

AERO INDIA 2021

DRDO HANDS OVER LICENSING AGREEMENT OF 14 TECHNOLOGIES TO 20 INDUSTRIES

Low Level Transportable RADAR (LLTR) - Ashwini

DRDO Lab: LRDE, Bengaluru

ToT recipient Industry:

M/s Bharat Electronics Ltd, Ghaziabad

Salient Features:

Ground based Surveillance RADAR
Multifunctional multi-mode R
Rotation and Modes of C
Distributed Active Phased with Digital Forming



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DRDO HANDS OVER LICENSING AGREEMENTS FOR TRANSFER OF TECHNOLOGY FOR 14 TECHNOLOGIES TO 20 INDUSTRIES

DRDO participated in the 'Bandhan' ceremony at Aero India 2021 in Yelahanka, Bengaluru on 5 February 2021 to enhance cooperation and synergy between industry and Government organisations. Raksha Mantri Shri Rajnath Singh, Chief of Defence Staff General Bipin Rawat, three Services Chiefs, Secretary Department of Defence R&D and Chairman DRDO Dr G Satheesh Reddy and Secretary (Defence Production) Shri Raj Kumar along with other senior officials from Ministry of Defence & Karnataka Government and industrialists from entire country were present in the programme. The documents of ToTs were handed over by the DRDO laboratories to the industry.

In his address, Raksha Mantri said, Bandhan exemplifies the spirit of 'public-private partnership' and that the fountain head of any capability emerges from its foundation and the foundation of our vision rests on three pillars namely, research and development, public and private defence production and defence export. He mentioned that with an aim of encouraging the manufacture of defence related items in India, our endeavour will remain to bring down the defence imports by at least two billion dollars by 2022.

The DRDO handed over Licensing Agreements for ToT (LAToT) for 14 DRDO developed



RM Rajnath Singh addressing the gathering (top) and ToT of Prachand Anti-tank Ammunition

technologies to 20 industries. The technologies transferred are from the area of electronics, laser technology, armaments, life sciences, materials science, combat vehicles, naval systems, aeronautics, sensors, etc. The

product technologies transferred are Low Level Transportable Radar (LLTR), Inertial Navigation System for Ship Application (INS-SA), Long Range Optical Target Locator (OTL 1500), Hand Held through Wall Imaging Radar



(HH-TWIR), and Commander TI (Thermal Imager) Sight for T-72 Tank.

NMRL-Fuel Cell based Air Independent Propulsion Technology for Naval Submarines is a unique capability developed by DRDO and now transferred to the industry. Multi Agent Robotic System (MARS) will be produced by Indian industry based on DRDO design.

Shri Rajnath Singh also stated that the order of 83 LCA Tejas MK1 worth over Rs 48,000 crore will give a big boost to

defence manufacturing specially to the aviation industry. He highlighted that the negative list of 108 items for import is also meant to provide opportunity to the domestic manufacturing sector to strengthen their base and contribute to Aatmanirbhar Bharat.

Many armament systems, namely 155 mm X 52 Cal Advance Towed Artillery Gun System (ATAGS), Mechanical Mine Layer—Self Propelled (MML-SP) and Prachand Anti-Tank Muniton were handed over to

the industry for production. Other technologies that were transferred for production by Indian industry included: Individual Under Water Breathing Apparatus, Basic WhAP 8x8 and Add-on Armour for WhAP and 4 MW Diesel Engine Infrared Signature Suppression System. An MoU was exchanged between DRDO and HAL to cooperate and finalize the aspects of ToTs of Uttam AESA Radar for new LCA configurations and new generation Radar Warning Receiver (RWR-NG).



Transfer of Technologies by DRDO

DRDO EXHIBITS ITS LATEST TECHNOLOGIES AND SYSTEMS AT AERO INDIA 2021

DRDO exhibited its latest defence technologies and demonstrated many systems during the 13th edition of Aero India International Air Show held at Air Force Station Yelahanka, Bengaluru during 3-5 February 2021. Hon'ble RM inaugurated the DRDO Stall on 3 February 2021. Aero India is a platform for aerospace enthusiasts, prospective defence industries, aspirant start-ups and all other stakeholders to participate and witness the advances in global defence and aerospace fields and interact with many national and international delegations and industries.

The DRDO is developing technologies for all major defence domains and has been participating in this exhibition in a big way in all its editions. The Organisation with its vast defence design and development capability has been working towards Atmanirbhar Bharat and has taken up many policy initiatives to work closely with all stakeholders of the ecosystem. More than thirty laboratories of DRDO connected to aeronautical development are exhibited their products and technological achievements in the mega event.

