and south Pangong Tso sector had triggered an urgent push at the Indian Army headquarters to look towards lighter, more urgent tanks than the workhorse T-90 Bhisma tanks that India has deployed at those heights. Unlike heavy Main Battle Tanks, light tanks like 'Zorawar' and Chinese counterparts are nimble, can climb higher, can perform better in rougher terrain and are far easier to maintain because these are purpose-built for high altitudes and cold temperatures.

First C-295 for Indian air force

Indian Air Force (IAF) will finally get a moment to exhale with the first C-295 transport aircraft to be delivered around September 2023. As part of a deal for 56 of these aircraft signed by the Indian government, the first 16 will be manufactured and supplied from an Airbus production

facility in Spain, while the remaining 40 will be manufactured at a Tata-Airbus joint venture facility in Vadodara.

Given India's excruciatingly long-winded weapons procurement process, the delivery of aircraft will be of huge significance. The journey towards the C-295 deal had been stalled for years, but took a major political push to see through given the Indian Air Force has been eager to induct new generation transport aircraft to feed its growing logistics requirements. By the time the first foreign-built, C-295 orders on the Indian joint venture facility could swell beyond 40 to accommodate requirements from the Indian coast guard and possibly other agencies as well.

Second Arihant class submarine

With understandable stealth, India's second Arihant class nuclear ballistic missile submarine is expected to enter service with the Strategic Forces Command in 2023.

The improved second Arihant class submarine has remained typically in the dark since its reported launch in 2017. It has been referred to by various names, including Arighar and Aridhaman. Like Arihant, which has been on nuclear patrol since it entered service in 2016.

The new submarine is a ballistic missile submarine or Boomer because it carries nuclear-tipped missiles and forms the third leg of a triad of air, land and sea-based nuclear weapon-carrying platforms, enunciated in India's draft nuclear doctrine after the May 1998 Pokharan two nuclear test. These submarines are part of the Advanced Technology Vessel project India's costliest defence project.

The programme to build four nuclear-powered ballistic missile-carrying submarines is quite simply India's largest defence programme estimated at 90,000 crore rupees. Each of these submarines costs upwards of 4000 crore rupees. By the end of this year, India will have two nuclear-powered ballistic missile submarines with the likely operationalisation of longer-range nuclear delivery missile systems as well.

Third squadron of S-400 air defence systems

The S-400 missiles squadron will be the third squadron of India's air defence systems from Russia. Despite its ongoing conflict with Ukraine, the Russian Government is working towards supplying the third batch of it to India between January and February 2023.

The Indian inspection teams were in Russia recently along with the Indian Air Force personnel who visited the production facility there. India's first two S-400 squadrons have already been operationalised in the northern and eastern sectors respectively. China and India now have their respective S400 air defence systems deployed along the line of actual control (LAC).

Last Scorpene Submarines

The year 2023 will also bring to an end the enormously important Scorpene submarine building programme with the final two submarines to be commissioned into the Indian Navy. The fifth submarine Vagir delivered to the Indian Navy in December will be commissioned in January, while the sixth and final submarine named Vagsheer will be delivered and commissioned a few months later.

<https://www.businessworld.in/article/Series-Of-Surprises-Awaits-India-s-Defence-Sector-In-2023/03-01-2023-460145/>

Tue, 03 Jan 2023

‘Could Use Harsher Words...’ S Jaishankar on Use of Phrase ‘epicentre of terrorism’ for Pakistan

External Affairs Minister S Jaishankar has said that he could have used “much harsher words than epicentre” for Pakistan for its role in promoting cross-border terrorism as he underlined that the world needs to be concerned about terrorism.

Jaishankar, who has often described Pakistan as the “epicentre of terrorism”, in an interview to Austria’s national broadcaster ORF on Monday also criticised European nations for not condemning the (terrorism) practices that have been going on for multiple decades.

