

# DRDO NEWSLETTER

A monthly house bulletin of Defence Research & Development Organisation ■ Vol. 35 No. 5 ■ May 2015



**BVR Air-to-Air  
Missile Astra  
Test Fired  
Successfully**

# *DRDO celebrates International Women's Day*



Smt Smriti Zubin Irani, Hon'ble Minister of Human Resource Development, Government of India, lighting the lamp to inaugurate the National Workshop on Women Innovators for Excellence in Research and Science organised by DRDO to celebrate International Women's Day at DRDO HQ on 9 March 2015



Smt Smriti Zubin Irani releasing the compendium on women achievers during the National Workshop on Women Innovators for Excellence in Research and Science. Dr K Tamilmani (right), Distinguished Scientist and DG (Aero Systems), DRDO and Shri Anil M Datar (left), Distinguished Scientist and DG (Armaments & Combat Engineering), DRDO, are also seen in the picture



35th year of Publication

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**Cover: Beyond Visual Range (BVR) air-to-air missile Astra**

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## BVR Air-to-Air Missile Astra successfully Test Fired

India's Beyond Visual Range (BVR) air-to-air missile Astra was once again successfully test fired by the Indian Air Force off the coast of Odisha near the Integrated Test Range (ITR), Balasore, on 19 March 2015. The missile has been indigenously designed and developed by the DRDO. Astra, carrying



Astra missile aboard Su-30 aircraft

telemetry equipment in place of the warhead, was fired from a Su-30 aircraft against a Lakshya Pilotless Target Aircraft (PTA). The target was successfully engaged, which was captured by Telemetry and Electro-optical Tracking Stations.

A successful trial of Astra, from Su-30 was also conducted on 18 March 2015 for confirming missile's capability to undergo manoeuvre involving very high gravitational forces up to the order of 30 'g'. These fourth and fifth launch campaigns, including the flight of Lakshya target, were coordinated by Air HQ.

Defence Research and Development Laboratory (DRDL), Hyderabad, is the primary development agency for this missile. Dr K Jayaraman, Director, DRDL, was present at the Mission Centre overseeing the trials along with Dr Subhash Chandran, the Programme Director. Dr VG Sekaran,

Director General (Missiles & Strategic Systems), DRDO, congratulated the team of designers, technologists, production and quality agencies, and the Air Force for developing and testing such a complex system, which is comparable with the best in the world.

Dr S Venugopal, Project Director, said that the fourth and fifth air launches of ASTRA were once again perfect in all respect and engaged the target with precision. More tests will follow to prove its capability as a formidable weapon.

## SASE conducts Operation Phutkal

In a first of its kind operation in the country, a team of experts from National Disaster Management Authority (NDMA), Army, Border Road Organisation, Central Water Commission and Survey of India under the leadership of Shri RK Verma, Sc F, Snow and Avalanche Study Establishment (SASE), Chandigarh, carried out controlled demolition to breach a large dam formed by a massive landslide along the Phutkal river in Ladakh. Phutkal is a key tributary of the Zaskar river in Kargil district in J&K.

A major landslide on Phutkal river path in early January resulted in an artificial dam of 14 km length, 130 m wide and 50 m high. This artificial dam posed



Landslide location



serious threat to several villages and a hydro-power station downstream.

The team was heli-lifted by the Indian Air Force to a minuscule snow-bound landing site a few hundred meters away from the dam. From the landing site a track was cut through the snow to gain access to the dam site. The team camped at the site for a week and triggered controlled explosions using mining explosives and shape charges to create a 100-m long and 2-m wide breach to drain out the water.



Shri RK Verma (extreme left), the team leader, and other experts

Praising the efforts of the team, Shri Ashwagosh Ganju, Director, SASE, said, “the conditions were tough as the terrain was treacherous and temperature as low as -35 °C at night. In such cases, the place and quantum of explosions had to be carefully assessed because of the danger of triggering avalanches on adjoining slopes”. Elucidating further the strenuousness of the task, he

added, “being the result of a landslide, the dam was unstable and there was always the risk of its busting. A sudden flow of water with levels simulated to be as high as 15-20 m would have proved devastating to the settlements downstream”. The team has been awarded Commendation Certificate by Secretary NDMA for their exemplary work.

## Indo-Myanmar Defence Cooperation

Further to Indo-Myanmar defence cooperation, Institute for Systems Studies and Analyses (ISSA), Delhi, has developed INFCOTT-M<sup>®</sup> Map Converter and Map Copier Software for Myanmar Army. INFCOTT-M<sup>®</sup> Map Converter and Map Copier Software facilitates generation of Terrain Map Sheet in INFCOTT-M (a computerised tactical training tool developed by ISSA for Myanmar Army) compatible format. A team of scientists from ISSA visited Myanmar during 23 February 2015 to 3 March 2015 for handing over the software and providing necessary user training to the officers of Myanmar Army at Command and General Staff College (CGSC), Kalaw.

The software was released in a ceremony held at CGSC, Kalaw on 26 February 2015 in the presence of Indian Defence Attaché, Embassy of India in Myanmar; Brigadier General Aung Thu, Commandant CGSC; Brigadier General Myint Maung, Office of the Chief Instructor, CGSC; Brigadier Alok Kacker, Commandant WARDEC (ARTRAC); Shri HS Bharati, Sc F, ISSA;



L to R: Navy Captain Ko Ko Kyaw, Brigadier General Myint Maung Oo and Shri HS Bharati releasing INFCOTT-M<sup>®</sup> Map Converter Software to Myanmar Army

Shri Sudhakar Kumar, Sc D, ISSA; Lt Col Deepankar Chaudhary, WARDEC and other distinguished guests from Myanmar Army.

## Bio-toilet Facility inaugurated at SECR Nagpur



**Dr Lokendra Singh inaugurating the Training and Development Center for environment friendly toilets at SECR, Nagpur**

Dr Lokendra Singh, OS, Director, Defence Research and Development Establishment (DRDE), Gwalior, inaugurated the Training and Development Centre for Environment Friendly Toilets of Indian Railways at Motibagh Workshop, South East Central Railway (SECR), Nagpur. Shri RS Kochak, Chief Mechanical

Engineer, SECR, Bilaspur, officers from Indian Railway, and DRDE scientists involved in development of Biodigester Technology, were also present on the occasion. The Centre is a state-of-the-art facility comprising a quality assurance/quality control laboratory for testing and monitoring of effluent quality, a design laboratory with latest design software such as CAD and CAE, conference as well as an exhibition hall for biodigesters.

In his inaugural address, Dr Lokendra Singh described MoU between Indian Railways and DRDO as an excellent example of team work where both organisations worked hard to make Indian railways clean and green by providing biodigester-based bio-toilets. Shri RS Kochak lauded the development of Anaerobic Microbial Inoculum Generation Plant equipped with Training and Development Centre and expressed that the building will cater to the training requirements of Indian Railway officers and staff and for evaluation of biodigester effluent quality parameters.

## Ballistic Test Facility established at TBRL

Ballistic test and evaluation of body armour is of great priority for any army to meet their operational needs. Since 1970s, Terminal Ballistics Research Laboratory (TBRL), Chandigarh, has offered its expertise and evaluation facilities for ballistic evaluation of protection systems like body armour, vehicle and structural armour. The laboratory has a full-fledged small arms ballistics range, which caters to ballistic evaluation of protection systems for the Indian armed forces, paramilitary forces and other law enforcement agencies as per various international standards. The range also supports other DRDO laboratories in development of armour materials.

In recent times, need for protection systems in the wake of current national and international scenarios has grown exponentially with availability of sophisticated small arms and ammunition with higher threat levels. The test and evaluation facilities for the protection systems also have to evolve simultaneously and become globally comparable, faster, more accurate, and cost-effective in



**Dr Avinash Chander, the then SA to RM, inaugurating the Ballistic Test Facility at TBRL**

addition to being infallible and safe. A new state-of-the-art Ballistics Test Facility has been established at TBRL for ballistic evaluation as per global standards. The facility, besides catering to the enhanced needs of our armed, paramilitary and police forces will also provide testing support to sister DRDO laboratories and other research organisations.



## Raising Day Celebrations

### CVRDE, Chennai

Combat Vehicles Research and Development Establishment (CVRDE), Chennai, celebrated its Raising Day on 26 March 2015 in a grand manner. Shri V Chandra Mohan, Vice Chairman, Works Committee welcomed the gathering. Shri AV Raghupathy, Sc E, Chairman, Celebration Committee, spoke about the history of CVRDE .



Dr P Sivakumar addressing CVRDE employees on Raising Day

Dr C Chandrasekaran, Additional Director (Mgt), gave a brief speech on the activities of Works Committee and achievements of other Sub-Committees during the year 2014. Dr P Sivakumar, OS, Director, CVRDE, spelt out the achievements, viz, development of Arjun MBT Mk-II, Arjun Catapult and Unmanned Tracked Vehicles

(MUNTRA). He exhorted all the employees to take oath in implementing the Prime Minister's Programme on Swachh Bharat and Make in India. Cultural programmes were conducted by CVRDE officers and staff. Laboratory Scientist of the Year Award, Technology Group Award, Laboratory Award for DRTC, Administrative and Allied Categories were presented to the meritorious employees. The employees who have rendered 25 years of outstanding services were felicitated with mementoes. Prizes were also distributed to the winners of various competitions and cultural events. Shri K Athavan, Secretary, Celebration Committee, proposed the vote of thanks.

