*From the Desk of Chairman*

**Innovation : Part 3 - 43**

"Soldiers in the Laboratory....." is a study report published January 2005 by the Scientists for Global Responsibility. It documents the invisible power and influence UK military commands in the governance and direction of science, engineering and technology, and in shaping the research agenda in the country. It points the extent and spheres of military impact on the emerging technologies, and identifies the main concerns impinging on priority social and environmental issues. Based on the findings of the study, the report arrives at a number of significant inferences covering ethical implications, security concepts, social justice and environment sustainability, as also the commercial priorities, the issues of technology transfer to civilian use, and so on. It also forwards a series of recommendations that address identified concerns.

The Special Feature in the present issue of the **WISTA: INNOVATION** deals with the above report and gives a gist of some cardinal conclusions and main recommendations.

The Royal Society of UK and the Royal Academy of Engineering, have addressed the potential health and environmental impacts of the new nano-scale technologies, particularly the risks of exposure to manufactured nanoparticles that are extensively used in a number of modern electronic/electrical gadgets. They recommend reviewing the adequacy of existing regulations on the use of nanoparticles in consumer products and the constitution of multi-stakeholders group to take close cognizance of the emerging technologies and initiate public dialogue around their development in order to ensure these are channelised in the right direction and their negative impacts are minimized.

The 'Perspective' in the current issue covers the findings of these independent studies on the extent and nature of damage caused to animals exposed to magnetic fields, and the implications of these findings for humans who in the moderns every day life are intermittently or occupationally exposed to various electronic appliances.

Other regular features covered are: Scan Around Us; Frontier S&T; S&T for Basic Needs; In Focus; Technology Development; Experts Converge; Knowledge Spreads, and Scan Around the Globe.

We welcome comments and suggestions from our readers.

***Dr K V Swaminathan***

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This publication aims at disseminating information on pertinent developments in its specific field of coverage. The information published does not, therefore, imply endorsement of any product/ process/ producer or technology by **WITT.**


**Editor : Dr K V Swaminathan**

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## SCAN AROUND US

### ADB Loan to PGCIL

The Asian Development Bank (ADB) will finance upgrading of the national power transmission grid through a loan of $ 400 million. The project is expected to strengthen and expand the capacity of national transmission grid, comprising of 765 KV and 400 KV transmission lines as well as substations operated by PGCIL. The project aims to improve system reliability, facilitate interstate power transfers by removing transmission bottlenecks, reduce transmission losses, facilitate efficient utilization of existing and planned power plants, facilitate development of national power trading market and promote increased private sector participation through open access to the national transmission grid. Proceeds of the ADB loan will be used to finance sub-projects, like construction of new EHV transmission lines and substations in Andhra Pradesh, Tamil Nadu and Pondicherry. This is the third ADB loan to the Power Grid, covering 70% of total project cost and comes from its ordinary capital resources, carrying a 20-year term, including 5 years' of grace period.

*(IEEMA Journal, Feb 2005)*

### Centre for Soft Computing Research

A Centre for Soft Computing Research is proposed to be set up at the Indian Statistical Institute in Kolkata with financial assistance from the Department of Science and Technology. As reported, the centre would undertake basic research in soft computing, pattern recognition, image processing, machine intelligence and in other related areas. It would also take up demonstration applications in focussed areas like web-mining, bioinformatics and image analysis. The other aim of the centre is to take up development of manpower by imparting training to researchers and students from industry and academia, including the research and development laboratories. The research output of the centre would help in establishing partnership with the industry for its benefit.

*(PTI Science Service, Jan 1-15, 2005)*

### Eco-Friendly Industrial Cleaners

Loctite India Pvt Ltd, Banglore (India), has developed and is offering eco-friendly industrial grade cleaners and degreasers. The biodegradable, all purpose, concentrated cleaners and degreasers are free from 'ozone depleting substances' (ODS). Formulated for wipe down, pressure spraying ultrasonic and immersion cleaning processes, Natural Blue can be economically diluted with water at room temperature or heated to meet a wide range of industrial cleaning applications. Common industrial contaminants and process residues like grease, cutting oils, light carbon, lubricants, tar, wax etc, can be removed using the said cleaners.

*(Vatis Update - Ozone Layer Protection, Nov-Dec 2004)*

### Indigenous Tele-Therapy Machine

Tele-therapy machines are used to eliminate or shrink localized cancers in human tissues. The development of first such indigenous machine has been completed by BARC. This state-of-the-art machine incorporates latest concepts of safety, controls and user interface. A unique feature of this machine is its fully closable collimator for improved radiation. It incorporates world-class features, such as 200 RMM Cobalt - 60 source capacity, fully computer controlled minimum couch height, and noise free movements at par with any imported machine of similar category. Besides, the machine has lower penumbra for better beam quality, total digital controls with self-calibration of motors and controls, single cable communication between machine and control console, computer controlled couch and total treatment data acquisition and data analysis. The cost of the indigenous machine is significantly lower than imported machines of similar capacity.

*(Nuclear India, Nov-Dec 2004)*

### Sewage to Treat Tannery Effluent

Leather tanners and the municipal administrations of Amber and Wallajah of North Arcot District, Tamil Nadu, will jointly implement a Rs 50-crore project for domestic sewage disposal and tannery effluent treatment. Domestic sewage will be used to dilute the tannery effluent to bring down the total dissolved solids (TDS) in the tannery effluent. It is expected that this will help industry to conform to environment norms laid down by the authorities.

Under the project, the effluent from the tanneries would be diluted with the domestic sewage to bring down the TDS levels to conform to the norm of 2100 mg a litre laid down by the Tamil Nadu Pollution Control Board. While the tanneries have set up common effluent treatment plants or individual treatment facilities, the TDS issue alone has been evading a solution till now. As reported, the project could commence operations in about two years.

*(Chemical Weekly, Feb 1, 2005)*

**Sludge Lancing Equipment**

A Sludge Lancing Equipment (SLE) developed for the first time by Bhabha Atomic Research Centre in Mumbai, would ensure corrosion free, long life to steam generators in nuclear power plants by periodic removal of corrosion products from them. The SLE incorporates a remotely operated state-of-the-art robot, technically called Jet Manipulator Assembly (JMA) with sophisticated computerised controls. High velocity water jets dislodge sludge from the steam generator tube sheet. System provides a Remote Visual Inspection System (RVIS) to carry out visual inspection of the steam generator. The dislodged sludge, suspended in water, is separated by passing the water containing the sludge through a series of increasingly fine filters. The sludge free clean water is recycled in a closed loop system and is pumped back to steam generator in the form of continuous high velocity water jets or lances.

*(PTI Science Service, Jan 16-31, 2005)*

**State of the Art Milling**

A latest state-of-the art Computerized Numerical Controlled (CNC) floor type, Ram type, boring and milling machining facility, costing Rs 6 crore and manufactured by the Hyderabad Division of HMT, was recently commissioned by BARC. The machine which has many firsts to its credit, is the result of close technical interaction between BARC and HMT. It incorporates the latest CNC control system having adaptive controls. The tool magazine head houses various cutting tools and right angle milling, face milling and universal milling heads, which can be changed automatically. The machine is reportedly having capability to handle complex jobs requiring CNC machined profiles. HMT/BARC technical collaboration is further aiming at several other high technology items of interest.

*(Nuclear India, Jan-Feb 2005)*

**Test for Space - Capsule Recovery**

The airdrop test of instrumented Space-capsule Recovery Experiment (SRE) was successfully conducted recently, using a helicopter from Satish Dhawan Space Centre (SDSC), SHAR, Sriharikota near Chennai. This was the third and the last of the three airdrop tests. These three tests were crucial for the qualification of SRE for its flight. SRE is intended for demonstrating the capability to recover an orbiting space capsule. The experiment envisages the development of a 500 kg recoverable capsule and the associated technologies. SRE will be launched on board ISRO's Polar Satellite Launch Vehicle (PSLV) during the second half of 2005.

The SRE comprises the aero-thermo structure (ATS), space craft platform, deceleration and floatation system and micro-gravity payloads. The capsule is made of mild steel. The parachute, pyrodevices, avionics packages of triggering unit and sequencer, telemetry and tracking system and the sensors for the measurement of system performance parameters, are located inside SRE capsule. After launch SRE will remain in orbit for a few days during which it will be used to perform experiments in micro-gravity environment. The capsule will then be de-orbited to re-enter the earth's atmosphere. On re-entry, after initial aerodynamic braking, a parachute system will reduce the touch down velocity. It will splash down in Bay of Bengal about 140 km east of Sriharikota coast. A floatation system will keep the SRE afloat to enable recovery. The SRE is intended to test a host of technologies, including reusable thermal protection system, navigation, guidance and control, hypersonic aero-thermodynamics, management of communication blackout, declaration and floatation system and recovery operations.

