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RAKSHA MANTRI HANDS OVER DRDO SYSTEMS TO ARMED FORCES CHIEFS

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DRDO NEWSLETTER WISHES READERS A VERY HAPPY NEW YEAR

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RAKSHA MANTRI HANDS OVER DRDO SYSTEMS TO ARMED FORCES CHIEFS

Raksha Mantri Shri Rajnath Singh handed over three indigenously developed DRDO systems to Army, Navy and Air Force at a function held on 18 December 2020 in DRDO Bhawan. Shri Rajnath Singh handed over the Indian Maritime Situational Awareness System (IMSAS) to the Chief of the Naval Staff Admiral Karambir Singh, ASTRA Mk-I Missile to Air Chief Marshal Rakesh Kumar Singh Bhadauria and Border Surveillance System (BOSS) to Chief of the Army Staff General MM Naravane. Raksha Rajya Mantri Shri Shripad Yesso Naik, the Guest of Honour and Chief of Defence Staff General (CDS) Bipin Rawat were also present on the occasion.

The development of these high technology systems has led to higher self-reliance in Defence technologies. These three systems have completed the design and development cycles and would be operationalised by the services.

IMSAS is a state-of-the-art high performance intelligent software system that provides global maritime situational picture, marine planning tools and analytical capabilities to Indian Navy. The system provides maritime operational picture from Naval HQ to individual ship in sea to enable Command and Control. Centre for Artificial Intelligence & Robotics (CAIR), Bengaluru and Indian Navy has jointly conceptualised and developed the product. Bharat Electronics Limited (BEL), Bengaluru is the production agency.

The Astra Mk-I is the first Beyond Visual Range (BVR) Missile, which can be launched from Sukhoi-30, LCA Tejas, Mig-29 and Mig-29K. Very few countries have the expertise and capabilities to design and produce BVR class of weapon system. Successful development of Astra Weapon System by Defence Research & Development Laboratory Hyderabad and production by Bharat Dynamics Limited (BDL), Hyderabad is a major contribution towards 'Atmanirbhar Bharat'.

Hon'ble RM handing over IMSAS to CNS Admiral Karambir Singh

BOSS is an all-weather electronic surveillance system successfully designed and developed by Instruments Research & Development Establishment (IRDE), Dehradun. The system has been deployed at Ladakh border area for day and night surveillance. The system facilitates monitoring and surveillance by automatically detecting the intrusions in harsh high

Hon'ble RM handing over Astra Mk-I to ACM Rakesh Kumar Singh Bhadauria

altitude sub-zero temperature areas with remote operation capability. The system is being produced by BEL, Machlipatnam.

Speaking on the occasion, Raksha Rajya Mantri Shri Shripad Naik lauded DRDO for playing an important role in self-reliance in Defence. He also appreciated the efforts of DRDO towards development of technologies and products for combating COVID-19.

CDS General Bipin Rawat in his address congratulated the scientific fraternity for their achievements and emphasised on the need of working at the fast pace so that the country will have most of the indigenous systems.

Speaking on the occasion Secretary, DDR&D and Chairman, DRDO Dr G Satheesh Reddy said that the DRDO is committed to the development of advanced systems and technologies for Defence and the organisation is striving to create robust ecosystem of design, development and production of niche defence technologies along with academia, industry and armed forces.

Hon'ble RM handing over Border Surveillance System to CoAS General MM Naravane

RM PRESENTS DRDO AWARDS

Raksha Mantri Shri Rajnath Singh also gave away DRDO Awards-2018 to DRDO scientists for outstanding contributions in various categories during the function.

The awards included DRDO Lifetime Achievement Award to Shri NV Kadam for his contributions for

RM Rajnath Singh addressing the DRDO Awardees

developing control and guidance schemes for missiles. Excellence awards were given to academia and industry for technology absorption. Besides, individual awards, team awards, technology spin-off awards, techno managerial awards and awards in other categories were also given.

Complimenting the DRDO scientists for their outstanding work in developing defence systems, Raksha Mantri said that DRDO has been developing high level technologies for defence systems for increasing the capability of our Armed Forces.

Shri Rajnath Singh also lauded the role of DRDO scientists in combating COVID-19 pandemic. He congratulated all the scientists who received the awards and wished them the very best for their future endeavours.

