India–US High Technology Co-operation Group to think ‘boldly and creatively’

During his 12–13 November visit to Delhi, US Under Secretary of Commerce, Kenneth I. Juster led a senior United States Government delegation for a high technology commerce dialogue with an inter-ministerial Indian delegation led by Foreign Secretary Kanwal Sibal.

The two delegations agreed to take concrete steps to pursue the commitment between Prime Minister Vajpayee and President Bush during their November 2001 meeting to stimulate bilateral high technology commerce towards realizing their goal of transforming India–US relations.

The US delegation reviewed with its Indian counterpart the current state of bilateral high technology trade, including trade in US controlled ‘dual use’ items. The two sides recognized the improvement in this area and pledged to think boldly and creatively about steps that may be taken to further enhance high technology trade in a way that reflects their countries’ new relationship and common strategic interests. The intention is to supplant the stillborn 1985 Indo–US MOU on the export from the United States to India of sensitive commodities, technologies and technical data, which was conceived during the Cold War with a new document which will be premised on the new post-11 September 2001 techno-geo-political context and realities.

In this context the delegations reaffirmed their countries’ shared commitment to and common interest in preventing proliferation of strategic goods and technology. They decided to further enhance their export control cooperation.

The two Governments agreed to create an India–US High Technology Cooperation Group, comprising senior representatives of relevant departments of both countries. The Group is to be tasked towards developing a new statement of principles governing bilateral cooperation in high-technology trade, including addressing ways to increase trade in ‘dual use’ goods and technologies.

French honour for India’s space scientist

One of France’s highest honours ‘Officer of the Legion d’Honneur’ was conferred on Krishnaswamy Kasturirangan, specialist in high-energy astronomy and satellite technology, Chairman Space Commission and Secretary, Department of Space by the President of the French Republic, Jacques Chirac. The coveted award was presented as a tribute to Kasturirangan’s ‘contribution to space research and management in India and in recognition of his contribution to Indo-French space co-operation’.

The speech delivered by Bernard de Monterrand, Ambassador of France in India on the occasion of ‘The grade of Officier de la Legion d’Honneur’ to Kasturirangan at a reception in New Delhi on 6 September 2002 lauded the achievements of Kasturirangan as ‘one of the architects of India’s space programme from its very beginning. The Indian National Satellite, the Indian Remote Sensing, the Polar Satellite Launch Vehicle and the Geo-Stationary Launch Vehicle, all these projects came of age under your leadership. Such a challenging task needs vision, courage and self-confidence. It needs also a great capability of animating teams and organizations. As the leader of India’s space programme you have embodied all these qualities. France intends to honour as well those achievements as the scientist and the leader you are.’

He said ‘France wants also to pay homage to the role you have played in developing Indo-French co-operation in the field of space research and development’. The Ambassador said that the ‘recognition of the importance of science has led both our governments to give a priority to the scientific sector in their budgets. It has naturally led our scientists to co-operate on an equal footing’. Teams of Indian and French scientists have been ‘working together for many years in the most varied areas’. ‘Few countries have such a close relationship with India in science and technology’, he added. The Indian Space Research Organization on the Indian side and the Centre National d’Etudes Spatiales on the French side are working together in the field of space technology. The Ambassador said that ‘by honouring you, we also pay tribute to the Indian Space Research Organization and the many scientists who have collaborated in your efforts’.

