

# DRDO

NEWSLETTER



75  
Azadi Ka  
Amrit Mahotsav

A Monthly Bulletin of Defence Research  
and Development Organisation

ISSN: 0971-4391

[www.drdo.gov.in](http://www.drdo.gov.in)

DECEMBER 2021 |

VOLUME 41 |

ISSUE 12

## HIGH-SPEED EXPENDABLE AERIAL TARGET ABHYAS SUCCESSFULLY FLIGHT-TESTED



# CONTENTS

DECEMBER 2021  
VOLUME 41 | ISSUE 12  
ISSN: 0971-4391

**COVER STORY** ..... 4



EVENTS .....	5
HRD ACTIVITIES .....	16
VISITS .....	20



### 41st Year of Publication

**Editor-in-Chief:** Dr K Nageswara Rao  
**Associate Editor-in-Chief:** Sunil Dhar  
**Managing Editor:** Nishant Kumar

**Editor:** Dipti Arora  
**Editorial Assistance:** Biak Tangpua, Raj Kumar

**Printing:** SK Gupta  
**Distribution:** Tapesh Sinha

**Website:** <https://www.drdo.gov.in/drdo/pub/newsletter/>

**Please mail your feedback at:**  
[director@desidoc.drdo.in](mailto:director@desidoc.drdo.in)

**Contact at:** 011-23902403; 23902472  
**Fax:** 011-23819151

#### LOCAL CORRESPONDENTS

**Ahmadnagar:** Col Atul Apte, Shri. RA Shaikh, Vehicle Research and Development Establishment (VRDE); **Ambarnath:** Dr Susan Titus, Naval Materials Research Laboratory (NMRL); **Chandipur:** Shri PN Panda, Integrated Test Range (ITR); Shri Ratnakar S. Mohapatra, Proof & Experimental Establishment (PXE); **Bengaluru:** Shri Satpal Singh Tomar, Aeronautical Development Establishment (ADE); Smt MR Bhuvanewari, Centre for Airborne Systems (CABS); Smt Faheema AGJ, Centre for Artificial Intelligence & Robotics (CAIR); Ms Tripti Rani Bose, Centre for Military Airworthiness & Certification (CEMILAC); Smt Josephine Nirmala M, Defence Avionics Research Establishment (DARE); Dr. Prasanna S Bakshi, Defence Bioengineering & Electromedical Laboratory (DEBEL); Shri Venkatesh Prabhu, Electronics & Radar Development Establishment (LRDE); Dr Ashok Bansiwal, Microwave Tube Research & Development Centre (MTRDC); **Chandigarh:** Dr HS Gusain, Snow & Avalanche Study Establishment (SASE); Dr Prince Sharma, Terminal Ballistics Research Laboratory (TBRL); **Chennai:** Smt S Jayasudha, Combat Vehicles Research & Development Establishment (CVRDE); **Dehradun:** Shri Abhai Mishra, Defence Electronics Applications Laboratory (DEAL); Shri JP Singh, Instruments Research & Development Establishment (IRDE); **Delhi:** Shri Ashutosh Bhatnagar, Centre for Personnel Talent Management (CEPTAM); Dr Dipti Prasad, Defence Institute of Physiology & Allied Sciences (DIPAS); Dr Nidhi Maheshwari, Defence Institute of Psychological Research (DIPR); Shri Navin Soni, Institute of Nuclear Medicine and Allied Sciences (INMAS); Smt. Rabita Devi, Institute for Systems Studies & Analyses (ISSA); Ms Noopur Shrotriya, Scientific Analysis Group (SAG); Dr Rupesh Kumar Chaubey, Solid State Physics Laboratory (SSPL); **Gwalior:** Dr Manorama Vimal, Defence R & D Establishment (DRDE); **Haldwani:** Dr Atul Grover, Defence Institute of Bio-Energy Research (DIBER); **Hyderabad:** Shri Hemant Kumar, Advanced Systems Laboratory (ASL); Shri Pramod K Jha, Centre for Advanced Systems (CAS); Ms Bidisha Lahiri, Centre for High Energy Systems & Sciences (CHESS); Shri ARC Murthy, Defence Electronics Research Laboratory (DLRL); Dr Manoj Kumar Jain, Defence Metallurgical Research Laboratory (DMRL); Shri Lalith Shankar, Research Centre Imarat (RCI); **Jagdalpur:** Dr Gaurav Agnihotri, SF Complex (SFC); **Jodhpur:** Shri Ravindra Kumar, Defence Laboratory (DL); **Kanpur:** Shri AK Singh, Defence Materials & Stores Research & Development Establishment (DMSRDE); **Kochi:** Smt Letha MM, Naval Physical & Oceanographic Laboratory (NPOL); **Leh:** Dr Dorjey Angchok, Defence Institute of High Altitude Research (DIHAR); **Mussoorie:** Dr Gopa B Choudhury, Institute of Technology Management (ITM); **Mysuru:** Dr M Palmurugan, Defence Food Research Laboratory (DFRL); **Pune:** Dr (Mrs) JA Kanetkar, Armament Research and Development Establishment (ARDE); Dr Vijay Pattar, Defence Institute of Advanced Technology (DIAT); Shri S Nandagopal, High Energy Materials Research Laboratory (HEMRL); **Tezpur:** Dr Jayshree Das, Defence Research Laboratory (DRL)

# HIGH-SPEED EXPENDABLE AERIAL TARGET ABHYAS SUCCESSFULLY FLIGHT-TESTED

**A**BHYAS—the High-speed Expendable Aerial Target (HEAT) was successfully flight-tested on 15 October 2021 from the Integrated Test Range (ITR), Chandipur Off the Coast of the Bay of Bengal in Odisha. The vehicle can be used as an aerial target for the evaluation of various missile systems. The performance of the target aircraft was monitored through telemetry and various tracking sensors including Radars and Electro-optical Tracking System (EOTS).