The awardees are:

Award	Awardees
DRDO Lifetime Achievement Award	**Shri NV Kadam, Sc 'G' (Retd), DRDL**
DRDO Technological Leadership Award	**Dr OR Nandagopan, OS & Director, NSTL** **Dr KM Rajan, DS & Director, ARDE** **Dr G Madhusudhan Reddy, OS, DMRL** **Shri VV Parlikar, OS & Director, R&DE (E)**
Scientist of the Year Award	**Shri Anil Prasad Dash, Sc 'G', DRDL** **Shri Anupam Sharma, Sc 'G', DLRL** **Shri Ajai Kumar Pathak, Sc 'G', LRDE** **Shri Manoj Kumar Dhaka, Sc 'G', DEAL** **Dr Mahesh Saran Roy, Sc 'F', DLJ** **Dr G Appa Rao, Sc 'G', DMRL** **Shri N Pandarinath Rao, Sc 'G', HEMRL** **Dr ASB Bhaskar, Sc 'F', DRDE** **Dr Hemant Kumar Pandey, Sc 'E', DIBER** **Shri V Krishna Prasad, Sc 'G', ADA** **Dr Abhijit Bhattacharyya, Sc 'G', RCI** **Dr (Ms) Farhath Khanum, Sc 'G', DFRL** **Shri DB Pedram, Sc 'G', R&D (E)** **Shri S Srinivasa Chary, Sc 'G', ANURAG** **Shri S Giridhar Rao, Sc 'G', ASL**
Academic Excellence Award	**Prof. Narinder Kumar Gupta, INSA Distinguished Professor, Indian Institute of Technology, Delhi** **Dr Prabaharan P, Professor, School of Engineering, Amrita Vishwa Vidyapeetham, Kerala**
Best Techno Managerial/ Popular Science Award	**Dr Zakwan Ahmed, OS & DG (R&M), DRDO HQ and Team** **Shri Sameer Abdul Azeez, Sc 'F', NPOL, & Team**
Silicon Trophy	**Electronics and Radar Development Establishment Bengaluru**

Titanium Trophy	**Defence Metallurgical Research Laboratory Hyderabad**
DRDO Award for Path Breaking Research & Outstanding Technology Development	**Dr Makarand Joshi, Sc 'G', R&D (E) & Team** **Dr G Balu, OS, DRDL & Team**
Agni Award for Self Reliance	**Dr MRM Babu, DS, Programme Director, Agni and Director, ASL &Team** **Dr N Eswara Prasad, OS & Director, DMSRDE & Team** **Dr K Ajith Kumar, Sc 'G', NPOL and Team** **Dr Manoj Kumar, Sc 'G', DRDL and Team** **Shri Amit Sharma, Sc 'F', O/o DG (MED & CoS), DRDO HQ and Team** **Shri LC Mangal, OS, DEAL and Team** **Dr S Ganesan, OS, CVRDE and Team**
DRDO Award for Performance Excellence	**Shri Peravali Trimurthulu, Sc 'G', NSTL, and Team** **Shri B Venkateswara Rao, OS, RCI and Team**
Special Award for Strategic Excellence	**Shri Sangam Sinha, OS, MSC and Team** **Shri KVP Chandra Sekhar, Sc 'F', SPIC and Team**
Defence Technology Absorption Award	**M/s Economic Explosives Ltd., Nagpur** **M/s Centum Electronics Limited, Bengaluru**
Defence Technology Spin-Off Award	**Centre for Artificial Intelligence and Robotics Bengaluru** **Defence Institute of High Altitude Research, Leh** **Centre for Fire, Explosive & Environment Safety Delhi**
Best Innovative/Futuristic Development	**Dr M Anniyappan, Sc 'E', HEMRL and Team**

DRDO NEWSLETTER CONGRATULATES ALL THE AWARDEES

NAVY TESTS BRAHMOS IN ANTI-SHIP MODE

BrahMos Supersonic Cruise Missile in Anti-Ship mode was successfully test fired on 1 December 2020 against a decommissioned Ship. The test firing was carried out by Indian Navy. The missile performed highly complex manoeuvres and hit bull's eye.

BrahMos is the supersonic cruise missile jointly developed by DRDO and NPOM of Russia. The missile has established itself as a major force multiplier with its impeccable anti-ship and land-attack capabilities with multi-role and multi-platform abilities and has been deployed in all the three wings of the Indian Armed Forces.

Secretary DDR&D & Chairman DRDO Dr G Satheesh Reddy congratulated Indian Navy for the successful test.

DRDO SUCCESSFULLY DEMONSTRATES QKD COMMUNICATION

Secure communication is vital for defence and strategic agencies world over and distribution of encryption keys from time to time is an important requirement in this context. Sharing of keys over the air or wired links requires encryption, which in turn requires encryption keys to be pre-shared. Quantum based communication offers a robust solution to sharing the keys securely.