“Because you are a diplomat, doesn’t mean you are untruthful. I could use much harsher words than epicentre. So believe me, considering what has been happening to us, I think epicentre is a very diplomatic word,” he said while responding to a question on using the word “epicentre of terrorism” for Pakistan. “This is a country which has attacked the Parliament of India some years ago, which attacked the city of Mumbai, which went after hotels and foreign tourists, which every day sends terrorists across the border...,” Jaishankar said, referring to Pakistan. If the terrorist camps operate in broad daylight in cities, with recruitment and financing, can you really tell me that the Pakistani state doesn’t know what’s going on? Especially if they’re being trained in military-level combat tactics?” Jaishankar said. “So, when we speak about judgments and principles, why don’t I hear sharp European condemnation of these practices which have been going on for multiple decades?” he asked in response to a question.

When asked if the world has to be concerned that someday there could be a war between India and Pakistan, the minister said, “I think the world needs to be concerned about terrorism.” “I think the world has to be concerned that there is terrorism going on and the world often looks away. The world often feels it’s not my problem because it’s happening to some other country. I think the world needs to be concerned about how sincerely and strongly it takes up the challenge of terrorists...,” he asserted.

On Monday, addressing a joint press conference with his Austrian counterpart Alexander Schallenberg here, Jaishankar said the effects of terrorism cannot be contained within a region, especially so when they are “deeply connected to narcotics and illegal weapons trade and other forms of international crimes”. “Since the epicentre (of terrorism) is located so close to India, naturally our experiences and insights are useful to others,” the minister had said, without naming any country.

India has repeatedly said it desires normal neighbourly relations with Pakistan in an environment free of terror, hostility and violence. India has said the onus is on Pakistan to create an environment free of terror and hostility.

India has also told Pakistan that “talks and terror” cannot go together and has asked Islamabad to take demonstrable steps against terror groups responsible for launching various attacks on India. Jaishankar is in Austria on the second leg of his two-nation tour. This is the first EAM-

level visit from India to Austria in the last 27 years, and it takes place against the backdrop of 75 years of diplomatic relations between the two countries in 2023.

<https://www.financialexpress.com/defence/could-use-harsher-words-jaishankar-on-use-of-phrase-epicentre-of-terrorism-for-pakistan/2935413/>

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Japan's New Security Strategy to Counter China is a Lesson for India

By Rajesh Rajagopalan

The security competition in Asia continues to intensify. Japan has recently announced a dramatic turnaround in its traditional security policy with a new security and defence strategy document and promises to junk its old policy of keeping its military budget below one per cent of GDP. Tokyo plans to develop a plethora of military capabilities to deter and, if necessary, defeat threats from China and North Korea.

While some argue that Asian countries are not threatened by China and are not seeking to counter it, Japan's dramatic turnaround would appear to strongly suggest the converse. Especially since Tokyo's traditionally limited defence spending has been touted as evidence of the lack of China-balancing in the region.

Moreover, the documents, many times obliquely and a few times directly, refer to China as the key security problem that Japan faces. The National Security Strategy, for example, states that "China's current external stance, military activities, and other activities have become a matter of serious concern for Japan."

India's takeaway

There are at least three broad conclusions and lessons that can be drawn from Japan's change in strategic direction. First, and most basically, India needs to come up with its own National Security Strategy that outlines the key challenges that the country faces and how it plans to deal with these changes.

Even China, often rightly accused of a lack of transparency, produces periodic White Papers on defence. That they are bland is a different issue. The last public document that India produced was the Group of Ministers Report on National Security, which was not exactly a strategy paper and, in any case, is over two decades old.

Such a public strategy paper serves multiple purposes. For one, it is a necessary means to coordinate actions within disparate departments of the government, which often work at cross purposes enmeshed in bureaucratic politics. A single document will not solve these internal problems, but it will go some way in putting everyone on the same page. Having to coordinate and justify programmes and actions with reference to one broad strategic outline may introduce

some discipline. A “whole of government” approach is an often-touted desire in the Indian government, but it requires a road map.

Moreover, it will signal to both friends and foes where India stands. This, of course, may be one reason why Indian decisionmakers do not want to bring out a strategy paper because they think it may cause trouble, especially with potential adversaries.