Raksha Mantri, Shri Rajnath Singh congratulated DRDO for the successful flight trial of ABHYAS. The flight test is carried out as

a part of developmental flight trials. Expression of interest for the production of the vehicle has already been floated to Indian industries. This indigenous target aircraft, once developed, will meet the requirements of high-speed expendable aerial targets for the Indian Armed Forces. ABHYAS is designed & developed by Aeronautical Development Establishment (ADE), Bengaluru. The air vehicle is launched using twin under-slung boosters which provide the initial acceleration to the vehicle. It is powered by a gas turbine engine to sustain a long endurance flight at sub-sonic speed. The target aircraft

is equipped with a MEMS-based Inertial Navigation System (INS) for navigation along with the Flight Control Computer (FCC) for guidance and control.

The vehicle is programmed for fully autonomous flight. The check-out of air vehicles is done using a laptop-based Ground Control Station (GCS). Dr G Satheesh Reddy, Secretary, Department of Defence R&D and Chairman, DRDO also congratulated the teams associated with the successful flight test of 'ABHYAS' and termed it as a force-multiplier considering its accuracy and effectiveness.





## SURFACE-TO-SURFACE BALLISTIC MISSILE, AGNI-5, SUCCESSFUL LAUNCH

A successful launch of the Surface-to-Surface Ballistic Missile, Agni-5, was carried out on 27 October 2021 from APJ Abdul Kalam Island, Odisha. The missile, which uses a three-stage solid fuelled engine, is capable of striking targets at ranges up to 5,000 kilometres with a very high degree of accuracy.

The successful test of Agni-5 is in line with India's stated policy to have 'credible minimum deterrence' that underpins the commitment to 'No First Use'.



## DRDO & IAF CARRY OUT SUCCESSFUL FLIGHT TESTS OF INDIGENOUSLY-DEVELOPED SAAW

Two flight tests of indigenously-developed Smart Anti-airfield Weapon (SAAW) have been carried out jointly by DRDO and Indian Air Force (IAF). The two different configurations based on satellite navigation and electro-optical sensors have been successfully tested. An electro-optical seeker-based flight test of this class of bomb has been conducted for the first time in the country. The electro-optic sensor has been developed indigenously. The weapon was launched by an IAF aircraft from Chandan ranges at Jaisalmer, Rajasthan on 28 October 2021 and 3 November 2021.

The electro-optical configuration of the system is equipped with Imaging Infra-Red (IIR)-seeker technology enhancing the precision strike capability of the weapon. In both the tests, the intended target was hit with high accuracy. The system is designed for a maximum range of 100 kilometers. The newly adapted launcher ensured smooth release and ejection of the weapon. Advanced guidance and navigation algorithms, the software performed as per the mission requirements. The telemetry and tracking systems captured all mission events throughout the flight. All the mission objectives were achieved. The weapon has been designed

and developed by Research Centre Imarat (RCI) in coordination with other DRDO laboratories and extensive support from IAF. Quality and design certification agencies have contributed significantly in its development and Hindustan Aeronautics Limited (HAL), Bengaluru has carried out weapon integration with the aircraft. Raksha Mantri Shri Rajnath Singh has complimented the synergistic efforts of DRDO, IAF and the teams associated with the mission. Congratulating the teams, Secretary, Department of Defence R&D and Chairman DRDO Dr G Satheesh Reddy said the performance and reliability of the weapon has been proved.

## DRDO & IAF JOINTLY FLIGHT TEST LONG-RANGE BOMB SUCCESSFULLY

**D**efence Research and Development Organisation (DRDO) and Indian Air Force (IAF) team jointly flight tested indigenously developed Long-Range Bomb (LRB) successfully from an aerial platform on 29 October 2021. The LR Bomb, after release from the IAF fighter aircraft, guided to a land-based target at a long range with accuracy within specified limits. All the mission objectives were successfully met. The flight

of the bomb and the performance was monitored by a number of range sensors including Electro Optical Tracking System (EOTS), Telemetry and radar deployed by the Integrated Test Range, Chandipur in Odisha.

The LR Bomb has been designed and developed by Research Centre Imarat (RCI), a DRDO laboratory located at Hyderabad in coordination with other DRDO laboratories.

Raksha Mantri, Shri Rajnath

Singh has congratulated DRDO, IAF and other teams associated with successful flight trial and stated that this will prove to be a force multiplier for the Indian Armed Forces.

Secretary DDR&D and Chairman DRDO, Dr G Satheesh Reddy in his message to the teams said that successful flight test of Long-Range Bomb has marked an important milestone in indigenous development of this class of systems.

## DRDO & DIRECTORATE OF DEFENCE R&D, ISRAEL SIGN BIA

**A**s a tangible demonstration of the growing Indo-Israeli technological cooperation, DRDO and Directorate of Defence Research and Development (DDR&D), MoD, Israel have entered into a Bilateral Innovation Agreement (BIA) to promote innovation and accelerated R&D in startups and MSMEs of both countries for the development of dual use technologies. The agreement was signed between Secretary, Department of Defence, R&D & Chairman DRDO Dr G Satheesh Reddy and Head of DDR&D, Israel BG (Retd) Dr Daniel Gold in New Delhi on 9 November 2021.

Under the agreement, startups and industry of both countries will work together to bring out next generation technologies



and products in the areas such as Drones, Robotics, Artificial Intelligence, Quantum technology, Photonics, Biosensing, Brain-Machine Interface, Energy Storage, Wearable Devices, Natural Language Processing, etc. Products and technologies

will be customised to meet unique requirements of both the countries. The development efforts will be jointly funded by DRDO and DDR&D, Israel. The technologies developed under BIA will be available to both countries for their domestic applications.

## DRDO PARTICIPATES IN DESTINATION HIMACHAL PRADESH-2021

Under the aegis of “Azadi Ka Amrit Mahotsav”, Defence Geoinformatics Research Establishment (DGRE), Chandigarh, a laboratory under the Armament and Combat Engineering (ACE) cluster of DRDO participated in “Destination Himachal Pradesh 2021” held during 28-30 September 2021 at Solan, Himachal Pradesh. DGRE Chandigarh was nominated as a nodal laboratory for organising the event.

