

CSIR NEWS

VOL 58 NO 17&18 15&30 SEPTEMBER 2008

Team CSIR



Vasvik Award for DG-CSIR

Prof. Samir K. Brahmachari, Director General CSIR, received the 2005 VASVIK Award (2008) for his contribution to research in Biological Sciences & Technology. These Awards are given by Vividhlaxi Audyogik Samshodhan Vikas Kendra, a non-profit, non-government organisation, to those who have made outstanding contribution to the advancement of science and technology or have provided leadership leading directly to national prosperity in India. The VASVIK Research Awards are given with the aim of promoting industrial research and Science and Technology in India. Dr A. P. J. Abdul Kalam, the former President of India, was the Chief Guest at the Awards function.

Prof. Samir Brahmachari, who was earlier Director of the Institute of Genomics & Integrative Biology (IGIB), for the first time conceptualized and implemented *Genomed*, a first-of-its-kind knowledge alliance in India between a government institute and a pharmaceutical company Nicholas Piramal India Limited dedicated to the study and advancement of genomics, pharmacogenomics and bioinformatics.



Prof. Samir K. Brahmachari, Director General CSIR, receiving the award at the hands of Dr A. P. J. Abdul Kalam, the former President of India



Prof. Samir Brahmachari being greeted by Shri M.I. Patel, Chairman, Patel Extrusion Group and the man behind the VASVIK Award (left), and by Prof. M.G.K. Menon, former Minister of State for S&T and Education and a distinguished scientist

Prof. Brahmachari also conceptualized the creation of TCGA, “The Centre for Genomic Application”. It is a collaborative R&D project between The Chatterjee Group and IGIB/CSIR/DST that is used as a shared resource for all the research centers

in the country, be it public or private. TCGA is a trendsetter in this direction, where a world-class high throughput facility/infrastructure required to harness the knowledge coming out of Human Genome research is established jointly by industry and an institute.

Taking advantage of the genetic diversity of the Indian population, Prof. Brahmachari has also pioneered a functional genomics initiative in India and led the Indian Genome Variation Consortium project towards development of predictive markers for complex disorders.

Projects undertaken/completed by NEIST

The following projects have been undertaken/completed at the North East Institute of Science & Technology (NEIST), Jorhat, in the recent past:

Projects undertaken (Grant-in-aid)

- Characterization, beneficiation and utility study of some Graphite deposits from Arunachal Pradesh undertaken on behalf of Ministry of Mines, Government of India. (Total Cost - Rs 26.30 lakh, PI - Mr P. Sengupta, Sc, Period - 3 yrs.)
- Creation of Bioinformatics

infrastructure facility (BIF) for the promotion of biology teaching through bioinformatics (BTBI) a Scheme of BTISnet undertaken on behalf of DBT, New Delhi. (Total cost - Rs 20 lakhs, PI- Dr R. L. Bezbaruah, Sc, Period - 1 yr.)

Projects completed (Grant-in-aid)

- Antibacterial activity of folk medicinal plants against the flacherie disease in muga silkworm *Antheraea assama* undertaken on behalf of Institute

of Himalayan Environment and Development, Ministry of Environment & Forests (GAP 0143). (PI - Dr B. G. Unni, Scientist).

- Improved biomass production in Som (*M. bobycina*) through molecular markers and PGPR and their application in muga silkworm undertaken on behalf of Department of Science & Technology, Government of India, New Delhi (GAP 0158). (PI - Dr B. G. Unni, Scientist).

NCL develops Process to Increase the Shelf Life of Neera

The National Chemical Laboratory (NCL), Pune, has developed a process for improving the shelf life of *Neera*, a traditional rural drink derived from the sap of the Palmyra, sago or date palm. These palms account for more than 35% of the 170 million palms in India. More than 70% of these palms are not tapped.

Neera, a nutritious drink, has a shelf life of a few hours. Hence it is consumed within a limited radius of the point of production in the coastal regions. Unless *Neera* is stored under chilled conditions, it changes to toddy when bacteria and yeast ferment the *Neera* within a few hours of its collection. A membrane filtration technique developed at NCL removes the microorganisms present in *Neera* without affecting its nutritive quality, thus extending the shelf life up to 45 days under conditions of refrigeration (4-8°C).

NCL has set up a Pilot Plant at the Gajanan Naik Multi-

Disciplinary Training Centre (GNMDTC) of Khadi and Village Industry Commission (KVIC), Dahanu in Thane District of Maharashtra. The plant has the capacity to process up to 500 litres of *Neera* per day and was commissioned on 3 May 2008. About 1500 pouches per day, each having a volume of 200 ml, are packed and distributed at KVIC retail outlets in Dahanu. The product is well received and represents a new approach to improve a traditional rural drink by infusing appropriate technology.

Another Pilot Plant with NCL's knowhow was commissioned on 14 May 2008 by the Gujarat Neera Federation (GNF) with assistance from Department of Biotechnology (DBT), New Delhi and KVIC (under their Scheme of Fund for Regeneration of Traditional Industries—SFURTI cluster programme) to process up to 3000 liters of *Neera* per day. *Neera* has

been successfully launched in 20 liter containers and efforts are under way to scale-up the capacity to 10,000 liters per day.

Membrane processing of *Neera* has resulted in an overall 15-20% saving in product, which would otherwise go waste due to its poor shelf life. A major portion of this saving will benefit the *Neera* tappers by way of increased wages. The GNF estimates that the existing *Neera* processing plant will create additional 1200 jobs in the forthcoming season. This technology will also benefit at least 14 more KVIC centres spread all over the country.

Analyses carried out at NCL and SNDT University, Mumbai (which is collaborating in the project under the DBT umbrella programme) confirm that *Neera* is a highly nutritious drink and can be consumed by young children and expecting mothers.



Neera filtration facility at GNMDTC, Dahanu



Neera filtration plant installed at the site of Gujarat Neera Federation, Saronda



Central Scientific Instruments Organisation, Chandigarh

R&D HIGHLIGHTS: 2006-2007

Central Scientific Instruments Organisation (CSIO), Chandigarh has successfully completed various projects of national importance during 2006-07. The work was carried out in three broad sectors: Agro-based, Health and Public safety. Considering the potential of nano science and technology, CSIO is pursuing exploratory work in areas such as CNT, DNA computing and bio-MEMs.

