USSR

Space programme: accentuating the cooperative

The Soviet Union will celebrate the twentieth anniversary of Sputnik-1 next year at the same time as the diamond jubilee of the October Revolution. Vera Rich reports

THE launching of Sputnik-1 on October 4, 1957, inaugurated a whole series of Soviet "firsts" in space, frequently co-ordinated (so far as the state of the art permitted) with some notable anniversary. The centenary of Lenin's birth was marked in 1971, for example, by the launch of the first orbiting space-station, Salyut 1; and it is entirely possible that the Soviet space programme is planning some equally prestigious "spectacular" for the sixtieth anniversary of the Revolution. The current emphasis, however, suggests that the year will be marked first and foremost by an extension of "fraternal cooperation" in space between the Soviet Union and her Comecon partners.

This trend is not a cover-up for the recent set-back to the Soviet space programme provided by the aborted Soyuz 23 mission when it failed to link up with the Salyut 5 station. On the contrary, it is perhaps best exemplified by the joint communique issued by Soviet Academician Boris Petrov and GDR Academician Karl Gröte, after the previous highly successful Soyuz flight. Soyuz 22 had carried a "multi-spectrum" camera from the Karl Zeiss (Jena) works, and was heralded as a new phase in Comecon cooperation in space. The same theme was enthusiastically repeated by the Soviet and Comecon media.

The presence of foreign equipment aboard a Soviet spacecraft is not new; French instruments were carried on Lunokhod 2 and by the Mars 5, 6, and 7 probes. Comecon has had its own space programme, Interkosmos, since 1967, and has launched 16 orbital satellites and 4 high altitude rockets. The Soviet Union supplies the rocketry for all Interkosmos launches, while her Comecon partners supply certain instruments, so the use of such instruments in a formally Soviet mission might seem a fairly predictable development. Why, then, was it greeted with such acclaim?

Propaganda plays a certain part: the current Comecon five-year plan, while temporarily soft-peddling the final goal of total economic integration, is concentrating on a short term drive

(15-20 years) towards integration in certain significant areas, notably sophisticated instrumentation. The Petrov-Gröte communication clearly refers to this policy, stating that East German participation in Soyuz 22 was "part of the process of Socialist integration in one of the newest regions of contemporary science and technology".

The concept of an integrated science policy is, however, meeting with opposition from certain research bodies and institutions in the member countries of Comecon, particularly where, as in Poland, there is a long native scientific tradition. Such bodies have been openly accused of "autarchic" (that is, nationalist) tendencies, necessitating the intervention of Party and

Government. Emphasis on cooperation in such a prestigious field as space research might well be interpreted as simply a tactical measure to offset in the mind of the public the effect of this academic discontent.

Earlier this year it was announced that Interkosmos would start a manned space programme with multinational crews. The first launches are scheduled for 1977 and the cosmonauts are already in training. It would seem, however, that each crew is to include at least one Soviet cosmonaut. Since the Soyuz 11 tragedy, though, the Soyuz missions have used a two-man crew, instead of the previous three—a change apparently associated with the decision that the crew should wear space-suits during re-entry as a safety measure. If the current pattern continues, it will take at least eight flights for each country to get one representative in space.

Expeditions: resources rationally used?

The rational use of natural resources in the Soviet economy is a major target of the current five-year plan. It is also a dogma which can be invoked to justify most things. That includes geological and geographical expeditions, where the data obtained can be interpreted to relate to the needs of prospecting, oceanography, climatology and other fields of practical significance. In the case of the expeditions of summer 1976, the range is from the immediately practical to the extremely remote in terms of the economy's needs.

On the one hand, there was massive Soviet participation in the 200-strong joint Comecon expedition to Mongolia, which worked within a surveying programme aimed at ensuring 10-20 years' supply of fuel and material resources for the Comecon bloc. During this first field season some 7,000 km² was systematically surveyed, and several outcrops of "valuable raw materials" (so far unspecified) were located. The expedition is a long-term project; to facilitate its work in future seasons a special base is to be established next year on the outskirts of Ulan-Bator, the Mongolian capital, with administrative and living accommodation as well as such services as shops and a kindergarten.

Although even the most cautious planners could hardly doubt the practical value of the Mongolian expedi-

tion, they might feel a little different about the other major long-term project inaugurated this summer. This is the scheme to sink a 16-km borehole at Saatly in the Murganskaya steppe. This area is a "geological anomaly", where the crust is significantly thinner. In 1970, a pilot borehole was sunk to a depth of 6,240 m. If successful the new project will allow material to be recovered from the upper mantle. The theoretical value of such specimens would be immense; the most practical outcome of the expedition may well be the experience which the Soviet oil industry will gain in sophisticated drilling techniques.