Other DRDO’s laboratories, namely-Terminal Ballistic Research Establishment (TBRL) and Centre for Fire, Explosive and Environment Safety (CFEES) also participated in the event. The venue for the exhibition was Centarosa Resorts Majhgaon, Rajgarh Rod, Solan, Himachal Pradesh. Inauguration and Lamp lighting ceremony for the event was performed by the Nodal Officers of the different participating agencies. Prominent exhibitors for the event were DRDO, Survey of India, Geological Survey of India, Zoological Survey of India, Botanical Survey of India, Ministry of Environment Forest and Climate Change, National Fertilizer Limited, Coir Board of India, Spices Board of India, Mineral Exploration Corporation Ltd., Himalayan Forest Research Institute Shimla, VV Giri National Labour Institute Tea Board of India, Petroleum Conservation Research Association, Indian



Council of Agricultural Research, Central Pollution Control Board, National Institute of Hydrology, Central Potato Research Institute Shimla, Directorate of Mushroom Research Solan, etc.

DGRE exhibited its capability by displaying a 3D Model of Integrated Avalanche Mitigation Scheme, 3D Immersive Training System (Virtual Reality System), Snow Avalanche Prediction in the Himalayas, Avalanche Hazard Mitigation using Control Structures and Avalanche and Snow Cover Modeling and Simulation in the exhibition.

Various VIPs and administrative heads of different govt. departments, industries, educational and vocational institutes, general public and students from different Industrial Training Institute of Solan District visited the exhibition. Visitors were informed about the various research activities and products of DRDO.

Guest of honour Dr Parvinder Kaushal, Vice-Chancellor Dr Y S Parmar, University of Horticulture and Forestry Nauni, Solan HP chaired the closing and award distribution ceremony.

DRDO was presented with the Best Stall Award in the exhibition.

# DR APJ ABDUL KALAM PRERANA STHAL INAUGURATED AT NAVAL SCIENCE & TECHNOLOGICAL LABORATORY

'Dr APJ Abdul Kalam Prerana Sthal' was inaugurated at Naval Science & Technological Laboratory (NSTL), Visakhapatnam on 15 October 2021 on the occasion of 90th birth anniversary of Bharat Ratna Dr APJ Abdul Kalam, former President of India and to commemorate 'Azadi Ka Amrit Mahotsav'. The NSTL is the premier naval research

laboratory of Defence Research & Development Organisation (DRDO). A statue of Dr Kalam was also unveiled by Dr Samir V Kamat, Director General (Naval Systems & Materials), DRDO.

On the occasion, NSTL products Varunastra, Torpedo Advanced Light (TAL) and Maareech decoy were displayed at the venue.

As part of 'Azadi Ka Amrit Mahotsav', the DRDO is taking various initiatives towards highlighting the importance of R&D and increasing awareness among general public and igniting young minds in particular. Dr Kalam's Prerana Sthal will motivate the people particularly young minds from Dr Kalam's life and his impeccable achievements.





## DIBER IN INDO-NEPAL EXERCISE

15th Indo-Nepal Battalion level combined training/exercise was organized under the aegis of 119(I) MtnBde at Army Foreign Training Node, Pithoragarh during 20 September 2021 to 3 October 2021 by 6 Garhwal Rif. A lecture on “Biodiversity and Environment Conservation” was delivered by Dr SK Joshi, Sc ‘E’ on 28 September 2021 for the benefit of troops of Nepal and India. The lecture covered the varied aspects of environmental conservation and biodiversity common to India and Nepal. The lecture was very well assimilated and appreciated by all ranks. Col Ajay Kumar, Project Officer, DIBER Haldwani also attended the exercise and moderated a session.



## AZAADI KA AMRIT MAHOTSAV

### DEAL, DEHRADHUN

A twenty-five kilometer padyatra on Gandhi Jayanti was undertaken by Defence Electronics Applications Laboratory (DEAL) employees from the establishment to Rajpur where Mahatma Gandhi planted a peepal sapling in 1929. The tree was planted at the erstwhile “Shakti Ashram” in honour of Dr Keshav Dev Shastri. The padyatra was flagged by Shri PK Sharma, Director, DEAL on 2 October 2021 at 0600 Hrs. The participants carried placards on communal harmony, health benefits of walking and environment awareness during the walk.



DEAL employees under the peepal tree planted by Mahatma Gandhi



**DESIDOC, DELHI**

In commemoration of 75 years of India's independence, Defence Scientific Information & Documentation Centre (DESIDOC), Delhi organised its second tree-plantation programme on 22 October 2021 at Metcalfe House, Delhi also as a part of the Van Mahotsav celebration. Van Mahotsav is a tree-planting festival that is celebrated annually to spread awareness about forests and a reminder that one must protect forests and stop deforestation.

Dr K Nageswara Rao, Director, DESIDOC and a team of officers/staff planted 67 saplings at Metcalfe House campus on 22 October



2021. The sapling plantation drive created a pleasant ambience. Dr Rajeev Vij, Sc 'G' coordinated the event.

**RAISING DAY CELEBRATION**

Defence Metallurgical Research Laboratory (DMRL), Hyderabad celebrated its 58th Annual Day on 29 October 2021. Dr B H V S Narayana Murthy, DS & Director General (MSS) was invited as the Chief Guest and Dr Samir V Kamat, DS & DG (NS&M) was the Guest of Honour. Dr G Madhusudhan Reddy, OS & Director, DMRL; Shri S Ramesh Kumar, Sc 'F' & Chairman, Works Committee; Shri K Srikanth Goud, President, DEFMETLAB Workers National Union and Shri Raju, Vice Chairman, Works Committee were also present. Shri Ramesh Kumar welcomed the guests and mentioned that this year Annual Day Celebration were coincided with 50th Golden Jubilee of Cluster Council Meeting. The Chief Guest highlighted the importance of



DMRL in terms of its contributions to labs of DRDO. DG (NS&M), mentioned that laboratories are required to adopt newer technological methodologies to reduce the development cycle time of various activities. Director, DMRL highlighted the progress of several project activities as well as briefed about the upcoming projects. Several dignitaries from other Hyderabad-based sister DRDO laboratories-EMU, MES, CCE(R&D) & PCDA attended the function.