R&D ACHIEVEMENTS AND CURRENT ACTIVITIES

Intelligent Instrumentation for Agro-Based, Seismic and Energy Management & Condition Monitoring

Chlorophyll Measurement System

Chlorophyll Measurement System measures the amount of chlorophyll in plant leaves. The system consists of an LED light source having a wavelength output of 660 nm at which maximum absorption takes place. This instrument can help in the study of leaf senescence, effect of environmental stress factors on plant health, and effects of fertilizers and herbicides on plants.



Chlorophyll Measurement System

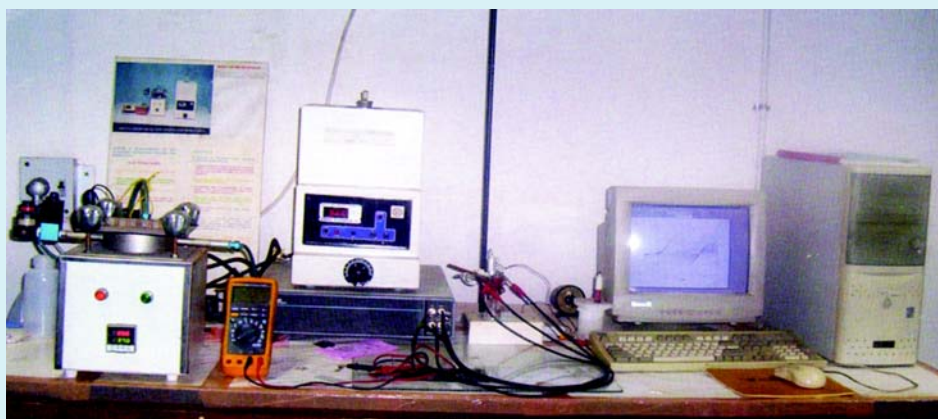
Performance Indicators

Patents	
Filed in India	02
Filed Abroad	19
Patents	
Granted in India	-
Granted Abroad	02
Research Publications	
25	
External Cash Flow	
Generated under sponsored/ Grant-in-aid/Collaborative/ Consultancy Projects	385.131 (Rs in lakhs)
S & T Receipts	44.117 (Rs in lakhs)

It finds extensive use in Agricultural Universities, R&D Establishments, etc. This project was funded by the Department of Science & Technology (DST), New Delhi.

Off-Flavour Detection System for Edible Oils

Oxidation leads to the formation of hydro-peroxides, which subsequently generate off-flavours of compounds such as ketones, aldehydes and alcohols, especially in edible oils. To sense off-flavour compounds generated due to the oxidation of edible oils, conducting polymer along with sampling and sensing system has been developed. Based on cyclic voltammetry studies, a number of polythiophene coated sensors were designed having different anions in their chain. This project was funded by TMOP&M, New Delhi.

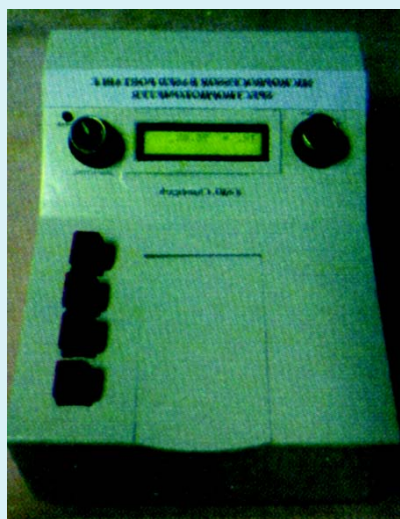


Computer controlled set-up for Off-flavour Measuring System



Microprocessor-based Portable Spectrophotometer

A microprocessor based portable spectrophotometer has been developed to determine nutrients such as N and P (nitrate, nitrite, ammonium and inorganic phosphate), Cu, Mo, Fe, Cr, Zn, etc. in soil, water and plants. This project was funded by the Indian Council of Agricultural Research (ICAR), New Delhi. The instrument is based on Beer-Lamberts law for absorption/transmission of light through soil, water and plants. The instrument can also be used to analyze various elements in fertilizers, pesticides, food, water, etc.



Portable Spectrophotometer

Automated Liquid Media Dispensing System

An automated bio-chemical dispensing system being developed will enable researchers to automate certain standard operations and repetitive and routine operational steps. It will be useful in handling procedures like serial transfer, pipetting, mixing etc. A multi-probe

computer-controlled system is being designed and developed for handling fluid-dispensing in milli and micro-litres for a variety of applications. It will provide automatic dispensing of liquids at faster speed and higher throughput with better precision and reproducibility of assays. Windows-based software has been developed to operate the integrated system as per its designed specifications and requirements. It will be a precision fluid delivery/dispensing system for use in Plant Sciences, Biomolecular Chemistry, Chemical Engineering, Pharmaceutical Industries, Biotechnology, Immunology & Microbial Technology, Tissue-culture, etc. This project has been sponsored by the Department of Information Technology (DIT), New Delhi.



Automated Liquid Media Dispensing System

Geo-Scientific Instrumentation

India is prone to various kinds of natural and man-made hazards that cause wide-spread destruction to human life and property. In view of

this, research, design and development of instruments for monitoring these activities and early warning systems to mitigate the loss of human life and property have become of prime importance.

Oscillation Monitoring System for Railway Vehicles

Oscillation Monitoring System (OMS) is an advanced portable instrument to monitor, detect and record the horizontal and vertical accelerations of railway vehicles (railway coaches, wagons and locomotives, etc.) and railway tracks. This project was funded by Research Design and Standard Organisation (RDSO), Lucknow. Field-testing of the Engineering Model of OMS has been done in

Oscillation Monitoring System





association with RDSO, Lucknow by installing it in Track Recording Coach (TRC) on the routes from Kalka to Ambala & from Ambala to Jalandhar. The potential users of the system include RDSO, Lucknow; Indian Railways, different Universities and Educational institutions.