Another fear may be that it will reduce India’s strategic flexibility. These are not concerns to be dismissed lightly. For example, the Japanese strategy documents have been criticised by China, Russia, and North Korea. But as the Japanese strategy papers show, creative writing can be broad enough to dismiss such criticisms, especially from a country like China that shows little indication that any formulation of words will satisfy it.

Moreover, it is actions that count, and India’s stance, such as its membership of the Quad, has anyway come in for Chinese criticism. In any case, the Indian bureaucracy is smart enough to write in a way that also does not tie its hands in future.

Avoid over-dependence on US

The second conclusion to be drawn from the Japanese documents is that all countries in the region, especially those that are capable, need to shoulder a bigger part of the burden to counter China rather than depend on the US to do the balancing.

The charge that American allies were free-riding on the US for security has been a consistent issue in US relations with its allies and partners. This has been true both during the last Cold War and in the emerging security competition with China. This was a rational response on part of US allies because, in general, no country likes to spend its wealth on unproductive expenses such as national defence. This is particularly true in democracies, where governments must meet numerous social welfare demands that directly affect electoral calculations.

The temptation to free-ride is made worse when others are available to pick up the burden. In a bipolar Cold War competition, the US was the source of this temptation. Washington had little choice but to shoulder the burden of balancing the Soviet Union and pick up the slack caused by its allies and partners. The situation has only gotten worse since then, with most NATO members failing to live up to the promise of spending two per cent of their GDP on defence.

Japan has been somewhat different. Its legacy issues of regional imperialism made it sensitive to charges of renewed militarism and provided an additional rationale to free-ride on US security shields. Thus, while keeping its defence budget below one per cent was a commitment it made to demonstrate its peacefulness in a neighbourhood that was still suspicious of Japan, this was probably not the only reason.

Despite its legacy sensitivity as well as its free-riding temptation, Japan has now decided that its security conditions are severe enough for it to do more to shore up the security partnership with the US to counter China.

This becomes a greater imperative for US partners in the bipolar competition between America and China because the relative wealth balance between the two nations is much more even compared to the US and Soviet Union. This means that the US would not be able to disproportionately shoulder the burden of balancing China as it could with the Soviet Union. If Washington’s partners in Asia, including India, do not share a sufficient weight of the burden,

China will not be balanced. In an extreme case, it could lead to a reduction in US commitment to balancing China, to the detriment of Asian powers.

A change in the burden-sharing proportions also requires a change in the responsibilities of the partners, something that Washington also needs to recognise.

Until now, the US has been able to put its larger concerns about stability ahead of the security requirements of its smaller partners. One example is nuclear weapons, where the US forced even its allies to depend on its nuclear guarantees, though it is not clear that they were necessarily well served by such a sacrifice. Taiwan, South Korea, and even Japan probably regret the choices they made in giving up their nuclear capability for American security guarantees, even if these were “choices” made under US pressure. The new Japanese documents explicitly talk of buying longer-range retaliatory capabilities, such as the US-built Tomahawk cruise missiles. There are hopeful early indications that the US would be willing to share the weapons, which suggests that it is also recognising that it needs much more capable allies who can have their own offensive capabilities.

A related third conclusion is about the need for offensive retaliatory capabilities. Japan plans to invest in both cruise missiles and hypersonics. As the Russian war against Ukraine demonstrates, the lack of a retaliatory deterrence capability can open a country up to punishment. Bombing civilians, as Russia is doing, rarely help militarily, but they do open up the civilian population to danger in the absence of a retaliatory deterrence capability. India has invested in conventional and dual-use missiles, but given the China requirement, it probably needs conventional missiles with longer ranges. Of course, India also needs larger quantities, again considering China’s stock of conventional missiles.

<https://theprint.in/opinion/japans-new-security-strategy-to-counter-china-is-a-lesson-for-india/1294219/>



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Overtaking Silicon Valley, Indo-Pacific is Emerging as Biggest Market for Artificial Intelligence; but can US & Allies Challenge China?

