

# DRDO NEWSLETTER



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**Dr Samir V Kamat is the new DRDO Chief**



42nd Year of Publication

Editor-in-Chief: Dr K Nageswara Rao
Associate Editor-in-Chief: Alka Bansal
Managing Editor: Ajay Kumar

Editor: Dipti Arora
Editorial Assistance: Raj Kumar

Printing: SK Gupta
Marketing: Tapesh Sinha



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Ambernath : Dr Susan Titus, Naval Materials Research Laboratory (NMRL)
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: 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

## DR SAMIR VANKATPATI KAMAT IS THE NEW DRDO CHIEF

Dr Samir V Kamat assumed charge as Secretary, Department of Defence R&D and Chairman, DRDO on 26 August 2022. Dr Kamat completed B.Tech. (Hons) in Metallurgical Engineering from IIT-Kharagpur in 1985 and PhD in Materials Science and Engineering from The Ohio State University, USA in 1988, and joined DRDO in 1989.

Dr Kamat has provided leadership and direction to several critical materials programmes in DRDO such as the development of high-strength steels for naval ship hulls, development of high-temperature titanium alloys and nickel-base superalloy-based components for aero engines, development of tungsten heavy alloys for kinetic energy penetrators, development of fused silica radomes for missile seekers, development of armour solutions for personnel as well as combat vehicles and stealth materials for airborne and naval applications. These have found use in various systems being developed by DRDO laboratories.

In addition, he has superheaded the development of naval systems such as advanced lightweight torpedo, anti-torpedo decoy systems, autonomous underwater vehicles, advanced hull-mounted and towed array sonars for ships, and fuel cells based air-independent propulsion



systems for submarines.

Dr Kamat is a Fellow of the Indian National Academy of Engineering (INAE) and Institution of Engineers India (IEI). He is a recipient of Distinguished Alumni Award from

IIT-Kharagpur, Metallurgist of the Year Award by the Ministry of Steel, and Scientist of the Year award from DRDO. He has published more than 180 papers in international peer-reviewed journals.

## MOU BETWEEN IRDE AND DIT UNIVERSITY, DEHRADUN

**I**nstruments Research & Development Establishment (IRDE), Dehradun signed a Memorandum of Understanding (MoU) with Dehradun Institute of Technology (DIT) University, Dehradun on 17 August 2022 at IRDE. The MoU was signed to strengthen interaction between the academia, scientists, research fellows, scholars, and faculty members for academic and scientific collaboration in areas of common interest.

The MoU was signed by Dr Ajay Kumar, Director, IRDE and Prof G Raghurama, Vice-Chancellor of DIT University. The MoU includes to organise joint conferences/seminars, conduct of B.Tech./M. Tech./Ph.D academic programmes for IRDE employees,



Dr Ajay Kumar, Director, IRDE and Prof G Raghurama, Vice-Chancellor, DIT University during the Signing of the MoU

sharing of scientific and academic knowledge and joint guidance of PG/UG students for project/thesis.

## SIX FLIGHT-TESTS OF QUICK REACTION SURFACE-TO-AIR MISSILE

**D**efence Research and Development Organisation (DRDO) and the Indian Army have completed six flight tests of the Quick Reaction Surface-to-Air Missile (QRSAM) system from Integrated Test Range (ITR), Chandipur off the Odisha coast. The flight tests were conducted as part of evaluation trials by the Indian Army.

The flight tests were carried out against high-speed aerial targets mimicking various types of threats

to evaluate the capability of the weapon systems under different scenarios, including long-range medium altitude, short-range, high altitude maneuvering targets, low radar signature with receding & crossing targets, and salvo launch with two missiles fired in quick succession. The system performance was also evaluated under day and night operation scenarios.

During these tests, all the mission objectives were met

establishing pin-point accuracy of the weapon system with state-of-the-art guidance and control algorithms including the warhead chain. The performance of the system has been confirmed from the data captured by several range instruments like telemetry, radar, and Electro-optical Tracking Systems (EOTS) deployed by ITR. Senior officials from DRDO and the Indian Army participated in the launches. These tests were conducted in the final deployment

configuration consisting of all indigenously-developed sub-systems, including the missile with indigenous Radio Frequency (RF) seeker, mobile launcher, fully automated command and control system, surveillance, and multi-function radars. The uniqueness of the QRSAM weapon system is that it can operate on the move with search and track capability and fire on a short halt. This has been proven during the mobility trials conducted earlier.

Raksha Mantri Shri Rajnath Singh has complimented DRDO and the Indian Army on the successful flight trials. He exuded confidence that the QRSAM weapon system will be an excellent force multiplier for the Armed Forces. Secretary, Department of Defence R&D and Chairman DRDO has congratulated the teams associated with the successful series of trials and said that the system is now ready for induction into the Indian Army.



## INDEPENDENCE DAY CELEBRATIONS

### CAIR, BENGALURU

Centre for Artificial Intelligence & Robotics (CAIR), Bengaluru celebrated 'Har Ghar Tiranga' during 13-15 August 2022 by conducting number of events. CAIR employees with tiranga in their hands assembled at the terrace of their respective office buildings. The CAIR employees and their families also participated in the campaign at CAIR House DRDO Township.

On 15 August 2022, Independence Day was celebrated with lots of enthusiasm. The



function started with flag hoisting by Director, CAIR followed by National Anthem. Dr Subrata Rakshit, Director, CAIR addressed the gathering and distributed merit awards to the wards of CAIR Officers/Staff/contract employees.

### IRDE, DEHRADUN

Instruments Research & Development Establishment (IRDE) celebrated 'Azadi Ka Amrit Mahotsav' and took part in the 'Har Ghar Tiranga' programme during 11-17 August 2022. IRDE hoisted tiranga at different locations at IRDE and Vigyan Vihar residential buildings. A quiz programme was organised at 20 different schools for the students of classes 6 to 8 in the Dehradun region in which around 1000 students participated. The programme aimed to inculcate the spirit of patriotism among youth and to develop a scientific vision. Dr BK Das, OS & DG (ECS) inaugurated the celebrations at IRDE on 12 August 2022 and delivered the keynote address. Dr Ajay Kumar, Director, IRDE addressed the officers and staff and outlined the present and future activities of IRDE. The COVID-19 booster dose programme was organised at IRDE Wellness Center. Events like a patriotic Odyssey Dance and a patriotic play depicting India's freedom struggle were also organised at IRDE.