More than 300 products, technologies and innovations were presented in indoor, outdoor, static and flying displays. The models and exhibits were shown in various technology categories; thrust was on digital display of data to highlight the product details. The major attraction



RM Shri Rajnath Singh inaugurating DRDO Stall

of DRDO's participation in the event was the flying display of Airborne Early Warning & Control (AEW&C) System, Light Combat Aircraft (LCA) Tejas and LCA Navy. LCA Navy was on tarmac for static display also. The highlights of indoor systems included: Combat Free Fall System, models of Advanced Medium Combat Aircraft (AMCA), Abhyas—High Speed Expendable Aerial Target, Twin Engine Deck Based Fighter (TEDBF), FCS System for LCA and Aerostat Systems. The displays also included Nirbhay Missile, P-16 Heavy Drop System, AWACS India Aircraft Model, Kaveri Dry Engine Prototype, Gas Turbine Blade and Pilotless Target Aircraft Engine (PTAE), etc. Titanium sponge, being developed for the aircraft carrier INS Vikrant, was shown in the materials category along with other important products for aeronautics applications.

Among the engineering products, the exhibits included: Aircraft Mounted Accessory Gear Box (AMAGB), AWAGB Bearing, MRSAM Launcher and Two-stroke single/double/four-cylinder engines for UAVs, etc. The armament-related products were 250 kg Pre-fragmented Bomb, 450 kg HSLD Bomb, INS GPS Guidance Kit for 450 kg HSLD Bomb, missile warhead models of Astra, Helina, Canopy Severance System (CSS) for Tejas Aircraft, and IR flare for PTA.

Among the missiles, full scale models of various Surface-to-Air missiles like LRSAM, QRSAM, Air-to-Air missile Astra; Next Generation Anti-Radiation Missile NGARM and Smart Anti Airfield Weapon SAAW were shown. Besides the missiles, technology sub-systems like RF Seeker, IIR Seeker, Pinaka Guidance Kit, Model of Rail Track Rocket Sled



(RTRS) facility and exploder for naval warheads, etc., were also on display.

In the area of electronics and communications, various mission and radar computers, laser warning sensors, AEW&CS data links, various SDR models, lightweight portable laser target designator, radars and antennae were displayed. Integrated Life Support System, Emergency Survival Rations, NBC Suit Mk-5, Personal Decontamination Kit and other life sciences products

were shown.

Outdoor exhibits of DRDO included: ADFCR Radar Vehicle, ADTCR Sensor and Power Systems, Anti Drone System, QRSAM, Rustom-1, Mobile Launcher Vehicle, MARS, Akash, and Rudram (NGARM) missile among others.

For India Pavilion, keeping in view the theme of Rotary Wing Platforms, over 17 products applicable to helicopters were exhibited. The products included: Low Frequency Dunking Sonar

(LFDS) on Advanced Light Helicopter (ALH), helicopter launched torpedoes, Airborne Software Defined Radio, Radar for Naval Utility, Lightweight Electro Optical Payload (LEOP), Dual Colour Missile Approach Warning System (DCMAWS), and Digital RWR. Dummies of rotary wing platforms included IFF Mk XII, Combat Search & Rescue (CSAR), Heli-Net, SANT Missile and NASM-SR.

DRDO Exhibits at Aero India 2021



LCA Tejas at tarmac (top). Akash surface-to-air missile (bottom left) and Next Generation Anti-Radiation Missile NGARM

DRDO Exhibits at Aero India 2021



Clockwise from top left: Mock up Advanced Medium Combat Aircraft (AMCA); Smart Anti Airfield Weapon (SAAW); Combuster Liner and Compressor Drum; Nose Landing and Main Landing Gears, Tandem Combat Free Fall System, Heavy-weight Torpedo Varunastra and BrahMos Missile System

Distinguished Guests at DRDO Stall



Clockwise from top left: Hon'ble President Shri Ram Nath Kovind; Hon'ble RM Shri Rajnath Singhw; Chief of the Air Staff ACM RKS Bhaduria; Vice Chief of the Army Lt Gen CP Mohanty; Chief of the Naval Staff Admiral Karambir Singh and Chief of the Defence Staff Gen Bipin Rawat

Meetings with the International Delegations



Meetings with the foreign delegations



DRDO ORGANISED INTERNATIONAL SEMINAR ON ENERGISING R&D CAPABILITIES TOWARDS ATMANIRBHAR BHARAT

An International Seminar was organized by DRDO on 4 February 2021, during Aero India at Yelahanka, Bengaluru. The theme of the seminar “Energising the R&D Capabilities of Industry for Atmanirbhar Bharat”, focused on various existing and new initiatives needed for enabling industry to become self-reliant in defence systems. Secretary DDR&D and Chairman DRDO, Dr G Satheesh Reddy presided over the seminar. Defence Secretary Shri Ajay Kumar delivered a special address.

