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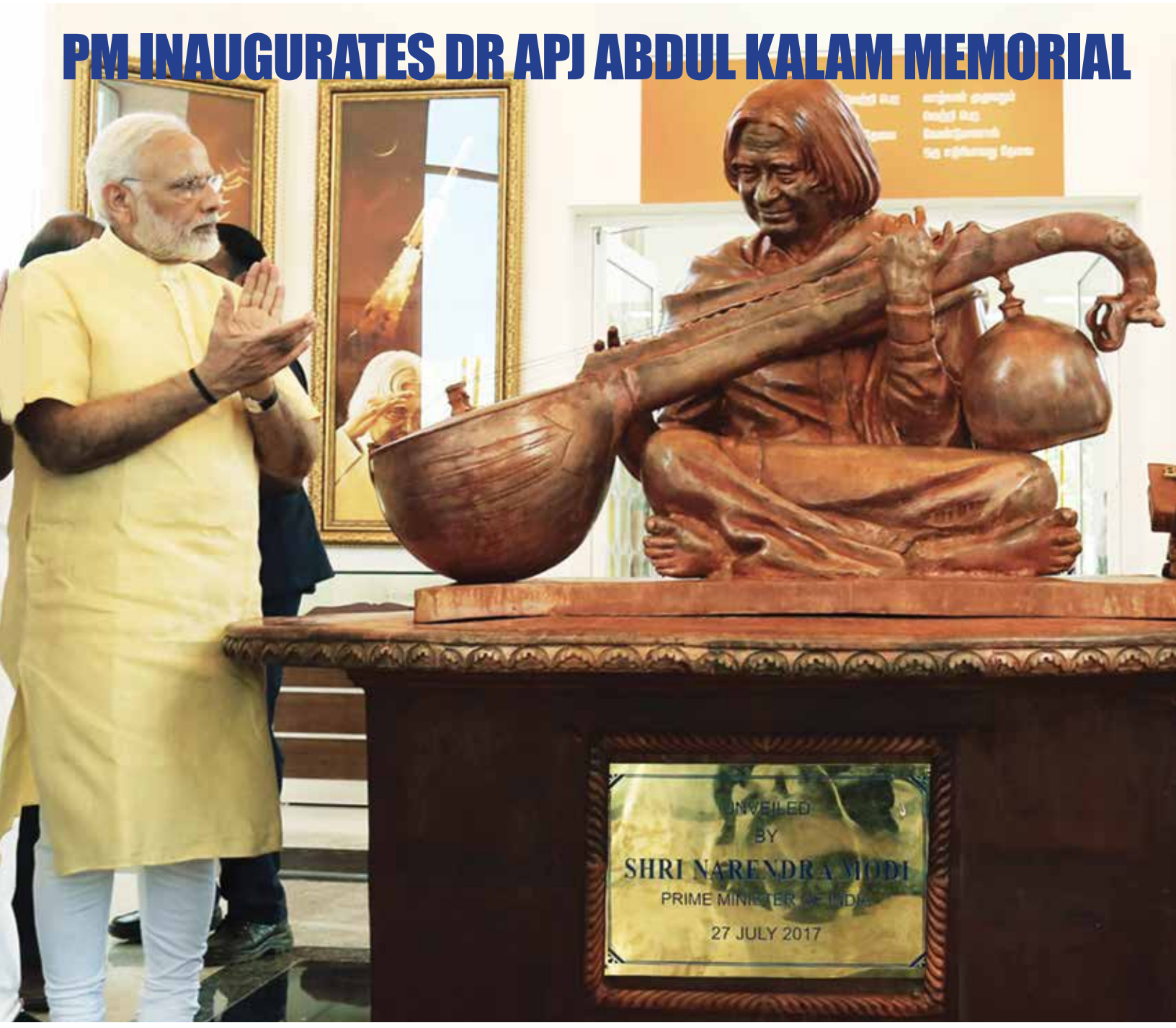
PM INAUGURATES DR APJ ABDUL KALAM MEMORIAL



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Defence Research & Development Organisation

FROM THE DESK OF THE CHAIRMAN

Dr S Christopher

CHAIRMAN
Defence Research & Development Organisation
&
SECRETARY
Department of Defence Research & Development

Dear friends,

Every organization inherits its heritage from its veterans who have given their best to upkeep the reputation and valour befitting it. Our organization boasts of some major achievements and technological advancements in the years gone by. “60 years” is a major milestone in our history and we have planned to commemorate this milestone with various activities as uploaded on DRDO website. Highlights of the events include a logo competition, tree plantation drives, robotics and unmanned systems exposition, movie with the theme “DRDO@60”, various exhibitions, seminars and lectures across the country, cyber challenge for youths and students, painting competitions among others.

The events can have arousing response with all of you participating whole heartedly to make it a grand success. It was encouraging to interact with the young scientist from labs in Delhi who gave a lot of innovative ideas to move forward in this direction. The cluster DGs gave a very positive response. I am sanguine that if we concentrate on meaningful participation for the grand success of ‘DRDO@60’, people at large will hold us in very high esteem for our achievements.

The month saw some major milestones of DRDO. Development Trials of Anti Tank Guided Missile ‘NAG’ were successfully completed along with the launcher system NAMICA. This has paved way for its User Trials and induction into the Indian Army. Similarly, 155 mm/52 caliber Advanced Towed Artillery Gun System (ATAGS) has also carried out the development trials successfully, achieving a maximum range of 48 km. Also, the mine trawl design was successfully validated against multiple full scale blast load trials of TNT. All these are proud moments for DRDO. My complements to all associated with these projects.

Friends, remember, “nothing is impossible”. We only have to focus on our goals to achieve the desired results. Together we can, and we will, make the difference.

Jai Hind

PM INAUGURATES DR APJ ABDUL KALAM MEMORIAL

Prime Minister Shri Narendra Modi inaugurated the former President Dr APJ Abdul Kalam's memorial designed and built by DRDO at Pei Karumbu, Rameswaram, on 27 July 2017.

The Prime Minister unveiled a statue of Dr Kalam, and offered floral tributes. He also interacted with the family members of Dr Kalam. PM flagged off 'Kalam Sandesh Vahini', an exhibition bus, which would travel across various States of the country and reach Rashtrapati Bhavan on October 15th the birth day of the former President.