### ITR, CHANDIPUR

Integrated Test Range (ITR), Chandipur celebrated 76th Independence Day amidst great enthusiasm on 15 August 2022. The event commenced with hoisting of the national flag by



Shri HK Ratha, Director, ITR. For the first time at ITR, national flag was hoisted on a 100 ft (30 m) high flag post. Director, ITR highlighted the achievements of the country in the post-independence period with emphasis on important accomplishments of DRDO since its inception. He also accentuated the dedication and whole hearted contribution of ITR employees and family members in transforming

ITR into a world class test range and a national asset from a humble beginning four decades ago. On the occasion, Centralized Technical Power House, Centralized Power Monitoring Facility and Range Exhibition Center were inaugurated by Director, ITR. A plantation programme was also held during which ITR employees planted 40 numbers coconut trees inside ITR technical area.



## NMRL, AMBERNATH

Independence week was celebrated at Naval Materials Research Laboratory (NMRL), Ambernath by organising various events. 'Har Ghar Tiranga' programme was organised during 11-14 August 2022. Flag hoisting was carried out at Durgadi Fort on 13 August 2022. As NMRL is engaged in R&D of materials and processes required for naval ship and submarine construction, it was decided to hoist the tri-colour at the iconic fort 'Durgadi' to pay tribute to great Maratha king Shivaji Maharaj as he used this fort as a dock to build boats and ships. The function was attended by Shri PT Rojtkar, OS & Director and other senior officers and staff of NMRL.



## NSTL, VISAKHAPATNAM

To celebrate the spirit of Azadi ka Amrit Mahotsav and to motivate the Gen Next, five Teams from NSTL embarked on a journey to visit 21 government, zilla parishad, and municipal schools spread over three districts of Vizianagaram, Srikakulam, and Visakhapatnam. The emphasis was on touching the students in the remote rural schools and explains them about evolution of Indian Flag, Flag Code and contributions of DRDO to achieve Atma Nirbharata. Importance of developing analytical and communication skills from school days was emphasised. Quiz on freedom fighters, flag code, DRDO products and on the spot talk by the students on their 'Vision for Future of India' were conducted





to promote active participation. NSTL fraternity has also seen this as an opportunity to provide the schools with items of scientific utility through the aegis of NSTL Seva Samithi and donations collected during Mahila Kalyan Manch Fest on 8 August 2022. There was a more than enthusiastic

response from the schools whose teachers voluntarily accompanied the NSTL Team to source items such as prisms, glass slabs for physics laboratory, chemicals for chemistry experiments, microscopes, charts for social studies and mathematics and sports kits. Motivational quotes

of Dr Abdul Kalam were also presented to the schools. For NSTL, it has been a rewarding and humbling experience to interact with a large section of the future generation from rural backgrounds, to motivate them, to 'Ignite their Minds' and give them 'Wings of Fire'.

## LADAKHI KISAN JAWAN VIGYAN MELA – 2022 IN LEH – LADAKH UT

Defence Institute of High Altitude Research (DIHAR), a premier laboratory of DRDO, located in the high altitude cold desert trans-Himalayan region of Ladakh, organised the 29th Ladakhi Kisan Jawan Vigyan Mela during 29-30 August 2022 with objectives of disseminating technical know-how related to latest agro-animal technologies developed by DIHAR among the local farmers and troops deployed in Ladakh sector.

The Mela was inaugurated on 29 August 2019 by Sushri Shobha Karandlaje, Hon'ble Union Minister of State for Agriculture & Farmers Welfare, Govt of India in benign presence of Shri RK Mathur, Hon'be Lt Governor of Ladakh, Sh Jamyang Tsering Namgyal, MP (Ladakh); Lt Gen A Sengupta, AVSM YSM, GOC, 14 Corps; Dr UK Singh, DG (LS), DRDO and Dr OP Chaurasia, Director, DIHAR. Representatives from LAHDC, Army and district officers, local farmers, and students attended the event in large numbers.

Sushri Shobha Karandlaje, lauded endeavors of DIHAR



made over the years since 1960s and appreciated the scientists in supporting local farmers to cultivate quality organic fresh foods which is supplied to troops deployed in the harshest environmental conditions.

The Hon'ble Minister further suggested that appropriate policies be promulgated so that maximum organic produce from local farmers can be supplied to Armed Forces locally. The

proposal was thoroughly endorsed by the Hon'ble MP and GOC 14 Corps. The efforts of the laboratory and the day-to-day support being provided by DIHAR to the union territory was highly appreciated by the Hon'be Lt Governor of Ladakh.

On the occasion, Sushri Shobha Karandlaje handed over miniature replicas of DIHAR greenhouse and micro-farming technology to the GOC 14 Corps as a notional gesture



of handing over the technologies to Indian Army. Technical bulletins for growing Sun Melon in Ladakh; Micro-farming technology & Black Goji berry were released and the 'Dr APJ Abdul Kalam Extension Centre', a one of its kind of facility at Ladakh was also inaugurated. The major attractions of Mela, included demonstration of various cutting edge technologies, viz.

growing of vegetable crops, potato storage technology for prolonged winters, different types of protected cultivation structures, mulch technology, conservation of medicinal plants and formulation of various value added products, double humped camels for load carrying and patrolling, etc.

Besides, various other agencies and institutes in the

Union Territory including NGOs displayed their products and technologies during the Mela.

As an offshoot of the main event, a mela was also organised at DIHAR Dett Partapur in the Siachen sector on 3 September 2022 with the aim to disseminate the technologies to the farthest regions of Ladakh.

