

Feb
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 : 37 23 फरवरी 2022
Vol. : 47 Issue : 37 23 February 2022



रक्षा विज्ञान पुस्तकालय
Defence Science Library
रक्षा वैज्ञानिक सूचना एवं प्रलेखन केंद्र
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The Tribune

Wed, 23 Feb 2022

DRDO's young Scientists to develop new cargo drones for Himalayan frontier

The 'high-altitude operating, vertical take-off and landing drone', driven by eight propellers, will have the ability to be launched from altitudes of up to 15,000 feet and the capacity to airlift up to 50 kg of cargo over a distance of 10 km

By Vijay Mohan

Chandigarh: Young scientists at the Defence Research and Development Organisation (DRDO) have been tasked to design and develop a new class of load-carrying unmanned aerial vehicle (UAV) that is capable of operating from high-altitude bases for undertaking logistic operations along the Himalayan frontier.

The 'high-altitude operating, vertical take-off and landing drone', driven by eight propellers, will have the ability to be launched from altitudes of up to 15,000 feet and the capacity to airlift up to 50 kg of cargo over a distance of 10 km.



Photo for representation only.

The project is being undertaken by the DRDO Young Scientist Laboratories (DYSL), a recently formed group of five specialised research establishments where all scientists, including the directors, are required to be below 35 years of age.

Located at Bengaluru, Chennai, Hyderabad, Kolkata and Mumbai, their core focus areas are artificial intelligence, cognitive technologies, smart materials, asymmetric technologies and quantum technologies, respectively.

In a request for proposal issued earlier this month seeking development partners, DYSL has defined its requirement for an octocopter (eight-engined UAV) with a carbon-composite airframe having a gross all-up weight, including payload, of less than 80 kg.

The octocopter is required to have a payload capability of 50 kg at mean sea level and above 20 kg at extreme altitude, and be able to operate at temperatures up to minus 20 degrees Celsius.

Artificial intelligence-based target tracking and accurate launching and landing, geo fence for operating within a defined geographical area, fully autonomous and semi-autonomous flight modes, GPS, real-time video telemeter and a failsafe system that enables the UAV to return to base in case of loss of radio link, low battery, etc, are other required features for the flying machine.

Cargo drones are being looked at as being force multipliers, according to DRDO scientists. Besides enabling faster and continuous supply to troops deployed at high-altitude areas and difficult-to-reach locations, they can be used for reconnaissance and mapping. In times ahead, they can also be modified for combat operations.

Urgent supplies of essential items such as rations, water, fuel, ammunition and medicines to forward posts in remote areas at present depends on helicopters, which is a costly affair, or ferried by porters and mules, which is time-consuming.

The use of UAVs for logistics in the mountains came into focus when the stand-off between India and China began along the Line of Actual Control in 2020, with propaganda videos showing Chinese troops on the frontline being delivered freshly prepared hot food from base camps.

Last year, a Noida-based Indian firm had demonstrated a cargo hexacopter (six-engined), christened MR-20, for logistic operations in high-altitude areas. The Army is reportedly procuring 48 of these drones that can carry a load of up to 20 kg.

The defence forces have been using various types of imported and indigenous drones, both fixed wing as well as rotary wing, for surveillance and recce. Several projects are already under way in the country to develop new drones of different categories to meet various requirements, including armed UAVs for combat.

<https://www.tribuneindia.com/news/nation/drdo-young-scientists-to-develop-new-cargo-drones-for-himalayan-frontier-372075>



Press Information Bureau

Government of India

Ministry of Defence

Tue, 22 Feb 2022 3:58PM

DRDO takes part in ‘Vigyan Sarvatra Pujayate’, organising exhibitions in 16 cities across the country

Defence Research and Development Organisation (DRDO) is participating in ‘Vigyan Sarvatra Pujyate’ being held across the country on the occasion of 75th year of India’s Independence, ‘Azadi Ka Amrit Mahotsav’. ‘Vigyan Sarvatra Pujayate’ is a pan-India programme to showcase science, technology & innovation from every part of the country during February 22-28, 2022.

The DRDO is also organising exhibitions on the theme ‘Amrit Mahotsav Science Showcase: Roadmap to 2047’ at 16 cities throughout the country. The cities where these science & technology mega expositions are being held by DRDO are Agra, Almora, Bengaluru, Bhubaneswar, Chandigarh, Chennai, Dehradun, Delhi, Hyderabad, Jodhpur, Leh, Mumbai, Mysuru, Pune, Tezpur, Ernakulam, Vijayawada and Visakhapatnam. Participation of DRDO in the ‘Mahotsav’ is an opportunity to highlight the work being done by R&D organisations and showcasing ideas and technology efforts on the road to 2047.

Various DRDO products pertaining to different technologies are going to be exhibited. This include models of Nag, Man Portable Anti-Tank Guided Missile (MPATGM), Akash, BrahMos, Astra, Pralay, Mission Shakti, Armoured Engineer Reconnaissance Vehicle (AERV), Mareech, 3D Central Acquisition Radar (3D CAR), Electronic Warfare System, Bridge Layer Tank (BLT), etc. Technologies on display are retromotor, booster motor, composite rocket motor casing, drop tank, break disk, etc.

The week will also be marked by the lectures of eminent scientists on various science and technology developments at various centres throughout the country. The DRDO scientists are also delivering lectures at 33 centres throughout the country on different themes and topics in 11 different Indian languages.

The Government of India (GoI) is holding a year-long programme, Azadi ka Amrit Mahotsav, to pay homage to freedom fighters and showcase the achievements of the country in various fields in the 75th year of Independence. Various science and technology organisations of the Government, in close partnership with agencies at the level of the states, are celebrating S&T achievements.

The ‘Amrit Mahotsav Science’ also titled ‘Vigyan Sarvatra Pujyate’ will put on display our scientific legacy and technology prowess that have helped find solutions to problems in defence, space, health, agriculture, astronomy, and other areas. The event is jointly organised by DRDO, Department of Science & Technology (DST), Department of Biotechnology (DBT), Council of

Scientific & Industrial Research (CSIR), Ministry of Earth Sciences (MoES), Department of Atomic Energy (DAE), Department of Space, Indian Council of Medical Research (ICMR) and All India Council for Technical Education (AICTE) under the aegis of the Office of the Principal Scientific Adviser to the GoI and the Ministry of Culture.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1800292>



पत्र सूचना कार्यालय
भारत सरकार

रक्षा मंत्रालय

Tue, 22 Feb 2022 3:58PM

डीआरडीओ ने विज्ञान सर्वत्र पूज्यते में लिया हिस्सा, देश भर के 16 शहरों में प्रदर्शनियों का आयोजन

'आजादी का अमृत महोत्सव' के तहत भारत की आजादी के 75वें वर्ष के अवसर पर रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) देश भर में आयोजित होने वाले 'विज्ञान सर्वत्र पूज्यते' कार्यक्रम में भाग ले रहा है। 22 से 28 फरवरी, 2022 के दौरान देश के हर हिस्से से विज्ञान, प्रौद्योगिकी और नवाचार को प्रदर्शित करने के लिए विज्ञान सर्वत्र पूज्यते अखिल भारतीय कार्यक्रम है।

डीआरडीओ पूरे देश के 16 शहरों में 'अमृत महोत्सव साइंस शोकेस : रोडमैप टू 2047' विषय पर प्रदर्शनियों का आयोजन भी कर रहा है। डीआरडीओ की ओर से आगरा, अल्मोड़ा, बंगलुरु, भुवनेश्वर, चंडीगढ़, चेन्नई, देहरादून, दिल्ली, हैदराबाद, जोधपुर, लेह, मुंबई, मैसूर, पुणे, तेजपुर, एरानाकुलम, विजयवाड़ा और विशाखापत्तनम में विज्ञान और प्रौद्योगिकी पर बहुत बड़ी प्रदर्शनी आयोजित की जा रही हैं। 'महोत्सव' में डीआरडीओ की भागीदारी अनुसंधान एवं विकास संगठनों द्वारा किए जा रहे कार्यों और 2047 की राह में विचारों और प्रौद्योगिकी के प्रयासों को प्रदर्शित करने का एक अवसर है।

