

with ground systems: previously this was a major factor dictating the use of large and expensive ground antennas.

Antenna diameters for the CTS range from 32 inches to 30 feet. The only other satellite designed to transmit high-quality colour television to small, simple ground stations is the ATS-6 (applications technology satellite), which was launched in 1974 and is now being used by the government of India to relay educational programs to isolated villages. The ATS-6 must use a 30-foot antenna, and its effective radiated power is 53 DBW (decibel watts), whereas CTS's is 59 DBW.

Canadian groups have designed 26 experiments for the CTS, to begin in May. They include:

- One-way video and two-way audio transmission to provide continuing medical education for doctors in remote areas.
- High-quality telephone links to and from remote camp-sites in the James Bay area, where a power dam is being built.
- Curriculum-sharing between Carleton University, Ottawa, and Stanford University, California, using a digital video compression technique.
- Provision of computer-communications networks for native peoples in Canada's isolated northern regions, and evaluation of the potential.
- Linking of two francophone communities in different parts of Canada—Zenon Park, in Northern Saskatchewan, and a community in Quebec—for interchange of cultural and educational programs via two-way audio and video links. Other projects involve propagation measurements, a system for sharing telephone channels, and a fast frequency-shift keying system for high-speed digital data transmission.

The Canadian Broadcasting Corporation will try to demonstrate direct television reception from the satellite using simple, domestic-type equipment from laboratories in Japan and perhaps Europe. The satellite is also to be used for remote coverage of the 1976 Olympic Games equestrian competition at Bromont, Quebec. The signals would help in assessment of portable ground stations and reception and transmission from large, populated areas.

The United States and Canada will share equally in experiment time during the satellite's lifetime, using it on alternate days. If the experiments go as planned, the remote areas of many parts of the world—as well as Canada and the United States—may soon benefit from a multitude of communications services presently not economically feasible using conventional ground-based methods. □

USA

WITH only one dissenting voice—that of Senator John V. Tunney of California—a subcommittee of the Joint Committee on Atomic Energy has produced a report giving full support to the liquid metal fast breeder reactor (LMFBR) programme and suggesting that “the time has come to end the discussion over whether or not [the United States] should have a breeder research and development program. Rather, national attention should be turned toward solving the outstanding problems associated with the program and its eventual commercialisation.”

Senator Tunney identifies what he describes as a failure to deal adequately with many fundamental issues and questions surrounding the breeder programme, and in particular he objects to the subcommittee's attempts to see discussion of the programme stifled. That would be an abdication of responsibility, he says, as well as inconsistent with the subcommittee's conclusion that the building of the Clinch River Breeder Reactor in Tennessee would not represent “an irreversible commitment to commercialisation.” (The Clinch River reactor, a 350-MW demonstration plant, is at present expected to be completed in 1983, at a cost of about \$2,000 million.)

The subcommittee, chaired by Congressman Mike McCormack of Washington, heard four main objections from opponents of the breeder reactor programme. It was argued that development costs would turn out to be prohibitive, that estimates by the Energy Research and Development Administration (ERDA) of indigenous uranium resources were too conservative, that energy demand would not grow as fast as projected, and that problems like plutonium toxicity and waste management would prove to be insoluble.

The subcommittee brushes those objections aside. One of its chief arguments in support of the LMFBR programme, for example, hinges on the suggestion that conventional reactors could start to run out of domestic supplies of uranium early in the twenty-first century, and unless the plutonium-producing capability of the breeder reactor is developed, the nuclear industry could grind to a halt. ERDA estimates, in fact, that there are about 3.6 million tons of uranium, available at a cost of less than \$30 per pound, in the United States. That is sufficient to guarantee a lifetime's fuel only to those reactors expected to be built before the mid-1990s.

● After 18 months of uncertainty, the future of Sacramento Peak Solar Observatory in New Mexico seems assured now that the National Science

Foundation (NSF) has agreed to provide \$1.45 million “to maintain the observatory at a productive level”. The US Air Force, which has operated the observatory since 1952, will, however, still maintain a presence, and provide some of that money—\$700,000 in the first year of the new arrangements, and \$450,000 in the second. After that it is not clear what, if any, contribution it will make, or how the NSF will make up the shortfall.

Even with the Air Force chipping in a further \$250,000 for the salaries of those remaining and \$250,000 in grants, the observatory will, according to its acting Director, Dr Richard Dunn, have to sustain cuts of 15% in its present budget of \$2.2 million and 27% in its staff of 63, as from June 30.

The new funding scheme was hammered out by a committee chaired by Professor Martin Schwarzschild of Princeton University, and the NSF has now formally accepted it. Agencies such as NASA and ERDA were also involved in the discussions: NASA already has a group working at Sacramento Peak, and the observatory's research programme contains sufficient plasma physics, hydrodynamics and so on for ERDA to find it relevant to its own fusion research activities. (In fact at one time it seemed as if ERDA might pick up the tab for the observatory itself.) As the Air Force's contribution diminishes, the NSF will undoubtedly be looking to other agencies to stump up some of the extra money needed. The matter awaiting resolution now is precisely how the observatory will be managed once the Air Force relinquishes its overall responsibility.

● The fifth annual report to Congress on marijuana and health shows that more than half of those between 18 and 25 have used the drug at some time, and that “what was once clearly statistically deviant behaviour has become the norm for this age group.” The report also says that the correlation with level of education has now all but disappeared. The authors of the report, produced by the Department of Health, Education and Welfare, say, however, that the drug's long term effects are not yet properly understood. Another aspect of the drug's use seems to have altered: whereas users of marijuana were once less likely than non-users to consume alcohol, they now seem more likely to do so. “Frequently the two drugs are used simultaneously,” says the report, “a combination that may be more hazardous than either used alone”.

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