

आज़ादी का अमृत महोत्सव
आज़ादी के 75 वर्ष



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DRDO DEVELOPS SPO_2 BASED SUPPLEMENTAL OXYGEN DELIVERY SYSTEM



INNOVATION >> p5

EVENTS >> p6



HRD ACTIVITIES >> p17

INFRA DEVELOPMENT >> p22

VISITS >> p23

CONTENTS

MAY 2021
VOLUME 41 | ISSUE 5
ISSN: 0971-4391

COVER STORY 4

DRDO Develops SpO₂ based Supplemental Oxygen Delivery System



INNOVATION 5

Advanced Chaff Technology to Safeguard Naval Ships from Missile Attack

Light Weight Bullet Proof Jacket



EVENTS

6



HRD ACTIVITIES

17

INFRA DEVELOPMENT

22

VISITS

23

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DRDO DEVELOPS SpO_2 BASED SUPPLEMENTAL OXYGEN DELIVERY SYSTEM

DRDO has developed a SpO_2 (Blood Oxygen Saturation) automatic supplemental Oxygen Delivery System for soldiers posted at extreme high-altitude areas. The system can help fight Covid-19 patients struggling for want of oxygen. Developed by DRDO's Defence Bio-Engineering & Electro Medical Laboratory (DEBEL), Bengaluru, the system delivers supplemental oxygen based on the SpO_2 levels and prevents the person from sinking into a state of hypoxia fatal in most cases if sets in.

Hypoxia is a state in which the amount of oxygen reaching the tissues is inadequate to fulfil the energy requirements of the body. Hypoxia gets replicated in a Covid patient due to the virus and has been a leading factor in the current pandemic.

The electronic hardware of the system is designed for functioning at extreme altitude in low barometric pressure, low temperature and humidity. The software safety checks of the system ensures the functional reliability of the system in field conditions. A wrist-worn pulse oximeter helps the system monitor the SpO_2 levels through a wireless interface and control a proportional solenoid valve to regulate the oxygen supply to the person affected with hypoxia. The oxygen is delivered from a lightweight portable oxygen cylinder through nasal nares. The

system is available in various sizes from one litre and one kg weight with 150 litres of oxygen supply to 10 litres & 10 kg weight with 1,500 litres of oxygen supply, which can sustain for 750 minutes with a continuous flow of two litre per min (lpm) oxygen.

Since the system has been indigenously developed for operation in field conditions, it is both robust & inexpensive. The technology has already been transferred to the industry and the system is in bulk production.

The system can be used for treating moderate Covid patients in home isolation for Oxygen flow therapy with flow controlled at 2/5/7/10 lpm. The system has a huge advantage as the oximeter gives an alarm for lower SpO_2 value. It automatically increases/decreases the O_2 flow based on the SpO_2 setting, which can be auto-adjusted at 2, 5, 7, 10 lpm flow rate. The optimal O_2 flow rate conserves the O_2 resources/ O_2 management and greatly increases endurance. With simple to use functions, the system would reduce the workload and exposure time of doctors and paramedics to monitor the SpO_2 levels of the patient. The automated Calibrated Variable Flow Control for Low O_2 levels (User pre-set, <90%, <80%) through a calibrated Flow Control Valve (PFCV) will facilitate in economising the oxygen supply (1-10 lpm with ± 0.5 lpm). A mildly-affected Covid patient requires a

longtime moderate O_2 supply of 10 litre/150 bar to 10 kg-1500 litres, which can sustain up to 750 minutes.





ADVANCED CHAFF TECHNOLOGY TO SAFEGUARD NAVAL SHIPS FROM MISSILE ATTACK

DRDO has developed an Advanced Chaff Technology to safeguard the naval ships against enemy missile attack. Defence Laboratory Jodhpur (DLJ) has indigenously developed three variant, viz., Short Range Chaff Rocket (SRCR), Medium Range Chaff Rocket (MRCR) and Long Range Chaff Rocket (LRCR) of this critical technology meeting Indian Navy's qualitative requirements. The successful development of Advanced Chaff Technology is another step towards Atmanirbhar Bharat. Indian Navy has successfully conducted trials of all three variants in the Arabian

Sea and found the performance satisfactory.

Chaff is a passive expendable electronic countermeasure technology used worldwide to protect naval ships from enemy's radar and Radio Frequency (RF) missile seekers. The importance of this development lies in the fact that very less quantity of chaff material deployed in the air acts as decoy to deflect enemy's missiles for safety of the ships. DRDO has developed the expertise in this area to meet the futuristic threats from adversaries. The technology is being given to the industry for production in large quantities.

Raksha Mantri Shri Rajnath Singh congratulated DRDO, Indian Navy and Industry for the achievement.

Secretary Department of Defence R&D & Chairman DRDO Dr G Satheesh Reddy appreciated the efforts of the teams involved in the indigenous development of this vital technology to safeguard Indian Naval Ships. Vice Chief of Naval Staff Vice Admiral G Ashok Kumar applauded DRDO for developing strategically important technology indigenously in a short span.

LIGHT WEIGHT BULLET PROOF JACKET

Defence Materials and Stores Research and Development Establishment (DMSRDE), Kanpur has developed lightweight Bullet Proof Jacket (BPJ) weighing 9 kilogrammes meeting the qualitative requirements of Indian Army.

The Front Hard Armour Panel (FHAP) jacket was tested at Terminal Ballistics Research Laboratory (TBRL), Chandigarh and met relevant BIS standards. The development is vital as every gram of BPJ weight reduction is crucial in enhancing soldier's comfort while ensuring the

survivability. This technology reduces the weight of the medium sized BPJ from 10.4 to 9 kg. Very specific materials and processing technologies have been developed by the DRDO for the purpose.