One of the most practically-orientated expeditions this summer was that of the Siberian Energy Institute of the Soviet Academy of Sciences, which set out to survey possible power resources in the construction area of the new Baikal-Amur Mainline railway. The Baikal area has long been famous for its geographical and ecological riddles; this expedition discovered another, a complex of "classical mountain glaciers" at a relatively low altitude and unexpectedly far south. The plans for the railway have from the beginning incorporated a number of conservation measures aimed at preserving the unique Baikal habitat. The presence of these glaciers "in direct proximity of the line" is causing the relevant experts considerable concern.

The head of the cosmonaut training programme, Lieutenant General Vladimir Shatalov, has spoken in terms of a three-man crew, consisting of a Soviet commander and a flight engineer and research engineer from other Comecon countries. This suggests either a return to re-entry in shirt-sleeves or else the use of a larger spacecraft, and Shatalov has indicated that "in time" larger orbiting stations will be used, making it possible for the crews to include specialists from different fields. But he did not make it clear whether such stations would be in use by 1983, and present plans for Comecon participation go no further than this date.

It remains to be seen whether such joint missions form an integral feature of long term Soviet space planning, or whether, as in the case of the flight of the first (and only) woman cosmonaut Valentina Tereshkova, a policy hailed as a triumph of socialism may later be quietly phased out. The manned programme, however, is by no means the only new development of Interkosmos, nor in the long term is it the most significant.

Petrov and Gröte speak rather

vaguely of Comecon participation in "still more complex and interesting experiments". This may mean no more than the provision of equipment for Soviet spacecraft, a development that is virtually implicit in the "integration" policy which aims at increasing specialisation of the member countries. But Comecon is also to provide some of the ground facilities. Already the Comecon countries track the Soviet spacecraft. The accession of Cuba to Comecon provided an important new link in the network; new plans include the provision of various research facilities. A new astronomical observatory was recently opened in Prague as part of the Interkosmos programme.

Poland's contribution will be considerable—a Space Studies Centre within the Polish Academy of Sciences to include institutes of space physics and geodesy, earth and environmental resources, the application of space technologies, materials testing, and also a computer centre. According to Professor Stefan Piotrowski, a member of the Polish Academy of Sciences and also of the Interkosmos Council, the centre will work on methods of research into the effect of solar

activity on the ionosphere and atmosphere which, he says, will benefit communications, meteorology, agriculture and possibly medicine. The council will also draw up a programme of experiments to be carried out by manned spacecraft and satellites.

Although such facilities are designated part of the Interkosmos programme, it seems inevitable that the Soviet Union's own national space programme will also benefit from access to them; indeed, this would provide a further opportunity for "fraternal cooperation". However, certain joint Comecon projects have already evoked the criticism that the Soviet Union has made little contribution other than a site or the expertise, while the financial burden has fallen on her partners. However great the official acclaim of such cooperation, the possibility remains that those scientists already disenchanted with Comecon countries may view the new developments in the space programme not so much as a triumph for fraternal integration as a way for the Soviet Union to get routine research and development done at someone else's expense. □

NETHERLANDS

An unfavourable climate

Casper Schuurung reports on recent developments in science policy in Holland

THE Dutch Government is going to spend 2,560 million guilders (about £640 million) for research in 1977. Universities will use less than half (1,130 million), after a budget this year of 2,300 million. Industry plans to have 2,810 million guilders available next year for research and development after 2,510 million this year; at the end of last year industry had expected to spend 2,190 million in 1976, indicating that the climate for investment in research is not as favourable as it seemed. Some 390 guilders will be spent on research and development per head of the population.

These figures are part of the new budget presented to parliament by the science policy minister, Fokele Trip. He says science policy cannot be seen apart from the socio-economic development of the country: out of science policy a contribution should come to the selective growth of the economy which the government has outlined in the government memorandum on industrial policy issued earlier this year. Environmental factors, town and country plan-

ning and a policy to avoid the wasteful use of energy and resources all form part of that selective growth policy.

On the energy front 60 million guilders will be available for research as the specially formed fund for the sodium-cooled fast breeder reactor in Kalkar will be abolished. This will be used mainly for programmes other than in the nuclear field. It is surprising, however, that in the plans for research up to 1981 which were presented along with the science budget, the nuclear energy component will increase while the total energy research and development budget will hardly be more in 1981 than in 1977. The future for alternative energy sources is therefore looking very bright at the moment.

Mr Trip is also planning to spend more money for a popularisation of science. For five years the University of Amsterdam has organised courses for scientists to write articles for a larger audience beyond their own discipline, and it will now receive a government subsidy. Other universities are also starting such a course. At the School for Journalism a training-course for science writing will also be introduced with ministerial money, and the Royal Dutch Academy of Sciences is conducting a study on a science information unit to improve "science-

Dutch Embassy

Trip: not available

society" communications; Dutch universities and some research institutes are, however, already more or less active in this respect.

The science budget received a favourable reception in the parliament's special commission on science policy. Mr Trip has said that for personal reasons he is not available for a government post after the elections in May 1977, and feels that a new minister for science policy is necessary. He says he will leave behind a sort of "last will" describing how best the position of such a minister can be used. □