*(Space India, July-Sep 2004)*

**Universal Glass Composition**

Complete specifications of the patent titled as "Universal Glass Composition Process for the Preparation Thereof" have been accepted by the Indian Patent Office on 25th December, 2004. Patent number 195061 has been invented by Devender Kumar and Jai Kumar Sharma (both Indians) and the same is assigned to Samcor Glass Limited, Village Naya Naya Nohra, Kota-Baran Road, Kota, Rajasthan, India. Patent, in brief, is as under:

A universal glass composition useful for black and white and colour computer monitors, comprising $SiO_2$ in an amount of 45-70%, $Al_2O_3$ in an amount of 0.01 to 10%, $K_2O$ in an amount of 0.01 to 15%, MgO + CaO in an amount of 0.01 to 10%, PbO in an amount of 5 to 30%, $Sb_2O_3$ in an amount of 0.01 to 5%, $FeO_2$ in an amount of 0.01 to 1%, $CO_3O_4$ in an amount of 30-45 ppm and NiO in an amount of 250-300 ppm, all percentages being expressed in terms of weight of the final composition, the balance if any comprising one or more conventional ingredients such as herein described.

*(The Gazette of India, Dec 25, 2004)*

## FRONTIER S&T

### AEROSPACE/SPACE

**European Space Agency (ESA) Probe**

Huygens is ESA's first successful attempt to land a probe on another 'world' in the outer Solar System. Its findings about the atmosphere of Titan could eventually provide new information about the history of Earth. The descent of the Huygens lander is just the latest in a series of milestones for the Saturn Mission of the Cassini-Huygens space probe, a joint European - US mission. The Huygens lander begun its solo journey by separating from Cassini on December 25, 2004. Its descent through Titan's atmosphere on January 14, 2005 lasted 2.5 hours and was slowed on the journey by a series of parachutes, allowing soft landing on moon. It transmitted data during the journey and as planned, continued to send images and data once on the surface. NASA hailed the lander's success.

Cassini-Huygens was launched from Kennedy Space Center in Florida in October, 1997 and used the gravitational pulls of Venus, the Earth and Jupiter to propel itself through space. Cassini will orbit Saturn for a total of four years, gathering information on the planet and its ring system. The total European cost for the Huygens lander is about 400 million Euro ($ 521 million), including Germany's contribution to the mission totalling 115 million Euro ($ 150 million).

*(German News, Feb 2005)*

**Rover to Mars**

The Mars Scientific Laboratory (MSL), the next Rover to the planet Mars, will be ready for launch by National Aeronautic and Space Administration (NASA) in 2009. It is reported that MSL would be the third Rover to carry out several experiments in Mars. The first and the second Rovers are said to have completed a year each on January 4 and 24 respectively. Both the missions are doing very well by showing clouds on the planet and spectacular sand dunes. Both the Rovers have driven long distances exceeding expectations. Scientists are now studying the heat shield of the Rovers which would help them to improve the landing technology on Mars. This study is important as the most dangerous part of going to Mars is not the journey but entry into the Martian atmosphere and therefore the temperature and resistance factors will be studied in detail. Since the heat shield covering the Rover fell off after the Rover entered the Martian atmosphere, scientists endeavour to improve upon it. NASA is also planning to launch Mars Resource Orbiter Mission in August 2005.

*(PTI Science Service, Jan 16-31, 2005)*

### BIOTECHNOLOGY

**Bio-Composting**

All biodegradable materials are naturally converted to compost by the microbes. The limitation, of course, of this process is the time taken for this process. It takes several months. On an average, aerobic bio-composting (stirring of waste periodically) takes only 25-30 days to fully stabilized compost. Aerobic bio-composting accelerates biodegradation and results in the high temperatures necessary for pathogen destruction. Use of a biological product, such as Earth Life Bio Great Compost Activator, can accelerate the composting process.

Advantages of bio-composting include (i) fast and simple process; (ii) highly efficient and high yielding; (iii) no colour, pests, rodents; (iv) highly decentralized, can be implemented at the ward, subward, society and even individual household level; and (v) low capital investment. In this connection, Greentech Bin manufactured under license from Perbara International, Australia, by Spiro Bioventures Pvt Ltd Panvel, Navi Mumbai, India, is useful for bungalows, housing colonies, clubs, hotels, industries, commercial institutions for treating kitchen/garden waste.

*(ENVIS-Biotechnology, Aug-Oct 2004)*

**New Vaccine Delivery Device**

Based on proprietary technology developed by the "Programme for Advancement of Commercial Technology (PATH)", supported by USAID and commercialized by (BD), Shantha Biotechnics, has announced the availability of its hepatitis - B vaccine, shanvac-B, in a unique vaccine delivery device called BD uniject. It is reported to be another step forward in the company's endeavour to constantly research and develop effective biotechnology products for human care and patient safety. The delivery system is a single - dose, single-use injection device that guarantees the integrity and sterility of the drug right up to the final moment of use. The device prevents any scope of tampering or contamination from the outside environment and in the absence of glass, rubber or silicone ensures that there is no chance of particulate matter mixing with the vaccine.

*(Chemical Weekly, Jan 25, 2005)*

## DRUGS AND PHARMACEUTICALS

### Developing New Medicines

Studies by Tufts Center for the Study of Drug Development (CSD) indicate that drug companies can significantly increase the flow of new prescription drugs, while maintaining patient safety, if they adopt more innovative R&D strategies aimed at improving clinical success rates and lowering clinical study costs. Product pipelines are reported to be bottleneck in bringing new medicines to market. Despite rapidly rising R&D spending by the research-based industry, the number of new drugs and biologies submitted to the FDA for review has steadily decreased in recent years. This calls for bolstering R&D efficiency on the part of the drug developers to remain competitive. As per expert opinion, one of the most effective ways to improve R&D productivity is by terminating unpromising R&D projects as soon as possible and the funds and the other resources are diverted to presumably, more productive lines of research. According to Tufts CSDO, a new prescription medicine, on average, costs $802 mn and takes upto 15 years to develop and get FDA approval. Thus two most promising routes available to the drug companies to improve R&D productivity are, investing in state-of-the-art information technology to better understand the data generated in discovery and developing strategic alliances with specialized drug developers.

*(Chemical Weekly, Jan 18, 2005)*

### Temsirolimus - An Investigational Drug

Temsirolimus is a very significant contribution to the Wyeth pipeline, a largest research-driven pharmaceutical and health care products company. Temsirolimus is an investigational drug, which specially inhibits in mTOR (mammalian target of rapamycin) Kinase, an enzyme required to control a cell's life cycle, preventing cell division into new cells. Phase III trials are underway using temsirolimus, an mTOR inhibitor, for several cancers including renal cell carcinoma and advanced metastatic breast cancer. The trials are investigating whether temsirolimus has the potential to provide improved survival rates for advanced cases of these cancers.

Recently the US Food and Drug Administration (FDA) granted "fast track" designation for temsirolimus in the first-line treatment of poor-prognosis patients with advanced renal carcinoma. In addition, based on the mTOR mechanism of action, temsirolimus is in clinical trials to investigate its therapeutic utility in other diseases such as mantle all lymphoma, rheumatoid arthritis and multiple sclerosis.

*(Biosalce.com, Dec 11, 2004)*

## ELECTRICAl/ELECTRONICS

### Revolutionary Vision Equipment

Dutch researchers have developed 'revolutionary' various equipment that makes video imaging at night as clear and as colorful as in broad daylight, reported in New Scientists. The system uses a computer to impose colour on an image, replacing the fuzzy grey or green monochrome images of conventional night-vision goggles. Night-vision cameras either amplify available light or use infrared sensors to map the heat radiation that emanates from objects.

The new gadget improves on this by 'sampling' colour daytime images in the landscapes in which the system is expected to be used. It then selects random pixels to obtain a sample of the range of colours in a typical environment - browns for tree trunks, green for grass, vegetation and tree canopies, blues for the sky. The system matches these colours to equivalent monochrome shades - for example, a light grey is matched to a shade of blue for the sky, a dark brown is matched to tree trunks. Then, when the system is used at night to view a target scene, the mapping is reversed, so that monochrome pixels are replaced with the closest colour match. The device has already been tested on a dozen volunteers, who say it has dramatically improved their ability to spot obstacles and terrain in the dark.