Raksha Mantri Shri Rajnath Singh congratulated DRDO and industry for developing the lightweight BPJ to make the soldiers more comfortable. Secretary Department of Defence R&D and Chairman DRDO Dr G Satheesh Reddy congratulated the DMSRDE team for the development.



INTERNATIONAL WOMEN'S DAY

ARDE, PUNE

Armament Research & Development Establishment (ARDE), Pune celebrated International Women's Day (IWD) on 8 March 2021. Prof. Priya Abraham, Director, National Institute of Virology (NIV), Pune, was invited as the Chief Guest. In her talk, Prof. Abraham highlighted the lead role played by NIV in sample testing during the Covid-19 pandemic and in the development of an indigenous vaccine. Dr V Venkateswara Rao, OS and Director, ARDE advised that everyone should commit on this day to put in greater efforts. Ms. Chitra Abhyankar, Sc 'F', Chairperson of ARDE Women's Cell presented the activity report. Women employees who had made outstanding contributions by undertaking special tasks



in the Covid-19 environment were felicitated at the hands of the Director. Prizes to winners of various competitions such

as handwriting, essay writing, rangoli and stand-up craft were given away by Mrs. Jaya Lakshmi, the First Lady of ARDE.

DEAL, DEHRADUN

International Women's Day was celebrated at Defence Electronics Application Laboratory (DEAL), Dehradun on 8 March 2021 with much fervor and passion. The programme was inaugurated by Shri PK Sharma, Director, DEAL along with Dr Aloka Niyogi and senior scientists, through the lighting of a lamp. In his inaugural address, Shri Sharma highlighted the contribution of the women employees in the growth of DRDO. A motivational talk by Dr Aloka Niyogi on "Gaining Momentum: It's Time to Think & Accelerate Gender Parity" was very much appreciated by the audience. Shri Anupam Pandey,



SAO-I, elaborated on the various facilities available to women employees working in Central Government offices in his talk. The women employees of DEAL showcased their immense talent

through Rangoli competition, recital of songs and craftsmanship. The programme concluded with an Art & Craft workshop by Ms. Vandita and the distribution of prizes.



DIPAS, DELHI

The Defence Institute of Physiology and Allied Sciences (DIPAS) celebrated International Women's Day (IWD) on 8 March 2021. Dr Vandana Kumar Joint Secretary, Department of Promotion of Industry and Internal Trade, Ministry of Commerce and Industry GOI, was the Chief Guest and Smt Sweta Verma, Image Consultant & Soft skill trainer was the Guest Speaker on the occasion. Dr Vandana Kumar shared her vast experience of working with DRDO and emphasized the need for encouraging women scientists in every field as in today's scenario women are handling all the situations at par with men and achieving tremendous heights in all the fields. Smt Verma, in her talk, explained the importance of dressing and grooming at workplace. The programme concluded with the felicitation of the guests by the Director DIPAS.

DLRL, HYDERABAD

International Women's Day 2021 was celebrated on 14 March 2021, in online (virtual) mode. Dr K Maheswara Reddy, DS & Director Defence Electronics Research Laboratory (DLRL) in his address, stressed the need for more women to come forward and choose to challenge in areas of technology, management leadership etc. and stand up for equality. Chief Guest Ms. Kiran Uniyal, spoke on the topic of "Women & Safety" and brought out the measures to be taken for ensuring women safety. Guest Speaker Dr Preeti Aghalayam, Professor, IIT Madras spoke on

"Women in Stem", and brought out that data available reflects drop in percentage of women in (STEM) (Science Technology Engineering Management) from college to higher studies. A video with the theme of IWD - 2021 "Choose to Challenge" on multifaceted achievements of women employees of DLRL was played. The talks were concluded by Q&A session.



DMRL, HYDERABAD

Defence Metallurgical Research Laboratory (DMRL) celebrated IWD 2021 on 19 March

2021 at Tamhankar Auditorium with great enthusiasm. Dr G Jagan Reddy, Sc 'G' & Chairman, Works Committee welcomed the gathering and highlighted the importance of this year's theme "Choose to Challenge". Ms. Anjali Kumari, Sc 'C' & Convenor, Women's Cell presented a report on the activities of Women's Cell during the last one year. She elaborated on the achievements of DMRL women employees and congratulated them. Shri K Srikant Goud, President, DMRL Workers' National Union and Shri Rashid Ali, Vice Chairman, Works Committee also spoke on women empowerment and the importance of IWD celebrations. Dr T K Nandy, OS & Associate Director, DMRL appreciated all the women employees for their efforts made in the field of material science and encouraged them for their future endeavors. Chief Guest for the programme Lieutenant (Indian Navy) Jaya Srivastava, Assistant Director, MSQAA gave a very inspiring and interactive speech on the topic "Do not stop until you are proud". She encouraged the audience with her own success story. Finally, Mrs. V Meena Kumari, TO 'B' & Co-Convenor proposed a vote of thanks. The celebrations were concluded by singing National Anthem.



