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DRDO, IIT-DELHI, AND THE INDUSTRIES SIGN TRIPARTITE AGREEMENTS



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Editor-in-Chief: Ms Kiran Chauhan

Associate Editor-in-Chief: Sudhanshu Bhushan

Editor: Dipti Arora

Design & Pre-press: Raj Kumar

Printing: Rajesh Kr Singh

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LABORATORY CORRESPONDENTS

- Ahmednagar** : Shri RA Shaikh, Vehicle Research and Development Establishment (VRDE)
- Ambernath** : Dr Ganesh S Dhole, Naval Materials Research Laboratory (NMRL)
- Balasure** : 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)
Dr Josephine Nirmala M, Combat Aircraft Systems Development & Integration Centre (CASDIC)
Dr Sanchita Sil & Dr Sudhir S Kamble, Defence Bioengineering & Electromedical Laboratory (DEBEL)
Dr V Senthil, Gas Turbine Research Establishment (GTRE)
Smt Saima Bashir, Electronics & Radar Development Establishment (LRDE)
Ms Mita Jana, Microwave Tube Research & Development Centre (MTRDC)
- Chandigarh** : Dr Pal Dinesh Kumar, Terminal Ballistics Research Laboratory (TBRL)
: Dr Anuja Kumari, Defence Geoinformatics Research Establishment (DGRE)
- Chennai** : Shri K Anbazhagan, Combat Vehicles Research & Development Establishment (CVRDE)
- Dehradun** : Shri DP Tripathi, Defence Electronics Applications Laboratory (DEAL)
Shri JP Singh, Instruments Research & Development Establishment (IRDE)
- Delhi** : Shri Hemant Kumar, Centre for Fire, Explosive & Environment Safety (CFEES)
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Shri Santosh Kumar Choudhury, Defence Institute of Psychological Research (DIPR)
Smt Arun Kamal, DPARO&M, DRDO HQrs
Dr Navin Kumar Soni, Institute of Nuclear Medicine and Allied Sciences (INMAS)
Dr Sujata Dash, Institute for Systems Studies & Analyses (ISSA)
Shri Ashok Kumar, Scientific Analysis Group (SAG)
Dr Rupesh Kumar Chaubey, Solid State Physics Laboratory (SSPL)
- Gwalior** : Dr AK Goel, 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 Srinivas Juluru, Defence Research and Development Laboratory (DRDL)
Shri Ch Narasimhachari, Defence Electronics Research Laboratory (DLRL)
Shri S Shashi Nath, Defence Metallurgical Research Laboratory (DMRL)
- Jagdarpur** : Shri Khilawan Singh, SF Complex (SFC)
- Jodhpur** : Shri DK Tripathi, Defence Laboratory (DL)
- Kanpur** : Dr Mohit Katiyar, Defence Materials & Stores Research & Development Establishment (DMSRDE)
- Kochi** : Smt Letha MM, Naval Physical & Oceanographic Laboratory (NPOL)
- Leh** : Dr Dorjey Anchok, Defence Institute of High Altitude Research (DIHAR)
- Musoorie** : Shri Sunil Bhandari, Institute of Technology Management (ITM)
- Mysuru** : Dr M Palmurugan, Defence Institute of Bio-defence Technologies (DIBT)
- Nasik** : Shri Ashutosh Sharma, Advanced Centre for Energetic Materials (ACEM)
- Pune** : Shri Ajay K Pandey, Armament Research and Development Establishment (ARDE)
Dr Vijay Pattar, Defence Institute of Advanced Technology (DIAT)
Dr Ganesh Shankar Dombe, High Energy Materials Research Laboratory (HEMRL)
- Tezpur** : Dr KS Nakhuru, Defence Research Laboratory (DRL)
- Visakhapatnam** : Smt Jyotsna Rani, Naval Science & Technological Laboratory (NSTL)



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director.desidoc@gov.in; drdonl.desidoc@gov.in
Contact at: 011-23902403; 23902472; Fax: 011-23819151**



DRDO, IIT-DELHI, AND THE INDUSTRIES SIGN TRIPARTITE AGREEMENTS

Transfer of Technology of Light Weight Bullet Resistant Jacket ABHED done with three industry partners, Memoranda of Agreement inked for development of Indigenous Ballistic Material and limited series production of Extreme Cold Weather and Extreme Heat Protective Clothing

DRDO-Industry-Academia Centre of Excellence (DIA-CoE) organised an event titled 'DRDO-Industry-Academia: Global Approach to Readiness of Indigenous Military Applications' (DIA-GARIMA) at the Indian Institute of Technology (IIT)-Delhi on 19 December 2024. During the event, 10 tripartite agreements were signed among DRDO, IIT Delhi, and industry partners, in the presence of Dr Samir V Kamat, Secretary, DD R&D & Chairman,

DRDO; Prof. Rangan Banerjee, Director, IIT-Delhi; and industry representatives. The details of the agreements are as follows:

Transfer of Technology (ToT) of Light Weight Bullet Resistant Jacket (ABHED-Advanced Ballistic High Energy Defeat) to:

- MIDHANI (Mishra Dhatu Nigam), Rohtak
- SMPP Pvt Ltd, Delhi
- AR Polymers (MKU)- Kanpur

Memorandum of Agreement

(MoA) for development of Indigenous Ballistic Material with Reliance Industries Ltd.

MoA for limited series production of Extreme Cold Weather Clothing with:

- Aeronav Industrial Safety Appliance, Delhi
- Arnaf Industries Ltd
- Arrow Garments, Tirupur

MoA for limited series production of Extreme Heat Protective Clothing with:





- Arrow Garments, Tirupur
- Aeronav Industrial Safety Appliance, Delhi
- Katalyst TECHTEX Ltd, Delhi

To integrate academia and industry into defence R&D, DRDO promulgated the Long Term Directed Research Policy of the Ministry of Defence. Under this policy, DIA-CoEs pursue focused, directed research for developing futuristic defence technologies. Aligned with the 'Aatmanirbhar Bharat' initiative, these centers leverage the expertise of faculty and researchers of the institute in collaboration with DRDO laboratories and Indian industries to meet national security needs. DIA-CoEs are being facilitated by the Directorate of Futuristic Technology Management (DFTM) under the Technology Management cluster of DRDO.

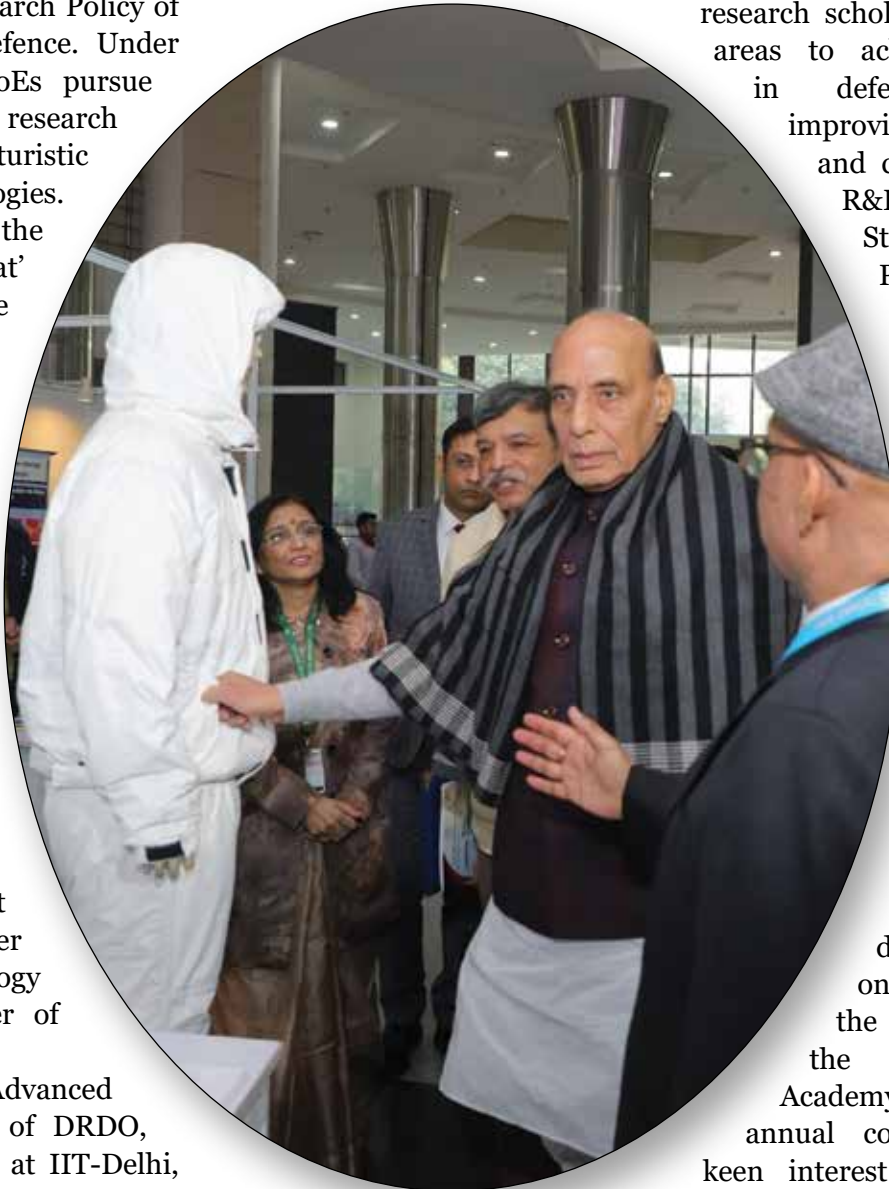
The Joint Advanced Technology Centre of DRDO, established in 2017 at IIT-Delhi, was converted to DIA-CoE, envisaging the association of Indian industry for the translation of knowledge to high technology readiness. Over the past seven years, around 50 research projects

have been initiated under five technology verticals, with a total funding of Rs 375 crore from DRDO. The focus has been on soldier-centric innovations, including high-performance lightweight body armor, advanced

weather jackets.

Each project is enabled to ensure high technology readiness levels for DRDO's advanced systems, with potential civil applications as well. The DIA-CoE, IIT Delhi, has engaged nearly 100 faculty members and 200 research scholars in its research areas to achieve self-reliance in defence technology, improving the capability and capacity of defence R&D in the country. Standard Operating Procedures (SOP) for Engaging Industry through Academia were brought out by DFTM to engage the industry actively through DIA-CoEs. This SoP has paved the path for activating the 'I' part of DIA-CoE.

