DRDO NEWSLETTER

A Monthly Bulletin of Defence Research and Development Organisation

www.drdo.gov.in

MAY 2017 | VOLUME 37 | ISSUE 5

DRDO HANDS OVER INDIGENOUS NAVAL PRODUCTS TO INDIAN NAVY

CONTENTS

MAY 2017
VOLUME 37 | ISSUE 4
ISSN: 0971-4391

DRDO NEWSLETTER
ISSN: 0971-4391
37th Year of Publication

Editor-in-Chief: Gopal Bhushan
Senior Editor: B Nityanand; Editor: Manoj Kumar
Asst Editor: Geeta Sharma; Pre-press: Gunjan Bakshi
Printing: SK Gupta, Hans Kumar

For feedback, please contact: director@desidoc.drdo.in
Tel: 011-23902403; 23902474; Fax: 011-23819151

Defence Research & Development Organisation

FROM THE DESK OF THE CHAIRMAN

Dr S Christopher
CHAIRMAN
Defence Research & Development Organisation
&
SECRETARY
Department of Defence Research & Development

GONE WITH THE WIND...
The Saga of Red Light Raj

I was a Scientist 'F' at LRDE, Bengaluru, when I was given a car with a red beacon. Though I never asked my driver to switch on the red light, I felt uncomfortable to sit inside such a car and felt that this paraphernalia to announce one's importance was unnecessary. The only comforting thought at that time was that if I had some medical emergency, I may be able to reach a hospital quickly. My view was later strengthened when my boss, Shri KU Limaye, mentioned that it was "illegal." Since then, I never allowed the driver to switch on the red beacon whenever I travelled in such a car and later had it removed from my vehicle.

As soon as I took over as Secretary, Department of Defence R&D, I was given a car with the red light. When I asked the beacon to be removed, my driver was visibly sad as though he had lost his glory. The issue of "red light" cropped up again when a new car was bought, but again I stood my stand. Many senior staff was uncomfortable and some even asked me why the comfort given by the government should be denied to all the senior officers. Still, a notice was issued in February 2017, to adhere to the rules. Now with the present cabinet decision, the task is complete!

In a similar vein, the old colonial practice followed by the services, to display prominently, photos of their Chiefs and Commanders, is also followed inadvertently by some of the labs. This practice is also not required. I request all DRDO establishments to display the photos of the President and Prime Minister of India only, and not the Chairman of DRDO. This may please be implemented at the earliest and not later than 15 May 2017.

Scientific and techno-managerial work should be given priority in our organization, and we scientists should be respected for our exemplary work rather than derive pride in these external trappings of importance. Due to large projects and insufficiency in manpower, we need to employ the industry to manufacture and support R&D but not "subcontract" R&D! Only our commitment and hard work matters to the organization. For the scientists, this hard work pays during their promotion boards. A close co-ordination exists between the growth of the individual and the organizational growth. Those who are technically sound should lead the industry that manufactures products of their design instead of merely describing the product of the industry's design. If we are acknowledged for our technical capabilities, we will be respected lifelong!

Let us therefore humble ourselves and excel in our work to make India stronger.

Jai hind

DEFENCE MINISTER HANDS OVER INDIGENOUS DRDO PRODUCTS TO INDIAN NAVY

Shri Arun Jaitley, Hon'ble Minister of Defence, Finance and Corporate Affairs handed over three Naval Systems, viz., USHUS II Submarine Sonar, Directing Gear for Hull Mounted Sonar Array and RLG-based INS-SA developed indigenously by DRDO to the Chief of the Naval Staff, Admiral Sunil Lanba at a function organised on 24 March 2017. The Minister also released two other products developed by DRDO, namely, IP-based Secure Phone and the Gallium Nitride Technology.

Speaking on the occasion, Shri Jaitley, said "DRDO is becoming an important instrument for self-reliance of the nation and some of the best innovations have come from the pool of scientists of DRDO. Great societies and nations are made through people working on important tasks in anonymity, like the DRDO scientists." In the modern world, societies that invent and innovate will make faster progress, added Hon'ble Minister.

Shri Jaitley also gave away the annual DRDO Awards in various categories during the function. Apart from the scientists and teams who won awards in various vistas of technological excellence, the Advanced Systems Laboratory (ASL), Hyderabad, and the Microwave Tube Research and Development Centre (MTRDC), Bengaluru won the coveted Silicon Trophy and Titanium Trophy, respectively. The export potential of DRDO technologies also received due recognition during the function, with the announcement of the bagging of export order for DRDO-developed torpedo to Myanmar.

Dr Subhash Bhamre, Minister of State for Defence, in his address said, "DRDO is playing an important role in self-reliance of Defence Forces and the export potential of the organisation is finding a place in the global Defence market." He congratulated all the awardees and their families.

Chairman, DRDO and Secretary, DDR&D Dr S Christopher, in his address said the DAC cleared order value of DRDO products has gone up to Rs 2.56 lakh crore out of which about Rs 1 lakh crore was in the last two years alone.

Dr G Satheesh Reddy, SA to RM; Dr SC Sati, OS and DG (NS&M), DRDO; Shri S Kedarnath Shenoy, OS and Director NPOL, Kochi; Shri S Vijayan Pillai, Programme Director, USHUS; Smt K Rameetha, Project Director, USHUS-2; Dr M Sabu Sebastian, Head, Engineering Group, NPOL; senior officers from Ministry of Defence, Indian Navy, DRDO and Industry partners were present during the function.

ARMOUR FOR LCH

Defence Materials and Stores Research and Development Establishment (DMSRDE), Kanpur, has developed and qualified armour panels against 7.62 mm API bullet from striking velocity of 636±5 m/s within areal density of 28 kg/m². Successful ballistic trials of armour panels were conducted at OF Varangaon against 12.7 mm API bullets from striking velocity of 703±5 m/s in areal density of 43 kg/m².

DMSRDE demonstrated technology for a successful armor solution for LCH from both 7.62 API and 12.7 API ammunitions.

The armor panel prototypes for LCH will be produced under a mission mode project of DRDO for providing the complete technological and system solution for LCH armor.