DRL, TEZPUR

Defence Research Laboratory (DRL), Tezpur celebrated IWD on 8 March 2021. An eminent cardiologist of Tezpur Dr Deepti Rekha Barua, MD, DIP, CARD, FEAC graced the event as Chief Guest. She encouraged all women scientists, researchers to take up the challenge and work hard with high dreams, determination, dedication,

discipline and direction. Dr Sanjai Kumar Dwivedi, Director, DRL welcomed the guest and narrated the role of women in balancing both families as well as work. A poster on the women force of DRL was designed and released during the occasion. Dr Rashmi Rekha Devi, Sc 'E' presented an overview on activities of women's cell of DRL. A cultural programme

was also organized where female trainees of DRL also participated enthusiastically. Awards were distributed to the winners of various competitions on "Women in Science & Technology" organized among female trainees of DRL. The guest also visited DRL Exhibition Hall where DRL products and technologies were showcased



HEMRL, PUNE

High Energy Materials Research Laboratory (HEMRL) celebrated IWD on 8 March 2021 in a befitting manner. Shri KPS Murthy, OS, Chairman Women's Council & Director HEMRL addressed the gathering. He touched upon various aspects related to women's empowerment and women's role in society. He elaborated the theme of this year's IWD, i.e., "Choose to Challenge". Mrs. Sandeep Kaur, Sc 'F', Vice-Chairperson, HEMRL

Women's Council accentuated the activities of the women council during 2020-2021. To commemorate the event, an online quiz competition, essay writing competition and rangoli competitions were conducted and the winners were suitably awarded on this day. Ms. Janaki Viswanath, Director, SHB (SaathiHaathBadana) Social Foundation was invited as the Chief Guest for the day. She gave a talk on "Lessons from Pandemic".





It was very well received by the audience. Further, a Group Discussion on “Can a symbolic Women’s Day celebration lead to women’s empowerment?” was arranged wherein two groups debated over the topic. The views and ideas put forth by both the groups were commendable and were well received by the audience too.

INMAS, DELHI

Women’s day was celebrated on 8 March 2021 at Institute of Nuclear Medicine and Allied Sciences (INMAS) with a lot of enthusiasm and fun. The programme was designed keeping in mind the theme for this year “Choose to Challenge”. The programme started with a small get-together keeping all the COVID 19 protocols in place. Every woman colleague was welcomed with a rose and a note of appreciation. The Chief Guest and Keynote Speaker for the day was Dr Seema Vinayak, Director, SSPL, Delhi who came and shared her experiences in the area of women empowerment. Two talks by in-house speakers



Dr Manju Bala Popli spoke on “Women for self” emphasizing the need for women to treat themselves as individuals. The second talk was by Ms. Sunita Sharma who focused on the astrological remedies for the state of depression. The Chairman Women welfare committee Dr Rashi Mathur Sc`F` presented an overview of the activities done by the Women of the Workforce (WOW) at INMAS during the year 2020 and towards the management, testing and handling of COVID 19. During the celebrations, a slogan writing competition was organised on “Women Empowerment”. The fun element in the event came in

the form of a public opinion on ‘Purple Elegance’ which was the internationally acclaimed colour of the day and was also the dress code. The event was successfully coordinated by Dr Poonam Rana, Sc`F`, Ms. Prabhjot Kaur and Ms. Sapna Vaid.

ITM, MUSSORIE

International Women’s Day was celebrated at Institute of Technology Management (ITM), Mussoorie on 8 March 2021. The event commenced with getting together of all women employees of ITM, including teachers from ITM School. Shri Sanjay Tandon, OS & Director ITM delivered a motivational speech on Organizational Behaviour with examples focused on the qualities of women. The speech was related to the topic “Learning Management from Wives/Women”. To make the day more memorable, few games were organized for Women, which saw whole-hearted participation from women folk with all male members in the audience cheering and encouraging them.



NMRL, AMBERNATH

International Women's Day was celebrated at Naval Materials Research Laboratory (NMRL) with immense happiness on 8 March 2021. Dr Shubhangi Vedekar from Chaya Hospital Ambernath graced the occasion as the Chief Guest. On this occasion, a lecture on "Women Health and Wellbeing" was delivered by Ms. Manishi Johari (Naturopath & therapeutic dietician) for NMRL women employees. Dr M. Patri, OS & Director NMRL, in his address motivated the women employees and highlighted their importance in the overall progress of an organization. Subsequently, Dr Shubhangi Vedekar energetically gave an encouraging talk by sharing her thoughts and life experiences with the distinguished gathering. She educated the ladies on COVID- 19 and shared tips



on how to remain strong in this pandemic time. First Lady of NMRL distributed gifts to ladies working at the canteen and NMRL garden. Director NMRL presented

a memento as a token of love and appreciation to Hon'ble Chief Guest, and finally, the programme concluded with a Vote of Thanks.

RAISING DAY CELEBRATION

DEAL, DEHRADUN

Defence Applications Laboratory (DEAL), Dehradun celebrated its annual day on 23 February 2021 with immense zeal and enthusiasm. To commemorate the occasion, various sport events and games were organized including cricket, football, volleyball, badminton, table tennis, field events, etc. A large number of DEAL employees participated in the events following all the COVID-related guidelines. Shri PK Sharma, Director, DEAL presented the laboratory-level DRDO awards, cash awards and sports awards to the meritorious

employees and the winners of the various sports events. He also planted a sapling to mark the occasion. In his address, Shri

Sharma congratulated all the DEAL employees and outlined the accomplishments of DEAL during the testing COVID times of 2020.





HEMRL, PUNE

HEMRL celebrated its 61st Raising Day on 1 March 2021. Keeping in view of the COVID pandemic situation, the function was organized in the open area of the porch at Main Building by taking all preventive measures & care. The programme started with paying tribute to Dr APJ Abdul Kalam with a garland by the Director, HEMRL at Self Reliance Point. It was followed by Director's welcome address to the gathering. As part of Raising Day celebrations, Laboratory level DRDO awards and cash awards were conferred to meritorious employees. Shri Bikash Ghose, Sc 'F' & Ms. Darshana Singh, Sc 'E' were conferred with Laboratory Scientist of the Year 2020 & Technology Group Award was awarded to Wg. Cdr. (Retd.) SV Pedgaonkar, Sc 'F' & team for successful development of '50mm MTV IR Flares for protection



of SU-30 Mk-I aircraft against IR Guided Missiles'. Excellence Award for R&D was conferred to Shri Sudhir, Sc 'E' & team. Best Performance Award for DRTC awarded to Shri AM Karanjkar, TO 'C' & Mrs. Kaveri M. Wakhare, Tech A. Ms. Shri Kulkarni, Sc 'E' was conferred with Excellence Laboratory Award for DRTC

cadre was conferred to Shri AK Devangan, TO 'B' and Ms. Jayashree Sreenadh, TO 'B'. While Laboratory Award for Admin and Allied Categories were conferred to Mrs. Sheela Kurian, Admin Officer & Shri VG Benedict, Store Officer. Employees who have completed 25 years of service were also felicitated during the function.