Hon'ble Raksha Mantri Shri Rajnath Singh, during an exhibition on the sidelines of the inauguration of the Indian National Academy of Engineering's annual convention, showed keen interest in the products made by the joint collaborations under DIA-CoE. He interacted with the scientists, professors, researchers, and industry partners, congratulating them for their collective achievements.



aerostat materials, smart soldier jackets, terahertz technology for spectroscopy, firefighter heat protection gear, and extreme cold-



INDIAN LIGHT TANK ACHIEVES MAJOR MILESTONE BY FIRING A NUMBER OF ROUNDS ACCURATELY AT HIGH ALTITUDE

The Indian Light Tank (ILT) has achieved a major milestone by firing a number of rounds at different ranges at an altitude of more than 4200 m at a high-altitude location with consistently accurate results. This was subsequent to the Phase I trial in a desert environment in September 2024. This light tank has been defined, designed, and developed by the Combat Vehicles Research & Development Establishment, the Chennai-based laboratory of the Defence Research and Development Organisation (DRDO), against the Provisional Staff Qualitative Requirements of the Indian Army. It is manufactured by the industry partner Larsen & Toubro Precision Engineering & Systems.

ILT is being designed as a 25-ton class armored fighting vehicle to meet the requirements of the Armed Forces for high-altitude applications. In an integrated manner, the design to realisation to demonstration at high altitude

has been achieved in three years.

The airlift capability of ILT was also demonstrated by the Indian Air Force. Such a capability would assist in the quick deployment of ILT in operating conditions that are remote and difficult to access through road or rail. With these two phases of internal performance trials, which were actively supported by the Indian Army and the Indian Air Force, ILT would be undergoing some

more trials before being offered for user trials. Hon'ble Raksha Mantri Shri Rajnath Singh complimented DRDO, the Indian Army, the Indian Air Force and L&T on the successful high altitude trials of the Light Tank. Dr Samir V Kamat, Secretary DD R&D & Chairman DRDO, congratulated the entire Light Tank Team, including industry partner L&T, for their efforts.



JOINT DEVELOPMENT OF 'JALDOOT' USV BY GRSE AND NSTL

Garden Reach Shipbuilders & Engineers (GRSE) formally handed over the 'Jaldoot' Unmanned Surface Vessel (USV) to the Naval Science and Technological Laboratory (NSTL), Visakhapatnam, marking

an important milestone for indigenous autonomous vessel technology.

'Jaldoot' was delivered on 28 October 2024 and successfully completed acceptance trials from 17 to 21 October. The

unmanned surface vessel designed and developed jointly by GRSE and NSTL for survey and communication missions features compact dimensions and weight. Powered by a rechargeable lithium-ion battery, the vessel



supports waypoint navigation, station-keeping, and failsafe behaviors. It can integrate various sensors, including an acoustic positioning system for tracking UUVs, side-scan sonar for SAR missions, and a 1080p HD camera with night vision capabilities.

This achievement is a testament to the joint R&D efforts of GRSE and NSTL in developing in-house expertise as well as leveraging the strengths of indigenous start-ups. An Indian technology start-up partner, M/s Rekise Marine, has been nurtured in the design and development of 'Jaldoot'.



PRODUCT DEMONSTRATION

DRDO AND IIT DELHI ORGANISED DEMONSTRATION OF VARIOUS QUANTUM COMMUNICATION TECHNOLOGIES

The DRDO Industry Academia-Centre of Excellence (DIA-CoE), IIT Delhi, demonstrated quantum communications technologies on 26 November 2024 in New Delhi. It has been developed by their collaborative initiative of the entanglement-based quantum key distribution approaches for robust and secure communication, demonstrating entanglement distribution and Quantum Key Distribution (QKD) over a 50 km fiber link in the laboratory. A separate field test has demonstrated entanglement distribution and QKD over 8 km of optical fiber in the IIT Delhi campus.

In another initiative of quantum research, free-space entanglement distribution was demonstrated using the BBM-92 protocol, a key QKD method, between two tables separated by 20 meters in the laboratory and 80 m in the open space. This experiment demonstrated short-range quantum communication in a free-space setup.

In an innovative experiment, hybrid entanglement has been demonstrated in a free-space environment, achieving a Quantum Bit Error Rate (QBER) of around 6% in the laboratory over a distance of 10 m in the laboratory. In addition, QKD

systems supporting multiple independent channels driven by a single source are also being explored with promising results. These open the door for more flexible, multi-protocol quantum communication systems.

Hybrid Photon-based Free-space Quantum Key Distribution Testbed

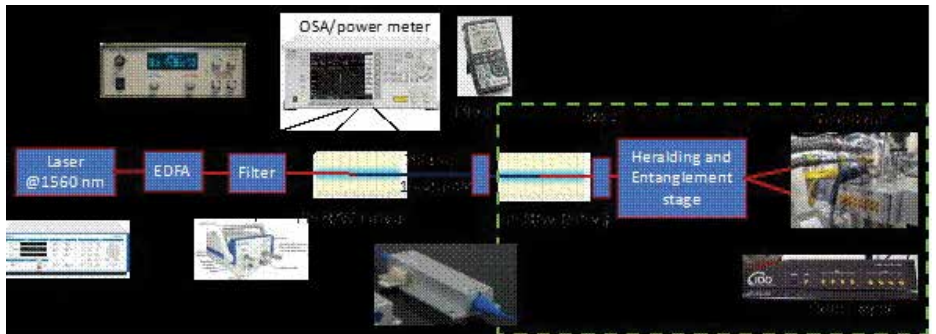
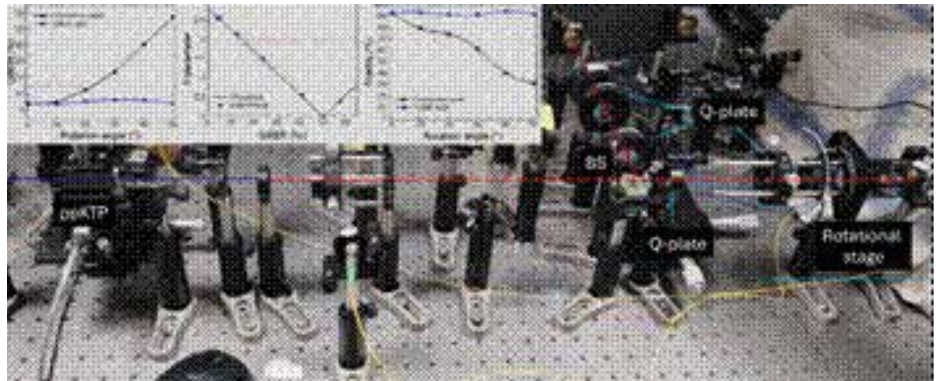
In achieving the above breakthrough, an all-fiber heralded photon source with a second-order correlation function ($g^2 \sim 0.01$) at rates reaching hundreds of kHz is developed. This innovation is vital for single-photon generation, a critical requirement for secure quantum communication. An all-



fiber entangled photon source has also been developed with high visibility. The Bell test parameter for this source is more than 2.6, exhibiting strong quantum entanglement, which is essential for protocols like BBM-92. For free-space quantum communication experiments, free-space heralded single-photon sources have been demonstrated with a heralding rate of over 4 million counts/sec. This development enables robust free-space quantum communication.

Following India's First QKD demonstration between the cities of Prayagraj and Vindhyachal, separated by 100 km, by DRDO laboratories and IIT-D in February 2022, many new initiatives have been taken by DRDO and IIT-D.

In addition, indigenisation of various components like quantum sources and detectors is initiated. These include single photon sources on LNOI, SNSPD and periodically poled non-linear crystals. These projects are launched at IIT Delhi in collaboration with DRDO laboratories like DYSL-QT and SSPL and are funded by Directorate of Futuristic Technology Management (DFTM) under its deep tech initiatives



aimed at fostering cutting-edge innovations in defence technology. Through its projects at the DIA-CoE, IIT-D, and DRDO have created a strong national footprint in QKD with breakthroughs in fiber and free space areas. Quantum communication holds significant potential for enhancing security in strategic sectors, such as defence and finance, by providing robust and tamper-evident communication channels.

The DRDO Industry Academia-Centre of Excellence (DIA-CoE) is a collaborative initiative between DRDO and IIT-Delhi, established at IIT-Delhi. The CoE is developing various quantum communication technologies, like the development of fiber and free-space (polarization/hybrid photon)-based quantum key distribution technologies, quantum sources, quantum detectors, and non-linear crystals.

TRIALS OF PROJECT DATALINK AIRBORNE PLATFORMS (DLAP, DEA-118)

Defence Applications Laboratory (DEAL), Dehradun, has conducted successful trials of C-Band LOS Datalink under the DLAP Project on HS125-800 HAWKER aircraft at the Centre for Airborne Systems (CABS), Bengaluru, along with industry partners. The following objectives were achieved:

- Ground trials between GES and ground moving vehicle
- Airborne Datalink LRU installation on HS125-800 Hawker
- 1.8 m TTC tracking systems, performance checked in RF and GPS tracking mode
- Tracking, data throughput, and

voice communication in full duplex in 3 flight sorties of C-Band LOS Datalink

The flights were highly successful, and full-duplex, error-free data and voice communication were observed with tracking in GPS and RF tracking modes up to 250 km aerial distance.



META-MATERIAL CENTRE AT DL, JODHPUR

The foundation stone laying ceremony for the 'Meta-material Centre' at Defence Laboratory (DL), Jodhpur, held on 5 December 2024, marked a significant event in the realm of artificially engineered materials for programmable/AI-enabled stealth technologies. The foundation stone for the meta-material center was laid by Shri RV Hara Prasad, DS & DG (NS&M), at the DLJ site in the solemn presence of Shri VS Sheno, OS & Director, DLJ.

