

DRDO NEWSLETTER

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Dr S Christopher is the new DRDO Chief



Dr G Satheesh Reddy takes over as SA to RM

35th year of Publication

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Assistant Editor

Geeta Sharma

Design & Pre-press

Anjan Kumar Das

Multimedia

RK Bhatnagar

Printing

SK Gupta; Hans Kumar

Distribution

RP Singh

Website: <http://www.drdo.gov.in/drdo-nl>

E-mail: director@desidoc.drdo.in; drdonl@desidoc.drdo.in

Tel: 011-2390 2474; Fax: 011-2381 9151

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Dr S Christopher appointed Secretary Department of Defence R&D and DG DRDO

Dr S Christopher, Distinguished Scientist, Programme Director, Airborne Early Warning and Control Airborne Early Warning and Control (AEW&C) system and Director, Centre for Airborne Systems (CABS), Bengaluru, has taken over as Secretary, Department of Defence R&D and Director General, DRDO.

Dr Christopher, known to be the man behind the indigenous AEW&C system, obtained his BE (Hons) in Electronics and Communication Engineering from University of Madras in 1978, MTech in Microwaves and Radar Engineering from IIT, Kharagpur, in 1980 and PhD in Antenna and Measurement Techniques from IIT Madras, in 1985. He joined IIT Madras, as faculty member in 1980 and carried out research in Microwave Antenna Design and Near Field Measurement Techniques. During 1985 to 1988, he worked as Senior Engineer with M/s Bharat Electronics, Ghaziabad, where he designed antenna for Digital Troposcatter Communication System.

Dr Christopher joined DRDO at Electronics and Radar Development Establishment (LRDE), Bengaluru, as Sc D in 1988 and since then has worked on various projects. At LRDE, he led a team to create the Automated Planar Near Field Measurement Facility, which paved way for the electronically scanned array antenna evaluation. As Project Director, LCA Multi-mode Radar, he designed and developed slotted array technology, which has been used in several airborne and missile projects. The technology was later exported to Poland. He was also Project Director for Airborne Surveillance Platform project and for development of the Maritime Patrol Airborne Radar, Supervision 2000, for the Indian Navy.

Dr Christopher joined CABS as Sc G on 18 June 2004 and assumed charge as Programme Director for the AEW&C system when the task was assigned to



Man behind the indigenous Airborne Early Warning and Control (AEW&C) system



CABS in October 2004. He took over the responsibility for design, development, fabrication and qualification of the AEW&C system to specific operational requirements of the Indian Air Force through many workcentres of DRDO. The AEW&C programme is one of the flagship programmes of DRDO for the design and development of indigenous Airborne Warning and Control (AWAC) system. AEW&C system is designed to detect, identify and classify threats present in the surveillance area and act as a Command and Control Centre to support different air operations. The system with its multiple communication and data links is meant to alert and direct fighters against such threats while providing 'Recognizable Air Surface Picture' to the Commanders at the Ground Exploitation Stations. The system comprises electronic and communication support measures that can interrupt and classify unfriendly radar transmissions and communication signals.

On 1 January 2007, Dr Christopher was appointed Director, CABS, in addition to his responsibilities as Programme Director AEW&C. He was elevated to the rank of Outstanding Scientist wef July 2008 and as Distinguished Scientist wef July 2012.

Dr Christopher is a fellow of the National Academy of Engineers (FNAE) and the Institution of Electronics and Telecommunication Engineers (IETE). He is a member of SEE and IEEE. He is the recipient of many awards

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Dr G Satheesh Reddy takes over as SA to RM

Dr G Satheesh Reddy, Distinguished Scientist and renowned expert in navigation and avionics technologies has been appointed as the Scientific Advisor to Raksha Mantri. He also holds additional charge of Director, Research Centre Imarat (RCI), a missile laboratory of DRDO in Hyderabad.

Dr Reddy joined DRDO in 1986 and since has been involved in conceptualisation, design, development and productionisation of inertial sensors, navigation schemes, algorithms and systems, calibration methodologies, sensor models, simulation along with development of satellite navigation receivers and hybrid navigation systems. Under his leadership, advanced products and varieties of avionics systems have been produced and successfully flight tested in strategic programmes of the country. As Project Director, he pioneered design and development of Ring Laser Gyro-based Inertial Navigation Systems (INS), MEMS-based INS System, Sea-Guard Reference System and Ship Navigation System strengthening the country's self-reliance in high accuracy and long-range navigation. He also successfully developed a 1000 kg class guided bomb.