## DRDO PARTICIPATION IN STATIC EQUIPMENT DISPLAY—VINBAX-2022

India and Vietnam share a comprehensive strategic partnership and defence cooperation as a key pillar of partnership. Vietnam is an important partner in India's Act East policy and the Indo-Pacific vision. VINBAX-2022, event was a part of 3rd edition of Vietnam-India Bilateral Army Exercise VINBAX-2022 conducted at Chandimandir, Haryana during 1-20 August 2022. The theme of VINBAX 2022 was the 'Employment and Deployment of an Engineer Company and a Medical Team as part of United Nations Contingent for Peace Keeping Operations'. DRDO laboratories participated at VINBAX-2022 static equipment display during 17-18 August 2022. Defence Geoinformatics Research Establishment (DGRE), Chandigarh as the Nodal Laboratory for VINBAX-2022 coordinated with Terminal Ballistics Research Laboratory (TBRL), Defence Institute of Physiology & Allied Sciences

(DIPAS), and Institute of Nuclear Medicine and Allied Sciences (INMAS) during static equipment display of VINBAX-2022 theme Humanitarian Assistance and Disaster Relief (HADR) at Kaushalya Dam, Chandimandir, Haryana.

DRDO delegates showcased the exhibits, models, posters and pamphlets of integrated avalanche mitigation scheme, digital avalanche atlas for avalanche prone areas, avalanche hazard mitigation using control structures, avalanche awareness rescue and safety training, Bund Blasting Device Mark-II, Multi-Mode Hand Grenade, Baffle Range, Rail Track Rocket Sledge National Test Facility, Smart Solutions for Small Firings, Ultra Swachh Radiation Biodosimetry Services, Rakshita, Anti-Covid Drug: 2G, Extreme Cold Weather Clothing System and Full Body Protector For Female Troops (PRABLA) Display in VINBAX-2022.

The visitors of the static equipment display includes Indian

Army Commanders, Engineer-in-Chief, Lt Gen Harpal Singh, Western Army Cdr, Lt Gen Nav K Khanduri, AVSM, VSM – COS, Lt Gen VB Nair - Corps Cdr 11 Corps, Lt Gen Devender Sharma - Corps Cdr 2 Corps, Lt Gen Pratik Sharma, Maj Gen KJS Rathore, Maj Gen Sandeep Singh, MGGS OPS, Maj Gen V Arya, Maj Gen Harinder Singh, Maj Gen Vikram Taneja, Maj Gen Harsh Chibber, MG ASC, Maj Gen Pawan Chadha, Chief Engr, Maj Gen Mohit Gandhi, MG EME and Maj Gen MK Mehta and Vietnam Ambassador in India, H.E. Pham Sanh Chau, Maj Gen Hoang Kim Phung, Director, Ministry of National Defence, Vietnam Department of Peacekeeping Operation Chief of Mission, Embassy of the Socialist Republic of Vietnam, New Delhi, Defence Attaché Sr Col Pham The Hung, Dr Do Thanh Hai, Minister Counsellor-Deputy Chief of Mission, Embassy of the Socialist Republic of Vietnam, Col Luu Dinh Hien, and Mai Anu Tuan, Political Officer and DG UNPKO.

During the visit, Dr PK Satyawali, Director, DGRE, and Shri Prateek Kishore, Director, TBRL interacted with dignitaries of Indian Armed Forces, Army

Medical Corps, NDRF, Haryana Police and Vietnamese dignitaries. The delegates were briefed about available DRDO products, engineering and medical solutions

for Humanitarian Assistance and Disaster Relief (HADR) for United Nations Contingent for Peace Keeping Operations.



Lt Gen Harpal Singh, PVSM, AVSM, VSM, ADC, Engineer-in-Chief of Indian Army during his visit to DRDO Pavilion



Vietnam Ambassador in India, H.E. Pham Sanh Chau and Team of Vietnamese Army delegates interaction with DRDO Officials at VINBAX-2022

## OBSERVATION OF SADBHAVANA DIWAS

Sadbhavana Diwas was observed in Integrated Test Range (ITR), Chandipur on 19 August 2022 to commemorate the birth anniversary of Shri Rajiv Gandhi (late Prime Minister of India) with a theme to promote national integration and communal harmony among all religion, languages, and regions along with the efforts to eschew violence and to promote goodwill among people of our country. Shri HK Ratha, Director, ITR administered the bilingual 'Sadbhavana Diwas Pledge' to officers and employees of ITR.



## UNITED INDIA FEST AND CHITRANGAN

Mahila Kalyan Manch (MKM), Naval Science & Technological Laboratory (NSTL), Visakhapatnam celebrated United India Fest on 8 August 2022 to explore rich culture and cuisines of India. The event was inaugurated by the Chief Guests Mrs Smita V Kamat, Chief Mentor, MKM and Mrs Y Lakshmi Sreenivas Rao, President MKM. In this colourful event, 15 stalls of handicraft items, regional cuisines, physiotherapy, and electro-homeopathy, variety of games, and Tarot card reading, etc., were placed. All these stalls were set up by the women employees of NSTL and wives of male employees. In addition, on the spot competitions were conducted with exciting prizes to the winners and lucky dip for buyers on hourly basis were arranged. During the



occasion, Dr Y Sreenivas Rao, OS & Director, NSTL along with Sri Prabal Mohanty, Senior Member of Vizag Camera Club inaugurated 'Chitrangana', a photo exhibition by NSTL fraternity. Also, a Souvenir, the compilation

of all the photographs of the exhibition was unveiled. In the exhibition, photos taken by several NSTL personnel were exhibited. Sri Sourav Mazumdar, Sc 'E' and team compiled and categorised the beautiful photos under en themes.

## NATIONAL LIBRARIAN'S DAY CELEBRATION

Defence Information & Documentation Centre, (DESIDOC), Delhi celebrated National Librarian's Day on 18 August 2022 to commemorate the birth anniversary of Padma Shri Dr SR Ranganathan who is considered as the Father of Library Science in India. Dr K Nageswara Rao, Director, DESIDOC gave floral tribute and highlighted the contributions and legacy of Dr SR Ranganathan. He also delivered an informative talk on retrieval of digital documents through metadata creation and storing them properly in the digital media. The event was attended by TIRC personnel and scientists from Delhi-based laboratories of DRDO. Dr Sangeeta Kaul, Director, DELNET-Developing Library Network, delivered a



motivating talk on the topic 'Serving the Library-users with Service Attitude'. She elaborated on various ways and means through which librarians can

reach to and satisfy their users in the current era. The event was organised by Shri Nishant Kumar, Sc 'E', and his team.