DRDO demonstrated Quantum Key Distribution (QKD) technology between the organisation's two Hyderabad-based labs, Defence Research and Development Laboratory (DRDL) and Research Centre Imarat (RCI). Raksha Mantri Shri Rajnath Singh congratulated DRDO for successful demonstration of QKD communication.

The technology is developed by Centre for Artificial Intelligence and Robotics (CAIR), Bengaluru and DYSL-QT, Mumbai. Quantum communication was performed under realistic conditions using time-bin QKD scheme. The setup also demonstrated the validation of detection of a third party trying to gain knowledge of the communication. Quantum based security against eavesdropping was validated for the deployed system at over 12 km range and 10 dB attenuation over fibre optic channel.

Continuous wave laser source was used to generate photons without depolarization effect. The timing accuracy employed in the setup was of the order of picoseconds. The Single photon avalanche detector (SPAD) recorded arrival of photons and key rate was achieved in the range of kbps with low quantum bit error rate. Software has been developed for data acquisition, time synchronization, post-processing, determining quantum bit error rate and extracting other important parameters.

The technology would be used to enable start-ups and SMEs in the domain of quantum information technologies. It will also serve to define standards and crypto policies that can leverage QKD system in a unified Cipher Policy Committee (CPC) framework for more secure and pragmatic key management for current and future military cryptographic systems.

TAPAS ACCOMPLISHES AUTO TAKE-OFF

One of the primary performance requirements of TAPAS Medium Altitude Long Endurance (MALE) UAV being developed by Aeronautical Development Establishment (ADE), a Bengaluru-based DRDO lab, is Automatic Take-Off and Landing (ATOL). During a recent flight on 7 November 2020, TAPAS took off on GPS-SBAS based auto mode successfully. GPS-aided Geo Augmented Navigation (GAGAN) was utilised for augmenting the accuracy of GPS and thereby accomplishing the safe auto take-off.

TAPAS has successfully demonstrated 8 hours of endurance, 250 kilometre of range and 15,000 ft of altitude using GAGAN. Rustom-I, the other UAV of DRDO, is also successfully flying with GPS-SBAS

receiver. It has completed 10 hrs endurance, long range (220 km) and auto take-off flights.

The receiver meets the performance requirements of DO-229D for the applicable phases of operation. Its primary function is to compute aircraft position, aircraft velocity and precise time and to provide an integrity assessment of the navigation solution using signals from GPS and compatible SBAS constellations including GAGAN, WAAS, EGNOS, and MSAS.

Unit also provides integrity in the absence of SBAS signal by detecting and excluding failed satellites (FD/FDE) using Receiver Autonomous Integrity Monitoring (RAIM) algorithm, whenever there are adequate number of tracked satellites. The receiver software is engineered as per DO-178B, Level B. The receiver provides accuracy better than 2 m.

PORTABLE DIVER DETECTION SONAR DEMONSTRATED TO BSF

The Portable Diver Detection Sonar (PDDS), developed by Naval Physical and Oceanographic Laboratory (NPOL), Kochi was demonstrated to a team from Border Security Force (BSF) on 20 November 2020. The field demonstration trials were conducted at NPOL's lake test facility - UARF at Kulamavu, Idukki. Shri S Vijayan Pillai, OS & Director, NPOL briefed the BSF team on the various features of the system. The project team led by Shri N Hari, Sc 'G' and Associate Director (HFS), carried out the product demonstration on-board the vessels FP Kuravan and MV Kurathi. The BSF team closely monitored the performance of the PDDS system in terms of detection and tracking of the underwater target and expressed their appreciation for the product.

Team BSF at NPOL's lake test facility UARF

DIPAS SIGNS LATOT FOR Q-DIP –QUERCETIN BAR

Defence Institute of Physiology and Allied Sciences (DIPAS), Delhi signed a License Agreement for Transfer of Technology (LAToT) of Q-DIP– Quercetin Bar nutraceutical with M/s Sarvotham Care Limited, Secunderabad on 5 October 2020. Dr Rajeev Varshney, Director, DIPAS, handed over the LAToT document to the representatives of the firm in the presence of inventors Dr S Sarada Surya Kumari, Sc 'F' and her team. The Q-DIP is prepared with natural ingredients, with added quercetin as the active molecule, which is a potent anti-oxidant and anti-inflammatory phytoflavanol.