Sensor for Measurement of Water Content in Snow-Pack

The Snow Moisture Sensor being developed is sponsored by Snow Avalanche Study Establishment (SASE), Chandigarh. It is actually a fork-shaped microwave stainless steel resonator. Resonant frequency and 3-dB bandwidth of sensor signals are used to determine the complex dielectric constant of snow. The density and liquid water content of snow are calculated using empirical equations. Field trials and testing of the sensor were conducted in and around SASE, Manali (HP). Results obtained are comparable to that of the imported instrument being used by SASE.

Multi-parameter Probe To Measure Temperature & Hardness In Snow Microstructure

Multiparameter Probe is a portable microcontroller-based instrument for measuring the bonding force between snow grains (vertical to snow layers) with high spatial resolution and high speed. It penetrates the snow-pack with user-selected velocity varying between 1-20 mm/s. The measurement is very fast and has high resolution. It can measure the hardness and

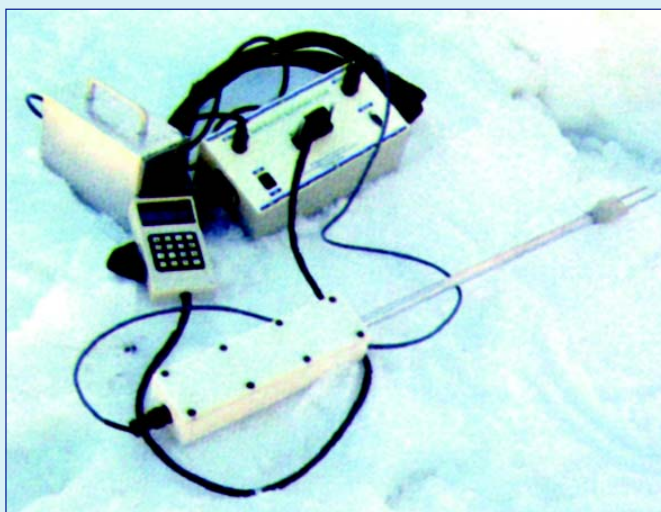


Multiparameter Probe

temperature of snow micro structure simultaneously, and can store multiple measurements upto 1700 mm penetration depth. This work is sponsored by SASE, Chandigarh. After laboratory testing, the instrument was taken for field trials and testing in and around SASE, Manali (HP). Results obtained are comparable to an imported instrument being used by SASE.

IR-based Snow Surface Temperature Sensor

The IR-based Snow Surface Temperature Sensor being developed involves detection of emitted infrared radiation by snow. It is capable of operating at high Relative Humidity and wind speed of the order of 200 km/hour. The sensor facilitates non-contact measurement of snow surface temperature remotely. It has been tested in the field in and around Manali and has also been interfaced with an automatic weather station installed in the deep Himalayan region. Data is being received at



Snow Moisture Sensor



Snow Surface Temperature Sensor

SASE, Chandigarh on hourly basis through satellite.

Study of Seismicity in and around Chandigarh

A network of three seismological observatories at Nauni, Sunder Nagar and Chandigarh is recording seismic data round the clock for monitoring the seismicity in and around Chandigarh. This study was sponsored by DST, New Delhi. Recorded data has been analyzed by using standard software and has been shared with other eminent users such as IMD, New Delhi; WIHG, Dehra Dun; CBRI, Roorkee and IIT, Roorkee.



Power Quality Analyzer set-up

Harmonics, Phase Sequence, and Unbalance along with other basic electrical parameters such as voltage, current, power factor, power and energy. It can be used as a standalone instrument with display for displaying the Power Quality parameters.

Energy Management

Quality of power delivered to the machineries in the industry plays an important role in maintaining efficiency and life of the equipment some of which are very sensitive to even short interruptions. In this area, CSIO has played an eminent role and efforts have helped to take corrective steps for improving the power quality of the supply, which in turn increases the productivity.

Low Cost Power Quality Analyzer

A low cost power quality analyzer has been developed for industrial and commercial applications. Power Quality Analyzer (PQA) measures the power quality events along with basic electrical parameters in a three-phase four-wire star connected system. It detects the Impulse Transients, Swells & Sags,

Pump Efficiency Monitoring System

The project for the development of Pump Efficiency Monitoring System (PEMS) is sponsored by DIT, New Delhi. PEMS is a tool for on-line monitoring of the pump efficiency. The developed system is based on the thermodynamic principle to find thermal losses in the pump from which the efficiency is calculated. By monitoring the electrical input to the motor, the pump flow rate can also be calculated. The PEMS, using the thermo-dynamic principle of flow measurement, can solve the a f o r e s a i d problems.

Medical Instrumentation, Linear Accelerator, Medical Imaging and Prosthetic Devices for Disabled

Medical instrumentation has been one of the thrust areas of R&D at CSIO since its inception and several technologies developed here are in production. The focus of this Group has been on Medical instrumentation for diagnostic and therapeutic applications and Intelligent prosthetic devices for rehabilitation of the disabled.

Various prosthetic instruments have been developed in the recent past. An Artificial Knee and a Myoelectric Arm are on trial at the National Institute for the Orthopaedically Handicapped (NIOH), Kolkata. A novel hand-held scanning device for reading by the blind has been developed and is undergoing demonstrations/trials.



Pump Efficiency Monitoring System



Integrated Medical LINAC System for Cancer Therapy (Jai Vigyan Programme)

The 6 MeV Medical Linear Accelerator (Siddharth-1) developed under Jai Vigyan Programme of the Government of India was successfully installed at the Mahatma Gandhi Institute of Medical Sciences, Wardha. The machine has been operational with a normal load of 40 patients per day. It is under evaluation by the Atomic Energy Regulatory Board (AERB), Mumbai for Type Approval. Another 6 MeV (Siddharth-2) machine is in the process of being commissioned for installation at Regional Cancer Institute, Adyar, Chennai.