### DEAL, Dehradun

Defence Electronics Application Laboratory (DEAL), Dehradun, celebrated its Annual Day on 23 February 2015 with great enthusiasm and fervour. Various sports events and games including cricket, badminton, carom, table-tennis, field events, etc., were organised. DEAL employees participated in the events with zeal and competitiveness.

A cultural programme was organised to mark the occasion. The talent of the DEAL employees was at full bloom during the function. Laboratory awards were conferred to the meritorious employees by Shri RC Agarwal, OS, Director, DEAL.



Director DEAL, Shri RC Agarwal (standing eighth from right) with DEAL employees on Annual Day

## DTRL, Delhi

Defence Terrain Research Laboratory (DTRL), Delhi, celebrated its 51<sup>st</sup> Raising Day on 27 March 2015. Dr Chitra Rajagopal, OS, Director, Centre for Fire, Explosive and Environment Safety (CFEES), Delhi, graced the occasion as the Chief Guest and Dr Aloka Niyogi, Director, Quality People Solutions, as the Guest of Honour. Directors of the sister DRDO laboratories and former Directors of DTRL were also present on this auspicious occasion.

Dr MR Bhutiyani, Director, DTRL, in his inaugural address, highlighted the charter of the DTRL and achievements made by the laboratory in the year 2014. He appreciated the efforts made by the scientists and the staff in producing Terrain Intelligence Reports, GeoINT Products, Route Atlas in landslide prone areas and in-house developed GIS software. Chief guest Dr Rajagopal in her keynote address congratulated Director, Scientists and staff of DTRL for their dedicated efforts. Dr Aloka Niyogi delivered a talk on Effects of Emotional Intelligence on R&D Leadership in which she shared her experience of emotional intelligence in different organisations of many countries.

Laboratory-level DRDO Awards, sport awards and Hindi annual awards were distributed to meritorious employees by Dr Bhutiyani and Dr Aloka Niyogi. The programme concluded with the vote of thanks by Dr LK Sinha, Sc G, DTRL.



Dr Chitra Rajagopal inaugurating DTRL's Raising Day

## HEMRL, Pune

High Energy Materials Research Laboratory (HEMRL), Pune, celebrated its Annual Day on 1 March 2015. Shri B Bhattacharya, OS, Director, HEMRL,

conveyed his good wishes to the employees and their families. He highlighted the achievements of the laboratory in year 2014. Meritorious employees were awarded laboratory-level DRDO awards. Besides, cash awards were also given to the employees for their excellent performance. Employees who completed 25 years of service in DRDO were also felicitated. Trophies for various sports events held during 2014-15 were also given away by Shri B Bhattacharya.



Shri B Bhattacharya addressing the employees on the occasion of HEMRL Annual Day

## IRDE, Dehradun

Instruments Research and Development Establishment (IRDE), Dehradun, celebrated its Annual Day on 18 February 2015. Dr SS Negi, OS, Director, IRDE, extended his good wishes to the august gathering. Meritorious employees were awarded on the occasion. Annual sports and various events were organised to celebrate the occasion. Officers, staff and their family members participated enthusiastically in these events.



Dr SS Negi inspecting IRDE Annual Day parade



## International Women's Day

### DRDO HQ

Hon'ble Minister of Human Resource Development Smt Smriti Zubin Irani exhorted women scientists of DRDO to play a greater role in promoting girl education and bringing a change in rural lives. Inaugurating a National Workshop on Women Innovators for Excellence in Research and Science held at DRDO HQ on the occasion of International Women's Day (IWD) on 9 March 2015, Smt Irani said, women scientists can be a source of inspiration for countless girls who seek opportunities to realise their dreams. She said her Ministry has launched the Udaan initiative to prepare girls coming from disadvantaged sections to excel in competitive exams to enter IITs and IIMs and some of the brightest minds in DRDO can interact with the girls who are trying to take flight.

The Minister exhorted women scientists of the premier research organisation to contribute to the success of the 'Unnat Bharat Abhiyan' mission and address issues confronting women in rural India. Unnat Bharat Abhiyan was launched last year by the Government of India and is piloted by IITs and the National Institute of Technology across the country with an aim to uplift rural India through technological interventions.

Speaking on this occasion, Dr K Tamilmani, DS, DG (Aero), DRDO, said that there is a growing realisation that limitations of women's access to resources and

decision making also limits their ability to develop and exercise their full capabilities for their own benefit. This realisation has prompted efforts to equalise opportunities for men and women, he said.

Earlier, in his welcome address, Dr Chitra Rajagopal, OS, Director, CFEES, Delhi, said that innovation grows in an environment where one is free to experiment and learn by trial and error. "Innovation is the process of translating an idea or invention into products or services that create value" she further added. The two-day National Workshop was hosted by CFEES and over 200 women scientists from various DRDO laboratories participated in it.

### ARDE, Pune

International Women's Day 2015 was celebrated on 10 March 2015 at Armament Research and Development Establishment (ARDE), Pune, on the auspicious occasion of the 'Smruti Din' of late Smt Savitribai Phule, the social reformer who led the campaign for education of women.

Dr KM Rajan, OS, Director, ARDE, was the Chief Guest on the occasion, and spoke about the significance of United Nation's slogan for IWD 2015, Empowering Women-Empowering Humanity: Picture It! Dr (Smt) Smita Naik, Sc F, Chairperson of ARDE Women's Cell, presented the report of women cell's activities. An interactive workshop on Cancer Awareness, Control



L to R: Smt Alka Diwan, Dr Chitra Rajgopal, Shri Anil M Datar, Smt Smriti Zubin Irani, Dr K Tamilmani, Shri GS Malik and Smt Alka Suri during the inaugural session of National Workshop on Women Innovators for Excellence in Research and Science at DRDO HQ

Cancer Before It Controls You by Captain (Dr) Ritu Biyani, a cancer survivor and a prominent activist for the cause, was also organised. A cultural programme and fun games were also arranged.



Inauguration of International Women's Day at ARDE

## CEMILAC, Bengaluru

On the occasion of IWD, Dr (Ms) Malathi K Holla, Paralympian and International Para Athlete, visited Centre for Military Airworthiness and Certification (CEMILAC), Bengaluru, and addressed the women employees. Her presence was an inspiration to one and all.

## DARE, Bengaluru

Defence Avionics Research Establishment (DARE), Bengaluru, celebrated IWD on 20 March 2015. Various sports activities were organised on the day for women employees. Dr K Maheswara Reddy, Associate Director, DARE, presided over the function and addressed the gathering on Women's empowerment.



Smt Sowmya Achar and Dr K Maheswara Reddy on the occasion of International Women's Day at DARE

Smt Sowmya Achar, IRS, Joint Commissioner, Income Tax, was the Chief Guest on the occasion. She narrated her experiences and the challenges in family and professional life in the context of women empowerment and called for giving time and space to the girls/women in the family to realise their dreams. Prizes were given by the Chief Guest to winners of various sports events.

## DL, Jodhpur

International Women's Day was celebrated at Defence Laboratory, Jodhpur (DLJ), on 16 March 2015. Dr Kamini Dinesh, former Director, KN Women's College, Jodhpur, was the Chief Guest on the occasion. Dr SR Vadera, OS, Director, DLJ welcomed the Chief Guest and the women employees. Dr Kamini Dinesh expressed her concern over the conditions of women in the country and said it is ridiculous that even educated persons have wrong opinion and often give statements and judgments over women that demolish women dignity. She advocated the equality between men and women in the society.



International Women's Day being inaugurated at DLJ

## DLRL, Hyderabad

Defence Electronics Research Laboratory (DLRL), Hyderabad, celebrated IWD on 17 March 2015. Smt Anjana Sinha, IPS, IG, Police (General & Juvenile Offences), Andhra Pradesh, was the Chief Guest and Smt B Hemalatha, first lady of DLRL, was the Guest of Honour on the occasion. Dr CG Balaji, OS, Director, DLRL, presided over the function. Smt Neeta Gogia, Sc G, Co-Chairperson, Women Cell, DLRL, gave the welcome address. Smt Anjana Sinha gave a talk on Empowering Women followed by invited talk by Dr K





International Women's Day celebration at DLRL, Hyderabad

Niranjan Reddy on Shrouded Womanhood. As a part of the programme, interesting memory games and quiz were organised. The event concluded with the vote of thanks by Smt Lakshmi, Sc E, Member Secretary, Women cell, DLRL.

## GTRE, Bengaluru

Gas Turbine Research Establishment, (GTRE), Bengaluru, celebrated IWD on 9 March 2015. Dr CP Ramanarayanan, OS, Director, GTRE, presided over the function. Prof. Sharada Srinivasan, National Institute of Advanced Studies (NIAS), was the Chief Guest on this occasion and Smt Santhosam Tamilmani and Smt Lakshmi Ramanarayanan, were the Guests of Honour. Later, Prof. Sharada Srinivasan, shared her knowledge in Indian archeological heritage and Use of various high-tech techniques in the metallurgical analysis.