By Prakash Nanda

Artificial Intelligence (AI) is proving to be as much a security tool as an economic one in the Indo-Pacific, with the US and China attempting to expand their influence in the region. Because of AI’s increasing role in military applications, the Indo-Pacific, rather than Silicon Valley, is now fast emerging as the principal AI market in the world. A new report from “Research and Markets” predicts that the radar simulator market alone in the Indo-Pacific will boom from \$326.2 million in 2022 to \$470.5 million by 2028 for a compound annual growth rate (CAGR) of 6.3%. “Unmanned aerial vehicles (UAVs) developed by various enterprises have modern capabilities and have extended their reach and operating boundaries,” the report states, adding,

“There has been a surge in the development of laser-guided missiles with higher accuracy to hit the locked target. To combat this threat in the future, there would be a rise in the development of radars and radar simulators to train operators to combat the rising modern warfare systems.”

The report points out that edge computing, AI, and machine learning will be critical in this market, speeding up the development of AI-enabled warfare systems that will, in turn, cause the radar simulator market to surge in the coming years. “Machine learning and deep learning have increased the computing power of drones, making them smarter and faster,” it states. “Furthermore, edge computing integrated with AI has enabled military and defense enterprises to detect faults in their warfare systems and proactively avoid unplanned downtime.”

Another study also highlights how the Indo-Pacific has now become the fastest-growing AI market in the world. It says that investments in AI are expected to account for close to 40% of its total information communication technology (ICT) investments by the end of 2023, a growth trajectory scheduled for at least the next decade and miles ahead of the rest of the world which sits at a rough growth rate of 22%. And this projection does not include the investments made by Japan in AI. Once that is taken into account, the figure will undoubtedly be higher.

Leading Countries Lean Toward AI Tech & Warfare

The US, China, Japan, South Korea, India, Taiwan, and Singapore – leading countries of the region technologically – have announced multiple-million-dollar national AI strategies to drive AI readiness and regulate AI deployment.

Even other Indo-Pacific countries, like Australia, Thailand, and Indonesia, have established targeted initiatives and programs in strategic sectors to drive the adoption of AI. Besides its civilian uses in the areas such as healthcare, agriculture, climate change, and the financial sector, AI has broad military applications. It has great potential in the fields of Intelligence, Surveillance, and Reconnaissance (ISR), cyber security, military logistics, autonomous vehicles, and Lethal Autonomous Weapons Systems (LAWS).

The effective use of AI in applications in rockets, missiles, aircraft carriers, and naval assets and its integration in C4I2SR (Command, Control, Communications, Computers, Intelligence, Information, Surveillance, and Reconnaissance) has made AI an essential feature in every country’s national security architecture. No wonder why Russian President Vladimir Putin has talked of Russia’s commitment to AI development and asserted that “whoever becomes the leader in this field will rule the world.” And this also explains why the then US President Donald Trump issued an executive order in 2019 stating that “continued American leadership in AI is of paramount importance to maintaining the economic and national security of the US.”

Accordingly, the US is investing heavily in “next-generation air dominance” technology that could include sixth-generation fighters and drones. There are AI-based projects like Project Maven, Defense Advanced Research Projects Agency’s (DARPA) Squad X Experimentation program, and the OFFSET program. They are said to have been successfully deployed in Iraq and Syria to identify insurgents.

Likewise, military logistic software (IBM Watson software for predictive maintenance of aircraft and Ground vehicles—Stryker fleet), cyberspace operations, autonomous vehicles such as the Loyal Wingman program (autonomous F-16), RCVs, and swarm drones are some other applications that the US is developing and deploying successfully.

Besides, AI-enabled software like Clearview AI, SpaceKnow, and Snorkel AI support federal efforts in identifying people, gathering geospatial data, and analyzing signals and adversary communications for high-value information, respectively.

China is also pursuing the path of a military-civil fusion with PLA-supported AI developmental goals. It is said to have made significant investments in “Predictive Maintenance and Logistics, Information and Electronic Warfare, Command and Control systems, battlefield software, autonomous vehicles, training simulators, and ISR systems.” It has, for instance, developed the ASN-301 (a reverse-engineered copy of the IAI Harpy loitering munition), the GJ-11 “Sharp Sword” combat UAV, AI-based applications for leak detection, fault diagnosis, and ‘smart warehouses’ intended to predict and fill orders for material, AI-based knowledge mapping and combat decision support, among other capabilities. Reportedly, StarSee, one of China’s military AI companies, successfully demonstrated tracking US naval assets in real-time off the coast of California in June 2020. Experts say that due to China’s lack of real-world combat experience, AI-enabled war-gaming software like DataExa’s AlphaWar (inspired by Deep Mind’s AlphaStar) is used for professional military training.

