

programme, which is apparently continuing, although, as the administrator of the National Aeronautics and Space Administration, James M. Beggs, made it clear there can be no resumption of joint US-USSR experiments or missions until the international political climate improves considerably.

Several countries including India, France and the host country, Austria, have already established their own cooperation programmes with both the capitalist and the socialist worlds. Yet it was occasionally

difficult to pin down the delegates from these countries on the advantages their countries have derived from such cooperation. And the Polish cosmonaut, Mirosław Hermaszewski, expertly fielded the question of what benefits Poland had derived from participating in the Comecon space programme — although, only a few metres away, the Polish Institute of Cartography had on display an excellent series of maps, which synthesized data from both the Interkosmos and the Landsat programmes. **Vera Rich**

Remote sensing satellites

French plans for spot satellites

The French national space agency, the Centre National d'Études Spatiales (CNES), believes there is money to be made by remote sensing from space. Sales of data recorded by the two Spot satellites, France's first national remote sensing satellites due for launch in 1984 and 1986, are expected to offset the capital cost of the satellites' development and running costs in about ten years. Responsibility for earning the revenue will rest with Spot-Image, the independent company created early last month to market Spot data worldwide.

CNES's approach to the commercialization of remote sensing data differs markedly from that in the United States. The US National Aeronautics and Space Administration (NASA), like CNES chiefly a research and development agency, has been an unwilling operator of the service forced upon it when data from the early Landsat satellites proved commercially attractive. Potential users have complained that NASA was sometimes insensitive to their needs.

NASA will indeed be administering the distribution of data from Landsat-D, the latest satellite in the series launched last month, and from Landsat-D', its successor, but beyond 1987 the Reagan Administration has insisted that NASA will have to get out of commerce so that the operational service will have to be taken up by private industry. Thus the fortunes of Spot-Image will be keenly watched in the United States as well as by the European Space Agency, now debating how to make available data from its planned remote sensing satellite ERS1, and the British government, which is contemplating a major effort in remote sensing.

Spot-Image's main shareholders are CNES with a 34 per cent holding, three French government agencies each with 10 per cent — the Institut Cartographique Nationale, the Institut Français du Pétrole and the Bureau de Recherche Géologique des Minières — and two companies, Matra and Société Européenne de Propulsion, with 7.5 per cent each. Organizations from Sweden and Belgium which have collaborated to some extent on Spot, will

also have small shareholdings. Spot-Image will buy data from CNES and sell them.

NASA's early experience in selling remote sensing data, however, seems not to augur well for Spot-Image. Although there has been great interest in Landsat data, there has been no prospect that fees would match development costs. But, according to Gérard Brachet, director-general of Spot-Image, the market for data from the second generation of remote sensing satellites should grow by leaps and bounds — he reckons that Spot should earn about \$900 million, to cover development and running costs, within ten years.

The chief advantages of Spot and Landsat-D over earlier generations of remote sensing satellites is their increased resolution and number of spectral bands. Spot, for example, whose chief instrument is a multilinear array, will observe in three bands in the infrared and visible regions of the spectrum with a ground resolution of 20 m and in a broad band with 10 m resolution. Stereoscopic images are also available.

Spot data will be received and interpreted in Europe at ground stations in Toulouse (France) and Kiruna (Sweden). Spot-Image plans to turn round data within 48 hours for dispatch to users. The charge for one scene in digital form is expected to be about \$1,000, but the fee for a photographic image has yet to be worked out, although it will be less. Brachet is confident that prices will compare favourably with those for images generated by the multi-spectra scanner aboard Landsat-D although comparisons with the thematic mapper, Landsat-D's most innovative instrument, are more uncertain.

Spot-Image is negotiating with some countries to receive Spot data direct via their own Earth stations, in which case there will be a copyright fee of only about FF220 (\$40) per scene, less than the cost of images bought from Toulouse or Kiruna. The apparent discrepancy is explained, according to Brachet, by the prospective loss of about 70 per cent of potential images due to cloud as well as the cost of processing images.

Judy Redfearn

South African funds

The UK Science and Engineering Research Council (SERC), is reviewing its future commitment to the South African Observatory (SAO), because of financial pressures. South African astronomers currently take up 65 per cent of the viewing time of SAO, and SERC "buys" the rest for UK astronomers; has been suggested that this proportion be decreased. A recent questionnaire, however, revealed a strong desire within the UK astronomical community for this level of involvement to continue.

In terms of technical sophistication and size, the telescopes of the SAO (near Capetown) are outranked by others available to British astronomers in the Southern Hemisphere, particularly the Anglo-Australian and UK Schmidt telescopes in Australia. Paradoxically, SAO's usefulness is increased because its telescopes are not so advanced as to be oversubscribed in demand and yet are sufficiently powerful to do valuable work. In particular, SAO is heavily used for optical and infrared photometry with such objects as the brighter active galaxies and also cataclysmic variable and Cepheid-variable stars.

Earlier this year, while reviewing its plans for the financial year 1983-84 and the following three years, the Astronomy, Space and Radio Board of SERC set up a working group to ascertain the need for continuing use of SAO. The group circulated a questionnaire, to which it received replies from 60 or so groups in the United Kingdom. SERC says the working group reported to the board in July that there was a strong user demand for SAO.

The position of the board is that the decision will depend on scientific and financial considerations and that political issues are not relevant. According to SERC, however, a handful of the questionnaires raised political reasons for discontinuing the use of SAO. One astronomer, Dr Michael Rowan-Robinson, who has just completed a period of service on the SERC committee responsible for SAO, feels particularly strongly: "I seem to be in a minority in feeling that SERC should not maintain an official link of this kind with the South African government. Use of the telescope should be left more to the consciences of individual astronomers."

SERC is due soon to start negotiating its next contract with SAO, to which it now pays about £240,000 a year (about 25 per cent of the annual budget of the observatory) for 35 per cent of the total observing time. The British astronomical community will have a chance to review its use of all observatories in the Southern Hemisphere at the Anglo-Australian Telescope symposium to be held next month.

Philip Campbell