*(The Times of India, Feb 10, 2005)*

### Wireless Access in Subways

Boston plans underground wireless access at four of the city's busiest subway stations. Massachusetts Bay Transportation Authority has entered into a 15 year contract with In Site Wireless of Alexandria, Va to this effect. System is expected to be beneficial with regard to safety and security. Installation of wireless service in subways will enhance security by allowing passengers to call for help without having to rely on police call boxes in the stations. Further people will have increased ability to report safety issues to the proper authority. Four stations are within a half mile radius and the service will eventually expand to other stations.

In site thinks all the major voice and data providers will sign contracts to use its system of underground antennas and fiber-optic cables to reach their subscribers.

*(abs News, Feb 11, 2005)*

## S&T FOR BASIC NEEDS

### BUILDINGS

**Fatigue Life of Welded Structures**

A scientist at Columbus, OH-Battelle has developed a method for predicting fatigue life in welded structures used in construction that could revolutionize the field and result in substantial cost saving. For the past 25 years, experts in the field have been trying to address the adequacies in stress analysis for fatigue design of welded structures so that companies would not have to compensate for poorly correlated test data.

While previous stress concentration calculation methods were highly sensitive to the detail of the computerized model, the new method, referred to as the Verity(TM) mesh-insensitive structural stress method, proved to be accurate regardless of that detail. And the accuracy far surpasses any existing modeling method, so that fatigue lives of welded structures now can be reliably predicted regardless of the complexity of welded components and modeling details. The method, further can eliminate the need for expensive testing and over engineering that is done to compensate for uncertainties in current fatigue design practices.

Battelle, headquartered in Columbus, Ohio, develops and commercializes technology in scientific field for its customers.

*(Bettelle News Release, Dec 13, 2004)*

**Innovation Discovery in Construction**

The Innovation Discovery Programme is a collaboration between BRE with its extensive technical expertise and knowledge of the construction sector, and Inventa Partners, a company with wide experience of guiding companies through the process of unlocking their own innovations, and exploiting the latest ideas from elsewhere. The new initiative will help construction industry companies gain greater commercial success from both their innovative ideas and practices, and the latest research and development in the construction and other sectors.

It is assessed to be a unique approach to enable companies to unlock innovation efficiently and effectively. BRE and Inventa will look across the existing research base (within the construction industry and outside) to see if there is anything that can be applied to solve clients' problems. BRE sees this as a natural extension to the services they offer to their clients in construction activities.

*(BRE Release, Jan 3, 2005)*

### CLOTHING/TEXTILES

**Financial Performance of Spinning Mills**

ATIRA has recently made a study on 'Financial Performance of Spinning Mills' during the last two financial years. It has studied 77 spinning mills representing a cross-section of spinning industry in India. Study includes analysis of basic financial performance aspects of mills, such as profitability, cost structure, capital structure, assets structure, working capital, liquidity and solvency and benchmarks for various financial parameters. Findings are expected to satisfy the need of various relevant interests, such as spinning mills, financial institutions and research workers. Mill-wise financial ratios will enable mill managements to (i) assess mills' performance, and (ii) identify strengths and weaknesses of their operations in comparison with its competitors to enable them to take up detailed investigation, where found necessary, to chalk out a plan for corrective action, so as to improve bottom line. Comparison, no doubt, assumes a greater importance in the present open market economy having keen competition.

*(UP-Datira, Nov-Dec, 2004)*

**Specified Finish for Textiles**

USPTO Patent No 6855772 is directed to polymeric treatment preparations for textiles that impart water and soil repellency to fibres, yarns and textiles. Invention comprises an aqueous solution, emulsion or suspension of a fluorinated polymer containing specified reactive groups and one or more metal atoms. Treated fibrous substrates exhibit a greatly improved, durable water and soil repellency or resistance, even after multiple launderings.

*(USPTO, Feb 15, 2005)*

**Thinking Carpet**

German carpet makers teamed up with leading chip makers to develop what they claim is the world's first 'Thinking Carpet'. It is claimed that it checks the temperature to control the heating, detects footprints to switch on lights and calls the police if it senses someone walking on it when the house is supposed to be empty. These new floor coverings are equipped with sensors, linked to control computer to discharge the said functions. Carpets are likely to be available in shops by year end.

*(The Times of India, Jan 13, 2005)*

## ENERGY

### Cost of Power Interruptions

A study conducted by Lawrence Berkeley National Laboratory researchers for the US Department of Energy's Office of Electric Transmission and Distribution, estimates that electric power outages and blackouts cost the nation about $80 billion annually. Of this, $57 billion (73%) is from losses in the commercial sector and $ 20 billion (25%) in the industrial sector. Estimated residential losses are $1.5 billion or only 2% of the total. Another important conclusion of the study is that momentary interruptions, which are more frequent, have a bigger impact on the total cost of interruptions than sustained interruptions, which are less frequent. Momentary interruptions were responsible for two-thirds of the cost, at $52 billion, while sustained interruptions of five minutes or more caused $ 26 billion. Another important factor is power quality. Grid experiences power quality events which occur when the power supplied to customers deviates from the standard that electric utilities try to deliver. Figures of loss on the quality aspects are not available. Above features however, encourage policy makers, regulators and industry to coordinate their collection of power interruption data, improve the recording of frequency and duration data, and collect more information on the costs and efforts of consumers to recover from power outages. Berkeley Lab in California conducts unclassified scientific research and is managed by the University of California.

*(Research News, Feb 2, 2005)*

### Cowdung into Kilowatts

Worldwide research is directed towards efficiency improvement in traditional biogas digesters. Generators fueled by methane extracted from dairy waste have not yet produced power cheap enough to be viable in the Northwest where electric rates still are among the nation's lowest despite drastic increases in the past four years. At best, traditional setups that have processed solid dairy waste managed to generate 0.2 kW/cow. Energy Northwest had hoped the system it has been testing, developed by Kennewick's Soil Search LLC, would produce 1 kilowatt per cow. That system, set up at Franklin County's 5D Farms, extracts solids and sucks methane from a giant lagoon of manure-laced water covered by a polyvinyl blanket. The lagoon can be heated to stimulate methane production and the blanket keeps the methane from escaping. Based on readings taken over the past year, Energy Northwest believes the system could generate between 0.3 kilowatts and 0.5 kilowatts per cow. Though below target, it is an improvement over other technologies. As per the company, what is left to be seen is how much potential utility customers would be willing to subsidize a dairy waste generator, and whether farmers would be willing to chip in to compensate for the odour reduction the system provides.

*(ENN, Mar 6, 2005)*

## FOOD

### Erucic Acid in Foods

The Food Standards Agency (FSA, UK) notified the foods with levels of erucic acid that breach the regulations. The FSA has issued a follow-up Alert for information after the above notification. In September 2004, the Agency advised people not to eat particular pickles, sauce and preserved vegetables imported from specified countries following a survey that showed that some products contained illegally high level of erucic acid.

Erucic acid is a substance naturally found in some oils derived from plants, primarily in some varieties of mustard seed oil and rapeseed oil. Although there have been no confirmed cases of erucic acid toxicity in humans, but its high levels have been linked to the formation of fatty deposits in heart muscle in animals. However, studies of some animals have suggested that any fatty deposits that might have formed around the heart following consumption of high levels of erucic acid will gradually disappear if one reduces his or her consumption of erucic acid. A breach of the 1977 Erucic Acid in Food Regulations applies when erucic acid is more than 5% of the fatty acid content of any oil or fat or mixture of the two or in case of a food to which oil or fat has been added and if the food in more than 5% total fat content, the erucic acid comprises more than 5% of the fatty acid content of all the oil or fat and the food product where oil or fat has been added is aimed explicitly or implicitly at young children and infants.

*(Medical News Today, Dec 25, 2004)*

### Falling Nutrient Value of Foods

A US study has shown that nutrient value of 43 common crops has declined significantly over the past 50 years. The crops include 39 vegetables, three types of melons and strawberries. This is reported to be due to general obsession to increase farm productivity, resulting in taking a toll on the quality of fruits and vegetables. Between 1950 and 1999 there have been intensive efforts to breed new varieties having greater yield. Emerging evidence, however, suggested that when you select for yield, crops grow bigger and faster, but they do not necessarily have the ability to make or uptake nutrients at the same faster rate, as found by scientists at University of Texas at Austin. They found the decline in nutrient value ranged from 6% for protein to 38% for riboflavin. Other nutrients investigated included calcium, phosphorus, iron and ascorbic acid.