NATIONAL SAFETY WEEK

ARDE, PUNE

The 50th National Safety Week celebrations at Armament Research and Development Establishment (ARDE), Pune culminated on 5 March 2021. The Chief Guest, Shri R Appavuraj, Chairman, CEPTAM and former Director, PXE, Balasore spoke on, "Testing and Evaluation of Weapon Systems at Test Range", which covered the safeties and preparedness to be observed during trials. Awards were distributed to winners of Safety competitions.



DIPAS, DELHI

National Safety week (4-11 March 2021) was celebrated at DIPAS by organizing a lecture for enhancing safety awareness. Due to the prevailing COVID-19 scenario, the celebration was done via video conferencing mode. Dr Richa, Sc 'E', Head, Quality Assurance Cell conducted the celebration. Mrs. Alka Diwan, Sc 'G' and Associate Director, CFEES, Delhi delivered a talk on "Occupational Health and Safety Management" on the occasion. She also emphasized following 360 degrees safety culture at every place as safety is not the responsibility of a single person but is a joint effort by all employees of the Institute. Her lecture sensitized the lab employees and created awareness towards overall safety at the workplace. The webinar was attended by officers and staff of DIPAS.



DMRL, HYDERABAD

DMRL organized a Safety Awareness Campaign week during 18-19 March 2021. The campaign was aimed at renewing the commitment of employees and the general public to work safely throughout the year, with an ultimate aim of integration of safety, health and environment in work culture and lifestyle. On this

occasion, all DMRL employees were welcomed with safety badges at the main security gate by the members of the Safety Group and the Safety Committee. A fire demonstration was also organised by the Fire Group for the employees. The 50th National Safety Day was celebrated on 19 March 2021. Dr G Madhusudhan Reddy, OS & Director presided over the inaugural function. Shri B B Singh, Sc 'F' & Group Head, Safety and Chairman, Safety Committee delivered the welcome address and briefly presented the safety-related measures undertaken during the last year. Shri Rashid Ali, Vice Chairman, Works Committee, Shri K Srikanth Goud, President, DEFMETLAB Workers' National Union and Shri Uday Kumar Goud, President, BPMS also addressed the gathering highlighting the importance of the safety culture. The Director in his address emphasised the importance of safety in all walks of life. Shri A Satyanarayana, Member, Safety Group proposed a Vote of Thanks while the safety pledge was administered by Dr PK Sahoo.



HEMRL, PUNE

The National Safety Week was observed at HEMRL, Pune from 4 to 10 March 2021. Various

programmes were arranged during the week. As a prelude to national safety week, safety badges were distributed to all employees. Safety slogan competition in English, Hindi & Marathi on safety, health and environment was conducted and the best three slogans from each language were awarded prizes and certificates. On 5 March 2021, Safety Quiz was conducted in online mode under two categories, category one for Scientists, Technical Officers & STAs and category two for non-technical officers/staff. The first three winners in each category were awarded prizes and certificates. On 8 March 2021, the Safety Poster competition was conducted and the first three winners were awarded prizes and certificates. On 9 March 2020, Safety Health & Environment (S.H.E) bulletin containing various articles on safety, health and environment was released and the best three articles from the bulletin were awarded. On 10 March 2021, a Fire-Fighting Demo for the employees of HEMRL was organized to create awareness about fire safety. On 10 March 2021, a First-aid lecture for the employees of HEMRL was organized to create awareness about first aid. Based on safety performance during the year 2021, Igniter Division and Security Division have been awarded safety trophies as best project division and support division, respectively. Prof. (Retd.) Vikram S Ghole, Savitribai Phule Pune University, Pune was the Chief Guest. He delivered a talk on "Effect of Pollutants on Ecosystems and Embryo Development".

Shri KPS Murthy, Director HEMRL, OS, HEMRL addressed the gathering on the importance of safety during the handling of various high-energy materials. Prizes and Certificates were distributed at the hands of Chief Guest, Safety trophies & best divisional safety officer awards were distributed at the hands of Director.

NMRL, AMBERNATH

Fire & Safety Group of NMRL conducted a programme on 4 March 2021 to mark the 50 Glorious National Safety Week, to enhance the safety practices among employees. As a part of the celebration, a safety day talk was arranged from the invited Guest Speaker. Shri RK Maindola, Jt. Chief Controller of Explosive (Retd.), PESO, Kolkata delivered a safety talk on “Safety Regulations for Gases and Hazardous Chemicals- A Case study”. Employees took a safety and health pledge led by Director. A committee constituted by Director NMRL visited all the divisions to check the safety norms compliance; subsequently “Adherence to the Safety- Best Department Trophy – 2020” was awarded to the Fuel Cell Technology Department (FCTD). An essay competition was also arranged for all employees and winners were awarded. Throughout the week banner with NSC theme-2021 were displayed and all employees wore safety badges. On 9 March 2021, fire mock drills along with the handling of fire victims in emergencies demonstration-cum-training



sessions were arranged. Fire and Safety Group provided training on operation and usage of fire extinguishers, their types, protocol in a situation of a fire emergency, information on fire hydrants, etc. MI Room specialists, providing information on the handling of victims in

an emergency in particular acid injury, burn injury, electrical shock, leg injuries, emergency communication, actions required to manage a fainted person, etc. Because of restrictions in gathering, limited employees from each department attended the function.