Prof. Sharada Srinivasan inaugurating International Women's Day at GTRE

## HEMRL, Pune

International Women's Day was celebrated at High Energy Materials Research Laboratory (HEMRL), Pune, on 11 March 2015. Smt JK Nair, Sc F, Vice Chairperson of Women's Council, HEMRL, highlighted the importance of the day and briefed about activities of Women's Council in HEMRL. Dr SN Asthana, OS,

Officiating Director, HEMRL, addressed the gathering and highlighted the contributions and achievements of women in various areas of society. An activity-based training programme on Inner Beauty Inner Peace was conducted by Wisdom Solutions on the occasion. About 120 HEMRL women employees participated in the event, which included sessions on stress management, self awareness and emotional maturity. Each session was followed by activities like handcuff, tower building and matchbox values, etc.

## RCI, Hyderabad

Research Centre Imarat (RCI), Hyderabad, celebrated IWD on 17 March 2015. Ms Aruna Bahuguna, IPS, Director, National Police Academy, Hyderabad and Ms Deepanwita Chattopadhyay, CEO, IKP, Knowledge Park were the Chief Guests on the occasion. Ms Deepanwita Chattopadhyay exhorted women to excel in all areas of science and technology. Ms Aruna Bahuguna felt



Ms Deepanwita Chattopadhyay inaugurating International Women's Day at RCI

women should be more positive and dynamic in facing present day problems. Dr G Satheesh Reddy, DS, Director, RCI, appreciated achievements of women scientists and staff in all areas of missile R&D. Later a panel discussion on why women are less as leaders in science and technology was also held.

## TBRL, Chandigarh

On this occasion invited lectures by eminent female achievers from diversified fields were organised. A dedicated web portal for women employees was also made live to ensure greater connect among female employees and easier and faster resolution of women grievances.

## National Science Day

The following DRDO laboratories/establishments celebrated the National Science Day (NSD) to commemorate the discovery of Raman Effect by the great Indian Physicist Sir CV Raman on 28 February 1928.

### ARDE, Pune

Dr Sourav Pal, OS, Director, National Chemical Laboratory (NCL), Pune, was the Chief Guest on the NSD. He gave a talk on Chemical Science towards New Materials and Cleaner Environment. Dr RJ Mukhedkar, Sc F, delivered NSD oration on Optimisation Solution Studies for WTAP–Military Application. Cash awards were distributed to the winners of Best Innovation and Poster Competitions conducted on the occasion.



Dr Sourav Pal delivering talk on the occasion of National Science Day at ARDE

### ASL, Hyderabad

Advanced Systems Laboratory (ASL), Hyderabad, celebrated the NSD on 3 March 2015. Dr I Srikanth,



Dr Tessy Thomas presenting National Science Day Oration Certificate to Dr I Srikanth

Sc D, delivered the NSD Oration on Nano Composites for Aerospace and Defence Application: Achievements and Challenges. Dr Tessy Thomas, OS, Director, ASL, presented NSD medal and certificate to the orator.

### CABS, Bengaluru

Shri MS Raju, Sc D, presented the NSD Oration on 3D Display Technology for Airborne Surveillance Systems. He was awarded NSD medal and certificate by Dr S Christopher, DS, Programme Director (AEW&C) and Director, CABS.



Dr S Christopher (right) presenting the National Science Day Oration Certificate to Shri MS Raju at CABS

### CVRDE, Chennai

Combat Vehicles Research and Development Establishment (CVRDE), Chennai celebrated NSD on 27 February 2015. Dr P Sivakumar, OS, Director, CVRDE, briefed about various technologies developed by DRDO particularly by CVRDE. While stressing the importance of science day, he explained the need to kindle interest in younger generation in basic research. Shri NS Sekar Sc E, gave the NSD Oration on Development of Hydro-Gas Suspension System for Tracked Armoured Fighting Vehicles and Ride Comfort Analysis. Dr P Vasundhra, Sc C, delivered a technical lecture on Virtual Reality.

Science quiz, essay and poster competitions were conducted as part of science day celebrations. Dr P Sivakumar awarded prizes to the winners. Shri K Athavan, Secretary Celebration Committee, proposed the vote of thanks.





National Science Day inaugural function at CVRDE

## CAIR, Bengaluru

Shri Arshad Jamal, Sc E, delivered the NSD Oration on Large Scale Video Analysis and Recognition. In his oration he elaborated that the security scenario around the world has necessitated the need for development and deployment of autonomous surveillance systems at vulnerable places to protect the national assets leading to generation of massive imagery data, which needs to be processed. He provided an overview of various large scale video analysis and recognition algorithms developed around the world.



Shri Sanjay Burman (left), Director, CAIR, presenting National Science Day Oration Certificate to Shri Arshad Jamal

## CEMILAC, Bengaluru

Shri Senthil Kumar G, Sc D, delivered the NSD oration on Understanding of flow physics associated

with Flapping Wing Micro Air Vehicles. The talk brought out the potential application of flapping flights in the development of micro aerial vehicles.



Shri Senthil Kumar G (left) receiving the National Science Day Oration Certificate from Shri P Jayapal, Chief Executive (A), CEMILAC

## DL, Jodhpur

Defence Laboratory, Jodhpur (DLJ), organised science quiz for school children on 10 February 2015. About 100 students of 9<sup>th</sup> and 11<sup>th</sup> standards from various schools of Jodhpur and adjoining areas participated in the contest. Winners of the contest were awarded by Dr SR Vadera, OS, Director, DLJ.

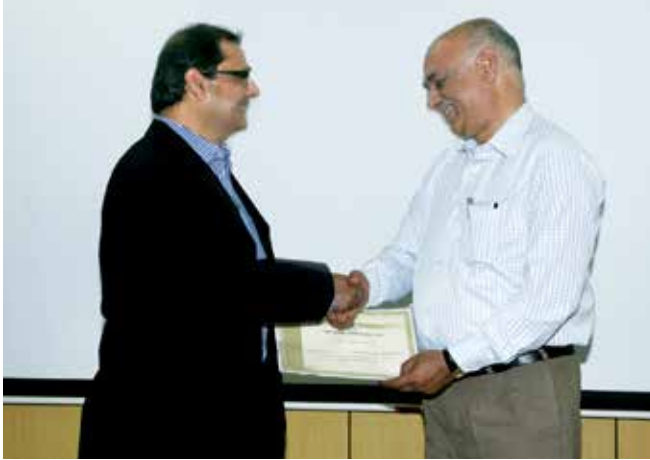
Dr Anuj Shukla, Sc E, delivered the NSD Oration on Microwave Absorbing Materials. Dr Vadera presented certificates to scientists and staff for the best scientific papers, technical reports and patents/copyrights filed during the year 2014.



Dr SR Vadera (left), Director, DLJ, presenting National Science Day Oration Certificate to Dr Anuj Shukla

## DRDE, Gwalior

Dr Rahul Bhattacharya, Sc F, delivered the NSD Oration on Cyanide: Threats Toxicology and Treatments. Dr Lokendra Singh, OS, Director, DRDE, presented NSD medal and certificate to Dr Bhattacharya.



Dr Lokendra Singh (right), Director, DRDE, presenting the National Science Day Oration Certificate

## HEMRL, Pune

High Energy Materials Research Laboratory (HEMRL), Pune, celebrated NSD on 27 February 2015. Dr S Pal, Hon'ble Vice Chancellor, Defence Institute of Advanced Technology (DU), Pune, was the Chief Guest on the occasion.

Dr SN Asthana, OS, Officiating Director, HEMRL, in his speech said that science day celebration will help in popularising the importance of science and applying it for the benefit of mankind. Dr Pal in his address highlighted



Dr S Pal, Vice Chancellor, DIAT, Pune, presenting National Science Day Oration Certificate to Shri Sujoy Debnath

the contributions of ISRO and DRDO. He also exhorted young scientists to come out with newer ideas. The NSD Oration was delivered by Shri Sujoy Debnath, Sc E, on Pyrotechnic Infrared Decoy Flairs for Self Protection of Aerial Vehicles. The speaker highlighted the need of IR decoy flairs and their roles in protection of various fighter aircraft during a war. He also gave a brief about the status of development of various IR decoy flairs for different aircraft at HEMRL. He was presented a NSD medal and certificate by Chief Guest.

## ITM, Mussoorie

Institute of Technology Management (ITM), Mussoorie, celebrated NSD with a short documentary on the achievements of DRDO. A science quiz was organised for the school children of Kendriya Vidyalaya, Sanatan Dharam Girls Inter College and Mussoorie Girls Inter College, Mussoorie. Extempore lectures on contemporary science topics were also conducted. Dr SB Singh, OS, Director, ITM, addressed the gathering and stressed upon scientific bent of mind and spirit of science to be developed amongst the new generation. He stressed upon the fact that science forms the bed rock of all inquiries for societal advancement and therefore it is our duty to promote science among the student mass. A function was organised at the Science Learning Centre of ITM where the basic principles of science were explained to school students. The programme culminated with a distribution ceremony during which all the students were awarded.