Handing over the LAToT documents to representatives of M/s Sarvotham Care Ltd

Q-DIP is a performance enhancer and immunity booster especially developed to prevent high altitude sickness after extensive preclinical studies. It improves operational efficiency of soldiers deployed at high and extreme altitudes.

Food Safety and Standard Authority of India (FSSAI) licence has been obtained for Limited Supply of Production (LSP). Safety and toxicity evaluation has been carried out at NIPER, Punjab.

DMRL TRANSFERS FOUR TECHNOLOGIES TO INDUSTRIES

Defence Metallurgical Research Laboratory (DMRL), Hyderabad transferred four technologies to industries on 11 November 2020. Chief Guest Dr Samir V Kamat, DS & DG (NS&M), DRDO transferred technologies to the respective industry in the presence of Dr G Madhusudhan Reddy, OS & Director, DMRL.

DMRL has indigenously developed the technology for manufacturing

DG (NSM), DRDO and Director DMRL with representatives of Transferee Firms

glandless valves required for advanced naval systems of Indian Navy. The technology involves joining of two incompatible materials, titanium alloy and stainless steel, through vacuum brazing route. Joining of titanium alloys to steels by conventional arc welding procedures and advanced solid-state joining procedures is not successful due to formation of brittle inter-metallic phases. DMRL used silver base brazing alloys and after carrying out a number of vacuum brazing cycles, optimized the brazing alloy, quantity (volume) of brazing alloy, brazing temperature and time with respect to the microstructure and bond strength of the joint. After successful trials, the brazing procedure was optimized with Ag-28 wt% Cu brazing alloy. The brazed components were successfully pressure tested at L&T Audco, Chennai in the presence of ATVP. Subsequently, the components were also subjected to shock test and found to meet the design requirements. DMRL has successfully brazed eight glandless valve components at the request of navy and supplied to L&T Audco, Chennai through ATVP. A large number of glandless valves are required for Indian Navy for Aakanksha Programme.

This technology has been developed and demonstrated its use for valves having dissimilar metal combinations, used in critical applications, which require zero leak tightness. The technology established by DMRL has been now transferred to M/s L&T Valves Ltd, Chennai to take up large scale production.

DMRL has successfully developed an indigenous technology for producing stainless steel-based brake piston insulators for wheel and brake assembly of Light Combat Aircraft (LCA). The process involves preparation of powder mixture using ball milling, uniaxial compaction in a die, sintering in hydrogen atmosphere, machining/surface finishing and characterization of properties like density, hardness, surface roughness, compressive strength and thermal conductivity. DMRL has also received the type approval certificate from Centre for Military Airworthiness & Certification (CEMILAC) after 700 taxi trials. The laboratory has also developed all the necessary processing facilities. This material technology developed by DMRL can be used in thermomechanical applications where both thermal management as well as mechanical stresses are involved. The technology was transferred to M/s Innomet Advanced Materials Pvt Ltd, Hyderabad.

Bulb bars are used as stiffeners in shipbuilding, especially in naval construction. They are long products with an asymmetric cross-section that are produced by hot rolling using semi-rolled continuous cast slabs or billets. The manufacturing process is fairly complex and involves multiple steps including roll pass design, actual rolling and heat treatment. The bulb bars have to meet stringent geometrical, dimensional, physical and metallurgical requirements. Eleven different sections of bulb bars have been developed and productionized in lengths up to 12 metres. DMR 249A bulb bars have met all the requirements for use in warship construction and have been accepted by the competent authority of Indian Navy.

The bulb bars have also been certified through a more rigorous process for use in submarine applications. The technology was transferred to M/s Krishna Allied Industries Pvt Ltd, Mumbai.

Silver Nanoparticles (Ag NPs) are well known for their anti-bacterial, anti-microbial and anti-viral applications. DMRL developed a simple process for in-situ formation

DG (NS&M) Dr Samir V Kamat transferring technologies to the representatives of industries.

of Ag NPs in a polymer matrix, which can be used to prepare films, sheets or laminates on fabrics. The process involves coating of silver salt on polymer granules and their conversion to Ag NPs during melting of the polymer granules. The polymer matrix itself acts as a stabilizer and controls the particle size. This technology can be used in various applications such as Personal Protective Equipment (PPE) used by

the medical fraternity, as covering sheets for medical equipment and bed covers for patients etc. The technology has huge demand for front line workers who are working in medical field, in hospitals and health care centres. The technology was transferred to M/s Vertex Enterprises, Hyderabad.