Speaking on the occasion, PM Modi said, It is a great honour for me to touch this sacred soil of Rameshwaram. As home to one of the 12 Jyotirlingas, Rameshwaram is not only a religious centre, it is also a centre of deep spiritual knowledge. A place that was also visited by Swami Vivekanand on his return from the United States in 1897. And it is the sacred land that gave to India one of its most famous son Dr APJ Abdul Kalam.

The memorial has been constructed by DRDO in exactly one year. Architecturally, it has taken inspiration from several national landmarks. The front entrance looks similar to India Gate, while the two domes are on the lines of Rahstrapati Bhavan.

The memorial has four main halls each depicting the life and times of Dr Kalam. Hall 1 focuses on his childhood and educational phase, Hall 2 the Presidential days, including address to Parliament and UN Council, Hall 3 his ISRO and DRDO days and Hall 4 his post-Presidential days, till he breathed his last at Shillong.

There is a separate section to exhibit some of the personnel belongings of Dr Kalam, including his famous Rudra Veena, G-suit he wore during his Su-30 MK I flight and numerous awards he received. Twelve walls have been utilized for murals and paintings.

The entire area has been landscaped beautifully to reflect the peace and harmony, an aspect of Dr Kalam's personality.

Hon'ble Prime Minister unveiling Dr Kalam's statue (top) and with Dr Kalam's family

LASTEC DEVELOPS KW CLASS SINGLE MODE CW FIBER LASER TECHNOLOGY

Laser Science and Technology Centre (LASTEC), Delhi, has developed technology for kW class all-fibre spliced single mode Continuous Wave (CW) laser sources for defence applications. Unlike other lasers, fibre lasers do not use bulk optics and hence are rugged and free from misalignments during transportation and usage. Multiple pressure and temperature sensors have been employed for online monitoring of health and control of the laser power. LASTEC along with Indian industry has upgraded the technology by using higher performance and integrated devices to realise compact, lightweight, military grade kW class single mode CW laser sources. India has become one of the few countries having capability of indigenous laser sources of indicated performance.

USER TRIALS OF 120 MM FSAPDS MK-II AMMUNITION COMPLETED SUCCESSFULLY

The 120 mm Fin Stabilized Armour Piercing Discarding Sabot (FSAPDS) Mk-II ammunition developed by ARDE, Pune, for the rifled gun of MBT Arjun was successfully tested (Phase I to III) by the user at PXE, Balasore. The lethality, toxicity, safety and consistency of the ammunition were successfully established during the trial. Phase IV and V of user trials were conducted at PFFR Pokhran during 3-13 July 2017. Critical parameters of consistency and accuracy were achieved as specified in the QR during these trials. Achievement of a greater depth of penetration of 500 mm in 230 mm RHA plate by the 120 mm FSAPDS Mk-II ammunition will lead to improved fire power of MBT Arjun.

ARDE has pioneered the indigenous design and development of FSAPDS ammunition, which serves as the primary kinetic energy anti-tank ammunition of MBT Arjun. It comprises a high density, long rod tungsten alloy penetrator with a tail unit for in-flight stability. 120 mm FSAPDS Mk-I ammunition is already under production.

DFRL TRANSFERS INSTANT IDLI SAMBAR MIX TECHNOLOGY

Defence Food Research Laboratory (DFRL), Mysuru, signed License Agreement for Technology Transfer of instant Idli Sambar Mix with M/s Jain Agro Food Products Pvt Ltd, Maddur, Karnataka. Dr Rakesh Kumar Sharma, Director, DFRL and Shri Ajay Kumar Jain, MD, Jain Agro Food Products Pvt Ltd, signed the agreements on 25 July 2017 in the presence of inventor Dr GK Sharma, Sc 'G', Dr AD Semwal, Sc 'G', Ms Padmashree A, TO 'B', Shri Govinda Raj, TO 'A' and Smt Neha Negi, STA 'B'.

CVRDE TRANSFERS AHSP OF AAT VEHICLE TO DGQA

The AHSP (Authority Holding Sealed Particulars) of Armoured Ambulance Tracked (AAT) vehicle developed by Combat Vehicles Research and Development Establishment (CVRDE), Chennai, were transferred to Controllerate of Quality Assurance (ICV), on 10 August 2017. Dr P Sivakumar, DS and Director, CVRDE, handed over the AHSP transfer certificate to Lt Gen Shamsher Singh, DGQA.

AAT vehicle has been designed for immediate medical care and speedy evacuation of battlefield casualties to the nearest hospital. It is equipped with latest medical equipment, viz., defibrillator/cardiac monitor, ventilator, suction apparatus, etc., and fitted with environment control system for cooling and heating in summer and winter. Besides two medical attendants, the vehicle can evacuate four structured patients or two structured patients and four sitting patients or eight sitting patients at a time. It can operate in all extreme terrains and has armour protection, ability to cross all obstacles and is amphibian.

AAT is in production at Ordnance Factory, Medak. Against the ordered quantity of 288 vehicles, 162 AAT vehicles have been delivered to the Indian Army.

ADRDE TRANSFERS BRAKE PARACHUTE SYSTEM TO OPF

Aerial Delivery Research and Development Establishment (ADRDE), Agra, a pioneer in design and development of state-of-the-art parachutes, transferred the technology to manufacture brake parachutes for LCA Tejas to Ordnance Parachute Factory (OPF), Kanpur, in a function held on 20 July 2017. Shri Debashish Chakraborty, OS and Director ADRDE handed over the documents pertaining to Transfer of Technology (ToT) to Shri GC Rout, IOFS, General Manager, OPF, Kanpur. The documents have been duly vetted by CEMILAC, Bengaluru.

The brake parachute for LCA Tejas is made of nylon and Kevlar material. The textile material used in the system has been developed as per ADRDE specifications and is available indigenously.

INTERNATIONAL DEFENCE COOPERATION

1ST MEETING OF INDIA-US JWG OS

The first meeting of Joint Working Group (JWG), Other Systems (OS), under the aegis of Indo-US Defence Technology and Trade Initiative (DTTI), was held during 3-4 August 2017 at Edgewood Chemical Biological Centre (ECBC), Aberdeen Proving Ground. The meeting was preceded by a facility visit to US Army Aviation and Missile Research Development and Engineering Centre (AMRDEC), Langley on 2 August 2017. The Indian delegation was led by Shri V Ashok Rangan, Outstanding Scientist, Aeronautical Development Establishment (ADE) and Co-Chair of JWG OS and had members from Indian Air Force and Embassy of India at Washington DC.