The center includes the following key facilities:

- **Materials processing laboratories:** For the preparation of functional materials for ink
- **Semi-automated pilot plant with infrastructure of preparation and qualification of functional ink:** Production of functional inks as per EM design to meet current and futuristic requirement
- **Roll-roll AEM pattern printing facilities:** Large scale roll-to-roll printing of AEM patterns
- **Laboratory for smart stealth (Multifunctional composite low-observable multispectral cloak):** Under this laboratory, the Clean Room Class 10000 facility will be created
- **State-of-the-art controlled multi-layer/multi-material deposition systems**
- **Integration of meta-surfaces and their functional characterization**
- **Robotic ink coating system:**



- **Controlled spray deposition on 2D and 3D components**
- **Composite and rubber processing facility:** In-house fabrication of reinforced fabric incorporated polymer composites and rubber sheets for design validation
- **Material characteristics laboratories:** For optimization of properties as per stealthy design
- **AEM simulation laboratories:** Comprising state-of-the-art hardware and software to design smart/programmable multispectral cloak
- **Laboratories for qualification:** Comprising all testing equipment required for qualification of components at different stage and obtaining the airworthiness clearance of stealth components

- **Laboratory for smart stealth (Multifunctional composite/low-observable multispectral cloak):** Under this, one facility will be created (i.e. Clean Room Class 10000)

The center will be contributing to the development of Artificial Engineered Material (AEM) with engineered and controllable electromagnetic properties to realize a state-of-the-art stealth solution. It will be capable of producing roll-roll large-area passive surfaces as well as futuristic programmable meta-surfaces.

Dr Anuj Shukla, Sc 'F', PD-A & MTD, mentioned that the 'Meta-material Centre' will play a pivotal role in realizing futuristic stealth requirements of many platforms, and the facility will be established within 18 months of duration.



NEW DMSRDE TECHNICAL BUILDING

Dr Samir V Kamat, Secretary, DD R&D & Chairman, DRDO, performed the Bhoomi Pujan for New Defence Materials & Stores Research & Development Establishment (DMSRDE), a technical building, on the auspicious day of Govardhan Puja, i.e., 2 November 2024. To grace the grand occasion, Shri RV Hara Prasad, DS & DG (NS&M), Dr Manu Korulla, OS & DG (R&M), Dr (Smt) Ranjana Nallamalli, OS & Director, DFTM, Dr G Raja Singh, OS & Prog. Dir. (PJ-10), Dr Bishwajeet Choubey, Director, DCW&E, Shri MP Singh, CCE (R&D) Central, and many other dignitaries were present. Before the ceremony, the Chairman, DRDO, and all the dignitaries garlanded the Dr APJ Abdul Kalam statue at the DMSRDE main gate. The Chairman, DRDO, addressed



the gathering and appreciated the efforts of the Director, DMSRDE, in the sanction of the new technical building for DMSRDE. He stated that the new building will be a milestone in the journey of DMSRDE. Dr Mayank Dwivedi,

OS & Director, DMSRDE, in his address, told about the need for a new DMSRDE building as the current buildings are very old. The new building will help the establishment for a better research environment.

BSL-4 FACILITY AND INAUGURATION OF BIO-DETECTOR TEST AND EVALUATION BUILDING AT DRDE

In a momentous step towards advancing bio-defence technological capabilities of Defence R&D Establishment (DRDE), Gwalior, the Bhoomi Pujan of the upcoming BSL-4 facility was carried out by Dr Samir V Kamat, Secretary DD R&D & Chairman DRDO. Dr Kamat also inaugurated the newly constructed Bio-detector Test and Evaluation Building at the new site of DRDE Gwalior. This auspicious occasion

had the gracious presence of other dignitaries, including Dr UK Singh, DS & DG (SSS); Dr Manu Korulla, OS & DG (R&M); Dr MM Parida, OS & Director, DRDE, Dr Bishwajeet Choubey, Director, DCW&E; Dr Subodh Kumar, Sc 'G' & project director (BSL-4), Dr S Ponnariappan, Sc 'F' & project director (Bio-detector project), and senior officials from DRDE and CCE (R&D).

The ceremony has marked the

beginning of the construction of a critical facility dedicated to carry out cutting-edge R&D in the realm of bio-defence. This initiative aligns with the national vision of ensuring technological self-sufficiency in bio-defence. Dr Kamat, during his address, expressed that the facility would play a pivotal role in meeting both domestic and international standards in the bio-defence research. The construction of



the BSL-4 facility is expected to be completed by 2027, and once operational, the facility will offer unique capabilities for the handling of high-risk pathogens and advanced challenge studies. This shall be the second facility in the country after NIV, Pune. Similarly, the advanced bio-detector test and evaluation facility will be one of its kind in the country that will bolster the self-reliance in the test and evaluation of imported as well as indigenously developed bio-detectors before induction into the Services.



NEW LAB SPACE FOR DYSL-QT AT PASHAN, PUNE

The Bhumi Poojan was done by Dr Samir V Kamat, Secretary DD R&D & Chairman, DRDO, on 23 November 2024 for the building of new laboratory space for the DRDO Young Scientists Laboratory for Quantum Technologies (DYSL-QT) in the DG-ACE Complex at Pune. The event was graced by the presence of other VVIPs, which included Ms Suma Varughese, DS & DG (MCC); Prof. Prateek Kishore, DS & DG (ACE); Dr BHVS Narayana Murthy, FNAE, FIETE, VC DIAT; Dr Makarand Ganesh Joshi, Director R&DE; Dr Anil Prasad Dash, Director, HEMRL; Shri Sanjay Chaudhari, OS & GM (MSC); Dr B Chaubey, Sc 'G' & DCWE; Shri PK Gupta, CCE (West); and Dr Santu Sardar, Director, DYSL-QT.





MOU BETWEEN DYSL-QT, PUNE AND MILIT, PUNE

A Memorandum of Understanding (MoU) was signed between the DRDO Young Scientist Laboratory for Quantum Technologies (DYSL-QT) and the Military Institute of Technology (MILIT) on 29 November 2024 at Girinagar, Pune, to have academic collaboration in the field of Quantum Technology. The MoU was signed in the presence of Lt General Vipul Shinghal AVSM, SM, DCIDS DOT HQ IDS, and Rear Adm Nelson D'Souza, NM, Commandant, MILIT. The MoU was signed between Mr Rajarshi Biswas, Scientist & Head Technical, DYSL-QT, and Gp Capt G Mahesh Kumar, DS Coord, MILIT, and exchanged between



Dr Santu Sardar, Director DYSL-QT, and Cmde Rajesh Chatterjee, DCCI, MILIT. The signing of the MoU has begun a new era for the

exchange of innovative technical ideas between young scientists of DYSL-QT DRDO and future military leaders.

EVENTS

ANNUAL DAY CELEBRATIONS

DLRL, Hyderabad

On November 13, 2024, the Defence Electronics Research Laboratory (DLRL), Hyderabad, a prestigious DRDO laboratory, celebrated its 63rd Annual Day. DLRL is at the forefront of designing and developing cutting-edge Electronic Warfare (EW) systems for the military and paramilitary services.

Dr Samir V Kamat, Secretary DD R&D & Chairman, DRDO graced the occasion as the Chief Guest. The Guest of Honour was Dr BK Das, DS & DG (ECS). A distinguished gathering of dignitaries, including heads of production agencies, directors, financial advisors, and director generals, attended the ceremony.



Sri K Murali, AD & Chairman, Central Organizing Committee, delivered the welcome address. Sri N Srinivas Rao, Director, DLRL,



highlighted the organization's achievements and advancements in the field of EW systems over the past year.

The Chief Guest, Dr Kamat, delivered a thought-provoking speech on the need to prepare for the evolving demands of the EW domain. He praised DLRL for its efforts and encouraged the laboratory to innovate and develop a broad range of solutions to address advancing technologies. The laboratory also organized sports and cultural competitions for staff members and their children.

DMRL, Hyderabad

Defence Metallurgical Research Laboratory (DMRL), Hyderabad, celebrated its 61st Annual Day on 9 November 2024. Dr Samir V Kamat, Secretary, DD R&D & Chairman, DRDO, graced the occasion as the Chief Guest, and Shri RV Hara Prasad, DS & DG (NS&M), was the Guest of Honour. The program started with the customary lighting of the lamp by the dignitaries, followed by an invocation song. Dr NV Rama Rao, Sc 'F' & Chairman, Works Committee, delivered the welcome address.

Shri Anil Rohidas Burde, Secretary, Works Committee; Shri C Prabhakar, General Secretary, DEFMETLAB Workers National Union; and Shri Jeeban Kumar Das, General Secretary, DMRL Karmika Sangh presented the reports.

Dr R Balamuralikrishnan, OS & Director, DMRL, highlighted the laboratory's overall progress and briefed about the upcoming projects in his address. The Guest of Honour and the Chief Guest



while addressing the gathering, spoke highly of the laboratory's rich legacy and its contributions towards nation building.

Commendation certificates were presented to the employees on the occasion by the Chief Guest. As part of the celebrations, several sports and cultural events were also held.

NPOL, Kochi

Naval Physical and Oceanographic Laboratory (NPOL), Kochi, celebrated its 72nd Annual Day on 13 December 2024. Shri RV Hara Prasad, DS & DG (NS&M), presided over

the first part of the celebrations. Dr D Seshagiri, Director, NPOL, presented achievements of the organization in both technical and corporate areas. The second event was arranged for NPOL employees and their families. Kochi City Police Commissioner, the Chief Guest of the function, Shri Putta Vimaladithya, IPS formally inaugurated the event. The directors of NS&M cluster laboratories were present on the occasion.

Outstanding employees were felicitated with awards and certificates for their contributions.





WORLD QUALITY WEEK -2024

World Quality Week is celebrated annually during the second week of November to celebrate the quality administration, activities, and achievements. Chartered Institute of Quality (CQI) has declared the theme for this global event for the year 2024 as "Quality: From Compliance to Performance." To raise awareness and mark the occasion, the following laboratories of DRDO celebrated various events at their respective laboratories:

CASDIC, Bengaluru

The Combat Aircraft Systems Development & Integration Centre (CASDIC), Bengaluru, celebrated World Quality Week 2024 from November 11-15, 2024. To mark the event, a talk was delivered by Dr Siddappaji B, Sc 'F', Aeronautical Development Establishment (ADE), Bengaluru. His talk covered quality and reliability management in the defence sector. Smt R Pitchammal, Sc 'H' presided over the event and welcomed the participants with a brief speech on quality. Smt Som Bhowmik Maran, Sc 'F', GD (QAG), gave a talk on the importance of maintaining the quality in defence products.