विभिन्न तकनीकों से संबंधित कई डीआरडीओ उत्पादों का प्रदर्शन किया जाएगा। इसमें नाग, मैन पोर्टेबल एंटी टैंक गाइडेड मिसाइल (एमपीएटीजीएम), आकाश, ब्रह्मोस, अस्त्र, प्रलय, मिशन शक्ति, बख्तरबंद इंजीनियर टोही वाहन (एईआरवी), मारीच, 3डी सेंट्रल एक्विजिशन रडार (3डी सीएआर), इलेक्ट्रॉनिक वारफेयर सिस्टम, ब्रिज लेयर टैंक (बीएलटी) आदि के मॉडल शामिल हैं। इसमें रेट्रोमोटर, बूस्टर मोटर, समग्र रॉकेट मोटर आवरण, ड्रॉप टैंक, ब्रेक डिस्क आदि तकनीकी का भी प्रदर्शन किया जाएगा।

इस सप्ताह के दौरान देश भर के अलग-अलग केंद्रों पर विभिन्न विज्ञान और प्रौद्योगिकी विकास पर प्रख्यात वैज्ञानिकों के व्याख्यान भी होंगे। डीआरडीओ के वैज्ञानिक देश भर के 33 केंद्रों पर 11 अलग-अलग भारतीय भाषाओं में विभिन्न मुद्दों और विषयों पर व्याख्यान भी दे रहे हैं।

स्वतंत्रता सेनानियों को श्रद्धांजलि देने और स्वतंत्रता के 75वें वर्ष में विभिन्न क्षेत्रों में देश की उपलब्धियों को प्रदर्शित करने के लिए भारत सरकार एक साल का कार्यक्रम आजादी का अमृत महोत्सव आयोजित कर रही है। सरकार के विभिन्न विज्ञान और प्रौद्योगिकी संगठन राज्यों के स्तर पर एजेंसियों के साथ करीबी साझेदारी में विज्ञान और प्रौद्योगिकी की उपलब्धियों का जश्न मना रहे हैं।

'अमृत महोत्सव विज्ञान' जिसका नाम 'विज्ञान सर्वत्र पूज्यते' भी है, हमारी वैज्ञानिक विरासत और प्रौद्योगिकी कौशल को प्रदर्शित करेगा, जिसने रक्षा, अंतरिक्ष, स्वास्थ्य, कृषि, खगोल विज्ञान और अन्य क्षेत्रों में समस्याओं के समाधान खोजने में मदद की है। यह कार्यक्रम डीआरडीओ, विज्ञान और प्रौद्योगिकी विभाग (डीएसटी), जैव प्रौद्योगिकी विभाग (डीबीटी), वैज्ञानिक और औद्योगिक अनुसंधान परिषद

(सीएसआईआर), पृथ्वी विज्ञान मंत्रालय (एमओईएस), परमाणु ऊर्जा विभाग (डीएई), अंतरिक्ष विभाग, भारतीय चिकित्सा अनुसंधान परिषद (आईसीएमआर) और अखिल भारतीय तकनीकी शिक्षा परिषद (एआईसीटीई) द्वारा भारत सरकार के प्रधान वैज्ञानिक सलाहकार के कार्यालय और संस्कृति मंत्रालय के तत्वावधान में आयोजित किया जाता है।

<https://pib.gov.in/PressReleasePage.aspx?PRID=1800332>



Press Information Bureau
Government of India

రక్షణ మంత్రిత్వ శాఖ

Tue, 22 Feb 2022 3:58PM

దేశవ్యాప్తంగా 16 నగరాల్లో ప్రదర్శనలు నిర్వహించే 'విజ్ఞాన్ సర్వత్ర పూజ్యత'లో డీఆర్డీవో పాల్గొంటుంది.

భారతదేశానికి స్వాతంత్ర్యం వచ్చి 75 ఏళ్లు అయిన 'ఆజాదీ కా అమృత మహోత్సవ' సందర్భంగా దేశవ్యాప్తంగా జరుగుతున్న 'విజ్ఞాన సర్వత్ర పూజ్యత'లో డిఫెన్స్ రీసెర్చ్ అండ్ డెవలప్‌మెంట్ ఆర్గనైజేషన్ (డీఆర్డీవో) పాల్గొంటోంది. 'విజ్ఞాన సర్వత్ర పూజ్యత' అనేది ఫిబ్రవరి 22 నుండి 28, 2022 వరకూ దేశంలోని ప్రతి ప్రాంతం నుండి సైన్స్, టెక్నాలజీ & ఆవిష్కరణలను ప్రదర్శించడానికి చేపట్టిన దేశవ్యాప్త కార్యక్రమం.

దేశంలోని 16 నగరాల్లో 'అమృత మహోత్సవ సైన్స్ షోకేస్: రోడ్‌మ్యాప్ టు 2047' అనే అంశంపై ప్రదర్శనలను కూడా డీఆర్డీవో నిర్వహిస్తోంది. ఆగ్రా, అలహాబాద్, బెంగళూరు, భువనేశ్వర్, చండీగడ్, చెన్నై, ఢిల్లీ, హైదరాబాద్, జోధ్ పూర్, లేహ్, ముంబై, మైసూరు, పూణే, తేజ్‌పూర్, ఎర్నాకులం, విజయవాడ మరియు విశాఖపట్నం నగరాల్లో ఈ సైన్స్ & టెక్నాలజీ మెగా ఎక్స్‌పోజిషన్‌లను డీఆర్డీవో నిర్వహిస్తోంది. ఆర్ & డీ సంస్థలు చేస్తున్న పనిని హైలైట్ చేయడానికి 'మహోత్సవ'లో డీఆర్డీవో పాల్గొంటోంది. అలాగే 2047కి వెళ్లే మార్గంలో ఆలోచనలు మరియు సాంకేతిక ప్రయత్నాలను ప్రదర్శించడానికి ఇది ఒక అవకాశం.

పలు సాంకేతికతలకు సంబంధించిన వివిధ డీఆర్డీవో ఉత్పత్తులను ఇందులో ప్రదర్శించనున్నారు. ఇందులో నాగ్, మ్యాన్ పోర్ట్‌బుల్ యాంటీ ట్యాంక్ గైడ్డ్ మిస్సైల్ (ఎంపీఎటిజీఎం), ఆకాశ్, బ్రహ్మోస్, అస్త్రా, ప్రళయ, మిషన్ శక్తి, ఆర్కర్డ్ ఇంజనీర్ రికనెస్సివ్ వెహికల్ (ఏఈఆర్వి), మారీచ్, 3డీ సెంట్రల్ అక్విజిషన్ రాడార్ (3డీ కార్), ఎలక్ట్రానిక్ వార్ ఫేర్ సిస్టమ్ బ్రిడ్జ్ లేయర్ ట్యాంక్ (బిఎల్టి) మొదలైన నమూనాలు వీటిలో ఉన్నాయి. అలాగే రెట్రోమోటర్, బూస్టర్ మోటార్, కాంపోజిట్ రాకెట్ మోటార్ కేసింగ్, డ్రాప్ ట్యాంక్, బ్రేక్ డిస్క్ మొదలైనవి సాంకేతికతలు కూడా ప్రదర్శనలో ఉన్నాయి.

దేశవ్యాప్తంగా వివిధ కేంద్రాలలో పలు శాస్త్ర సాంకేతిక అభివృద్ధిపై ప్రముఖ శాస్త్రవేత్తల ఉపన్యాసాలు కూడా ఈ వారం గుర్తించబడతాయి. డీఆర్డీవో శాస్త్రవేత్తలు దేశవ్యాప్తంగా 33 కేంద్రాలలో 11 విభిన్న భారతీయ భాషల్లో విభిన్న డీమ్‌లు మరియు అంశాలపై ఉపన్యాసాలు ఇస్తున్నారు.