His long-term expertise has been providing the necessary thrust to the programmes of national importance. As Director, RCI, he led the development of avionics technologies in critical areas of inertial systems, embedded computers, control, real-time software and simulation, power supplies, RPG, seekers, antennae, flight instrumentation for Agni A1, A2, A3, A4, A5, Prithvi, Dhanush, Astra, Akash, underwater missiles, BrahMos, Nirbhay, Helina, Nag, MRSAM, AD-PDV interceptor, two-stage ship-launched target, AAD and other defence programmes. Dr Reddy has spearheaded a number of technology development, mission mode, and S&T projects delivering variety of systems to



multiple projects in different capacities. He led the development and production of GPS+GLONASS+GAGAN on Module (G3OM) receiver and System on Chip (SoC) bringing in quantum jump in miniaturisation of on-board avionics; development of IIR seeker for anti-tank applications and long-range BMD applications as well as development of high accuracy accelerometers for the long-range precision navigation.

Dr Reddy, a graduate in Electronics and Communication Engineering from JNTU, Anantapur and MS and PhD from JNTU, Hyderabad, is a Fellow of Indian National Academy of Engineering, Royal Institute of Navigation London, Aeronautical Society of India, Royal Aeronautical Society London, Institution of Engineering and Technology UK, Society for Shockwave Research, Institution of Engineers (India), Andhra Pradesh Akademi of Sciences, Institution of Electronics and Telecommunication Engineers and a senior member of many other professional/scientific bodies in the country and abroad. He has been awarded Full Member Diploma and inducted as a foreign member of the Academy of Navigation and Motion Control, Russia and is an Associate Fellow of American Institute of Aeronautics and Astronautics, USA. In recognition of his distinguished contributions in the country, Computer Society of India conferred on him the honorary Fellowship. He is also an honorary member of Automatic Control and Dynamic Optimization Society, and a national member of International Federation of Automatic Control, Austria.

Dr Sateesh Reddy is the recipient of the prestigious Indian Science Congress Association Homi J Bhabha Memorial Award, DRDO Young Scientist Award, DRDO Scientist of the Year Award and DRDO Agni Award for Excellence in Self Reliance. He is also the recipient

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Dr S Christopher appointed Secretary Department of Defence R&D and DG DRDO

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such as JC Bose Gold Medal, DRDO Scientist of the Year Award, DRDO Technology Group Award, NRDC Award, Dr VM Ghatge Award for his contributions in the field of microwave antennas and radar systems. He was awarded IETE-IRSI Award in 2008 for his significant contributions in design and development of

airborne S-band transmit-receive multimodule (TRMM), indigenous maritime patrol airborne radar for Navy and Coast Guard and Supervision-2000 and waveguide slotted array for various applications in radar in India and abroad. He has published/presented more than 50 papers at international and national level.

Dr G Satheesh Reddy takes over as SA to RM

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of Aeronautical Society of India Dr Biren Roy Space Science and Design Award, Astronautical Society of India Rocketry and Related Technologies Award, FAPCCI Outstanding Engineering Award, IETE BV Baliga Memorial Award, Systems Society of India

Vikram Award and many other honours/recognitions. He is a Member of Governing Council/Academic Senate of reputed academic institutes and has chaired sessions, delivered inaugural and keynote addresses during many National and International Conferences.

INMAS signs MoU with Thapar University

Institute of Nuclear Medicine and Allied Sciences (INMAS), Delhi, and Thapar University (TU), Patiala signed a Memorandum of Understanding (MoU) on 28 May 2015 for enhanced academic interaction and R&D collaboration. The MoU is initially between two Departments—Department of Biotechnology Engineering, and Department of Electrical, Electronics and Instrumentation—of TU and INMAS. This collaboration will include applied research and projects. The MoU was exchanged between Prof. Prakash Gopalan, Director, TU, and Dr RP Tripathi, OS, Director, INMAS.

The MoU is aimed at fostering the interactions between INMAS and TU in the areas of mutual interest to enhance the quality of research and training at both places by undertaking collaborative research projects. There will be exchange of Scientists/Faculty and students between the two institutions. While employees working at the Life Sciences laboratories of DRDO may register for PhD degree to be awarded by TU under joint supervision, PhD students working at the TU will be able to carry out a part of their work at INMAS. If required an INMAS Scientist may be a Co-guide. Bye-laws of TU governing the admission and award of PhD will apply.