India’s Artificial Intelligence Journey

India, too, has begun its AI journey in the military sphere. As Sanur Sharma, Associate Fellow at Manohar Parrikar Institute for Defense Studies and Analyses, points out, Defense AI Council (DAIC) and Defense AI Project Agency (DAIPA) have been constituted with Rs 1,000 crore annual budget specifically for AI-enabled projects. And Centre for AI and Robotics (CAIR), a laboratory of the Defense Research and Development Organization [DRDO], a primary laboratory for R&D in different areas of Defense Information and Communication Technology (ICT), is developing an AI-based Signal intelligence solution to enhance intelligence collation and analysis capabilities of the armed forces. Incidentally, in July 2022, the Ministry of Defense came out with 75 AI-enabled and 140 AI-enabled sensor systems deployed across Pakistan and China borders.

Notably, India is in favor of collaborating with the United States and other friends in the Indo-Pacific to develop AI technologies. And there has been a positive response. Defense and Foreign ministers of India and the US have called for strengthening the bilateral partnership on emerging technologies. Similarly, India and Japan have also discussed essential areas of bilateral cyber cooperation and reviewed the progress in cyber security, ICT, and 5G technology.

It may be noted here that the US National Security Commission on Artificial Intelligence (NSCAI) has said that despite significant advantages, the United States cannot create AI systems alone and that Washington needs to collaborate with allies, especially in the Indo-Pacific region, to improve capabilities and promote interoperability.

It recommends building “a favorable international technology order.” It says that “the United States must work hand-in-hand with allies and partners to promote the use of emerging technologies to strengthen democratic norms and values, coordinate policies and investments to advance global adoption of digital infrastructure and technologies, defend the integrity of international technical standards, cooperate to advance AI innovation, and share practices and resources to defend against malign uses of technology and the influence of authoritarian states in democratic societies. The United States should lead an Emerging Technology Coalition to achieve these goals and establish a Multilateral AI Research Institute to enhance the United

States' position as a global research hub for emerging technology. The Department of State should be reoriented, reorganized, and resourced to lead diplomacy in emerging technologies.”

And when talking of America's “allies and partners” in the Indo-Pacific, Yll Bajraktari, Executive Director, NSCAI says, “Technology requires us to look at new allies and partners. New countries are at the forefront of this technology, so we have argued that we must have a technology alliance with India. We have argued that Israel and the research environment that Israel cultivates needs to be elevated to a different dialogue with the United States... A new EU-United States technology and trade dialogue has been launched.

“AI [Artificial Intelligence] is not a single thing. We tend to look at the AI stack, a combination of hardware, data, algorithms, applications, talent, and the ability to integrate across all these five areas. So when we compare or assess how we and China compare, we look at their capabilities across these six components and our capabilities, and we conclude that the United States has an advantage in three of these six areas. “We have argued that you need a new type of coalition; you got to build around technology... you need to establish an emerging tech coalition and whether or not this is a gathering of 12 or 15 countries; I know everybody has an opinion of which country should be there, but I think this should be a new coalition of countries... I think there are like seven areas that this coalition should sit down and talk about, from how we set up standards, how we do data sharing, to how do we invest together in R&D, and how we do people exchanges.”

However, any coalition of like-minded countries has got some challenges to overcome. Despite AI's benefits, there remains a considerable concern for the legal and ethical issues of AI implementation. For instance, there is the issue of data ownership, security, and information privacy. As most data used by AI is stored in clouds, the security, support, and maintenance capabilities in the provider's cloud storage are essential.

