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## BRAHMOS SUPERSONIC CRUISE MISSILE SUCCESSFULLY TEST-FIRED





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# BRAHMOS SUPERSONIC CRUISE MISSILE SUCCESSFULLY TEST-FIRED

**B**rahMos supersonic cruise missile, with increased indigenous content and improved performance, was successfully test-fired from Integrated Test Range, Chandipur off the coast of Odisha on 20 January 2022. The launch was conducted by Brahmos Aerospace in close coordination with the teams of DRDO. The missile followed the predicted trajectory meeting all mission objectives.

The missile was equipped with the advanced indigenous technologies and followed a modified optimal trajectory for enhanced efficiency and improved performance. The missile with the modified control system has been fine tuned to achieve an enhanced capability. The flight test was monitored by all the sensors of the range instrumentation including telemetry, radar and electro-optical tracking systems deployed across the eastern coast and the down range ships. The flight test is a major milestone in the way forward for BrahMos programme. Teams from DRDO and NPOM, Russia participated in the test.

BrahMos Aerospace, the joint venture between DRDO and NPOM, Russia, has been continuously upgrading the powerful, highly versatile BrahMos to increase its effectiveness and lethality against sea and land targets. BrahMos is the potent missile weapon system already inducted into the Armed Forces.

Raksha Mantri Shri Rajnath Singh has complimented the



Brahmos, DRDO teams and industry for the successful flight test. Secretary, Department of Defence R&D and Chairman DRDO Dr G Satheesh Reddy appreciated the scientists and engineers for continuously putting efforts to maximise the weapon systems efficiency and more focus on indigenous content. Director General, BrahMos Shri Atul D Rane congratulated the joint teams of NPOM, Russia and DRDO teams involved in the test.



## LATOT FOR IRDE DEVELOPED PRODUCTS

**J**nstruments Research & Development Establishment (IRDE), Dehradun celebrated an iconic week to commemorate Azadi ka Amrit Mahotsav in December 2021. A function was organised on 17 December 2021 to hand over Licensing Agreement for Transfer of Technology (LAToT) for two IRDE developed products to the industries.

The technology for ‘Simulated Test & Interrogator Kit (STIK) for T-90 Tank’ was transferred to Opto Electronics Factory, a unit of India Optel Limited, Dehradun. The Kit will be used to check the readiness of the guided weapon system of the T-90 Tank in the field. IRDE has designed and developed the STIK based on the PSQR by the Indian Army. The system is completely indigenous and there is an urgent requirement for this system in the Indian Army. The technology for ‘Driver Night Sight for T-90 Tank’ was transferred to MKU Limited, Kanpur. The system comprises an advanced uncooled thermal imager and a day camera having



**Dr B.K. Das, OS & Director IRDE handing over the ToT of STIK for T-90 Tank to Shri S.K. Yadav, GM, OLF**

low light level imaging capability in form-fit configuration. It also incorporates electronic image fusion of thermal imager and day camera. The system is a substantial upgrade to the existing sighting system, which will greatly enhance the night fighting capability of T-90 tank.

Dr B.K. Das, OS and Director IRDE handed over the LAToT to officials of the industry in the presence of Dr Sudhir Khare, Sc ‘G’ & Group Director (ToT); Shri Niraj

Bhargava, PD (STIK); Shri Vipin Kumar Sharma, PD (DNS-T90); Shri M.P. Srivastava, Group Head (ToT) and senior officers of IRDE and the project teams. IRDE Director in his address emphasised the synergy between the industry and DRDO and urged the industry to absorb the ToT efficiently to produce world-class reliable systems and products. It was concluded with the photographs of the IRDE project team with the industry partners.

# DRDO HANDS OVER TECHNOLOGY OF EXTREME COLD WEATHER CLOTHING SYSTEM TO FIVE INDIAN COMPANIES

Secretary, Department of Defence R&D and Chairman DRDO Dr G Satheesh Reddy handed over technology for indigenous Extreme Cold Weather Clothing System (ECWCS) to five Indian companies on 27 December 2021.

The extreme ECWCS is required by Indian Army for its sustained operations in glacier and Himalayan peaks. The army, till recently has been importing extreme cold weather clothing and several Special Clothing and Mountaineering Equipment (SCME) items for the troops deployed in high altitude regions.

The DRDO designed ECWCS is an ergonomically designed

modular technical clothing with improved thermal insulation and physiological comfort based on the insulation required at various ambient climatic conditions in Himalayan regions during different levels of physical activity.

The ECWCS embodies physiological concepts related to reduction in respiratory heat and water loss, unhindered range of motions and rapid absorption of sweat while providing water proof, wind proof features with adequate breathability and enhanced insulation as well as strength features required for high altitude operations. The three layered ECWCS is designed to suitably provide thermal insulation over