DEBEL, Bengaluru

World Quality Week 2024 was celebrated in the Defence

Bioengineering and Electromedical Laboratory (DEBEL), Bengaluru, during 11-14 November 2024. The event was kick-started with a quiz competition and a poster-making competition. A total of 50 participants took part in the competitions, and the winners were awarded during the concluding event. During the week, two lectures were organized, for the benefit of the employees of DEBEL. A training lecture by Mrs Chitra Srinivas, Senior Lead Auditor, M/s. Digital Age Technologies Pvt. Ltd., Bangalore, on 'Awareness on QMS' for DRTC Personnel was conducted on 12 November 2024.



DMRL, Hyderabad

As a part of the World Quality Week 2024 celebrations, the Defence Metallurgical Research Laboratory (DMRL), Hyderabad, celebrated World Quality Week 2024 corresponding to the theme 'Quality: from compliance to performance.' Initiating the event, a welcome address was delivered by Dr R Balamuralikrishnan, OS & Director, DMRL, followed by an inaugural address delivered by Shri Soumya Deb, Sc 'G', Group Head, Quality, Reliability & Safety Group (QRSG), DMRL. The

learning sessions started off with a brief introduction on quality management by the faculty. To improve the quality awareness among personnel and the effectiveness of DMRL's quality management system, a training program on 'QMS Awareness as per ISO 9001:2015 Requirements' by M/s Bureau of Indian Standards (BIS), Delhi, was organized during 25-28 November 2024.



DMSRDE, Kanpur

Defence Materials and Stores Research & Development Establishment (DMSRDE), Kanpur, celebrated World Quality Week 2024 during 11-15 November 2024. Dr Mayank Dwivedi, OS & Director, DMSRDE, inaugurated the event and emphasised the importance of documentation as one of the important aspects of quality and stressed that quality should be inculcated within ourselves as a culture. To mark the celebration, a workshop on 'Quality & Reliability Tools and Best Practices in Defence R&D to Drive Innovation' was organised where external and internal speakers talked about quality tools and best practices in quality. As a part of the celebration, essay & slogan writing and poster-making competitions were organised. The event was organised by Shri Kamlesh Kumar, Sc 'E' and his team.



DSP, Hyderabad

World Quality Week 2024 was celebrated in a ceremonial way at the Directorate of Special Projects (DSP), Hyderabad, on 25 November, 2024. Dr A Swarna Bai, Technology Director, R&QA, welcomed the gathering, followed by her welcome address. Dr Anupam Sharma, OS & Director, DSP, emphasized the significance of quality for space projects and also encouraged working towards zero defects and getting it right the first time.

On the occasion, Cmde MAK Shetty ADG SSQAG graced the event as the Chief Guest. Sri N Sudarshan, Sc 'G' Tech Director R&QA, ASL, Hyderabad, graced the event as the Guest of Honour and gave live examples where quality was overlooked that resulted in catastrophic mission failures. The vote of thanks was proposed by Dr Netra Singh, Sc 'F'.



MTRDC, Bengaluru

Microwave Tube Research &

Development Centre (MTRDC), Bengaluru, celebrated World Quality Week 2024 during 11-15 November 2024. The laboratory organised five events as part of the celebrations. These included an essay competition, a slogan competition, a poster competition, a lecture on quality assurance for vacuum electron devices through metrology, and a quiz on quality and reliability. The topics for the essay, poster, and slogan were considered the same as that of the theme of this year. A talk was delivered by Shri HS Ramesh Kumar, Technical Officer 'C' of MTRDC.



NSTL, Visakhapatnam

Naval Science & Technological Laboratory (NSTL), Visakhapatnam, organized World Quality Week 2024 during 11-15 November 2024. The Chief Guests Dr Abraham Varughese, OS & Director, NSTL, provided the opening remarks, and Dr HN Das, OS & Associate Director, emphasized the requirement of quality and its role in the success of an organization in general and in the development of individuals in particular. The keynote lecture was delivered by Shri GNVS Kasi Rao, Sc 'F' of Q&R, on Q&R Audit: Policy and Scope, and another lecture on Reliability Growth Analysis by Shri D Sreedhar Patnaik, Sc 'F'. The lecture by Shri SR Girish, Head (Retd.),

BEL, on Reliability: Aspects of Demonstration and Testing.



SFC, Jagdalpur

World Quality Week 2024 was celebrated at SFC, Jagdalpur, during 11-15 November 2024. A quality awareness campaign and a workshop on Quality 4.0 were also organized. Dr MVL Ramesh, OS & GM, SFC, emphasized the two critical aspects for an SFC that are the safety of the personnel involved in processing and maintaining quality to produce zero-defect solid rocket motors of various strategic programs for our nation.

Shri Mallikarjuna G, Sc 'G', RCI, Hyderabad, the Chief Guest of the event, delivered a very informative and insightful lecture on the importance of reliability, quality control, and quality assurance, which is very much needed in the processing of SRMs.

Shri Deo Kumar Verma, Sc 'F' & DGM (Mech, Q&S), SFC, delivered an informative lecture on how quality standards, tools, and norms evolved over a period of time.





NATIONAL CONSTITUTION DAY CELEBRATION

CVRDE, Chennai

The 75th Constitution Day of India was celebrated on 26 November 2024 at the Combat Vehicles Research & Development Establishment (CVRDE), Chennai, to commemorate the adoption of the Constitution of India. A special lecture was delivered on the occasion by the Chief Guest Dr B Damodaran, Senior Advocate, Madras High Court, wherein he highlighted the constitutional values, rights, and duties that shall be imbibed by every citizen of India.

Shri J Rajesh Kumar, OS &



Director, CVRDE, addressed the gathering and honoured the Chief Guest. Dr V Balamurugan,

OS & Associate Director, Senior scientists, officers, and staff were also present during the event.

DLRL, Hyderabad

To mark the 75th anniversary of the adoption of the Constitution of India, the Defence Electronics Research Laboratory (DLRL), Hyderabad, observed National Constitution Day on November 26, 2024. As part of the commemoration, the Director, DLRL, paid floral tributes to Dr BR Ambedkar, the principal architect of the Indian Constitution, as a gesture of respect and remembrance. The event witnessed the participation of senior scientists, staff, and



members of the Works Committee. Subsequently, all employees witnessed the live stream organized

by DRDO HQrs, featuring an address by Shri R Venkataramani, the Attorney General for India.

DRDO PARTICIPATION AT VIETNAM INTERNATIONAL DEF EXPO 2024

The Defence Research and Development Organisation (DRDO) proudly participated

in the Vietnam International Defence Expo 2024, held in Hanoi, Vietnam, from 19-22 December

2024. Showcasing its cutting-edge technologies and innovations, DRDO reaffirmed its position as a



global leader in defence research and development.

The DRDO pavilion was a major attraction, highlighting a wide range of indigenously developed systems, including advanced missile technologies, unmanned aerial vehicles (UAVs), electronic warfare systems, and state-of-the-art combat vehicles. Key exhibits included the Akash Surface-to-Air Missile System, the BrahMos Supersonic Cruise Missile (in collaboration with Russia), and the Tejas Light Combat Aircraft, which epitomizes India's self-reliance in defence production.

A significant aspect of DRDO's participation was its emphasis on "Make in India, Make for the



World." Through interactive displays and live demonstrations, DRDO underscored its commitment to fostering international collaborations and promoting indigenous technologies on a global stage.

Delegates from Vietnam and other participating nations were keenly interested in potential technology transfers, joint ventures, and strategic partnerships, further strengthening India's defence ties in the ASEAN region.

NMRL PARTICIPATION IN TECHFEST 2024 AT IIT BOMBAY

The Naval Materials Research Laboratory (NMRL), located in Ambarnath, took part in IIT Bombay's TechFest 2024, which took place from 17-19 December 2024. The technology festival provided an excellent platform to showcase NMRL's cutting-edge innovations and foster engagement with students, academicians, and entrepreneurs. Dr Samir V Kamat, Secretary DD R&D & Chairman DRDO, graced the event as the Chief Guest and delivered an inspiring lecture during the opening ceremony. His address emphasised the pivotal role of R&D in advancing technological frontiers and strengthening national security. At the DRDO pavilion, NMRL showed off a wide range of new and advanced



technologies. These included the air-independent propulsion system, coatings for corrosion protection, impressed current cathodic protection, composite ball valves, supercapacitors, ceramic piezocomposites, oil-

bioremediation products, and more. NMRL stall attracted significant attention from visitors. Students showed keen interest in learning about emerging technologies and exploring potential research opportunities.



NMRL PARTICIPATION IN GUJARAT GLOBAL EXPO-2024

The Parichit Foundation jointly organized the Gujarat Global Expo-2024 in Surat, Gujarat, from December 19-21, 2024. This mega exhibition was themed around Amritkaal—reflecting the 25-year period leading up to the centenary of India's independence, focusing on building a self-reliant nation that fulfills its humanitarian obligations. The organizations such as DRDO, ISRO, the Department of Atomic Energy, the Geological Survey of India, the Ministry of Micro, Small, and Medium Enterprises (MSME), etc., exhibited their technologies in this event. Dr Kishorsinh N Chavda, Vice Chancellor, Veer Narmad, South Gujarat University, and Shri Manubhai M Patel, MLA, Gujarat



Vidhan Sabha, inaugurated the exposition. NMRL was nominated as the nodal laboratory for organizing the DRDO exhibits. DRDO laboratories, viz. NMRL,

DLJ, and DYSL, participated and showcased their products during this exhibition. The DRDO Pavilion received a good response from industry and academia.

KARNATAKA RAJYOTHSAVA CELEBRATION

LRDE, Bengaluru

Karnataka Rajyothsava was celebrated at Electronics & Radar Development Establishment (LRDE), Bengaluru with great enthusiasm on 28 November 2024. Dr Vishnu N Hayagreev, MBBS, MD (Internal Medicine), Director of Shree Maruti Hospital, Bangalore, and Dr PC Srikanth, Prof. and Head of ECE, Dean of Malnad College Engg, Hassan, Karnataka, were the Distinguished Chief Guests. Shri Gampala Viswam, DS & Director, LRDE, presided over the function.