*(Down to Earth, Jan 15, 2005)*

## HEALTH

### Genetic Variation

Using healthy minnows from Wiscasset, Maine and Sapelo Island, Georgia, researchers have found a genetic set of keys to unlock the mystery of why some people can eat fatty food and not suffer from heart diseases or why some medical treatments work more effectively in some people than others.

Researchers have found that some hearts use glucose (sugar) better than others, and some hearts use fatty acids (fats) better than others. In general, if an individual is good at using or metabolizing one food source, he/she is not good at using the other. Using microarrays, the researchers were able to measure how much of many hundreds of genes were produced. These gene products make the proteins that convert the food sources (fats, sugars, etc) into energy. They found that there is a lot of variation also in the amount of genes. These differences in the amount of genes explain much of the variation in cardiac metabolism. Surprisingly, the genes that matter are not the same for everyone: in some individuals, increases in some genes affect fat uses, while in others, it is a totally different set of genes. This variation in which genes are important, starts to explain why some can eat fatty food and not suffer from cardiac disease. Ultimately, this research tells that by identifying the number and types to these kinds of genes a person has, one may be able to better prescribe the most effective of medication within a given class of drugs and have a clearer understanding of their propensity for heart disease.

*(ENN.com, Dec 20, 2004)*

### Killer Indoor Smoke

Recent joint statement issued by UNDP and WHO describes how thick acrid smoke rising from stoves and fires inside homes is associated with around 1.6 million deaths per year in developing countries. In order to promote solutions for reducing indoor air pollution (IAP), the Shell Foundation has been running Breathing Space™- a $10m investment which can be scaled up to reach the two billion people. Breathing Space will shortly enter a scale-up phase for successful pilot programmes and the Shell Foundation will be summarizing and disseminating its approach through a commercialisation toolkit. It will be designed to provide a framework for the development of demand driven, financially viable models for delivering improved household energy solutions. The toolkit is being compiled in India by Accenture Development Partnership - a charitable organization. Commenting on the toolkit, Karen Westley, Shell Foundation programme manager, said: it's part of our overall aim of infusion development thinking with 'business, DNA' to ensure solutions are both financially sustainable and scalable.

*(Boiling Point, No 50, 2005)*

## TRANSPORTATION

### Pendulum Vehicle

A 'Pendulum Vehicle,' an autonomous transportation system made on more than one similar pendulums in longitudinal position made on equidistant both side fixed vertical pillars of same height placed at equal distance where each pendulum comprises of a suspension beam, made on from equidistance strips connected serially in lateral position vertically with the help of an upper most horizontal strip connected and swinging on suspension place fixed on both side vertical pillars comprising a joining car, a hollow cylinder like body containing two hollow similar joining cylinders in horizontal position with elongated scars on lower side horizontal position comprising joining hand in each cylinder in solid cylinder like body twice the length of hollow cylinder connected with operating handle by chain attached with middle downward position swinging in the lower sides, suspending in the middle of suspension beam by an adjusting cum suspending rod revolving on horizontal position and comprised of vehicles comprising shock absorbers, room balancing solid, four revolving wheels and a joining aperture the length of which one is equal to the half of the joining hand while the diameter is twice the diameter of joining hand, capable to move from one station to another near by station through movement of suspension beam, where in the station the suspension beam is stopped by stoppers attached on pulling chamber and after connection of vehicle into suspension beam in between stopping rod and the last pulling chamber nearest to the middle of station where stopping rod is situated with the help of joining hands of the joining cars with the joining cones attached permanently to the lowest outside end to suspension beam internally.

This invention made by Sudhir Kumar Mukim, 209 A Bidan Sarani, Third Floor, Kolkata - 700 006, India has secured an Indian patent, Number 194903, in December, 2004.

*(The Gazette of India, Dec 11, 2004)*

"*Without the science base there is no innovation and without innovation there is no competitiveness*".

Sir John Cadogan

## SPECIAL FEATURE

### SOLDIERS IN THE LABORATORY

#### Introduction

The report 'Soldiers in the Laboratory - Military Involvement in Science and Technology', published by Scientists for Global Responsibility (SGR) in January, 2005, indicates that 30% of the total UK research and development (R&D) spending is funded by the Ministry of Defence (MoD). Furthermore, 40% of government R&D personnel are employed by the MoD. The main purpose of this report is to document the power and influence of military in the governance and direction of science, engineering and technology in the UK. It also examines whether some reallocation of the resources that the military currently devotes to weapons - related science, engineering and technology (SET) would contribute better to the goals of peace, social justice and environmental sustainability. The main focus of the report is seen to be UK situation since the end of the Cold War in 1989. Military involvement in and influence on SET is complicated and expensive. The report thus attempts to identify the main concerns, in detail where possible, over the past fifteen years or so.

#### SET and Military Involvement

Investigations have uncovered a wide range of information about military involvement with SET. A small number of military corporations in the UK exert a largely invisible influence on the government. Through a complex array of advisory committees and lobby groups, they have a significant voice in the funding and shaping of the research agenda. Besides, the military sector supports emerging technologies such as space technology, and the nanotechnologies, enjoying a large scale effect on the direction of their development. A number of new multimillion pound collaborations between the military sector and the universities have been created in the UK in the last few years. The three main initiatives are: Defence Technology Centres, Towers of Excellence, and Defence and Aerospace Research Partnerships. All however, reflect a narrow technological approach to security issues.

It is observed that military sector today plays a disproportionate role in setting the research agenda for science and technology. According to the report, 'an increasing emphasis on high technology weaponry among the wealthier countries is contributing to a narrow approach to dealing with security issues. For example, the UK MoD only spends approximately six percent of its budget on conflict prevention. A broader interpretation of security is called for which takes account of global issues, such as climate change, resource depletion, loss of biodiversity and an array of human health problems. Some redirection of the global 'defence' burden to under funded areas (many with a SET [science, engineering and technology] component) such as renewable energy and climate change mitigation would significantly assist in the development of these areas.

#### Global Issues

The world today faces a range of social and environmental problems. These being pressing issues in their own right, many of them can be seen in terms of a broader concept of security. The United Nations Development Programme statistics of poverty and deprivation highlight the extent of the problem. Environmental problems are becoming increasingly urgent with serious impacts on human populations. Local and regional damage from industrial expansion, mining and deforestation are affecting greater numbers of people and ecosystems. Meanwhile, emissions of greenhouse gases are causing global climate change. The impacts of this, which include increased flooding and other severe weather events and disruption to water supplies and agriculture, will particularly affect the most vulnerable, i.e. those in poverty and endangered wildlife.

Environmental problems create refugees, which causes yet further problems. These effects can be contributing factors to conflict, including terrorist activities. The expansion of the traditional concept of security such that it encompasses security of access to basic resources (eg food, water shelter, a clean environment) can affect policy responses to these problems. This can be especially important in countries where military demands for resources are prioritized over social needs. The policy approach to security can also change how scientific research and technological development is directed and used.

#### Corporate Influence in Change of Goals

An important dimension of the report is the radical change which has occurred over at least the last fifteen years in the way research worldwide is funded and directed, especially as a result of increasing economic globalization. Commercial interests have increasingly penetrated all areas of SET, with industrial representatives now occupying positions of influence in the governance of research and teaching within universities. Many of the world's science and technological research programmes

are directed and funded, or are influenced by, major corporations.

This change has shifted the priorities within SET. Wealth creation is now accepted as a major goal, as demonstrated in the UK's recently released ten-year science and innovation strategy. There is concern that these interests focus SET too narrowly, sidelining work which has wider social and environmental goals. Moreover, when corporations have military interests, this can have a significant impact on the type of security-related SET which is prioritized.