## NPOL, Kochi

Dr R Rajesh, Sc E, delivered the NSD Oration on Fiber Optic Hydrophones: Choice for Futuristic Advanced Compact Passive Sonar. The talk was a lucid narration of the characteristics, types and applications of fiber optic hydrophones especially in compact sonars.

Shri S Anantha Narayanan, DS, Director, NPOL, delivered a talk on My Vision for NPOL focusing on future commitments, challenges and promising capabilities of the laboratory. He presented NSD Oration Certificate and Medal to the science day orator.

Dr T Santhana Krishnan, Sc E, Shri K Sasikumar, Sc D, Dr NR Manoj, Sc F, Dr R Ramesh, Sc F and Dr





Dr R Rajesh (right) receiving the National Science Day Oration Certificate from Shri S Anantha Narayanan, Director, NPOL

T Mukundan, Sc F, who were granted US and Indian patents for their product were felicitated on the occasion.

## NSTL, Visakhapatnam

Naval Science and Technological Laboratory (NSTL), Visakhapatnam, organised science talks, open house exhibition with participation of scientists and students during 27 February -2 March 2015.

Dr DN Reddy, Chairman, Recruitment and Assessment Centre (RAC), Delhi, inaugurated the NSD celebration on 27 February 2015. Delivering the welcome address, Shri C Durga Malleswar, OS, Director, NSTL, spoke on the importance of taking up research in science which would help to improve quality of life by providing state-of-the-art technologies for the benefit of common man. He touched upon the employability gap for fresh graduates and how to address the issue.

Speaking on the occasion, Dr DN Reddy spelt out the various technological breakthrough that helped to foster a comfortable life. He also explained various technologies of the future and their likely impact on the life in the 21st century and beyond.

In line with Prime Minister Shri Narendra Modi's view expressed at DRDO Day Celebrations that scientists need to provide necessary support to students in building scientific spirit in them and in tune with this year's Science Day theme "Science for Nation Building", Shri CD Malleswar devised a programme TEAMSONG—Talent Exploration, Assessment and Motivation for Scientists of Next Generation to build scientific spirit in the youth. Students from over 50 Engineering Colleges,



Dr DN Reddy, Chairman, RAC, inaugurating National Science Day inaugural function at NSTL

Degree Colleges and 20 Schools were put up for display. Various systems developed by NSTL, and its facilities were kept open for the benefit of students and general public. This provided students an opportunity to meet and interact with scientists working on advanced technologies.

As a part of the celebrations, Dr PS Avadhani, Professor and Vice Principal of Andhra University College of Engineering, spoke on Information Technology and Society. He gave a detailed presentation on various aspects of Cyber Security, Cyber Crime and related legislation. Besides, Shri M Srinivas, Sc C, delivered NSD Oration on Reduction of Hydrogen Gas Evolution on Aluminium Anode of Al-Ago Battery by Heat Treatment.

## TBRL, Chandigarh

Dr Surinder, Sc D, delivered the NSD Oration. Chief Guest Prof. Ashok Kumar Ganguli, Director, Institute of Nano Science and Technology, Mohali, Punjab, described that how with very limited resources one can contribute to great extent in the field of basic science.

## VRDE, Ahmednagar

Vehicles Research and Development Establishment (VRDE), Ahmednagar, celebrated NSD by organising a number of competitions for college students. Shri MW Trikando, Principal Associate Director, VRDE, inaugurated the function. Dr Vijay Bhatkar, Architect of India's Super Computer was invited as the Guest Speaker. He gave a lecture on Recent Trends in



Information Technology and suggested that from next year the theme of NSD should be Science for Building Nation. Shri A Kannan, Sc C, gave the NSD Oration on

Performance Evaluation of Vehicle by using Jatropha-based Bio Diesel for Defence Application. He was presented the NSD Oration Medal and Certificate.

## Swacch Bharat Campaign

### CEMILAC, Bengaluru

Continuing the Swacch Bharat Campaign, Centre for Military Airworthiness and Certification (CEMILAC), Bengaluru, invited Dr Rajendra Joshi, Senior Chief Medical Officer, Central Health Service, to deliver a talk on Cleanliness Promoting Good Health. Dr Joshi's talk included the subject of H1N1 and Dengue, the symptoms and its prevention through cleanliness.



Dr Rajendra Joshi delivering the talk on cleanliness

### LASTEC, Delhi

To create awareness about cleanliness Laser Science and Technology Centre (LASTEC), Delhi organised a walk to generate awareness and interest towards cleanliness. The walk started from LASTEC and proceeded via Trauma Centre, Shri Ram Road, adjoining areas and back to LASTEC. Shri HB Srivastava, Director, LASTEC, led the walk along with other LASTEC employees. Lot of people came forward and joined the walk to further strengthen the Swacch Bharat Abhiyan.



Swacch Bharat Rally by LASTEC employees

### PXE, Chandipur

Proof and Experimental Establishment (PXE), Chandipur, organised a walk up to a nearby local village with banners and placards for creating awareness about the cleanliness among the villagers. A debate on Cleanliness in PXE was also organised on 31 March 2015 in which 12 employees participated. Miss Pooja Singh, Hindi Assistant, was awarded the best performer.



Swacch Bharat awareness walk by PXE employees

### READERS' VIEWS

Your feedback is important for us as it gives us scope for improvement and serve the Organisation in a better way. DRDO Newsletter requests its esteemed readers to send their views about the quality of contents and coverage in the Newsletter. Please send your suggestions to:

The Editor, DRDO Newsletter, DESIDOC, Metcalfe House, Delhi-110 054





## Manpower Development Activities

Conferences/Seminars/Symposia/Training Courses/Meetings

### Translation Course

A five-day Translation Course was organised at **Aeronautical Development Establishment (ADE), Bengaluru**, during 23-27 February 2015 by Central Translation Bureau, Ministry of Home Affairs, Department of Official Language, Bengaluru. The inauguration programme began with the invocation song and lighting of the lamp.

In his presidential address, Shri P Srikumar, OS, Director, ADE, encouraged all the participants to make utmost use of the course and contribute in the official language implementation. A total of 24 officers/staff of all cadres of the establishment benefitted from the Course. The participants were imparted knowledge on the constitutional status of Hindi, nature and methodology of translation, official translation, Hindi-English terminologies, etc., along with practical sessions.



Shri P Srikumar delivering inaugural address

### CEP on Assurance Requirement of Off-the-Shelf and Open Source Components in Mission Critical Systems

**Centre for Artificial Intelligence and Robotics (CAIR), Bengaluru**, organised a course on Assurance Requirements of Off-the-shelf and Open Source Components in Mission Critical Systems during 23-27



Participants with Shri Sanjay Burman, Director, CAIR (sitting centre)

February 2015 under Continuing Education Programme (CEP) of DRDO. Nineteen participants, including three service personnel attended the course. Shri Vinay Aggarwal, Sc E, Course Director, explained the objective of the course, which aimed at providing insight into issues, challenges and way ahead in the context of usage of COTS and Open Source Software for mission critical systems.

Twenty-four lectures covering various aspects related to assurance requirement such as security, reliability, survivability, dependability and availability of off-the-shelf and open source components in mission critical systems, cots and open system security, analysis techniques for scanning vulnerabilities in source code and executable were delivered by the expert faculty comprising scientists who have experience of working in the relevant domain, service personnel and by speakers from renowned Industries.

### Workshop on Aligning Training Programmes of DRTC and Admin/Allied with the Organisational Objectives of DRDO

**Centre for Personnel Talent Management (CEPTAM), Delhi**, organised a one-day workshop on 4 March 2015 on Aligning Training Programmes of DRTC and Admin/Allied cadres with the organisational objectives of DRDO. The objective of the workshop

was to discuss and align training methodology, contents, faculty, duration and venue, etc., as per the organisational needs. The workshop was inaugurated by Dr Hina Gokhale, Director, Directorate of Human Resource Development (DHRD), DRDO HQ, in the presence of Shri RB Singh, Chairman, CEPTAM, and Shri Sudhir Gupta, Director, CEPTAM. Representatives from DG clusters; DHRD; DoP; DBFA; DP&C; RTI; Vigilance; DRDO Training Institute, Jodhpur; Targeted Training Centre, Bengaluru; ITM and representatives from INMAS, CFEES, ISSA, LASTEC, SSPL, DIPR and SPIC attended the workshop. The CEPTAM Training Calendar for the year 2015-16 was also released in the inaugural function.

The workshop came out with changes/inputs in Induction Training of new entrants in view of mandatory two-weeks along with the inputs in orientation and technical trainings offered by CEPTAM. The inputs provided guidance to CEPTAM in reviewing some of its training offerings to the concerned cadre. The workshop highlighted the need for such interactions in the future.