## WORLD QUALITY DAY

**W**orld Quality Day–2021 was celebrated at Integrated Test Range (ITR), Chandipur on 11 November 2021. Shri H K Ratha, Director ITR inaugurated the programme.

In his inaugural address, Director ITR emphasised on the process of quality improvement during mission support, improvement in the quality of providing support service, improvement of relationship and improvement in environment and elaborated the theme ‘Sustainability: Improving our products, people and planet’.

A talk on ‘Quality Tools’ by Prof. RudraPradhan, IIT, Kharagpur was also conducted on this occasion. More than 100 officers and staff attended the programme.



World Quality Day celebrated at DRDO HQ was also video telecasted.

The programme was organised by Shri P K Mohanty, Sc ‘G’ and his team.

## VIGILANCE AWARENESS WEEK

**V**igilance Awareness Week–2021 was observed in ITR from 26 October 2021 to 1 November 2021 with the theme ‘Independent India @ 75 : Self Reliance with Integrity’. Banners promoting vigilance awareness

were displayed inside and outside of the office premises. Shri H K Ratha, Director, ITR administered the integrity pledge on vigilance awareness to all the employees. During the week, employees were encouraged to take e-pledge

on CVC GoI Portal. During the observation a presentation talk was delivered by Maj Gen MK Hada, Director, DVS, DRDO, HQ. The programme was organised by P N Panda, Sc ‘F’, AGD (HR) and his team.



# HINDI PAKHWARA

## ADE, BENGALURU

The Hindi Fortnight Programme-2021 was organised at Aeronautical Development Establishment (ADE), Bengaluru. The programme commenced with under the Chairmanship of Shri Ashok Rangan V., OS & Associate Director on 31 August 2021. Various competitions were conducted and a new competition 'Slogan writing in Hindi' was also included which had a very good response. The closing ceremony was organised on 14 September 2021 under the Chairmanship of Dr S. Venugopal, OS and Director. Shri Jitendra J. Jadhav, Director, CSIR-NAL, Bengaluru was the Chief Guest of the function, who in his address appreciated the continuous efforts being made by ADE in the implementation



of official language in addition to scientific and technical field.

'Manthan'(Mann ki baat) a special programme was presented by senior scientist and officers of the estt. wherein they expressed

their views on various subjects in Hindi. Mementos were presented to 'Manthan' participants by Chief Guest and Prizes for the winners of the competitions were awarded by Director.

## CAIR, BENGALURU

Hindi Fortnight was organized from 23 August to 14 September 2021. Various competitions were organised for the officers and staff of the Centre, viz., Hindi Poetry Recitation, Quiz, Translation—Hindi- English, English—Hindi, Kannada—Hindi, Hindi—Kannada, Hindi Dictation, Technical writing, Essay writing, Hindi Handwriting, etc. All the competitions were separately organised for Hindi speaking and Non-Hindi speaking. Two-hundred officers/staff participated and overall 31 first, 35 second, 35 third and 45 consolation awards were given to the participants. The closing ceremony was celebrated in a befitting manner on 14 September



2021. The function was presided over by Dr Subrata Rakshit, Director CAIR. In his address, Dr Rakshit elaborated on the journey of Official Language Hindi and underlined the importance of Official Language in India.

Vice Chairperson Smt TR UshaKumari, Sc 'E' read out the message of Chairman, DRDO and presented Official Language Implementation report. Prizes were distributed to the winners by the Director.

## IRDE, DEHRADUN

Instruments Research & Development Establishment (IRDE) celebrated Hindi Pakhwara from 1 September 2021 to 14 September 2021 with a plethora of Official Language-based competitions. Inauguration ceremony was chaired by Dr B.K. Das, OS & Director IRDE. Shri J.K. Bajpai, Sc 'H' & Associate Director, and Shri Avnish Kumar, Sc 'G' were also present. In his inaugural speech, Dr Das encouraged all to promote Hindi in every field and ensure maximum use of Hindi in their day-to-day work. Various competitions were conducted to promote Rajbhasha in the establishment. Officers and staff participated in the events with great zeal.

Closing and prize distribution ceremony was organised on 14 September 2021. Shri L.M. Pant,



Vice-chairman, Rajbhasha read out the Hindi messages received from Hon'ble Home Minister Shri Amit Shah, Hon'ble Defence Minister Shri Rajnath Singh and Secretary DD R&D & Chairman DRDO, Dr G Satheesh Reddy.

Dr Das thanked the employees for participating in the competitions and awarded the prizes to winners. The Pakhwara was coordinated by Shri Krishna Murari, TO 'C'. The Pakhwara was organised as per the Covid-19 guidelines.

## NPOL, KOCHI

Hindi Fortnight Celebrations was organised by Naval Physical and Oceanographic Laboratory (NPOL), Kochi from 14 September 2021 to 27 September 2021. Shri S. Vijayan Pillai, OS & Director, NPOL inaugurated the celebration on 14 September 2021. Dr Subash Chandra Bose M R, Sc 'G' & Director (Management) and Shri Wilson K Cherukulath, Sc 'F' & Group Director (P&A) offered felicitations. Smt. Manjula Rani P, Sc 'G' was the Chairperson of the Hindi Fortnight Celebrations Committee. Fourteen categories of Hindi competitions were conducted aiming to promote wide use of Rajbhasha in the laboratory. An Official Language Exhibition was also organized on 23 September 2021 to commemorate



the occasion.

The valedictory function was organised on 27 September 2021. Director NPOL congratulated the employees for their enthusiastic participations in the competitions.