Electronic Portal Imaging Device for Radiation Therapy

An experimental prototype for a camera-based EPID has been fabricated. A scintillator has been developed that converts X-ray radiation into the visual range for use in conventional cameras. Software for radiation-triggered acquisition was developed. It allows a series of images to be acquired with the onset



Electronic Portal Imaging Device

of radiation. The Electronic Portal Imaging Device (EPID) has several advantages including patient position and dose verification. The device can be used for immobilization verification along with organ motion detection and to assess the errors in dose specification, machine parameter and

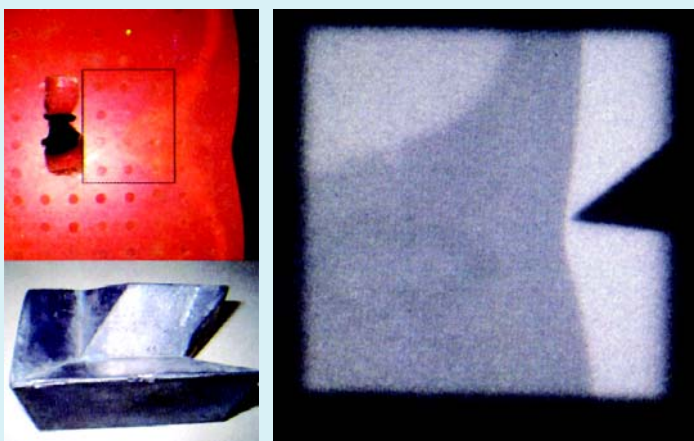
field positioning. It is funded by DIT, New Delhi.

Hand-held Scanner-based Hindi And English Text Reading Machine For Visually Impaired

The device using physical image sensing and step-scanning technique allows reading by simple interaction with the user rather than a complicated human-computer interaction. The device is designed for reading by people without sight at their own pace and control. The device is under trial and improvement for English



Hand-held Text Reading Machine for visually impaired



Sample Image using camera based EPID for the phantom and lead block (6MeV.250 MU/min, 50 MU) at Delhi State Cancer Hospital

language. Integration of the scanner with Hindi OCR and TTS from CDAC is nearing completion. It can further be extended to the indigenous OCR and TTS for many Indian languages.

Technology Upgradation of Pulse Oximeter

The Pulse Oximeter developed earlier is now being upgraded for portable operation. The electronic module is being redesigned to incorporate automatic gain control



Pulse Oximeter

for signals in IR and red regions of the spectrum. De-multiplexing of the RED, IR and ambient light signals has been achieved along with the subtractor circuit for reducing the effect of ambient light.

Optics-Based Strategic Instrumentation

Optics is one of the growth areas of modern physics and engineering. Some of the tasks have been successfully completed for strategic instrumentation. The broad areas of activities are: Strategic instrumentation for defence, civil avionics and atomic energy, and optics-based instrumentation for medical and industrial applications.

The focus is on avionics-based cockpit display instrumentation like Head Up Display. The other significant achievements include the development of indigenous Tele-Microscope and Optics for near and intermediate vision aids.

Pc-based Optical Inspection System For PCBs Mounted With SMDs & Conventional Components

A PC-based Optical Inspection System (OIS) has been developed for

inspection and location of faults on PCBs assembled with SMD components. This project was sponsored by DST, New Delhi. An OIS uses image processing and pattern matching technique between a known good PCB reference image with that of the PCB under test to identify and locate the faults like component absence, misalignment, positional error, colour code, polarity etc. of SMD components on the assembled PCBs. The system uses colour CCD camera and motorized X-Y controlled movement for acquiring PCB image. The PCB is illuminated through LED.

Development Of Low Vision Aids Using Plastic Aspheric Lenses

CSIO has taken up the programme of 'Development of Dedicated Low Vision Aids' under the sponsorship of Ministry of Social Justice & Empowerment (MoSJ&E), New Delhi. The initiative of indigenous development of PAL-LVAs by CSIO is expected to meet the requirements of persons with low vision thus helping in their rehabilitation and bringing them into the mainstream of the society. In the 'Near Vision Aid Development Programme', the LVAs in dioptric range of 16D-30D are explored. The

developed PALs were spectacle-mounted, lab-tested and clinically- tried. Under the 'Low Vision Aid Development Programme', the Unit has developed PALs based Tele-microscope TM for Intermediate Vision.

Head Up Display (HUD) for LCA

This breakthrough indigenous technology was further evolved during the year with the delivery of Units S/No 007, 010, 011, 012 and 013 to Aeronautical Development Agency (ADA), Bangalore as per the MoU signed with them. These units have been integrated in the aircraft and are flying successfully in LCA TD2, prototype vehicle 1, 2 and 3 aircrafts. The four RFAs raised by LCA Test Pilots for problems



Low Vision Aids



Tele-microscope for Intermediate Vision



observed during LCA flights and ground trials have been solved and implemented on one of the HUD units. These RFAs have been solved on HUD Unit-005 by implementing major modifications on HUD Software after carrying out detailed theoretical analysis and field trials.

High Precision Optical Components for High Power CO₂ Lasers

This project deals with the development of various spherical and aspheric laser resonator mirror prototypes for high power CO₂ lasers. The mirrors are required to focus beams of the indigenously developed lasers by the Raja Ramanna Centre for Advanced Technology (RRCAT), Indore to deliver high energy density in a prescribed diametric spot to meet various laser applications.



Laser Resonator Mirrors

Optical Grade New Material Lenses (12d & 26d) For Visually Impaired

This Project explores the utility of optical grade new material lenses for Low Vision Aids for the visually impaired using state-of-the-art

Aspheric Technology and has been sponsored by MoSJ&E, New Delhi. For this exercise, the most uncommonly required powers (12D & 26D) have been identified for development of LVAs in consultation with Low-Vision Experts (LVEs).

Super Precision Ball-End-Shafts and Cups (Feasibility Study)

Machine tool parametric kinematics studies for suitable diamond tools and CBN tools have been conducted. Accordingly, diamond tools of various types and makes have been identified for Super Precision 2% Be-Cu Cups and Special Alloy Steel (SAS) Ball-End-Shafts (BESs). BES Fixtures with different collets have been designed and modified to suit Diamond Turning Machine (DTM).

Photonics

For the last several years, the Photonics Group has been working in the area of fibre optic sensors, Extrinsic Fabry Perot Interferometric (EFPI) sensors, fibre optic systems and holography. The FBG/LPG writing system facilitating grating writing using interferometric/holographic and phase mask techniques is being established. FBG/LPG sensor characteristics have been studied and investigated for bio-agent



Super Precision Ball-End-Shafts and Cups

detection and fuel level gauge applications. The fibre optic tail rotor control system for advanced light helicopter (ALH) has been developed, tested and delivered to HAL, Bangalore.