**Conclusions**

Based on above and also on detailed study of various other related aspects, the report makes a number of significant conclusions about the role of SET in today's world, especially on its direction and funding. Seven main conclusions as a result of research undertaken are: (i) The military sector, especially in the UK and USA, has a very large and disproportionate effect on science, engineering and technology. The UK-US 'special relationship' (largely based on a 1958 treaty, which was renewed in 2004) further drives military R&D which has profound social and ethical implications. (ii) Current military thinking is based predominantly upon the idea of security through the superiority of military force, and marginalises broader concepts of security based on social justice and environmental sustainability. This affects which areas in SET are funded by the military. (iii) The UK government policies which have shaped SET over recent decades have moved commercial priorities centre stage, and military corporations have played a large part in this process. (iv) Military and commercial pressures compromise openness and accountability in SET, for example through the use and overuse of commercial confidentially and national security arguments. This can stifle debate and dissent over ethical issues in SET. In general, public scrutiny of SET in the UK, including its funding and direction, is weak. (v) Military support of emerging technologies such as the nanotechnologies is high (especially in the USA). This imposes barriers to full public scrutiny of these technologies and colours the public perception of the potential usefulness of such technologies. (vi) Technology transfer from military - supported R&D to civilian use is a complex and expensive route which has, to a large extent, been disappointing in view of the massive investments involved. (vii) Areas such as peace-building and sustainable development are currently underfunded, and would benefit substantially from an expansion of SET expertise paid for by a reallocation of proportions of military budgets.

**Recommendations**

Based on the extensive evidence assembled in the report, series of recommendations which address the concerns, have been identified. They are divided into three groups according to the audience to which they are addressed: the UK government; professional scientific and engineering institutions and publishers; and individual scientists and engineers.

***To the UK Government***

Divert a large fraction of current UK military R&D funds to addressing wider issues. Restrict military involvement with R&D of emerging technologies. Enact procedures to make Ministry of Defence funding of R&D far more transparent and open to public scrutiny. Devote more resources to implementing a far more inclusive concept of security within policy. Conduct a full and transparent review of the 1958 Agreement for Cooperation on the Uses of Atomic Energy for Mutual Defence Purposes (renewed in 2004) and all other military agreements between the USA and the UK. Cease all scientific and technical work related to the design and development of new nuclear weapons.

***To Professional Bodies etc***

Require all academic papers and exports based on work funded by the military (whether government or corporate) to publicly acknowledge this funding and its scale. Strengthen or initiate professional ethical codes to encompass the problems of professional involvement with the military and its current narrow interpretation of the concept of security. Reduce or eliminate financial ties with the military at least until the adoption of the policies recommended above.

***To Individual Scientists and Engineers***

Educate yourself about any military interest in your field of work and in your institutions. Engage with military interests to try to encourage a shift in the way they use the work to a more holistic security perspective or avoid working with the military altogether and choose a scientific/engineering post which provides civil benefits to society, for example, by helping to address social and/or environmental problems. Support lobbying for the above change in government policy. Encourage discussion of these issues in your institution and within the appropriate committees or boards of your professional associations.

## IN FOCUS

### Inductees 2005 of Inventors Hall of Fame

To honour innovation and invention and recognize all those whose vision, hardwork and creative drive have helped shape the future, the USA has established a National Inventors Hall of Fame (NIHOF), and the inductees for 2005 include six living inventors and seven who have been given posthumous recognition.

The names of the six, and their inventions are;

- C Donald Bateman: Ground Proximity Warning System
- R Gundlach: Modern Photocopier
- Alec Jeffreys: Genetic Fingerprinting
- Dean Kamen: Auto Syringe
- Les Paul: Solid - Body Electric Guitar
- Leo Sternbach: Valium

The posthumous awardees are M Baldwin for Steam Locomotives; C Birdseye for Frozen Foods; L Godowsky and L Mannes for Kodachrome Colour Film; G Seaborg for Isolating Plutonium; J Rainbow for Optical Character Recognition; and S Waksman for Streptomycin.

Incidentally, Seaborg is the only person to hold patents on chemical elements and is also the only person to have an element named after him-seaborgium.

*( NIHOF, Feb 13, 2005)*

### Internet Search Scientist Gets Award

The inaugural Chris Wallace Award from the Computing Research and Education Association (CORE) in Australia has been awarded to Dr David Hawking of the ICT Centre in the Commonwealth Scientific and Industrial Research Organization (CSIRO) for developing an enterprise search engine called 'Panoptic' which enjoys great popularity. While internet search engines like Google help locate a business or other organizations, an enterprise search engine allows visitors to locate goods, services and relevant information from the site.

Dr Hawking is one of Australia's leading researchers in internet search and his interests encompass both improved methodologies and technical applications of search.

*(CSIRO, Feb 13, 2005)*

### Prototype Award

The South African Bureau of Standards (SABS) Design Institute had established in 1997 an annual Prototype Award Scheme to assist and encourage new product developments in that country.

One of the 29 products to win the Prototype Award for 2004 which was presented in December last year was for iSlices, a beauty product co-developed by the CSIR, the largest R&D, technology and innovation institution in Africa.

iSlices are high-tech disposable eye treatment pads that release active ingredients into the area around the eye to relieve tired eyes, puffiness, dark rings and signs of ageing. The hydrogel polymer technology which contains among other ingredients, indigenous rooibos tea, aloe vera, camomile, hops and lemon balm that forms the basis of the product has been patented. In addition, the product has been packaged in a neat, easy-to-open plastic holder which keeps the pad moist, easy to store and makes the product reusable.

*(CSIR Home, Feb 13, 2005)*

### Young Scientist Award 2004

Supported by GE Healthcare, and the journal Science, and instituted in 1994 in USA, the Young Scientists Award, worth $25000, recognizes outstanding young molecular biologists each year, who have done exceptional thesis work while investigating biological processes in terms of the physical and chemical properties of molecules in a cell.

The Award for 2004 has been given to Saba Valadkhan of Case Western Reserve University for correctly identifying " a relic from the RNA world" and thus proving its catalytic potential.

"Saba's discovery was akin to finding the Holy Grail of the splicing catalysis field," said Prof James L Manley of Columbia University who supervised her graduate work. "Obtaining catalytic activity from purified nuclear RNAs has been attempted many times over the years in many of the splicing labs around the world, which underscores the significance of the accomplishments".

DNA, life's genetic blue print, drives most biological events together with proteins, and is considered the primary repository of genetic information, but many scientists believe that DNA's modern-day messenger, RNA played a far more important role in the past.

An Indian, S N Bhattacharya, was one of the regional winners for discovering a molecule motor that might some day be used to repair damaged genes in persons with certain neuro-myopathic diseases.

*(Am Assoc for Advance of Science, Feb 11, 2005)*

## PERSPECTIVE

### EMERGING TECHNOLOGIES:BOON OR BANE

**Backdrop**

Two recent studies reinforce what has been known since long, that advances in cutting edge scientific technologies are not an unmixed blessing. These studies show that exposure to nanotechnologies as well as to low level magnetic fields may have serious adverse effects on human health and safety, in the absence of regulatory oversight.

**Royal Society's Report**

The UK's Royal Society and the Royal Academy of Engineering have recently released a report, which addresses the potential negative health and environmental impacts of nano-scale technologies, particularly the use of nanoparticles. While rejecting the need for a moratorium on nanotechnology, it has categorically concluded that uncertainties about the risks of exposure to manufactured nanoparticles need to be addressed immediately.

.Among its major recommendations are that ingredients in the form of nanoparticles should undergo full safety assessment, the use of free manufactured nanoparticles in applications such as remediation should be prohibited till further research is undertaken,and manufactured nanoparticles should be treated as if they were hazardous and should be reduced or removed from the waste stream. The report stresses that consumer products containing manufactured nanoparticles should be labelled on ingredients lists, and with the support of the UK, the EU should review the adequacy of current regulations with respect to the introduction of nanoparticles into any consumer products.

Specifically it recommends the establishment of a multi-stakeholder group to look at new and emerging technologies, such as nanotechnology and initiate adequately funded public dialogue around their development.

**DNA Strands**

Two researchers, meanwhile, across the Atlantic, Henry Lai and N P Singh at the Bioelectromagnetic Research Laboratory, University of Washington, Seattle USA, exposed rats to low level magnetic fields for 24 to 48 hours and compared the extent of DNA damage in the animals that were exposed to the magnetic field with those that were not. For this purpose, DNA strands were extracted from the brains of the experimental and controlled animals and the different lengths of the strands were compared. Shorter strands were found to have greater damage. The cells from the rats' brains were also examined for the two forms of brain cell deaths, viz apoptosis and necrosis.