Similarly, AI has challenged traditional intellectual property (IP) notions and aroused many questions. Who is the owner of AI-developed IP: is it the AI inventor or the AI machine itself? Answers vary from country to country. In democracies, innovating companies usually have less protection of their products because of the judiciary interventions, which tend to support “freedom” to use technologies over their protection. This, perhaps, is the reason why even US companies prefer to invest in China, whose laws are more in favor of AI innovators. In other words, a coalition of allies and partners in the Indo-Pacific for developing AI must deal with their respective institutional policies and political barriers.

<https://eurasianimes.com/overtaking-silicon-valley-indo-pacific-region-emerging-as-biggest/>

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Drone Advances in Ukraine War may Bring Dawn of Killer Robots

Drone advances in Ukraine have accelerated a long-anticipated technology trend that could soon bring the world's first fully autonomous fighting robots to the battlefield, inaugurating a new age of warfare. The longer the war lasts, the more likely it becomes that drones will be used to

identify, select and attack targets without help from humans, according to military analysts, combatants and artificial intelligence researchers. That would mark a revolution in military technology as profound as the introduction of the machine gun.

Ukraine already has semi-autonomous attack drones and counter-drone weapons endowed with AI. Russia also claims to possess AI weaponry. But there are no confirmed instances of a nation putting into combat robots that have killed entirely on their own. Experts say it may be only a matter of time before either Russia or Ukraine, or both, deploy them. "Many states are developing this technology," said Zachary Kallenborn, a George Mason University weapons innovation analyst. "Clearly, it's not all that difficult."

Ukraine's digital transformation minister, Mykhailo Fedorov, agrees that fully autonomous killer drones are "a logical and inevitable next step" in weapons development. He said Ukraine has been doing "a lot of R&D in this direction." "I think that the potential for this is great in the next six months," Fedorov said in a recent interview. Ukrainian Lt Col Yaroslav Honchar, co-founder of the combat drone innovation nonprofit Aerorozvidka, said in a recent interview near the front that human war fighters simply cannot process information and make decisions as quickly as machines. Ukrainian military leaders currently prohibit the use of fully independent lethal weapons, although that could change, he said.

Russia could obtain autonomous AI from Iran or elsewhere. The long-range Shahed-136 exploding drones supplied by Iran have crippled Ukrainian power plants and terrorised civilians but are not especially smart. Iran has other drones in its evolving arsenal that it says feature AI. Without a great deal of trouble, Ukraine could make its semi-autonomous weaponised drones fully independent in order to better survive battlefield jamming, their Western manufacturers say. Those drones include the US-made Switchblade 600 and the Polish Warmate, which both currently require a human to choose targets over a live video feed. AI finishes the job. The drones, technically known as "loitering munitions," can hover for minutes over a target, awaiting a clean shot.

"The technology to achieve a fully autonomous mission with Switchblade pretty much exists today," said Wahid Nawabi, CEO of AeroVironment, its maker. That will require a policy change - to remove the human from the decision-making loop - that he estimates is three years away. Drones can already recognise targets such as armoured vehicles using cataloged images. But there is disagreement over whether the technology is reliable enough to ensure that the machines don't err and take the lives of noncombatants.

The AP asked the defence ministries of Ukraine and Russia if they have used autonomous weapons offensively - and whether they would agree not to use them if the other side similarly agreed. Neither responded. If either side were to go on the attack with full AI, it might not even be a first. An inconclusive UN report last year suggested that killer robots debuted in Libya's internecine conflict in 2020, when Turkish-made Kargu-2 drones in full-automatic mode killed an unspecified number of combatants. A spokesman for STM, the manufacturer, said the report was based on "speculative, unverified" information. He told the AP the Kargu-2 cannot attack a target until the operator tells it to do so.

