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Indo-US High Level Roundtable on Science and Technology: The second phase

The second Indo-US High Level Roundtable on Science and Technology (S&T) was hosted by the U.S. government on 15 September 2000, coinciding with Indian Prime Minister A. B. Vajpayee's visit to that country. The Government of India hosted the first roundtable on 24 March 2000 in Hyderabad. This set the ball rolling for the launch of the Indo-US S&T Forum, a significant effort towards closer links in S&T co-operation between the two countries.

A public meeting of the US President's Committee of Advisers (PCAST) on S&T was held on 14 September this year and an Indian delegation was invited where V. S. Ramamurthy, Secretary, Department of Science and Technology addressed the gathering on 'borderless science, sustainable technologies and equitable development'. The official report published on the occasion states that Ramamurthy's address highlighted the 'changing S&T scenario in India'. The meeting had presentations by several distinguished scientists, science-administrators and policy makers. According to one of the participants, 'the vibrancy of the meeting came through carefully planned presentations that highlighted aspects such as how to build S&T capacity abroad, and new opportunities for capacity building, from first hand experiences'. The salient points of the meeting included a 'technology driven 'push' and market driven 'pull' for accelerating technology-based development for developing countries, the programme of CISCO network academy covering 84 countries, pivotal role of USAID in bringing about a partnership between University of Oklahoma, USA and Chulalongkorn University, Thailand, in petrochemicals and polymer science. Points raised included 'new administration and how any agency/scientific community need to position itself to maximize the benefits which are expected over the next 3 years in the form of increased allocations'.

At the second roundtable meeting, co-chaired by Neal Lane, Assistant to the President for S&T and V. S. Ramamurthy, USA and India agreed 'to seek greater co-operation to advance the frontiers of S&T', states the official communique of the Office of S&T Policy, the White

Table 1. List of Indo-US Science & Technology Forum Governing Body Members

Name	Affiliation
Indian members	
V. S. Ramamurthy	Department of Science and Technology, Government of India
R. A. Mashelkar	Department of Scientific and Industrial Research, Government of India and Council of Scientific and Industrial Research, Government of India
Manju Sharma	Department of Biotechnology, Government of India
P. V. Jayakrishnan	Ministry of Information Technology, Government of India
G. Mehta	Indian Institute of Science, Bangalore, India
Anji Reddy	Dr Reddy's Laboratories, India
P. N. Tandon	National Brain Research Centre Trust, India
US members	
Frank E. Loy	Under Secretary for Global Affairs, US Department of State
Ernest J. Moniz	Under Secretary, US Department of Energy
I. Miley Gonzalez	Under Secretary, Research, Education and Economics, US Department of Agriculture
Rita L. Colwell	National Science Foundation, USA
Kenneth L. Shine	Institute of Medicine, National Academy of Science, USA
Arun Netravali	Bell Labs, USA

House, released on 19 September 2000. The release states that Lane called upon 'the scientific community to voice the importance of international collaboration in S&T'. It further notes that 'one determinant of the US success in the knowledge-based economy will be how well the US manages its S&T partnerships with countries like India in order to mutually benefit from each other's strengths'. Ramamurthy underlined 'the importance of the roundtable as a mechanism for transforming the current donor–recipient model prevalent in S&T to one of mutual partnership and cooperation'.

On the occasion of the second Indo-US High Level Roundtable on S&T a Roundtable Joint Communiqué was presented by Lane and Ramamurthy to the Indian Prime Minister. The joint statement listed collaborations in S&T in five areas, namely genomics, agricultural biotechnology, nanoscale science and engineering, computer modelling, mainly weather prediction and energy. In genomics, both sides agreed that 'they were poised for greater co-operation and accomplishment in the global fight against diseases; especially joint activities that would contribute to understanding how genetic polymorphism and gene expression influence susceptibility or resistance to infectious or chronic diseases'. For agricultural biotechnology, attention was brought to the role which 'biotechnology can play in ensuring food safety and environmental protection'. As part of the programme on nanoscale science, areas of joint collaborations would be advanced optical, electronic, magnetic and micro-mechanical devices, and also nanobiostructures and nanobiotechnology. Possible co-operation in setting up two centres of excellence, one for modelling and visualization and the other in engineering design analysis was considered. The formation of a 'worldwide digital library' was also envisaged. Energy development, both sides felt must be 'without environmental degradation'. The 'Jai Vigyan' mission and the Indian Millennium Mission 2020 by the Government of India, for integrated rural and small town development with 'physical and electronic connectivity', as well as energy-related areas of biomass utilization, etc. was discussed.

The Forum will comprise seven members from each side. While seven members from the Indian side now constitute the Governing Body of the Forum, as yet only six from the US have been identified (Table 1).

Finally, both sides agreed to hold roundtables on a regular basis. It was further decided to hold the first Governing Body meeting concurrent with an Indo-US workshop in two of the five identified areas to begin with, genomics and nanostructures, towards the end of the year, in India.

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RESEARCH NEWS

The future of flat panel displays

Nirupa Sen

The technology of electronic displays used in the area of televisions, personal computer screens and the like has been galloping at an amazing pace. The visual image obtained by conversion of electronic signals on the electronic display screen, aids information transfer between man and machine. Individual picture elements called pixels create a pattern by an 'on and off mechanism', including play in brightness and contrast. The pixel array visually enables the data transfer in the form of pictures, symbols or graphs.

Today's display screens are primarily based on old vacuum tube technology, first conceptualized in the mid nineteenth century. The technology has a basketful of woes that include manufacturing expenses, a fragile product and possible risk to human safety. What hide behind the screen are high voltages, as electrons are accelerated at large potentials to illuminate the screen. Large screens, with dimensions of about 10 feet by 8 feet with the desired resolution are yet out of reach technically.

How distant is research from achieving a cost-effective product, a screen both cheaper and safer to use, circumventing the cathode-ray tube technology? Existing flat panel displays are basically motivated from an idea to hang a television receiver on the wall, as would a painting. These displays are designed both on emissive and non-emissive phenomena. Emissive displays have gas discharge, plasma panel and electroluminescence as examples and non-emissive displays include liquid crystalline, electrochromatic and electroactive solid types. In a consumer-driven environment, the costs do still remain high and out of bounds. There are other problems as well. As any laptop owner would vouch for, the user finds it difficult to view his screen from any angle with zero distortion of the image. Liquid crystal displays (LCD) are ridden with slowness, in addition to poor visibility of the monitors as a commonly experienced problem.

So, where is the solution? The solution is to have a quantum change in technology. The next generation of display screens would be flat and could-you-believe-it, cheap too. Liquid crystal technology meets the need in a limited way in terms of cost and power requirement. Desktop personal computers still remain the exclusivity of cathode-ray tube design. Flat panel displays on the shelf are expensive.

The traditional display screens are generally made up of a luminescent material such as zinc sulphide (ZnS). ZnS has an inherent problem. A screen coated with this material requires electrons of about 25 keV energy to illuminate and brighten up the screen. Nanoparticles with large quantum efficiencies have already

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