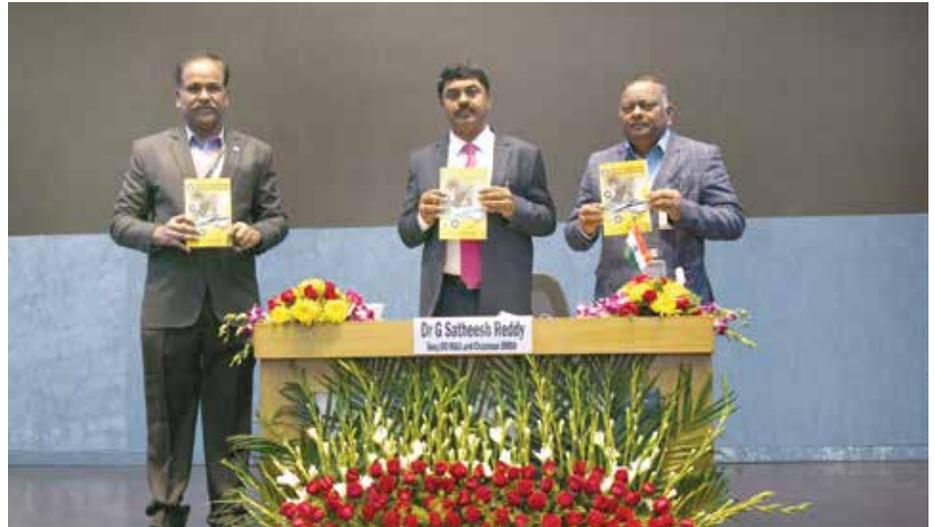
a temperature range of +15 to -50° C with different combinations of the layers and intensity of physical work.

Considering the widely fluctuating weather conditions in the Himalayan peaks, the clothing provides an advantage of fewer combinations to meet the required insulation or IREQ for the prevailing climatic conditions, thereby providing a viable import alternative for the Indian Army. Speaking on the occasion, Dr G Satheesh Reddy emphasised on the need for developing indigenous industrial base for SCME items, not only to cater to the existing requirements of the Army but also to tap its potential for export.



## DRDO CELEBRATES ITS FOUNDATION DAY

The DRDO working on multiple cutting-edge military technology areas like aeronautics, armaments, combat vehicles, electronics, naval systems, missiles, materials, advanced computing, simulation, hypersonic, quantum computing and artificial intelligence, life sciences and other technologies celebrated 64th DRDO Day on 1 January 2022. Secretary Department of Defence R&D and Chairman DRDO Dr G Satheesh Reddy addressed the DRDO fraternity on 3 January 2022. Dr Reddy along with Director Generals and other Directors of DRDO HQ paid floral tributes at the bust of Dr A P J Abdul Kalam. Addressing the gathering he said, DRDO has accomplished many successes through relentless zeal, perseverance and dedication of project teams, able leadership of project DGs, directors and lab directors. He acknowledged the support of all stakeholders like financial advisors, corporate teams, industry partners and government stakeholders in achieving the goals. He stated that scientists need to accelerate development of state-of-the-art systems and technologies for realising the goals of 'Make in India and Make for the World' set by Prime Minister Shri Narendra Modi. Four internal automation portals and two documents along with a monograph on Systems Engineering for Self-reliance were launched during the occasion. Entire DRDO fraternity from across the country participated online through internal network in DRDO Day celebrations.



# USER'S INTERACTION-CUM-TECHNOLOGY DEMONSTRATION OF IRDE PRODUCTS

**D**efence Research Laboratory (DRL), Tezpur organised a User's Interaction Meeting-cum-Technology Demonstration of IRDE-DRDO Products at DRL on 1 December 2021. The meeting was chaired by Lt Gen Ravin Khosla, AVSM, SM, VSM, GOC of 4 Corps. Dr D.V. Kamboj, Director, DRL in his welcome address highlighted the mandate and charter of the lab and the role played by DRL in the last six decades for the services in the North-Eastern sector. Dr Vanlalhmuka, Sc 'E' of DRL gave a presentation on the domain activities of DRL.

Shri Manoj Purohit, Sc 'F' of IRDE gave a detailed presentation on IRDE products and technologies suitable for the border areas for the Users. Technology demonstration of various IRDE products – BOSS, SRSE, HHTI with LRF, OTL, etc. were shown to the Users. GOC, 4 Corps appreciated the efforts of DRDO scientists and stressed on



**Lt Gen Ravin Khosla, AVSM, SM, VSM, GOC of 4 Corps during the technology demonstration of IRDE products at DRL**

the capability of the products and their upgradation while taking into consideration the factor of technology obsolescence in a shorter span of time. Senior service officers from HQ 4 Corps and senior scientists from DRL,

IRDE and DGRE participated in the meeting. The meeting and the technology demonstration was coordinated with HQ 4 Corps of Indian Army by Dr B.J. Gogoi, Sc 'E' of DRL and Shri Manvendra Singh, Sc 'G' of IRDE.

## WORK QUALITY DAY CELEBRATIONS

### CAIR, Bengaluru

Centre for Artificial Intelligence & Robotics (CAIR) celebrated World Quality Day on 26 November 2021. A talk was organised on Sustainability in Design Process for Defence Products. The talk was delivered by Mr M Satish, General Manager of Rangsons Aerospac, Bengaluru.

The speaker explained in details Six essential principles of



sustainable business, the triangle of equity, ecology and economy.

He also brought out that across the world the defence industry's only customer is the government sector and cited some examples.

He concluded that defence organisations can improve their sustainability performance by measuring, monitoring and reporting so as to have a positive impact on society, economy and the planet as well through continuous improvement.

## NSTL, Vishakapatnam

Naval Science & Technological Laboratory (NSTL) celebrated World Quality Day-2021 on 11 November 2021 with the theme "Sustainability: Improving our Products, People & Planet".

The event was inaugurated by chief guest Dr Samir V Kamat, DS & DG (NS&M). Shri R Srihari, Sc 'G' & Technology Director (QRS) gave the welcome address and told that the main purpose behind this celebration is to raise the level of quality awareness and to recognise the efforts and contribution of quality professionals. He said that achieving long-term sustainability can be achieved with continuous efforts and by habituating a quality culture in the organisation and that quality lies inside innovation and successful outputs come by making quality mandatory.