FBG-based Sensors

Wind Impact Measurement: Wind speed has impact on the health of structures which include buildings, vehicles, aircrafts and ships. Keeping this aspect in view, investigations were carried out by simulating wind impact with the help of an air compressor.

Temperature Sensitivity Enhancement

Efforts have been made to enhance temperature sensitivity of FBG sensors. For this purpose, a suitable metallic encapsulating fixture was designed and fabricated and its performance was investigated. The above study has been carried out under the project sponsored by National Programme on Smart Materials (NPSM), Aeronautical Development Agency (ADA), Bangalore.

Fly-by-Light Tail Rotor Control System for Advanced Light Helicopter (ALH)

This system has been developed to control the helicopter motion by means of light signals transmitted through an optical fibre cable link laid from the cockpit to the tail rotor area. This system will be useful for fly-by-light technology. This project was sponsored by RWRC, HAL, Bangalore.

Fibre Optic High Power Laser Beam Delivery System

Objective of this project was to develop fibre optic cables and components for high power laser beam delivery system. It was sponsored by the Terminal Ballistics Research Laboratory (TBRL), Chandigarh. Various high power optical and opto-mechanical parts like multi component lens systems, single and branched fibre optic cables, high power sapphire fibres, fibre tapers for beam coupling, and beam dividers were designed, fabricated and tested. The system

was assembled and delivered to the users for test and trials.

Multizone Optical Fibre Based Perturbation Sensing System

The system consists of transmitter module (comprising of laser diodes source), receiver module (comprising of a fibre optic sensor device) and PC-based image acquisition and process sensing unit. The system finds applications in multi-zone intrusion detection, temperature monitoring for engines and machinery or processes, landslides detection and similar other situations. This project was funded by DST, New Delhi.

Analytical Instrumentation

The R&D achievements are under two distinct areas namely: Analytical and cold plasma instrumentation and Micro-electro mechanical systems (MEMS) and sensors. In the area of cold plasma, the Group has collaborated with

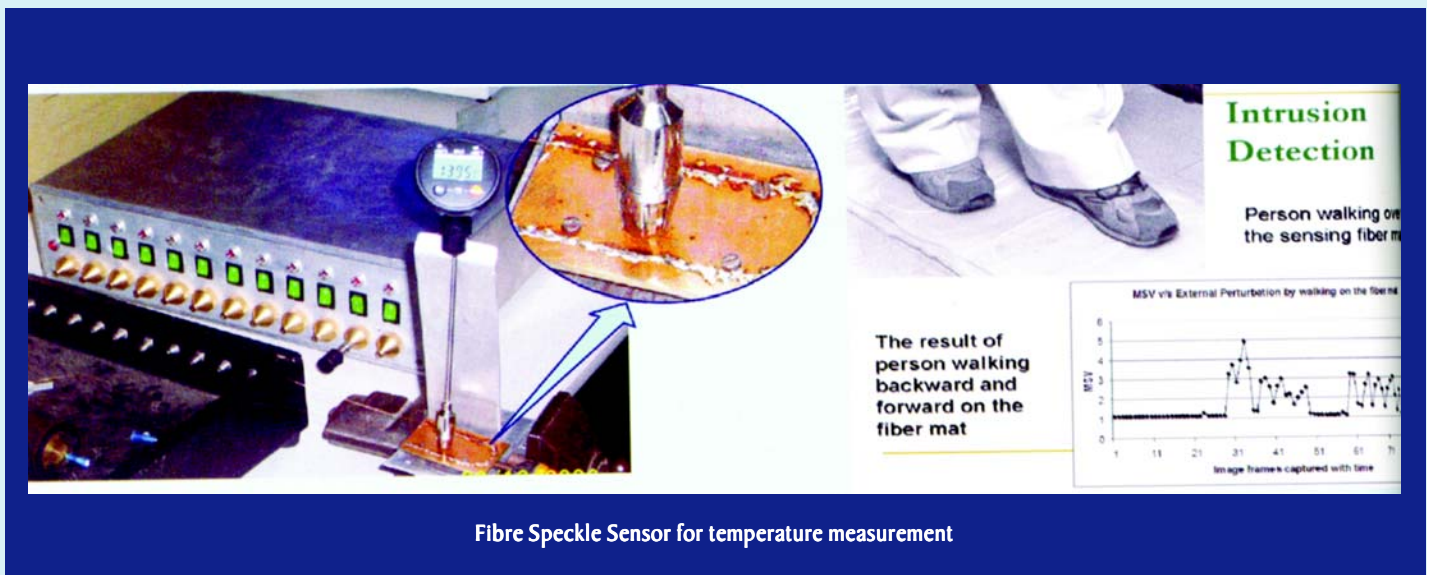
CEERI for the development of ion textured microwave tube components.

AlGaAs/GaAs Based Quantum Well Laser Diodes Structures

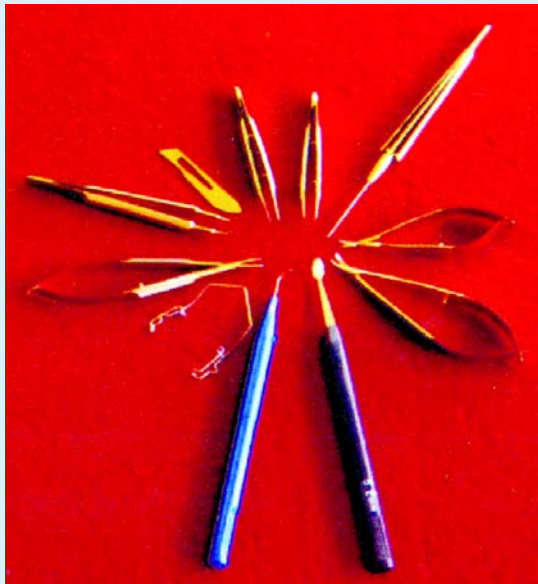
The objective of this project funded by DST, New Delhi was to develop semiconductor laser diode structures based on AlGaAs/GaAs with operating wavelength 0.7 to 0.9 μm.