The US delegation was led by Dr Augustus Way Fountain, Deputy Assistant Secretary of the Army for Research and Technology and Co-Chair JWG OS with members from the Army Research Laboratory (ARL), US Department of Defence (DoD), AMRDEC, US Army Training and Doctrine Command (TRADOC), and US Embassy at New Delhi.

Topics of mutual collaboration were discussed in the areas of Unmanned Aerial Vehicles (UAV), Interceptors and other UAV defensive technologies. Both the countries will review the interest areas and share common and overlapping interests at the next JWG OS meeting to be held in India.

CAS CELEBRATES IDY

Centre for Advanced Systems (CAS), Hyderabad, celebrated International Day of Yoga (IDY) on 21 June 2017. Shri Navath Vittaleshwar, Yoga Master, provided important tips to the officers and staff of CAS, SSQ AG and BDL to perform simple yoga postures. Dr V Venkateswara Rao, OS and Director, CAS urged all to do yoga regularly to keep themselves healthy.

SASE EXTENDS SUPPORT TO NCC GIRLS MOUNTAINEERING EXPEDITION

Snow and Avalanche Study Establishment (SASE), HQ Manali, provided administrative and technical support to NCC girls mountaineering expedition team for expedition to Mount Ladaki Peak (17537') during 1st week of July 2017. Twenty NCC girl cadets, four officers and five other rank reached SASE HQ Manali on 24 May 2017 and was based at SASE field station, Solang for around one month for preparation and acclimatisation. During this period the team carried out number of treks viz. Jogni Fall (7382'), Anjani Mahadev Temple (12030'), Patalshu Peak (13451'), Marhi, Brighu Lake (14100'), Bakarthach, Lady Lake etc., before moving out to base camp for Mount Ladaki Peak.

HQ SASE provided all the assistance to the team during entire period of their training and main expedition. Shri Ram Singh, a mountaineer from HQ SASE, proved to be a great help in successful conduct of the expedition. Col. Dinesh Dikshit, OIC, HQ SASE, Manali, congratulated all the girl cadets and team members on successful completion of the expedition. The team leader Col. Shamsher Singh, appreciated SASE for whole hearted support to the expedition.

NPOL-VARUNA MERIT EVENING 2017

Naval Physical and Oceanographic Laboratory (NPOL), Kochi, organized NPOL-Varuna Merit Evening–2017 on 4 July 2017 to felicitate and honour the academic excellence of Bhavan's Varuna Vidyalaya (BVV), a joint venture of NPOL and Bharatiya Vidya Bhavan (BVB). Shri VS Shenoi, Chairman, School Management Council welcomed the gathering and highlighted the consistent academic excellence of BVV. Shri S Kedarnath Shenoy, OS and Director, NPOL, appreciated the stellar performance of the young achievers and stressed on the importance of approaching education in its true holistic spirit rather than in a narrow careerist view point.

Prof. MK Sanoo, Social Activist, renowned literary person, and Chief Guest of the function, presented trophies and merit certificates to the stream toppers and students who secured A1 in all subjects in the CBSE XII Board Examinations. He lauded the synergistic efforts of DRDO and BVV for the noble cause of education and emphasised on nurturing human values in students besides education. Shri E Ramankutty, Director, BVB, Kochi Kendra, enunciated rapport between NPOL and BVV as one of the reasons for the excellent performance of the school in all its activities. Smt K Usha, Principal, BVV, in her address congratulated the students for their success. Smt Sinchu P, Vice Chairman, SMC, proposed the vote of thanks.

DLJ CELEBRATES PROF. DS KOTHARI BIRTH CENTENARY

Defence Laboratory, Jodhpur (DLJ) organised Prof. DS Kothari Oration to pay tribute to its founder Prof. DS Kothari, the first SA to RM, for his outstanding contributions towards the growth of science and education in the country. This year's Prof. DS Kothari Oration was delivered by eminent scientist Prof. D Balasubramanian, DS and Director Emeritus, LV Prasad Eye Institute, Hyderabad, on 10 July 2017. Dr AK Singhvi, Honorary Scientist, JC Bose Fellow and Raja Ramanna Fellow, Physical Research Laboratory, Ahmedabad, presided over the function and Dr N Kumar, former Director and DRDO Fellow, DLJ, was the Guest of Honour on the occasion.

Dr SR Vadera, Director, DLJ, elucidated the contribution made by Prof. Kothari in the field of science and education. Dr AK Singhvi, in his

Presidential Address, talked about the challenges in technological development being faced in India. Dr N Kumar remembered Prof. Kothari's ideology, his passion for science and his humbleness.

Prof. Balasubramanian delivered his oration on "The Birth and Growth of Biotechnology in India". He started his oration with history of Biotechnology growth profile of India with the emphasis on translating basic research findings into improving the health from bench to bedside and elaborated the effective translation of results of biochemistry and intermediary metabolism. He also talked about the nutritive value of Indian foods and how to manage and prevent nutritional problems. He talked in detail about R&D in the treatment of various eye diseases like cataract, glaucoma, limbal stem cell deficiency and stem cell culture. He concluded his oration with discussions on some unanswered questions in the field of eye treatment.

"Utkrisht Sewa Samman" were conferred to meritorious employees in their respective fields of work on the occasion. Shri Ravindra Kumar, Associate Director and Chairman of the Organizing Committee proposed vote of thanks.

INS SAGARDHWANI COMPLETES 200 MISSIONS

Naval Physical and Oceanographic Laboratory (NPOL), Kochi and Southern Naval Command jointly organised celebration to mark the successful completion of 200 missions of INS Sagardhwani along with the ship's annual day on 7 August 2017 at Kochi. INS Sagardhwani, the marine acoustic research ship of NPOL, was commissioned on 30 July 1994 and is maintained by Indian Navy. The ship comprises a number of state-of-the-art scientific laboratories, and has provided a platform for conducting scientific missions related to the areas of interest and projects of NPOL. During the last two decades, the ship has covered the waters of Arabian Sea, Bay of Bengal and the Andaman Sea in the course of its scientific expeditions. The ship's missions have helped NPOL to understand the ocean environment and its relation to sonar performance. Thus the vessel has played a crucial role in ensuring competence and credibility in oceanographic experiments for the laboratory.