The chief guest distributed prizes to the winners of the quiz contest on the basic concepts of quality and reliability, along with Director NSTL. Also, three short lectures on the theme by Cmde. RK Jena, Chief Inspector of Naval Armaments (East), Rear Admiral S. Misra, Ex-Director General

of Naval Armaments Inspection (DGNAI), DRDO Fellow and Dr A Srinivas Kumar, OS & Technology Director (Batteries & Explosives), were arranged. All senior scientists, officers, members of NSTL Civil Employees Union and Works Committee and staff of the NSTL participated in the event.

## ITR CELEBRATES DRDO DAY

**J**ntegrated Test Range (ITR), Chandipur celebrated 64th DRDO Day – 2022 on 3 January 2022. On this occasion, Director ITR Shri H K Ratha briefed about the achievements of ITR during the Year 2021. He highlighted the notable achievements of ITR during the year 2021 like successful Test Firing of a record number of Missiles despite COVID-19 Pandemic situation and Infrastructure developments programs taken up such as renovation and expansion of Health Care Centre, Inclusion of ICU on Wheels, etc. He appreciated the social activities taken up by ITR like Swachhata Hi Seva Campaign, Plantation



programme and drive for Green ITR.

He further emphasised the contributions of every individual along with the support of the families towards achieving the goal. He inspired the employees to have a shared vision of a world-class test range with state-of-the-art instrumentation and infrastructure along with the expansion of Ranges.

The fifth edition of in-house Hindi magazine 'Arohi Utkrushtata ki or' and 'Goal Document of ITR 2022' were released during the occasion.

Annual Cash Award of ITR for commendable performance during the year 2019 and ITR Rajbhasha Award for significant contribution towards implementation of Official Language Policy of the Union and Rajbhasha Hindi were given to the

employees of ITR. Prizes in various competitions - Quiz, Antakshari, Classical and Folk Dance, Classical and Light Vocal Songs, Ladies events, etc. held in connection with annual day celebrations were distributed to the winners on this occasion.

Shri P N Panda, Sc 'F', AGD (HR) and his Team coordinated the programme.

## RAISING DAY CELEBRATIONS

### DRDE, Gwalior

Defence Research & Development Establishment (DRDE) celebrated its 49th Raising Day on 28 December 2021. Dr U.K. Singh, OS and DG (LS) was the chief guest of the function. Dr Devakanta Pahad Singh, Director, PM & SQR and Dr Maya Kumari, Sc 'E' from DG (LS) office also graced the function. Dr MM Parida, Director, DRDE welcomed the chief guest and audience and presented an overview of various achievements, ongoing as well as upcoming project activities at DRDE. He thanked all the previous directors of DRDE for bringing the laboratory to this level and urged the scientists not only to keep this level maintained rather take big strides further. Dr Singh, DG (LS) distributed the laboratory-level awards to scientists and staff. Dr S. Upadhyay, Sc 'F' and Dr Subodh Kumar, Sc 'F' were bestowed with the 'Laboratory Scientist of the Year' award. The 'Technology Group Award' was conferred to a team who contributed in the development of '2-DG' a potential



repurposed drug for Covid management. Medals were also given to employees who completed 25 years of service in DRDE. In his address, Dr Singh mentioned that DRDE is an important laboratory of LS cluster and appreciated the R&D efforts being pursued here, especially in the area of Chem-bio defence. Citing the mythological examples, he emphasised that

each individual has unique power like 'Hanuman'. The only need is to identify this power so that concerted efforts can be made collectively in the right direction at right time to achieve the specific targets. He suggested that scientists and staff should work keeping the specific deliverables in mind. Dr K. Ganeshan, Sc 'G' delivered the vote of thanks.

## ITR, Chandipur

Integrated Test Range (ITR), the establishment engaged in test and evaluation of rockets and air borne systems, observed 39th Lab Raising Day on 26 December 2021. DG (MSS), Dr BHVS Narayana Murthy was present as the chief guest along with Shri K S Varaprasad, DG (HR) and Shri D K Joshi, Director, PXE as guest of honour, respectively. Director ITR, Shri H K Ratha and Associate Director, Mrs B Sucharita joined the guests on the stage during the celebration function. The function was live telecasted on online platform. The employees witnessed the programme from their respective workplaces whereas the family members

enjoyed the programme through live streaming.

Shri Ratha highlighted the achievements of ITR during the year 2021 and new challenges ahead to meet the future requirements of the users. Dr Murthy appreciated the effort of team ITR in conducting launch activities throughout the year and providing test data to the users in record time enabling quick analysis of flight vehicle performance.

On this occasion, in house trilingual magazine, 'UTKARSH' (5th edition) was released containing literary works from the employees and their family members in Hindi, English and Oriya languages.

Prior to the main celebration function held on 26 December, various events were conducted

in the evening at ITR residential complex, Balasore. Sit and Draw for the children (with more than 100 participants), quiz and antakshari competitions, ladies events, track and field for children and cultural competitions were conducted where all the employees and their family members participated in huge numbers.

The winners of these events were subsequently awarded by the Director, ITR on the evening of 26 December 2021. The award ceremony was followed by a cultural programme in which ITR employees and their family members presented song and dance performances which was enjoyed by the audience who joined at ITR colony as well as through online.