He encouraged the employees to consciously include Hindi in their day-to-day work. Shri Ram Lochan Awasthi, Sc 'E' & Hindi officer presented an overview of the fortnight celebrations. 'Hindi

Fortnight Celebrations Rolling Trophy' was presented to the 'O' house. Cash prizes with merit certificates were distributed to

the children of NPOL employees, for proficiency in Hindi language in the Xth & XII th class CBSE examinations. The competitions

and the meetings in connection with the Hindi fortnight celebrations were held strictly adhering to the Covid-19 protocol.

## CELEBRATION OF VISHWAKARMA PUJA

Instruments Research & Development Establishment (IRDE), Dehradun celebrated Vishwakarma Puja on 17 September 2021 with full devotion. On this day, Lord Vishwakarma, who is known as the chief architect of the world or the divine architect, is worshipped. This festival is celebrated in factories, industries and shops to get the blessings of Lord Vishwakarma. Dr B.K. Das, OS & Director IRDE performed Vishwakarma Puja with full fervor. On this occasion, Dr Das remembered Lord Vishwakarma and wished for his blessings for a



successful tomorrow. The 'Prasad' was distributed after the Puja. All

IRDE employees witnessed the Puja.

## CLEANLINESS DRIVE AT NPOL

Naval Physical and Oceanographic Laboratory (NPOL), Kochi organised "Cleanliness Drive" during 1-2 October 2021 in commemoration of the birth anniversary of Mahatma Gandhi. The drive was led by Shri P V Jose, OS & Officiating Director NPOL. In the inaugural address, he highlighted the relevance of clean working spaces and its intangible effects on enhancing individual and team performance. Shri K Ajithkumar, Sc 'F' & GD (WES) also offered felicitations. Cleaning of work places, corridors and immediate premises of Groups/Projects/Divisions, was carried out on 1 October 2021 under the leadership of respective Associate



Directors/Group Project Directors/Division Heads. Cleaning drive was organized under the auspices of the Works,

Estates & Services Group and NPOL Works Committee. The Cleanliness Drive was held adhering to the Covid-19 protocol.

## HINDI SANGOSHTHI

The All India Joint Official Language Scientific and Technical Seminar under Balasore Cluster was organised during 6-7 October 2021 at Integrated Test Range (ITR), Chandipur.

Chief Guest Hon'ble MP and Chairperson Parliamentary Standing Committee on Defence S.J. Jual Oram inaugurated the seminar. Dr Ravindra Singh, Director, Dte. Of Parliamentary Affairs, Rajbhasha, O & M, DRDO HQ joined the inaugural ceremony as a Guest of Honour through Video Conference. Seminar Patron Shri H K Ratha, Director ITR, Co-Patron Shri D K Joshi, Director PXE, Mrs B Sucharita, Associate Director ITR and Seminar Chair Shri P N Panda, Sc 'F' along with other delegates and participants were present at the inaugural ceremony. The souvenir of the seminar was also released by chief guest during the occasion.

In his address Chief Patron of the Seminar S.J. Jual Oram highlighted the importance of languages and its official uses. He emphasised on the progress of the official language Hindi in offices to strengthen the development and making it towards the Global



Language. He lauded the effort of ITR team in organizing an event of such scale accommodating participants and delegates from DRDO labs from all over India.

The seminar was attended by 83 participants and delegates from 16 DRDO labs from all over the country. Debate and discussions among the participants were carried out on various topics such as Testing of Defence Products: Necessity and achievements, Contribution of Missiles in Indian Defence Sector, Role of Science and

Technology in Nation Building, Hindi and Ourselves, Natural Resources, Cure with Yoga, Effect of Corona on Human Life during the Seminar. Invited Lectures were also conducted on the occasion.

Co-organisers of the seminar were PXE, Chandipur; DRL, Tejpur; CCE (E), Kolkata; and DIC, Panagarh under the Balasore Cluster. On its valedictory the participants were awarded with certificates. The seminar concluded with showcase of a cultural program performed by in-house artists.

## RASHTRIYA EKTA DIWAS

Rashtriya Ekta Diwas (National Unity Day) was observed in Integrated Test Range (ITR), Chandipur on 31 October 2021 to commemorate

the birth anniversary of Sardar Vallabh bhai Patel. Director ITR administered Rashtriya Ekta Diwas Pledge among all the employees of ITR fraternity to spread the spirit

of strengthening the security, Unity and Integrity of the Nation.

The program was organised by P N Panda, Sc 'F', AGD (HR) and his team.

# HINDI WORKSHOP

Defence Research (DMRL), Hyderabad organised a Hindi Workshop on 24 September 2021 in which many Sc 'B' and TO 'A' participated. Dr Sant Ram Yadav, Deputy Director (OL), Central Research Institute for Dryland Agriculture (CRIDA), Hyderabad was invited as the speaker. Dr Yadav elaborated the different aspects of Drafting and Noting used in day-to-day official work.



# WORKSHOP ON UTILIZATION OF LIBRARY SERVICES THROUGH IT-ENABLED ONLINE PLATFORMS

A one-day workshop on "Utilisation of Library Services through IT enabled online platforms" was organised on 6 October 2021 at Defence Materials and Stores Research and Development Establishment (DMSRDE), Kanpur. Director, DESIDOC, Head, DSL, DESIDOC and Dr Alka Suri, former Director DESIDOC, Delhi joined it online.

The Course Director Dr R.K. Tiwari, Sc 'F' briefed about the purpose of the workshop, i.e., to create awareness among library users regarding available online services and enhancing their utilization. Director, DMSRDE delivered keynote address and welcomed the Chief Guest Shri K Nageswara Rao, Director, DESIDOC, Delhi, Guest of Honor, Mrs Alka Suri, former Director, DESIDOC and Guest Speaker

Shri Tapesh Sinha, Sc 'E', Head DSL, DESIDOC, Delhi. Director DESIDOC delivered a lecture on "Requirement Analysis of developing 24X7 Digital Library". Dr Suri appreciated the initiatives and efforts taken by DMSRDE for organising the workshop. Shri Sinha delivered a talk on "DESIDOC Library Serves: User Awareness and Interaction". A lecture on "Online Library Services available in DMSRDE Library" was also delivered by Shri V.S. Pandey, Sc 'E' Head, KNSD (Tech. Library). Hands-on sessions for accessing online journals and for using DESIDOC



Services through DRONA was also conducted. The workshop was attended by 20 participants and all the participants shared their feedback about the knowledge and information update that they desired from the workshop.