Dr KV Sanil Kumar, Group Director, Ocean Sciences, NPOL, welcomed the august gathering. Cdr Raj Davis, CO, Sagardhwani, presented the major achievements of the ship. Shri S Kedarnath Shenoy, OS and Director, NPOL, delivered the presidential address and described Sagardhwani as the crown jewel of NPOL, which has helped in understanding the complexities of the ocean and in refining the sonar technologies. Rear Admiral RJ Nadkarni, VSM, Chief of Staff, Southern Naval Command, the Chief Guest of the function, appreciated the synergy between Indian Navy and NPOL that propelled the extensive data collection in Indian waters to meet the evolving needs of the laboratory.

A Monograph and a Souvenir on "INS Sagardhwani: A Journey over Two Decades and 200 Missions" were released on the occasion.

HEMRL ORGANISED VAN MAHOTSAV

As a part of national Van Mahotsav, High Energy Materials Research Laboratory (HEMRL), Pune, organized a Tree Plantation Programme on 9 July 2017.

Dr Manoj Gupta, OS and Officiating Director, inaugurated the programme and highlighted the importance of tree plantation. A large number of employees enthusiastically took part in the programme and more than 150 saplings were planted in HEMRL premises.

AFORESTATION AT CAS

Centre for Advanced Systems (CAS), Hyderabad, conducted a tree plantation drive on 31 July 2017 within its premises under the initiative of Harita Haram Programme of Telangana State. About 2000 trees saplings were planted as part compensation to civil constructions carried out in the premises of CAS.

The participation was headed by Dr V Venkateswara Rao, Director, CAS and included all the scientists, NGO's, staff of BDL, SSQAG, DSC and about 50 representatives of Confederation of Indian Industries (CII). Casual employees and maintenance also participated in the afforestation activity wholeheartedly. Department of Urban Forestry, Telangana, provided the saplings for afforestation.

As a social service responsibility, CAS also invited 50 school children from the Zilla Parishad School, Yadgarpally, and 25 NCC cadets from NCC Group, Hyderabad, to encourage young minds imbibe the importance of afforestation.

CEP ON EXPLOSIVE, ENVIRONMENT& FIRE SAFETY

High Energy Materials Research Laboratory (HEMRL), Pune, organised a five-day course on "Explosive, Environment and Fire Safety" during 3-7 July 2017 under the Continuing Education Programme (CEP) of DRDO. Shri KPS Murthy, OS and Director, HEMRL, presided over the inaugural function.

Shri Rajiv Narang, Director, Centre for Fire, Explosives and Environment Safety (CFEES), Delhi, inaugurated the course and delivered a talk on "Accident: Case Studies". Lectures were delivered on various aspects of safety.

Valedictory function was chaired by Shri KPS Murthy, who brought out importance of safety. Dr DB Sarwade, Sc 'G', was the Course Director and Dr RS Palaih, Sc 'F', was the Course Coordinator.

SECURITY SENSITISATION PROGRAMME

Intelligence Bureau (IB) conducted a one-day security sensitization programme for senior scientists of DRDO on 5 July 2017 at Kothari Auditorium, DRDO HQ. The objective of the programme was to sensitize DRDO personnel towards the importance of security and means to eliminate/mitigate security breaches.

Proceedings commenced with Dr Zakwan Ahmed, OS, DG (R&M), DRDO, and Brig MK Hada, Director, Vigilance and Security, DRDO, welcoming the participants and the IB delegation. Dr Zakwan Ahmed, in his address, emphasized that security has a universal domain and requires intrinsic and active contribution by all irrespective of their rank or nature of work.

The IB delegation, headed by Shri Sheel Vardhan Singh, Additional Director, and Shri Amitabh Ranjan, Joint Director, sensitized the participants on national and international security scenario; multi dimensional threats to vital installations, contingency planning and dealing with crisis situations; precautions while interacting with foreigners; document and personal security; cyber security threats, verification and mitigation methodology and threat to DRDO from foreign intelligence agencies.

COURSE ON ADMINISTRATION, ACCOUNTS & ORGANISATIONAL BEHAVIOUR

A CEP course on "Administration, Accounts and Organisational Behaviour: An Update" was organized at ITR, Chandipur during 10-14 July 2017. Dr BK Das, OS and Director, ITR, inaugurated the course. In his inaugural address, Director, ITR, highlighted the importance of administration and accounts in an R&D establishment. The course aimed to update the knowledge of the participants in administrative rules and procedures. Various topics related to Administration, Accounts and Organisational Behaviour, were covered in the course.

Shri CR Ojha, Sc 'F', and Shri Santosh Munda, Sc 'D' were the Course Director and the Course Coordinator respectively.

COURSE ON NUTRITION FOR HEALTHY LIFE & IMPROVED PERFORMANCE

Defence Institute of Physiology and Allied Sciences (DIPAS) conducted a CEP course on 'Nutrition for Healthy Life and Improved Performance' during 12-14 July 2017. Dr Bhuvnesh Kumar, Director, DIPAS, inaugurated the course and highlighted the benefits of nutritious diet.

Participants were introduced to various aspects of balanced diet, concept of functional food, nutrigenomics, robotics in food technology, interventions for weight management and were given demo and training on high-end analytical equipment along with body composition analysis, bone density evaluation, quantification of energy expenditure, and vitamin analysis. Dr Som Nath Singh, Sc 'F' was the Course Director and Dr Mrinalini, Sc 'E', was the Course Coordinator.

COURSE ON PROTECTIVE EQUIPMENT & FLYING CLOTHING

A course on "Protective Equipment and Flying Clothing (PE&FC)" was organized by Defence Bio-engineering and Electro-medical Laboratory (DEBEL), Bengaluru, during 13-14 July 2017 on the request of IAF for Logistics Officers. Participants included 12 officers from the IAF and three from Sri Lanka.

Dr UK Singh, Director, DEBEL, inaugurated the course and delivered the inaugural address on 'Importance of Life Support System, Protective Equipment and Flying Clothing.' The lectures included development and testing of PE&FC products such as FR overalls, Integrated Helmet, Pressure Breathing Oxygen Mask, Anti G suit, Aircrew Survival Jacket, etc. Gp Capt (Retd) AN Bableshwar, Sc 'F', RCMA (Helicopters) delivered a talk on the 'Certification for indigenous PE&FC'. The other faculty included DEBEL scientists working in the relevant areas. The participants were also shown various DEBEL developed products and test facilities at DEBEL.