While accepting the honour, Kasturirangan gave his ‘profoundest thanks to Jacques Chirac, and the people of the French Republic for this most generous recognition’ saying that he ‘shall cherish, forever, this memorable evening’. Kasturirangan recounted that his knowledge and appreciation for France ‘dated back to my school days’ through the literary works of writers such as Alexander Dumas, Jules Verne and Victor Hugo. Later, as a student of science he ‘learnt the work of several great French scientists and mathematicians’. Kasturirangan said that co-operation between India and France ‘dated back to the inception of the Indian space programme’. He recalled eminent French space scientists like Jacques Blamont and Hubert Curien who were part of the international team and who contributed to the pioneering steps of the Indian space endeavour. Indo-French co-operation spread over four decades is an ‘excellent example of how a developing country and a developed country could work together to serve not only mutual interest, but also for bringing the benefits of such endeavour to the broader cross-section of the humankind’. ‘I am sure’, he added, ‘that in the years to come these efforts would broaden and strengthen to take the co-operation to higher heights including areas of social relevance.’
Kasturirangan said ‘three generations of Indian Space Research Organizations’ scientists and the leadership have played a very significant and crucial role on the Indian side’. He also cherished his association with several leading and distinguished French scientists and personalities. Finally, he said ‘the success of any collaboration can never be complete without the political will. The Space Department has received the support of the political system in India, consistently, cutting across party lines, in forging a strong and enduring relationship with France’.

The Legion d’Honneur established on 19 May 1802 by Napoleon Bonaparte has five classes and is France’s recognition for military and civil service. From its origins, the badge of the Legion d’Honneur has changed little, the badge is a five branch star with a central gold medallion and is worn from a red ribbon. France celebrates this year as the national bicentenary of the creation of the Legion d’Honneur.

Some Indo-French co-operation projects that are presently underway are, according to Kasturirangan, the following:

- Joint development of the satellite ‘MEGHATROPIQUES’ due for launch in 2005 for global climate studies
- Joint programmes in the areas of tele-medicine, tele-education and natural disaster management that help social development.

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**RESEARCH NEWS**

**NMR – Bigger, stronger, faster . . .**

*Siddhartha P. Sarma*

Since the first demonstration of nuclear induction in bulk matter in 1946, by Purcell and Bloch at Harvard and Stanford respectively, nuclear magnetic resonance (NMR) has become unarguably the most important and widely used physical tool for investigating matter. Its range is astonishing, encompassing such diverse areas as imaging of tissues in living animals, organic and inorganic materials in the liquid, liquid crystal or solid phase to quantum computing. The growth of NMR into this pre-eminent state has been a long and arduous journey, punctuated with the award of the Nobel Prize to four scientists for their contributions to NMR. Purcell and Bloch shared the 1952 Nobel Prize in physics and Richard Ernst was awarded the 1991 Nobel Prize in Chemistry for his contributions to the development of the methodology of high resolution NMR spectroscopy. Only a few weeks ago the Nobel prize for 2002 in Chemistry was awarded to three scientists, one of whom is Kurt Wüthrich for his development of NMR spectroscopy for determining the three-dimensional structure of biological macromolecules in solution, and the other two being John Fenn and Koichi Tanaka for their development of soft desorption ionization methods for mass spectrometric analyses of biological macromolecules. The growth of NMR as a bioanalytical tool has been aided by developments in other seemingly unrelated areas of science such as solid state physics and material science for the design and construction of exquisitely sensitive electronic components for the detection of very weak radio frequency signals and concurrently development of high field superconducting magnets that today range in field strength from 7.05 to 21.14 T (10,000 Gauss = 1 T, for comparison the earth’s magnetic field is 0.5 Gauss) that increase the sensitivity of detection and resolution. Today NMR signals can be recorded on samples ranging in quantity from a few tenths of a milligram to a milligram (Purcell recorded his first NMR signal using a 1 kg block of paraffin wax as a sample). Last but not the least, bioanalytical NMR has benefited enormously from methodological improvements in genetic engineering and molecular biology for production of native proteins in quantities, usually milligrams, necessary for structural studies.

The impact of NMR in biology, particularly in structural biology and biochemistry is underscored by the fact that it is the only method currently available for determination of structures of biomacromolecules in solution. Pioneering efforts to establish NMR as an alternative and yet complementary method, to the older and better established single crystal X-ray diffraction method, for protein and nucleic acid structure determination were made by Kurt Wüthrich and coworkers in the late 1970s and early 1980s. Great success has been achieved in the study of proteins, but the techniques are not limited to proteins alone. In 1986 Wüthrich and coworkers determined the first novel structure of a globular protein (7.9 kDa) by NMR methods, that of Tendamistat (Figure 1).

Determination of this structure was preceded by the development of several