Prof. Prakash Gopalan (right) and Dr RP Tripathi signing the MoU

Speaking on the occasion, Prof. Gopalan remarked, “This is a momentous occasion for TU. By signing this MoU with one of the renowned R&D institutes, we are unleashing a new era of DRDO-Academia partnership. This MoU will aid us in bridging the gap between graduating engineering and professional engineers as well as reduce the gap between laboratory-level research and the research required by the industry in developing new technologies. The missing gaps in expertise at both the partners may be filled through this collaboration.” Director, TU also said that engineers and

biomedical scientists should work together to enhance indiginisation in order to produce better products and services.

Dr Tripathi in his address, said, "We are beginning a new era of paradigm shift, from cooperation to collaboration, which will be mutually beneficial for both the institutes. We value our relationship with TU and believe that our collaboration with TU will help us in

strengthening the knowledge and innovation eco system in the country and enhanced "Make in India" products. He further elaborated that the fruits of joint collaborations should help Indian Armed Forces in particular and the benefits should gradually trickle for society at large. The MoU will be initially for a period of five years and can be further renewed mutually. Dr Rajeev Vij, Head (HRD, Library, BFA & PRO), INMAS, coordinated the MoU.

DIPR develops Psychological Screening Test for ITBP

Defence Institute of Psychological Research (DIPR), Delhi has developed a Psychological Screening Test for Indo-Tibetan Border Police Force (ITBP) for assessing commando-like qualities among its personnel who wish to join the elite commando forces like National Security Guard (NSG). A team of DIPR scientists, led by Project Director Dr Updesh Kumar, Sc F and Principal Investigator Dr Vijay Prakash, Sc C, developed the test in the minimum possible time duration. The test provides a comprehensive personality profile essentially for performing commando duties. The requisite qualities were determined on the basis of thorough job analysis of NSG commandos. The test has robust psychometric properties in terms of high reliability and criterion validity.



Dr K Ramachandran (second from right), Director, DIPR, handing over Psychological Screening Test to Shri SK Sharma, DIG (Training), ITBP

Dr K Ramachandran, Director, DIPR, handed over the test to Shri SK Sharma, Deputy Inspector General (Training), ITBP, on 12 May 2015. ITBP has inducted the test for pre-screening of ITBP personnel who wish to join NSG in future.

Dr Nayak inaugurates Analysis Wing of SAG

Dr KD Nayak, DS, DG, Microelectronics Devices and Computational Systems (MED & CoS), DRDO, inaugurated the Analysis Wing of Scientific Analysis Group (SAG), Delhi, on 20 June 2015. The new six-storied building will supplement the main building and the Communication Wing. It would house state-of-the-art Electronics, Computers, Mathematics and Statistical Analysis laboratories. It would also host a small state-of-the-art Conference Facility. Dr G Athithan, OS, Director, SAG and Dr PK Saxena, former Director, SAG, were present on the occasion.



Dr KD Nayak, DS, DG (MED & CoS) inaugurating the Analysis Wing of SAG

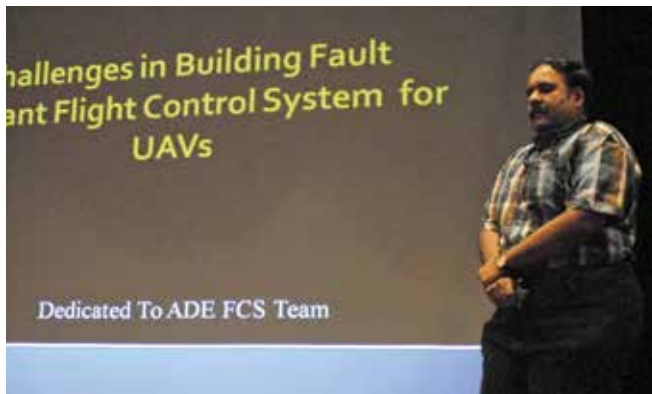


National Technology Day Celebrations

National Technology Day (NTD) is celebrated all over the India on 11 May every year to commemorate nuclear tests conducted second time at Pokharan, Rajasthan, in 1998. The NTD is celebrated as a symbol of quest for scientific inquiry, technological creativity and the translation of that quest in the integration of Science, Society and Industry. The following DRDO laboratories/ establishments also celebrated NTD by organising technology day orations, special lectures, science exhibitions and other scientific events.