## CELEBRATION OF WORLD PHOTOGRAPHY DAY-2022

World Photography Day was celebrated at Integrated Test Range (ITR), Chandipur on 19 August 2022 with theme 'Pandemic Lockdown through the Lens'. On the occasion, an exhibition of photographs, taken by ITR employees and their family members, was organised where variety of photographs were showcased. Director, ITR presented mementos to the participants of the exhibition.



# RAISING DAY CELEBRATIONS

## DESIDOC, DELHI

Defence Scientific Information and Documentation Centre (DESIDOC), Delhi celebrated its 52 Raising Day on 29 July 2022 with great enthusiasm. Dr G Satheesh Reddy, Secretary, DD R&D and Chairman, DRDO was the Chief Guest of the occasion and Shri KS Varaprasad, DS & DG (HR) was the Guest of Honour. Directors from DRDO HQ and from sister DRDO laboratories based in Metcalfe House and Timarpur Complex, senior scientists, invitees from Delhi based establishments and employees of DESIDOC attended the function. DESIDOC showcased various DRDO publications during the event. The Chief Guest and other dignitaries visited the stall and had a glance of all the regular

and special publications brought out by DESIDOC on behalf of DRDO.

Dr K Nageswara Rao, Director, DESIDOC gave the welcome address highlighting achievements of various activities of DESIDOC in the past year. He also enlightened the august gathering about the latest initiatives and future plans of DESIDOC and emphasised that DESIDOC will continue to serve DRDO scientific community with its untiring efforts and innovative approach.

DS & DG (HR) appreciated the hard work being done by DESIDOC over the years and stressed that DESIDOC should work more diligently in fulfilling the information service requirements

of DRDO in a better way.

Chairman, DRDO in his address praised DESIDOC for providing excellent services to DRDO and advised that DESIDOC should work in the field of Technical Documentation and related areas. He further advised that DESIDOC should re-invent itself and should come forward with new ideas which are of utmost importance in today's scenario. On this occasion, Lab-level Awards were distributed to the employees.

Mementos were presented to the employees who have completed 25 years of dedicated service in DRDO. Smt. Sumati Sharma, Sc 'G' coordinated the event. Shri Kuldeep Singh Sc 'G' proposed the vote of thanks.



## NSTL, VISAKHAPATNAM

Naval Science & Technological Laboratory (NSTL), Visakhapatnam established on 20 August 1969 with 10 staff members, NSTL has grown multifold with 585 personnel including 174 Scientists and has made significant contributions to defence R&D and is recognised as one of the premier laboratories of DRDO engaged in the development of underwater weapons and systems.

Vice Admiral Biswajit Dasgupta, AVSM, YSM, VSM Flag Officer Commanding-in-Chief (FOC-in-C), Eastern Naval Command (ENC) was the Chief Guest of the celebration. The programme started with invocation, followed by welcome address by Chairman LRDC-2022, Sri M Srinadh, Sc 'F'.

Sri ChVSN Murty, President, NSTL Civil Employees Union talk about the social service activities of NSTL during COVID-19 pandemic

and the booster vaccination programme. He requested scientist community and technical cadre personnel to put more efforts to support the nation. Dr Manu Korulla, Sc 'G' & Chairman, Works Committee presented the annual report of Works Committee. In particular, he mentioned the social service activities which were carried out with the cooperation of the members of NSTL Civil Employees Union, JCM-IV, Works Committee and NSTL fraternity. He highlighted more than 75 events including Swatantrata Rally, Freedom Walk, Har Ghar Tiranga activities, etc. that were organised under the aegis of Azadi Ka Amrit Mahotsav.

In his address, Dr Y Sreenivas Rao, OS & Director, NSTL explained the genesis of NSTL and how it evolved to the present state-of-the-art premiere naval research laboratory; briefed the status of ongoing projects, stressed to progress on the innovative

technologies to meet futuristic requirements; and gave details of new improvements in the laboratory towards achieving the targets. He specifically applauded the support given by NSTL Seva Samiti and Mahila Kalyan Manch in doing many altruistic activities.

Dr Samir V Kamat, Distinguished Scientist who assumed charge as Chairman DRDO & Secretary Dept. of Defence R&D addressed NSTL fraternity through a video message. In his message, he wished NSTL to reach more heights and to work with more enthusiasm towards achieving Atma Nirbharata.

On the occasion, a Coffee Table Book, the compilation of all the activities carried out by NSTL fraternity under Azadi Ka Amrit Mahotsav, was unveiled by the Chief Guest, Director NSTL and other dignitaries. As part of celebrations various cultural and sports events were conducted by NSTL employees.



## ITR PARTICIPATION IN INDISCON-2022

**I**ntegrated Test Range (ITR), Chandipur participated in Third International flagship, annual and sub-sectional conference of the IEEE India Council 'INDISCON-2022' organised by IEEE, Bhubaneswar sub-section during 15-17 July

2022 hosted at KIIT (DU), Bhubaneswar. On the occasion, one missile park was set up by ITR, Chandipur for indoor and outdoor displays of various missile models. The missile park was inaugurated by Dr Sasmita Samanta, Hon'able Vice-

Chancellor of KIIT (DU). Shri HK Ratha, Director, ITR graced the occasion and in his address highlighted about various aspects of such type of conference and emphasised to publish papers on recent research activities.





## LIVE CHEMICAL WARFARE AGENTS TRAINING AT CDEF, NAGPUR

**C**hemical Defence Equipment Evaluation Facility (CDEF), Defence Research & Development Establishment (DRDE), Nagpur conducted a two-day advanced course on 'Live Chemical Warfare Agents Training' during 29-30 August 2022 for JCOS/NCOs of Armed Forces. The training programme was as part of DRDE's continuous effort to impart knowledge and skill on CBW defence.