<https://timesofindia.indiatimes.com/world/europe/drone-advances-in-ukraine-war-may-bring-dawn-of-killer-robots/articleshow/96724416.cms>

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Making a Killing: Continuing Russia-Ukraine Conflict is a Bonanza for Arms Makers, and Bad News for Almost Everyone Else

Any hope of a New Year thaw in the Ukraine conflict was blown away by Ukraine's offensive in the Russian-occupied Donetsk region. Of course, Russia has been conducting night-time air strikes against Ukrainian cities and civilian infrastructure. So, the world wearily wonders whether the continuing war will deliver fresh economic shocks, even as economies are yet to recover from shocks delivered last year. Millions across countries have seen prices go up and real incomes drop, energy and food becoming more expensive and bank credit get dearer. Ukraine has suffered terribly, and Russia, despite its leadership's bravado, has suffered too. But every day of the war is Christmas Day for global arms manufacturers. Since the beginning of the conflict last February, defence companies have seen their stocks rise as the West rushed military aid to Kyiv. Many of these weapons came from reserve stockpiles of Western countries, requiring these systems to be replenished through fresh contracts to arms makers. And while Europe has upped its contribution in recent months, the US still remains the largest individual contributor towards weapons for Ukraine, committing \$18.5 billion till November 20. In December, Washington announced another \$1.85 billion in military aid for Kyiv, which included the Patriot air defence system.

The US defence budget will hit a record \$858 billion – bigger than Switzerland's GDP – this year out of which at least \$800 million will go towards security assistance to Ukraine. The defence bill authorises specific purchases from arms companies like Lockheed Martin and General Dynamics whose systems have already marked their presence on the Ukrainian frontline. In fact, the American Himars rocket launcher used by the Ukrainian forces in the Donetsk strike was probably of Lockheed Martin make. Therefore, it is hardly surprising that American defence companies are having a good time. Lockheed Martin's share price over the past year grew by 11%, Northrop Grumman by 23%, and AeroVironment by 21%. Arms manufacturers like wars. And they must be loving the Ukraine-Russia conflict, which has the potential to carry on for months more. That's another very good reason to try and wage peace in Ukraine.

<https://timesofindia.indiatimes.com/blogs/toi-editorials/making-a-killing-continuing-russia-ukraine-conflict-is-a-bonanza-for-arms-makers-and-bad-news-for-almost-everyone-else/>

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Britain says it is Committed to Leading a NATO Task Force in 2024

Britain said on Tuesday it was committed to leading a NATO task force in 2024, dismissing a report by Berlin-based Table.Media that British delays had prompted the German defence ministry to look into extending its leadership beyond 2023. "The UK is ready to honour our

commitment to lead NATO's Very High Readiness Joint Task Force in 2024 – any suggestion otherwise is completely untrue," a spokesperson for Britain's Ministry of Defence said. "NATO is currently reviewing its military plans and force model which may affect their requests to Alliance members," the spokesperson added.

Citing German army sources, the Table.Media news outlet reported earlier on Tuesday that Britain would take over leadership in 2024 several months later than planned. "There is nothing official I can tell you about this at the moment," a German defence ministry spokesperson told Reuters in response.

France handed over command of the VJTF to Germany's Bundeswehr this week for 12 months. Germany is providing up to 2,700 soldiers as lead nation. The VJTF was created after Russia unilaterally annexed Crimea from Ukraine in 2014 and was deployed for the first time for collective defence after Russia invaded Ukraine in February. The leadership position is rotated among members to share the burden that it places on the military, and brigades are bound to the VJTF for three years to help with the stand-up, stand-by and stand-down phases, meaning they are not available for other missions or international obligations.

<https://theprint.in/world/britain-says-it-is-committed-to-leading-a-nato-task-force-in-2024/1296722/>

Science & Technology News

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Make India Top Lab of Modern Science: PM Modi

PM Narendra Modi on Tuesday said he was confident that the country's scientific community will help India achieve the position it deserves in the 21st century, and urged scientists to step up their efforts in various fields to make the country "the most advanced laboratory of modern science" in the 'Amrit Kaal' - the next 25 years leading to the centenary of India's independence.

Addressing the 108th Indian Science Congress (ISC) through a video conference, he also appealed to the scientific community to focus on critical areas like vaccine development to deal with threats of new diseases, energy requirement and waste management which will help not just in dealing with pollution but also in saving valuable resources through circularity.

"Today, we are living in such an era when humanity is facing the threat of new diseases. We have to promote research and development to prepare new vaccines in the same way we are prepared in advance to deal with catastrophes like floods or earthquakes. Similarly, we have to identify diseases well in time through Integrated Disease Surveillance and take measures to deal with them. Different ministries will have to work together to achieve this goal," said Modi while virtually inaugurating the five-day ISC being held in Nagpur.