ADE, Bengaluru

Shri Balakrishna Prakash, Sc F, gave a talk on Challenges in Building Fault Tolerant Flight Control System for UAVs. Shri P Srikumar, OS, Director, Aeronautical Development Establishment (ADE), presented NTD Oration Certificate and Medal to the speaker.



Shri Balakrishna Prakash presenting NTD Oration

CABS, Bengaluru

Shri M Karthick, Sc D, presented NTD Oration on Effect of Different Forms of Glass Fiber and Glass QAM/carbon WRM Hybrid Composites on Low Velocity Impact. He was presented NTD Oration Certificate and Medal by Dr S Christopher, Programme Director AEW&C systems and Director, Centre for Airborne Systems (CABS).

CAIR, Bengaluru

Shri Philip Abraham, Sc F, delivered NTD Oration on Security of Internet Protocol Communication: From Open Source to High Assurance. In his talk he explained Internet Protocol Security (IPSec) Protocols, which take care of the secure communication, typically between gateways, and are used to interconnect enclaves in military networks. Military systems need to provide high

assurance of their effectiveness against very skilled and resourceful adversaries and therefore the mainstream IPSec protocol needs to be adapted so that it can be provided adequate safeguard against resourceful adversary. Shri Philip was presented NTD Oration Certificate and Medal by Shri Sanjay Burman, OS, Director, Centre for Artificial Intelligence and Robotics (CAIR).



Shri Sanjay Burman, OS, Director, CAIR, presenting NTD Oration Certificate and Medal to Shri Philip Abraham

CEMILAC, Bengaluru

Dr Sai Krishna Rao, Sc D, delivered NTD Oration on Composite Thermal Barrier Coating: In-situ Deposition Technique and Characterisation of Oxidation Behaviour. His talk covered an introduction to thermal barrier coating (TBC) system and the experimental work done by him on the same. Comparison of the isothermal oxidation resistance of composite TBC system with that of a conventional TBC system as well as with uncoated super alloy substrate and with only coat was brought out to the audience.

DLRL, Hyderabad

NTD Oration was delivered by Shri HD Kulkarni, Sc G, on Progression of Anti-Aircraft IR Missile



Dr CG Balaji (right), OS, Director, DLRL, presenting NTD Oration Certificate to Shri HD Kulkarni



Guidance Technology and Countermeasures. The oration covered the IR Guidance Techniques employed in the first generation IR Missiles to those employed in the latest Missiles and also the IR countermeasure techniques. Dr CG Balaji, OS, Director, Defence Electronics Research Laboratory (DLRL), presented NTD Oration Certificate and Medal to Shri HD Kulkarni.

DMRL, Hyderabad

Dr AK Mukhopadhyay, OS, delivered NTD Oration on Industrial Scale Development and Production of Wrought Aluminium Alloys for Missile, Naval, Armament, Combat Engineering and Aerospace Applications. Dr Mukhopadhyay elaborated that indigenisation of Aluminium alloys for defence applications is associated not only with the country's technological growth, but also with substantial cost savings. Dr Amol A Gokhale, DS, Director, DMRL, presented the NTD Medal and Certificate to Dr AK Mukhopadhyay.



Dr Amol A Gokhale, DS, Director, DMRL, presenting the NTD Oration Medal and Certificate to Dr AK Mukhopadhyay

RCI, Hyderabad

Dr Satheesh Chandra Sheno, Director, Indian National Centre for Ocean Information Services, Hyderabad, was the Chief Guest. Shri SS Reddy Kumar, Sc E, delivered NTD Oration on Realisation of Multi-functional Integrated Optic Chip (MIOC) for FOG. To mark the occasion RCI Science Council conducted two invited talks on Earth Quakes and Tsunami by Dr Purnachandra Rao, Senior Principle Scientist, National Geophysical Research Institute, Hyderabad, and Nano Scale Transistors for Low Power Integrated Circuits-

New Innovations by Prof. M Jagadesh Kumar, IIT, Delhi. Dr G Satheesh Reddy, DS, Director, RCI, presided over the function.