The seminar was preceded by DRDO-Industry synergistic interaction where aerospace professionals from across the globe shared their ideas, views and opinions for promoting self-reliance in aerospace and defence sector. The industries were exposed to the latest policy initiatives, sustained engagements, intense technology transfers and test facility support provided to them by DRDO, which will enhance their technological capabilities substantially. Information was also shared regarding the initiatives of DRDO

for R&D funding to industry under Technology Development Fund (TDF) and free use of DRDO patents.

There was full spectrum coverage on the topic, right from the Government to Private Industries, including MSMEs, start-ups and foreign industries. In an invigorating talk on various aspects of Atmanirbhar Bharat, DRDO’s perspective was elaborated by Shri GN Rao, Director General (Production Coordination & Services Interaction), DRDO. The start-up perspective was covered by a young



Secretary Department of Defence R&D and Chairman DRDO addressing the participants

entrepreneur, Shri Karan Garg, Director, M/s Raphe mPhibr Pvt Ltd, Greater Noida. MSME perspectives were elaborated by Dr Arvind Patel, MD & CEO, M/s Sahajan and Laser Technology Ltd, Gandhinagar, Gujarat and Shri Sachin Agrawal, CMD, M/s PTC Industries, Lucknow.

Shri MV Gowtama, CMD, M/s BEL Bengaluru, highlighted DPSU viewpoints of R&D in defence manufacturing. Shri Baba Kalyani, CMD, M/s Bharat Forge Ltd, Pune explained the points of industry, which are important for energizing defence R&D in Indian industry. Foreign OEM perspectives were elucidated by Mr Emmanuel de Roquefeuil, VP and Country Director, M/s Thales. The talks were followed by an open house in which constructive suggestions were submitted and debated. A suggestion from user was a request for funding opportunities and mentoring by DRDO right up to tying up with users. Other suggestions were component level manufacturing capability,



Secretary Defence speaking at DRDO Seminar

IT incentives for R&D, need to cut down on elaborate trial schedule through simulation analysis and third party certification.

The Defence Secretary in his address stated that R&D is the most important pillar of self-reliance. He said that India is the most attractive R&D centre and the world has faith in our capabilities. He spoke about the list of 108 defence items identified by DRDO for local production by the industry to achieve self-reliance in the defence sector. He encouraged

and challenged the industry to take up this wonderful opportunity and make the country self-reliant. He also praised DRDO for leading from the front in fighting the COVID-19 pandemic and developing various technologies.

Dr Satheesh Reddy spoke about the initiatives undertaken by DRDO for providing support to industries and said that ideas are welcome which can further the R&D prospects in the country. He spoke about the way forward and how the industry can be encouraged to come out with production of

the state-of-art weapon systems. He further said that Atmanirbhar Bharat in true sense means having the design, development and production capabilities. He stated that getting ideas from industry is important and getting the products inducted is also an important aspect.

The seminar was attended by 100 participants and more than a thousand participants in virtual mode. There was a live streaming of the seminar as well.

RAKSHA MANTRI RELEASES DRDO DOCUMENTS & PROCEDURES AT AERO INDIA 2021

Raksha Mantri Shri Rajnath Singh released the Export Compendium of DRDO, which consists of defence systems and platforms, which can be exported to friendly countries at Aero-India 2021 on 3 February 2021. A major revision of Design, Development

& Production of Military Airborne Stores (DDPMAS) document was also released. DDPMAS document is followed by the aeronautics fraternity for design, development, production and certification of airborne systems. The new airworthiness framework emphasizes on Atmanirbhar Bharat

for self-reliance, empowering the organisations and industries with liberal certification procedures. The document released by the certification agency CEMILAC would enable Defence PSUs, MSMEs and R&D Establishments to develop and deliver world class products to our Defence Services.



Commemorating the Golden Jubilee of the Aeronautical Research & Development Board (AR&DB), RM released a Stamp and a book on the journey of AR&DB's contributions to the field of aeronautics. The book highlights the major achievements of AR&DB since its formation. The AR&DB was constituted by DRDO in 1971 to promote research and take India towards self-reliance in aeronautics.

Raksha Mantri also released a DRDO Monograph "Radiance in Skies – The Tejas Saga" during the function. The monograph authored by Air Marshal P Rajkumar (Retd) and Shri BR Srikanth highlights the interesting journey of DRDO's Light Combat Aircraft Tejas.

Addressing the scientists, aerospace professionals and industrialists present at the function, Raksha Mantri complimented DRDO for multiple initiatives undertaken to enhance the technological capabilities of the Indian industry and playing a significant role in making the country Atma Nirbhar in the area of defence manufacturing. He said that technologies being developed by DRDO are continuously transferred to industries, making them confident to produce indigenous defence systems. He further said that release of the Golden Jubilee Stamp of AR&DB shows the long R&D path travelled by DRDO in partnership with Indian academia in the area of

aeronautics. He also said that export compendium released today will further enhance the strategic partnership with friendly countries and make India a major player in the global defence market.