# ICONIC WEEK CELEBRATION

## DRL, Tezpur

Defence Research Laboratory (DRL) Tezpur organised a webinar on 16 December 2021 as a part of the celebration of Iconic Week, under Azadi Ka Amrit Mahotsav. The webinar aimed to make the younger generation aware of the latest scientific advancement in various fields of science. The inaugural speech was delivered by Dr Rama Dubey, Scientist, DRL followed by a series of scientific lectures on various topics such as 'Polymers for Defence Applications' by Dr Rama Dubey, 'Use of Laboratory Animals in Research' by Dr YD



Bhulia, 'Toxicogenic Cyanobacteria' by Dr A Bora and 'Application of Nanotechnology for Water/Wastewater Purification' by Dr RR Devi. Students and faculty members from various colleges

participated and enthusiastically interacted with the speakers. The programme was ended with a vote of thanks proposed by Dr Bodhaditya Das, Technical Officer.

## DLRL, Hyderabad

Iconic Week was observed at Defence Electronics Research Laboratory (DLRL), Hyderabad during 13-19 December 2021. The programme was inaugurated by Director DLRL Dr K Maheshwara Reddy in presence of Associate Directors, DoMS and employees in the ANR auditorium following all Covid -19 protocols. On this occasion, the Science & Technology Forum of DLRL organised a series of lectures.

The first lecture was on the Design & Development of Novel Compact Broad Band Antennas using Canonical structures for VHF/UHF bands by Dr C. Sairam, Sc 'G', DLRL. The second lecture was on Cognitive Electronic Warfare, by Capt. Rami Reddy, DLRL. The third lecture was on VIDYA – Science of Happiness, by Dr S. Karunanidhi, Sc H, Associate Director, RCI. The fourth lecture was on DF & LF Algorithms for



COMINT by Shri. Sanjay Pandav, Sc 'F', DLRL, and the fifth lecture was on Drone Technologies and Countermeasures by Shri V. Kishore, Sc 'D', DLRL and the Sixth lecture was on Challenges in Integration of EW Systems by Shri E. Ramesh, Sr. DGM, BEL (H).

## NPOL, Kochi

Naval Physical & Oceanographic Laboratory (NPOL) Kochi celebrated Azadi Ka Amrut Mahotsav. In continuation of the year long activities, two events were organised for the higher secondary school students during November

2021. The objective of the events was to motivate the students to participate in nation-building, introduce them to the challenging opportunities in DRDO, provide an overview of the major R&D initiatives, introduce the unique R&D facilities and infrastructures in NPOL and excite them with the challenging career opportunities awaiting them in Defence R&D.

"INSPIRE: Online Interactive outreach Event" was conducted with Principals, Placement Officers and selected students of the Polytechnic colleges in Kerala on 19 November 2021. Shri S Vijayan Pillai, OS & Director, NPOL inaugurated the online session. The programme focused on career opportunities in DRDO for polytechnic students. A session was exclusively conducted for providing information regarding CEPTAM examinations. Smt. Remadevi M, Sc 'G', Associate

Director (Electronics) & Chairman, HRD Council, interacted with the participants. Shri Jojish Joseph, Sc 'F' gave a presentation on various career opportunities in DRDO. A visit was arranged for the students of Bhavans Varuna Vidyalaya on 24 November 2021. Bhavans Varuna Vidyalaya is a joint venture

of NPOL and Bharatiya Vidya Bhavan. They visited the Materials and Transducers Simulated Test Centre (MATS) facility, the only such facility in the Asia Pacific region capable of undertaking any static or dynamic measurement and calibration of materials meant for "under the ocean" use. The

students also visited the project integration rooms and interacted with the scientists. USHUS Submarine Sonar, USHUS Training Simulator, NAGAN Towed array, Project SPACE, Optical and Materials Division were among some project facilities demonstrated to the students.



Students from Bhavans Varuna Vidyalaya' at NPOL

## DEFENCE PRODUCTS EXHIBITION

Defence Research and Development Establishment (DRDE), Gwalior organised a 'Defence Products Exhibition' on 17 December 2021 during the Iconic Week of 'Azadi Ka Amrit Mahotsav'. The exhibition was inaugurated by Prof. Avinash Tiwari, Vice Chancellor, Jiwaji University, Gwalior. Addressing the gathering, Dr Manmohan Parida, Director, DRDE said that the purpose of such programme is to demonstrate the glimpse of 'Self-reliant India'. Highlighting the importance of the Hon'ble Prime Minister's slogan 'Jai Jawan, Jai Kisan, Jai Vigyan & Jai Anusandhan', he said that the coming era is going to be full



Prof. Avinash Tiwari, Vice-Chancellor, Jiwaji University inaugurating the Exhibition

of challenges and research will play a pivotal role. Various DRDE developed products including CAM, ACADA, NBC Mk-V suit,

FAK, RVD kit, water poison detection kit, various diagnostic kits and biodigester were displayed in the exhibition. It is

pertinent to mention that during the Covid pandemic, DRDE has made a notable contribution in bulk production of Sanitizer, N-95 Mask and PPE kits besides testing

and evaluation of various samples. Prof. Tiwari said that DRDE has made a remarkable contribution in the field of chemical and bio-defence and students, researchers

and the academic world would also be benefited from such exhibitions as they get first-hand information about the scientific achievements of the country.