7.62x54 API


12.7x54 API

TOT

DIHAR TRANSFERS PERSONNEL PROTECTION PRODUCT KNOW-HOW

Defence Institute for High Altitude Research (DIHAR), Leh, transferred technologies for Anti-Blemish UV Protection Cream and Joint Care Gel to M/s Ocean Lifecare Pvt Ltd, Pune, on 15 March 2017 on non-exclusive basis.

License Agreements were jointly signed by Dr OP Chaurasia, Director, DIHAR, and Shri Kiran Walvekar, Managing Director, Ocean Lifecare, at DIHAR Base Lab, Chandigarh.

DIHAR is associated with the R&D in cold and high altitude region of Ladakh with a view to enhance the availability of fresh vegetables, fruits, milk, meat, eggs, and medicinal and aromatic plants for Indian troops through local farmers.

DIPAS TRANSFERS TECHNOLOGY OF SPACE HEATING DEVICE & ERGONOMICALLY DESIGNED BACKPACK

Defence Institute of Physiology and Allied Sciences (DIPAS), Delhi, transferred the technology of Space Heating Device to M/s Vishwa Traders, Kanpur, on 17 March 2017 and to M/s Madnani Industries, Kanpur, on 23 March 2017. Dr Bhuvnesh Kumar, Director, DIPAS, Dr Lilly Ganju, Associate Director, inventor scientist Dr SK Sharma and Head TMD Dr P Reddy were present on the occasion.

Space heating device or bukhari is the basic requirement in the cold conditions at high altitude. The existing bukaris used by soldiers have low operating efficiency and are unsafe. The improved space heating device and burner, developed by DIPAS, is more efficient (60 per cent saving of kerosene oil) because of its coherent design, which provides both convective as well as radiative heating. The device is totally safe (no emission of carbon monoxide) with triple-level protections from the back draft to avoid the chances of fire blast.

This device has been accepted by the Army. BSF has procured about 2400 Space Heating Device for replacing the existing bukharis.

DIPAS also transferred the technology of ergonomically designed Backpack to M/s Radnik Auto Exports, Noida, on 27 March 2017.

The Backpack is designed using indigenous anthropometric database for proper fitting to the soldiers with better balance, stability, mobility, comfort and with enhanced load carrying capacity by deducing energy expenditure.

DIPR HANDS OVER OTHER RANK TRADE ALLOCATION SYSTEM VER 3 TO ARMY

Defence Institute of Psychological Research (DIPR), Delhi, handed over Other Rank Trade Allocation System (ORTAS) Ver 3 to Indian Army on 28 March 2017. Personnel from training and regimental centres of Corps of Signals, Corps of Engineers, Corps of EME, Regiment of Artillery, Army Service Corps, Army Air Defence, Brigade of Guards Armoured Corps and Mechanized Infantry were present during the handing over ceremony.

ORTAS is an aptitude centric-based psychological battery that indicates the best fit man for a specific job (trade) by matching the qualities possessed by a person and skills required for that job. The system assesses recruit's cognitive and psychomotor abilities.

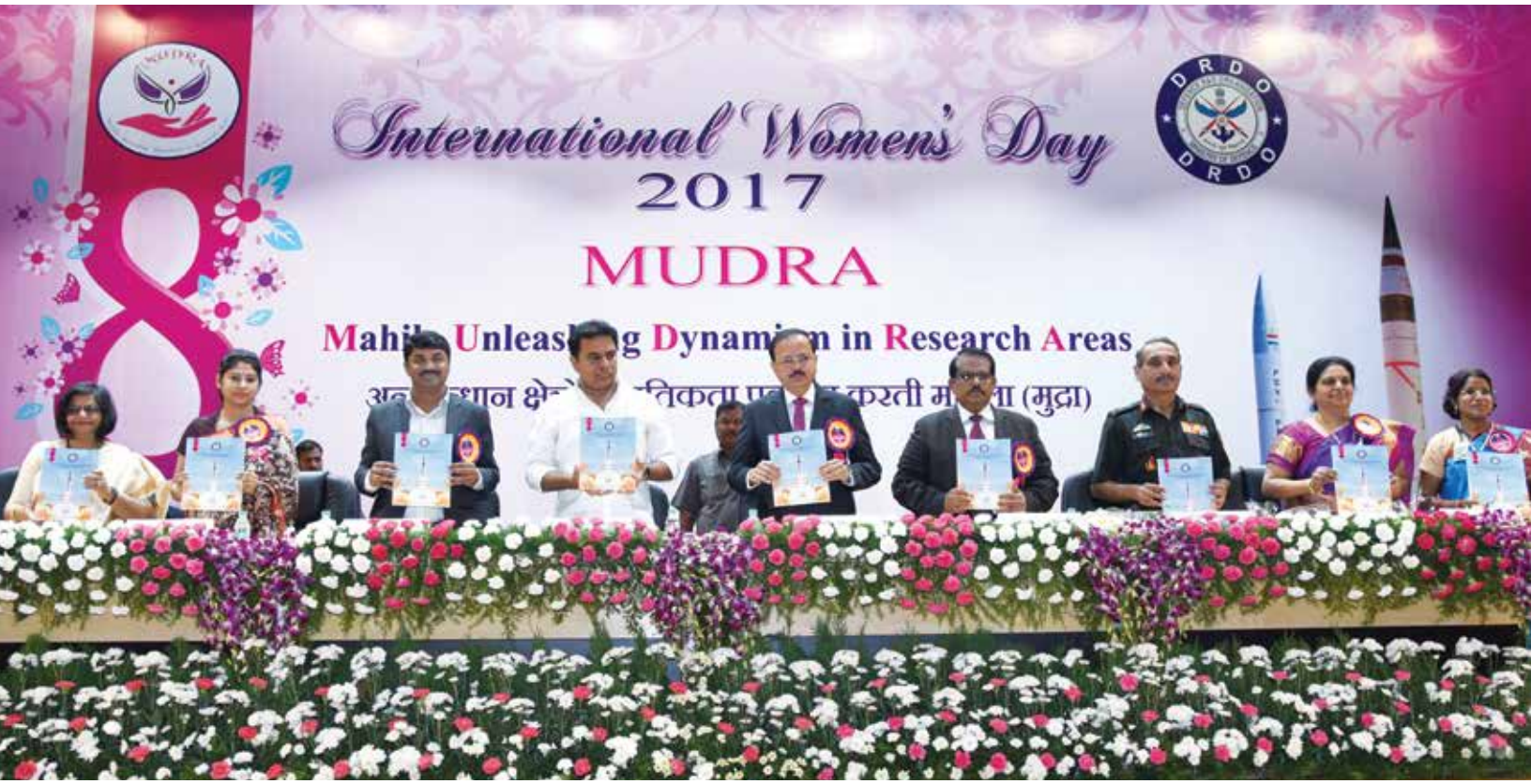
Personnel from Training and Regimental Centres who got the training on ORTAS