స్వాతంత్ర్య సమరయోధులకు నివాళులు అర్పించేందుకు మరియు 75వ స్వాతంత్ర్య సంవత్సరంలో దేశం సాధించిన వివిధ రంగాలలో సాధించిన విజయాలను ప్రదర్శించడానికి భారత ప్రభుత్వం (జీఓఐ) ఆజాదీ కా అమృత మహోత్సవ అనే కార్యక్రమాన్ని ఏడాదిపాటు నిర్వహిస్తోంది. ప్రభుత్వంలోని వివిధ సైన్స్ అండ్ టెక్నాలజీ సంస్థలు, రాష్ట్రాల స్థాయిలోని ఏజెన్సీలతో సన్నిహిత భాగస్వామ్యంతో ఎస్ & టీ విజయాలను జరుపుకుంటున్నాయి.

రక్షణ, అంతరిక్షం, ఆరోగ్యం, వ్యవసాయం, ఖగోళ శాస్త్రం మరియు ఇతర రంగాలలోని సమస్యలకు పరిష్కారాలను కనుగొనడంలో సహాయపడిన మన శాస్త్రీయ వారసత్వం మరియు సాంకేతిక వైపుణ్యాన్ని 'విజ్ఞాన సర్వత్ర పూజ్యతే' పేరుతో 'అమ్మత్ మహోత్సవ్ సైన్స్' ప్రదర్శిస్తుంది. డిపార్ట్‌మెంట్ ఆఫ్ స్పేస్, ఇండియన్ కౌన్సిల్ ఆఫ్ మెడికల్ రీసెర్చ్ (ఐసీఎంఆర్) మరియు ఆల్ ఇండియా కౌన్సిల్ ఫర్ టెక్నికల్ ఎడ్యుకేషన్ (ఎఐసీటీఈ) జీఓఐ మరియు మినిస్ట్రీ ఆఫ్ కల్చర్ కి ప్రాధాన్యత సైంటిఫిక్ అడ్వాన్స్ కాన్ఫరెన్స్ ఆఫ్ ఇండియాలో జరుగుతున్న ఈ కార్యక్రమాన్ని డీఆర్డీవో, డిపార్ట్‌మెంట్ ఆఫ్ సైన్స్ & టెక్నాలజీ (డీఎస్టీ), డిపార్ట్‌మెంట్ ఆఫ్ బయోటెక్నాలజీ (డీబిటీ), కౌన్సిల్ ఆఫ్ సైంటిఫిక్ & ఇండస్ట్రియల్ రీసెర్చ్ (సిఎస్ఐఆర్), మినిస్ట్రీ ఆఫ్ ఎర్త్ సైన్సెస్ (ఎంఓఈఎస్), డిపార్ట్‌మెంట్ ఆఫ్ అటామిక్ ఎనర్జీ (డీఏఈ) సంయుక్తంగా నిర్వహిస్తున్నాయి.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1800402>



Wed, 23 Feb 2022

Integration of public and private tech institutions need of the hour: DRDO Scientist

National-level Science Week Festival begins

By P. Sujatha Varma

Vijayawada: Scientist and Director of Missile Systems, Advanced Systems Laboratory, Defence Research and Development Organisation (DRDO), Hyderabad, N. Rama Manohara Babu on Tuesday stressed the need for integrating scientific and technological organisations in the public and private sectors along with startups to achieve excellence.

Addressing the inaugural session of a national-level Science Week Festival jointly organised by the School of Planning and Architecture, Vijayawada (SPAV) and Andhra University, Visakhapatnam, under the Science Communication, Popularisation and Extension (SCoPE) project, Mr. Manohara Babu said India is self-sufficient in terms of atomic research, nuclear energy, space exploration and Defence R&D.

“There is a need to prove a good learning and research environment for young minds to make them future scientists,” he said.

Later, Mr. Manohara Babu inaugurated an exhibition organised by the DRDO, where models of the Indian missile systems, defence technologies, and state-of-the-art defence products were on display.

The ISRO organised a mobile exhibition in a bus, while science books in Telugu and exhibits of the students from the National Institute of Design, Andhra Pradesh, working models of science experiments and magic shows are some of the highlights of the expo.

‘Vigyan Sarvatra Pujyate’

The week-long celebration of science on the theme ‘Vigyan Sarvatra Pujyate’ is being organised as part of the ‘Azadi ka Amrit Mahotsav’ by the Union Ministry of Culture, in association of the Vigyan Prasar.



Students looking at the exhibits on display at the ‘Science Week Festival’ at the School of Planning and Architecture in Vijayawada on Tuesday. | Photo Credit: V. RAJU



M. Rama Manohara Babu, Scientist and Director of Advanced Systems Laboratory, DRDO, Hyderabad inaugurating the ‘Science Week Festival’ at the School of Planning and Architecture in Vijayawada on Tuesday. | Photo Credit: V. RAJU

Besides scientists from the ISRO and the DRDO, students of local schools and colleges and members of scientific organisations and NGOs participated in the programme.

Registrar, SPAV, K.V. Uma Maheswara Rao, Head of the Planning department and organising secretary Abdul Razak Mohammed, Ramesh Srikonda and Kailasa Rao from the Department of Architecture, SPAV, also spoke on the occasion.

<https://www.thehindu.com/news/national/andhra-pradesh/integration-of-public-and-private-tech-institutions-need-of-the-hour-drdo-scientist/article65074545.ece>



Wed, 23 Feb 2022

Need to provide good R&D environment for students: DRDO Director

The DRDO director was the chief guest at the week-long Science Festival that began at the School of Planning and Architecture (SPA) here on Tuesday.

Vijayawada: Stating that India is self-sufficient in terms of atomic research, nuclear energy, space exploration and defence R&D, Defence Research and Development Organisation (DRDO) Director (Advanced Systems Laboratory) Dr M Rama Manohara Babu stressed the need for providing a good learning and research environment for the young minds to make them future scientists.

The DRDO director was the chief guest at the week-long Science Festival that began at the School of Planning and Architecture (SPA) here on Tuesday. Dr Rama Manohara Babu emphasised on the need for integration of public and private organisations with startups to become a global power for excellence in science and technology.



Students take a look at the missile models displayed during the Science Festival held at SPA. (Photo |EPS, P Ravindra Babu)

The DRDO director said as a part of “Azadi ka Amrit Mahotsav” celebrations, the Union Ministry of Culture in association with Vigyan Prasar has marked the period between February 22 and 28 as the glorious week called ‘Vigyan Sarvatra Pujyate’ under its Science Communication Popularization and Extension (SCoPE) Project.

The Sanskrit phrase translates to Science and Technology is revered all over. SPA-Vijayawada and Andhra University in Visakhapatnam are the two institutes that are organising the programmes in the State

Later, Manohara Babu along with all other local dignitaries inaugurated the exhibits of DRDO where models of the Indian missile systems, defence technologies and state of the art defence equipment are being showcased to the public for the first time.

The exhibition showcases the contributions of 75 renowned Indian scientists. The mobile exhibition by ISRO, science books exhibition (in Telugu), exhibition by NID AP, science experiments and magic shows were some other highlights of the event on day 1. Over 300 students from three local schools and colleges took part in the opening day.

<https://www.newindianexpress.com/cities/vijayawada/2022/feb/23/need-to-provide-good-rd-environment-for-students-drdo-director-2422699.html>

Missile models steal show at science fest

Bhubaneswar: City students got a unique opportunity to witness the models of various missiles like Agni, Akash, Prithvi, Brahmos, Astra, Nag and the like during the Amrit Mahotsav Science Showcase here on Tuesday.