Chief of Defence Staff General Bipin Rawat, Air Chief Marshal Rakesh Kumar Singh Bhaduria, Chief of Army Staff General Manoj Mukund Naravane, Secretary DDR&D Dr G Satheesh Reddy, Secretary Defence Production Shri Raj Kumar, Dr Tessa Thomas, Director General (Aeronautical Systems), DRDO and Chief Postmaster General Ms Sharda Sampath were present at the function, which was presided over by Hon'ble Raksha Mantri.



Clockwise from top: Release of DDPMAS, AR&DB Golden Jubilee Stamp and DRDO Monograph Radiance in Skies – The Tejas Saga

SUCCESSFUL MAIDEN TEST LAUNCH OF AKASH-NG MISSILE

DRDO conducted the successful maiden launch of Akash-NG (New Generation) Missile from Integrated Test Range off the coast of Odisha on 25 January 2021. Akash-NG is a new generation Surface-to-Air Missile developed for Indian Air Force with an aim of intercepting high manoeuvring low RCS aerial threats.

The missile intercepted the target with text book precision. The launch met all the test objectives by performing high manoeuvres during the trajectory. The

performance of the Command and Control system, onboard avionics and aerodynamic configuration of the missile was successfully validated during the trial. During the test launch, entire flight path of the missile was monitored and the flight data was captured by various Range instruments such as Radar, EOTS and Telemetry systems deployed by ITR, Chandipur. The Multi Function Radar was tested for its capability of integration with the system.

The Akash-NG system has been developed with better

deployability compared to other similar systems with canisterised launcher and much smaller ground system footprint. The test launch was carried out by a combined team of DRDO, BDL & BEL in the presence of the representatives of Indian Air Force.

Raksha Mantri Shri Rajnath Singh congratulated the scientists from DRDO, BEL and Indian Air Force for the achievement. Secretary DDR&D and Chairman DRDO Dr G Satheesh Reddy also praised the team for the successful flight trial of Akash-NG.





DRDO AND IISC SIGNS MOU FOR JOINT ADVANCED TECHNOLOGY PROGRAMME

DRDO signed a Memorandum of Understanding (MoU) with Indian Institute of Science (IISc) Bengaluru on 8 February 2021 for creation of JATP–Center of Excellence (JATP-CoE) in the premises of IISc to expand the scope and objective of existing Joint Advanced Technology Programme. Dr G Satheesh Reddy, Secretary DDR&D & Chairman DRDO and Prof. Govindan Rangarajan, Director, IISc signed the MoU at a virtual event held in DRDO Bhawan, New Delhi.

The JATP-CoE located in the campus of IISc will enable directed basic and applied research and engage with premier research institutes through multi-disciplinary and multi-institutional collaboration. The focused research efforts at the centre will lead to realization of indigenous technologies in the

critical areas to develop state-of-the-art technologies.

As per the MoU, DRDO will support JATP in equipping it with advanced and unique research facilities that will enable the faculty and scholars to conduct advanced research. DRDO will facilitate advanced research to utilize technology outcome in the futuristic applications. DRDO scientists and engineers will work with the academic research faculty and scholars in addressing challenging scientific problems to find an innovative solution in Advanced Aerospace Systems and Materials, High Temperature Materials, Micro and Nano Systems, Artificial Intelligence and Robotics, Quantum Technologies, etc. JATP-CoE may also involve other premier institutions in the country in research based on their R&D strengths.

In his address, Dr Satheesh Reddy said that the JATP was created by Late President of India Dr APJ Abdul Kalam in 1983 while leading IGMDP Programme, where the DRDO scientists actively collaborated with the faculty of IISc to work on various missile technologies. He further emphasized on expanding research activities for defence and security by incorporating the future technology requirements of other DRDO technology clusters and associated laboratories. He also briefed about the long term research and technology development at the other Center of Excellences created by DRDO at various academic institutes.

Director IISc appreciated DRDO's decision of expanding the JATP-CoE and assured active involvement of IISc in development of futuristic technologies.

MOD & BEL SIGN CONTRACT FOR PROCUREMENT OF SDR (TACTICAL) WORTH OVER RS 1,000 CR

Ministry of Defence and Defence Public Sector Undertaking (DPSU) Bharat Electronics Limited (BEL) signed a contract for procurement of Software Defined Radio Tactical (SDR-Tac) worth over ₹ 1,000 crore in New Delhi on 8 February 2021.