DFRL TRANSFERS FRUIT PRESERVATION TECHNOLOGY

Defence Food Research Laboratory (DFRL), Mysuru, signed ToT agreement with M/s Viatla Foods Private Limited, Vijayawada, Andhra Pradesh, for transfer of Hurdle Technology for preservation of fruits. Dr Rakesh Kumar Sharma, Director, DFRL, and Shri VK Viatla, Director, Viatla Foods Private Limited, signed the agreement on 20 March 2017.

The inventors, Dr OP Chauhan, Sc E, Smt N Roopa, TO B, Shri Smith Kumar STA B, Dr AD Semwal, Sc G, Associate Director, Smt VALSS Vani, Managing Director, Shri Ramachandra Rao, Director, Viatla, and Shri Ramkrishna Devarsetti, General Manager, Viatla, were present during ToT.

DRDO CELEBRATES INTERNATIONAL WOMEN'S DAY



DRDO celebrated International Women's Day 2017 (IWD 2017) at Research Centre Imarat, Dr APJ Abdul Kalam Missile Complex, Hyderabad, on 8 March 2017. To commemorate the occasion in a felicitous manner, Advanced Systems Laboratory (ASL), Hyderabad, the nodal laboratory for the IWD 2017 organized a national workshop on Mahila Unleashing Dynamism in Research Areas (MUDRA), which showcased women as Dynamic Leaders in decision-making in DRDO. Dr Subhash Bhamre, Hon'ble Raksha Rajya Mantri (RRM), and Shri KT Rama Rao, Hon'ble Minister of IT and Industries and Commerce, Govt of Telangana, were the Chief Guest and Guest of Honour, respectively, at the inaugural function. Dr S Christorpher, Chairman DRDO and Secretary DDR&D; Dr G Satheesh Reddy, SA to RM and DG (MSS), DRDO; Dr Tessy Thomas, OS and Director, ASL; Smt Smita Sabharwal, IAS, Additional Secretary to Chief Minister of Telangana; Lt Gen Satish Dua, Chief of Integrated Defence Staff; and Smt Alka Suri, Chairperson DRDO Women Cell, DRDO HQ, were present on the occasion.

Dr Subhash Bhamre, in his inaugural address, lauded the efforts of women scientists of DRDO and said, "Due to significant national contributions from our women scientists we have come a long way since our independence from mere buyers of technology to those who have made science and technology as an important contributor for national development. Sustained efforts of our women scientists have made the country a reckonable power in many areas and have propelled us to the elite club of nations." Highlighting the policy of the Central Government, RRM said, "Government of India has taken many initiatives to promote female child development and women empowerment like Beti Bachao and Beti Padhao, Mahila e-Haat, Rashtriya Mahila Kosh, Women of India Exhibitions and other important programmes. In recent years, there has been a paradigm shift in effective women participation in all walks of life but there is still a strong need to orient more and more women towards science and technology."

Exhorting the women, Hon'ble RRM said, "I urge upon the young women scientists present here to take the lead and promote science and technology among female students at various schools, colleges, universities and other academic institutions. You have to be the much-needed catalyst for raising scientific temper among students. The future of this great nation is equally in your hands; mold it the way you dream and keep inspiring all of us."

Shri KT Rama Rao, in his address, stressed on breaking stereotypes and lauded efforts of women in national development.

Articulating the contributions of women scientists in DRDO, Dr S Christopher said, "The women across the globe have set a benchmark not only in the areas of science and technology but in all spheres of work. The dynamic contribution of women professionals has enabled DRDO to scale greater heights." Women should not think they are nothing but should always think that they are something and capable of doing everything, added Dr Christopher.

Dr G Satheesh Reddy in his address said, "I have always been inspired by the commitment, achievements and innovations of women employees of DRDO. The women of DRDO have played an important role in the successful missions and have contributed immensely in strengthening the path of self-reliance in defence technologies."

A panel discussion on "Challenges faced by Women in Research Areas" was also organised. The following DRDO labs/estts also celebrated IWD 2017 at their respective places:

ARDE, Pune

Dr SD Naik, Sc F, Chairperson, ARDE Women's Cell, briefed about various activities undertaken at ARDE and expressed her satisfaction at the setting up of the ARDE children Day Care Centre. Dr Ankita Sanghavi, Founder Director of Innocent Times Childcare Pvt Ltd, spoke about the facilities provided at the Day Care Centre. ARDE Women's Cell donated 436 kg of dry groceries, cash and cheques worth ₹70,000 to Abhalmaya Old Age Home. An interactive session on "Cashless Payments and Precautions" by Ms Charulata Kar, General Manager, Reserve Bank of India, Mumbai, was orgnaised. A cultural programme, "MUKTA: Mahilayen—Unki Kala Tatha Aavishkar" was presented by women employees of ARDE. Prizes were given away to winners of various competitions organised to mark the occasion.

DFRL, Mysuru

Dr Shiby Varghese, Chairperson, DFRL Women's Cell, presented a report on activities of DFRL Women's Cell. Dr Indira Ramrao, Retd. Professor of Sociology and Director, Centre for Women's Studies, University of Mysore, was the Chief Guest of the function and delivered a talk on "Importance of Women in Society" and the need of policies that ensure equal participation of women in decision making. She emphasised the need for changes in mindset of people to overcome traditional stereotypes about women.

Dr Farhath Khanum, Sc G, DFRL, delivered the felicitation address. Prizes were distributed to winners of collage making competition.

DMSRDE, Kanpur

Smt N Swarn Latha, the Chief Guest, inaugurated IWD 2017 function of Defence Materials and Stores Research and Development Establishment (DMSRDE), Kanpur. Prizes were distributed to the women employees of DMSRDE on the occasion.