Protective Biocompatible Coating On Ophthalmic Surgical Instruments

Surface engineering modifies the surface of the components to improve their performance, working lifetime, and aesthetic appearance and reduces the cost of production. Surface Engineering Process was developed using titanium and its alloy coating to enhance the useful life of these instruments. The deposition process was standardized in terms of coating thickness, film stoichiometry, hardness and adhesion. This project was funded by DST, New Delhi.



Fibre Speckle Sensor for temperature measurement



Tin-coated ophthalmic surgical instruments

Plasma Simulation Studies

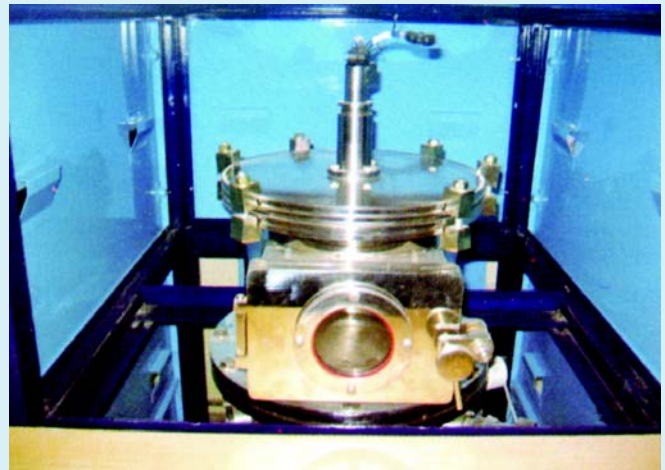
Plasma process simulation studies using ESI-CFD have been carried out for ICP etcher. CFD-ACE-GUI allows users to define the physics of the problem. These phenomena are numerically modeled by a set of partial differential equations called the Navier-Stokes equations using CFD-ACE+.

Ion Texturing Experimental Set-Up

Development of ion texturing experimental set-up has been undertaken and the complete equipment is being integrated and testing of various subsystems such as vacuum system, electronics/electrical assembly such as RF/DC supply, thin film monitor etc is under progress. The objective of this project is to develop the set-up for conducting experiments on ion texturing of copper/graphite collector electrodes of high efficiency space TWT. The project is funded by CEERI, Pilani.

Explosive Detector Based On Ion Mobility Spectrometry (Ims)

The challenge of technology involves mechanical design of sample inlet system, drift tube, ion gates/shutters, aperture and electronics for low current signal processing and switching of ion shutter biasing at high voltage at the speed of < 1 msec.



Process chamber integrated with magnetron

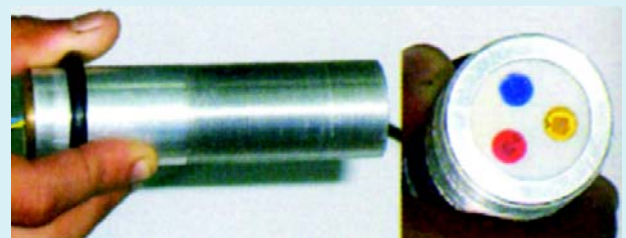
Automatic Counterfeit Currency Detector

An automatic counterfeit currency detector cum counting machine dynamically senses spectral reflectance and transmission (including fluorescence) of currency notes and distinguishes between the genuine and fake currency notes under visible Ultra Violet (UV) illumination during counting/stacking process. A novel time and space integration technique has been developed for this purpose.

**Material Science,
Bio-Molecular Electronics
and Nanotechnology**

Bio-MEMS Based Micro-Diagnostic Kits

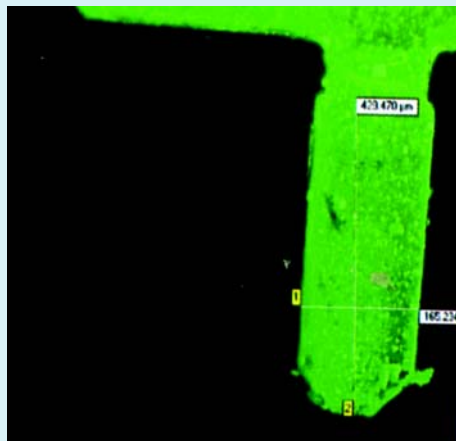
The objective of the project was to develop disposable micro-diagnostic kits for diseases in place of conventional techniques as



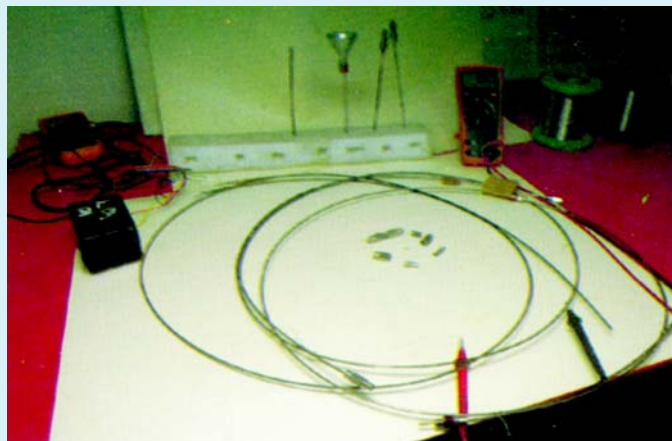
Sensor head with three wave band filters



Automatic counterfeit currency detector



Antibody Coated Cantilever



Hot Air Leak Detector

molecular electronic devices with ultra high packing density and performance. CNTs filled with medicines are well suited for study of targeted drug delivery.

ELISA (enzyme linkage) and RIA which require radio tagging of bio-molecules. The micro-cantilever based micro-diagnostic kit has high specificity provided by the bio-molecular recognition characteristics of antigen-antibody, probe DNA-target DNA, protein-receptor and enzyme-substrate. The project was funded by NPSM, ADA, Bangalore.

Hot Air Leak Detection System for Environmental Control System of LCA

An electronic control system to sense the impedance change has been developed. The completed prototype has been tested by ADA, Bangalore. It is proposed to carry out assembly and testing of the prototype as per MIL standard.