The SDR-Tac, jointly designed and developed by

Defence Electronics Applications Laboratory (DEAL), DRDO through a consortium of domestic agencies and industry, comprising Weapons and Electronics Systems Engineering Establishment (WESEE), BEL, Centre for Artificial Intelligence & Robotics (CAIR), DRDO and Indian Navy, will bring strategic depth to the Armed Forces. The delivery will

take place within three years. The BEL is already supplying SDR-Naval Combat (NC) to the Indian Navy. SDR-Air is under user evaluation trial.

DRDO and BEL are planning to provide latest SDR with security grading to the Armed Forces. The SDR-Tac is a four channel multi-mode, multi band, 19" rack mountable, ship-borne

Software Defined Radio system. It is intended to serve ship-to-ship, ship-to-shore and ship-to-air voice and data communication for network centric operations. It supports simultaneous operation of all the four channels covering V/UHF and L Band. This SDR system houses multiple types of waveforms for narrow band and wide band applications. The MANET waveforms are available in UHF and L Band to support ad hoc networking feature for net centric operations.

The Armed Forces are in need of transition from the single purpose radio of the past to more flexible SDRs to serve most of their wireless communication needs. These SDRs will be backward compatible with existing Indian radios. Different Service groups require different form factor radios for



specific platforms and waveforms/applications. The SDRs allow use of common waveform/application implementation methods for

different form factors. They also allow implementation of futuristic waveforms on the same hardware using software programmability, thus ensuring longer life and savings on cost.

A key factor of SDRs is software programmability, which allows easy changes of the radio's fundamental characteristics like modulation types, operating frequencies, bandwidths, multiple access schemes, source and channel coding/decoding methods, spreading/de-spreading techniques and encryption/decryption algorithms. Traditional hardware-centric radios require hardware changes to modify these fundamental characteristics. Multiple types of radio equipment can be replaced with multi-mode, multi band, multi-role SDR's of suitable form factors.

DRL INKS MOU WITH DARRANG COLLEGE

Defence Research Laboratory (DRL), Tezpur signed a Memorandum of Understanding (MoU) with Darrang College, Tezpur in order to promote cooperation in scientific education and research, especially the project work of PG students at DRL. The MoU was signed by Dr SK Dwivedi, Director, DRL and Dr Joysankar Hazarika, Principal, Darrang College on 7 January 2021.

The MoU would enable the utilization of each other's strengths in teaching and research, in term of collaborative research work of mutual interest, sharing of laboratory facilities, library facility and opportunities for students in



Exchange of MoU between DRL and Darrng College

pursuing their academic projects etc., which in turn, will mutually

benefit the students, faculties and scientists of both institutes.

DRDO SHOWCASED ADVANCED INDIGENOUS DEFENCE TECHNOLOGIES AT REPUBLIC DAY PARADE 2021

Delivering on its mandate of development of state-of-the-art defence systems, DRDO showcased two major achievements of the year—LCA Navy take off and landing onboard the aircraft carrier and complete family of Anti-Tank Guided Missiles in the Republic Day 2021.

LCA Navy has achieved a major technology capability milestone by landing and taking off from the Aircraft Carrier of IN. The LCA Navy tableau exhibited the successful demonstration of carrier operations of LCA Navy from INS Vikramaditya on sea. The tableau of LCA Navy shows landing, take-off and lift operation, three most important operations required to be met by an aircraft onboard a carrier ship. LCA Navy successfully demonstrated landing on a 90 meters runway and take off from short run of 145 meters in 2020. LCA Navy is India's first 4+ Generation STOBR (Ski-Jump Take Off But Arrested Recovery) fighter aircraft. Cdr Abhishek C Gawande of Indian Navy lead the tableau.

Symbolizing India's strides in anti-tank missile technologies, the second DRDO tableau exhibited the full complement of DRDO's Anti-Tank Guided Missile (ATGM) Systems. NAG, helicopter launched ATGM HELINA, Man portable ATGM (MPATGM), Stand-off Anti-Tank Missile (SANT) and Laser-Guided ATGM for MBT



DRDO tableau showcasing anti-tank guided missiles (top) and LCA Navy

Arjun were the main attraction of the tableau. The ATGM tableau was represented by Shri Shiladitya Bhowmick, Scientist 'D', a young scientist of DRDL, Hyderabad.

NAG is a 3rd generation fire and forget missile developed for mechanized formations to engage heavily fortified enemy tanks. HELINA is a 3rd generation fire

and forget missile, with a range of 7 km, has been designed and developed for integration on weaponised version of Advanced Light Helicopter (ALH). MPATGM has a range of 2.5 km with fire and forget and top-attack capabilities for infantry use. SANT is being developed for launch from Mi-35 helicopter of IAF for anti-tank operations. ATGM for MBT Arjun is a laser guided Precision Guided Munition, which is launched from the 120 mm rifled gun of Arjun tank to engage and defeat ERA protected armoured targets.