NATIONAL SCIENCE DAY

ARDE, PUNE

ARDE, Pune celebrated National Science Day (NSD) on 26 February 2021. The Chief Guest on the occasion was Dr Narendra Karmarkar. Shri Surendra Kumar, OS (Retd.), former Director, ARDE was present as the Guest of Honour. Dr Karmarkar delivered a talk on the topic, "Towards a Broader View of Theory of Computing". Shri Surendra Kumar spoke on the topic, "Innovation Time". The Science Day Oration was delivered by Dr BA Parate, Sc 'F' on "Science and Technology of Aircraft Seat Ejection - Advanced Concepts".



DIBER, HALDWANI

National Science Day 2021 was celebrated at DIBER Haldwani. Dr DK Singh, Director, Uttarakhand Biotechnology Council (UBC), Haldi, Uttarakhand was invited as Chief Guest during the event. Dr Singh spoke about the activities being undertaken by UBC and sought partnership with DIBER, DRDO in coming years. Dr Madhu Bala, Director DIBER complemented Dr Singh

for upbringing biotechnology activities at UBC and assured that DIBER will continue to collaborate with UBC within the periphery of defence research. Dr Atul Grover, Sc 'E' was decorated with a NSD medal on this occasion and Laboratory Awards too were presented to the DIBER scientists and staff.



DMRL, HYDERABAD

DMRL celebrated NSD and an oration was delivered by Dr A Venugopal Rao, Sc 'G' on "The Multidisciplinary Science of Structural Integrity" at Tamhankar Auditorium on March 11, 2021.



DRL, TEZPUR

Defence Research Scholars Forum (DRSF) under the aegis of Defence Research Laboratory (DRL) organized NSD on 1 March 2021. Mr Ananta Saikia, Sc 'E', presented NSD oration on 'Mountain & Glacier Region as Fresh Water Resources'. He was awarded NSD medal and certificate. Various science activities, such as brainstorming sessions on technologies for supporting soldiers in jungle operations and science quiz were organized among student participants of DRL. Winners were awarded prizes and certificates. On this day, DRSF also supported the Udmari primary school, Solmara by handing over a bookshelf and



books for students by personal contribution.

HEMRL, PUNE

High Energy Materials Research Laboratory (HEMRL), Pune, celebrated NSD 2021 on 1 March 2021. On the occasion, Prof. Jayant Udgaonkar, Director,



Indian Institute of Science Education and Research (IISER), Pune had been the Chief Guest of the function. A Deep Prajwalan was performed by Shri KPS Murthy, OS & Director, Senior Scientists along with the Coordinator NSD Celebration. The Director HEMRL welcomed the Chief Guest. Due to COVID restriction, limited number of participants were invited and the Chief Guest joined through video conferencing. The Director HEMRL addressed the gathering with a welcome note and briefed about the science in HEMRL and highlighted the contribution of the laboratory towards transforming India into Atmanirbhar Bharat in the areas of propellant, explosives, pyrotechnics and allied technologies. The Director, HEMRL also spoke about the theme for NSD 2021 "Future of STI

(Science Technology Innovation): Impacts on Education, Skill, and Work". The NSD Oration was delivered by Ms. Vijayalakshmi, Sc 'E' on 'Chemistry of Tunable Explosive Ink and its Emerging Applications". She was awarded by the Director, HEMRL with a Medal and Certificate. The Chief Guest Prof. Jayant Udgaonkar delivered an innovative and interesting talk on "An Understanding of Protein Folding and Unfolding" giving an insight into the processes which occurs inside the human body at a sub-nano level. He also briefly talked about for detection of explosives at the PPM level through biological means. The Chief Guest was presented a memento. The programme was concluded with a Vote of Thanks proposed by Dr (Ms) Paromita Chowdhury, Sc 'E'.

NMRL, AMBERNATH

National Science Day was celebrated at NMRL on 26 February 2021 with great zeal as well as adhering to COVID guidelines. Director, NMRL, Dr M. Patri, addressed the elated gathering, more particularly the scientific officers and staff from respective departments to pursue innovative, advanced science and technology work for the empowerment of the organization. Science Day Oration medal was bestowed upon Dr Baloji Naik, Sc 'D', for his talk entitled "Research Strategies towards Development of Durable Non-toxic Fouling Release Coatings for Marine Applications".



PATENT GRANTED

Patent "Process for Preparing an AA2519 (Al-Cu-Mg-Zn-Ti-V) Alloy" Patent No. 345987 has been granted for which Dr A K Mukhopadhyay, Defence Metallurgical Research Laboratory (DMRL) is the inventor.

YOUNG SCIENTIST TECHNICAL FORUM POSTER SESSION

Young Scientist Technical Forum (YSTF), DMRL organized a one-day “YSTF Poster Session” on 3 March 2021. The session was inaugurated by Dr G Madhusudhan Reddy, OS & Director DMRL. He delivered an inspiring inaugural address presenting a detailed roadmap of material development work at DMRL and highlighted various critical and upcoming research areas in which young scientists can make significant contributions. This was followed by a visit of the Director and other senior scientists of the laboratory to the hall displaying posters prepared by YSTF members. Around 20 posters were displayed covering different material themes such as steels, superalloys & refractory alloys, Ti alloys, ceramics, polymers & composites and advanced processing and characterization techniques. Apart from the YSTF



members from DMRL, around 20 young scientists from Hyderabad-based sister DRDO laboratories also visited DMRL for attending the poster session. This created a stimulating scientific environment where detailed interaction took place among the young and senior

scientists. The young scientists got an excellent opportunity to discuss their research work and receive valuable scientific comments from the senior scientists. The posters were scrutinized by a panel of judges and 5 posters were selected for the awards.