Dr Hina Gokhale inaugurating the workshop on Aligning Training Programmes of DRTC and Admin/Allied Cadres

## Workshop on Generic Vehicle Architecture

A two-day workshop on Generic Vehicle architecture (GVA) was organised by **DIC and TCG (Vehicles)** in consultation with **DG (ACE)** and **CC R&D (PC&SI)**, during 25-26 February 2015 at DRDO HQ, New Delhi, under Indo-UK Govt to Govt Cooperation. Around 35 delegates



Workshop on Generic Vehicle Architecture in progress at DRDO HQ DRDO Bhawan

of senior officers from Defence Science and Technology Laboratories (DSTL), MOD, UK; DRDO HQ; Indian Army; Combat Vehicles Research and Development Establishment (CVRDE), Chennai; Vehicles Research and Development Establishment (VRDE), Ahmednagar; Instruments Research and Development Establishment (IRDE), Dehradun; Research and Development Establishment Engineers [R&DE(Engrs)], Pune; Electronics and Radar Development Establishment (LRDE), Bengaluru; Defence PSUs, i.e., BEML, Bengaluru and BEL, Chennai actively participated in the Workshop. DSTL team was led by Mr Richard Hooper, Project Lead, along with Mr Ross Jones, CCS Programme Manager and Mr Benet McNamra, MCS Project Technical Lead. The visitors met Dr Sudarshan Kumar, DS, CC R&D (PC&SI) before commencement of the workshop. He appreciated the UK MoD initiative to delegate experts to conduct the workshop. Indian team was led by Shri Benjamin Lionel, Director Tech (Vehs) who is the Point of Contact for proposed GVA Programme. Shri SN Yadava, Addl Director, TCG, DRDO HQ, was the Workshop Coordinator.

The aim of the workshop was to spread awareness about GVA that defines the open, modular and scalable electronic and physical architecture of ground weapon platforms, to promote the efficient design of vehicles and to enable cost-effective upgrades through life, in cooperation with industry and academia. The scope of deliberation included the introduction about DRDO and its activities in the field of fighting vehicles; introduction about DSTL, UK by UK team; overall view of GVA,



and its benefit by UK Team; research area in the field of Vetrionics at their end by UK team; and detailed deliberation on GVA standard, and its implementation, issues and prospects. The roadmap for future action plans was also decided.

## ECS Cluster Meet

**Defence Electronics Application Laboratory (DEAL), Dehradun**, organised meeting of the Electronics Cluster laboratories of DRDO on 14 March 2015. The meeting was chaired by Shri SS Sundaram, DG, ECS and was attended by Directors of Defence Avionics Research Establishment (DARE), DEAL, Solid State Physics Laboratory (SSPL) and IRDE. Other ECS labs joined via video tele-conferencing. Shri Sundaram was apprised about the ongoing projects including that



Workshop on Sarkari Kaamkaj mey Sahaj avam Saras Hindi in progress at DEAL

The workshop was conducted by Shri Anupam Pandey, Assistant Passport Officer.



Shri Sundaram being apprised about ongoing projects at DEAL of Software Defined Radio (SDR), VLF Communication Systems and Integrated Coastal Surveillance System.

## Corporate Review Committee Meeting

Meeting of the Corporate Review Committee of **Defence Laboratory (DLJ), Jodhpur**, was held on 2 March 2015 at DLJ under the chairmanship of Lt Gen Anoop Malhotra, CC R&D (R&M). The meeting was attended by members of the Corporate Review Committee from DRDO HQ. Smt Nabanita R Krishnan, Director, P&C, DRDO HQ, gave introductory remarks. Dr V Bhujanga Rao, DS, DG (NS&M), welcomed all the members on behalf of the Corporate Review Committee.

The Chairman briefed about the objectives and charter given by DRDO HQ to discuss the Manpower, Material Management, Budget and Finance and other issues related to the laboratory. Dr SR Vadera, OS,

## Workshop on Sarkari Kaamkaj mey Sahaj avam Saras Hindi

A Hindi workshop was organised by Rajbhasha Coordination Committee, **DEAL, Dehradun**, on 25 March 2015 for Senior Technical Assistant, Technical Assistants and Technicians. The topic of the workshop was *Sarkari Kaamkaj mey Sahaj avam Saras Hindi*.



Corporate Review Meeting in progress at DLJ

Director, DLJ, gave a presentation covering DLJ's structure, status of current projects, future projects and issues related to HR, works, finance, etc.

## CEP on Communication ESM Technologies

**Defence Electronics Research Laboratory (DLRL), Hyderabad**, conducted a CEP course on Communication ESM Technologies during 16-20 March 2015. Dr CG Balaji, OS, Director, DLRL, inaugurated the course and released the course material. In his inaugural address, Shri Balaji stressed the importance of Communication ESM Technologies for electronic warfare systems.

Sixteen technical lectures were delivered by eminent academicians, industrial experts and scientists from DLRL. Topics covered during the course included basics of communications to latest trends in communications like multiple input multiple output (MIMO) technologies and its benefits, wireless communications, etc. It also included electronic support technologies to Com ESM systems like antennas, packaging and thermal analysis and qualification aspects. Twenty-five participants from SI Directorate, BEL, Hyderabad, and from different DRDO laboratories attended the course. Ms K Anitha, Sc F, was the Course Director and Ms P Usha Rani, Sc F, was the Course Coordinator.

## Conference on Microscopy in Materials Science and Biometric Technology

Academy of Microscope Science and Technology (AMST) provides a common platform to researchers,

scientists and technologists to share their views and extend collaboration so that the multidimensional growth could be achieved in materials science, life science and instrumentation.

The recent trends in S&T are tending towards the development of new multifunctional materials to miniaturise the technologies having diversified properties in one so that the exploration could be made successful. AMST organised a Conference on Microscopy in Materials Science and Biometric Technology during 26-28 February 2015 at **Defence Materials and Stores Research Development Establishment (DMSRDE), Kanpur**. The conference was aimed to provide a common platform to all academicians, scientists and technologists working in the areas of materials science, life science and instrumentation together because the advancement in materials science and life sciences are



Inauguration ceremony of AMST Conference at DMSRDE



Dr CG Balaji (third from left) releasing CEP course material at DLRL

largely dependent on the advancement of microscopy. The fast expansion in the number of microscope in India in different laboratories has necessitated a pool of trained and skilled manpower to run these machines efficiently and to impart training to researchers and students on SEM, TEM, etc.

The conference provided a common forum for R&D labs, academia, industry, and the user agencies to get together and discuss the present status and the various challenges and opportunities that lie ahead.



## International Workshop on Advances in Solid Propellant Systems–2015

**High Energy Materials Research Laboratory, (HEMRL), Pune**, in association with High Energy Materials Society of India (HEMSI) organised an International Workshop on Advances in Solid Propellant Systems–2015 (IWAPS–2015) during 12-13 March 2015 at Dr APJ Kalam Auditorium, Pashan. The workshop was aimed at providing a platform for scientists, technologists, academicians and industries to come together and exchange views on various aspects related to research and development in the area of new generation Solid Propellant Systems.

Shri B Bhattacharya, OS, Director, HEMRL, and Patron, IWAPS-2015, gave an overview of the events organised by HEMSI and briefed about the topics to be covered during the two-day workshop.

Shri Anil M Datar, DS, DG (Armaments & Combat Engineering), DRDO, inaugurated the workshop. In his inaugural address, he emphasised on the need for interactive sessions and encouraged all the delegates to deliberate on state-of-the-art and advanced technologies in the area of Solid Propellant Systems. He also stressed on the future trends in armament systems in the context of advancements in High Energy Materials.

Mr Andrey Litvinov, Deputy Director General, Altai, Russia, the Guest of Honour, also addressed the gathering and appreciated the efforts made by HEMRL

and HEMSI in organising the workshop. He also delivered a talk on Approaches for Accurate Prediction of Life for High Energy Materials.

In his welcome address, Dr SN Asthana, OS, and Chairman, IWAPS-2015, welcomed the participants and brought out the significance of IWAPS in fast changing HEM technology scenario.

The workshop included five technical sessions comprising 14 invited talks from eminent researchers in Solid Propellant Systems. Experts from France, Russia, Singapore and the United Kingdom also delivered talks on issues like innovative approaches, current research in their respective countries, state-of-the-art processing technologies, advances in propellant ingredients, relevance of nano materials, advanced testing methods, etc. Researchers from ISRO and DRDO also delivered talks on Mars Mission of India, evolution of solid propellants and modern disposal methods.

Around 250 delegates from various countries, DRDO, ISRO, Ordnance Factories, academia and industry attended the workshop. The extensive deliberations and discussions during the two-day workshop provided key inputs in the area of High Energy Materials for futuristic defence technologies.

The workshop concluded with Panel Discussion on evolving future line of action for collaborations and roadmap for further research a development in this area. Shri PP Singh, Sc F, Convenor, IWAPS-2015, proposed the vote of thanks.