The Chief Guests spoke on the importance of the Kannada language, the formation of Karnataka State, and its



contributions to India. Later, Shri Gampala Viswam, Director, and Shri Abid Hussain VA, Associate Director, felicitated the Chief Guests and employees who contributed to the Kannada development activities, and

also prizes were distributed to the winners of the Kannada competitions. As part of the Karnataka Rajyothsava festivities, a cultural program was organized and a special lunch was served to all the employees.



MTRDC, Bengaluru

Karnataka Rajyotsava was celebrated at the Centre on 22 November 2024. On the onset, Dr SK Datta, OS & Centre Head, addressed the gathering and welcomed the audience. Dr N Someshwara, physician and literaturist, was the Chief Guest of the event. He brought out the aroma of Karnataka in all its aspects, including its history, its formation, antiquity, etymology, themes for tourism, Geographical Indicators (GI) tags, etc., through his mesmerizing presentation. Following these there were cultural events that enthralled one and all present at the event.



SWACHHATA PAKHWADA 2024

CHESSE, Hyderabad

The Swachhata Pakhwada on the theme 'Swachhata is Everyone's Business 2024' was celebrated at the Centre for High Energy Systems & Sciences (CHESSE), Hyderabad. A swachhata pledge was taken on 13 December 2024 and swachhata drive was carried out in an around the CHESSE premises. All employees of CHESSE participated in the event with enthusiasm.



DEAL, Dehradun

Defence Electronics Applications Laboratory (DEAL), Dehradun, organised Swachhata Pakhwada 2024 during 2-17

December 2024. All officials of DEAL participated in the event. DEAL organised various events, like the Mass Swachhata pledge, Shram Daan activities, repair and renovation of public toilets, Swachhata Rath and Rally, and plantation under the Pakhwada.



DL, Jodhpur

The Defence Laboratory, Jodhpur (DLJ), observed Swachhata Pakhwada 2024 during 2 to 16 December 2024. Various day-by-day activities, such as the Swachhata pledge, cleaning activities in schools, the

Swachhata Rally, the plantation drive, the signature campaign, and discarding the use of single-use plastic, were planned and executed during the pakhwada. A drawing competition on 'Swachhata' was conducted for DLJ employees' children, and a rally was organized by depicting banners and placards to create awareness in the society.



DMRL, Hyderabad

Defence Metallurgical Research Laboratory (DMRL), Hyderabad, observed Swachhata Pakhwada 2024 during 1-15 December 2024 on the theme 'Swabhav



Swachhata–Sanskar Swachhata.’ The event aimed to promote environmental awareness and sustainable practices among employees. The program began with Dr A Venkata Ramana, Sc ‘F’ welcoming the gathering and emphasizing the significance of maintaining cleanliness and protecting the environment. Dr R Balamuralikrishnan, OS & Director, DMRL, delivered an insightful address highlighting the perils of environmental degradation. He stressed the responsibilities of every individual



in ensuring livable surroundings and urged the audience to embrace sustainability in its truest form. Associate Directors, Group Heads, Scientists, Nodal Officers, GH-Environment, and other officials and staff participated enthusiastically during the event.

NMRL, Ambernath

Naval Materials Research Laboratory (NMRL), Ambernath, observed Swachhata Pakhwada 2024 from 1–15 December 2024. Shri PT Rojatkar, OS & Director NMRL, pledged to support Mass Swachhata along with NMRL employees. As part of Shramdan, NMRL employees cleaned the area adjoining NOMI and participated in the cleaning of Chikhloli village, located near NMRL.

The director, NMRL, flagged off Swachhata Raths and also took part

in a tree plantation drive. A selfie booth was set up in front of the main gate of NMRL to capture the memorable moment and to convey the importance of cleanliness.

A campaign advocating elimination of single-use plastic was conducted, and a lecture on ‘Campaign on Discarding the Use of Single-Use Plastic’ by Dr Sanjay Joshi, Vice President, and Ms Mukul Muzumdar, Project Coordinator of Paryavaran Dakshata Mandal, Thane was organised on the occasion.



HRD ACTIVITIES

COURSE ON ADVANCES IN AUV TECHNOLOGIES

A five-day course on ‘Advances in Autonomous Underwater Vehicle (AUV) Technologies’ was conducted at the Naval Science & Technological Laboratory (NSTL), Visakhapatnam, during 2-6 December 2024. The course was a resounding success as it attracted diverse participants from DRDO, the Indian Navy, DPSU, CSIR-NIOT, industry, and academia. The course was inaugurated by the Chief Guest Dr Manu Korulla, OS & DG (R&M), and the Guest of Honour Dr Abraham Varughese, OS & Director, NSTL. Dr Korulla also gave a keynote address on ‘Indigenous AUV Development’ followed by lectures from Prof. CS Kumar, IIT Kharagpur, on



‘Bio-mimetic AUV Development,’ Dr Vedachalam, Sc ‘G’ & PD (Matsya), NIOT on ‘Digital twin for Matsya6000’, Dr VBS Ayyangar,

Sc ‘F’ on ‘Design & Architecture of AUVs’ and Cmde (Dr) Amit Ray, DND(SDG) on ‘Indian Navy’s Perspective on AUVs’.



MHA-DRDO COLLABORATION: 5TH APEX COUNCIL MEETING

Directorate of Low Intensity Conflicts (DLIC), DRDO HQs organized the 5th Apex Council meeting on 14 December 2024 at DRDO Bhawan, New Delhi. The meeting was Chaired by Shri Govind Mohan, IAS, Union Home Secretary and Co-Chaired by Dr Samir V Kamat, Secretary, DD R&D & Chairman DRDO and attended by all members of the Apex Council, viz. DGs from CAPFs (CRPF, ITBP, BSF, CISF, NSG, Commissioner of Delhi Police, Special Director IB, AS (NSCS), AS (Police Modernization), MHA, and AS & FA (Home), representatives of SSB, NDRF, and Assam Rifles. DG (MCC), DG (SSS), and DG (R&M), Director, INMAS and Director, SSPL joined the meeting in person while DG (MSS) and Directors/Representatives of other laboratories joined the meeting through VC.

Dr Chandrika Kaushik, OS & DG (PC&SI) & Member Secretary, Apex Council briefed about the



progress made in development of new products, Field trials of various equipment by MHA BOOs and DRDO's support to CAPFs in procurement of products. Dr Kamat briefly touched upon the DRDO-MHA collaboration, significance rise in its domain over past few years and DRDO's commitment towards providing the latest technological solutions to meet the operational challenges of the MHA agencies, viz. CAPFs, Delhi Police, and NDRF.

Sh Sangita Rao Achary, Director, DLIC briefed on DRDO overview and organizational structure, Charter of DLIC and existing MHA OM on induction mechanism of DRDO developed products into CAPFs and need for amendments for simpler procedures for project initiation, product evaluation and eventually agile procurements by CAPFs. All the members actively participated in the discussions and appreciated the indigenous solutions offered by DRDO.

CFEES HOSTED ASIA FIRE SAFETY EXPO 2024

Centre for Fire, Explosive, and Environment Safety (CFEES), Delhi, organized a three-day event: the 11th Asia Fire Protection Inspection Council (AFIC) Meet, Asia Fire Safety Expo 2024 (AFSE 2024), and an International Seminar on Latest Trends in Fire Safety and Future Prospective during 21–23 November 2024 at Yashobhoomi, New Delhi, with

the support of the Confederation of Indian Industries (CII) and the Fire Protection Association of India. The event was inaugurated by the Chief Guest Dr Samir V Kamat, Secretary DD R&D & Chairman DRDO, in the presence of Guests of Honour as Dr Subrata Rakshit, DS & DG (TM & SAM), Shri Vivek Srivastava, IPS, DG (FS, CD & HG), and Shri Changjin

Kim, Chairman AFIC & President, KFI, Korea. In his inaugural speech, Dr Kamat emphasized that the AFIC meet, AFSE 2024, and International Seminar will provide an excellent platform for meaningful dialogue, knowledge sharing, and collaboration on innovative solutions. He expressed confidence that the event would significantly contribute to DRDO's



vision of achieving a self-reliant India equipped with world-class fire safety technologies, bolstering both national security and global competitiveness.

During the event, CFEES transferred technology on the “Bus Occupant Water Mist Fire Protection System” to 18 Indian industries. The AFIC meeting was attended by representatives from six Asian countries to foster knowledge sharing and technical exchange on advanced fire safety technologies and standards across the Asian countries.

An international seminar was held on ‘Latest Trends in Fire Safety and Future Prospective’ with 5 technical sessions on different domain areas. The seminar was attended by 21 international delegates and over 200 Indian delegates from



various sectors, including state fire services, the Army, Navy, Air Force, BSF, DRDO, IITs, CAPF, etc.

The Asia Fire Safety Expo (AFSE) 2024 was held, and more than 50 Indian industries from fire safety sectors participated in the

expo, including BEL and DFS, who exhibited and showcased their products and innovations. The purpose of this focused exhibition was to unite key stakeholders from the fire safety industry, fostering innovation, collaboration, and technology transfer.

SEMINAR ON QUANTUM TECHNOLOGY

On 3 December 2024, the Defence Electronics Research Laboratory (DLRL), Hyderabad, organised an invited talk on ‘Design innovation and thinking’ by Dr BK Chakravarthy, the famed author of ‘Innovation by Design: Lessons from Post Box Design & Development, Dr. BK Chakravarthy & Janaki Krishnamoorthi, Springer, 2013. His captivating talk on ‘Chakku 7Cs of Innovation by Design’ kept the audience spellbound. He spoke about the seven concerns (7Cs) that form the backbone for the process of innovation: Cause, Concern, Comprehension, Check, Conception, Crafting, and Connection. He deeply discussed these seven concerns and related them to design and development.

He said that the connection between a new product and its user is crucial, as customer satisfaction is the most important criterion for innovation and a winning product,

as it leads to increased demand for the product. A Q&A session followed the talk, and the program concluded with a vote of thanks and the national anthem.