**Results of Findings**

The researchers found that animals in the experimental group had more DNA damage compared to the controlled group. Furthermore, animals with 48 hours exposure had more DNA damage than those exposed to lesser hours. It was also found that animals treated with the three drugs, trolox (eliminates free radicals), defriprone (reduces the amount of iron available for chemical reactions) and 7-nitroindazole (stops nitric acid synthesis) had less damage than untreated animals. Lai and Singh conclude that the magnetic field increases the availability of iron, which in turn increases the availability of free radicals. The free radicals caused localized effect in the proteins and lipids involved in the cell's structural integrity. This causes calcium to leak from storage sites, which in turn causes synthesis to increase. The nitric acid diffuses among the cells causing DNA damage, and increasing cell death, both through apoptosis and necrosis.

**Implications for Humans**

These findings have serious implications for humans. In modern every day life, people are exposed to weak magnetic fields through exposure to electric appliances. Where there is exposure to transmission wires through transmission lines, the risk is 50-100 times higher. In certain kinds of occupational exposures, the risk is even higher than that. Moreover, certain types of human brain cells have relatively higher amounts of iron which could make these cells more susceptible to damage from magnetic fields. Several neurodegenarative diseases, such as amyotropic sclerosis, Alzheimer's disease, and Parkinson's disease include biological neuronal death and/or demyelination. The findings showed that the risks to these conditions increased with exposure to magnetic fields.

**The Future**

Both the Royal Society study as well as the researches of Lai and Singh point to the need for close and sustained monitoring to ensure that the fruits of cutting edge technologies are channelized in the right directions and its negative impacts are minimized to the extent possible.

## TECHNOLOGY DEVELOPMENT

### R&D COMMERCIALISATION

#### Antrix-Measat Joint Venture

The Indian Space Research Organisation (ISRO) and Malaysian counterpart MEASAT Global Bhd have decided to form 50:50 joint venture to promote their satellite capabilities in the Asia-Pacific region. An agreement signed to this effect paves the way for ISRO to extend the commercial use of its broadcast and telecom satellites, the Insats, to Malaysia, Singapore. Indonesia, the Philippines and Australia who have a high density of such users.

The move will develop a satellite neighbourhood for millions of broadcasting and telecommunication customers across the Asia-Pacific region. ISRO has so far launched four commercial satellites mostly for domestic and public sector users. MEASAT operates its network for customers in South-East Asia, Indo China, South Asia and Australia. It is believed that agreement is a major step in the ongoing co-operation between the satellite sectors of the two countries.

*(Technology Export, Oct-Dec, 2004)*

#### Gene Therapy Advance

Researchers at the University of Delhi have given a US pharmaceutical company, named American BioSciences, the license to use a novel technique developed by them that could help commercialize gene therapy. Technology is licenced through the National Research Development Corporation, the state arm to commercialize technologies developed through public funded research projects. The gene delivery technology uses calcium phosphate nanoparticles to deliver specific engineered genes to injected cells. This can help in the treatment of many diseases like cancer, cardiovascular diseases and Parkinson's disease. It seems to be first ever technology developed at an Indian university to be licensed to a foreign firm.

The basic concept of gene therapy is to introduce a gene whose product has the ability to cure or slowdown the progression of disease into cells. The speciality of this new technique is that it is a non-viral technique that seems to work. The low efficiency in non-viral vectors stems from their inability to cross various layers inside a cell and reach its nucelus. But when a therapeutic gene is delivered, encapsulated in calcium phosphate nanoparticles, it manages to reach the nucleus, reason being normal human body temperature of $37^0$C is also the temperature at which calcium phosphate dissolves in the acids contained in the endosome (the intra cellular compartment isolated from the rest of the cell). The endosome expands as a result and bursts, helping the gene to bypass the lysomes, a set of minute bodies whose enzymes are involved in localized digestion. The therapeutic DNA crosses the cytosol, the final barrier before the nucleus, and enters the nucleus with the help of divalent metal ions in calcium phosphate.

The technology has been recently licensed for an aggregate payment of US $ 345,000. The company will also pay a royalty of 4%, to be shared between the government and the University, once they commercialize the technology. The Rs 67 lakh research project was funded by the Union Government's Department of Science and Technology.

*(Down to Earth, Jan 15, 2005)*

#### Tapioca Chipping Machine

Tapioca tubers require to be chipped for use for diverse edible purposes. This chipping operation is carried out manually with knives. Need, therefore, was felt of an efficient time saving device for mechanically chipping the tubers. Society for Science and Technology Applications in Rural Shelters (STARS), Kottayam, Kerala, worked in this direction and after design development, a prototype of chipping machine was developed, tested under field conditions and then further improved. The final version of the machine comprises the main components such as driving mechanism, blade assembly, feeder assembly and frame assembly.

The tapioca tubers are fed through the tubes of the feeder assembly one by one in each tube. They slide down to the blade assembly where the moving blades, slice them and the chips are collected. The machine can be operated manually as also through electric power. Considerable saving in human energy is effected through the use of this machine as also speedier chip production of thickness 0.9-1.2cm. Once the study on various other related aspects are complete and the machine optimized, commercialisation will effect release of its widespread use, especially among small and marginal farmers.

*(AT News, Dec 2004)*

## INTELLECTUAL PROPERTY

### Clamping Device of Disc Brake

Complete specifications of the above named patent, originated in UK, have been accepted by the Patent Office of India on 25th December, 2004. Patent number 195032 has been assigned to Lucas Industries, Public Limited Company, Stratford Road, Solihull B - 90 4LA, England. Inventors of the patent are Dietmar Knoop, Wilfried Giering and Franz - Helmut Holl. Abstract of the patent is given below:

"A clamping device of a disc brake in particular a sliding caliper spot-type disc brake or a reaction beam spot-type disc brake for trucks or buses, comprising at least one plunger which is movable in the direction of a plunger axis in order to apply a brake lining to a brake disc; - at least one eccentric which is rotatable about a transverse axis for the actuation of the brake and is supported in at least one roller bearing; and - a rolling body which is supported at the eccentric by means of a bearing shell for the transmission of actuation forces to the plunger, characterized in that the bearing shell comprises an extension which, relative to the transverse axis, projects at least approximately radially outwards and is adapted for engagement with a cage of the roller bearing and which can return the cage into a defined initial position upon release of the brake.

*(The Gazette of India, Dec 25, 2004)*

### Rentech's 19th US Patent

Rentech, Inc, a developer and licensor of a patented and proprietary Fischer-Tropsch (FT) gas-to-liquids process (GTL) for conversion of synthesis gas made from natural gas, industrial off gas, or solid or liquid carbon-bearing materials into high-value fuels and chemicals, has been granted its 19th US patent. The patented invention is about a method for regenerating spent (non-reactive) iron based FT catalysts. It explains how iron based catalyst that is being used in a FT reactor to produce hydrocarbons can be reprocessed and rejuvenated or regenerated, to again produce the FT reaction after it has become non-reactive due to carbon build up on the surface of the catalyst.

Invention is reported to have at least two distinct applications. Off-shore or barge mounted GTL plants could benefit from reduced handling and transport of catalysts to and from the facility, possibly saving both time and money. Another application could be in pristine rainforest habitat, such as the upper Amazon, with long difficult distances to and from industrial centers. One may also choose catalyst regeneration over landfilling in order to maintain the integrity of the environment and reduce the transport costs of bringing catalyst into this type of GTL facility.

*(Chemical Weekly, Jan 18, 2005)*

### Technology Protection

Intellectual Property Rights (IPR) provide the mechanism to safeguard an individual's, firm's invention for a certain time period. IPR allows individuals to own their creativity and innovation in the same way as they own physical property legally. Strong IP portfolio helps organizations to achieve their growth plans. In this era of speedy creation and transfer of technology, one of the fundamental challenges for organizations is to have core competency. Protection of its intangible assets is thus an important part of technology management process. By providing protection to the IP, organization can properly manage, control its IP and reward the creators. Companies build up their IP portfolio by generating and protecting IP and those with a strong portfolio are generally in better position to negotiate during transfer, selling and sharing of IP. The system should be structured carefully to ensure that existing and future IP rights are protected properly and that holding and licensing structures are cost effective and are sufficiently flexible for the purpose of commercialisation.