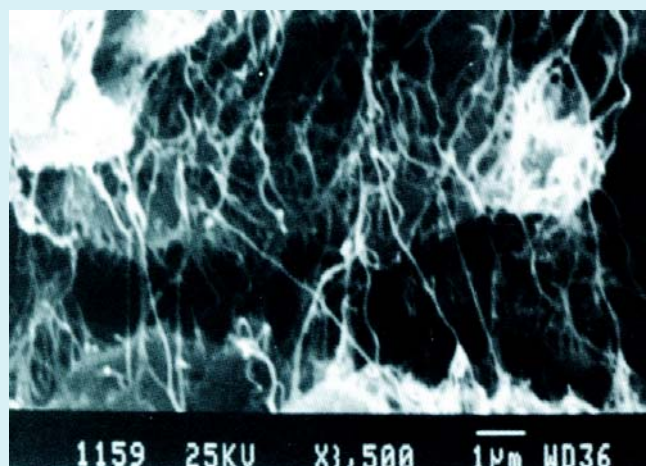
Bio-Molecular Motors

The aim of this project funded by DST, New Delhi, is to study this system under various electromagnetic fields, electrolyte, pH, etc. which help in (a) Targeted drug delivery, (b) Designing molecular switches with ultra-high density, using low cost fabrication technique

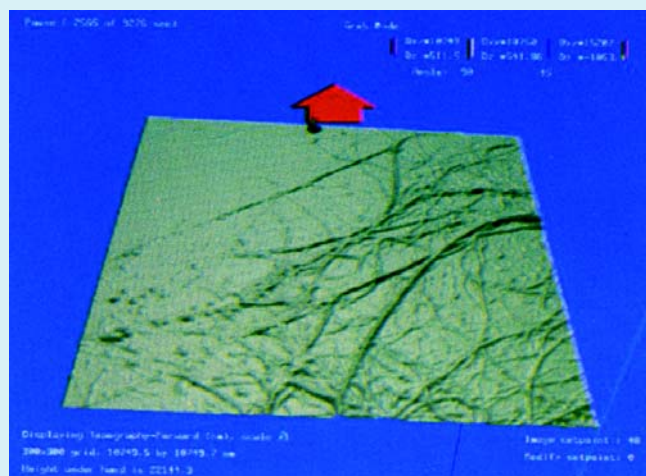
of molecular biology and (c) Nanorobotics.

Carbon Nanotubes Based Sensors And Targeted Drug Delivery

Carbon nanotubes (CNTs) are tiny molecular tubes made up of hexagonal carbon rings joined together with dimensions ranging from 1 nm to 50 nm depending upon their structure i.e. single wall or multi-wall. These tubes have wonderful electrical behaviour, which can be tailored by changing orientation or angle of bending. CNTs are one of the most dominant materials for fabrication of



SEM image of amidated CNTs immobilized with lipase



AFM image of dispersed CNTs



National Technology Day Celebrations at CLRI, NAL, NEIST

Many CSIR laboratories celebrated the National Technology Day (11 May). The highlights of the celebrations at the Central Leather Research Institute (CLRI), Chennai; National Aerospace Laboratories (NAL), Bangalore; and North East Institute of Science & Technology (NEIST), Jorhat; are given here.

Central Leather Research Institute (CLRI), Chennai

CLRI celebrated the National Technology Day on 12 May 2008. Mr C.P. Viswamohan, General Manager, Indian Molasses Company, Chennai; Mr E.K.M.T. Mohammed Khaleel, Secretary, Erode Tannery Owners Association, Erode and Mr Abdul Rehman, Plant Manager, Vaniyambadi Tannery Enviro Control System Ltd, Vaniyambadi, were the Guests of Honour during the programme.

Mr Viswamohan in his impressive address praised the timely and value-added services of team members of the Cell for Industrial Safety & Risk Analysis (CISRA), CLRI during their

company's diversification programmes and also in complying with the statutory requirements of Government of India in ports like Kakinada, Porbandar, Mumbai, Chennai and Kandla.

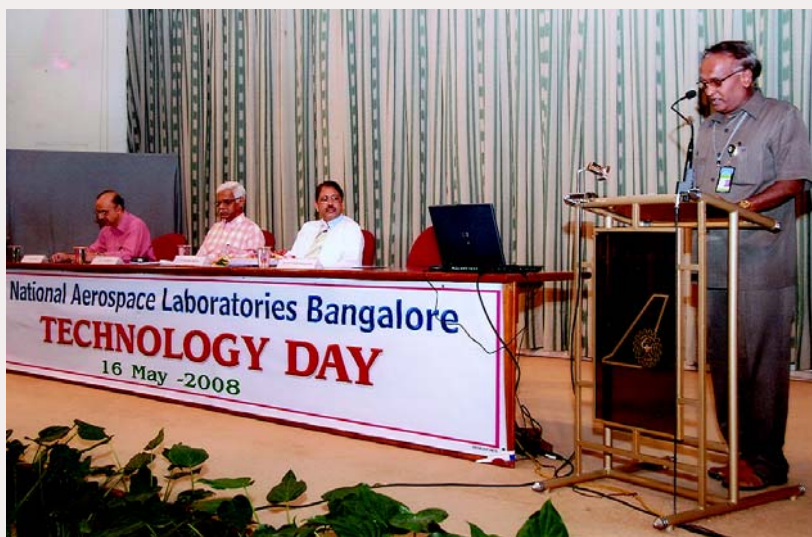
Mr Khaleel in his talk explained about the importance of evaporation technology and about the generation of Sprinkler Evaporation Technology by the CLRI for implementation in the tanneries. He also emphasized the sincere, timely and untiring efforts of CLRI in ensuring a second lease of life to the tanneries at Erode thereby protecting the employment of weaker and other sections who are

ever remembering the services of CLRI. Mr Rehman talked about the commissioning of the Common Effluent Treatment Plant based on the principles of Reverse Osmosis process for the benefit of tiny, small and medium tanneries located in the cluster of Vaniyambadi on "No profit No loss basis." He also mentioned that during three decades of developmental activities pursued in respect of Effluent Treatment Plants, this plant is unique and of its kind in the whole world.

Earlier, Mr D. Chandramouli, Director-Grade Scientist, delivered the welcome address.