The weeklong exhibition is being organised by Defence Research and Development Organisation in collaboration with the Odisha Council of Science and Technology at KiiT International School.

Students and teachers from across the capital interacted with 20 scientists, who have been felicitated by the National Innovation Foundation for their explorations. About 1,200 delegates have registered for the event. Founder of KiiT and KISS, Achyuta Samanta, said, "This is the age of science, knowledge and exposure.

Earlier, students were only dependent on books for knowledge, but now everyone is getting exposure due to the advancement of science. It also helped us fight the Covid-19 pandemic."

"I have never witnessed missiles in real. These models are so close to the real ones and scientists elaborated on their functioning," said Swagat Mishra, a class-VII student.

<https://timesofindia.indiatimes.com/city/bhubaneswar/missile-models-steal-show-at-science-fest/articleshow/89759903.cms>



Tech upgrade is need of the hour, says top missile Scientist

Hyderabad: There is a need for improving technology in manufacturing and material science and with the help of the Technology Development Fund, the government has been encouraging the private sector to actively take up in the research and development of new technologies in the defence and space arenas, said Director-General of Missiles & Strategic Systems BHVS Murthy on Tuesday.

Participating in the inaugural ceremony of the 'National Science Week Festival' as part of the 75th Independence Day celebrations at the ICMR-National Institute of Nutrition (NIN), he pointed out that technology upgradation has become rapid with 'disruptiveness' being the norm. Tracing the growth of the defence sector, he said with active government support the research institutions are capable of making best of the missiles within a couple of years.



BHVS Murthy | Photo

Welcoming celebrating science and scientific achievements of the country, he said this would nurture more bright youngsters to pursue it as careers. NIN senior scientist A. Laxmaiah called for expanding the nutrition surveillance across the country to collect real time data on the food habits to prepare data for an appropriate diet programme nationwide.

All the current food and nutrition programmes under implementation in the country have been due to the scientific knowledge provided by the institute and programmes like these would help in learning issues in the country, he said. NIN director R. Hemalatha, G.Bhanuprakash Reddy and G. M. Subba Rao also spoke.

<https://www.thehindu.com/news/national/telangana/tech-upgrade-is-need-of-the-hour-says-top-missile-scientist/article65075124.ece>

DRDO on Twitter

DRDO Retweeted

A. Bharat Bhushan Babu @SpokespersonMoD · 22h

Ministry of Defence to organise 'Atmanirbharta in Defence - Call to Action' webinar on February 25, 2022 to facilitate speedy implementation of Union Budget 2022-23 announcements.



Atmanirbharta in Defence
Call to Action
Webinar on budget Announcements
2022 - 2023

📅 25th February 2022
🕒 10:00 Hrs - 13:50 Hrs

@SpokespersonMoD @DefenceMinIndia MinistryofDefenceGovernmentofIndia

22 February 2022

Defence MOS Ajay Bhatt, Guj CM review DefExpo-2022 preparations in Gandhinagar

Ahmedabad: Minister of State for Defence Ajay Bhatt and Gujarat Chief Minister Bhupendra Patel on Tuesday reviewed the preparations for the 12th edition of the DefExpo 2022 which will be held in Gandhinagar from March 10 to 14.

As many as 973 exhibitors, including 121 foreign exhibitors from 63 countries, have already registered for Asia's largest exhibition on land, naval and homeland security systems, and their number is likely to increase in the coming days with relaxations in COVID restrictions, a defence release stated.

DefExpo 2022 — a premier defence exhibition to be conducted under the aegis of the Ministry of Defence — will be the biggest to be held so far, showcasing India's defence manufacturing capabilities along with participation from the world's top defence manufacturing companies, it said.

“Reviewing the planning and arrangements for the event (at the apex committee meeting), Raksha Rajya Mantri expressed that DefExpo would give a great opportunity to investments being sought for defence based industries, especially in Gujarat,” an official release said.

The Union minister expressed the government's keenness to “Indigenise” the defence manufacturing sector and take India towards becoming self-reliant in terms of defence production, with the country on the path to being recognised as a net defence exporter.

This mega event will provide an opportunity for major foreign Original Equipment Manufacturers (OEMs) to collaborate with the Indian Defence industry and help promote the ‘Make in India’ initiative envisaged by Prime Minister Narendra Modi, the release quoted the Union minister as saying.

During the review meeting, CM Patel thanked PM Modi for allowing Gujarat to host the DefExpo. He assured full support from the Gujarat government to the Ministry of Defence for the successful conduct of the event.

The DefExpo-2022 will be held in a hybrid format, with stalls in both physical and virtual realms to ensure greater engagement as the exhibitors will be able to cater to both physical and virtual attendees.

“Exhibition is being planned in a three-venue format – exhibition at the Helipad Exhibition Center (HEC); Events and Seminars at the Mahatma Mandir Convention and Exhibition Center (MMCEC) and live demonstration for the public at Sabarmati Riverfront. Safety protocols as instituted by the Health Ministry will be ensured and followed,” it said.

<https://theprint.in/india/defence-mos-ajay-bhatt-guj-cm-review-defexpo-2022-preparations-in-gandhinagar/842925/>

Plan to buy Predator drones put on hold

The centre was planning to acquire 30 Predator armed drones for use across services at the cost of at least \$3 billion from US-based General Atomics

By Shishir Gupta

India has put its plan to acquire 30 Predator armed drones from the US on the back burner, on account of its focus on indigenous development and manufacturing, as well as the prohibitive cost involved. HT learns that the Pentagon has been informed of the decision.

Although the Narendra Modi government on February 9 banned the import of drones, acquisition of unmanned aerial vehicles for defence and security purposes are exempt, but still require special and specific clearances. “As of now, the Predator deal is off,” said a top South Block official who asked not to be named.

Spearheaded by the Indian Navy, India was planning to acquire 30 Predator armed drones for use across services (10 each for the navy, air force and army) at the cost of at least \$3 billion from US-based General Atomics. The Indian Navy already has taken two surveillance Predators on lease from the US company and uses them for conducting reconnaissance of India’s maritime and land borders with China and Pakistan.



India plans to acquire 30 Predator drones in a proposed \$3 billion deal.

The decision to put the acquisition on hold was taken as India already has some capability in armed drones; it is currently upgrading the Israeli Heron drones. The Predator platform with armed payload, as in missiles and laser-guided bombs, costs nearly \$100 million apiece, but the platform has an endurance of nearly 27 hours.

The Indian Navy uses it for maritime domain awareness from Gulf of Aden to Sunda Straits in Indonesia.

While the Indian Defence Research and Development Organization (DRDO) is expected to unveil its medium altitude long endurance (MALE) drone latest by March, the country’s national security planners are looking at futuristic high altitude pseudo satellite (HAPS) technology for surveillance and targeting capability.

India has already demonstrated its capacity and capability for the manufacture of swarm drones, as was showcased in the Beating Retreat ceremony this year.

Besides DRDO, private Indian companies are also involved in the development of drones that are cheaper to operate compared to the Predator and pack similar lethality.

While the Indian Navy and Army have significant use for the drones for domain awareness, the Indian Air Force was sceptical of Predators due to congested air space, and the presence of surface to air missiles and radars in Pakistan occupied Kashmir. The Air Force is in favour of purchasing more fighter aircraft.

<https://www.hindustantimes.com/india-news/plan-to-buy-predator-drones-put-on-hold-101645565612604.html>

Make in India Engines for LCA Tejas? Modi Govt looks at securing key deals for fighter jets, nuclear submarines with France

By Ashish Dangwal

India's External Affairs Minister S. Jaishankar on February 20 arrived in Paris on a three-day visit, which is aimed at boosting bilateral ties and increasing cooperation in the Indo-Pacific region. Jaishankar met with his French counterpart Jean-Yves Le Drian, during which he discussed bilateral cooperation, Indo-Pacific, and the Ukraine situation.