CDEF, DRDE, Nagpur meticulously designed and organised the course for the first time for Indian Armed forces. The focus of the course was practical demonstrations of various NBC equipment and technologies developed by DRDE and field exercises with live chemical warfare agents to enhance their skill for effective, efficient, and safe handling and management of CW emergencies. Hands-on-training



was provided on detection, protection, and decontamination of CWAs in closed controlled environment and open field scenario. The course enhanced the confidence of the participants in handling emergencies involving CWAs and would definitely

enhance the combat efficiency of the troops. Dr K Ganesan, Sc 'G' & Director, DRDE addressed participants and distributed certificates in the valedictory function in presence of Dr Bidhan Chandra Bag, OIC-CDEF & Course Director.

## COURSE ON RECENT TRENDS IN VLSI AND ITS APPLICATIONS

**A** course on Recent Trends in VLSI and its Applications was organised at Integrated Test Range (ITR), Chandipur, during 23-25 August 2022. Shri HK Ratha, Director, ITR inaugurated the course. The inaugural lecture was delivered by Shri Anoop Kumar, Associate Director, C-DAC, Hyderabad.



The course was aimed at updating knowledge of participants in VLSI, its applications and its usefulness. Topics like: Analog & mixed-signal VLSI design trends, various aspects of data converter, improving the performance of ADCs, programmable logic device,

digital VLSI design methodology, design & development of passive RF surface target, etc., were covered and discussed in detail in the course. Distinguished faculties and experts from IIT, KGP, C-DAC, Siemens delivered the lectures. Twenty Seven participants from

Integrated Test Range (ITR), Chandipur and Naval Physical and Oceanographic Laboratory (NPOL), Kochi attended the course.

The course was organised by Dr Pradipta Roy, Sc'F', Course Director and his team.

## COURSE ON AIRBORNE SURVEILLANCE SYSTEMS

Continuing Education Programme (CEP) on 'Airborne Surveillance Systems' was conducted during 08-12 August 2022 at Centre for Airborne Systems (CABS), Bengaluru to share the technical knowledge acquired with the working forces of DRDO.

Dr K Rajalakshmi Menon, OS & Director, CABS and Programme Director, AEW&C Mk-II programme, inaugurated the CEP and Shri MS Easwaran, Former Director, CABS honored the inaugural function as Chief Guest. Other senior scientists and senior officers were also present during the inauguration.

In the inaugural speech, Director, CABS and Chief Guest emphasised the importance of the course as a platform to share the knowledge and acquire practical exposure on DRDO products from the domain experts.



A total of 34 scientists/officers from both internal and sister laboratories of outstation participated in the course. The lectures were conducted by senior scientists from CABS and other DRDO laboratories. Most of the participants shared their feedback that the course content was much informative and well suited for their immediate and future applications. A MCQ test was conducted on

the concluding day of the CEP. Dr K Rajalakshmi Menon, OS, Director, CABS & Programme Director AEW&C Mk-II Programme and Dr SK Venkatesh, Sc 'G', CABS distributed the certificates to all the participants. The Course Director was Ms MR Bhuvaneshwari, Sc 'F' and Deputy Course Director, Shri A Muthukumar, Sc 'E' presented the feedback and vote of thanks.

## COURSE ON TECHNOLOGIES FOR ELECTRONIC WARFARE OPERATIONAL SUPPORT SYSTEM

The first Continuing Education Programme (CEP) on 'Technologies for

Electronic Warfare Operational Support System (EWOSS)' was conducted by Defence Electronics

Research Laboratory (DLRL) during 24-26 August 2022. The course was designed to



deliver a thorough, ground-up understanding of EWOSS and its current and future technologies and the effect it has on military principles.

Shri N Srinivas Rao, OS & Director, DLRL inaugurated the course. In his inaugural address, he emphasised the importance and necessity of EWOSS to unlock the potential of any EW system. The Course Director Smt Preeti Gupta, Sc 'F' briefed about the course details. The course schedule brushed upon a spectrum of exciting and benefiting topics that discusses on various aspects of EWOSS. Col. Ramesh Jogarao delivered a key note address on current trends in EW and provided a peek into the futuristic goals. Shri Prashant Tripathi, Sc 'F' delivered a talk on EW fundamentals. Smt Preeti Gupta presented a generic overview of DLRL designed EWOSS system. Capt. Rajiv Kumar Jha from EWOSC, Mumbai gave user perspective of EWOSS. The course



also covered talks by Smt Jaya Kalpana, Sc 'F', CASDIC, on 'Pre-Flight Message Generation and Post Mission Data Analysis', Shri Himanshu Haran, Sc 'F', CAIR on 'Network and Data Security' and Shri Sumit Sarkar, Sc 'E', DYSL-AI on 'AI in EW'. During the course, visit to Sangam Exhibition Hall, DLRL and ELSEC Campus was also organised to provide a glimpse of DLRL projects.

The course was attended by 25 participants, with from Indian Navy (EWOSC, Mumbai and

Signal School, Kochi), Indian Army (MCTE, Mhow), Indian Air Force (AF HQ, New Delhi), CABS, Bengaluru, BEL, Hyderabad and from DLRL.

All the sessions were much interactive with enriching experience and the response from all the participants were overwhelmingly positive. The course has met its objective. During the closing ceremony Director, DLRL distributed certificates to all the participants.

## COURSE ON 'CHALLENGES IN LIBRARY AND INFORMATION SERVICES: STRATEGIES AND TOOLS'

**A** Continuing Education Programme (CEP) on 'Challenges in Library and Information Services: Strategies and Tools' was organised at Defence Scientific Information and Documentation Centre (DESIDOC), Delhi, during 22-24 August 2022. Dr K Nageswara Rao, Director, DESIDOC inaugurated the course. During his inaugural address, he emphasised the challenges faced by library professionals and the ways to tackle



them efficiently. He also delivered a talk on 'Long term Preservation of Digital Documents: Technical Issues & Concerns'. The course was focused on enhancing and updating the skills of library personnel of DRDO. The course saw a wide participation from various DRDO Units as almost

35 participants attended the course from DRDO laboratories across the country. Various topics like 'Emerging Trends in Librarianship', 'DRDO Library Manual-2021', 'Rebranding of Libraries', 'Recent Trends in Scholarly Communication', 'Introduction and Overview of

Cloud-based Automation Software for DRDO', 'App-based Library Services', 'Library and Information Services of DESIDOC for DRDO labs/estt' and a demonstration of DRDO e-library were covered during the course. The course was organised by Shri Nishant Kumar, Sc 'E' and his team.