DRL, Tezpur

Dr Jayshree Das, Sc D and Chairperson DRL Women's Cell, welcomed the guests. Dr Rama Dubey, Officiating Director, DRL, highlighted the significant role of women in society as well as in DRDO. Dr Sumita Gogoi Hazarika, the Chief Guest, delivered an engaging talk on gender inequality. Her talk focused on the vital role parents can play at home in shaping the thought process of children for a gender unbiased society. A colourful cultural programme by ladies of DRL was organised on the occasion.

HEMRL, Pune

Smt Hima Prasanth, Sc F, Vice Chairperson, HEMRL Women's Council, accentuated the activities of HEMRL Women Council during 2016-2017. Shri KPS Murthy, OS and Director, HEMRL, addressed the gathering and emphasised the need for gender equality and urged women employees to be bold and stand for what is right. Ms Janaki Viswanath, Director, SHB Social Foundation, Pune, delivered a talk on "Gender and Culture Issues in India: How is it Played at Work and Home" wherein she stressed upon the need for gender parity. A workshop on 'Smile Wellness Programme' was also conducted by Dr Surekha Bhalerao. About 88 HEMRL women employees participated in the event, which included sessions on stress release techniques, smart exercise tips, and emotional freedom techniques.

A Day Care Facility was inaugurated by Director, HEMRL, for the welfare of HEMRL employees. Various games were also organised for the women employees and a cultural programme showcased in-house talent of HEMRL.

NMRL, Ambernath

An art and craft display was organized to promote extra-curricular activities of the women employees. Smt Monika Chaudhary, Sc D and Chairperson NMRL

Women's Cell, welcomed the Chief Guest, Smt Kalpana Saroj, Chairperson, Kamani Tubes, Mumbai and Guest of Honour Smt Kumudini Singh, the first lady of NMRL. An inspirational talk on 'Be Bold for Change" was delivered by the Chief Guest. Dr SB Singh, OS and Director, NMRL, felicitated women employees on this joyous occasion and delivered a lecture on 5S for organizing oneself. Pink balloons were released to mark the occasion.

NPOL, Kochi

Smt Pradeepa, R, Sc F and Coordinator, NPOL Women's Cell, elaborated the achievements of NPOL women community and emphasised on the need for further progress to reach greater heights.

Dr Sangeetha Menon, Professor and Head, Consciousness Studies Programme, National Institute of Advanced Studies (NIAS), Bengaluru, the Chief Guest for the programme, delivered an enlightening talk on "Understanding Mental Health and Stress Free Life". The talk was an exhaustive exposition of the relationship of body and mind, significance of self and environmental awareness for peaceful life and the relevance of the attitude of realizing and acknowledging the feelings of other people around an individual for a stress free life with a healthy mind. The talk was followed by a lively interactive session. Launching of a video show on the successful role of women workforce in both technical and non-technical areas depicting their contributions and achievements at NPOL was another highlight of the function.

NSTL, Visakhapatnam

Smt Ch VS Sudha, Sc F, Chairperson IWD 2017 celebrations, welcomed the august gathering and enunciated the genesis and growth of IWD. Dr Chitra Rajagopal, OS and CC R&D (System Analysis), DRDO, the Chief Guest at the programme, articulated women leadership and their role in decision making especially in DRDO. Dr C Pradgna, Associate Professor, GITAM University, delivered an invited talk and spoke about how both men and women have to change their thinking in bringing up the children and eradicating gender inequality. As part of IWD celebration, various competitions were organised for the women employees

and their spouses. The Chief Guest distributed prizes to the winners of the competitions. A free medical camp was organized for thyroid profile testing sponsored by Durga Hospitals for women employees and female dependants of male employees. Nearly 110 women participated in the medical camp.

Dr OR Nandagopan, Director, NSTL, and Smt Lalitha Nandagopan, the first lady of NSTL; Smt Anjali Sati, wife of Dr SC Sati, DG (NS&M); women employees and the family members of male employees, scientists and officers, Members of Works Committee, JCM, NSTL Civil Employees Union and other NSTL personnel participated in the programme.

R&DE(E), Pune

Smt Rashmi Shukla, Commissioner of Police, Pune City, was the Chief Guest and delivered the Keynote Address on "True Women Empowerment." Besides, six speakers delivered talks on various aspects like leadership, work-life balance, health issues, etc.

NATIONAL SAFETY WEEK

The National Safety Week (NSW) is celebrated in India every year to make the people, in the public sectors not covered by any safety legislation, aware about the industrial accidents and how to prevent them by organising widespread safety awareness programmes, demonstrations and by other means as per the safety requirements.

The following DRDO labs/estts celebrated National Safety Week:

CAS, Hyderabad

Centre for Advanced Systems (CAS) celebrated 46th NSW during 4-11 March 2017. Dr A Subhananda Rao, DS and CC R&D Aeronautics (Retd), was the Chief Guest of the inaugural function. Employees of CAS, Bharat Dynamics Limited (BDL) and Strategic Systems Quality Assurance Group (SSQAG) took safety and health pledge as per the National Safety Council.

Dr V Venkateswara Rao, OS and Director, CAS, elucidated the importance of the safety guidelines provided by DRDO for the integration and production of strategic systems to avoid the unwanted mishaps. He also stressed the need of remaining vigilant and cautious and strict adherence of the safety procedures.

Lectures were delivered on safety by the Chief Guest and Shri N Madhavan, Sc D, Safety Officer, Advanced Systems Laboratory, Hyderabad.

Safety Quiz and Safety Slogan competitions were conducted to promote the safety consciousness among the employees.

DARE, Bengaluru

Defence Avionics Research Establishment (DARE), Bengaluru, celebrated National Safety Week during 6-10 March 2017. Quiz on safety awareness, safety related banners and slogans were displayed at prominent locations in the establishment.

A talk on "Safety First" by Shri C Muttumani, Manager Safety, HAL, was organised wherein he explained the importance and inevitability of understanding and practicing safety related concepts, rules and regulations.