HINDI WORKSHOP

Research Centre Imarat (RCI), Hyderabad, organized a Hindi workshop on 13 July 2017. Shri N Venkatesh, Sc 'G', Member OLIC, gave overview of Hindi Cell activities during the year. Shri T Narsimha Rao, Sc 'G', Vice Chairman, OLIC, inaugurated the workshop. Ms Archana Pandey, Senior Hindi Translator, DRDL, delivered a lecture on 'Role of Hindi in Technical Terminology' and Shri Kazim Ahmed, on 'Hindi Grammar.'

WORKSHOP ON QUALITY, RELIABILITY & SAFETY

High Energy Materials Research Laboratory (HEMRL), Pune, organised one-day workshop on "Quality, Reliability and Safety" with DQRS, DRDO HQ, on 20 July 2017 for Project Directors and Heads SQA of all the labs under Armament and Combat Engineering (ACE) Cluster. The meet provided platform to the participants to interact with each other on various aspects related to Quality, Reliability and Safety.

Dr KM Rajan, DS and Director, Armament Research and Development Establishment (ARDE), Pune, the Chief Guest, inaugurated the workshop and gave an insight on interrelation between quality and safety. Shri KPS Murthy, OS and Director, HEMRL, presided over the inaugural function, and stressed on essentiality of quality and reliability of products delivered by ACE labs.

Shri S Nandula, Director, DQRS delivered a talk on the role and initiatives taken by DRDO in spreading the awareness of quality, reliability and safety in the Organisation. Twenty-nine participants from various DRDO labs attended the workshop.

COURSE ON TECHNOLOGY MANAGEMENT

A five-day course on "Technology Management for Mid Level Scientist" was conducted by Institute of Technology Management (ITM), Mussoorie, during 17-21 July 2017. Twenty-eight DRDS Officers from different DRDO labs/estts and BrahMos Aerospace Pvt Ltd attended the course. The objective of the course was to focus on different facets of Technology Management and its application in DRDO projects.

Shri Debasish Chakraborty, OS and Director, ADRDE, Agra and Shri Sanjay Tandon, Director, ITM inaugurated the Course. ITM faculty and eminent speakers deliberated on various topics, viz., Technology Forecasting, Assessment and Evaluation, Knowledge Management, Analytical Hierarchy Process (AHP), Technology and Product Development Process in DRDO Context, Technology Transfer Models, etc.

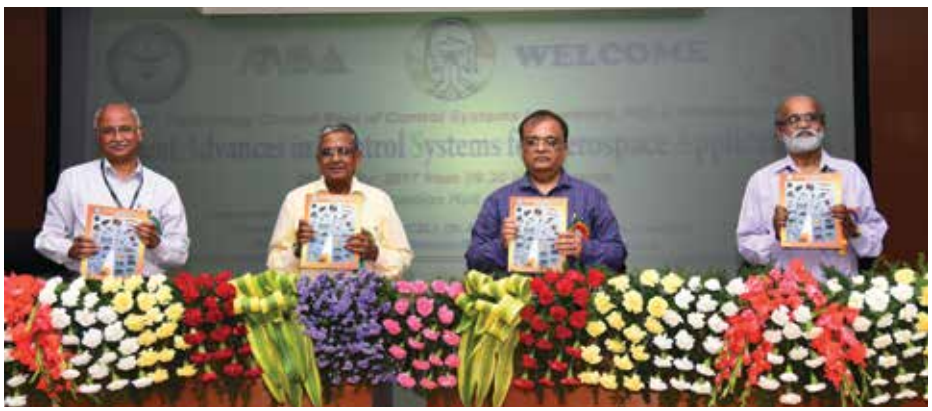
SPECIALIZED TRAINING PROGRAMME ON CBRN EMERGENCY MANAGEMENT FOR SPG

Institute of Nuclear Medicine and Allied Sciences (INMAS), Delhi, organised a "Specialized Training Programme on CBRN Emergency Management for Special Protection Group (SPG)" during 24-28 July 2017. The course was specifically designed for the SPG with lecture-based demonstrations and hands-on training. Seventy SPG officers and personnel participated in the five-day course. Besides CBRN awareness, topics like decontamination and decorporation, chemical and biological warfare agents, and nuclear and radiological incidents and their management were discussed during the Course. Demonstration of various products developed by DRDO for CBRN emergency mitigation and management was also made. Participants were also given HAZMAT demonstration by the team of the Delhi Fire services. The course also included hands-on training like radiological source search exercise. Topics such as media management in the CBRN emergency and psychological aspects of emergency handling were covered as well.

WORKSHOP ON RACSAA-2017

Research Centre Imarat (RCI), Hyderabad organized a three-day workshop on "Recent Advances in Control Systems on Aerospace Applications Specifications (RACSAA-2017)" during 26-28 July 2017. The workshop was inaugurated by Shri BHVS Narayana Murthy, OS and Director, RCI. Dr Kota Harinanarayana, former PD, LCA, was the Guest of Honour and delivered the keynote address on "Evolution of Flight Control Systems from Manned Fighter to unmanned Combat Aircraft". Eminent experts delivered lectures on Aerospace systems and technologies during the workshop.

Dr G Satheesh Reddy, SA to RM and DG (MSS) addressed the participants during the valedictory function emphasising on changing role of control systems for various missile applications.



DR KALAM SCIENCE COUNCIL

Advanced Systems Laboratory (ASL), Hyderabad, organised Dr Kalam Science Council on 27 July 2017 on the second Death Anniversary of former President Dr APJ Abdul Kalam.

Dr Tessy Thomas, Director, ASL, paid homage to Dr Kalam. Peace walk was organised from ASL Main Building to ASL Auditorium. Prof. B Yegnanarayana, INSA Senior Scientist, IIIT, Hyderabad, delivered an invited talk on "Human vs Machine: Learning from Pattern Processing Perspective."

Research Centre Imarat (RCI), Hyderabad, also organised Dr Kalam Science Council in memory of Dr APJ Abdul Kalam on 27 July 2017.

Dr D Nageshwara Reddy, Chairman, Asian Institute of Gastroenterology, delivered a talk on "Gastroenterology" and Dr M Raghava Dutt, Director, Spine Surgery Division, Omni Hospitals, delivered lecture on "Current Technologies involved in Spine Surgery" on this occasion.