DIBER WINS UJWAL UTTARAKHAND 2021

DIBER exhibited its R&D products at the DRDO pavilion at an exhibition titled “Ujwal Uttarakhand 2021” held on 19-21 February 2021 at Rudrapur, Uttarakhand. Other major government entities were CSIR, ICMR, NDDDB, NIELIT, NHPC, KVIC, etc. DIBER exhibited its major technologies and products in the field of bio-energy, enhancement of livelihood opportunities in border areas of Uttarakhand, and herbal medicines. The exhibition was inaugurated by Shri Rajkumar Thukral, MLA,



Shri Rajkumar Thukral, MLA (3rd from Left) in discussion with Dr Atul Grover, Scientist 'E', DIBER (2nd from Left)



Rudrapur, who also took keen interest in the technologies for livelihood opportunities in border areas. DIBER's exhibits were also appreciated by other distinguished visitors including Shri Baldev Singh Aulakh, Hon'ble Jal Shakti Minister, Uttar Pradesh and Smt Rekha Arya, Hon'ble Women

and Child Welfare Minister, Uttarakhand. Smt. Rekha Arya, who is also MLA from Someshwar (Almora) appreciated the R&D efforts of DIBER in gainful utilization of pine needles for energy production, as these pine needles are otherwise a menace for local communities. She also

appreciated the leaps made by DIBER in bio-diesel R&D. DRDO pavilion was adjudged as the best stall of the exhibition for inviting the maximum number of visitors during the three-day exhibition. Shri Thukral handed over the shield in recognition of the same to all three DRDO laboratories.

HRD ACTIVITIES

16TH ALL INDIA JOINT HINDI SEMINAR

Naval Science & Technological Laboratory (NSTL), Visakhapatnam hosted 16th All India Joint Hindi Seminar during 19-20 March 2021. The theme of the Seminar is "Contribution of DRDO towards Self-reliant India". The Seminar was jointly organised by Hyderabad Cluster DRDO laboratories, i.e, NSTL, RCI, ASL, DMRL, DRDL, DLRL, CHES and Digital Signal Processing (DSP). Dr D.K. Srinivas, IRS, Principal Commissioner of Customs was the Chief Guest, Dr Samir V Kamat, DS & DG (Naval Systems & Materials) was Distinguished Guest and Dr Ravindra Singh, Director, Directorate of Rajbhasha & O&M, DRDO (attended through video conference), was Guest of Honour for the occasion. Other dignitaries included Dr O.R. Nandagopan, OS & Director NSTL, Dr Manu Korulla, Sc 'G' Chairman, Organising Committee and Sri Vivek Sharma, Sc 'E', Coordinator, Organising Committee Dr Srinivas emphasised that "India is a peace-loving country. At the same time, it is our responsibility to prove that



India is brave and self-reliant". Dr Singh described the genesis of Hindi and how its usage has been transforming from time to time. He explained in detail, how various activities are being conducted in DRDO for encouraging the usage of Hindi in all administrative and technical correspondences. On this occasion, Dr Samir V Kamat said that the theme is most relevant. He stressed the importance of self-reliance both strategically and financially. He wished India to

become an exporter rather than an importer. Dr Nandagopan in his address requested all scientists and officers to present papers in English as well as in Hindi. Also, he urged all to strive towards making India self-reliant. On this occasion, in-house Hindi magazines of RCI & NSTL and proceedings of the Seminar were released and also, Smt D Sailaja, Retired Hindi Officer of NSTL was felicitated in recognition of her services in implementing Hindi usage in NSTL.

JCM-III LEVEL (DRDO) COUNCIL MEETING AT DRL

The preliminary and main meeting of the JCM-III level (DRDO) Council was held at Defence Research Laboratory (DRL), Tezpur on 12 & 13 March 2021 under the Chairmanship of Shri KS Varaprasad, DS & DG (HR) and Dr G Satheesh Reddy, Secretary DD R&D and Chairman, DRDO, respectively. The meeting was attended by 13 Staff side representatives and 17 members from the Official side. Ms. Nabanita Radhakrishnan, DG (R&M), Shri Subir Mallick, AS & Addl FA (R&D), Shri V.C. Jha, OS & DMS, Shri G.S. Gupta, DOP, Dr Alok Jain, Director, CEPTAM, Shri Alok Mall, DHRD also participated in both the meetings. Dr S.K.

Dwivedi, Director of DRL thanked DOP, DG (HR) and Secretary DD R&D and Chairman, DRDO for conducting this important meeting at Tezpur. Shri Himanshu

Dwivedi, Dy Director (Pers) and Dr B.J. Gogoi, Sc 'E' of DRL coordinated the event from the DRDO HQ and DRL, respectively.



A glimpse of the JCM-III level meeting

DRL CONDUCTED FARMER'S TRAINING PROGRAMME AT TAWANG

Defence Research Laboratory (DRL) R&D Centre (DRDO), Tawang (Arunachal Pradesh) conducted a Farmer's Training Programme on "Production of High-Value Crops and Mushroom in High Altitude Region" on its campus at Tawang on 14 March 2021. More than 50 farmers of nearby villages of the Tawang region actively participated in the training programme and subject experts were from DRL, Tezpur. Dr B.J. Gogoi, Sc 'E' & OIC of the Tawang center delivered the inaugural lecture and briefed about the



overall R&D of the organization in the Tawang sector. Chief Guest Shri K.B. Kayastha, Entomologist, Deptt of Agriculture, Tawang

delivered a lecture on insect pest management of different crops which are grown in the Tawang region. Shri A Naglot, Sc 'E'



and Shri Ankit, Sc 'B' of DRL delivered lectures on mushroom production and protected cultivation of high value crops in Tawang region respectively. Shri Nawang Chota, DIPRO, Tawang

also spoke on the occasion and encouraged the farmers for organic farming. *Gaonburah of Khinmey* village conveyed his gratitude to Dr S.K. Dwivedi, Director, DRL for conducting the

training programme. Later on the farmers were shown vegetables and mushroom, grown in its green houses and mushroom hut respectively.