HEMRL, Pune

As a prelude to National Safety Week, safety badges were distributed to all employees and various programmes were organised during the week. Shri KPS Murthy, OS and Director, HEMRL, emphasised on the importance of safety during handling of various high-energy materials.

The Safety Health and Environment (S.H.E) Bulletin, containing various articles pertaining to safety, health and environment, was released and best three articles were awarded.

Activities like slogan and poster competition, quiz, etc., were conducted and winners were awarded. Fire-fighting demo for the employees of HEMRL was organized to create awareness about fire safety. Certificates and safety trophies were distributed by Shri DK Kankane, Sc G, HEMRL.

MTRDC, Bengaluru

The Safety Week started with safety pledge by MTRDCians. Dr Sudhir Kamath, OS and Director, MTRDC, motivated employees to strictly adhere safety guidelines at office and at home. A special talk was organised on "General Safety Measures" by Shri S Giridharan, Safety Officer, BEL Bengaluru.

NPOL, Kochi

Dr D Thomas, Sc F and Chairman, Safety Committee, NPOL, welcomed the gathering and stressed the significance of practicing safety measures in the organization. NPOL fraternity took safety pledge.

Dr DD Ebenezer, Officiating Director, NPOL, emphasized the relevance of safety. Competitions like essay, slogan, short-story, cartoon and quiz focusing on the concept of safety were organized to inculcate and strengthen the awareness of safety.

Shri AL Jackson, Chief Security Officer and Dr CT Sudhir, Chief Medical Officer, Cochin Shipyard Limited, delivered enlightening talks on Safety Precautions, Industrial Safety and First Aid. A live demo on fire fighting was conducted to enhance the awareness of fire safety in the organization.

DRDO EXHIBITS NOVEL PRODUCTS AT NAVDEX-2017

DRDO participated in the International Naval Exhibition NAVDEX-2017 held at Abu Dhabi, UAE, during 19-23 February 2017. Shri MH Rahman, DS and CC R&D (HR), DRDO, was part of the official MoD delegation to the exhibition led by Dr Subhash Bhamre, Hon'ble Raksha Rajya Mantri. Shri Sameer Abdul Azeez, Sc E, NPOL, Kochi and Shri Sourav Majumdar, Sc D, NSTL, Visakhapatnam, represented DRDO in the leading defence and maritime security event.

DRDO interacted with various stakeholders, with the aim of marketing suitable products for export. The team had focused interactions with many foreign nationals, including military delegations from UAE and other countries of the Gulf Cooperation Council, industries and the media. The team also had interactions with top naval officials of UAE, including Rear Admiral Ibrahim Salim Mohammed Al Musharrakh, Commander of the UAE Navy and Rear Admiral Sheikh Saeed bin Hamdan Al Nahyan, Deputy Commander of the UAE Navy. Many firms and traders from the Middle East and North Africa region also evinced interest in DRDO products.

DRDO products and technologies exhibited at NAVDEX included models of LCA Navy, Ship Sonar HUMSA-UG, Submarine Sonar AIDSS, Heavy-weight Torpedo Varunastra, Advanced Lightweight Torpedo ALWT, and the Airborne Early Warning and Control System Netra.

SFC CELEBRATES RAISING DAY

SFC, Jagdalpur, celebrated its 15th Raising Day with grandeur on 6 April 2017. Shri G Ramguru, Sc G, Project Director Agni-V, ASL, Hyderabad, was the Chief Guest of the function.

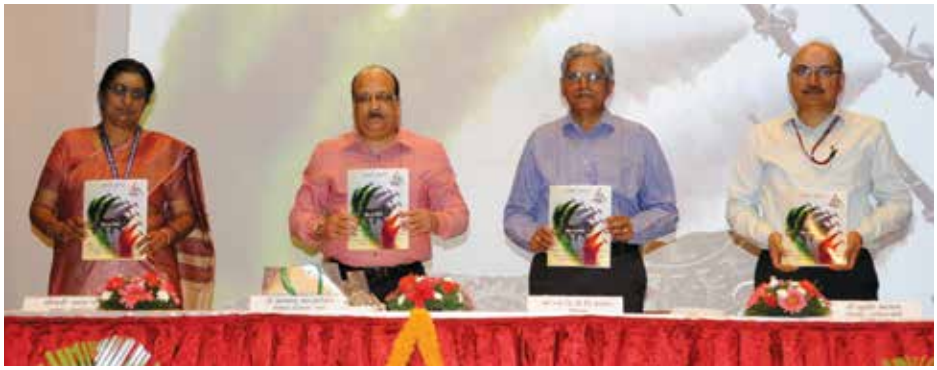
Shri JC Choudhary, General Manager, SFC, presided over the function and gave a brief account of production and R&D achievements of the laboratory in the year 2016.

Laboratory-level DRDO Awards, DRTC Awards, Cash Awards and various other awards were presented to the meritorious employees and the winners of sports activities. The programme concluded with a cultural programme performed by SFC staff and their children.

UTKARSH 2017

Utkarsh 2017, joint Rajbhasha Technical Seminar by Bengaluru-based DRDO labs, was organized by Aeronautical Development Establishment (ADE), Bengaluru, on 1 March 2017. The main theme of seminar was "R&D Leading to Make in India: Experiences, Achievements and Challenges." Shri Shantanu Bhatwdekar, Director, EOS, ISRO, Bengaluru, was the Chief Guest of the inaugural function. Shri MVKV Prasad, DS & Director, ADE, presided over the function. Dr Sudhir Kamat, OS & Director, Microwave Tube Research and Development Centre (MTRDC), was present on the occasion.

Smt Asha Garg, Sc G and Chairman, Utkarsh 2017, welcomed the august gathering. Messages from the Chairman, DRDO, Dr S Christopher and SA to RM Dr G Satheesh Reddy were read to all.



Shri Shantanu Bhatwdekar gave his Keynote Address on the achievements and challenges of ISRO related to Make in India concept.

Forty-two papers on Mechanical, Electronics, Computer Science, Bio-Science, IT, Rajbhasha, Management in Hindi were received from Bengaluru-based DRDO labs, DFRL, Mysuru and CEPTAM, Delhi.

Seminar Proceedings was released on the occasion by the dignitaries. Eight best papers and 15 best questions were awarded.