*(TM Eye, Sep-Oct 2004)*

### USPTO to Implement CREATE Act 2004

The Cooperative Research and Technology Enhancement Act of 2004 (CREATE Act) amends the patent laws. CREATE Act amends 35 USC 103 (c) to provide that subject matter developed by another person shall be treated as owned by the same person or subject to an obligation of assignment to the same person for purposes of determining obviousness if three conditions are met: (1) the claimed invention was made by or on behalf of parties to a joint research agreement that was in effect on or before the date the claimed invention was made; (2) the claimed invention was made as a result of activities undertaken within the scope of the joint research agreement; and (3) the application for patent for the claimed invention discloses or is amended to disclose the names of the parties to the joint research agreement. The United States Patent & Trademark Office is revising the rules of practice in patent cases to implement the CREATE Act. Section 3 of the CREATE Act provides that its amendments shall apply to any patent (including any reissue patent) granted on or after December 10, 2004).

*(Federal Register, Jan 11, 2005)*

## TECHNOLOGY FUNDING

### Asian Fund for Renewable Energy

Investments made by various Japanese businesses, including Chubbu Electric Power Company, Hokkaido Electric Power Co, Mitsubishi Corporation and Japan Bank of International Cooperation (JBIC), have resulted in the FE Global-Asia Clean Energy Services Fund, Asia's first fund for energy service companies (ESCOs) and clean energy projects. An ESCO is a special type of company that provides services to boost energy efficiency through equipment improvements, and receiving returns based on the customers' reduced energy costs. Its services and renewable energy projects in developing countries involve high levels of risk owing to the lack of information and uncertainty regarding environmental regulations and policies. In addition to capital participation, JBIC brings its negotiating strength with governments, and provides authentic information on country risks and local investment conditions. Chubbu Electric Power and Mitsubishi plan to assign an employee to the fund management firm to evaluate prospective investments, taking advantage of the company's technology expertise and networks.

*(VATIS Update, NCE, Nov-Dec 2004)*

### BASF Venture Capital

BASF Venture Capital GmbH, Ludwigshafen, is investing $ 2 mn in Advanced Bio-Nutrition Corp (ABN) Columbia, Maryland. Advanced Bio-Nutrition is an emerging biotechnology company, focusing on functional nutrition to prevent diseases. ABN has developed a vegetable-based diet for fish using a renewable source of docoshexanoic acid (DHA) and arachidonic acid (ARA) that replaces the current non-sustainable diet of fishmeal and fishoil. It has also developed an encapsulation technology that helps protect sensitive substances from harmful external influences, such as changes in temperature or pH. BASF venture capital investment is channeled towards companies that can demonstrate successful applications for their product developments, as well as market demand. It also reportedly supports these companies with its expertise.

*(Chemical Weekly, Jan 25, 2005)*

### Capital Subsidy for Textile Units

The Government of India, as approved by the Cabinet, will provide one-time capital subsidy of 10% to processing units in the textile sector as part of enhanced assistance under the Technology Upgradation Fund Scheme (TUFS). The Textiles Ministry had proposed that interest subsidy given to processing units under TUFS be enhanced from 5 to 8%. Since investment required for modernization of a textile processing unit is estimated to be of the order of Rs 50-100 crores, capital subsidy of 10% will encourage/ assist such units in adopting technology upgradation.

*(Technology Experts, Oct-Dec 2004)*

### Developing Artificial Muscles

Researchers at the NanoTech Institute of the University of Texas at Dallas (UTD) have been awarded a $ 750,000, 20-month grant to develop artificial muscles that convert chemical energy to mechanical energy. The grant, made by the United States Projects Agency (DARPA) aims to develop new technologies for military applications. UTD NanoTech Institute researchers have long pioneered in inventing artificial muscles that are electrically powered, and their discoveries in this area have led to industrial commercialization efforts in the United States, Japan and Sweden. This new program is more ambitious - to make artificial muscles that are chronically powered, like natural muscle, and exceed the force generation, contraction and speed of their natural counterpart. The proposed fuel-powered artificial muscles are at the same time fuel cells, super capacitors and mechanical actuators, so the same elements convert a high energy density fuel to electrical energy, store this energy and use it to do mechanical work. These artificial muscles use strong, tough carbon nanotube yarns. An important possible eventual application of this research is artificial limbs that function like natural arms and legs, including the ability to move and manipulate objects, both for amputees and robots.

*(Chemical Weekly, Jan 18, 2005)*

### Full Cell Research Centre Funding

University of North Dakota (UND) is one step closer to housing a $3 million hydrogen fuel cell research centre. The funding of the research centre was approved as part of a $388 billion domestic speeding bill for Fiscal Year 2005. The bill, which was approved by the House, provides $ 10 million in advanced energy research projects at the Energy & Environment Research Center (EERC). Replacing internal combustion engines with alternative fuel technology would reportedly eliminate dependence on oil. If approved by the Senate in the upcoming days, the Center is expected to create high-paying research jobs and add a new dimension to the existing EERC at UND.

The funding will move the EERC in the direction of becoming one of the top hydrogen fuel cell research facilities in the nation and enhance the existing Red River Research Corridor.

*(ENN.com, Nov 28, 2004)*

## EXPERTS CONVERGE

### Advances in Control and Instrumentation

The 2nd National Symposium on Advances in Control and Instrumentation (SACI) - 2005 was planned to be held during February 16-18, 2005. The symposium acts as a forum for researchers and practitioners interested in the areas of modelling, design, analysis and simulation of control and instrumentation systems of nuclear reactors and processes. SACI - 2005 aims to strengthen relations between industry, research laboratories and universities. Sponsored by the Board of Research in Nuclear Science, Mumbai, it is organised by BARC. For details please see http://www.barc.ernet.in/webpages/brns/brns/html.

### International Mining and Machinery Exhibition

International Mining and Machinery Exhibition (IMME) 2004, the 7th international exhibition and conference for technologies in mining, mineral and machinery, was held in Kolkata from 24-27, November 2004. There were 200 exhibitors from 15 countries. Besides Germany, there were country pavilions from South Africa, Australia, UK, Russia and Poland. This fair was organized by the Confederation of Indian Industry (CII) in association with the Ministry of Coal and Mines, Government of India and Coal India Ltd, with South Africa being the partner country. German speakers at the summit shared technical know-how and creative solutions for the mining industry of India.

For more information, contact - VDMA, GC 34, Sector III, Salt Lake, Kolkata - 700 106, Tel: 033 - 2321, Fax 2321,7073.

### National Disaster Reduction

National Disaster Reduction Day (NDR) was observed at the Conference Hall of Disaster Management Institute, Bhopal, on 29th October, 2004. During the occasion, the professionals, senior scientists from various technical institutions, engineers, managers from government and management organizations, participated. Various likely scenarios in a crisis situation were addressed. Also highlighted were those specific measures which could be initiated to minimize the possible impacts of industrial and man-made disasters, ie, effective planning and conduct of mock drills. Importance of observation of International Decade for Disaster Reduction was highlighted by a distinguished speaker. Faculty members of Disaster Management Institute discussed prevention, mitigation and preparedness measures for various disasters. For further details visit: www.dmibpl.org.

## KNOWLEDGE SPREADS

### Communication Protocol Engineering

The rapid growth and convergence of computer and communication technologies has led to a need for designing and developing efficient, robust, and reusable communication protocols. In the above book the authors extensively cover the various stages of protocol design and development. Every stage is explained using example codes that make use of SDL based specifications derived from TCP/IP protocol suite. The text provides an active learning medium to study the principles underlying reusable communication software design. Publisher is: Prentice-Hall of India Private Limited, M-97 Connaught Circus, New Delhi - 110 001, E-mail: phi@phindia.com.

### Complementarities and Potentials of Intra-regional Transfers of Investments, Technology and Skills in Asia *by* Saikat Sinha Roy

Research and Information System for the Non-Aligned and other Developing Countries (RIS), discussion paper No 79, 2004, examines complementarities in merchandise trade and potentials for intra-regional transfers of investment, technology and skills in Asia. The analysis shows that intra-regional trade was substantial and growing, but trade complementarities were limited. Asian countries have also emerged as sources of as well as destinations for investment, technology and skills. In the event of a formal regional integration arrangement in Asia, there is potential for intra-regional trade, investments, technology transfers and skills movements. Substantial gains in regional welfare are also expected. For details contract: RIS; Core IV-B; Fourth Floor; India Habitat Centre; Lodhi Road; New Delhi - 110 003; Phone 91-11-24682177-80.