Shri RN Agarwal former Director, ASL, and Shri KV Ramana Sai, former Associate Director, RCI, shared their experiences with Dr APJ Abdul Kalam. Shri BHVS Narayana Murthy, OS and Director, RCI, presided over the function.

IPR AWARENESS WORKSHOP

A one-day workshop on "IPR awareness" was conducted at ARDE on 4 August 2017. Various forms of Intellectual Property were explained to the participants and importance of protecting them was highlighted. An interaction with inventors of potential patentable technologies from ARDE was held. The workshop was attended by 40 participants from Pune-based DRDO labs/estts.

DFRL GETS ISO 9001-2015 & ISO 22000-2005

Defence Food Research Laboratory (DFRL), Mysuru, received ISO 9001-2015 certification for 'Research and Development in Food Science and Technology for Defence Requirements' and ISO 22000-2005 (Food Safety Management System) for 'Processing and Supplies of Convenience and Ready-to-Eat food to Defence Services, Security Forces and during National Calamities'. The certificates were handed over to Lt Gen Ashok Ambre, AVSM, SM, Quarter Master General (QMG) by Dr Shashi Bala Singh, DS and DG (LS), during Integrated Research Council Meeting held at DRDO HQ, New Delhi on 5 July 2017.

ISO 9001:2015 CERTIFICATION TO CAIR

Centre for Artificial Intelligence and Robotics (CAIR), Bengaluru, got new version of quality management system ISO 9001:2015. Implementation of the new version of standard was achieved by an internal team of CAIR without any industrial support. Internal Audit to this revised standard was also carried out by CAIR teams.

DIAT STARTS MASTERS IN FOOD TECHNOLOGY

The Defence Institute of Advanced Technology (DIAT), Pune, has started Masters of Science Course in Food Technology for military officers, DRDO personnel and candidates sponsored by food industries with basic objective of providing scientific knowledge to maintain the quality of food.

Dr Surendra Pal, Vice Chancellor, DIAT, launched the course on 31 July 2017. Dr Rakesh Kumar Sharma, Director, DFRL, Mysuru, was present on the occasion. First year of this course will be conducted at DIAT and second year will be conducted at DFRL, Mysuru.

A food technology laboratory was also inaugurated by the Dr Surendra Pal and Dr Rakesh Kumar Sharma, at DIAT. The function ended with the vote of thanks by Dr Shaibal Banarjee, Assistant Professor.

AWARD

Shri Sreenath Bhat B, Sc 'F', Defence Avionics Research Establishment (DARE), Bengaluru, was conferred with Dr N Narayanamurthy Medal for Best ME Student in Aerospace Engineering for the year 2015-16 in the convocation held on 5 July 2017 at Indian Institute of Science (IISc), Bengaluru. This medal was conferred for securing highest CGPA in ME in Aerospace Engineering at IISc for the academic session 2014-2016.

HIGHER QUALIFICATIONS ACQUIRED

DRL, Tezpur

Shri Ajitabh Bora, Sc 'D', Defence Research Laboratory (DRL), has been awarded PhD by Gauhati University, Guwahati, for the thesis entitled "Molecular characterization of Begomoviruses infecting Bhut Jolokia (*Capsicum assamicum*) in Assam."

Shri Bodhaditya Das, TO 'A', DRL, has been awarded PhD by Gauhati University, for the thesis entitled "Application of Parent and Modified Nanoporous Materials & Iron Acetated Coated Activated Alumina in Removal of Fluoride and Arsenic".

VISITORS TO DRDO LABS/ESTTS

DL, Jodhpur

Parliamentary Committee on Estimates headed by Shri Gajendra Singh Shekhwat, MP from Jodhpur Constituency, and six MPs from various parts of the country visited Defence Laboratory, Jodhpur (DLJ), on 8 June 2017. The committee discussed various technical, administrative and financial issues of the laboratory. Ms Anjali Bhatia, Officiating Director, DLJ briefed the committee about the technical activities, achievements and infrastructure of the laboratory. The Committee visited various technical facilities of the laboratory.

HEMRL, Pune

Dr G Satheesh Reddy, DS, SA to RM and DG (MSS), DRDO, visited High Energy Materials Research Laboratory (HEMRL) on 17 July 2017. Shri KPS Murthy, OS and Director, HEMRL, briefed Dr Reddy about the activities of HEMRL.

Dr Reddy, inaugurated the latest state-of-the-art Continuous Mixing Facility. He visited various Rocket Propellant Processing Facilities. Presentations on the Solid Rocket Propellants were given to Dr Reddy by the scientists from HEMRL and DRDL, Hyderabad.

RCI, Hyderabad

Smt Veena Prasad, IDSA, CGDA, visited Research Centre Imarat (RCI), Hyderabad on 26 July 2017. She was briefed about the activities and ongoing projects at RCI.

DRDO HARNESSING SCIENCE FOR PEACE AND SECURITY- XX

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

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

CONSOLIDATION

Defining the Role of DRDO

The repeated emphasis by the Scientific Adviser that the work in DRDO laboratories need to be oriented to meet the needs of defence also had an impact on the techniques/research oriented laboratories. Though the scientist was still the originator of the project, the scientist and the laboratory found that higher priority and more resources would be made available if the Services showed enthusiasm and endorsed the activity. Therefore, these laboratories also shifted their stance and chose more and more projects of relevance to the Services and attempted to involve them at early stages.

On the part of the Services also, there was a growing realization that the Services would have to be guided by the expertise of DRDO for projecting the futuristic requirements of weapon systems. It is in this connection Lt Gen KN Dubey, Master General Ordnance (MGO) urged the DRDO to considerably step up the dissemination of technical intelligence available with DRDO on the type of equipment and futuristic thinking in the more advanced countries to aid the Services in spelling out their futuristic requirements. Rear Admiral KL Kulkarni, Chief of Materials (COM) Indian Navy brought out that the Navy was embarking on a programme of warship construction for which it would need tremendous support from DRDO and urged that scientists and servicemen would have to work together and establish a two-way traffic of problems, trials, feedback and new ideas.