COURSE ON FROZEN CHICKEN & MEAT

Capsule course on Frozen/Chilled Chicken and Meat was conducted by Defence Food Research Laboratory (DFRL), Mysuru, at 222 COY ASC (SUP), Type G, Udhampur, during 22-24 March 2017. Dr Rakesh Kumar Sharma, Director, DFRL, inaugurated the course, released the course material and delivered inaugural address.

Maj Gen SP Yadav, MGASC, Northern Command, was the Guest of Honour at the inaugural function. Dr Sharma enlightened the audience about safe preservation of frozen/chilled chicken and meat. Seventy participants including 15 Officers and JCO's and others participated in the course.

TRAINING ON IRON REMOVAL UNIT

Defence Research Laboratory (DRL), Tezpur, organized a training programme on "Installation and Maintenance of Iron Removal Unit (IRU)" on 12 April 2017. Dr PS Raju, Director, DRL, inaugurated the programme and stressed on the importance of iron-free water.

Dr HK Gogoi, Course Director, explained effects of iron on health. Dr Rama Dubey, Sc E, delivered a lecture on "Installation and maintenance of IRU" in Hindi. Twenty-five participants attended the training programme.

SPECIALIZED TRAINING PROGRAMME ON CBRN EMERGENCY MANAGEMENT

A specialized Training programme on CBRN Emergency Management at Incident Site for Special Protection Group (SPG) was conducted during 20-24 March 2017 at Institute of Nuclear Medicine and Allied Sciences (INMAS). Thirty-one participants were imparted knowledge on diagnosis and response to CBRN contingencies.

The lecture-based training course was specifically designed for SPG and besides information on CBRN scenario included special training in protecting VVIP along with self-protection during CBRN scenario. They were made aware about the products developed by DRDO or identified as supporting the response action during emergencies. Facilities available at INMAS, viz., Human Patient Simulator, Mobile Whole Body Counter, Radio-Chemical Analytical Facility, etc., were shown to the participants to sensitize them about the role of facilities during the CBRN emergency.

National Disaster Relief Force and Delhi Fire Services chipped in with exposition exercises to handle such disaster scenarios. The course included various interactive sessions to address the special queries of participants.

HRD COORDINATORS' MEET

In order to make Institute of Technology Management (ITM) Management Courses more effective, ITM conducted a meeting of HRD Coordinators of various DRDO labs/estts during 1-2 March 2017. Feedbacks from previous courses and planned Training Calendar of ITM for 2017-18 were discussed during the meeting. The participants gave their valuable suggestions with respect to the duration of the courses, eligibility of participants, syllabus, etc. Courses under four major verticals set by ITM, i.e., Technology Management, Project Management, Material Management and Organisation Behaviour along with the courses suggested by CEPTAM were discussed and finalised. The meet provided a strong platform to enrich the course curriculum of ITM planned for FY 2017-18 and concluded with a panel discussion where all the valuable inputs that emerged during the meeting were summarized and considered for further incorporation.

HEAD MMG MEET

A two-day meeting on Procurement Manual (PM)–2016 was conducted by ITM, Mussoorie, during 16-17 March 2017 for the Heads of Material Management Groups of various DRDO labs/estts. The theme of the meet was "PM-2016: SWOT Analysis." Fifty-six delegates from DRDO labs, DG Clusters and DRDO HQ attended the meeting. Various queries, ambiguities faced in interpretations of the regulations and issues related to procurement of stores/services were deliberated upon. The panel was headed by Shri Sanjay Tandon, Director, ITM with Shri AA Ghosh, Consultant HEMRL and Shri Jagdeep, Addl Director, DMM, DRDO HQ. The meet provided platform to participants to interact with each other on various aspects related to PM-2016.

AWARDS

Information Professional Award

Dr Rajeev Vij, Sc F, Defence Scientific Information and Documentation Centre (DESIDOC), Delhi, was awarded "Society for Library Professionals (SLP) Information Professional award" in recognition of commendable and exemplary contributions in adopting original and innovative practices for library management and meritorious services to the profession.

Ms Dee Magnoni, President 2017, Special Libraries Association, USA, presented the award to Dr Vij at the 6th International Library and Information Professionals Summit (i-LIPS 2017) organised jointly by Indian Institute of Science Education and Research (IISER) and SLP in association with Special Libraries Association, USA, Asian Chapter, at IISER, Mohali, on 6 April 2017.

National Award for Technology Innovation

A team, lead by Dr Debdatta Ratna, Sc F, and members comprising Shri Anil Sudhakar Patankar, TO B, and Shri Ramakant Kushwaha, TO A, of Naval Materials Research Laboratory (NMRL), Ambernath, has been awarded 7th National Award for "Technology Innovation-2017" in the category of Innovation in Polymeric Products. The award carries a citation and ₹ 2 lakh. Shri Ananth Kumar, Hon'ble Minister of Chemicals and Fertilizers presented the award in presence of Shri Mansukh L Mandaviya, Hon'ble Minister of State for Road Transport, Highways, Shipping, Chemicals and Fertilizers, Govt of India.

Aerospace Standard Certification

Aeronautical Development Establishment (ADE), Bengaluru, received Aerospace Standard AS9100C Certificate from AS9100 certifying body TUV-SUD America Inc on 31 March 2017. ADE's name is listed in Online Aerospace Supplier Information System (OASIS) on the website of International Aerospace Quality Group with Registration No: 951177264. Shri V Veeraiah, Sc F and Shri Anil, Sc G, coordinated the certification process.

NPOL GETS NEW TRANSIT FACILITY

Dr S Christopher, Chairman DRDO and Secretary, Department of Defence R&D, inaugurated a new transit facility at Naval Physical and Oceanographic Laboratory (NPOL), Kochi, on 19 March 2017. The facility would provide upgraded facilities to the laboratory. Shri Ajay Singh, Chief Executive, CW & E Delhi, Shri Govinda Rajan, CCE (Estates), Hyderabad, Shri R Ravichandran, Deputy CCE (Estates), Hyderabad, Lt Col (Retd) MVLN Rao, Estate Manager, Bengaluru, Smt Indu C, Deputy Estate Manager, EMU, Bengaluru, Shri S Kedarnath Shenoy, OS and Director, NPOL, Shri K Mohanan, Sc G, Group Head (WES), and senior officers of NPOL attended the inaugural function.