“Arrived in Paris. Held wide-ranging and productive talks with FM @JY_LeDrian. Discussions on bilateral cooperation, Ukraine situation, Indo-Pacific and JCPOA reflected our deep trust & global partnership. Look forward to participating in the EU Ministerial Forum on Indo- Pacific,” Jaishankar tweeted.

During their meeting, Jaishankar and Le Drian lauded India and France's close cooperation during the COVID-19 pandemic and agreed to strengthen their strategic partnership, specifically in the realm of trade and investments, defense and security, health, education, research and innovation, energy, and climate change, according to a statement from the Ministry of External Affairs (MEA).



M88-4E afterburning turbofan engine for Dassault Rafale (Wikimedia Commons)

In line with this vision, both sides adopted the India-France Roadmap on the Blue Economy and Ocean Governance that will involve institutional, economic, infrastructure, and scientific cooperation.

France is a leading European player in the Indo-Pacific with territories it has held since colonial times. It has been attempting to expand its bilateral activities with regional maritime powers as well as through the EU missions.

The two countries also agreed to deepen the long-standing cooperation between their agencies dealing with public administration and administrative reforms, according to the statement.

The Indian foreign minister praised France for hosting an EU Ministerial Forum on Indo-Pacific Cooperation on February 22, 2022, which he would attend alongside many other ministers from the Indo-Pacific and the EU.

They additionally agreed to strengthen India-EU ties during France's presidency, as well as the need to start negotiations on India-EU FTAs and implement the India-EU Connectivity Partnership. The two ministers also agreed to jointly launch the Indo-French call for an 'Indo-Pacific Parks Partnership' during the EU Forum.

Made In India Engines

France is regarded as one of India's most important strategic allies and shares strong defense ties with New Delhi. India has already ordered 36 Rafale fighter jets from France and is reportedly considering ordering more.

Given the growing defense collaboration between the two nations, Jaishankar may hold negotiations with the French government about the transfer of technology to produce 100-kilonewton Safran aircraft engines in India as part of the 'Aatmanirbhar Bharat' (self-reliant India) program.

The engine development agreements between the two countries have been ongoing for quite some time. Indian Defense Minister Rajnath Singh said in December last year that France has

agreed to jointly produce aircraft engines in India to increase the country's self-reliance in the defense manufacturing sector.

“A big French company will manufacture an engine in India, thus far not made in the country, in collaboration with an Indian firm,” Rajnath Singh then said, most presumably referring to the Safran group.

France had earlier also proposed an enticing proposal to revive plans to develop the indigenous Kaveri jet engine as part of the Rafale agreement, as previously reported by The EurAsian Times. In addition, a detailed presentation on developing an aircraft engine ecosystem in India was given.

Safran, which develops engines and electronics for the Rafale fighter, has offered to co-develop the Kaveri engine for the Indian Light Combat Aircraft (LCA) program, which currently relies on GE engines.

Rajnath Singh stated that the Indian defense and aerospace industry market, which is currently around \$85,000 crore, would grow to \$1 lakh crore in 2022 and \$5 lakh crore by 2047.

In early 2021, Hindustan Aeronautics Limited (HAL), India's state-owned aircraft maker, and Safran signed an MoU (Memorandum of Understanding), announcing their intention to collaborate on bringing niche engine technology to India.

France had indicated that India will be the sole country to get such advanced technology transfer, ensuring that New Delhi would achieve complete “sovereignty” in the field of aero-engine technology.

France To Offer Nuclear-Powered Subs?

Owing to the changing security dynamics in the Indo-Pacific, it is widely thought that France could also offer to manufacture and jointly develop nuclear-powered conventional attack submarines in India.

Last year, the United States, the United Kingdom, and Australia announced the formation of a regional security partnership, ousting its “traditional ally” Paris. Australia will be given the technology and capability to deploy nuclear-powered submarines as part of the AUKUS partnership.

Despite the fact that this was a major setback for France, many experts considered it could be good news for India's defense industry. During French Defense Minister Florence Parly's visit to Delhi in December last year, it was reported that France had offered its Barracuda nuclear attack submarine to India.

It's worth noting that this is one of the most advanced military equipment offered to India, and it could enable the Indian Navy a potent sea denial capability in the Indian Ocean. Nuclear submarine technology is considered the pinnacle of naval prowess.

Following the Rafale fighter jet contract, this purported French promise to equip India with nuclear submarine know-how has the potential to cement France's status as India's top defense partner. This position has been historically held by Russia.

The submarines of the Barracuda class are nuclear-powered but not nuclear-armed. Despite this, a Submersible Ship Nuclear (SSN) like the Barracuda is the most lethal sea denial weapon. With the 1,000-kilometer-range Scalp Naval cruise missile, it can stay submerged for long periods of time and yet have a significant land strike capability. According to reports, the time between refueling is 10 years. The Naval Group, which is currently building six Scorpene-class diesel-electric submarines for the Indian Navy at Mazagon Dock Shipbuilders (MDL), Mumbai, is the manufacturer of the Barracuda submarine.

If the Barracuda proposal gains traction, it could have ramifications for the Indian Navy's existing \$5.7 billion Project 75 (I) program to develop a new line of six diesel-electric submarines. The project has already suffered delays with foreign vendors seeking time to formulate their proposals. Russia recently said it is not participating in the competition.

<https://eurasianimes.com/make-in-india-engines-for-lca-tejas-modi-govt-looks-at-securing-key-deals-for-fighter-jets-nuclear-submarines-with-france/>

सेना को देश में ही मिलेंगे सस्ते हथियार और गोला-बारुद

विदेशी सप्लायर्स को एक हफ्ते में, तो स्वदेशी को 4 से 6 माह में होता है भुगतान

जोधपुर: देश में ही सेना के लिए सस्ते हथियार, उपकरण, गोला-बारुद और अन्य तकनीक को बढ़ावा देने के लिए रक्षा लेखा विभाग दो महीने बाद प्रबल योजना लॉन्च करेगा। इसके तहत स्थानीय आपूर्तिकर्ताओं को आठ से दस दिन के भीतर भुगतान की व्यवस्था की जाएगी, ताकि उन्हें महंगे लोन लेकर महंगी चीजें नहीं बेचनी पड़े। उप कार्यालयों के निरीक्षण के लिए जोधपुर आए रक्षा लेखा विभाग के मुखिया रक्षा लेखा महानियंत्रक रजनीश कुमार ने सोमवार को यहां पत्रकारों से बातचीत में कहा कि प्रबल योजना से विदेशी आपूर्तिकर्ताओं और स्थानीय आपूर्तिकर्ताओं के बीच भेद खत्म हो जाएगा। अभी विदेशों से आनी वाली सैन्य सामग्री के आपूर्तिकर्ताओं को लगभग सप्ताह भर में भुगतान हो जाता है, जबकि स्वदेशी आपूर्तिकर्ताओं को 4 से 6 महीने लग जाते हैं।



सेना को देश में ही मिलेंगे सस्ते हथियार और गोला-बारुद

बजट का 22 प्रतिशत पेंशन में

देश में सेना का बजट करीब 4.50 लाख करोड़ रुपए है। इसमें 1.20 लाख करोड़ केवल पेंशन पर खर्च हो जाते हैं। देश में 13 लाख सैनिकों की तुलना में वर्तमान में 33 लाख पेंशनर्स हैं। जिससे सरकार पर काफी वित्तीय भार पड़ता है। रजनीश कुमार ने बताया कि सरकार पेंशन का भार कम करने के लिए अन्य तौर तरीकों पर विचार कर रही है ताकि पेंशन को सेल्फ जनरेट किया जा सके। हालांकि राज्य सरकारों की तरह न्यू पेंशन स्कीम समाधान नहीं है।

पेंशनर्स के लिए स्पर्श लॉन्च

देश के रक्षा पेंशनर्स को अधिक व त्वरित सुविधा प्रदान करने के लिए ऑनलाइन प्लेटफॉर्म स्पर्श लॉन्च किया गया है। इससे पेंशनर्स एक क्लिक पर अपनी पेंशन संबंधी समस्त सूचनाएं प्राप्त करने के साथ अन्य पूछताछ भी कर सकता है।

सभी 36 रफाल आए, अगले माह तक पूरा भुगतान

रजनीश कुमार ने बताया कि फ्रांस से सभी 36 लड़ाकू विमान रफाल आ चुके हैं। इसका अंतिम बैच कुछ दिन पहले ही आया है। रफाल निर्माता कम्पनी दसॉल्ट एविएशन को अगले महीने तक पूरा भुगतान भी कर दिया जाएगा। लड़ाकू विमान की नई स्कवाइन को लेकर उन्होंने कुछ नहीं कहा।

<https://www.patrika.com/jodhpur-news/indian-army-will-get-cheap-arms-and-ammunition-in-the-country-itself-7356694/>

India–Saudi Arabia military cooperation takes a step forward

Even though India has little to offer in comparison to other countries in terms of defence technology, it can aspire to become a hub for cooperative development of intra-regional defence technologies.