The workshop successfully served its purpose for enhancing awareness about utilisation of library online services.





## GROUP TESTING OFFICERS COURSE

Defence Institute of Psychological Research (DIPR), Delhi conducted a five-week course during 23 August 2021 to 24 September 2021 on Group Testing Officers Course (GTO). Participants from the three services and Coast Guard Officers attended the course. Director, DIPR welcomed the trainee officers. Twenty-one participants from the rank of Lt Col/Wg Cdr to Major/SqLdr attended the course. Several sessions were conducted to provide overview of Evolution of Selection System and Ethics in selection, Adolescence and its Implication in Selection, Personality, Stress in selection and in detail topics related to Group Testing Technique

were covered during the course. The course also included live demonstration of some of the tasks. The course participants had

very positive and encouraging wordstowards the effort of DIPR instructors in understanding and assessment of human personality.



## INTERVIEWING OFFICERS' COURSE- 146

Defence Institute of Psychological Research (DIPR), Delhi regularly conducts Interviewing Officers (IO) Course for Officers (Maj Gen equivalent and below) of Army, Navy, Air Force, Coast Guard and friendly foreign countries. This course is prerequisite for Officers to take over as Commandants, Presidents and Dy Presidents at Service Selection Centres/ Service Selection Boards (SSBs).

Interviewing Officers' Course-146 was conducted during 4 October 2021 to 29 October 2021 at Defence Institute of Psychological Research (DIPR), Delhi. Eighteen participants from three services and Coast Guard attended the course. Director, DIPR welcomed

the trainee officers. During the four-week theory training at DIPR, officers were taught the nuances of personality assessment through interview technique. The topics taught during the course includes personality, personality

theories, questioning techniques, behavioural principles, defence mechanism, body language, psychology of adolescence, Officer Like Qualities, biases and errors, interpretation and evaluation, quantitative assessment etc.



Participants were also given exposure of real time interviews. Volunteer students from DU colleges and schools including Sainikschool participate in the mock interview which was conducted as part of the training.

The closing ceremony of the course was presided over by Dr UK Singh, OS and DG (LS), DRDO. During the closing address, DG highlighted the professional approach by DIPR towards conducting various courses and its contribution

towards selection system of armed forces. Senior-most Course Officer acknowledged the excellent efforts put in by the Instructors/Scientists in teaching them new subject within the short span of time. Director, DIPR thanked the gathering.

## CERTIFICATE DISTRIBUTION CEREMONY FOR APPRENTICE TRAINEE

A certificate distribution ceremony for Apprentice Trainee (2019-20 FY) was organised in Integrated Test Range (ITR), Chandipur on 1 November 2021. Shri H K Ratha, Director ITR distributed the certificates to the outgoing apprentices. Director ITR further shared his advice and wishes among the apprentice for their bright future.

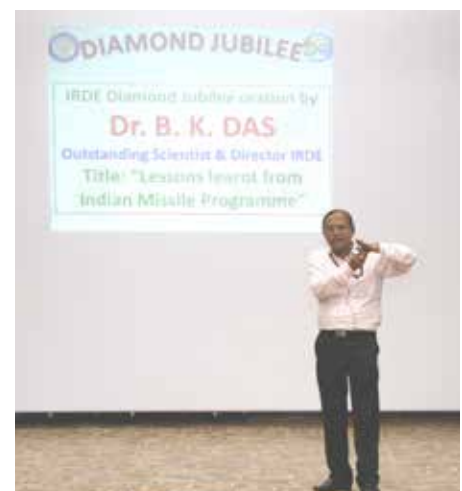
The program was organised by P N Panda, Sc 'F', AGD (HR) and his team.



## LECTURE ON LESSONS LEARNT FROM INDIAN MISSILE PROGRAMME

Dr B.K. Das, OS & Director, Instruments Research & Development Establishment (IRDE), Dehradun delivered a lecture on the topic 'Lessons Learnt from Indian Missile Programme'. The lecture was organised by IRDE Science Forum on 24 September 2021 at IRDE as part of IRDE Diamond Jubilee celebration lecture series. In his oration, Dr Das explained in detail about the Indian Missile Programme and

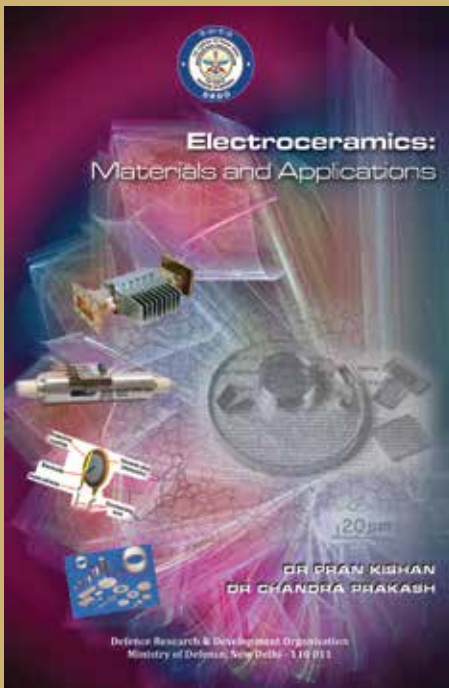
the successful conduct of missile tests at Integrated Test Range (ITR), Balasore. He shared his rich experience with the IRDE fraternity in missile development programme of India. A highly interactive question answer session was held at the end of the lecture. IRDE family appreciated the lecture and thanked him for the knowledge gained by them from this oration which will help them to implement the lessons learnt in current and futuristic progress of the lab.