Inaugural session of International Workshop on Advances in Solid Propellant Systems

## Workshop on Publish and Present: Strengthening the Quality of Scientific Scholarly Communication

University College of Science (UCSS), Saifabad, Osmania University (OU), in collaboration with Institute of Nuclear Medicine and Allied Sciences (INMAS), Delhi, and Defence Metallurgical Research Laboratory (DMRL),



Inaugural session of workshop on Publish and Present

Hyderabad, organised a seminar-cum-training workshop on Publish and Present: Strengthening the Quality of Scientific Scholarly Communication during 16-18 March 2015 at Tamhankar Auditorium, DMRL, Hyderabad.

Prof. D Balasubramanian, Director Research, LV Prasad Eye Institute (LVPEI) and former Director, Centre for Cellular and Molecular Biology (CCMB) inaugurated the event. In his Inaugural address, he emphasised on quality in scientific publication and presentations. Welcome address was delivered by Dr Amol A Gokhale, Director, DMRL. Dr RP Tripathi, Director, INMAS and Prof. Syed Rahman, Principal, UCSS, OU were the Guests of Honour. Dr Rajeev Vij, Sc F, Director of the Programme, gave a brief about the workshop. Many eminent resource persons from India and abroad presented informative lectures on topics related to Scientific Scholarly Communication. Prof. Subbiah Arunachalam, Prof. Vangari Vishwa Mohan, Prof. CK Ramaiah, Dr AL Moorthy, Dr G Mahesh, Prof. S Sudarshan Rao, Shri Chandrashekar DP and Ms Nitisha Balay, Dr Peter Suber, Mr Trevor A Grigoriev Dawes, Ms Naomi House and Mr James Agee, interacted with the participants. The participants interacted online with the foreign experts. Ninety-four participants included students, research scholars and scientists.

## Course on Safety Awareness at Workplace

**Integrated Test Range (ITR), Chandipur**, organised a short-term course on Safety Awareness at Workplace during 17-18 March 2015. Forty-five participants comprising Technical Officers, Supervisory Staff, Safety Committee Members and Safety Monitors of all Groups

and Directorates of ITR attended the course. The faculty was drawn from the Institute of Fire and Safety, Cuttack.

Shri MVKV Prasad, OS, Director, ITR, inaugurated the Course. Shri MV Bhaskarachary, Sc G, Associate Director and Dr BK Das, Sc G, Chairman Works Committee addressed the participants. Emphasis was given on house keeping and safe, clean and healthy workplace in line with Swachh Bharat Abhiyaan of the Hon'ble Prime Minister of India. Various video films on fire and industrial safety, demonstration of safety appliances and personal protective equipment and quiz were conducted to make the technical sessions interactive. Shri RK Behera, Sc F, was the Course Director and Dr SK Sahu, Sc D, was the Course Coordinator.

## CEP on Quality Improvement in Engineering Practices

**Microwave Tube Research and Development Centre (MTRDC), Bengaluru**, conducted a CEP course on Quality Improvement in Engineering Practices at BEQI Campus, Bharat Electronics, Bengaluru, during 25-27 February 2015. Eighteen participants attended the course. The course covered quality basics, quality tools, awareness on the concepts of ISO 9001, ISO 14001, AS 9100, CII Exim model, six sigma and LEAN.

## Workshop for the Technical Officers

**Proof and Experimental Establishment (PXE), Chandipur**, organised a Hindi Workshop for the Technical Officers during 9-13 March 2015. The workshop was inaugurated by Shri R Appavuraj, Director, PXE. In his inaugural address he said that the workshop would improve working in Hindi. Twenty officers participated in the workshop. The working methodology on Hindi was discussed in detail by Shri SK Ray, Hindi Officer, and Kumari Pooja Singh, Hindi Assistant. Dr AK Sannigrahi, Sc F and Additional Director, narrated in brief about the origin and growth of Hindi and also focused on the uses of Hindi as official language. Dr N Nayak, Sc G and Associate Director, discussed advanced testing technology to be used in future armament development. Shri KK Chand, Sc E, also briefed the participants about safety procedure in official work.





Shri R Appavuraj, Director, PXE, inaugurating the Workshop for the Technical Officers

## CEP on Administrative & Financial Procedure

**Proof and Experimental Establishment (PXE), Chandipur**, organised a CEP course on Administrative and Financial Procedure for 30 Administrative Assistants and Officers of DRDO during 16-20 March 2015. Shri R Appavuraj, OS, Director, PXE, inaugurated the course and inspired the participants to take full benefits of the programme by knowing different government rules and regulation on administration and following these in true sense in their office work.

Different rules and regulation on leave, TA/DA, LTC, advances and allowances, welfare measures, new pension system, retirement benefits, etc., were discussed in details by the expert faculty. Important topics like team building, positive attitude, good habits,

and polarity management were also discussed. Dr AK Sannigrahi, Sc F, was the Course Director.

## Science Council Meet

**Research Centre Imarat (RCI), Hyderabad**, organised Science Council meeting of RCI. Invited lectures on Nanoscale Transistors for Low Power Integrated Circuits: New Innovations by Prof. M Jagadesh Kumar from IIT Delhi and Brain Stress Mapping using Non-invasive Imaging Technique and its Potential by Prof. Parvat Mandal from National Brain Research Center, Manesar, Gurgaon were organised. Dr G Satheesh Reddy, DS, Director, RCI, presided over the function.

## CEP on Hardware in Loop Simulation

**Research Centre Imarat (RCI), Hyderabad**, organised a CEP on Hardware in Loop Simulation (HILS) during 23-27 February 2015. Shri L Sobhan Kumar, Sc G, Course Director, in his welcome address stressed on the objectives of the course. Dr G Satheesh Reddy, DS, Director, RCI, inaugurated the course. He highlighted the importance of HILS and need of system design covering realistic simulation features. More than 34 participants from various DRDO laboratories and other organisations attended the course. The important topics covered during the course included: Introduction to missile aerodynamics, navigation, control and guidance, RF and IIR seekers modelling and HILS,



Shri R Appavuraj (third from right) with participants of CEP course on Administrative and Financial Procedure at PXE



Dr G Satheesh Reddy (fourth from left in front row) with course participants

Monte Carlo simulation, model-based design approach, 6-DOF modelling, future trends in HILS, etc. Shri Samir B Patel, Sc E, was the Course Coordinator.

## Hindi Workshop

Research Centre Imarat, Hyderabad, organised fourth Hindi Workshop on 18 March 2015 for the year 2014-15. Shri K Rama Sharma, ScG, DOMS, Vice Chairman, OLIC, RCI, inaugurated the workshop. Shri N Venkatesh, Sc F, Member Secretary, OLIC, highlighted various activities of Hindi Cell. Shri Kazim Ahmed, Senior Hindi Assistant, RCI, delivered lectures on Rajbhasha rules and implementations and Hindi grammar. Around 20 participants attended the workshop.

## CEP on Latest Trends in Aerospace Instrumentation

Directorate of Flight Instrumentation, RCI, Hyderabad, conducted a CEP course on Latest Trends in Aerospace Instrumentation during 2-6 March 2015. Twenty-three participants from various DRDO laboratories like ASL, DRDL, CVRDE, CABS, ADA, ITR, PXE, ANURAG, GAETEC and RCI attended the course. Dr G Satheesh Reddy, DS, Director, RCI, inaugurated the course. In his opening remarks, he laid emphasis on the importance of flight instrumentation in missile and avionics applications and hoped that the CEP

would give an exposure of latest trends in aerospace instrumentation system to all the participants. Dr SB Gadgil, OS, Associate Director, RCI, in his concluding remarks expressed that participants might have benefitted from the CEP.

## Sangoshthee on Rashtra Nirmaan evam Raksha Anusandhan

Scientific Analysis Group (SAG), Delhi, together with sister DRDO labs in Metcalfe House Complex, organised a two-day *Samyukta Rajbhasha Hindi Sangoshthee on Rashtra Nirmaan evam Raksha Anusandhan* during 25-26 March 2015. Shri RB Singh, Chairman, CEPTAM, was the Chief Guest of the inaugural function, which was also graced by Shri Haribabu Shrivastva, Director, Laser Science and Technology Centre (LASTEC), and Shri Sudhir Gupta, Director, CEPTAM, Shri SB Taneja, Director, ISSA and Dr MR Bhutiyan, Director, Defence Terrain Research Laboratory (DTRL).

Smt Anu Khosla, Sc G, SAG, welcomed the distinguished guests and apprised the house about the objective of the *Sangoshthee*; to encourage technical writing through the medium of Hindi and to provide a platform to scientific community for writing research papers in Hindi. Shri RB Singh released the *Sangoshthee Smarika* and in his address motivated the gathering for writing more scientific and technical research papers in





Chairman CEPTM, Shri RB Singh inaugurating the *Sangoshthee on Rashtra Nirmaan evam Raksha Anusandhan* organised by SAG

Hindi. About 30 research papers covering the length and breadth of the issues important to nation building and defence research were presented during the workshop. Smt Pratibha Yadav, Sc G and Vice President of Rajbhasha Implementation Committee, SAG, proposed the vote of thanks.

## Research Council Meeting

First meeting of re-constituted **SASE** Research Council was held on 23 March 2015 under the chairmanship of Dr PS Goel, former Secretary, Ministry of Earth Science (MoES) and Prof MGK Menon DRDO Chair. Shri Naresh Kumar, Sc G, R&D E (Engrs), Pune, Dr Amod Kumar, Sc F, Office of DG (ACE), Pune, and

Maj Vikram Singh, Military Operations, New Delhi, were present in the meeting as expert members.