CEP COURSE ON METAL EXTRACTION AND RECYCLING TECHNOLOGIES

Defence Metallurgical Research Laboratory (DMRL) conducted a Continuing Education Programmes (CEP) on 'Metal Extraction and Recycling Technologies' during 15-17 March 2021. The course was organised in a hybrid mode, online lectures by eminent scholars and subject experts in the field and physical participation of scientists and officers of DMRL. The Course Director, Dr Ch R V S Nagesh, Sc 'G' while addressing the participants highlighted the need to have a critical look at the developments in the extraction

and recycling of the metals in the backdrop of continuous depletion of natural mineral resources and growing need to manage with lean metal resources in addition to the environmental restrictions. Dr D V V Satyanarayana, Sc 'G' and HRD Coordinator in his address stated that the theme of the course is very relevant and enables in updating the knowledge base of researchers on this important area of metal extraction and recycling processes. Dr D K Das, OS & Associate Director in his address underlined the importance of extractive metallurgy and scrap recycling processes. He lauded

the efforts that have been put in for organizing the course on such an important theme. The course had lectures covering the importance of mineral beneficiation, fundamental and applied technological aspects of metal extraction, scrap recycling processes of various strategic metals such as titanium, magnesium, cobalt, tungsten & rare earth metals, heavy alloy & super alloy scraps recycling, processes for the production of special metals and materials for energy storage and defence applications. About 20 scientists and officers of DMRL and DMSRDE participated in the course.



ONLINE COURSE ON AI IN DRUG DEVELOPMENT AND ITS IMPLICATIONS

The Institute of Nuclear Medicine and Allied Sciences (INMAS) conducted an online course entitled “Artificial Intelligence in Drug Development and Its Implications” from 2-4 February 2021. The organizers of the course were Dr Shubhra Chaturvedi, Sc ‘E’ and Dr Puja P Hazari, Sc ‘F’. Dr K Ramachandran, OS & Director, DIPR and also Director, INMAS (Additional charge) gave the inaugural address. The Keynote Address was delivered by Dr Upendra Kumar Singh, OS & Director, CAIR. He holistically covered the role of AI in different fields including medicine.

The course provided an interactive and informative platform for DRDO researchers with experts working in different facets of AI. The lecture and hands-on training series were designed to introduce the concept of AI and showcase certain areas of drug development wherein AI has straightforward implications, viz., bioinformatics and statistics for the life sciences, mathematical modeling, computational analysis, and drug discovery. Expert faculty has been drawn from R&D institutes like Jawaharlal Nehru University (JNU)-Delhi, Ambedkar Centre for Biomedical Research (ACBR)-Delhi, CSIR-

Institute of Genomics and Integrative Biology (IGIB)-Delhi, Delhi University and INMAS. The perspectives and experiences of industries especially in extending AI approaches during COVID-19 were also covered. The course closing remarks were delivered by Dr Anil K Mishra, Sc ‘G’, INMAS, who emphasized the role of AI in research in times to come. With close to forty participants including the students at INMAS, the course was expected to be useful for researchers who intend to include AI tools in their research.





INDO-US JTG ORGANISED WORKSHOP ON HUMAN MACHINE TEAMING

The Indo-US defence scientific cooperation is emerging as a major pillar of strategic partnership between both nations to further advance their shared security interests. As a part of this exercise, an Indo-US Joint Technical Group (JTG) Workshop on “Human-Machine Teaming” was partnered by the US Department of Defence and DRDO. The workshop was organized virtually by the Institute of Nuclear Medicine and Allied Sciences (INMAS), Delhi, from 2 to 11 March 2021. The workshop was inaugurated by Dr A K Singh, DS and DG (Life Sciences) DRDO and was followed by Dr K Ramachandran, OS

and Director INMAS Delhi, who shared his views on the goals of the workshop. Dr Sushil Chandra, Sc ‘G’, INMAS and Dr Patrick Mason, Head, Warfighter Performance Department, ONR started the proceedings for the first session. The workshop focused on human-machine teaming strategies. The scope of the workshop was to share current research and seek future cooperation in areas of neurocognitive assessment, measurement of trust and reliability in human-machine teams, use of VR and AR for training and simulating HMT tasks, and intelligent autonomous systems for situational awareness. The workshop sought to identify

potential strategic areas of mutual interest which would culminate into fruitful scientific collaboration and help in synergizing the strength of both nations. The workshop was attended by more than 150 participants from both sides. Presenters from both sides shared their knowledge and expertise to enhance current and future preparedness for war challenges in these critical and unconventional areas. The workshop proved a significant milestone in furthering the bilateral relationship of the USA with India and will give impetus to future scientific collaboration in the field of human-machine teaming.