COURSE ON METALLURGICAL FAILURE ANALYSIS OF ENGINEERING COMPONENTS AT DMRL

Defence Metallurgical Research Laboratory (DMRL), Hyderabad, organized a Continuing Education Program (CEP) during 4-6 December 2024 on 'Metallurgical Failure Analysis of Engineering Components.' The objective of the course was to provide knowledge of metallurgical failure analysis basics, techniques, and case studies. Dr SN Sahu, Sc 'F', Head HRD, delivered the welcome address, followed by the inaugural address and course overview delivered by Dr Premkumar Manda, Sc 'E', Course Director. Dr Partha Ghosal, Sc 'G' & Associate Director, and Dr R Balamuralikrishnan, Director, DMRL, also addressed the audience. The keynote



address was delivered by Dr S Satyanarayana, President, SFA, Hyd Chapter, on 'Failures of Tools and Dies in Production Shops,' in which various metal cutting tools, types of cutting tool inserts, a brief on die failures, relevant investigations, and corrective methods were discussed. A series

of lectures by domain experts and faculty members from DMRL, ARCI, NAL-Bangalore, CEMILAC, GTRE, and IIT Roorkee were held during the 3 days. The course enriched 74 participants, including 49 from DMRL and 25 from other sister laboratories and organizations.

IRDE PARTICIPATION IN UTTARAKHAND STATE SCIENCE & TECHNOLOGY CONFERENCE

The Uttarakhand State Council of Science & Technology (UCOST) organised 19th Uttarakhand State Science and Technology Conference (USSTC) during 28-30 November 2024 at Doon University, Dehradun. Dr SS Negi, Ex-Director, Instruments Research & Development Establishment (IRDE) and Shri JP Singh, Sc 'G', IRDE, were invited as panelist members in the conference on 30 November 2024. In a special session, he presented his views on artificial intelligence in India's Defence. He further elaborated

on strengthening national security through technological advancements using AI. The scientists who attended this special

session were Dr Negi; Dr Amreek Singh, Sc 'G', DGRE, Chandigarh; and Shri Shailesh R. Chansarkar, Sc 'G', CAIR Bengaluru.





FAMILIARISATION PROGRAMME BY DESIDOC AT NPOL

Dr K Nageswara Rao, OS & Director, DESIDOC, visited the Naval Physical and Oceanographic Laboratory (NPOL), Kochi, on 8 November 2024. Dr D Seshagiri, OS & Director, NPOL, welcomed the Director, DESIDOC. Subsequently, NPOL, in collaboration with the Defence Scientific Information & Documentation Centre (DESIDOC), Delhi, conducted a familiarisation programme on 'Effective Utilisation of DRDO e-Resources and Writing High-Quality Technical Papers' at NPOL to enhance the knowledge of NPOL officials for effective use of DRDO eResources and their better contribution in writing research papers.

Dr Rao addressed the NPOL fraternity and delivered a talk on



'eResources subscribed under the DRDO Consortium, DRDO e-Library Platform, Jane's Database, and DRDO Digital Library Software.' The talk focused on the digital library developed for the benefit of the DRDO scientific community on the DRONA network and familiarizing oneself with the use of the subscribed Jane's database and other eResources.

Shri Sudhanshu Bhushan,

Sc 'F', DESIDOC, delivered a lecture on 'Writing High-Quality Technical Papers, DRDO Journals, and Demo of Scopus Database.' He explained how to write quality technical papers and covered topics like publishing research papers in journals of international repute, the Scopus database, avoiding plagiarism to improve paper quality, and DRDO publications. More than 100 participants attended the workshop.

HANDS-ON TRAINING ON 'INSTALLATION, OPERATION AND MAINTENANCE OF AUTOMATIC WEATHER STATION' AT DGRE, RDC, MANALI

The Defence Geoinformatics Research Establishment (DGRE), Chandigarh, is operationally committed to warning the troops against the hazard of avalanches in the snowbound, high-altitude, mountainous terrain of the Himalayas. The Automatic Weather Stations (AWS) network collects snow and meteorological data daily for avalanche danger evaluation. The AWS network has been established at the unattended





field locations of Sikkim, Jammu & Kashmir, Ladakh, Himachal Pradesh, and Uttarakhand to collect necessary snow met data.

To enhance the capability for

the installation, operation, and maintenance of the automatic weather station, two weeks of training on upkeeping preventive procedures for uninterrupted data

collection from field locations and maintenance of AWS were conducted at DGRE, RDC, and Manali.

AVALANCHE SAFETY AND RESCUE MEASURE TRAININGS BY DGRE

During winters, the snowbound area of the Indian Himalaya is prone to snow avalanches, and the mobility of troops and various military activities gets severely restricted by these avalanches. Avalanche awareness and safety-rescue training for 445 troops from different units of HQ15 Corps and 16 Corps was given by DGRE MMC Srinagar in November 2024. HQ 14 Corps and Siachen Battle School (SBS) also received the training. The goal was to make the troops better prepared for their operational duties and commitments in the Himalayas. Troops were given technical talks on the collection of snow and meteorological data, avalanche



safety and rescue measures, health issues in snowbound areas, and also about avalanche and snow

awareness. The training will help them efficiently perform their assignments in these regions.

SEMINAR ON INFRARED OPTICS AND TECHNOLOGIES AT IRDE

Instruments Research & Development Establishment (IRDE), Dehradun, organised a seminar on 'Infrared Optics and Technologies' on 12 November 2024. The seminar aimed to explore the latest advancements and innovations in the field of infrared optics and brought together experts, researchers, and

enthusiasts from various DRDO laboratories, DGQA, OLF, and BEL in the seminar. Dr Ajay Kumar, OS & Director IRDE, inaugurated the seminar and highlighted the importance of IR optics in modern defence systems and emphasized the need for continuous research and development in this field. Dr Sudhir Khare, Sc 'G' & Additional

Director IRDE, outlined a comprehensive roadmap for the development of the electro-optical system in IRDE together with the technical support of Ophir Israel.

Mr Benny Kosman, Mr Omer Frank, and Mr Michel Hochner from Ophir Israel delivered the lectures related to IR Optics in Electro-Optical products.



Mr Frank provided the details of Ophir's Make in India campaign and their product roadmap. The technical talks by the speakers provided insights into the IR component fabrication and coating together with fundamental principles of Zoom lens design and integration strategies for Zoom lenses in electro-optical products.

Dr Himanshu Singh, Sc 'F' gave closing remarks and a vote of thanks to Ophir Israel and presented a memento as an appreciation for their unwavering support in developing cutting-edge defence products.



COURSE ON MATERIALS AND COATINGS FOR FLEXIBLE ELECTRONICS AT DMSRDE

Defence Materials and Stores Research & Development Establishment (DMSRDE), Kanpur, organised a Continuing Education Programme (CEP) on 'Materials and Coatings for Flexible Electronics' during 18-22 November 2024. A total of 28 participants from DMSRDE and various sister DRDO laboratories, namely ADE, DIPAS, and RCI, attended the course. Chief Guest Prof. PK Khanna, Dean of Applied Science DIAT, Pune, inaugurated the course. He delivered the inaugural lecture on nanostructured materials. Eminent speakers from various reputed national institutes, namely IITs, DIAT, BITS, IISER, NIT, UPES, ARCI, etc., and industry delivered scientific talks on recent technological advancements in the



field of flexible electronics. One day of the course was dedicated to an industrial visit to M/s E-Spin Nanotech Pvt. Ltd., Kanpur, to have practical exposure to the participants. The course was successfully concluded with a valedictory function where Dr

Mayank Dwivedi, OS & Director, DMSRDE, handed over the course certificates to the participants after an interactive feedback session conducted by the Course Director, Dr Santosh Kumar Tripathi, Sc 'F' and Course Coordinator, Mohd. Imamuddin, Sc 'F'.



MHA-DRDO COLLABORATION: 9TH TECHNOLOGY COUNCIL MEETING

The 9th Technology Council Meeting under the MHA-DRDO collaboration was held at DRDO Bhawan on 4 November 2024, chaired by Dr Chandrika Kaushik, OS & DG (PC & SI), while members from MHA, CRPF, BSF, NSG, ITBP, CISF, SSB, NDRF, Assam Rifles, IB, and Delhi Police and officers from DRDO HQrs attended the meeting. Shri Sangita Rao Achary, Director, DLIC, and Member Secretary of the Technology Council, presented progress on various developments being taken, and New developments by various laboratories were also presented: assault rifles (Ugram), BPJ Level



6, ergonomically designed combat boots, ECWCS, Compact Tran horizon Communication System (CTCS), etc. The council members expressed their appreciation for

the DRDO laboratories' progress on these technologies and expressed that regular meetings will aid in meeting their technology requirements.

PARTICIPATION OF DIRECTOR, IRDE IN DEFENCE MSME CONCLAVE

The Federation of Indian Chambers of Commerce and Industry (FICCI), in association with the Department of Defence Production and India Optel Limited (IOL), organised a state-level defence MSME conclave in Dehradun on 3 December 2024. The theme of the conclave was 'Enhancing Regional Capabilities through MSME Defence Cluster Development in Uttarakhand.' Dr Ajay Kumar, OS & Director, Instruments Research & Development Establishment (IRDE), Dehradun, participated in the conclave. He addressed the delegates regarding different initiatives taken by the government for MSMEs in defence. He also



stressed the role of industry in defence and opportunities in R&D, policy incentives, and defence supply chain. The event was organised in line with the Prime

Minister's 'Make in India' initiative to promote indigenous defence manufacturing and procurement, where over 70 entrepreneurs from the region took part.



WORKSHOP ON THE INTERNATIONAL DAY OF PERSONS WITH DISABILITIES

On the occasion of the International Day of Persons with Disabilities, a workshop was organized under the aegis of the Directorate of Personnel (DOP) at DRDO HQrs on 4 December 2024. The event was organised with the aim of sensitizing and creating awareness amongst the admin and employees of DRDO to create a more inclusive, accessible, and equitable work environment for all.

During her address Dr Chandrika Kaushik, OS & DG (PC&SI). She spoke on the achievements made by persons with disabilities and on the ways DRDO can use its expertise in this field and develop devices to help PwDs.

Dr Sanjai Kr Dwivedi, Director, DOP, in his address, spoke on the



need for sensitivity and empathy in the administration while dealing with cases of appointment/transfer/representations of PwDs.

The invited speakers were Shri TD Dhariyal, the ex-state commissioner for persons with disabilities, NCT Delhi, and currently the president of the

National Association for the Blind, and Shri Praveen Prakash Ambashta, the deputy Chief Commissioner for Persons with Disabilities, who gave an overview of the requirements of the RPwD Act, 2016, and the need to make the environment accessible to PwDs.