Underlining that there are immense possibilities of scientific research in the waste management sector, he said, "Municipal solid waste, electronic waste, bio-medical waste, agricultural wastes are such areas, which are continuously expanding. This is the reason the government laid a lot of emphasis on the circular economy in last year's budget. "Now we have to further strengthen the Mission Circular Economy. For this, we have to work on such innovations which can make better use of metal and plastic scrap. We have to work simultaneously on curbing pollution and making scrap useful." Referring to India's growing energy needs, he said, "In such a situation, if the scientific community of India makes innovations related to energy requirements, then it will be of great benefit to the country."

The focal theme of this year's ISC is 'Science and Technology for Sustainable Development with Women Empowerment' which will witness discussions on issues of sustainable development, women empowerment and the role of science and technology in achieving this.

Expressing happiness about the theme of the Science Congress this year, which combines sustainable development with women empowerment, the PM emphasised the complementarity between the two areas. He stressed, "Our thinking is not just that we should empower women via science but also empowering science by the contribution of women."

The PM recalled how India is fast becoming one of the top countries of the world in the field of science. "Out of 130 countries, we were at number 81 in the Global Innovation Index till 2015. But we have jumped to 40th position in 2022. Today India is among the top three countries in the world in terms of PhDs. Today India is among the top three countries in terms of start-up ecosystem," he said. Noting that the one who takes the initiative takes the lead in science, he said Indian scientists will not only have to be aware of what is going on around the world but at the same time focus on works which are not being done anywhere and which are futuristic ideas. "Today there is debate on AI (artificial intelligence), AR (augmented reality), and VR (virtual reality) in the world. We have to include these issues in our priorities," he said.

<http://timesofindia.indiatimes.com/articleshow/96722794.cms>

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IIT-Guwahati Develops Drone for Warehouse Management, Military and Law Enforcement

'Warehouse drones' for warehouse management, 'Reaper drones' for military and law enforcement and 'Ornithopter' based on the design of birds for surveillance in tight spaces are among the various drones developed by the aeromodelling club at IIT-Guwahati. The club is encouraging students to harness creativity, technology and innovation in aeromodelling and develop smart drones with an easy interface for common people, an official said.

"The club has developed different types of drones, including 'Warehouse drones' for warehouse management, 'Reaper drones' for military and law enforcement, 'Ornithopter' based on the design of birds that can be used for surveillance in tight spaces, for wildlife photography, and 'RAVEN', an indigenously developed VTOL (Vertical Takeoff and Landing) capable fixed-

winged aircraft,” said Chivukula Vasudeva Sastri, a professor at the Department of Chemistry, the Indian Institute of Technology (IIT)-Guwahati.

“Apart from these projects, students have also developed a drone capable of firing at targets with high precision. The firing mechanism is designed in such a way that it returns to its previous position waiting for the pilot’s command for the next firing,” he added.

Sastri explained that in a real-world scenario, warehouses were one of the most difficult places to maintain with various repetitive tasks such as inventory management or moving objects to different places.

Any failure in doing these tasks on time can cause heavy financial losses. To avoid human inefficiency, the innovators have developed a drone to eliminate such labour-intensive duties that involve time consuming repetitive physical work. “With a little bit of tweaking in the program, for future scope, the utility of the drone can be modified from understanding the flow of water in agricultural lands to delivery of goods within a city by using line following algorithms along roads, it can also be used for faster identification of items in the inventory of industries,” Sastri said. ‘Reaper’ is an indigenously developed unmanned aerial vehicle designed primarily for military and law enforcement use such as patrolling, target identification and tracking, among others. “The drone can also be used during natural disasters like floods or earthquakes, helping disaster management teams search for injured/trapped people by making use of hyperspectral imaging. Another use is that it can collect data on animals in any national parks/wildlife sanctuaries and study their behaviour,” Sastri added.

<https://theprint.in/india/iit-guwahati-develops-drone-for-warehouse-management-military-and-law-enforcement/1295875/>