# DRDO Monographs For Sale

## Electroceramics: Materials and Applications

Dr Pran Kishan and Dr Chandra Prakash



Price:  
INR ₹ 1150 | US \$ 30 | UK £ 28

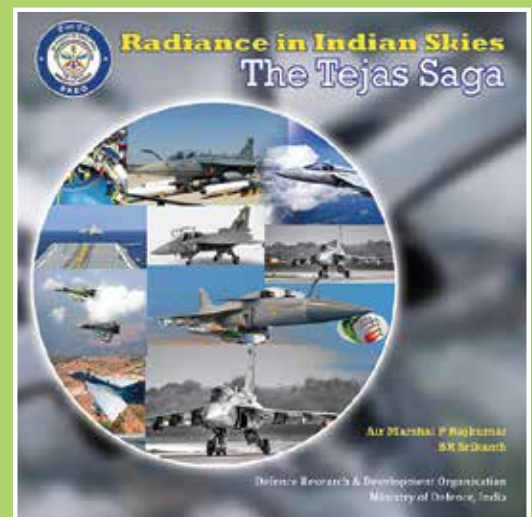
Electroceramics are essential components of all sorts of devices and systems used in everyday life or in space or defence applications. This monograph provides some basic introduction to the subject of 'Electroceramic Materials and their Applications'. A brief but essential combination of its basic science, technology, description of various types of materials and also some recent salient advancements have been described. A number of chapters is made out to deal with various material groups based upon their inherent nature, characteristics, and area of applications. Some of the established device applications have also been covered in every chapter. Distinct chapters on 'Microwave Ferrites'; 'Sensors' and 'Technological developments' taken place in various DRDO labs of India in this area also form part of the monograph. This book will be useful particularly to readers of younger generation for undertaking interest in pursuing R&D work in this exciting field of materials.

## Radiance in Indian Skies- The Tejas Saga

Air Marshal Philip Rajkumar PVSM AVSM VM (Retd) and BR Srikanth

Development of the Tejas fighter aircraft was independent India's most ambitious aeronautical project. The Government of India which always wanted the nation to achieve self reliance in high technology fields like aeronautics and space backed the idea. The Aeronautical Development Agency (ADA) was established in 1984 to manage the project. Hindustan Aeronautics Limited (HAL) was the principal partner in the project because it was the only organization in the country which had a design bureau and the infrastructure to manufacture prototypes and serially produce the aircraft. ADA, which was placed under the DRDO was strongly supported by many DRDO laboratories in particular the Aeronautical Development Establishment (ADE) and the National Aerospace Laboratory (NAL) under the CSIR. It was undoubtedly a mammoth multi disciplinary effort requiring good project management skills. The grant of Final Operational Clearance (FOC) for the aircraft, development of the trainer version, arrested landing of the Naval version on the carrier and the equipping of two front line fighter squadrons with the Tejas is testimony to the dedication and technical

virtuosity of Team LCA, an omnibus term for the many hundreds of men and women who contributed to the success of the project. This book is about the inspiring journey of the Tejas from concept to entry into squadron service. A must read book for all Indians.



Price:  
INR ₹ 1400 | US \$ 60 | UK £ 50



## VISITORS TO DRDO LABS

### CAIR, BENGALURU

• Maj Gen PK Airy, VSM Assistant Chief of Integrated Defence Staff (ICT) visited Centre for Artificial Intelligence & Robotics (CAIR) on 26 August 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.



• Rear Adm Gurinder Singh Jawana, DG WESEE visited Centre for Artificial Intelligence & Robotics (CAIR) on 17 September 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 & Command Control System.



### DEAL, DEHRADUN

Hon'ble Raksha Rajya Mantri Shri Ajay Bhatt visited Defence Electronics Applications Laboratory (DEAL) on 8 October 2021. He was received at the laboratory by Shri P.K Sharma Director, DEAL. In an elaborate presentation Director, DEAL briefed him regarding the ongoing and planned projects. The Hon'ble Minister discussed the activities of DEAL at length and provided his valuable feedback and suggestions. While visiting a specially curated exhibition, he was shown products developed by DEAL including SDR, GSAT-6 terminals, Troposcatter Modem, HD-VLF communication system and Data Links for RUSTOM-II MALE UAV and AEW&CS. He planted a sapling at the DEAL campus. He admired the efforts put up by DEAL in the development

of state-of-the-art technologies and products in communication and surveillance systems. He further praised the role of DEAL towards the social responsibilities including setup of COVID related support, providing internship to the Engineering graduate and post graduate students, organizing webinars with Universities, showcasing of products developed by DEAL for general public at various occasions/national events and providing communication support during natural calamities. He further instructed to take measures towards setting up of private production units in Uttarakhand in order to boost local defence production. He provided his valuable suggestion towards the induction of Policy of Products developed by DRDO so that critical technologies should not go unused.



Hon'ble Raksha Rajya Mantri being demonstrated the products developed by DEAL

## DMRL, HYDERABAD

AVM A K Arora, VSM, ACAS (ENG A), Indian Air Force and Shri A P V S Prasad, Chief Executive (A), Cemilac visited Defence Metallurgical Research Laboratory (DMRL), Hyderabad on 3 September 2021 and 14 September 2021, respectively. The dignitaries were received and welcomed by Dr G Madhusudhan Reddy, OS & Director, DMRL. Dr Reddy highlighted the ongoing R&D activities as well as the past achievements of the laboratory. The visitors have shown keen interest in DMRL products and technologies. They appreciated the role of DMRL in providing material solutions to the strategic sectors.