Inauguration of NTD celebrations at RCI

NSTL, Visakhapatnam

Shri CD Malleswar, OS, Director, Naval Science and Technological Laboratory (NSTL), inaugurated the function. Delivering the welcome address, Shri Malleswar spoke on the need of harnessing the best of the technologies supported by the best of the engineering practices. He emphasised on the need of technology to empower society and build the nation free from poverty. Prof. Ratnam V Raja Kumar, Director, IIT, Bhubaneswar, and Dr SS Sundaram, DS, former DG (ECS), DRDO, delivered talks on Underwater Communication for AUV, and Futuristic Defence Technologies Developed by DRDO, respectively. Shri K Srikanth, Sc C, delivered NTD Oration on Estimation of Radar Cross Section Reduction of Corner Reflectors with Orthogonality Errors. Shri Malleswar presented NTD Medal to Shri K Srikanth.



Shri CD Malleswar, OS, Director, NSTL, delivering inaugural address on NTD at NSTL

Manpower Development Activities

Conferences/Seminars/Symposia/Training Courses/Meetings

Workshop on Food Safety & Security

A one-day workshop on Food Safety and Security was organised by **Defence Institute of High Altitude Research (DIHAR), Leh**, on 25 April 2015. Objective of the workshop was to discuss the different acts and guidelines related to food safety and security and requirements of different documents essential for obtaining certificate from Food Safety and Standards Authority of India (FSSAI).

Dr Bhuvnesh Kumar, Director, DIHAR, in his welcome address, highlighted the implications of food safety and security with respect to food certification and production by industry. He emphasised on the importance of different guidelines, acts, procedures required for obtaining certification on herbal nutraceuticals and fortified food for human consumption. He also stressed on designing experimentation and documentation in a way that will be helpful for obtaining certificate for DIHAR developed herbal nutraceuticals. Dr Meenakshi Singh, the expert from FSSAI, discussed different acts and guidelines related to food safety and security for different kinds of food, oils, nutraceuticals, herbal formulations, ointments, beverages, etc. She also told about different international bodies and acts regulating the quality control, certification and production.



Interaction among the participants during the workshop on Food Safety and Security at DIHAR, Leh

Workshop on Retirement Plan

Defence Metallurgical Research Laboratory (DMRL), Hyderabad, on behalf of Centre for Personnel Talent Management (CEPTAM), Delhi, organised a three-day workshop on Retirement Plan during 20-22 May 2015. The workshop was organised for DMRL employees scheduled to superannuate over the next

one year. The objective of the workshop was to educate these employees on various aspects of post retirement life.

Dr Amol A Gokhale, DS, Director, DMRL, and Shri Sudhir Gupta, Director, CEPTAM, addressed the participants and asked them to clarify all their doubts on retirement benefits. Lectures were delivered by the expert faculty on a variety of topics including post-retirement life, financial planning, health care, pensionary entitlements, yoga and stress management. The workshop was attended by 50 employees. Dr SV Kamat, OS, DMRL, presided over the valedictory function.



Shri S Prakash, Sc G (Retd) elaborating pensionary entitlement during the workshop on Retirement Plan at DMRL, Hyderabad

Dissemination Meeting on Avalanche Feedback

Snow and Avalanche Study Establishment (SASE), Manali, organised 17th Dissemination Meeting on Avalanche Feedback at RDC, SASE, Chandigarh on 22 May 2015. The Meeting is an annual interaction, at the end of winter season, with forces deployed in snow-bound avalanche prone areas and to exchange notes with respect to the services provided by the SASE. Thirty-six officers from 2, 9, 14, 15, 16, 33 Corps of Army, High Altitude Warfare School, HQ UB Area, ITBP and Border Road Organisation attended the meeting. During the day-long meeting, the problems as well as the solutions to the problems faced by the troops in snow-bound regions of the Himalaya were discussed. Summing up the discussions, Shri Ashwagosh Ganju, Director, SASE, brought out the salient points on which SASE will be working to alleviate the problems faced by the troops in avalanche prone areas.

Personnel News

Higher Qualification Achieved

GTRE, Bengaluru



Shri Dhruba Biswas, Sc F, Gas Turbine Research Establishment (GTRE), has been awarded PhD by IIT, Kharagpur, for the thesis titled 'Active Control of Geometrically Nonlinear Vibrations of Rotating Composite, Sandwich and Fuzzy Fiber-reinforced Sandwich Beams using Different Piezoelectric Composites'.

NSTL, Visakhapatnam



Shri S Raja, Sc G, obtained PhD in Computer Science and Systems Engineering from Andhra University, Visakhapatnam for the thesis titled 'A Frame Work for Finding Ontology-based Semantic Similarity Measures'.