Model of LCA Tejas was also part of IAF tableau and adorning the Ministry of Information and Broadcasting representing the theme 'Vocal for Local'. Other DRDO products on Rajpath were Akash surface-to-air and Astra air-to-air missiles on IAF tableau.

The following DRDO labs also celebrated Republic day at their respective places.

ITR, CHANDIPUR

The 72nd Republic Day was celebrated in Integrated Test Range (ITR), Chandipur premises on 26 January 2021 with hoisting of National Flag by Shri HK Ratha, Director, ITR, followed by national anthem. Director, in his address appreciated the officers, staff and their families and contributions done by Military Wing, DSC Jawans and Home Guard round the clock to safeguard the sovereignty of ITR and Missile Complexes. He also highlighted the importance of our constitution in our day-to-day life for peace, harmony and integrity. Strengthening of health



Republic Day Celebration at ITR

care for ITR employees, extension of Health Care Centre, a special care unit inaugurated on this occasion. Enhancing the security system of ITR, Access Control and Control Room and Missile Park, showcasing the world of missiles also inaugurated during the celebration.

Tree plantation was carried out to mark green and clean ITR campaign. About 200 officers and staff of the establishment attended the programme. The programme was conducted by Shri CG Subudhi, Sc 'F', Chairman Republic Day Celebration Committee and his team.

CAIR, BENGALURU

Dr Upendra Kumar Singh, OS & Director, Centre for Artificial Intelligence & Robotics (CAIR) hoisted the national flag and addressed the gathering. In his address, Director, CAIR highlighted about the importance

of our constitution, fundamental duties and responsibilities. In addition, he also mentioned the recent achievements of CAIR in various projects and goals for year 2021. Director, CAIR distributed lab-level, welfare and sports prizes to the winners.

NMRL, AMBERNATH

The celebrations at Naval Materials Research Laboratory (NMRL) commenced with hoisting of National Flag by Dr M Patri, Director, NMRL. He motivated the gathering through his talk especially young scientists for taking up projects in exigent and challenging fields that will augment the capability and readiness of our Armed Forces with cutting edge technologies.

In his address, he also laid strong emphasis on punctuality, promptness, cleanliness and teamwork for the success of ongoing NMRL projects.

NSTL, VISAKHAPATNAM

Naval Science and Technological Laboratory (NSTL) celebrated the 72nd Republic Day with patriotic fervour. Unfurling the tricolour, Dr OR Nandagopan, OS & Director NSTL, paid rich tributes to the builders of our nation, and recalled the sacrifices made by the brave men and women in India's fight for freedom. He exhorted the NSTL fraternity to draw inspiration from their deeds, and to give their best in developing the best systems for the user, Indian Navy. Smt Lalitha Nandagopan, first lady of NSTL and President NSTL Mahila Kalyan Manch handed over assistance to deserving students of schools in Visakhapatnam. Officers and Staff of NSTL participated in the programme.



Flag hoisting at NSTL and NMRL on Republic Day

NSTL CELEBRATES 51ST RAISING DAY

Naval Science & Technological Laboratory (NSTL), Visakhapatnam celebrated its 51st Lab Raising Day on 8 January 2021. NSTL is one of the premier naval labs of DRDO engaged in the development of underwater weapons and systems. Chief Guest of the function was Dr G Satheesh Reddy, Secretary, DDR&D & Chairman DRDO. Vice Admiral Kalidoss Srinivas, AVSM, NM, VSM, PD (SBC) and Dr Samir V Kamat, DG (NS&M), DRDO were the Guests of Honour. Smt DR Rajeswari Devi, Sc 'G' and Chairperson Lab Raising Day celebrations gave welcome address and detailed the various activities carried out to celebrate Raising Day.

Participating through video conference, Dr G Satheesh Reddy

described NSTL as a vibrating lab and appreciated the team members who went to Ulan and succeeded in heavy-weight torpedo trials. He assured that utmost importance is being given to the issues of employees and at the same time expected more productivity from them. He expressed his faith that NSTL will become one of the best naval labs in the world and would be followed in the nearby future.

Vice Admiral Kalidoss Srinivas explained the 50-year journey of NSTL and its association with Indian Navy. He appreciated NSTL for giving importance to the user requirements and congratulated NSTL for becoming one-stop solution in research & development of underwater weapons and marine vessels.

Dr Samir V Kamat (participated through video conference) congratulated NSTL and suggested to keep timeline in the futuristic projects and asked to focus on new generation technologies and systems. He further exhorted NSTL to introduce cutting-edge technologies like artificial intelligence and machine learning in the products and systems.