## COURSE ON SAFETY AND CYBER SECURITY

**S**olid State Physics Laboratory (SSPL), Delhi organised three days CEP course on 'Safety and Cyber Security' during 14-16 September 2022. The inaugural ceremony was graced by Dr Seema Vinayak, OS & Director, SSPL and Ms Rama Vedashree, CEO, Data Security Council of India. Twenty-five participants from 14 DRDO laboratories attended the course.

Eminent speakers delivered talks on various aspects of cyber security like threat landscape, implications of cyber attacks, network & cloud security, and AI-based strategies and security solutions.

In addition, the general topic of personnel and infrastructure safety like fire & electrical safety, safe handling of toxic chemicals & gases, and environmentally safe work practices were also covered



during the course. A 'Sahaj Yoga' workshop was conducted by volunteers of Sadhguru ISHA Foundation for the rejuvenation of the mind, body, and soul.

The course was successfully concluded with a valedictory function where Ms Meenakshi Srivastava, Sc 'G' & Chairperson, Safety Committee, SSPL and

Ms Neeraj Jain, Sc 'G' & Technology Director, (IT & AI) SSPL, handed over the course certificates and quiz prizes to the participants after an interactive feedback session conducted by the Course Coordinators, Dr Jaya Lohani, Sc 'F' and Shri Sachin Saini, Sc 'C'.

## COURSE ON SAFETY MANAGEMENT IN RANGE SCENARIO

**A** CEP course on 'Safety Management in Range Scenario' was organised at Integrated Test Range (ITR), Chandipur, during 5-7 September

2022. Shri HK Ratha, Director, ITR inaugurated the course and appreciated the efforts of the safety team of ITR for zero occurrences throughout the year

and highlighted that such a course will strengthen the knowledge and competence concerning safety aspects. The course was organised to impart basic knowledge and



general awareness of the safety aspects involved in the missile test range. Topics like: safety during processing and handling of high explosives, impact of static electricity and precautionary measures during explosive handling, assessment of safety

zone for conducting static and dynamic trials, electrical safety with EMI/EMC protection in an explosive environment relevant to a test range, safety considerations for onboard propellant systems and major concerns during integration & checkout operations,

range safety scenario in a test range and safety in storage and handling of liquid propellants were covered. Twenty Eight participants from various DRDO laboratories attended the course. The course was organised by Dr Sukanta Das, Sc 'F', and his team.



## SOCIAL ACTIVITIES

# FIRST-AID TRAINING PROGRAMME

**I**ntegrated Test Range (ITR), Chandipur organised a three days first-aid programme during 10-12 August 2022. The programme was inaugurated by Shri HK Ratha, Director, ITR. In his address, he highlighted the necessity of knowledge in first-aid not only in office hours but also in day-to-day life in case of any incident/emergency. He further appreciated for zero occurrences/incidents reported so far for ITR from safety point of view. Expert doctor and trainer from St. Johns Ambulance, Bhubaneswar conducted the training programme. Twenty-



five participants from various sections of ITR attended the programme. The programme was mostly practical-oriented and the

participants got highly benefited from the training. Shri PN Panda, Sc 'F' and his team organised the programme.

# BLOOD DONATION CAMP

## ITR, CHANDIPUR

Integrated Test Range (ITR), Chandipur, observed the 4th Death Anniversary of Bharat Ratna Late Dr APJ Abdul Kalam with due solemnity across all strata of the ITR fraternity. Shri HK Ratha, Director, ITR, in his ode to the icon, recollected the contributions of the multi-faceted genius to the cause of DRDO and the nation. He described the pioneering roles played by Dr Kalam during his epoch-making stints as the first Director of ITR, SA to RM & DG DRDO, PSA to PM, and President of India. On this occasion, in a special tribute to Dr Kalam, ITR organised a blood donation camp. Director, ITR inaugurated the camp and said that the blood one donate gives someone another chance at life. There is no



substitution for blood. Everybody should be encouraged to donate blood voluntarily for a noble cause. Some 301 units of blood were collected during the camp.

Many scientists, officers, staff, and ITR fraternity, DSC personnel participated in the noble cause. All the participants were awarded a certificate.

## NSTL, VISAKHAPATNAM

Naval Science & Technological Laboratory (NSTL), Visakhapatnam organised a blood donation camp at Family Welfare Center, inside NSTL campus on 24 August 2022.

The camp was organised by Social Service Committee of LRDC-2022 in association with AS Raja Blood Bank, Visakhapatnam. Smt Lakshmi Sreenivas Rao, the first lady of NSTL along with Dr Y Sreenivas Rao, OS & Director, NSTL inaugurated the camp, as the Chief Guest. Director, NSTL expressed contentment over the voluntary participation of employees of NSTL and applauded the donors. Dr A Radha Rani and



ten member team of AS Raja Blood Bank; and Lt. Cdr. Priggya Rit Roy, Principal Medical Officer of NSTL Surgeon and team of NSTL

MI Room supervised the camp.

Around 100 NSTL personnel and their family members donated blood during the camp.

## RCMA, CHANDIGARH

6th Chandigarh State Masters Table Tennis Tournament was conducted by Chandigarh Table Tennis Association (CTTA) affiliated to Table Tennis Federation of India (TTFI) during 13-14 August 2022. In this tournament, Mohd Amzad Khan, TO 'B' of RCMA-Chandigarh won Gold Medals in 40+ age category in Men Singles and Men Doubles event.