By Kabir Taneja

The maiden visit to India by the Chief of Saudi Arabia Land Forces, Commander Lt. Gen. Fahd Bin Abdullah Mohammed Al Mutair, has pushed defense relations between the two countries beyond one that has been largely defined by cooperation on the high seas between the navies. The visit has been another highlight in India’s expanding strategic outreach to the Gulf, with the recently concluded Comprehensive Partnership Economic Agreement (CEPA) with the UAE, a close ally of Riyadh, setting a developing cooperation standard between the two regions.

India’s steady expansion on matters of defense with Riyadh comes side by side to diplomacy between the two states taking center stage.

Lt Gen Al Mutair’s visit comes on the heels of a visit to the Gulf in December 2020 by Chief of the Indian Army, General MM Naravane, which was followed by the first joint naval exercise between the two countries in August 2021. During this visit, New Delhi and Riyadh agreed to expand on defense cooperation including in the fields of procurements and exploring defense industrial collaborations. To add to the subtleties of diplomacy, the fact that Lt. Gen. Al Mutair and Gen. Naravane publicly released photographs of the visit with the mural in the backdrop showcasing the moment when Pakistan signed the instrument of surrender in Dhaka as the 1971 war ended in Pakistan’s defeat, leading to the liberation of what is now Bangladesh was not an issue for the Saudis showcases the changes that have taken place in the recent past, and that Pakistan’s influence in the Gulf capitals over the question of India and Kashmir has its limitations.



India’s steady expansion on matters of defense with Riyadh comes side by side to diplomacy between the two states taking center stage. For New Delhi, these strategic and tactical manoeuvres alike come at a time when the traditional constructs of security in the West Asian (Middle East) region are being remolded around a relatively more ambivalent US, an increasingly visible China, and perhaps most importantly, a significant recalibration of strategic stakes amongst the three poles of power in the region, that is Saudi Arabia, Iran, and Israel. The signing of the Abraham Accords in 2020 brought a back-room collaboration between a section of the Arab world and Israel out in the open. While this consolidation of power has come forward due to a common interest to counter Iran’s regional power ambitions, its realisation was also pushed through by the views of former President Donald Trump, who wanted the US to retreat from its traditional role as a global security supplier. The wake of this discourse is still being felt across the region, as policymakers and scholars alike attempt to decipher a prevailing view of American power in ‘retrenchment’ in the Middle East and what, as former diplomat Martin Indyk has asked, a ‘post-American’ Middle East would look like. Perhaps scholars Amos Yadlin and Assaf Orion have best described American confusion over its own role as a superpower in traditional bastions of influence, such as the Middle East, as being “absent without leaving”, adding that while the American presence is still unquestionable, its willingness to use force is “limited and diminishing”.

The wake of this discourse is still being felt across the region, as policymakers and scholars alike attempt to decipher a prevailing view of American power in ‘retrenchment’ in the Middle East and what, as former diplomat Martin Indyk has asked, a ‘post-American’ Middle East would look like.

It is imperative to see India’s increasing defense ties with the Gulf in alignment with these fundamental shifts of the region’s security construct. These shifts in the Middle East are taking place as threat perceptions remain consistent. The waterways of the Persian Gulf have come under consistent strain, as a response to which New Delhi orchestrated Operation Sankalp in 2021 where Indian Navy vessels were tasked to provide safe-passage to Indian-flagged merchant vessels as US–Iran tensions escalated. As per reports, Indian warships guided more than 16 vessels a day safely through that geography, one that is critical to India’s energy security as a net importer of oil and gas. Other Asian importers, such as South Korea and China, have also committed towards similar deployments. The uncertainty of the US security blanket in the Middle East has only exacerbated further since the fallout in Afghanistan in August 2021. These events have forced the hands of those that operated under these blankets to re-work their strategic outlook, and this includes India. The US blanket also had one more significant, yet not very debated, outcome that of promoting a more moderate and globalist line of thought within Islamic politics of the region. Shades of this have been visible in both the UAE and Saudi Arabia, as the latter looks to integrate more firmly into the global economy through a reformist agenda that has also targeted religion’s traditional roles in society and politics. It, of course, remains to be seen on how effective these reforms will be in the long run.

On the bilateral front, Saudi Arabia’s moves towards opening its economy to global investment offers many opportunities for India, especially in the defense technologies sector led by private firms. As Riyadh looks to transition away from its economic dependency on oil, it still requires Asian economies and their voracious appetite for hydrocarbons to navigate this transition. The recent CEPA with the UAE, for example, offers 140,000 visas for highly skilled workers from India, and similar understandings between India and Saudi Arabia can help in creating a technology and defense-tech highway between the two as well. There is no denying here, however, that the contest is immense. The Gulf has largely relied on the West for its weapons, and even though countries like Egypt have bought MiG 29 fighter jets from Russia and the UAE has bought and operated Wing Loong UAVs from China, India’s offerings remain very limited. While both UAE and Saudi Arabia have reportedly shown interest in the joint Indo-Russian BrahMos missile system, not much headway has been made on this front and experts remain sceptical of any potential sale due to Moscow’s involvement. A recent deal for carbine guns between India and the UAE has also fallen through, with New Delhi’s call for ‘*Aatmanirbhar Bharat*’ gaining strength after the border crisis with China in Ladakh, which began in 2020.

Indian warships guided more than 16 vessels a day safely through that geography, one that is critical to India’s energy security as a net importer of oil and gas.

For now, India’s expansion on defense cooperation with the Gulf is, and should, be concentrated on securing interests specifically in the realm of trade, energy security, and demography. India’s indigenous defense technology, as of today, has little in its arsenal to counter the options that the Gulf countries have, or to break any monopoly of western, or even Russian and Chinese alternatives. Nonetheless, while expansive cooperation in defense technology and manufacturing is a good aspiration to hold, the current trajectory that of securing immediate interests is the foundation for much of this strategic outreach. India broadly should extend its support to the Gulf to build its own protective and sustainable security architecture for the future, where the region does not have to bank on ideas such as ‘security umbrellas’ designed by third parties. To this end, India’s economy and market is ideally placed to offer itself as a hub for cooperative development of an intra-regional defense technologies hub that will benefit countries like Saudi Arabia as they move forward with their reformist aims.

The views expressed above belong to the author(s).

<https://www.orfonline.org/expert-speak/india-saudi-arabia-military-cooperation-takes-a-step-forward/>

Why Bhutan is India's Achilles' heel

One reason for the PLA aggression in East Ladakh in 2020 was the Indian rebuff to China at Doklam. Disengagement from Doklam did not stop the aggression. The PLA has since fortified defences north of Doklam, extending the road along another axis — the Mochu river — towards the Jampheri ridge and built dual-use villages inside Bhutan.