SOCIETAL ACTIVITY

DEAL organises Blood Donation Camp

Defence Electronics Applications Laboratory (DEAL), Dehradun, organized 10th voluntary blood donation camp on 22 March 2017 under the aegis of IMA Blood Bank, Dehradun.

The camp was inaugurated by Shri PK Sharma, OS, DEAL, and was conducted by Dr JC Arora and Dr Manish Sharma.

Overall 41 units of blood was donated by the DEAL employees.

VISITORS TO DRDO LABS/ESTTS

DIHAR, Leh

Lt Gen PJS Pannu, AVSM, VSM, GOC 14 Corps, visited Defence Institute of High Altitude Research (DIHAR), Leh, on 15 March 2017. He was briefed about the various R&D activities and services being extended by DIHAR to the troops of 14 Corps. He also visited the experimental fields of DIHAR. Gen Pannu complimented DIHAR for providing support to the troops located at the Sector.

NMRL, Ambernath

Dr S Christopher, Chairman DRDO and Secretary, DDR&D, visited Naval Materials Research Laboratory (NMRL), on 6 March 2017 to review the various projects under Naval Science and Materials (NS&M) cluster. DG (NS&M) Dr SC Sati, Directors of NMRL, DMRL, NSTL and NPOL presented progress made in the ongoing projects and roadmap for the future.

Dr Christopher also visited the AIP site and inaugurated the Feed Preparation System (FPS) required for preparation and storage of Sodium Borohydride ($NaBH_4$) feed solution for operation of land-based prototype (LBP) of AIP. Dr Christopher congratulated NMRL for the achievement.

RCMA, Chandigarh

Dr S Christopher, Chairman DRDO and Secretary, DDR&D, and Dr G Satheesh Reddy, SA to RM and DG (MSS), DRDO, visited Regional Centre for Military Airwothiness (RCMA) and 3BRD, Air Force on 18 March 2017. Dr PS Kohli, Regional Director, RCMA, apprised them about the ongoing technical activities.

TBRL, Chandigarh

Dr S Christopher, Chairman, DRDO and Secretary, DDR&D, and Dr G Satheesh Reddy, SA to RM and DG (MSS), DRDO, visited Terminal Ballistics Research Laboratory (TBRL) on 18 March 2017. They were apprised about the technical activities being carried out at TBRL. The distinguished visitors witnessed experimental trials.

DRDO HARNESSING SCIENCE FOR PEACE AND SECURITY- XV

CHAPTER 2: TRANSFORMATION-DEFENCE RESEARCH & DEVELOPMENT ORGANISATION (1958-1969)

The article is fifteenth in the Series of extracts of the monograph, "Defence Research & Development Organisation: 1958-1982", by Shri RP Shenoy, former Director of Electronics and Radar Development Establishment (LRDE).

THE EARLY YEARS OF DRDO

Further Expansion of DRDO

Dr Bhagavantam who took over as Scientific Adviser, in July 1961, understood Shri Krishna Menon well and was equally convinced as the Minister was, that for indigenisation of weapons and equipment in defence leading to self-reliance, it is necessary to build a strong R&D base and to link it as closely as possible with production without losing the autonomy needed for R&D. Therefore, with the full backing of the Minister, in 1962 alone six more new laboratories were added to the growing list thus bringing the total number of laboratories to 27. The six new institutions were:

- Defence Electronics Research Laboratory, Hyderabad
- Defence Institute of Physiology and Allied Sciences, Chennai (later shifted to Delhi)
- Defence Institute of Work Study, (now renamed as Institute of Technology Management) Mussoorie
- Directorate of Psychological Research, Delhi (renamed as Defence Institute of Psychological Research)
- Field Research Station (later converted to Laboratory), Tezpur
- Research and Development Establishment (Engineers), Pune.

The Defence Electronics Research Laboratory (DLRL), Hyderabad, was a new laboratory that was created in recognition of the extended scope of application and rapid technological advances that were taking place in electronics. The charter of DLRL was to take up all research work and technique-oriented activity in electronics while the work of Electronics and Radar Development Establishment (LRDE) at Bangalore was changed to broadly cover equipment-oriented design and development in electronics. This was in accordance with prevalent global thinking about the model of innovation namely, the linear innovation model. In the course of a few years, DLRL's work focused on cypher, and electronic warfare, while the thrust at LRDE was for terrestrial communications, speech secrecy and radar systems. The Defence Institute of Physiology and Allied Sciences (DIPAS) was formed around the core group set up in DSL in 1952 to carry out applied research in physiology for the Armed Forces. On the recommendations of the Parliamentary Consultative Committee, a separate full fledged R&D laboratory, DIPAS was set up by end 1962 at Chennai and was immediately involved in high altitude effects as there was little or no information available on that subject. Defence Institute of Works Study was set up at Mussoorie to take up work-study methods with application to defence activities. Over a period of years, the aim of the Institute has changed and currently it imparts training in technology management for the DRDO scientists. The Directorate of Psychological Research (DPR) was nucleated from the Psychological Research Wing established in Delhi under the Defence Science Organisation. Its main emphasis was in developing excellence in areas of selection, recruitment, placement and trade classification for defence services and also for undertaking research on morale, motivation, attitude, job enrichment, leadership effectiveness and human engineering factors. The Field Research Station (later named Defence Research Laboratory) at Tezpur was established for purposes of carrying out indoor and outdoor exposure trials on military stores under hot and humid climatic conditions prevailing in the northeastern part of the country. The Research and Development Establishment (Engineers) with the acronym (R&DE Engrs) at Pune was spun out from TDE (Vehicles) in 1962 from Ahmednagar. Personnel carrying out import substitution and limited development of lightweight engineering structures were separated from inspection personnel to form the new laboratory under the DRDO. The laboratory was given the mandate of designing and fabricating assault bridges, minelayers, portable masts and ladders, engineering tools primarily used by the Corps of Engineers in the Army.