Shri Ashwagosh Ganju, Director, SASE, welcomed the members and delivered a brief presentation on the ongoing research activities and futuristic programme of SASE. This was followed by the presentation of different divisions by respective scientists. In his opening remarks, Dr Goel emphasised on the need of inclusion of scientists from Central Scientific Instruments Organisation, Chandigarh; National Remote Sensing Centre, Hyderabad; Ministry of Earth Sciences and the Indian Institute of Tropical Meteorology, Pune, in the Research Council as the areas in which SASE is working are very specialised and multi-disciplinary.

The council also suggested formulation of futuristic R&D programme as per the requirements of the Army and more relevant to the country. The council deliberated upon the following subjects: Avalanche forecasting, training of trainers in avalanche prone areas, ground penetrating radar studies, Doppler weather radar, avalanche control structures, snow harvesting, avalanche hazard maps, web-based cryosphere portal, calibration of snow-met instruments and setting up of Cryosphere Simulation Laboratory. The Council was of the opinion that SASE should expand its role in the entire Himalayan region for providing service in avalanche forecasting to civilian population.



Shri Ashwagosh Ganju and Dr PS Goel at SASE Research Council Meeting

## Insensitive Munition Test Methodologies and Protocols

For the first time in the country, a CEP course on Insensitive Munition (IM) Compliance was organised by **Terminal Ballistic Research Laboratory (TBRL), Chandigarh**, during 16-20 February 2015. Aim of the course was to provide guidance on implementing the policy and requirements, which has international traceability. Fifteen lectures by experts in the field were delivered to 38 participants.

## National Safety Week

### ARDE, Pune

The 44<sup>th</sup> National Safety Week (NSW) was celebrated at Armament Research and Development Establishment (ARDE), Pune during 4-10 March 2015. To mark the occasion, Cmde (Retd) SK Patel, Director, DQR&S, DRDO HQ, delivered a guest lecture on Safety Culture. Essay, slogan and drawing competitions on safety aspects were conducted for all ARDE employees as a part of the celebrations. All the winners were awarded Cash Prizes. ARDE also organised a special training programme on First Aid with CPR Emergency Responses.



Cmde (Retd) SK Patel delivering the lecture on Safety Culture

### HEMRL, Pune

The NSW was celebrated at High Energy Materials Research Laboratory (HEMRL), Pune, during 4-10 March 2015. Various programmes were arranged during the week and safety badges and safety gift items were distributed to all employees. Fire fighting demo was organised to create awareness about fire safety. Safety quiz was also conducted for different categories of employees. First three winners in each category were awarded with prizes and certificates. Slogan competition on Safety, Health and Environment in English, Hindi and Marathi was conducted and the best three slogans from each language were awarded with prizes and certificates.



Dr SN Asthana (left), OS, releasing Safety, Health and Environment Bulletin

A Safety Health and Environment Bulletin containing various articles pertaining to safety, health and environment was released and best three articles from the bulletin were awarded prizes.

### ITR, Chandipur

The NSW was organised at ITR, Chandipur, during 4-10 March 2015. The programme was inaugurated by Shri MV Bhaskarachary, Sc G, Associate Director, who administered a pledge on Safety and Health to all employees. Shri Jiban Mohapatra, DGM and ES, NALCO, BBSR was the Chief Guest on this occasion. He delivered a talk on Evaluation of Safety, Health and Environmental Clauses in India and highlighted the environmental clearances required for new strategic projects of DRDO.

In his keynote address, Shri PC Routray, Sc G, highlighted the Importance of Safety in Range Scenario. The welcome address was delivered by Shri RK Behera, Sc F. The Best Conscious Directorate of ITR was awarded a Trophy and a Certificate. The Best Safety Monitor of ITR for the year 2014-15 was awarded to Shri Santosh Kumar Kabi, TO A. Safety Week Programme was organised by Dr SK Sahu, Sc D.





Safety and health pledge being administered on the occasion of National Safety Day at ITR

## NPOL, Kochi

Naval Physical and Oceanographic Laboratory (NPOL), Kochi, celebrated NSD on 4 March 2015 to promote the awareness of safety in the laboratory. The programme started with flag hoisting by the senior most technician, followed by safety day pledge by the NPOL fraternity and a live demo on fire fighting.

Dr Reji John, Sc F, Chairman, Safety Committee, NPOL, welcomed the gathering and



National Safety Day pledge being taken at NPOL

stressed the importance of practicing safety measures in the working environment.

Shri S Kedarnath Shenoy, Director, NPOL, in his address, emphasised the pivotal role of safety measures in ensuring safety of human life and assets and highlighted the significance of safety through cleanliness and its relevance with Swachh Bharat Abhiyan initiative by the Government of India.

As part of the celebration, an invited talk on Fire and Safety by Shri Harikumar, Lead Fire Fighter, Fire and Rescue Department, Government of Kerala, was also organised.

## EMU (R&D), Delhi wins Trophies at Pusa Horticulture Show 2015

The Estate Management Unit (R&D) Delhi, won 28 prizes during the Garden Competition organised by Delhi Agri-Horticulture Society at Indian Agricultural Research Institute (IARI), Pusa, New Delhi, from 25 February to 01 March 2015.

The trophies won are: Verma and Company Challenge Cup for the best large garden attached to institutions, embassies, hotels and clubs in Delhi and New Delhi; DAHS Challenge Cup for best medium, small and mini gardens attached to institutions, embassies, hotels and clubs in Delhi and New Delhi; Second prize

in the category of small and mini gardens attached to institutions, embassies, hotels and clubs in Delhi and New Delhi; DAHS Challenge Cup for the best small garden in a government allotted accommodation and 18 other prizes for best potted plants, cut flowers and flower arrangements like rangoli, floral craft, etc., in Delhi and New Delhi.

Besides, EMU also begged Best Garden Trophy for Aerial Delivery Research and Development Establishment (ADRDE) Guest House and Community Centre, Agra.

## Personnel News

### Appointments

#### VC, DIAT, Pune



**Dr Surendra Pal** has taken charge as the new Vice Chancellor, Defence Institute of Advanced Technology (DIAT), Deemed University, Pune, wef 3 February 2015.

A space communication technologist, Dr Pal is an accomplished researcher, academician, administrator and visionary of great repute. He is an alumnus of Birla Institute of Technology and Science, Pilani and Indian Institute of Science, Bangalore. He is former Prof. Satish Dhawan Professor and Senior Advisor Satellite Navigation Programme, Indian Space Research Organisation (ISRO); Distinguished Scientist, Associate Director and also Programme Director Satellite Navigation Programme at ISRO Satellite Centre, Bangalore; and also President of Institution of Electronics and Telecommunication Engineers (India).

Dr Pal joined ISRO in 1971 after a brief stint at Tata Institute of Fundamental Research. He pioneered the microwave, antenna and RF communication activities at the ISRO Satellite Centre at its inception. He was responsible for development of onboard telecommunication systems of all Indian satellite starting from Aryabhat to IRS, INSAT, GSAT, low Earth orbit series of space crafts and Chandrayan. The team mentored by him worked for Mars Orbiter Mission (Communication System). He is also responsible for pioneering satellite-based navigation activities in India. He spearheaded the Indian satellite-based wide area augmentation system, GAGAN (GPS-Aided Geo Augmented Navigation System) from infancy to blossom and Indian Regional Navigation Satellite System (IRNSS) for aviation activities for civilian and restricted users (GAGAN is operational after certification by DGCA for civil aviation. IRNSS four satellite are in orbit). He is the initiator of Satellite Navigation Programme in India.

Programmes initiated by him, would impact and benefit to a host of GNSS users in the Asia Pacific Region and Indian Security Services. During his 42-year career at ISRO, he developed many innovative technologies, which even now are important for other world space agencies; One example is satellite-based spherical phased array, transmitting signals in two beams over two ground stations for orbiting satellite like IRS.

Dr Pal is widely respected for his technical knowledge. His expertise in various areas has been utilised by a number of national and international organisations, viz., INMARSAT/ICO (UK) for LEO-SAT Mobile Satellite Communication definition and also responsible for the development of Satellite Hand-held Antenna System for ICO (UK), International Telecommunication Union (ITU) for defining Regional African Satellite Communication System, Nanyang Technological University, Singapore, on X-Sat, etc. He was on the United Nations panel of experts on Global Navigation Satellite Systems (GNSS) and Chaired/participated in various UN meetings at Vienna, Geneva and at other international venues. He also developed various antennas for DRDO.

Dr Pal, a Distinguished Fellow of IETE, Fellow of Indian National Academy of Engineering, Indian National Academy of Sciences, Fellow of IEEE (USA), IET (UK), MIAA (Paris), FVEDA, MASI, has received more than 22 national and international awards. Some of these include: Hari Om Ashram Prerit Vikram Sarabhai Research Award, Om Prakash Bhashin Foundation Award, ISRO/DoS Distinguished Achievement Award, National Research and Development Corporation awards, BITS Pilani Distinguished Alumni Award. He is the first Indian national and first professional to get IEEE-2010 Judith A. Resnik prestigious award east of France. Besides, he holds patents for his various inventions.