INFRA DEVELOPMENT

COMMISSIONING OF MIL-STD 461F EMI/EMC TEST FACILITY

An EMI/EMC Test Facility has been established at Defence Electronics Application Laboratory (DEAL), Dehradun to fulfil the testing requirement as per MIL-STD 461E and F except RS105 Test. As all these tests are similar in MIL-STD 461G, hence, it also complies for MIL-STD 461G except for test CS 117 (lightning induced transients). This facility has enhanced capability of ESD test up to 30 kV (Contact and Air Discharge) along with RS 103 test (electric field up to 200 V/m). The Test facility has RF shielded Semi-Anechoic Chamber (SAC) of working volume 11 m x 7.5 m x 6.0 m, fully automated EMI/EMC Test instrumentation and accessories for EUT of size 1 x 1 x 1 m^3.

RF shielded Semi-Anechoic Chamber of the EMI/EMC Test Facility

The facility is also open to public and private industries as per DRDO Policy in effect.

ENHANCEMENT IN ICU CAPACITY AT SARDAR VALLABHBHAI PATEL COVID HOSPITAL DELHI

The DRDO has increased the number of ICU beds to 500 in Sardar Vallabhbhai Patel Covid Hospital at Delhi Cantonment on the advice of Union Government. All the beds are provided with oxygen support. Sardar Vallabhbhai Patel Covid Hospital is DRDO's 1000-bed facility, which was made operational on 5 July 2020 with a mandate to treat COVID-19 positive patients from Delhi and other states.

The increase in the number of ICU beds required additional equipment like ICU monitors, HFNC machines, and up-gradation of existing oxygen pipeline. To deal with the unprecedented surge in number of cases, Armed Forces Medical Services (AFMS) has increased the medics. Doctors and nursing staff from ITBP, CAPF and other services have also joined and are working round the clock.

The hospital has been admitting patients from all over Delhi and adjoining states like Haryana, Rajasthan, Uttar Pradesh, Himachal Pradesh, Punjab and Madhya Pradesh. The Directorate General AFMS has provided Doctors, Nursing officers, paramedics and associated manpower for state-of-the-art medical treatment to Covid-19 patient care. The support services and the technical services for the routine hospital activities like Housekeeping Services, Laundry, CSSD, Food and Beverages, and Fire Services are maintained by DCW&E and CCR&D Central, DRDO.

This is the biggest facility in Delhi in terms of ICUs for COVID-19

DRDO COVID Hospital in Delhi

patients and infrastructure has been made in such a way that more ICU beds can be made available on requirement.

DRDO undertook the design, development and operationalisation of the facility on war footing and built it in a record time of 12 days jointly with Ministry of Home Affairs (MHA), Ministry of Health and Family Welfare (MoHFW), Armed Forces, Tata Sons and other industries. The existing facilities at the hospital include oxygen supply to each bed, x-ray, electrocardiogram (ECG), haematological test facilities, ventilators, COVID Test Lab, Wheel Chairs, Stretchers and other medical equipment. DRDO developed COVID-19 technologies productionised by the Industry such as ventilators, decontamination tunnels, personal protective equipment (PPEs), N95 masks, contact-free sanitizer dispensers, sanitisation chambers and medical robots, trolleys etc., have also been utilised at the facility.

The patients in the hospital are treated free of cost including diagnostics, medicines and food and have expressed satisfaction and appreciation for the care and hygienic facilities at the hospital

DRDO CELEBRATES CONSTITUTION DAY

Constitution Day is celebrated on 26 November every year to commemorate the adoption of the constitution of India on this day. Defence Research and Development Organisation (DRDO) also celebrated the 70th anniversary of the day by organising a webinar. The most important part of the celebration was the reading of Preamble to the Constitution by the DRDO fraternity.

Raksha Rajya Mantri, Shri Shripad Naik, Chief Guest for the occasion, joined the webinar through video conferencing and delivered a talk on "Constitutional Values and Fundamental Principles of Indian Constitution". In his address, he recalled the contribution of the founding fathers of the Constitution and said that the Constitution is not only a theoretical idea, it must be made important to the lives of individuals in every part of the country. He further added that the Constitution needs to be interfaced with the citizens of the country.