National Aerospace Laboratories (NAL), Bangalore

The National Aerospace Laboratories (NAL), Bangalore, celebrated Technology Day on 16 May 2008. Mr Surendra Kumar, Director, Armament Research and Development Establishment, Pune, who was the Chief Guest, in his lecture, 'Advances in Armament Technology' highlighted the achievements of the armament development efforts of the country in general and ARDE in particular. He talked of the trends and challenges. He opined that materials technology still



A dais view of NTD celebrations at NAL



remains an aspect that drives the performance of these systems. This is in addition to advances in miniaturization, control and guidance. He emphasized that since nature of warfare itself is undergoing a major transformation towards an increasingly electronic,

digital and network-centric framework, it is imperative that the armament technology is also developed to fit within this.

Earlier, Dr A.R. Upadhya, Director, NAL, pointed out in his welcome address, "We are in an age where technology, economics and

politics are inextricably linked. Armament especially being a 'big-ticket' commodity in terms of international trade, and a fulcrum on which geopolitics turns, it is important that we safeguard our position of strength and independence."

North East Institute of Science & Technology (NEIST), Jorhat

At NEIST, Prof. P. K. Seth, former Director of the Indian Institute of Toxicology Research (formerly ITRC), Lucknow, and Chief Executive Officer, Biotech Park, Lucknow, was the Chief Guest. He delivered the Technology Day Lecture on 'Biotechnology Applications in Health, Agriculture and Environment'.

Prof. Seth, in his lecture, spoke on the status of Biotechnology in India, its contributions and future. He mentioned that the discovery of DNA in 1955 revolutionized biology leading to MNC's scripting success in India. Because of biotechnology, there had been a significant increase of 140% production of Bt cotton in 2006 over the year 2004 from 1.3 million to 3.8 million h. India today is among the top 10 growers of biotech crops in the world and its role in the healthcare sector particularly in diagnostics and detection is never to be questioned, he informed. India is today counted among the biotech knowledge providers. The National Biotechnology Development Strategy encourages Public-Private partnership ventures and the

Department of Biotechnology invests up to 30% for biotechnology development.

On the occasion, two NEIST developed technologies, namely *Herbal Agarbatti* with mosquito repellent properties and *Liquid Deodorant Cleaner* were released to two entrepreneurs—one from Sivasagar, Assam and the other from Imphal, Manipur. The Chief Guest also released a four-paged special brochure on NEIST brought out on the occasion. Prof. Seth was presented a memento.

The Technology Day function was largely attended by invited guests, prominent citizen of the town Shri Dulal Chandra Barua, members of press and media, family members of NEIST both old and new, invited entrepreneurs notably Mr Samsul Haque of M/s Premier Agro Products of Sivasagar and Mr R.K. Birendra Singh and Mr Maibam Dhanbir Singh of M/s Aroma Health Care, Manipur, students and teachers besides the scientific community of NEIST.

Welcoming the audience, Dr P.G. Rao, Director NEIST, who presided over the function

mentioned that he felt deeply honoured to find an eminent personality like Prof. Seth at NEIST on this occasion who almost single handedly established the Biotech Park in Lucknow. He also acknowledged with gratitude the presence of invited entrepreneurs who took technologies from NEIST for commercial exploitation.

Speaking on the importance of the day he said that national security and technology development are inseparable from each other. In fact, it is technology alone that can remove many impediments that our country is facing today. In so far as technology development is concerned, CSIR is at the forefront and it has become more user-focussed today, he added. He also briefly mentioned about the contributions made by NEIST in nation building.

Earlier, the day was declared an 'Open Day' and was marked by visits of students, teachers and public. About 500 school children visited the laboratory and went round the various departments to see the various ongoing research activities of NEIST.



International Course on Dissemination of HDM-4

The Central Road Research Institute (CRRI), New Delhi, shall conduct the 11th HDM-4 programme at CRRI, which is already announced in CRRI website (<http://crridom.gov.in/training.html>). International Organizations such as PIARC, World Bank, TRRB, ARRB etc. recognize CRRI as Asia Pacific Center of this training programme.

Highway and Transport Professionals (Engineers, Planners and Economists) working in Government and Private Sectors are welcome to attend this course. Participants should be at least assistant engineers or above with good experience in MS Excel, Word etc. and associated with Highway construction and maintenance projects or Traffic & Transport Demand Estimation or Economic analysis of Highway projects. Pavement maintenance management and Economic evaluation of road projects are disseminated through this course. Foundation lectures on HDM-4 data collection, road deterioration, pavement maintenance methods simulation models, pavement management, traffic estimation, asset management and economic evaluation will be delivered for first two days by the experts, which are the basic requirements for using HDM-4. Next eight days will be devoted for the development of operational Skill in HDM-4 and case studies through brief presentations, spreadsheet analysis, hands-on, tutorials and one to one interaction. Special topics such as model calibration, strategy and program analysis will also be covered. Features added in version 2 of HDM-4 will be explained and demonstrated.

Willing professionals may register by sending an e-mail or letter to the course organizer T.K. Amla, Head, Information, Liaison & Training Division or course coordinator latest by 30 September 2008. Admission will be made only after receiving the course fee on or before 8 October 2008. The course is for 10 days duration and fee for candidates from SAARC countries is INR Rs 25,000/- or USD 600; for other country candidates USD 700 and for Ph.D students (must be introduced by their Head of Department) INR 20,000/-.

Fee does not include the cost of boarding and lodging. Guest House / Hostel facility at CRRI may be booked for the confirmed participants (if requested in advance). Demand Drafts may be drawn in favour of Central Road Research Institute Payable at New Delhi, India.

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Printed and Published by Deeksha Bist on behalf of National Institute of Science Communication And Information Resources (NISCAIR), (CSIR), Dr K.S. Krishnan Marg, New Delhi -110 012 and printed at NISCAIR Press, Dr K.S. Krishnan Marg, New Delhi -110 012

Editor: Dr B.C.Kashyap; **Associate Editors:** Meenakshi; Vineeta Singhal; **Editorial Assistant:** Neelima Handoo

Design: Pradip Banerjee; Sarla Dutta; **Production:** Kaushal Kishore

Editorial help by Mr Hasan Jawaid Khan, Editor-*Science Reporter*, is greatly acknowledged.

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For subscription: The Sales & Distribution Officer, NISCAIR; E-mail: sales@niscair.res.in; Annual Subscription: Rs 300; Single Copy: Rs 15.00

Subscription Complaint No: 25843359