In his address, Dr OR Nandagopan, OS & Director, NSTL detailed various achievements of the lab over the past year, and also the progress on the innovative technologies to meet futuristic requirements. He congratulated NSTL fraternity for showing consistent improvement in sea-trials, in particular the team members who went to

Ulan and succeeded in heavy-weight torpedo trials. He also thanked all the officers and staff for their support during COVID-19 lockdown and keeping the critical projects going. He specially mentioned the services rendered by the members of NSTL Civil Employees Union and other employees who distributed food packets to the needy people during lockdown period. Keeping in view the COVID-19 guidelines,

the laboratory organized Banner Competition and Talent Hunt Competition for the officers and staff. Prizes to the winners of these competitions were given away by Vice Admiral Kalidoss Srinivas. Meritorious employees were also awarded various laboratory-level DRDO Awards, Special Awards Director's Commendation for Civil, Services as well as Defence Security Corps personnels and the Best Library User.

Dr Manu Korulla, Sc 'G' & Chairman Works Committee; Sri Ch. VSN Murthy, JCM Staff side Leader & President, NSTL Civil Employees Union; Sri Ch Chandrasekhara Rao, Vice President, NSTL Civil Employees Union; Sri Hemant Bais, Secretary Works Committee; Senior Scientists; Officers and Staff of NSTL extended their full cooperation to the programme.



Meritorious employees with Director, NSTL at NSTL Lab Raising Day

PXE ORGANISES BLOOD DONATION CAMP

On the 73rd Army Day on 15 January 2021 a Blood Donation Camp was organised at Proof & Experimental Establishment (PXE), Chandipur under the aegis of Red Cross Blood Bank Society Balasore. The camp was inaugurated by Shri DK Joshi, Sc 'G', Director, PXE, who urged employees to come forward for the noble cause. During the camp 101 units of blood was collected, 11 people registered for eye donation and five people for organ donation. A Certificate of Appreciation and Voluntary Blood Donor Identity Card were issued to the donors.



Blood donation camp at PXE



DRL ORGANISES SKILL DEVELOPMENT PROGRAMME

A one-day skill development programme on “Oyster Mushroom Production” was conducted by Defence Research Laboratory (DRL), Tezpur at 17 Maratha Light Infantry on 29 January 2021. A total of 33 army personnel (JCOs and ORs) attended the training programme.

Participants were informed in detail about the nutritional benefits of mushrooms, their economic importance as an alternative source of income and stepwise cultivation methodology of mushroom.

As a part of practical demonstration and execution, participants prepared mushroom bags under the supervision of DRL team. Sixty mushroom bags, each weighing 2.5 kg, were prepared by

army personnel. The participants were thoroughly explained about the micro points to be remembered during mushroom bag preparation, incubation and harvesting. Kit and mushroom technology calendar were distributed to each Participant. Team DRL was led by Shri Vijay Pal, TO ‘A’, Shri NJ Kalita, Tech ‘C’ and Shri Balaram Das, ALS-I.

DRL also conducted training on Organic Farming in Thembang, Mukuthing and Namsu villages in West Kameng district of Arunachal Pradesh. During training, judicious use of fertilizers and pesticides were highlighted and organic farming techniques and organic certification processes were discussed. Ten farmers were selected for demonstration of organic farming techniques in fruit

production.

DRL also organised a day long training on Bamboo-based Skill Development at DRL R&D Centre, Salari, West Kameng, Arunachal Pradesh on 27 January 2021 for local youths and SHGs of Salari village. Mrs Neera Sarmah, Design Consultant, and known as the ‘Bamboo Lady of India’ acted as a resource person and conducted hands-on training on various techniques for preparation of different handicrafts and other utility products from bamboo. A total of 30 participants from Salari village attended the workshop with great interest. She urged the local youths to establish bamboo based cottage industry, for which, she assured buy back scheme as well. Dr SK Dwivedi, Director, DRL, appreciated the workshop.



Participants at Oyster Mushroom Production programme conducted by DRL, Tezpur

STEERING COMMITTEE MEETING

Thirty-first Steering Committee Meeting on Warship Materials Technology was held at Naval Materials Research Laboratory (NMRL), Ambarnath on 28 January 2021 through video conferencing to approve the recommendations made for various ongoing project activities during Working Group Meeting. The meeting commenced with welcome address by Director, NMRL followed by introductory address by Dr SV Kamat, DG (NS&M). Chairman, V Adm. SR Sarma, PVSM, AVSM, VSM, COM in his opening address complimented NMRL for the



Steering Committee meeting at NMRL

support and assistance being rendered to IN. The Chairman highlighted the need for addressing field issues and early nomination of trial platform both by IHQ and NMRL. Chairman also congratulated NMRL for the successful endurance mode trials in AIP technology for submarine.