## ISO 9001:2015 CERTIFICATION FOR IRDE

**J**nstruments Research & Development Organisation (IRDE), Dehradun was awarded an ISO 9001:2015 certificate on 17 December 2021 by the Bureau of Indian Standards (BIS). This is a QM Certificate awarded by BIS for maintaining the quality management systems. The certificate was handed over by Shri Sudhir Bishnoi, Head, BIS Dehradun Office on behalf of BIS to Dr B.K. Das, OS & Director IRDE. In his remarks, Dr Das thanked BIS for awarding the certificate and appreciated the efforts of Shri J.P. Singh, Sc 'G' and his team for this achievement.



## TECHNICAL BOOK EXHIBITION 2021

### CASDIC, Bengaluru

A Technical Book Exhibition was organised by Technical Information Centre (Nalanda) during 10-11 November 2021 at Combat Aircraft Systems Development and Integration Centre (CASDIC), Bangalore. The exhibition was inaugurated by Dr K Maheswara Reddy, DS & Director, DLRL and Shri CH Durga Prasad, Sc 'G', Centre Head, CASDIC presided over the function. The display of books was well planned and executed. The exhibition included a wide range



**Dr K Maheswara Reddy, DS & Director, DLRL & Shri CH Durga Prasad, Sc 'G', Centre Head, CASDIC**

of books on diverse subjects. The exhibition received immense response from officers and staff of CASDIC.

### IRDE, Dehradun

Knowledge Centre (KC) of Instruments Research & Development Organisation (IRDE) organised a Technical Book Exhibition during 9-10 December 2021 at IRDE under 'Azadi Ka Amrit Mahotsav'. Dr B.K. Das, OS & Director IRDE inaugurated the exhibition on 9 December 2021. Five book supply firms displayed their books. A total no. of 1760 books was displayed during the exhibition and 458 books were selected by IRDE officers and staff.



**Dr B.K.Das, OS & Director IRDE interacting during Technical Book Exhibition**

## HINDI PAKHWADA CELEBRATION

Defence Research Laboratory, Tezpur organised Hindi Pakhwada from 9-22 November 2021. Shri Vishnu Chandra Jha, Director, DMS, DRDO graced the inaugural function as the chief guest. Chief guest in his inaugural address expressed his views on the Hindi language in a broader way and conveyed his best wishes for making Hindi Pakhwada a success. Dr DV Kamboj, Director, DRL, delivered a welcome address, emphasising the importance of the Hindi language and highlighting the purpose of organising the Hindi Pakhwada. Competitions like poem recitation, dictation, essay writing, memoirs, translation, calligraphy, debate, folklore, digital poster design, etc. were organised. The vote of thanks, proposed by Dr



Soumya Chatterjee, Sc 'E'. During the period, Esteemed Guests, Col. (Retd.) Dr P. Bhattacharya and Dr Amod Kumar, Sc 'G', DGRE, Chandigarh also delivered lectures highlighting the importance of the Hindi language. The closing ceremony was graced by Dr Sudhir

Kamath, OS & DG (Med & Cos), as chief guest. Dr Kamath expressed his happiness to be present at the function and deliberated on the wide use of Hindi language in the workplace and conveyed wishes to one and all, for making the Hindi Pakhwada a grand success.

# SANYUKT RAJBHASHA VAIGYANIK EVAM TAKNIKI SANGOSHTHI

**J**nstitute of Nuclear Medicine and Allied Sciences (INMAS), New Delhi organised a Joint Official Language Scientific and Technical Conference during 17-18 November 2021. Chief Guest, Dr U.K. Singh, DG(LS), inaugurated the conference. Conference patron Dr Anil Kumar Mishra, Director, INMAS; Co-patron Dr K. Ramachandran, Director, DIPR; Dr S.B. Taneja, Director, ISSA; Dr K. Nageswara Rao, Director, DESIDOC; Dr Alok Jain, Director, CEPTAM; Dr Rajiv Varshney, Director, DIPAS; Shri K.K. Gaur from EMU and representatives of other labs attended the inaugural ceremony. Inauguration commenced with release of souvenir of the meeting followed by the brief conference description by Dr Sudhir Chandna, Sc 'G', Chairman organising committee and Welcome note by

Dr Mishra. Dr Kumar appreciated the efforts and congratulated the organising committee and emphasised the role of Hindi in S&T. He deliberated his views on Hindi as an official language. He stressed its use to strengthen it and make it towards the language of S&T and suggested writing a scientific research article in Hindi to make it worthwhile for the ordinary person.

A total of 107 participants attended and 73 participants presented paper in the conference from various labs of Delhi Cluster and all over India. They shared their research and research aptitude in the tight sessions of the two-day conference. The conference was divided into five sessions, starting with the psychological effect due to COVID-19 and their remedies; the second session was dedicated to COVID research and

management. In the third session, scientists shared their ideas and research on basic science in Hindi and the fourth session was about Rajbhasha rules and their progress as an official language. The fifth session was for poster presentation and a short 3-minute discussion on each poster. To make the conference interactive, a Yoga session was conducted at the end of day one and Kavita-path on day two. The valedictory session was chaired by Dr Ravindra Singh, Director, Dte. of Parliamentary Affairs, Rajbhasha, O&M, DRDO HQ with the closing note and certificate distribution to all the presenters. He emphasised the use of simple Hindi for its wider use and applications in official as well as research and technology areas. A vote of thanks was given by Dr Anshoo Gautam, Sc 'E' and Rajbhasha Adhikari, INMAS.