DGs, Directors, Senior Scientists and other senior officials of DRDO joined the webinar through video conferencing. The following DRDO labs also celebrated the day at their respective places

Raksha Rajya Mantri, Shri Shripad Naik delivering a talk on Constitutional Values and Fundamental Principles of Indian Constitution through video conferencing

DEAL, DEHRADUN

70th anniversary of the Constitution of India was celebrated at Defence Electronics Application Laboratory (DEAL) during third and fourth week of November. The celebration started by the inauguration of an elaborate exhibition by Shri PK Sharma, Director, DEAL. The exhibition charted interesting facts about the Constitution in the form of posters and standees along with the display of the preamble wall. Employees were encouraged to go through the exhibition and sign the wall confirming allegiance to the Constitution of India. On the Constitution Day, i.e., 26th November 2020, employees read the preamble and listened to a talk on "Constitutional Values and fundamental Principles of Indian Constitution" by Hon'ble Raksha Rajya Mantri, Shri Shripad Y Naik by following all COVID related protocols.

Shri PK Sharma, Director, DEAL addressing the employees about the Constitution Day

DRL, TEZPUR

Defence Research Laboratory (DRL) celebrated 70th anniversary of the adoption of Constitution of India on National Constitution Day on 26 November, 2020. Director and staff of the laboratory read the preamble to the constitution and signed their pledge on a preamble wall established for the purpose. Posters on fundamental rights enshrined in the constitution of India were displayed at prominent places of the laboratory to create awareness.

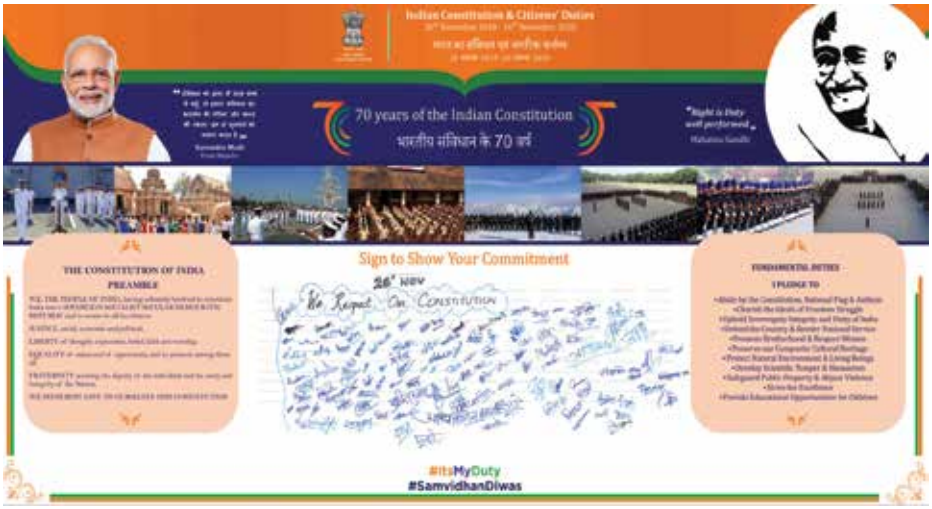
NPOL, KOCHI

Naval Physical and Oceanographic Laboratory (NPOL) commenced the day with the reading of Preamble to the Constitution of India in each floor of the technical building to ensure that social distancing norms are followed during the event. Posters on the significance of Constitution Day were displayed on the premises of the lab. Shri S Vijayan Pillai, OS & Director, NPOL, officers and staff signed on the Preamble Wall to show the respect to the Constitution and to reaffirm the commitment to uphold its ideology. Full sized banners about the day were displayed at the main gate, main foyer and at prominent places in the technical campus. The programme was coordinated by the NPOL Works Committee.

TBRL, CHANDIGARH

Constitution Day was celebrated in Terminal Ballistics Research Laboratory (TBRL) on 26 November 2020. Dr Manjit Singh, DS & Director TBRL, led TBRL family for reading the preamble to the Constitution. Highlighting the importance of the Preamble, he emphasised that the Preamble embodies fundamental values, philosophy and ethos on

Dr Sanjai K Dwivedi, Director DRL signing on the Preamble wall



Preamble Wall at NPOL

which our Constitution is based. Acknowledging the contribution of the Founding fathers of the Constitution, he recounted the history about the making of the Constitution from the year 1946 to 1949. He reiterated the importance of Fundamental Duties of citizens for nation building and called upon the TBRL family to uphold the ideas and duties enshrined in the constitution. An oath of allegiance to the Constitution and Fundamental Duties was taken by all scientists, officers and staff members of TBRL.

An exhibition hall was established in TBRL Ranges and banners, posters and standees were displayed to create awareness about the constitutional values, fundamental duties and fundamental rights. A giant Preamble Wall was created at the centre of the hall and more than 300 scientists, officers and staff members signed on the Preamble Wall to mark their commitment to the constitution.

Director TBRL along with Senior Scientists at the entry of Exhibition Hall.