By Maj Gen Ashok K Mehta (Retd)

The US Department of Defence's annual report for 2021 says that Chinese intrusive activities have continued in the Chumbi valley, including inside Bhutan, augmenting the threat to the Siliguri corridor, despite the resumption of border talks between them. Such is the sweep of the Chinese aggression across its two remaining unsettled borders with India and Bhutan.

That India unilaterally offered to revise the Treaty of Perpetual Peace and Friendship, 1949, with Bhutan, encouraging Nepal to ask for a similar update of their 1950 treaty is untrue.

In his autobiography, The Presidential Years 2012-17, Pranab Mukherjee explains how the treaty revision occurred. In early 2007, a two-hour closed-door meeting took place among Bhutan's king Jigme Singye Wangchuck, Prime Minister Manmohan Singh and Foreign Minister Mukherjee. Crown Prince Khesar Namgyel Wangchuck was present during the entire discussion. Though his father had already abdicated, he was crowned only on November 1, 2008.

India was not keen to revisit the treaty, but the King insisted. Mukherjee told the King: "We are vitally interested in preserving the concept of the joint security of India and Bhutan being common and indivisible." Both Singh and Mukherjee urged the King to reconsider revising the treaty, but he did not budge.

Instead, the King presented a draft treaty in which "common security" was central and contained in Article 2 of the treaty: "Both countries will cooperate closely in issues relating to national interest." The operative part was "neither government shall allow the use of its territory for activities harmful to the national security and interest of the other."

The 2007 treaty was signed by the then Crown Prince, who is now King Khesar, and Mukherjee. It replaced the old Article 2 — of Bhutan being guided by India in its external affairs with the issue of common security embedded. In terms of strategic security, Bhutan presented India more practical and operational terms for intervention, though there is no SOP between the two sides, either in Thimphu or New Delhi or even in Kolkata's Eastern Command responsible for the security of Bhutan.

The King is the 'sanctum sanctorum' in Bhutan. There is no defence minister; de facto the King is. The Major-General in charge of the Indian Military Training Assistance Team (IMTRAT) is the King's military adviser, although the tiny Royal Bhutan Army (RBA) as a Lieutenant-General as its Commander.

The King is believed to have done some loud thinking with his Indian military adviser about inviting Indian troops other than the 1,000 or so Indian soldiers deployed with IMTRAT.

The Indian Army units, which are to be deployed in the event of an emergency, have not visited their operational areas, except for their commanders. Skeletal troop movement for operational training is kept below the radar; so is the visibility of the Medical Assistance Mission, which is acknowledged by the Bhutanese as a key asset.



A THREAT: Chinese intrusions have continued in the Chumbi valley, including inside Bhutan. Reuters

Still, the Bhutanese youth resent the presence of the Indian troops on their soil even as business houses want diplomatic relations with China, which has exploited this chink, especially after the Indian intervention at Doklam. Bhutan fears China.

In June 2017, PLA Engineer units constructing a road in the Chumbi valley from Yatung, extending across the Doklam plateau towards the Jampheri Ridge while approaching the disputed trijunction of Gyachen, were intercepted at Doklam by 8 JAK LI deployed on the Doka La post. Disputed between Bhutan and China, Doklam poses a direct threat to the Siliguri corridor. The Indian intervention at Doklam was consequent to invoking Article 2 of the revised 2007 treaty. The RBA deployed on their post at the Jampheri Ridge did not join hands with the Indian soldiers who held the line for 72 days, till the disengagement on August 27.

The Chinese learnt cardinal lessons from the Indian intervention at Doklam that challenged and arrested PLA intrusions in violation of the standstill agreements of 1998 and 2012.

One of the reasons for the PLA aggression in East Ladakh in 2020 was the Indian rebuff to China at Doklam. Disengagement from Doklam did not stop the aggression. The PLA has since fortified defences north of Doklam, extending the road along another axis — the Mochu river — towards the Jampheri ridge and built dual-use villages inside Bhutan. The Bhutanese have denied the existence of the village identified by Google Earth imagery.

India, too, had turned a Nelson's eye, not invoking Article 2 of the treaty, with one Indian diplomat remarking that it is a "civilian matter". Obviously, India did not want to start a second front after East Ladakh. With fresh intrusions inside Bhutan, China wants its swap package — 269 sq km in the west at Doklam exchanged for 495 sq km in the north — to be implemented, though the Chinese have already occupied most of the disputed Doklam. The Chinese have done yet another *fait accompli*: in contravention of the 1890 Convention (which China invoked in 2017), they unilaterally declared the Mochu river the border with Bhutan, which is undemarcated.

Following the Chinese intrusions, a three-step Framework China-Bhutan Accord was reached last year which China has called a deadlock-breaker that may become the first step towards a border settlement, though it is inconceivable that India was not consulted, as is the practice before border or expert group negotiations. External Affairs Ministry spokesperson Arindam Bagchi said: "We have noted the developments and are aware of it."

India has also had its own three-step Framework Agreement of 2005 with China on border settlement, which was scuttled by the Chinese. Beijing has displayed power and belligerence in occupying Doklam and making an ingress southwards towards Jampheri in the Bhutanese territory. Trading Doklam in the west with territory in the north will breach Article 2 of the treaty.

But the bigger question is: If the PLA crosses India's red-lines in Bhutan, would K5, the fifth King, Khesar who did the 45th NDC course in New Delhi in 2005, invite the Indian troops for assistance? And if not, would the Indian troops unilaterally intervene, as they probably did in Doklam, invoking Article 2?

<https://www.tribuneindia.com/news/comment/why-bhutan-is-indias-achilles-heel-372152>



Wed, 23 Feb 2022

Aerial combat, individual formations highlight Day 2 of IAF-RAFO's bilateral exercise

Jaipur: The Indian Air Force (IAF) and the Royal Air Force of Oman (RAFO) are taking part in a bilateral exercise named Eastern Bridge-VI from February 21-25 at the Jodhpur Air Force station.

This is the sixth edition of the exercise which will provide an opportunity to enhance operational capability and interoperability between the two air forces.

On Tuesday, the second day of the bilateral exercise, there were interactions and familiarisation carried out with men and machines which were followed by preparations for aerial combat.

Individual formations and small-scale aerial combats were practised. Large-scale engagements will be practised at the latter half of the exercise, said defence officials, adding that both forces aim to learn the best practices of each other.

Mirage and Jaguar aircraft together flew with Air Force's leading fighter Sukhoi along with Oman's F-16. All of them flew one to one apart from forming different formations.

Participation of IAF and RAFO in this exercise will promote professional interaction, exchange of experiences and enhancement of operational knowledge, besides strengthening bilateral relations between the two countries, said officials.

<https://www.daijiworld.com/news/newsDisplay?newsID=929510>

Science & Technology News



Press Information Bureau
Government of India

Ministry of Science & Technology

Tue, 22 Feb 2022 6:56PM

India evolving as frontrunner in high power computing

India is fast evolving as a frontrunner in high power computing with the National Super Computing Mission (NSM) with Supercomputing infrastructure already installed in 10 premier institutions like IITs, IISc, IISER Pune, JNCASR Bengaluru, various C-DACs, NABI Mohali, and benefitting researchers from several other institutions too. The final stage installation work is being carried out in 5 more institutions.

This will not only help meet the increasing computational demands of academia, researchers, MSMEs, and startups in areas like oil exploration, flood prediction as well as genomics, and drug discovery, but also firm up indigenous capability of developing supercomputers.

As part of the National Supercomputing Mission (NSM), the Indian Institute of Science (IISc) Bengaluru has installed Param Pravega, one of the most powerful Indian supercomputers. Param Pravega having a supercomputing power of 3.3 petaflops, is the largest supercomputer that has been installed in an Indian academic institution.

Going ahead, design and development of indigenous server nodes, interconnect switch, storage, and system software stack for next generation of High-Performance Computing (HPC) systems has been initiated with 85% indigenous manufacturing. This includes India's first indigenous server platform called 'Rudra', which can meet the HPC requirements of all governments and PSUs as well as the strategic needs of the country.