Dr Bhagavantam tried to put across to the politician and to the bureaucrat alike that DRDO is one link, though an important one, in the long chain of many links for design, development and manufacture of defence equipment. He outlined the modern concept of defence thus, "In modern concept, the fighting man does not have the sole responsibility for defence but he consists naturally the front or the key or what we are used to call the 'teeth' in this business of defence. Following 'teeth' comes 'tail' called the tail of logistics, which is concerned with the supply of all the where withal by which the fighting man is able to live, fight and move, i.e., the supply of food, clothing and all the munitions of war. To maintain the logistics, calls for a powerful industrial base which has to produce a lot of things to feed the channel that flows from the interior of the country to the forward areas. The industrial base in its turn has to be kept at a certain level by the technology and engineering which flourish in the country. The scientist and technologists are produced by the universities and the technical institutions, which for their proper functioning require the support of the people and the leaders. Thus, there is along chain starting from the fighting man, going into the industrial base, the technology and engineering, the research scientists, the universities and the people, i.e., every important sector of community is drawn in this whirlpool of total conflict. We have to get fully tuned in this country to this modern concept of total defence by paying attention to every aspect of it. "In effect he was highlighting that education, training in the acquisition of both analytical and experimental skills for R&D and an industrial infrastructure, which is keeping pace with technology advancement need attention.

Project Selection & Planning

In the process of getting the DRDO focused on defence needs, measures were taken to reduce the number of projects and enhance the scientist/project ratio, this was met with partial success. Dr Bhagavantam drew the attention of the Directors of the laboratories and their scientists to this and brought out that individually these projects were of little significance to the Services and the sum total of their contribution was small compared to the effort needed. Though an attempt was made to reduce projects of potentially low contribution, overall the number of projects increased from about 850 in 1963-1964 to about 1050 in 1967-1968. One reason was that in this period, the number of laboratories and field stations had increased from 27 to 35 and the project plus equipment expenditure had gone up from about Rs 1.5 crores in 1963-1964 to about Rs 4.0 crores in 1967-1968. Thus, even though the number of projects had increased, the average expenditure per project had more than doubled. Another reason for the number of projects not having gone down was the longer times taken for Staff and Development projects to be sanctioned for the equipment oriented laboratories if the formal procedure such as the DDPIL-69 was followed.

Simultaneously, an orderly procedure was being evolved and put in place for undertaking projects. A project could be initiated in four different ways.

The first category was the laboratory/ establishment projects under powers of the Director. These were small projects to gain lead time and might involve investigation/analysis or even small hardware to generate specific knowledge/ data or to gain hands-on- experience on specific aspects. In this case, work could be initiated even before the staff or the development project was proposed. The next category was the development project under the powers of the Director General R&D but these had to be linked either to a long term requirement of the General Staff Policy Statement or to a potential defence application. If one of the Services expressed interest in such an application, it would get preference over others on which there had been no interaction with the Services. These projects would require higher resources and their purpose was to establish the feasibility of the technology or technique or process in defence systems. They took longer time for sanction than the laboratory projects as these would be examined by the concerned Technical Director, interest of the Services would be gauged by interaction and sometimes even commitments were sought. The third type of projects were the Staff Projects which were based on a Qualitative Requirement/ Air Staff Requirement or a similar commitment. These projects did require greater time because sanction had to be preceded by dialogue-discussion between the DRDO laboratory and the User Service about the technical characteristics, the operational parameters and the time frame and cost of development. The fourth category of projects were the projects allotted to the DRDO by the Defence Minister's Scientific Advisory Committee with defined system, technical and performance characteristics, specified time and funds for completion but with funding external to the Organisation. There would also be a commitment by the Service in terms of quantities for production in the form of a budget provision. By 1966, a uniform procedure for all DRDO projects was evolved so that the numbering of projects, the format and contents of documents for new project sanction and the format for reporting of progress on current projects followed a standard pattern.

The greater involvement of the Users with the DRDO, the technological advances that were changing weapon systems and the increased outlay needed for DRDO led to the activities of DRDO being subjected to planning and control and evaluation just as any other government function. This was in keeping with the global trend of recognising that the problems and operations of basic research are different from that of development and that activities concerning applied research and development especially dealing with hardware concepts is more amenable to application of management tools for optimization of effort. As each laboratory gained more experience in dealing with the Users, the necessity for taking up projects ahead of User's requirements forced the laboratories to be actively involved in forward planning and dovetailing the plans into the Five Year plans of the Ministry and the country. There was a growing realization within the technology and within the equipment– oriented DRDO laboratories that lead time was necessary for launching a major effort which had been signalled by Dr Bhagavantam in 1964. He laid great stress on the necessity for forward thinking and urged the Directors and the senior scientists to look beyond the current needs of the Services and prepare long term plans sufficiently in advance. Accordingly long term planning covering a five year period, 1964-1969, was first introduced in DRDO in 1964. This was a bottom-up approach to long-term planning since each laboratory was required to prepare a plan and phase it out over the period 1964-1969 on an yearly basis. Initial efforts in projecting only the resources needed for build up of facilities, equipment and manpower had to be expanded to cover yearly outlay for current as well as for new projects proposed to be undertaken in the five year period. After further refinements to link the proposed projects to anticipated User needs and to the status of User interaction and elimination of duplication in projects among laboratories, the plans had to be again revised to cover the period 1967-1972 to synchronise with the national Five Year Plan period.

The Five Year Plans of the laboratories were finalised in consultation with the Services and the Ministry of Defence. The individual plans of the laboratories were consolidated as the DRDO plan and integrated into the Five Year Plan of the Ministry. The plan outlay was Rs 116 crores with a foreign exchange content of Rs 10 crores and an investment of Rs 17 crores for laboratory buildings and residential accommodation which was long overdue. The implementation of the plan meant that the DRDO through each of its laboratories had to plan in greater detail its activities to meet the planned targets. For each of the projects above a monetary limit, the newly introduced PERT (Programme Evaluation and Review Technique) and CPM (Critical Path Method) replaced simpler time charts and also enabled monitoring of the major projects. In addition, a standardised format was introduced for budget estimated by the laboratories. The laboratories were required to submit the budget estimates six months before the beginning of the financial year and furnish justification for each facility, test equipment and machinery. This could only be done if the scientists at the laboratory carried out a systematic analysis of their project activities and worked out the manpower, material, test equipment and component needs in greater depth than hitherto. However, planning to such depth at the beginning was fraught with uncertainties and also cut into the valuable time of the senior scientists. Further, even though sanction would be obtained for the total financial resources as well as early requirements for a project, this did not guarantee that the financial resources would be made available yearly as planned by the laboratory. Yearly allocation, rupees as well as foreign exchange, was subject to changes which was not possible to predict. Hence, the paper work was burdensome especially as changes and revisions had to be carried out often, due to uncertainty in foreign exchange allocation, variations in price quotations of imports, and due to changes in original goals and scope of projects.