INDIA INTERNATIONAL SCIENCE FESTIVAL-2020

Defence Institute of High Altitude Research (DIHAR), Leh organized the curtain raiser event of 'India International Science Festival' (IISF) – 2020 at Leh on 28 November 2020. The event was inaugurated by Hon'ble Lt Governor of Ladakh UT, Shri RK Mathur. Shri Mathur addressed the participants online and briefed about the importance and relevance of IISF. He asked all the stakeholders to promote and make science and technology reach to every remote location. He further emphasized the relevance of science and technology in context of Ladakh region. Being a high altitude cold and arid region of India, the utility of S&T in Ladakh is even more relevant and imminent for the population to sustain and adapt to the prevailing harsh environmental condition, he added further.

The IISF 2020 is the sixth of the series, organized continuously since 2015-2019. Every year IISF has witnessed diversity in its programmes in terms of number of events, participants, etc. Today, IISF has become a much-awaited annual event that celebrates the achievements of Science, Technology and Innovation and demonstrates how science can be the fulcrum of the country's progress.

Inaugural Session of the curtain raiser event of IISF–2020

Dr OP Chaurasia, Director, DIHAR in his welcome remarks, mentioned about the importance of utilizing science and technology to make a better and sustainable world. He specifically mentioned about the development and dissemination of appropriate technologies related to agriculture in high altitude region like

Ladakh, through which farmers are able to grow more with sustainable resource management.

Shri C Phuntsog, Vice Chancellor of Ladakh University, in his address, briefed about the importance of taking science out of university campus so that livelihood of the population is made more healthier, economical and sustainable. The event witnessed a fruitful brainstorming among the participants representing diverse areas like administration, policy, education, agriculture, entrepreneurship, local students, representatives of social organizations and SHGs. This event received wide coverage in local media (DD Leh and AIR Leh), apart from which it also witnessed wide coverage in various national level media channels.

WORLD QUALITY DAY CELEBRATION

World Quality Day is celebrated to recognise the contributions of quality professionals across the globe. The following DRDO labs also celebrated the day at their respective places.

DIPAS, DELHI

World Quality Day 2020 was celebrated at Defence Institute of Physiology & Allied Sciences (DIPAS), Delhi on 27 November 2020 via video conferencing. Dr Richa, Sc 'E', Head, Quality Assurance Cell , DIPAS conducted the celebration. Dr Rajeev Varshney, Director, DIPAS addressed the gathering and discussed that DIPAS focus on developing a culture of creating value for end users by innovating and improving products, services with emphasis on quality meeting user expectations. A talk was arranged for World Quality Day celebration. Dr Mayank Dwivedi, Director, DIITM, DRDO HQ delivered a talk on "Quality in Defence Products" on the occasion. Director, DIITM has emphasized that proper Documentation, detailed Quality Assurance Plan (QAP), responsive Life Cycle Support are the key of quality and reliability management, leading to customer satisfaction.

Dr Mayank Dwivedi, Director, DIITM delivering talk on Quality in Defence Products

ITR, CHANDIPUR

World Quality Day – 2020 was celebrated at Integrated Test Range (ITR), Chandipur on 24 November 2020. Shri HK Ratha, Director, ITR inaugurated the program. In his inaugural address, Director highlighted the importance of Quality in Test firing of missiles scenario justifying the vision and Mission of ITR and elaborated the theme 'Creating Customer Value'. More than 100 Officers and Staff attended the

World Quality Day celebration at ITR

programme. On this occasion a quiz program on quality was conducted and a documentary short film was showcased.

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

WORLD SOIL DAY 2020

World Soil Day was celebrated in Defence Research Laboratory (DRL) R&D Centre, Salari, West Kameng, Arunachal Pradesh on 5 December 2020. On this occasion, a training programme on "Organic Farming" was organized for farmers of Salari village. Dr Juri Das, Research Associate delivered lecture on "Organic farming" where she described about different components of organic farming and NPOP guidelines for certification.