He has published/presented more than 220 papers in international, national journals and conferences of repute, one book on communications, and has guided number of PhD students. He is a Distinguished Visiting Professor of Indian National Academy of Engineering.



Presently, he is on the Distinguished Lecturer Programme of IEEE-USA. Under the IEEE-DLT Scheme, he has delivered invited talks, lectures and tutorials on antenna, GNSS, space and RF communications at NTU, Singapore; NASA and IEEE-Houston, USA; Bradford University, UK; University of Cape Town, and Stellenbosch University, Cape Peninsular Technical University, South Africa; CSIR, and DST. He was also a Senior Advisor on ICT curriculum and other academic matters to newly formed Institute of ICT, Ahmadabad University, Gujarat and BITS Pilani. Dr Pal is Honorary Professor of number of Indian Universities.

His fields of interest are RF Communications, Space communication, Space Technology, Microwaves, Electromagnetics, Antennas, Radars, Digital Communication and Satellite Navigation (GNSS). He is recognised as an expert in these areas at international level.

## Director, DIHAR, Leh



**Dr Bhuvnesh Kumar**, Sc G, has assumed the charge of Director, Defence Institute of High Altitude Research (DIHAR), Leh, wef 1 March 2015. He obtained his Master degree in Veterinary Sciences and PhD in Veterinary Medicine from GB Pant University of Agriculture and Technology, Pantnagar, Uttarakhand in 1984 and 1999, respectively.

He joined DRDO as Sc B in February 1985 at Defence Agriculture Research Laboratory, Almora (now Defence Institute of Bio-Energy Research, Haldwani) and served at various strategic locations, viz., Pithoragarh, Kinnaur and Lahul Spiti bordering Indo-Tibet and Nepal for 21 years in various capacities to promote agro-animal technologies for augmenting fresh food availability to troops deployed in far flung remote mountain areas.

Dr Bhuvnesh Kumar has worked as a member of G-FAST from Life Science cluster, Programme Director, Low Intensity Conflict programme and Director, PM (LS) before taking over the present assignment. He has vast experience of working in mountainous regions covering western, central and north-east Himalayas.

He has published more than 50 research papers in national and international peer-reviewed journals and presented research findings in various national/international conferences. He has chaired and Co-Chaired many national and international conferences. He is member of various professional societies. Commendation Certificate from the then Scientific Advisor, Dr APJ Abdul Kalam in 1998 and Agni Award, 2005 are amongst many awards to his credit.

As Director, DIHAR, his focus will be to strengthen Siachin Glacier base in Western Himalayas and Tawang in North Eastern Himalayas by developing agro-animal technologies to boost fresh food availability round the year.

## Awards

### Dr Yelavarthy Nayudamma Memorial Award

Dr Tessy Thomas, OS, Director, Advanced Systems Laboratory (ASL), Hyderabad, has been awarded Dr Yelavarthy Nayudamma Memorial Award-2014 for her outstanding contribution in the field of missile technology by Dr Y Nayudamma Memorial Trust, Tenali, Andhra Pradesh on 1 March 2015.



Dr Tessy Thomas receiving the award from the Chief Guest Prof. Shantha Sinha (second from right)

### Best Librarian Award

Dr Rajeev Vij, Sc F, Institute of Nuclear Medicine and Allied Sciences (INMAS), Delhi, has been awarded Best Librarian Award during the 60<sup>th</sup> International ILA Conference held during 8-10 April 2015 at Panjab University, Chandigarh. The Award was presented by



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Dr Rajeev Vij (right) receiving Best Librarian Award from Prof. Arun Kumar Grover

Prof. Arun Kumar Grover, Vice Chancellor, Panjab University, in the presence of Prof. Kaptan Singh Solanki, Honorary Governor of Haryana and Punjab.

## Higher Qualification Achieved

### ASL, Hyderabad



Shri Khalane Sanjay Ananadrao, Sc F, Advanced Systems Laboratory (ASL), Hyderabad, obtained PhD in Mechanical Engineering for the thesis entitled Stability and Vibration

Analysis of Functionally Graded Material Structures including Geometric Non-linearity from Jawaharlal Nehru Technological University Hyderabad (JNTU), Hyderabad.

### CAIR, Bengaluru



Shri P Murli Krishna, Sc E, Centre for Artificial Intelligence and Robotics (CAIR), Bengaluru, has been awarded PhD in Mechanical Engineering by Indian Institute of Technology, Hyderabad (IITH) for the thesis entitled

Energetic and Passive Dynamics of Quadruped Robot Planar Running Gaits.

### HEMRL, Pune



Col Sultan Singh Malik (Retd), High Energy Materials Research Laboratory (HEMRL), Pune, has been awarded PhD (Environmental Science) by Savitribai Phule Pune University for the thesis entitled Studies on Disposal of

Combustible Cartridge Case by Alkaline Hydrolysis and Application of its Hydrolysate as Fertilizer for Crop.

## DRDO's Social Contributions

### DL, Jodhpur

A Medical Camp for the awareness and prevention of Swine Flu was organised by Defence Laboratory, Jodhpur (DLJ), in collaboration with the District Ayurvedic Department, on 26 February 2015. The camp was inaugurated by Dr SR Vadera, OS, Director, DLJ. About 1100 family members of DLJ employees were given the Ayurvedic medicines for the prevention of Swine Flu. Dr Indivar Bhardwaj, District Ayurved Officer, and his team members also imparted important information and advice to the family members about the awareness and prevention of Swine Flu.



Ayurvedic medicines being distributed for the prevention of Swine Flu in Medical Camp at DLJ





The camp was a grand success because of the initiative taken by Dr Antaryami Singh, OIC MI and his team, and members of the DLJ Works Committee and Ayurvedic Department.

## DRL, Tezpur

To fulfil its societal obligations, Defence Research Laboratory (DRL), Tezpur, distributed long-lasting insecticidal net, named Defender Net, developed by it to 500 violence affected families living in the refugee camp of Phulbari village under Biswanath Charali, Sub Division of Sonitpur district, Assam. Shri RM Singh, Additional Director General of Police and Superintendent of Police of Biswanath Charali



Shri RM Singh distributing Defender Net to violence affected persons

distributed net on 4 February 2015. The Net is effective even after 20 washing against adult mosquitoes of Anopheles, Culex and Aedes groups.

## Visitors to DRDO Labs/Estts

### ARDE, Pune

Lt Gen PR Shankar, VSM, DG Artillery, Brig Sanjeev Grover, DDG Arty (Ops) and Brig S Harimohan Iyer, DDG Arty (Eqpt) visited ARDE on 13 February 2015. DG (Arty) was briefed on Advanced Towed Artillery Gun System (ATAGS) and Pinaka Mk-II.



Shri SV Gade, Project Director, ATAGS briefing DG (Artillery)

### CHES, Hyderabad

Dr VG Shekaran, DS, DG (MSS), DRDO, visited Center for High Energy System and Sciences (CHES),

Hyderabad, on 21 March 2015. Shri Suranjan Pal, OS, Director, CHES, briefed him about the technical achievements, infrastructural facilities and civil works activities. Dr Shekaran witnessed the demonstration of the brass board module of 1 kW laser of the laboratory-based beam directing optical channel against a rotating target. He also visited High Power Laser Laboratory and witnessed the working of various test benches established for seeding the critical DEW technologies.



Dr VG Shekaran (right) showing keen interest in CHES activities

## DL, Jodhpur

The members of Corporate Review Committee of DLJ comprising Lt Gen Anoop Malhotra, CC R&D (R&M), Smt Nabanita R Krishnan, Director P&C, Dr AK Singh, DoP and members from DMM, DHRD visited DLJ on 3 March 2015. Dr SR Vadera, OS, Director, DLJ briefed them about the achievements and infrastructure of the laboratory.



Lt Gen Anoop Malhotra (right) and other members of Corporate Review Committee being explained about DLJ activities

## GTRE, Bengaluru

Shri G Mohan Kumar, IAS, Secretary, Defence Production, visited Gas Turbine Research Establishment (GTRE), Bengaluru, on 5 March 2015. Dr CP Ramanarayanan, OS, Director, GTRE, briefed



Shri G Mohan Kumar (third from right) showing keen interest in the engine's critical components

the visitor on the latest achievements in engine development programme. The visitor also witnessed the test demonstration of the Kaveri and Manik engines.

## NPOL, Kochi

Commodore Puneet Chadha, PDSR IHQ-MoD (N), visited Naval Physical and Oceanographic Laboratory (NPOL), Kochi, on 10 March 2015.



Cmde Puneet Chadha (second from left) being briefed about the project activities of NPOL

## RCI, Hyderabad

Mrs Vandana Srivastava, FA (DS), visited Research Centre Imarat (RCI), Hyderabad, on 9 April 2015.



Mrs Vandana Srivastava being explained RCI activities