NPOL CONDUCTS INCREON-2021

Naval Physical and Oceanographic Laboratory (NPOL), Kochi organized a two-day training course titled INCREON (In-house Course for Retiring Employees of NPOL) during 6-7 January 2021, for the the calendar year 2021. Twenty-six employees along with their spouses attended the training course. INCREON is organized at NPOL every year to provide expert guidance to the retiring employees and to adapt them to the abrupt changes in life after retirement. The syllabus of the course is carefully prepared in consultation with domain experts and holistically addresses the social, psychological, financial, and physical issues post retirement. The course was inaugurated by Shri PV Jose, OS, and Officiating Director, NPOL.

The opening session by eminent psychologist Shri Vipin Roldant, comprehensively covered the socio-psychological aspects of retired life. The session was vibrant and refreshing which was evident from the enthusiastic involvement of the participants. Shri Rajesh Nambiar, Accounts Officer, NPOL, elaborated on the CGHS health schemes and Shri Mohith S, Senior Admin Officer, NPOL, explained on the PPO & Pensionary Benefits. This was followed by a session on Post Retirement Investment Plans by Shri Vivek Singh Jha, Chief Manager (Training), SBI. He explained the various investment options, benefits and also cautioned on the risks involved in some of the investment options.

The focus of the second day was on health, wellness and happiness.

Two eminent doctors, Dr PM Abdul Haleem, and Dr A Sreekumar took sessions on geriatric diseases and diet plan to be followed in old age. An experience sharing session by Shri NK Viswambharan, retired senior scientist, was an eye-opener. He narrated his personal experience, the risks involved in venturing into business without experience and domain expertise, the exciting options to be creative and active, without bothering about old age and loneliness. Dr Madhu H, HoD, Department of Safety, CUSAT presented a session on post retirement career opportunities. The session was very informative and he explained on career options specific to the different categories of retiring employees. The concluding session was on 'Inner Engineering' by Shri



K Mohanan, Sc ‘G’. He gave a lucid talk on happiness and inner peace. He held the audience through his simple analogies from daily life

and urged them to rediscover the innocence of childhood. INCREON ended on this session on happiness, with the participants promising to

conscientiously create their own ecosystem for happiness after retirement.



Participants at INCREON-2021

INFRA DEVELOPMENT

DFRL GETS FOOD PROCESSING FACILITIES

Director General (LS), DRDO, Dr AK Singh inaugurated Modern Food Processing Facilities at Defence Food Research Laboratory (DFRL), Mysuru on 11 January 2021. Dr AD Semwal, Director, DFRL was present on the occasion. The facilities comprise positive air pressure area for food processing, clean room facility for packaging of food, state-of-the-art food processing machineries such as semi-automatic chapati making machine, combi-oven, cooking mixture, bar making machine, retort food processing system,



Dr AK Singh inaugurating the Food Processing Facility at DFRL

fruits and vegetable washing and slicing machine, vacuum fryer, etc., with modern kitchen facilities and

access control units. The facility will be utilised for the production of food for the Gaganyaan mission.

VISITORS TO DRDO LABS/ESTTS

CAIR, BENGALURU

Lt Gen BK Respwal, VSM, Commandant, ASC College and Centre visited Centre for Artificial Intelligence & Robotics (CAIR) on 7 January 2021. Dr UK Singh, OS & Director, CAIR briefed the visitor about technologies in the area of Secure Systems, Command and Control Systems and Intelligent Systems and Robotics.

DIPR, DELHI

Air Vice Marshal H Bains, AVSM, VSM, Assistant Chief of Air Staff, Training, and Gp Capt H Page (Gp Capt PO-3) visited Defence Institute of Psychological Research (DIPR) on 5 February 2021. AVM overviewed the work and assignments being done by DIPR. He appreciated the work being done at DIPR.

HEMRL, PUNE

* Brig. AK Singh, SM, DDG Acquisition Tech (Army) visited HEMRL on 6 January 2021. He was briefed about High Energy Materials Research Laboratory (HEMRL) and simulation activities related to HEMs. He witnessed dynamic firing of 81 mm ATAL Smoke Grenade & static test of 40 kg Ballistic Evaluation Motor. He also visited ERA test facility.

* Maj. Gen. KV Jauhar, ADG, Army Design Bureau visited HEMRL on 8 January 2021. He was briefed about the activities of HEMRL. He also visited Exhibition Hall and took keen interest in the exhibits.



Lt Gen BK Respwal being briefed about CAIR activities



Air Vice Marshal H Bains being briefed about DIPR activities



Brig. AK Singh showing keen interest in Static Firing Set-up of Rocket Motor at HEMRL