To be continued...

THE TIMES OF INDIA

Wed, 02 Aug, 2017

This black box ejects, helps save vital data

By Ayyappan V

DRDO Floating Device Will Make Retrieval Of Debris, Info Easier

Several aircraft have gone miss ing in mysterious circumstanc es -some never to be traced again, others found only after decades, like the remains of two airplanes that an amateur investigator found on Mont Blanc in the French Alps last week, which experts believe could be those of one of the aircraft that Air India lost in two crashes in 1950 and 1966.

But military R&D agency Defence Research Development Organisation (DRDO) has now developed a self-ejectable black box for airplanes. The device ejects from aircraft when it sinks after an accident and self-activates when it comes in contact with water, with a homing signal that can help rescuers easily locate the device. Built as part of 'Make in India' initiative, the produ for use on planes and subma received "notice of allow patent" in the US and Russia.

The product can prevent situations like the 2016 AN32 crash where in spite of us sea probes, authorities were not able to trace debris in the sea.

Quwa
Defence News & Analysis Group

Thu, 03 Aug, 2017
(Online)

DRDO showcases BMP-2 based Muntra UGV

The Defence Research & Development Organization (DRDO) has showcased its Muntra (short for "Mission Unmanned Tracked") unmanned ground vehicle (UGV) for detecting mines and operations in nuclear, biological and chemical (NBC) conditions.

According to The Economic Times, DRDO's Combat Vehicles Research and Development Establishment (CVRDE) had developed the Muntra for the Indian Army, but the system has also drawn interest from the country's paramilitary outfits for counterinsurgency (COIN) use against Naxalite militants.

DRDO is pitching three Muntra variants: the Muntra-S for surveillance operations, the Muntra-M for mine-detection and the Muntra-N for areas ridden with NBC threats.

The Muntra's tests were completed in the Mahajan field firing-range in Rajasthan, where DRDO was able to validate the UGV's viability in hot-temperature (52°C) environments. It is equipped with a surveillance radar and electro-optical (EO) sensor with integrated laser rangefinder.

indiatoday.in

Sun, 27 Aug, 2017
(Online)

Boost for Army's air power: DRDO, Israel Aerospace Industries to produce medium-range missile system by 2020

The system will be capable of shooting down enemy ballistic missiles, aircraft, helicopters, drones, surveillance aircraft and Airborne Warning and Control Systems, a senior army official said.

By Ganesh Kumar Radha Udayakumar

After a long wait, the Indian Army will finally get an advanced medium-range surface to air missile (MRSAM) system by 2020. It will be able to shoot down ballistic missiles, fighter jets and attack helicopters from a range of around 70 km.

The missile system will be produced by India's premier defence research organisation - DRDO (Defence Research and Development Organisation) - in collaboration with the Israel Aerospace Industries (IAI), a senior army official said.

The MRSAM system will be capable of shooting down enemy ballistic missiles, aircraft, helicopters, drones, surveillance aircraft and AWACS (Airborne Warning and Control Systems) aircraft, the official said on the condition of anonymity.

The current version of MRSAM is operational with the Indian Air Force and the Navy.

THE NATIONAL INTEREST

Mon, 07 Aug, 2017
(Online)

India Unveils Its 'Robot' Tank: Could It Be a Game Changer?

By Michael Peck

India has unveiled an unmanned armored vehicle—and it's a big one.

While many military robots look like toys or little NASA Mars rovers, the Muntra is a full-sized armored vehicle. The Indian press refers to the Muntra as a "tank" and somewhat resembles a Russian BMP armored personnel carrier. It's unarmed for now, but does come in three versions: surveillance, mine clearing and operating in nuclear- or chemical-contaminated zones.

The new vehicle was designed by the Combat Vehicles Research and Development Establishment, part of India's Defense Research and Development Organization (DRDO), which displayed the Muntra at a recent exhibition.

The DRDO Web site describes the Muntra as the "the first unmanned tracked vehic DRDO." The UGV, or unmanned ground vehicle, "has a very diverse range of technolog al act

DNA

Fri, 04 Aug, 2017
(Online)

2 State villages chosen by DRDO for setting up radar to track enemy

Two little known villages in Alwar and Pali districts will soon gain strategic importance as they have been selected by the Defence Ministry's Defence Research and Development Organisation (DRDO) for setting up radars to track enemy missiles.

The forest department has cleared the acquisition of 850 hectares of land in Khoo in Alwar district and 350 hectares in Roopnagar for installing ballistic missile defence grid that will protect the western and northern parts of the country. This was done after the union ministry of environment and forest in 2014 cleared the DRDO proposal on the conditions laid down by the ministry.

According to AK Singh, additional principle chief conservator of forest, the state government following the clearance given by the union ministry has allotted then land to to DRDO. The ballistic missile defence grid will help guard New Delhi and Mumbai. The state government has also allotted 80 hectares of land in Pilani for setting up the Bramhos missile assembly line.

DEFENCE AVIATION POST
Your Connect To The World Of Defence And Aviation

Fri, 11 Aug, 2017
(Online)

DRDO signs 96 ToT Agreements with Private Sector

Defence Research and Development Organisation (DRDO) has entered into Technology sharing agreements with private Indian industries with total of 96 Licensing Agreement for Transfer of Technology (LAToT) have been signed for worth Rs 22.36 Cr, Defence Minister Arun Jaitley informed the Lok Sabha on Friday.

He said presently MoUs have been inked with major industrial groups including PHD Chambers of Commerce & Industry (PHDCCI), Confederation of Indian Industry (CII), National Research Development Corporation (NRDC) and Associated Chambers of Commerce and Industry of India (ASSOCHAM).

To a question, Mr Jaitley said the Transfer of Technology (ToT) for DRDO developed products to other countries can be done only after meeting the requirements of Indian Armed Forces and export policy of the country.

"ToT of Explosive Detection Kit Technology developed by DRDO has been done with M/s Crowe & Co., USA and has been evaluated by US Armed Forces," he said.