### Handbook of Fuel Cell Modelling

Above mentioned publication examines how engineers can model fuel cell systems to achieve optional results for any application. It provides practical accounts of how to create models, manipulate them as well as interpret the results, a must-read for fuel cell manufacturers, electrochemical engineering companies, utility companies, consultants and researchers. Major topics covered include diffusion limitations of reactants and products, modelling examples for different fuel cell types, modelling of fuel cell stakes and modelling of fuel cell plants. For further information contact: Elsevier Advanced Technology; P O Box No 150; Langford Lane, Oxford OX5 IAS; United Kingdom; Tel: +44(1865) 843825; Fax: +44(1865) 843971.

## SCAN AROUND THE GLOBE

### Denmark's Membership Agreement

Denmark has made relation with BioMed Central, an independent online publishing house. BioMed Central's Institutional Membership Program was launched in January 2002 and now has over 450 members, including some of the world's most prestigious academic institutions. Denmark has made a national commitment to Open Access for the biomedical research it funds. All universities, hospitals and other research institutes in Denmark became BioMed Central members in October 2004. BioMed Central agreed the membership with the Denmark's Electronic Research Library, a co-operation between the Danish research libraries under the Ministry of Science, Technology and Development and the Ministry of Culture. The main aim of Denmark's Electronic Research Library is to support Danish research and education by strengthening the development of the Danish research libraries and creating a coherent and simple access to the information resources of these libraries.

(Denmark - *Medical News Today, Dec 25, 2004)*

### Innovative Start-ups

In December 2004, French Government has launched the seventh national competition for the creation of innovative start-ups. With a total budget of 30 million euro, the competition is aimed at helping the creation and development of young innovative start-ups. It is divided into two categories. The first category, called 'emerging', provides entrepreneurs with promising projects the opportunity to validate a project that is still at the idea stage. Those laureates will be provided with 40,000 euro each. The second category, 'creation-development', provides 270,000 euro to entrepreneurs about to establish a start-up. This money is aimed at financing up to 50% of the entrepreneur's innovation programme. Since the launch of the first competition in 1999, 600 start-ups have been created and 94% of the them are sill active today.

(France - *CORDIS, Feb 13, 2005)*

### Improved Irrigation Sprinkler

A recent invention by Hydroplan Engineering Ltd of Devora Hanevia St, P O Box No 58185, Telaviv, Israel an "Improved Irrigation Sprinkler" has secured Indian patent, No. 194898, in December 2004.

An improved irrigation sprinkler is having a tubular housing; inlet and outlet ends of the housing; a sprinkler outlet fixedly located within the outlet end: and deflector element juxtaposed with respect to said sprinkler outlet; a flow control means comprising a base member separated from said sprinkler outlet and having a longitudinally directed wall and an outlet of the flow control means formed therein; said flow control means comprising a resiliently flexible membrane oriented co-directionally with said longitudinal wall; a first coupling means for sealingly coupling the base member to the housing inlet: a second coupling means for coupling the base member to a water supply; said sprinkler outlet communicating with said outlet of the flow control means.

(Israel - *The Gazette of India, Dec 11, 2004)*

### Robotic Laser Welding

Kawasaki Heavy Industries (KHI) plans to introduce a robotic laser welding system at a plant in Hyogo, Japan, that assembles SS railway wagons. Estimated cost is 700 million yen. Company has completed the trial manufacture of a SS railboard vehicle using laser welding technology. It is expected that by mid 2005, the laser welding mass production system will replace traditional spot welding. Unlike spot welding, laser welding eliminates the welding mark that is left on the welded surface. Since this improves the appearance and strength of SS being welded, it results in a vehicle of higher quality. Because of excessive heat, overuse of spot welding in the assembly of SS vehicles can result in distortions. Besides this, laser welding solves many other problems inherent in spot welding because it is a continuous process. Typically the surface flatness of railway cars is specified at $\pm$ 3 mm. Laser welding enables surface flatness to be maintained at about $\pm$ 1 mm, and so unevenness on the surface is virtually undetectable.

(Japan - *Nickel, Nov 2004)*

### Medicines to Brain

A special barrier between the blood and the brain, the so-called blood-brain barrier (BBB), protects the brain from toxic substances. It only lets through important nutrients for the brain, such as iron, glucose and oxygen. Much of the BBB is made up of capillary endothelial cells, the cells which line the walls of blood vessels. In the brain, unlike other parts of the body, these cells are closely packed together. This makes it almost impossible for substances to pass between the cells. Further in the brain, few substances can pass through the endothelial cells.

Dutch researcher Corine Visser has found a novel way of transporting medicines into the brain. Approach makes use of an iron transport system located on the blood-brain barrier. The smaller the medicine, the more easily it penetrates the brain. Visser allowed larger

molecules, such as medicines, to pass through the BBB by attaching these to iron containing protein transferrin.

Transferrin is a protein in the blood that contains two iron atoms. On reaching the BBB it binds to transferrin receptors on the endothelial cells. Once the transferrin has bound to the receptor, a vesicle in the cell completely engulfs it. The transferrin then releases the iron atoms, which are brought to the brain by another protein. A major advantage of this transport system with vesicles is that larger molecules can pass through the BBB. The vesicle has a diameter of about 120 nanometres. The research was funded by the Netherlands Organization of Scientific Research.

(Netherlands - *EurekAlert, Feb 11, 2005)*

**Priorities for Science Funding**

News from Parliamentary Commissioner for the Environment says that some healthy signs are emerging indicating that New Zealand science funding is heading in the right direction. Foundation for Research, Science and Technology (FRST) sets out its priorities for the next five years. This is expected to lead to stronger links between science and policy making, more collaboration between researchers, and better dissemination of scientific knowledge. FRST will fund public good science research and development projects worth $430 million this financial year. Proposed priorities until 2010 also include: (i) better alignments of the interests of researchers, local authorities and central government; (ii) earmarking 5% of all environmental research funding for the transfer and uptake of research results; and (iii) better interaction between researchers, public agencies and the wider community.

(New Zealand - *pce.govt, Mar 10, 2005)*

**Innovation as Priority**

An advisory body, the Strategic Council for Economic Development, has urged the Slovene government recently to give its development strategy more of a focus and to prioritise innovation. It is, however, felt that draft document on the subject must state clearly a small number of development priorities, along with measurable objectives and responsible departments of bodies. Also it should make provisions for money to be used efficiently for innovation and economic development. This focus on innovation should encompass improving the quality of higher education in Slovenia, and forging closer ties between universities and the private sector. The government should also draft a proposal on the creation of a favourable business environment, promoting promising investment, cutting red tape, and the withdrawal of the state from companies. The government proposal is aimed at attracting private funds to various state projects. Further recommendations from the Strategic Council relate to the modernization of Slovenia's social security system and regulation of the labour market. It is believed that it will boost both economic activity and employment.

(Slovenia - *CORDIS, Feb 1, 2005)*

**Piper Betle Linn (Betel)**

Betle has a wide and well spread domestic market in Sri Lanka as well as a significant position in the export market. Further, Natural Products Development Group embarked on a R&D programme on betle to investigate the pharmacological activities of betel and to develop value added products based on these investigations. According to the research work carried out at ITI P, betle showed potent antioxidant and antidiabetic activities. This is a new finding for the betel leaves grown in Sri Lanka. These studies were carried out using rats for the feeding trials. Studies also suggested that P betle had lymphoproliferative activity. The finding opens up the possibility of developing immunomodulatory drugs from the Sri Lankan variety of betel leaves. This research has also developed several value added products from betel, namely betel toothpaste, mouthwash, betel ointment, betel cream and instant betel chew. Studies funded by Council for Agriculture and Research Policy and the National Science Foundation amply demonstrate that the betel has immense therapeutic potential and hence could be exploited commercially as a cost effective, safe, natural antioxidant and antidiabetic agent.

(Sri Lanka - *Iti Bulletin, Aug-Oct 2004)*

**Innovative Energy Application**

Rural Tanzania is targeted in a research project that a Sokoine University (SUA) lecture, Dr Joseph Mpagalile, is pursuing in the US together with a team of US researchers led by Professor Milford Hanna of the University of Nebraska-Lincoln. The research, funded by Fulbright African Research Scholarship and administered by the US State Department's Bureau of Educational and Cultural Affairs, looks into ways of using solar PV modules to power vegetable oil presses. It is expected that the effort to improve small-scale oil processing in rural areas of Tanzania will enrich its scientific and technological development and contribute to worldwide technological development. The project will help rural area communities conserve the environment by using solar energy and vegetable oils.

(Tanzania - *Boiling Point, No 25, 2005)*