## CONSTITUTION DAY CELEBRATION

Constitution Day was celebrated in Naval Science & Technological Laboratory (NSTL), Visakhapatnam on 26 November 2021. Director with all officers and staffs assembled at Main Building Director's office Foyer and collectively read out the preamble to The Constitution of India, and Pledge to Abide it, in front of Dr B R Ambedkar statue and paid floral tribute to the National Leader.



## SWACCHATA PAKWADA AT DEAL

Swacchata Pakhwada was organised at Defence Electronics Application Laboratory (DEAL), Dehradun from 12-15 December 2021. It kick-started with the Swacchata Pledge taken by DEAL officials on the first day. This was followed by identifying and cleaning the areas around DEAL premises and tree plantation by Director DEAL and other lab officials. Employees were encouraged for the indoor cleaning of their workplaces. Weeding out of the old records was carried out at the Admin, Budget, Accounts and Audit section. E-waste was disposed of following the laid down



SOP. An awareness campaign was carried out for discouraging the use of single-use plastics and jute bags were distributed by Dr BK Das, Director, DEAL. Online

Swacchata Quiz was organised. In the interactive discussion with the officials, Director, DEAL stressed the need of making Swacchata practice a regular affair.

### Patent Granted on Robotics System

Shri K. Ramesh, Sc 'G' (Retd), Dr Murali Krishna, Sc 'F' and Shri Aurn Prakash Rao, Sc 'E' from Centre for AI & Robotics (CAIR) were granted a patent by the Indian Patent Office for the development of Robotics System. The system consists of a wall-climbing robot that uses a high-speed impeller for generating low pressure that helps it to adhere to a flat surface. A high-speed brushless DC motor is used to drive the impeller. The skid steering mechanism is driven by two DC servo motors. It can manoeuvre easily on flat surfaces and is capable of moving from floor to wall and vice versa. The robot can be put on the floor near the wall on which the robot is to be deployed which can be helpful, especially when going near a wall can be hazardous. A remote control unit is used for controlling the robot motion as well as the robotic arm where a wireless camera is mounted.

# NPOL COMMENCES CONSTRUCTION OF NEW INFRASTRUCTURE FACILITY

The Naval Physical & Oceanographic Laboratory (NPOL), Kochi the only DRDO lab in Kerala is all set to expand its infrastructure for cutting-edge research and development of state-of-the-art underwater surveillance systems. Adding to its array of facilities at the Underwater Acoustic Research Facility (UARF), Kulamavu is the new facility called “Submersible Platform for Acoustic Characterization & Evaluation (SPACE)”. This unique water-based infrastructure is being developed and constructed by L&T Shipbuilding, Chennai.

The ‘Plate Cutting Ceremony’ of the facility took place at L&T’s shipyard at Kattuppali near Chennai on 14 December 2021. Shri S. Vijayan Pillai, OS & Director NPOL, switched on the steel cutting process for the hull of the SPACE in the presence of Shri Sameer Abdul Azeez, Project Director (SPACE) and Shri Ashok Kumar Khetan, Head Shipbuilding Business, L&T Shipbuilding. Speaking on the occasion, he pointed out that SPACE is going to be a unique facility of its kind in the world considering its technical attributes as well as the geographic features of the site where it will be based. He also added that this national facility will be a boost to NPOL in its quest for developing sonars of global standards.

Elaborating on the operational advantages of the facility, Shri Sameer Abdul Azeez highlighted



**Shri S. Vijayan Pillai, OS & Director NPOL addressing during the Plate Cutting Ceremony**

that SPACE offers the capability of integrated testing and evaluation of full-fledged sonar systems and associated technologies in submerged conditions in a controlled environment. He further pointed out that the facility would enable deployment of 100 tons of payload to depths

of 100 meters, and maintain them at the required depths in stable conditions, closely monitored through various sensors and controls. Thereby, SPACE would serve as a test track for any type of sonars or other types of underwater sensors in the days to come.



# DRDO Newsletter

## Readers' Views

(Your feedback is important to us as it gives scope for improvement and serve the organisation in a better way)

1. **Name of the Establishment:** \_\_\_\_\_
2. **How would you rate the *DRDO Newsletter* as a medium to adequately present DRDO developments?**  
 Excellent     Very Good     Good     Fair     Satisfactory
3. **How would you rate the technical contents of the *Newsletter*?**  
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 In the previous month of publishing     In the same month of publishing   
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8. **Suggestions, if any, to further improve the technical content of the *Newsletter*?**

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Name: .....

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Please mail your suggestions to:

**The Director, DESIDOC**

**DRDO, Metcalfe House, Delhi - 110 054**

## RAKSHA RAJYA MANTRI INAUGURATED BSL-3 FACILITY AT DIBER

**R**aksha Rajya Mantri Shri Ajay Bhatt inaugurated the BSL-3 facility at Defence Institute of Bio-Energy Research (DIBER), Haldwani on 23 December 2021. The facility is Uttarakhand's first Container-based BSL-3 facility and at present is being deployed for covid testing. The facility is compact, self-sufficient, fully air-conditioned and has the capacity to test 96 samples per shift. It can be easily deployed in the hills.

Shri Bhatt reviewed and witnessed R&D activities, products and technologies of the Institute at DIBER HQ Haldwani and Field Station Pithoragarh between 21 and 23 December 2021. He appreciated the extended trials of bio-diesel with the Indian Army



and Navy, hydroponics technology R&D solutions for deriving energy from pine needles. He took special cognizance of DIBER's reach out efforts to more than 4000 farmers in border districts of Uttarakhand, exemplarily to village Niti. Shri

Bhatt was keen to expand these activities at a faster pace and to more farmers so that the socio-economic status of farmers is improved and ultimately the migration from the hills is contained.