He is now 40+ state level champion for the third consecutive year (2018, 2019 & 2022) in Men Singles. He had also won Silver and Gold medal in Men Doubles event during 2018 and 2019. Mohd Amzad Khan is also current DRDO National Table Tennis Champion.



## NSTL, VISA KHAPATNAM

Naval Science & Technological Laboratory (NSTL), Visakhapatnam celebrated week-long sports activities during 11-17 August 2022. The celebrations started with Table Tennis Tournament in Pitchaiah Indoor Stadium, NSTL Complex. Dr Y Sreenivas Rao, OS&Director, NSTL inaugurated the tournament, in which teams from NSTL, Greater Visakha Municipal Corporation (GVMC), Bharat Dynamics Limited (BDL), Visakhapatnam, and Visakhapatnam Doctors' Association participated with lot of enthusiasm. The laboratory also organised a motivational sports event-Volleyball at NSTL Volleyball Ground on 22 July 2022, with the objective of motivating school children towards sports.

Matches between four teams (NSTL Boys, Railway Boys;



Girls from Steel Plant and Girls from Pendurti) were conducted. The motivational sports event was organised by NSTL Sports Committee. Students from

Ramnath Secondary School, Members of NSTL Civil Employees Union and Works Committee, other NSTL employees participated in the event.

# ESTABLISHMENT OF GNSS RTKBASE STATION AT ITR, CHANDIPUR

To meet the requirement of highly accurate position survey of Range Instrument stations, a low cost precise Global Navigation Satellite System (GNSS) Real Time Kinematic (RTK) Base Station has been established at Integrated Test Range (ITR), Chandipur, on 4 August 2022. The system has been realised under the leadership of Shri HK Ratha, Director, ITR and Shri M Goswami, Sc 'F' in technical collaboration with GNSS Laboratory, Department of Physics, The University of Burdwan, West Bengal.

A Contract for Acquisition of Research Services (CARS) Project was taken up with The University of Burdwan with Dr Anindya Bose as the Principal Investigator and Shri Somnath Mahato, SRF as the primary technical contributor.

The Base Station has been configured using a compact low cost dual frequency GNSS module. Whereas, a COTS single frequency receiver has been used as rover. The base set up has achieved very low position uncertainty (95 %), i.e., 0.005 mm x 0.003 mm x 0.010 mm.



RTK is a technique to enhance the position accuracy of GNSS applications. In RTK, a Base is operated at a precise pre-surveyed location which sends correction messages. A user receiver at a certain distance receives and uses the correction message to improve the quality of position solution. In case of application in ITR, the LAN has been used to communicate the correction messages to ensure data security. The 2D position precision of the

system is of the order of 20-45 cm (95 % confidence level), whereas; the 3D position precision is of the order of 0.5 m (61 % confidence level). Multiple measurements have been carried out for various locations including Survey of India reference points to verify the performance of the system. The set up can be implemented at other defence establishments where precise survey is required to be carried out in a secured manner.

## PATENT

**A Patent No. 402650 for 'A Magnetorheological Fluid Composition for Automobile Suspension and a Preparation Method There of' has been granted by Indian Patent Office to Dr Reji John, Shri Shiv Kumar and Shri R S Arun Sundar, Naval Physical & Oceanographic Laboratory (NPOL), Kochi.**





## APPOINTMENT

### Director, DMSRDE



Dr Mayank Dwivedi, Sc 'G' is appointed as Director, Defence Materials and Stores Research & Development Establishment (DMSRDE), Kanpur. He is M.E. in Polymer Technology from Delhi College of Engineering, Delhi and PhD in Advanced Composites from IIT, Delhi. He is recipient of Gold Medal in M.E. and is alumni of prestigious National Defence College, New Delhi.

He started his career from Advanced Systems Laboratory, Hyderabad in 1992. During his initial years he worked in the area of polymeric composites and nano composites. He has worked in the area of stealth and radar absorbing systems, and also on major projects such as Agni missile, BrahMos missile, warhead technologies, and biomechanical devices.

He has an expertise in the area of processing and structure-property relationship of advanced composites. He has contributed on indigenisation of high temperature resins systems and development of airframes. He has worked in the area of identification and development of counter insurgency technologies and products and formulated various DRDO policies/SoPs pertaining to Transfer of Technology (ToT), export of DRDO developed products, Government Owned by Company Operated (GOCO) Model, use of DRDO test facilities by industry, etc. and carried out

their implementation. He has spearheaded interactions with industries across the country for dissemination of DRDO's policies for industries.

He has number of international publications and patents to his credit and delivered lectures in various international and national forums. He has authored three books on nanotechnology and polymeric composites. He is recipient of 'Agni Award for Excellence in Self-Reliance' in 2018 and 'Lab Scientist of the Year' award in 2003.

## HIGHER QUALIFICATIONS

### CABS, Bengaluru



Shri Bhagwanji, Sc 'E', Centre for Airborne Systems (CABS), Bengaluru completed PhD from Defence

Institute of Advanced Technology (DIAT), Pune, for his thesis entitled 'Image Segmentation using Various Local Structural Information'.



Dr S. Ilavarasu, Sc 'F', Centre for Air Borne Systems (CABS), Bengaluru, has been awarded PhD in Aerospace Engineering, for

his thesis titled 'Characterization of Composite Radome Material for Airborne Surveillance Aircraft', by Jain (Deemed-to-be-University)2022.

### NPOL, Kochi



Shri Sarath Gopi, Sc 'F', Naval Physical and Oceanographic Laboratory, Kochi, has been awarded PhD from

the Department of Electrical Engineering, Indian Institute of Technology, Madras, in the area of Wireless Communication, for the thesis titled, 'Modulation and Transmit Precoding Techniques for beyond 5G Communication Systems'.

## BEST STUDENT PAPER AWARD



The paper titled 'Variable Bandwidth Multicarrier Communications: A New Waveform for

the Delay-scale Channel' authored by Shri Arun kumar KP, Sc 'F', Naval Physical and Oceanographic Laboratory (NPOL), Kochi, Dr Chandra R Murthy, Professor, IISc, Bengaluru, and Dr P Muralikrishna, Sc 'F', NPOL won the best student paper award at the International Workshop on Signal Processing Advances in Wireless Communications (SPAWC)-2022 held in Finland.