WORKSHOP ON GENDER SENSITIZATION AT NSTL

The Naval Science & Technological Laboratory (NSTL), Visakhapatnam, organized a workshop on 'Gender Sensitization for Male and Female Employees at the Workplace' for all cadres of employees on 15 November 2024. Dr T Venkata Ratnam, TO 'D' & Workshop Coordinator, welcomed the dignitaries, invited speakers, and invited members. Smt DR Rajeswari Devi, Sc 'G' & ICC Presiding Officer, emphasized that the workshop aimed to promote awareness and understanding of gender equality within the team, within the unit, and within the

organization. In his address, Dr Abraham Varughese, OS & Director, NSTL, highlighted the importance of creating awareness about gender-sensitive behavior among all cadres of employees and inculcating an egalitarian

behavior to foster gender equality. Prof. V Vijaya Lakshmi, former Principal, Dr BR Ambedkar College of Law, Andhra University, Visakhapatnam, addressed the sensitive issues of the PoSH Act with guidelines.





SANYUKT RAJBHASHA VIGYANIK AND TAKNIKI SANGOSTHI AT DLJ

The Defence Laboratory Jodhpur (DLJ) successfully hosted the Sanyukt Rajbhasha Vigyanik and Takniki Sangosthi NS&M Cluster on December 5-6, 2024. The Sangosthi was inaugurated by Shri RV Haraprasad, DS & DG (NS & M), in the presence of Shri Sunil Sharma, OS & Director, DPARO & M. Representatives from 17 DRDO laboratories attended the event, demonstrating a strong commitment to promoting Hindi in scientific and technical contexts. The event included the unveiling of the Sangosthi Smarika, which contains research papers by participants in Hindi. The Vigyan Darshan magazine (in Hindi) was also unveiled during the Sangosthi. This magazine showcases the latest technologies and innovations from DLJ, highlighting the laboratory's contributions to defence S&T.



The Chief Guest of the sangosthi, Shri RV Haraprasad DS & DG (NS&M), emphasized that promoting Hindi in scientific communication strengthens both our cultural identity and the accessibility of research advancements. Guest of honour,

Sh Sharma encouraged all the participants to do as much work as possible in Hindi. Shri V Shachin and Sheno, OD & Director DLJ, expressed that the laboratory is proud to showcase its innovations through Vigyan Darshan while promoting the use of Hindi in research.

HINDI KARYASHALA

DMRL, Hyderabad

On 29 November 2024, the Defence Metallurgical Research Laboratory (DMRL), Hyderabad, organized the third Hindi workshop of 2024-25. Shri Vipin Kumar, CAO, Secretary & Convener, O&M, welcomed the speaker, 'Shri Santosh Kumar, Assistant Director,' Hindi Shikshan Yojana, Dept. of Official Language, Min. of Home Affairs. In his address, Shri Kumar stressed the Rajbhasha rules, regulations, and policies and also spoke about the responsibilities





of the personnel in implementing them. The speaker encouraged the participants to practice Hindi self-learning through online resources and gave tips for working efficiently in Hindi on PCs, including usage of UNICODE, typing tools, and voice typing. He particularly advised everyone to start using Hindi for short notes/comments, signatures, register entries, and meeting conversations as a routine. 46 personnel from different cadres participated enthusiastically in the workshop and expressed the need for holding more of such enriching workshops. Shri Pawan Kumar, Asst Dir (OL), coordinated the event with support from Shri Jai Prakash, TO 'A', DMRL.

DMSRDE, Kanpur

A Hindi Karyashala on 'Samagri Prabhandhan: Jatiltaye in Evam Samadhan' was organised by Rajbhasha Karyanvayan Samiti at Defence Materials and Stores Research & Development Establishment (DMSRDE), Kanpur, on 12 November 2024. The Karyashala was inaugurated by Dr Mayank Dwivedi, OS & Director, DMSRDE. In his inaugural address, he spoke about the use of more Hindi in day-to-day official work since DMSRDE is located in the prominent Hindi belt of the country. Shri Manish Kumar Gupta, Senior Stores Officer Grade-II, was the speaker in the Karyashala. He elaborated on various government procurement procedures, rules, and regulations in light of different manuals and guidelines such as the DRDO Procurement Manual-2020, GFR-2017, GeM Guidelines, Stores Management Guidelines, CVC Guidelines, Make in India



preference, etc. All the officers and staff of the establishment attended the karyashala. Dr Vineeta Nigam, Sc. 'F' & Rajbhasha Adhikari, coordinated the event.

PXE, Chandipur

The 96th Hindi Workshop was organized by the Proof & Experimental Establishment (PXE), Chandipur, for admin cadre personnel during 20 to 22 November 2024. Shri Aniruddha Bose, the Sc'G' & Officiating Director of PXE, inaugurated the workshop. In his inaugural address he mentioned that the workshop is going to be beneficial for Admin group personnel and would be impactful and useful to do their official works in Hindi.

On this occasion, Dr HS Panda, Sc 'G', the Dy Chairman (OL) & ASD, addressed that Hindi should be used progressively for administrative tasks and that such workshops are assistive in maximizing the use of Hindi. The faculties in the Hindi workshop trained the participants in writing simple and general applications, interoffice notes, circulars, Hindi covering letters, ways of Hindi implementation, official language rules, and the importance of Hindi grammar in official Hindi, Hindi terminologies, and short official sentences, which are useful while working in the office. Leave, LTC, Pension, Central Civil Service related Rules, etc. were discussed in detail in Hindi by the faculties.





GUEST OF HONOUR FOR DIRECTOR, IRDE IN ICMLDE AT UPES

The third edition of the International Conference on Machine Learning and Data Engineering (ICMLDE 3.0) was organised by the School of Computer Science (SoCS) of the University of Petroleum and Energy Studies (UPES) on its campus at Dehradun in collaboration with Elsevier, the University of Dayton (USA), and Providence University during 28-29 November 2024. Dr Ajay Kumar, OS&Director, Instruments Research & Development Establishment (IRDE), Dehradun, was invited as the Guest of Honour in the inaugural function of the conference on 28 November 2024.



In his address, he emphasised the importance of machine learning and data engineering in defence applications. The major topics covered in the conference were machine learning foundations, deep learning and data engineering, machine

learning and data engineering, and applications. The Ministry of Electronics and Information Technology (MeitY) and IBM sponsored the conference. The Chief Guest of the conference was Dr Sanjay Bahl, Director General, CERT-In, MeitY.

TANSA AWARD

Dr K Kadirvelu, Sc 'G' & Associate Director (DEBEL), DIA-CoE, Bharthiar University, Coimbatore, has been honoured with the Tamil Nadu Scientist Award (TANSA) in the category of Environmental Sciences for the year 2020. from Dr K Ponmudi, Hon'ble Minister for Higher Education Govt. of Tamilnadu. The award was conferred by the Tamil Nadu State Council for Science and Technology in recognition of his outstanding contributions to the field of environmental science research and innovation work which has significantly advanced the understanding and application of sustainable solutions to environmental challenges. The "Tamil Nadu Scientist Award"



is given to individuals who demonstrate excellence and significant contributions to the field of science and technology. This award highlights the

work of those who have made impactful contributions in various disciplines, inspiring the next generation of scientists and innovators.



HIGHER QUALIFICATION ACQUIRED

DGRE, Chandigarh



Dr Rakesh Kumar Agarwal, Sc 'F', Defence Geoinformatics Research Establishment (D G R E) , Chandigarh

has been awarded PhD from Department of Mechanical Engineering, Indian Institute of Technology, Ropar (Punjab) on 7 October 2024 for his thesis entitled, 'Investigation of Avalanche flow and its interaction with Obstacles'.

DMRL, Hyderabad



Shri Srinivasa Rao Nandam, Sc 'F' of Defence Metallurgical Research Laboratory (DMRL) has been awarded

PhD for the thesis entitled 'Laser Induced Surface Damage in Single-Crystal Nickel-based Superalloy for Improving Machinability' by IIT, Bombay.



Shri Vivek Kumar Chandra vanshi, Sc 'E' of Defence Metallurgical Research Laboratory (DMRL) has been

awarded PhD for the thesis entitled 'Effect of thermo mechanical treatment on the evolution of microstructure and mechanical properties in a β and a β rich $\infty + \beta$ titanium alloy' by IISc, Bengaluru.

SPORTS ACTIVITIES

DEAL, Dehradun

Defence Electronics Applications Laboratory (DEAL), Dehradun, participated in the DRDO North Zone Football Tournament organized at IRDE during 3-6 December 2024. The final match was played between DEAL and IRDE, in which DEAL won the final match and won the title of DRDO North Zone Football winner for the second consecutive time and 06 players from DEAL were selected for the DRDO National Team.



NMRL, Ambernath

The Naval Materials Research Laboratory (NMRL), Ambernath's Samudri Sports Complex and playground hosted annual sports competitions during 9 to 13 December 2024. Shri PT Rojatkar, OS & Director, NMRL, inaugurated the sports event. NMRL employees participated in various indoor and outdoor game competitions, including chess, carom, badminton, cricket, and volleyball. Musical chairs, brisk walks, and lemon & spoon competitions were also conducted especially for women employees. These sports activities were arranged to inculcate a sense

of team-building spirit. NMRL employees participated in the sports very enthusiastically.



VRDE, Ahmednagar

Sports Week 2024 was celebrated at the Vehicles Research and Development Establishment (VRDE), Ahmednagar, on November 25-28, 2024, and various sports, both indoors and outdoors, were conducted. All the employees actively participated in these events.

Many team games like football, volleyball, cricket, and tug of war, and individual events like chess, table tennis, carom, and cycling, etc., were conducted during the sports week. Events like chess, carom, badminton, throwball, and cycling were conducted separately for lady employees. Cricket and cycling events were also conducted for employees above the age group of 50 years. The winning employees were felicitated during the closing ceremony.





VISITORS TO DRDO LABORATORIES

CHESSE, Hyderabad

Brigadier Vijay Kotiyal visited the Centre for High Energy Systems & Sciences (CHESSE), Hyderabad, on 27 November 2024, and interacted with the senior officials. He appreciated the impact of DEW and the contribution of CHESSE. He expressed his desire for frequent interaction with PMO SURAJ to fine-tune DEW's requirement against a static target. Director CHESSE requested target details against which DEW efficacy can be tested and also informed that an earlier similar test report has already been submitted to PMO SURAJ.