ITR CELEBRATES LAB RAISING DAY

Integrated Test Range (ITR), Chandipur, the premier Defence R&D establishment engaged in Test & Evaluation of Rockets and Air Borne Systems observed 38th Lab Raising Day online on 6 December 2020. Various Laboratory-level awards were distributed to meritorious employees for their excellent services in their respective fields in Range activities even amidst COVID-19 pandemic. Dr G Satheesh Reddy, Secretary, Department of Defence R&D (DDR&D) and Chairman, DRDO, was present as the Chief Guest during this function along with Shri MSR Prasad, DS and DG (MSS), DRDO as distinguished guest and Shri HK Ratha, Director, ITR. Video/Audio msg of all former Directors of ITR were displayed. Former Directors, viz., Shri SC Narang, Shri AK Cheker, Shri SP Dash, Shri R Appuvaraj, Dr BK Das and Shri DK Joshi graced the occasion through VC. Others present, included Mrs B Sucharita, Associate Director, Shri Anup Sahu, Chairman Works Committee, Shri Ghanashyam Adhikari, Chairman, Raising Day, Shri PK Roy, Vice-Chairman, Raising Day & Shri SK Rout, Secretary, Works Committee. Shri MK Pal & Shri Jaysankar Bharati conducted the function.

Shri MSR Prasad, lauded ITR for achieving many successful goals making the laboratory one of the busiest Test Range. Dr G Satheesh

Reddy, congratulated team ITR for the extraordinary achievements of the past year. He wished the team to work with more enthusiasm and vigour to bring many more laurels to the laboratory in future. He stressed upon the cultural heritage and reminded us about our glorious past. He appreciated Director ITR for the efforts in calling all ex-Directors as an extended family and joining through Video Conference. Shri PK Roy presented the vote of thanks.

PXE CELEBRATES RAISING DAY

Proof & Experimental Establishment (PXE), Chandipur completed 125 years of its existence and celebrated its 126th Raising Day on 7 November 2020. On account of prevailing COVID-19 pandemic, the celebration was a very limited affair. Shri DK Joshi, Director, PXE highlighted the remarkable contributions of PXE to the National Defence preparedness and expressed his appreciation to all past & present employees, Works Committee, Unions and Associations for their valuable contributions, cooperation and wholehearted support. He also applauded the efforts of all employees for courageously working through the lock down period in pandemic and completing all trial activities as per the requirements.

Various Laboratory-level and DRDO Cash Awards were conferred to the employees for their significant contributions in their respective areas of work. Besides, Shri Mangala Murmu, Technician 'B' was awarded 'Proof Man of the Year' and Hav (Gnr) Vinay Kumar with 'PXE Sainik Puraskar' for the year 2019. Employees who have rendered their service in DRDO for 25 years were also felicitated.

A plantation programme was conducted by the employees of PXE throughout the 125th year to commemorate its harmonious coexistence with the nature over last 125 years.

To fulfil corporate social responsibility and In order to contain the outbreak of COVID-19, masks and sanitizers were distributed to the orphanages, old age homes and blind schools in Balasore town. Respect and gratitude were offered to all the COVID warriors by offering flowers and lighting lamps.

Plantation drive at PXE

DRL CELEBRATES HINDI PAKHWARA

DRL Tezpur, organized Hindi Pakhwara Samaroh during 4-21 November 2020. Dr Joysankar Hazarika, Principal, Darrang College, Assam graced the inaugural function as Chief Guest on 4 November 2020. DRL employees actively participated in different competitions as per the COVID-19 guidelines.

On the closing day, DRL celebrated its 59th Raising Day on 21 November 2020. Dr SK Dwivedi, Director hoisted the DRL Flag and delivered inaugural speech. Prof. VK Jain, Vice Chancellor, Tezpur University graced the function as Chief Guest. Dr Vanlalhmuaka, Sc 'E', gave a brief presentation on R&D activities of DRL. Various DRDO Lab-level Awards and 'SN Dube Publication Award' for the best paper were distributed to meritorious employees. The winners of the competitions of Hindi Pakhwara and Director's appreciation reward were also awarded.

Inaugural of Hindi Pakhwara at DRL, Tezpur

KANNADA RAJYOTSAVA CELEBRATION

65h Kannada Rajyotsava was celebrated at Defence Food Research Laboratory (DFRL), Mysuru on 12 November 2020 to commemorate the formation of Karnataka State. Mrs Suma Rajkumar, Kannada Artist (Ventriloquist), Mysuru was the Chief Guest. Dr Anil Dutt Semwal, Director, DFRL presided over the function. The function began with lighting of lamp, singing of Nada Geete (Kannada Anthem) and offering flowers to goddess Bhuvaneshwari.

Dr Rudrgoud P, Secretary, Welfare Committee welcomed the guest and audience. Mrs Rajkumar, in her speech touched upon the history of Rajayotsava, its importance and expressed her happiness about services offered by DFRL to the nation. The programme ended with vote of thanks from Shri Madhukar, TO 'A', Member, Welfare Committee.

Inaugural of Kannada Rajyotsava at DFRL

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