Besides, a next-generation indigenous HPC interconnect called "Trinetra" has been designed and developed in the country for efficient inter-node communication between compute nodes. This will help improve power efficiency and also support large-scale systems.

The National Supercomputing Mission was launched to enhance the research capacities and capabilities in the country by connecting them to form a Supercomputing grid, with National Knowledge Network (NKN) as the backbone. The NSM is setting up a grid of supercomputing facilities in academic and research institutions across the country. Part of this is being imported

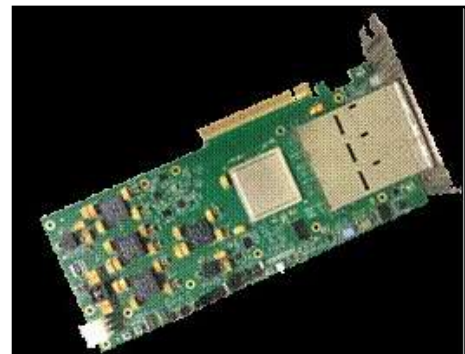


Figure: Trinetra-B PCB

from abroad, and part built indigenously, the latter being increased with time. The Mission is being jointly steered by the Department of Science and Technology (DST) and the Ministry of Electronics and Information Technology (MeitY) and implemented by the Centre for Development of Advanced Computing (C-DAC), Pune, and the Indian Institute of Science (IISc), Bengaluru.

PARAM Shivay, the first supercomputer assembled indigenously, was installed in IIT (BHU), followed by PARAM Shakti, PARAM Brahma, PARAM Yukti, PARAM Sanganak at IIT-Kharagpur IISER, Pune, JNCASR, Bengaluru and IIT Kanpur, IIT Hyderabad, NABI Mohali, CDAC Bengaluru respectively.

India's march towards leadership position in supercomputing found a fresh dimension with the convergence of HPC and Artificial Intelligence (AI). A 200 AI PF Artificial Intelligence supercomputing system created and installed in C-DAC can handle incredibly large-scale AI workloads, increasing the speed of computing-related to AI several times. PARAM Siddhi - AI, the high-performance computing-artificial intelligence (HPC-AI) supercomputer, has achieved global ranking of 62 in the TOP 500 most powerful supercomputer systems in the world, released on 16th November 2020.

The mission has also created the next generation of supercomputer experts by training more than 11,000 HPC aware manpower and faculties. To expand the activities of the HPC training, four NSM Nodal Centres for training in HPC and AI have been established at IIT Kharagpur, IIT Madras, IIT Goa, and IIT Palakkad. These centres have also conducted online training programs in HPC, AI, and other areas.

In the upcoming year, 9 more supercomputers will be commissioned and installed in institutes like IIT Bombay, IIT Madras, IIT Patna, IIT Delhi, IUAC Delhi, CDAC-Pune, SNBNCBS, NCRA Pune, and NIC Delhi. Powered by the NSM, India's network of research institutions, in collaboration with the industry, is scaling up the technology and manufacturing capability to make more and more parts in India, taking indigenous manufacturing to 85%.

This mission will provide access to High-Performance Computing (HPC) Facilities to 100 several institutions and more than thousands of active researchers, academicians working through Nation Knowledge Network (NKN) - the backbone for supercomputing systems.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1800356>



Wed, 23 Feb 2022

Scientists develop long-lasting, anti-fogging coating for plastic surfaces that self-cleans

Scientists at Nanyang Technological University, Singapore (NTU Singapore) have developed a new type of coating that, when applied on a plastic surface, prevents fogging and "self-cleans," overcoming the need for frequent reapplications.

The durable coating of a thin double layered silicon dioxide—titanium dioxide film is applied through a two-step technique.

Firstly, the plastic surface is treated with oxygen plasma, which is a common industrial method to clean surfaces to improve adhesion. Then the thin double layered film is deposited on the plastic surface using pulse laser deposition—in which a laser beam is focused to vaporize material from the intended coating targets to achieve the desired level of thickness of the film.

The approach offers better control of the film's thickness and structure during fabrication, compared to similar industrial methods, and results in a higher quality film.

The coating showed excellent adherence to the plastic surface. When subjected to abrasion using a cheese cloth pad—a standard test for optical coating, and an adhesion test using cellophane tapes, the coating maintained good durability.

Fogging is observed when water vapor condenses as water droplets on a surface, and so the anti-fogging performance of coating is measured by the speed at which the condensed water droplets spread into a uniform film that does not block vision. In experiments on the new coating, digital fast frame imaging showed a water droplet spreading within 93 milliseconds, less than the duration of the average human eye blink of 100 milliseconds.

The findings by the NTU team were published in the peer-reviewed scientific journal *Applied Surface Science*, in December 2021.

Overcomes limitations of temporary anti-fogging coatings

Anti-fogging sprays and wipes are popular products among spectacle or eyeglass wearers, more so since the COVID-19 pandemic as mask wearing becomes the norm and wearers seek to prevent condensation obscuring their view.

Anti-fogging coatings are also used in solar panels, windshields and displays or lenses that are used in humid environments.

However, current solutions in the market, such as anti-fogging sprays and wipes are temporary as they cannot withstand washing and must be reapplied regularly. In addition, they are prone to surface contamination by dirt or bacteria, which means replacement or maintenance is necessary.

While researchers elsewhere have developed anti-fogging coatings for plastics, two of the biggest barriers to their widespread adoption are the long processing time for fabrication and poor durability—that is, weak adhesion between the plastic surface and the coating.

Co-principal investigator of the study, Professor Chen Zhong of the NTU School of Materials Science and Engineering (MSE) said, "Most anti-fogging solutions today are temporary and have limited efficacy. Our team has demonstrated an approach that is fast to fabricate, taking around an hour, and produces long-lasting results, proving its potential for wide-ranging practical applications." As a result of the long-lasting anti-fogging and "self-cleaning" ability of the newly devised coating, the NTU research team believes their innovation offers an attractive, long-term solution to overcome issues of plastic fogging that may also reduce costs and waste.

Coating 'self-cleans' under sunlight exposure

Titanium dioxide—a chemical used in the coating developed by the NTU team, has photocatalytic ability, meaning it can "self-clean" by reacting with and removing organic residues under sunlight (ultraviolet light) exposure.

In lab tests, of its "self-cleaning" ability, the newly developed coating was able to break down contaminants (i.e., bacteria, dirt) on the plastic surface after a full day of ultraviolet light exposure.

Co-lead researcher, Professor Rajdeep Singh Rawat, Head, Natural Sciences & Science Education Academic Group at the National Institute of Education, NTU, said, "Our innovation is promising for use in industrial applications of various optical components, for example, on surveillance camera protective covers. The ability for the coating to 'self-clean' makes it a low-maintenance and trouble-free solution since the cover may be less obscured by surface dirt and grime, providing a clearer view for surveillance."

The newly developed coating is also anti-reflective with a superior visible light transmittance of up to 89% on a regular plastic lens, about 5% better than the same lens without a coating. This is particularly useful for use in eyeglasses, as higher visible light transmittance allows for more light to travel through the plastic and reach the eye, allowing greater clarity.

First author of the study Sun Ye, a Ph.D. student at the School of MSE, said, "The reported results prove the multifunctionality of our coating. It is antireflective, antifogging, and self-cleaning. Additionally, the fabrication approach is fast and easy to implement with great durability. This makes our innovation unique among other antifogging methods which tend to end up with coatings with limited functions."

More information: Ye Sun et al, Mechanically robust multifunctional antifogging coating on transparent plastic substrates, *Applied Surface Science* (2021). DOI: [10.1016/j.apsusc.2021.152307](https://doi.org/10.1016/j.apsusc.2021.152307)
<https://phys.org/news/2022-02-scientists-long-lasting-anti-fogging-coating-plastic.html>