The paper is listed in the IEEE Computer Society Best Reading List in the area of Orthogonal Time Frequency Space (OTFS) and Delay Doppler Signal Processing for June-2022.

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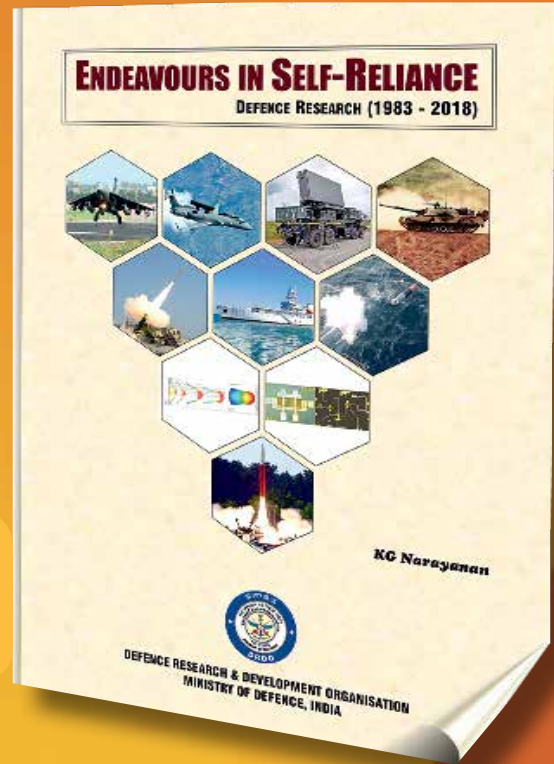
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A Special Publication titled “Endeavours in Self-Reliance–Defence Research 1983-2018” was released formally by the Honourable Raksha Rajya Mantri, Shri Ajay Bhatt on the National Technology Day, May 11, 2022 at DRDO Bhavan, New Delhi. This is a successor volume of the book “Defence Research and Development Organisation (1958 – 1982)” by Dr RP Shenoy, published by DESIDOC, DRDO earlier.

This Special Publication covers the period 1983-2018 which were decades of explosive growth and achievements in the history of DRDO. Through the efforts scientists, soldiers, and policy makers in a single generation, indigenous capabilities in strategic weapon systems, guided missiles, aeronautical systems such as fighter aircraft and aerial early warning platforms, main battle tank, naval platforms, sensors and weapons, radars, communication systems, electronic warfare capabilities and numerous other equipment made huge leaps upwards. This Publication describes the Himalayan efforts made by the laboratories, establishments and programmes under the aegis of Department of Defence Research and Development, India, from the perspective of a historical account. The book was edited by Dr KG Narayanan, former Chief Adviser DRDO.

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## VISITORS TO DRDO LABS

### CAIR, BENGALURU

\* Maj General Sanjiv Sharma, SM, ADG Tac C and team visited Centre for Artificial Intelligence and Robotics (CAIR) on 16 August 2022. There was a briefing by Dr Subrata Rakshit, OS & Director, CAIR followed by discussion and demonstration of technologies developed by CAIR in the area of information and communication security systems.

\* Vice Admiral AB Singh, PVSM, AVSM, VSM, ADC Flag Officer Commanding-in-Chief Western Naval Command and team visited CAIR on 22 August 2022. There was a briefing by Dr Subrata Rakshit, OS & Director, CAIR followed by discussion and demonstration of technologies developed by CAIR in the area of command control for naval and land forces.

\* Air Cmde SK Pathania, PD SI Air Force and team visited CAIR on 25 August 2022. Dr Subrata Rakshit, OS & Director, CAIR briefed him followed by discussion and demonstration of technologies developed by CAIR in the area of intelligent system and robotics and geographical information science.

### HEMRL, PUNE

Air Mshl CR Mohan, AVSM VSM, SMSO HQ MC, IAF visited High Energy Materials Research Laboratory (HEMRL) on 18 August 2022. During the visit, presentations were made by the senior scientists on IR flares, indigenisation of EAX, power cartridges, and impulse cartridges, thermobaric bomb and case bonded propellant used in air-to-air missile.



Maj General Sanjiv Sharma, SM, ADG Tac C and team during his visit at CAIR, Bengaluru



Vice Admiral AB Singh, PVSM, AVSM, VSM, ADC Flag Officer Commanding-in-chief Western Naval Command with Dr Subrata Rakshit, OS & Director, CAIR



A moment during the visit of Air Mshl CR Mohan, AVSM VSM, SMSO HQ MC, IAF on 18 August 2022 to HEMRL, Pune

## IRDE, DEHRADUN

Shri Benjamin Lionel, OS & former Director, Instruments Research & Development Establishment (IRDE), Dehradun and Directorate of International Cooperation (DIC), DRDO HQ visited IRDE on 22 August 2022. Dr Ajay Kumar, Director, IRDE and other senior scientists of IRDE welcomed him.

Shri Lionel visited IRDE Diamond Jubilee Gallery and was overwhelmed watching the technology area, system area, down-the-memory lane and lab WOW moments in the gallery. Dr Ajay Kumar explained in detail the technologies and systems developed by IRDE. Shri Lionel also saw the IRDE tableau showcasing IRDE presence in sea, land, water, and space. in achieving the self-reliance in India's defence sector.



Shri Benjamin Lionel, Former Director of IRDE & DIC interacting during his visit at IRDE

## NPOL, KOCHI

Dr Samir V Kamat, Secretary, DD (R&D) and Chairman, DRDO visited Naval Physical and Oceanographic Laboratory (NPOL), Kochi on 2 September 2022. At the outset, Dr K Ajith Kumar, Sc 'G' & Director, NPOL

welcomed Chairman. Dr Kamat had interaction with scientists of NPOL.

A brief about the ongoing projects was presented by respective project teams. Dr Chandrika Kaushik, OS & DG (PC&SI) was also present during the review meetings.



Dr Samir V Kamat, Secretary, Dept of Defence R&D and Chairman DRDO, being briefed on NPOL projects