Shri Abraham Varghese, Sc G, obtained PhD in Computer Science and Systems Engineering from Andhra University, Visakhapatnam, for the thesis titled 'Development of an Underwater Sensor Network Node and devising of a Network Protocol'.



Shri VVS Bhaskara Raju, Sc F, obtained PhD in Mechanical Engineering from Andhra University, Visakhapatnam, for the thesis titled 'Development and Characterisation of Ethylene Propylene Diene Monomer materials for Constrained Layer Damping Applications'.

Awards

Biotech Product and Process Development and Commercialisation Award 2015

The Department of Biotechnology (DBT), Ministry of S&T, Government of India (GoI), conferred

Biotech Product and Process Development and Commercialisation Award-2015 on Dr Manmohan Parida and his team comprising Dr PK Dash, Dr JS Kumar, Dr S Sharma and Shri Ambuj, all from Defence Research and Development Establishment (DRDE), Gwalior, for their outstanding contribution for development of indigenous rapid and low-cost Swine Flu RT-LAMP technology for early confirmatory diagnosis and surveillance of pandemic swine flu H1N1 virus.

Dr Harsh Vardhan, Hon'ble Union Minister for S&T and Earth Sciences, GoI, presented the award to Dr Manmohan Parida and his team during the National Technology Day 2015 celebration held at Vigyan Bhavan, New Delhi, on 11 May 2015. The award includes a memento, certificate, and cash prize of Rs 2 lakhs.



Dr Harsh Vardhan (third from left), presenting Biotech Product and Process Development Award-2015 to DRDE scientists

Outstanding Reviewer Award



Dr Sanil Kumar KV, Sc F, Naval Physical and Oceanographic Laboratory (NPOL), Kochi, has been awarded Certificate of Outstanding Contribution in Reviewing by Deep Sea Research Part II—Tropical Studies in Oceanography, an International Journal in Oceanography published by Elsevier. The award has been given in recognition of excellent contributions made to the quality of the Journal by Dr Sanil.



डीआरडीओ न्यूज़लैटर

Dr BR Ambedkar Birth Anniversary Celebration

Aeronautical Development Establishment (ADE), Bengaluru, SC/ST Employees Welfare Association celebrated Dr BR Ambedkar's 124th birth anniversary on 14 May 2015. Shri P Srikumar, OS, Director, ADE, presided over the function and elucidated Dr Ambedkar's life and struggle. Justice HN Nagamohan Das, former Justice, High Court of Karnataka, was the Chief Guest of the function. He delivered a talk on Democracy, Dalit Rights, Women Empowerment and Social Justice. Shri Eshwar, Chairman, Karnataka Forest Industries Corporation, was the Special Guest on the occasion. Shri HV Virendra Simha, former Chief Superintendent of Prisons was the Special Invitee. Various social activities like books distribution, school bags, scholarship for economically weaker section were conducted to mark the occasion.



Dr Ambedkar Birth Anniversary celebration at ADE

Swachh Bharat Abhiyan

Research Centre Imarat (RCI), Hyderabad, organised Swachh Bharat Abhiyan on 24 April 2015 to create awareness about the cleanliness drive launched by the Government of India. Large number of RCI employees took active part in cleanliness drive in and around RCI. Shri BHVS Narayana Murthy, OS, Associate Director, RCI, exhorted RCIans to promote Swachh Bharat Abhiyan to near by local villages also.



RCI employees all set to clean the RCI campus

Visitors to DRDO Labs/Estts

DIHAR, Leh

✧ Shri RK Mathur, Defence Secretary, Government of India, visited Defence Institute of High Altitude Research (DIHAR), Leh, on 3 May 2015. He was appraised about R&D activities being undertaken by the institute. Shri Mathur applauded DIHAR for the diversity of activities being undertaken for the benefit of local farmers and the defence forces deployed in the Ladakh sector.

✧ Dr Manas K Mandal, DS, DG (Life Sciences), DRDO, visited DIHAR during 11-13 May 2015. Dr Bhuvnesh Kumar, Director, DIHAR, appraised him about R&D activities being undertaken by DIHAR to fulfill the fresh food requirement of troops and the status and future planning of works related to DIHAR.



Shri RK Mathur (second from left) Defence Secretary, being briefed about vegetable cultivation at DIHAR