## INAUGURATION OF FACILITY FOR HYPER SPECTRAL IMAGING

**D**r B.K. Das, OS & Director, Instruments Research & Development Establishment (IRDE), Dehradun inaugurated Optics Integration and Characterization Facility for Hyperspectral Imaging on 17 December 2021 at IRDE. This is an excellent facility for optics integration. This facility is equipped with all the latest equipment. Dr Das lauded the efforts made by the team for establishing this facility.



## FIRE SAFETY TRAINING AT CASDIC

**C**ombat Aircraft Systems Development & Integration Centre (CASDIC), Bangaluru organised Fire Safety Training on 17 November 2021 to educate CASDIC personnel regarding the importance and inevitability of understanding and practising fire safety-related concepts. The talk was delivered by an eminent expert on the subject, followed by a practical session on how to use the fire extinguishers during exigency.



## TRAINING OF SERVICE OFFICERS IN COUNSELING

**D**efence Institute of Psychological Research (DIPR), Delhi conducted a special training programme in Psychological Counseling for the Army Officers. The programme was conducted from 15-26 November 2021. The inaugural address was delivered by Dr K. Ramachandran, Director, DIPR. Brig Navin Verma, DDG (DV), Army HQ addressed the course participants. The training program was attended by 28 Indian Army officers in the Ranks from Captain to Colonel and 2 BSF Officers also attended the course. Around 20 expert speakers specialised in their area both from the lab as well as from various institutions, academia and hospitals shared their knowledge and expertise with the participants by delivering enlightening talks and conducting



practical sessions. Dr Archana, Sc 'F', Group Head Follow up Division was the coordinator of the training program. This was the eleventh such program conducted successfully by DIPR and so far

more than 367 officers have been trained in psychological counseling who are delivering their services at the units and formation levels of the Indian Army.

## COURSE ON GEM PROCUREMENT FOR DEAL, IFA & IAF

A one-day course on 'GeM Procurement' was conducted by Institute of Technology Management (ITM), Mussoorie on 16 November 2021 for the officials of DEAL, IFA and IAF at Dehradun. The course was conducted offline and 27 Officers participated. The course was inaugurated by Dr BK Das, OS & Director, DEAL & Gp Capt Raja K Mansharamani, Course Director, ITM and Shri Ajay Mailk, Sc 'G', HRD Gp Director, DEAL. Gp Capt Mansharamani addressed the course participants and deliberated upon the importance of understanding GeM Procurement Process. Director DEAL, in his address, emphasised the relevance of organising such types of courses. Gp Capt Mansharamani was the faculty for this course.



Sessions on various topics, viz., Overview of GeM, Mode of Procurement in GeM, Bid RA, GeM RA & PTS, Bunch Bid-BOQ buyer, Custom Catalogue Bids,

Order Process and CRAC and Question- Answer were delivered.

The feedback responses from the participants were overwhelming.

## TRAINING ON PROTECTED CULTIVATION

To mark Aazadi Ka Amrit Mahotsav, a training programme on 'Protected Cultivation' with the theme Improving Quality of Life of Farmers was organised at DRL R&D Centre, Tawang on 15 November 2021. During the training, the farmers were taught various techniques of protected cultivation, including low-cost structures so that they can grow vegetables even during severe winter that prevails in Tawang, due to which, open cultivation is not possible during the period. A total of 25 farmers from nearby villages namely, Khinmey and New Lebrang attended the programme.



## HIGHER QUALIFICATIONS ACQUIRED



### ASL, Hyderabad

Shri Golla Rama Rao, Sc 'F', Advanced Systems Laboratory (ASL) has been conferred PhD from National Institute of Technology (NIT), Warangal, Telangana for the thesis titled "Studies on the Effect of Nanoclay Addition on Mechanical, Thermal and Ablation Behaviour of Carbon Fiber Reinforced Polymer Composites"



### NPOL, Kochi

Shri Jomon George, Sc 'G', Naval Physical and Oceanographic Laboratory (NPOL) has been awarded PhD under the faculty of Technology from Cochin University of Science and Technology, in the area of Electronics, for the thesis titled, "Novel Detection and Countermeasure Techniques for Torpedo Defence Systems".

## VISITORS TO DRDO LABS

### CAIR, BENGALURU

✧ Student officers from Long Gunnery, INS Dronacharya visited Centre for Artificial Intelligence & Robotics (CAIR) on 11 October 2021. There was a briefing by Dr Subrata Rakshit, OS & Director, CAIR followed by discussion and demonstration of technologies developed by CAIR in the area on intelligent systems and robotics and command control land forces, geographic information system and secure systems.



✘ Brig. Ravi Singh, Brig PMO TCS visited CAIR on 20 October 2021. There was a briefing by Dr Subrata Rakshit, OS & Director, CAIR followed by discussion and demonstration of technologies developed by CAIR in the area on intelligent systems & robotics and command control land forces, geographic information system and secure systems.



✘ Lt.Gen MU Nair, SM, Commandant MCTE, Mhow visited CAIR on 20 October 2021. There was a briefing by Dr Subrata Rakshit OS & Director, CAIR followed by discussion and demonstration of technologies developed by CAIR in the area on intelligent systems & robotics and command control land forces, geographic information system and secure systems.