Brigadier Vijay Kotiyal in discussion with CHESSE scientists at CHESSE, Hyderabad

DIPR, Delhi

Lt Gen Devendra Sharma, AVSM, SM, GOC-in-C, Army Training Command (ARTRAC) visited Defence Institute of Psychological Research (DIPR), Delhi, Soldier Support System Cluster, DRDO, Delhi on 20 December 2024.

Dr Arunima Gupta, Director, DIPR briefed the Army Commander on key R&D achievements, ongoing projects & futuristic research initiatives for the Indian Armed Forces.

Army Commander complimented the team's efforts and urged upon the scientific fraternity to remain at the forefront for evolving novel solutions to address the modern day challenges in training and placement, thereby strengthening and empowering the Armed Forces.



Lt Gen Devendra Sharma, ARTRAC, during his visit at DIPR, Delhi

DLIC, DRDO HQrs

Shri Daljit Singh Chawdhary,



Dr (Mrs) Chandrika Kaushik felicitating Shri Daljit Singh Chawdhary at DRDO HQrs on 20 November 2024

IPS, Director General, BSF, visited DRDO HQrs on 20 November 2024 along with his team. The Border Security Force (BSF) is one of the key paramilitary forces

under the Ministry of Home Affairs, which is responsible for guarding India's borders with Pakistan and Bangladesh. During the visit, the officers interacted



with Dr (Mrs) Chandrika Kaushik, DG (PC & SI), and the team of the Directorate of Low Intensity Conflicts (DLIC) and deliberated over niche technology areas where DRDO can assist BSF under the DRDO-MHA Collaboration. Director DLIC gave a detailed presentation on the ongoing engagements with BSF. Detailed discussions on technological solutions for border management challenges were held. The meeting ended with the felicitation of the guest by DG (PC & SI).

DMRL, Hyderabad

Shri RV Hara Prasad, DS & DG (NS&M), visited the Defence Metallurgical Research Laboratory (DMRL), Hyderabad, on November 8, 2024 (a maiden visit after taking charge as DG). Dr. R. Balamuralikrishnan, OS & Director, DMRL, briefed him about DMRL's current activities and future plans through a presentation. Shri Prasad interacted with the DMRL scientists and reviewed the progress of current projects. He visited several technical groups, including the Advanced Materials Characterization Centre, Enabling Technology Centre, Powder Processing Group, and Near Net Shape Group. Shri Prasad was greatly impressed by the state-of-the-art technical facilities and was highly appreciative of DMRL-developed technologies. He also emphasised the need for DMRL to focus on futuristic materials and related technologies.

DMSRDE, Kanpur

Shri SP Shukla, former president of SIDM and chairman of the Mahindra Group of



Shri RV Hara Prasad, during his visit at DMRL, Hyderabad



Shri SP Shukla with Director, DMSRDE and DMSRDE scientists during his visit at DMSRDE, Kanpur

Industries, visited the Defence Materials and Stores Research and Development Establishment (DMSRDE), Kanpur, on November 28, 2024. Dr Kingsuk Mukhopadhyay, Officiating Director, DMSRDE, welcomed Shri Shukla and demonstrated the products and technologies developed by DMSRDE in the area of non-metallic materials, including ceramics and Ceramics Matrix composites (CMCs), stealth & camouflage materials, nanomaterials, coatings, polymers

& rubbers, fuels & lubricants, technical textiles, and personal protection systems.

MTRDC, Bengaluru

An industrial visit was organised at the Microwave Tube Research and Development Centre (MTRDC), Bengaluru, on 28 November 2024. Forty-five students from the Dayananda Sagar College of Engineering participated in the industrial visit. Dr Anurag Srivastava, Sc 'F' and Shri B Bharat Kumar, Sc 'D' from

MTRDC were the co-coordinators for the event.

NMRL, Ambernath

✂ Shri RV Hara Prasad, DS & DG (NS&M), visited the Naval Materials Research Laboratory (NMRL), Ambernath, on 7 December 2024 for a review (EBM) of various ongoing projects of NMRL. Shri PT Rojatkar, OS & Director, NMRL, welcomed Dr Prasad. DG (NS&M) visited the land-based prototype of the AIP site to witness the operation of the system. He also visited the exhibition of various products and technologies developed by NMRL. Dr Prasad closely interacted with NMRL officers and staff during the visit. He praised the hard work of NMRL scientists in creating many useful products and notable accomplishments in areas like fuel cell-based propulsion systems, weld consumables and welding technologies, corrosion protection, paints, ceramics, bio-remediation, acoustic stealth, energy storage devices, and more. He also advised conducting frequent reviews to ensure project timelines.

✂ VAdm Krishna Swaminathan, AVSM, VSM, VCNS, along with VAdm AY Sardesai, VSM, IGNS, visited NMRL, Ambernath, on 7 December 2024 for a review of the integration of the Air Independent Propulsion (AIP) system with the P-75 class of submarines. The guests were received & welcomed by Shri RV Hara Prasad, DS & DG (NS&M), and Shri PT Rojatkar, OS & Director NMRL. VCNS, in his opening remarks, highlighted the necessity for timely completion of AIP system realization and assured providing support of the Indian Navy for the same. A detailed presentation on the 'DRDO AIP



Students from the Dayananda Sagar College of Engineering at MTRDC, Bengaluru



Shri RV Hara Prasad, during his visit at NMRL, Ambernath



VAdm Krishna Swaminathan along with VAdm AY Sardesai during his visit at NMRL, Ambernath

Programme for the first P-75' covering background, status of AIP design vetting, qualification, procurement of materials and equipment, manufacturing, issues, etc. was made by Dr Suman Roy Choudhury, Sc 'H' (Programme

Director). The industry partners, viz. MDL, L&T, and Thermax, also presented the status of various sub-systems of AIP. VCNS, in his closing remarks, expressed his satisfaction regarding progress made by NMRL.

DARE TO DREAM




DARE TO DREAM 5.0

LAUNCHED BY



SHRI RAJNATH SINGH
HON'BLE RAKSHA MANTRI

Challenge Areas for Individual Category

1. Anomaly and Point of Interest Detection in Streaming Data (No Prior Data Distribution)
2. Brain Computer Interface for Deciphering Intention
3. Compact Solid State based Non-Lethal Active Denial System (ADS)
4. Development of ML/AI Module for Rocket Motor Design
5. Innovative Applications of Blockchain
6. Large Metallic Object Proximity Detection using Permanent Magnet Array
7. Measures/Solutions of Internet Intervention in Emergency /Disaster/Civil Unrest/Critical Events/Situation
8. Non-Destructive Evaluations Techniques for Ceramics Matrix Composites
9. Space Debris Removal
10. Open Challenge: Exploring the Unthinkable and Unimaginable



DARE TO DREAM 5.0

INNOVATION CONTEST BY DRDO

Giving wings to innovation in Defence & Aerospace

"If you want to shine like a sun, first burn like a sun." - Dr. A. P. J. Abdul Kalam

REGISTRATIONS OPEN!
LAST DATE TO APPLY - 31 JAN 2025

Eligibility

Individual Innovators: Should be an Indian citizen above 18 years of age (can also register as a team)

Start-ups: Recognized by DPIIT and owned by Indian citizens.

Micro & Small Enterprises (MSEs): Registered with Ministry of MSME & owned by Indian citizens.

Prizes for Dare to Dream 5.0

1st Prize * Rs 6 Lakh # Rs 12 Lakh	2nd Prize * Rs 5 Lakh # Rs 10 Lakh	3rd Prize * Rs 4 Lakh # Rs 8 Lakh
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*Individual #Start-ups & MSEs

Challenge Areas for Startups or MSEs Category

1. Contact Less Power Transfer using Resonant Coils in Underwater
2. Energy Autonomy for Autonomous Surface Platform
3. Ensuring Data Privacy using Searchable Symmetric Encryption
4. Fire Fighting Helper Robots
5. Metamaterials based Cloak for Evading Detection/Recognition
6. Optical Beam Forming Network for Active Phased Array Applications
7. Pilot Safety for Helicopter Related Emergency Situation
8. Quantum Sensing and its Application for Magnetic Mass and Radar
9. Use of Virtual Machines in Cyber Security
10. Open Challenge: Exploring the Unthinkable and Unimaginable

Objective: The objective of Dare to Dream 5.0 is to provide the right platform to the nation's innovators in order to unearth & realize their disruptive ideas and concepts in different disciplines of emerging technologies possessing military and dual-use identified by DRDO for enhancing defence capabilities.

About the Contest: After seeing massive success of the fourth edition of the competition, Defence Research and Development Organization (DRDO) has launched the fifth edition of its innovation contest, 'Dare to Dream 5.0' as a tribute to the visionary, the legendary former President and eminent scientist, Dr APJ Abdul Kalam

Dr. Kalam first espoused the vision of self-reliance and India's very own development model. The Contest is being launched for promoting research in various fields of emerging technologies in order to promote Individuals, Startups and MSEs for the creation of innovation in defence and aerospace technologies in the country for realizing the vision of an 'Aatmanirbhar Bharat' given by our Hon'ble Prime Minister Shri Narendra Modi.

Dare to Dream 5.0: Dare to Dream 5.0 is an idea-based open challenge to promote the Individuals, Startups and MSEs of the country and enable them to dream big without any limitations, putting their ideas into tangible results. The winners will be declared after a comprehensive evaluation process by two level committees i.e Domain Expert Committee (DEC) and Independent Expert Committee (IEC). Award money of upto INR 12 lakhs for Startups and MSEs and INR 6 lakhs for individuals will be provided to the respective winner.



“ Dream is not that you see in sleep, Dream is something that doesn't let you sleep. ”

Dr. A. P. J. Abdul Kalam

Awards in (INR)	
Individual	Start-ups or Micro & Small Enterprises
1st Prize: 6 lakh	12 lakh
2nd Prize: 5 lakh	10 lakh
3rd Prize: 4 lakh	8 lakh

Important Dates:

- Start Date: 03 Dec 2024
- End Date: 31 Jan 2025

Two Categories:

- Individuals
- Indian Start-ups or MSEs



“ To succeed in your mission, you must have single-minded devotion to your goal. ”

Dr. A. P. J. Abdul Kalam

www.drdo.res.in/dare2dream5/portal/kalam.html

**DRDO NEWSLETTER WISHES ITS READERS
A VERY HAPPY NEW YEAR 2025**