Shortly, thereafter Shri Krishna Menon was ousted as Defence Minister by his party men and the creation of new laboratories slowed down with his exit. In the course of the next six years only eight more laboratories came into existence. These were:

- Defence Research & Development Establishment, Gwalior
- Systems Analysis Group, Delhi
- Himalayan Radio Propagation Unit: (later renamed as Defence Electronics Applications Laboratory) Dehradun
- Vehicles Research & Development Establishment, Ahmednagar
- Combat Vehicles Research & Development Establishment, Avadi, Chennai

- ✧ Aerial Delivery Research & Development Establishment, Agra
- ✧ Naval Science and Technological Laboratory, Vishakapatnam
- ✧ Snow and Avalanche Study Establishment, Manali.

The Defence Research & Development Establishment (DRDE), Gwalior owes its origin to the Jiwaji Industrial Laboratory set up by the Maharaja Jiwaji Scindia of Gwalior in 1947 to carry out R&D related to forest products and mineral resources of the erstwhile Gwalior state. After the state merged with the Union of India, the Laboratory languished for funds and in 1963 after the Chinese invasion of our borders; it was acquired by DRDO from the state of Madhya Pradesh as a detachment of the Defence Research Laboratory (Materials), Kanpur. It became an independent laboratory in 1972 and was given the charter to carry out R&D in toxicological and environmental problems related to defence including protection against chemical and biological weapons. The Himalayan Radio Propagation Unit was established in 1965 at Dehradun to collect, study and investigate radio propagation in our border areas and in mountainous regions for the purpose of enabling communication links to be set up by the Armed Forces. In 1970's it was renamed as Defence Electronics Applications Laboratory (DEAL). The Vehicles Research and Development Establishment (VRDE) was spun out in 1965 from TDE (Vehicles) in Ahmednagar. Personnel carrying out import substitution and limited development of vehicles used by the Army were separated from inspection personnel to form the new laboratory under the DRDO. The VRDE was given the charter to design, develop, test and tender advice on motorised vehicles used by the defence forces. In 1966, with the commencement of indigenous production of tanks at Heavy Vehicles Factory, Avadi, Chennai, DRDO set up a detachment at Avadi from VRDE for rendering support in technology transfer from Vickers. A year later the need for handling R&D activity in the area of fighting vehicles was felt as a result of which the detachment was given the status of independent laboratory called VRDE, Avadi. In the nineteen seventies it was renamed as Combat Vehicles Research & Development Establishment (CVRDE). With the concurrence of Indian Navy, the gap with respect to R&D in underwater weapon systems such as mines, torpedoes and so on, was sought to be covered by setting up the Naval Science and Technological Laboratory (NSTL), Vishakapatnam for underwater test ranges, design and development of marine navigation aids and for studies in noise and vibration. During the Chinese hostilities against our borders the need to combat the hazards of snow and avalanches in order to maintain roads and lines of communication especially in winter was felt by the Indian Army and accordingly the Snow and Avalanche Study Establishment (SASE) was set up in Manali with the aim of assisting the defence forces in these aspects. Thus, by the time Dr S Bhagavantam relinquished his office by the end of 1969, the DRDO had expanded into 33 R&D laboratories and two training institutions covering practically all major science and technology areas related to defence activities.

Reach of DRDO

The Defence R&D Organisation was spread far and wide in this land of ours; from Tezpur in the east to Mumbai in the west, from Leh in the north to Kochi in the south. The scientific and technological fields of activities covered almost every aspect of defence activities. Of the thirty five establishments, twelve of them namely, ADE, ARDE, CVRDE, DLRL, DRDL, HRPU, NPOL, IRDE, LRDE, NSTL, RD&E (Engrs) and VRDE would be engaged primarily in the development of hardware/software culminating in equipment and systems for the Services such as armaments, avionics, communication systems, electronic warfare, fighting vehicles, light weight engineering structures like bridges & portable masts, missiles, night fighting equipment, radars, sonars, torpedoes and so on. Out of the remaining institutions, DMRL, DMSRDE, and HEMRL would focus their attention on materials of specific application in defence such as armour, high temperature resin systems, high energy materials for gun ammunition, rockets, missiles and so on. Three laboratories, namely ADRDE, DFRL and NMRL were established to work on products and processes such as parachutes and other aerial delivery systems; packaged foods for the land-based and the submarine-based naval personnel; and anticorrosive materials and processes such as cathodic protection, anti corrosive and antifouling paints for the marine environment. GTRE and SSPL would build up expertise in the areas of critical and special components and sub-systems such as gas turbine engines for combat aircraft, electronic materials and devices, infra red detectors, microwave ferrites, and so on. Thirteen laboratories namely, DIFR, DIPAS, DL (J), DIPR, DRDE, DSL, FRS (L), FRS(T), INMAS, ISSA, SAG, SASE, TBRL would undertake investigations, research, instrumentation, and mathematical modelling for specific problems which are unique and outside the purview of commercial interests such as arid region needs, high altitude requirements, cold region as well as humid & hot region effects on flora, fauna and humans, defensive protection against chemical and biological warfare, radiation effects and protection, wargaming, electronic media secrecy, deciphering, snow and avalanche studies, basic and applied research in detonics, immunity studies against ground shoot and blast effects, studies on motivation, leadership effectiveness, stress effects, and so on. DIWS and IAT are training institutions with the former concentrating on work study and technology management techniques while the latter focused on imparting science and technology inputs on a systematic and programmed basis for the Service personnel. Two laboratories namely, ADE and GTRE had the Indian Air Force as their main customers while the Navy's specific problems were looked after by INPOL, NMRL and NSTL. CVRDE, R&DE (Engrs), SASE and VRDE would have the Indian Army as their customers. The rest of the laboratories were driven by the tri-service needs, the major customer being the Indian Army which is the largest and predominant among the three Services. The gamut of activities ranged from investigations and studies, applied research, development and engineering of hardware to limited production. While the investigations and studies conducted would be partly pro-active and partly reactive to a user problem, the applied research activities addressed problems or issues specific to our climate, food habits, physical or psychological make-up, strategy and tactics and other similar factors. The design, development and limited production activities were predominantly based on User Services requirements. The rate of change in the technology disciplines handled by the DRDO ranged from very high such as in electronics encompassing communications, computers, electronic warfare and radars, to a low rate in other technologies such as textiles, leather and so on.

To be continued...

Published by DESIDOC, Metcalfe House, Delhi-110 054