ONLINE COURSE ON NEW FRONTIERS IN NANOMATERIALS RESEARCH

Institute of Nuclear Medicine and Allied Sciences (INMAS) Delhi conducted an online course on “New frontiers in Nanomaterials research” during 9-12 March 2021. Twenty-five DRDS officers from different DRDO labs outside INMAS and 15 DRDS officers from INMAS attended the course. Dr K Ramachandran, OS and Director, INMAS inaugurated the course. Shri Vinod Kumar, Head CBRN Defence informed the usefulness of the course. Dr Himanshu Ojha, Sc ‘E’ course coordinator briefed the dignitaries, faculty members, and participants regarding the course content of the course. Some of the important topics covered in the course were Computational

Nanotechnology, Graphene, graphene composites, Synthesis of Nanomaterials, Nanocomposites, Nanodevices, Nanomaterials Characterization, Nanorobotics, Nanotubes, and environmental toxicity of Nanomaterials. Prof (Dr) Ashok K Ganguly, Emeritus Professor from the Department of Chemistry, Indian Institute of Science, Delhi, delivered the keynote talk on “Design of Nanostructures and some Amazing Applications”. Over three days, 20 lectures were delivered covering basic concepts to hands-on exercise. The faculties were invited from the University of Delhi, National Institute of Technology Surathkal and Srinagar, National Environmental Engineering

research institute, Nagpur, Jawaharlal Nehru University, CCS University, BBRA University, Lucknow. Apart from that two faculties were invited from DMRL Hyderabad and SSPL, Delhi. Several interactive sessions were held with serious deliberations and brainstorming on topics related to Nanomaterials. The valedictory session was attended by Dr Ramachandran, Dr A K Mishra, Sc ‘G’, and Additional Director, INMAS, Shri Vinod Kumar. Director, INMAS conveyed thanks to all lab Directors for permitting the participants for attending the course and applauded the efforts of the organizing committee for the smooth conduct of the CEP.

INFRA DEVELOPMENT

INAUGURATION OF MI ROOM AT ATC, DEVTALAGUTTA

Dr G Madhududhan Reddy, Sc ‘H’ & Director, DMRL inaugurated a new MI Room complex at Advanced Technology Centre (ATC), Devatalagutta on 8 March 2021 to cater for the DSC personnel and DMRL employees. Lt Col (Dr) P V Ram Mohan, Medical Officer, DMRL visits this MI Room on Wednesdays and Thursdays. This MI Room has come as a boon for the employees of ATC, Devatalagutta which is almost 10 km away from DMRL. Earlier, the employees had to travel all the way from Devatalagutta to Kanchanbagh for every minor ailment.



DRL, TEZPUR

Dr G Satheesh Reddy, Secretary, Department of Defence, R&D and Chairman, DRDO, along with Dr A K Singh, DS & DG (LS), visited Defence Research Laboratory (DRL), Tezpur on 13 March 2021. Dr Reddy reviewed the mandate, progress and ongoing R&D activities of the laboratory and gave directions towards focussed R&D and steps for strengthening DRL in the future. Several issues pertaining to the development, successful deployment and induction of different DRL products in the armed forces and paramilitary were also discussed at length. Dr Reddy also entered into close discussions with the state and military authorities of the state to envisage the scope of further successful interactions with the stakeholders. The chairman applauded the contribution made by DRL in mitigating the corona challenge in this part of the state by conducting PCR-based sample testing and large-scale sanitation drives. The chairman also addressed all ranks of DRL in an open forum and assured to strengthen the only DRDO lab in the Northeast by providing all required resources.



Dr. G Satheesh Reddy, Secretary, DD, R & D and chairman, DRDO with DRL Staff: A glimpse of the review meeting

HEMRL, PUNE

Maj. Gen. Sanjay Rihani, DG, Combat Engineers, Delhi visited the High Energy Materials Research Laboratory (HEMRL) on 26 February 2021. During his visit, a presentation & demo of Explosive Detection Equipment, viz., Explosive Detection Kit and OPX Revilator were given. Presentations on the activities of



Maj. Gen. Sanjay Rihani, DG, Combat Engineers, New Delhi showing keen interest in OPX Revilator during visit to HEMRL on 26th February 2021

HEMRL and contribution to NFM programmes were also made by the Senior Scientists. Maj. Gen.

Rihani has shown keen interest in the research & development activities of HEMRL.

HEMRL, PUNE

Shri Shivraj Dhuppe, Dy. Secy & DFA (R&D) visited HEMRL on 3 March 2021. During the visit, senior scientists briefed him on the ongoing research activities being carried out at HEMRL followed by the visit to various processing facilities related to HEMs. He witnessed a static test of 40 kg Ballistic Evaluation Motor. He also visited Exhibition Hall. Shri Dhuppe, shown keen interest in the research & development activities of HEMRL.

Rear Admiral Sanjay Misra, VSM, Director General NAI visited HEMRL on 1 March 2021. During the visit, presentations were made by the senior scientists on naval warhead & indigenization of signal flares. Rear Admiral Sanjay Misra interacted with scientists of the laboratory and discussed various issues.

DIBER, HALDWANI

Hon'ble Minister of State for Textiles and Member of Parliament from Almora Constituency, Shri Ajay Tamta visited the Defence Institute of Bio-Energy Research (DIBER) Field Station Pithoragarh on 23 February 2021. He was given a guided tour of the R&D facilities available at the Field Station and a briefing on the major technologies and products developed by DIBER. Shri Tamta took a keen interest in the Himalayan medicinal plants, protected cultivation techniques, soil less and hydroponics. He was also briefed on how efforts of the Institute are dedicated to doubling of farmers' income in border districts including Pithoragarh, Chamoli and Uttarkashi. Such



Shri Shivraj Dhuppe, Dy. Secretary & DFA (R&D) during visit to HEMRL



A Moment during visit of Rear Admiral Sanjay Misra, VSM, Director General NAI

efforts are being made with an overall objective of curtailing migration from border villages in search of greener pastures. Shri Tamta praised and congratulated the DIBER team at Pithoragarh,

and acknowledged DIBER's efforts in remote areas towards fulfilling the Hon'ble Prime Minister's vision of doubling the income of farmers by the year 2022.