## DEAL, DEHRADUN

Major General PK Airy, VSM, Assistant Chief, IDS (ICT), HQ IDS visited Defence Electronics Application Laboratory (DEAL) on 18 November 2021. He was briefed about the various ongoing project and activities of the laboratory by Dr BK Das, Director, DEAL. He visited the different divisions and was apprised of projects including Software Defined Radios (SDR), satcom terminals, multichannel hub baseband system, data links, troposcatter communication and VLF systems. He took a keen interest in these projects and appreciated the progress made by DEAL in the development of these high-end communication and surveillance systems.



## DIBER, HALDWANI

✧ Dr UK Singh, DG (LS) visited DIBER during 5-6 December 2021. Dr Madhu Bala, Director DIBER welcomed him and presented a brief of R&D efforts of DIBER, and their utility for Services and other sectors. Dr Singh took keen interest in the activities of DIBER and visited the technical area. He instructed to suitably identify and include industry partners in different R&D activities to pace up the development and commercial launch of the products at the earliest possible.



✧ Lt Gen. SS Mahal, VSM, GOC-in-C UB Area visited DIBER on 7 December 2021. He was welcomed by Dr Madhu Bala. Briefing on activities of the institute and relevant products was provided by her. He was very impressed with the extensive trials of bio-diesel in army and navy vehicles and generator sets. He showed keen interest in the implementation of the technology at the earliest. He was also keen on utilising the pine fuel at forwarding locations.



## IRDE, DEHRADUN

✧ Shri Bhaskar Burman, Sc 'G' & SA to CNS visited Instruments Research & Development Establishment (IRDE) on 1 December 2021. Shri J.K. Bajpai, Sc 'H' & Associate Director, IRDE welcomed him and explained in detail the products and technologies developed by IRDE. Shri Burman took keen interest in these products and technologies. He appreciated the efforts of IRDE for the successful development of these products.



✧ Ms J. Manjula, DS& DG(ECS) visited IRDE on 11 December 2021. Dr B.K. Das, OS & Director, IRDE welcomed her. Ms Manjula reviewed various projects of IRDE. Dr Das explained in detail the progress of these projects. An exhibition of products developed by IRDE was organised during her visit. Ms Manjula interacted with the scientists and appreciated the efforts of IRDE for the successful development of these products



**Dr B.K. Das, OS & Director IRDE welcoming Ms J. Manjula, DS & DG (ECS)**

## NPOL, KOCHI

✧ Shri KS Varaprasad, DS & DG (HR) visited Naval Physical & Oceanographic Laboratory (NPOL) on 9 November 2021. Shri S Vijayan Pillai, OS & Director, NPOL welcomed DG (HR) and briefed him on the ongoing project activities being carried out at NPOL. He had interaction with all scientists of NPOL.

✧ The Hon'ble Vice President of India, Shri M. Venkaiah Naidu, visited Naval Physical & Oceanographic Laboratory (NPOL) on 2 January 2022, as chief guest in a function that was arranged in connection with the 'Azadi Ka Amrit Mahotsav' initiatives at NPOL. The Hon'ble Governor of Kerala, Shri Arif Mohammad Khan; Minister for Industries, Govt. of Kerala, Shri P. Rajeev; Member of Parliament of the Ernakulam Lok Sabha Constituency, Shri Hibi Eden; Director General (NS&M),



**Shri KS Varaprasad, DS & DG (HR) being briefed by Shri S Vijayan Pillai, OS & Director, NPOL**

DRDO, Dr Samir V. Kamat; Director General (ATVP), Vice Admiral, KO Thakare (Retd); Director, VSSC, Shri Somanath; Chief Staff Officer (Training), Southern Naval Command, Rear Admiral TVM Presenna; Director (R&D), BEL, Shri M V Raja Shekhar; Director NPOL, Shri S. Vijayan Pillai; and many other

dignitaries from the government and industry also attended the function.

The Hon'ble Vice President laid the foundation stone of the Towed Array Integration Facility that is being set up at NPOL. The facility when completed is slated to become a state-of-the-art integration facility for long length flexible

sensor arrays and cables and will have its own machine shop, array assembly shop, pressure testing facility, array filling facility and winch testing facility.

The programme also witnessed the handing over of the DHWANI Acoustic Trainer System to the Indian Navy. DHWANI is a complete automated sonar trainer that is equipped with a small acoustic tank, multiple sensors, vessel signature generation tools, as well as Signal Processing and displays hardware.

The Hon'ble Vice President, in his address, said that he was very happy to see that NPOL

has established itself as a world leader in the niche area of underwater surveillance systems and technologies. He added that the contributions of a single lab of DRDO such as NPOL was immensely contributing towards national security and prosperity, and applauded the fact that all leading platforms of the Indian Navy were equipped with NPOL designed surveillance and defence equipment.

The Hon'ble Vice President formally inaugurated the Dr APJ Abdul Kalam Memorial erected at NPOL and unveiled the plaque in the ceremony. The memorial,

made in tribute to former President, comprises his statue, along with descriptions that chart his inspirational life. Models of missiles and rockets developed under the IGMDP programme of DRDO which was initially guided and championed by Dr Kalam also adorn the memorial area. An Azadi Ka Amrit Mahotsav installation – which portrays some of the exemplary sonar achievements of NPOL was also inaugurated by the Hon'ble Vice President. The dignitaries also visited a special exhibition area that showcased various NPOL products.



**Hon'ble Vice President of India, Shri M. Venkaiah Naidu Laying Foundation Stone of Towed Array Integration Facility**