Visit of AVM A K Arora, VSM, ACAS (ENG A), Indian Air Force

## DFRL, MYSURU

Hon'ble Minister of Rural Development and Panchayati Raj Shri Giriraj Singh visited Defence Food Research Laboratory (DFRL), Mysuru on 24 September 2021 for implementation of rural technologies available with DFRL for the benefit of Shelf Help Group (SHG), small and medium scale industries and farmers. Dr Upendra Kumar Singh, DG (LS), DRDO welcomed Shri Singh and briefed about DRDO contributions in development of rural technologies. Dr Anil Dutt Semwal, Director, DFRL made a detailed presentation on DFRL R&D activities to meet the food requirement of Armed Forces and the spin-off technologies developed by DFRL for the rural India.

Hon'ble Minister told that 60 to 70% of Indian population living in rural India is depending upon agriculture for their livelihood. He also stressed that 30% of population who live in urban areas depend upon this 70% for their food and basic needs. The technologies developed by R&D institutions should be made available to Self Help Groups (SHGs) and entrepreneurs in rural area to develop value added products to increase the income. He also told that we cannot consume software /hardware chips for sustaining the life and we have to motivate the young children towards farming and allied activities. The technologies developed for rural India should be simple, cost-effective and semi

skilled persons should be able to make use of it. He also told that 30-40% of post-harvest losses is occurring in fruits and vegetables, DFRL and other R&D institutions should come forward to reduce the loss where by farmers will benefit. He also told that preservation technologies should be focused on traditional food such as LitiChoka, IdliSambar, Satoo based products, and Millet based food products. He asked DFRL Scientists to explore the possibilities of incorporation of phytonutrient rich leafy Vegetables to enhance micro nutrient and vitamin content in food to alleviate malnutrition in children. He appreciated the R&D activities carried out by DFRL for Armed Forces as well as spin off technologies to Rural India. He

also expressed his thankfulness to DFRL which personifies the quote ‘ Force behind Forces’ and keep our Army Jawan fit and strong . He visited DFRL Product Technologies Exhibition hall and Pilot scale food production facilities.

Dr Upendra Kumar Singh, DG (LS) felicitated Hon’ble Minister and both planted saplings on the occasion of Azaadika Amrut Mahotsav Celebration.

Shri Kushwant Singh Sethi, Joint Secretary, Shri CharanJeet Singh, Joint Secretary, Dr Bagadi Gautham, DC, Mysuru, Shri. Yogesh, CEO, ZillaPanchayat, Shri. C.S. Prakash, PushpakIndustries, Brand Ambassador for Chez Republic, Shri Chandan, SETNER, Bangaluru were also present during the visit. The programme ended with a vote of thanks from Dr R. Kumar, Associate Director, DFRL, Mysore.



**Hon’ble Minister of Rural Development and Panchayati Raj Shri.Giriraj Singh showing keen interest in the R&D activities of DFRL**

## IRDE, DEHRADHUN

Rear Admiral V Srinivas, PD (O&T), New Delhi visited Instruments Research & Development Establishment (IRDE) on 1 October 2021. Dr B.K. Das, OS & Director IRDE welcomed him. Dr Das explained him in detail about the technologies and systems developed by IRDE. Products developed by IRDE were also displayed during his visit. He took keen interest in these products and appreciated team IRDE for successful development of these products. Dr Das honoured him with a memento.



**Rear Admiral V Srinivas taking keen interest in IRDE developed products**



## LRDE, BENGALURU

Shri Amarendra Dhari Singh, Hon'ble MP, RajyaSabha visited LRDE, Bengaluru on 20 Oct 2021. Dr. P Radhakrishna, Director, LRDE made presentation on LRDE projects. Director, LRDE presented the Hon'ble MP with memento. Later, Hon'ble MP visited the display area of LRDE Radars and test facilities.

## TBRL, CHANDIGARH

Sh. Rajnath Singh, Hon'ble Raksha Mantri, Govt. of India visited TBRL on 28 October 2021. He was accompanied by General Bipin Rawat, Chief of Defence Staff; Air Marshal Sandeep Singh, Vice Chief of Air Staff; Dr Satheesh Reddy, Secretary DDR&D and Chairman DRDO and Dr. BHVS Narayana Murthy, DG, Missile & Strategic Systems.

Shri. Prateek Kishore, OS and Director TBRL briefed him about the warhead and weapon technologies developed by the laboratory. Honourable RM visited the technical facilities for demonstration trials of warheads developed by TBRL.

He also inaugurated the augmented environmental test facilities at TBRL, which are utilized for performance evaluation of indigenously developed warhead systems under extreme temperature, vacuum, humidity, shock, acceleration and electro-magnetic environment as per International military standards.

The licensing agreement for transfer of technology (LAToT) for warhead of Man Portable Anti-Tank Guided Missile (MPATGM) Mk-II developed by TBRL was



Dr P Radhakrishna, Director, LRDE presenting memento to Shri Amarendra Dhari Singh, Hon'ble MP, RajyaSabha

handed over to M/s Economic explosive Limited, Nagpur by Director TBRL on the occasion.

Honourable RM lauded the contributions of TBRL in providing crucial defence technologies for Nation's missile and armament programs. He commended the laboratory for design & development of Multi-Mode Hand Grenade, which is the first munition being manufactured by Indian private industry for Indian Army. Congratulating TBRL for handing over Bund Blasting Device MK-II to Indian Army, he expressed confidence that many more indigenously developed systems will be inducted in the armed forces.

He also expressed special interest in the baffle range technology developed by TBRL for practice firing by the soldiers. He mentioned that baffle range technology has helped in reducing the area required for setting up a practice firing range

from 500 acres to only 20 acres without compromising on safety requirements.

Emphasizing the need to formulate Indian standards for defence related equipments, he appreciated the contributions of TBRL in the development of Indian Standard for bullet resistant jackets.

Acknowledging the efforts of DRDO towards Atmnirbhar Bharat Abhiyan launched by Govt. of India for making the country self-reliant in critical technologies, he praised DRDO for its novel initiatives like Technology Fund Scheme and providing DRDO patents free to cost to Indian Private Industry.

He suggested that DRDO should strengthen the defence eco-system in the country by involving security forces, academic institutes and private industry for making the country self-reliant in the development of critical defence technologies.

