

Tasmania's ear on the sky

A glance at the weather map reveals how important Antarctica and the Southern Ocean are to Australia's climate. Yet little is known about just how they exert so much influence on our weather: hardly surprising, given the storms and glacial cold that make up so much of these regions' own weather!

A new generation of environment-monitoring Earth resources satellites will be launched this decade as the world urgently seeks to add to its knowledge of global environmental processes — and it just happens that Tasmania is ideally situated to take advantage of the stream of information they will beam down to us.

Scheduled to be in operation by the end of this year, the \$2.3 million Tasmanian Earth Resources Satellite Station (TERSS) is a joint venture between the CSIRO Division of Oceanography and the University of Tasmania.

Historically, satellites have transmitted information at low frequencies on the S-band, between 2.2 and 2.3 gigahertz (GHz). This has

made signal tracking relatively easy, but it limited the amount of information that could be transmitted. The new Earth resources satellites will transmit data at much higher rates on the X-band, between 8 and 8.4 GHz, and nations wishing to benefit will need ground stations capable of fine tracking.

Australia already has one such station, at Alice Springs (this station receives information covering the northern part of the continent, as well as parts of the Indonesian archipelago and the island of New Guinea), and TERSS will permit coverage of southern Australia, New Zealand and Antarctica — providing invaluable insights into the forces that shape our climate.

Building on satellite data-capture technology developed at the CSIRO Marine Laboratories in Hobart and at the Division of Radiophysics in Sydney, TERSS incorporates a high degree of Australian technology. The first satellite to come 'on line' will be the European Space Agency's ERS-1, launched in April, and TERSS is designed to receive data from planned Japanese, Soviet and United States satellites.

Foxes attacked

The fearsome fox, an introduced pest, has been and continues to be a disaster for our small native mammals, as well as a nuisance for farmers.

Accordingly, the CSIRO Division of Wildlife and Ecology has set up a program to devise an efficient method of control. With a grant of \$250 000 from the Commonwealth government in 1990, and further funding from the Australian National Parks and Wildlife Service's endangered species program, the Division has brought together a team of eight to target the fox.

The biologists' strategy centres on rendering the pests sterile by using their own immune systems to attack their gametes (eggs and sperm). In effect, the animals will be inoculated against themselves. But rather than injecting the animals, the researchers hope to use a virus, to which genes for proteins found on fox egg and sperm will be added, to perform the inoculation.

The plan calls for the release of the modified virus — specific to foxes — into the wild population. As it spreads, causing disease but probably

little mortality, it will also be quietly inoculating the animals against their own germ cells. The normal immunological response against the invading virus will also include the production of antibodies that attack the fox-gamete proteins that it carries.

Thus the female foxes' antibodies will attack their own ova, and males' their own sperm. Another feature is that the females' antibodies could also attack the males' sperm. The results should be painless sterility and eventually a decline in the numbers of this pest. We'll let you know the results as the research unfolds.

Pulp mill research

The CSIRO is managing a \$15-million pulp mill environmental research program on behalf of the federal government. The program, funded by the Commonwealth, States and industry, will play a key role in enhancing the existing standards and assessment procedures for the approval and operation of any new bleached eucalypt kraft pulp mills in Australia.

The 5-year National Pulp Mills Research Program — started in 1990 — will investigate the technologies used in the kraft chemical pulping process, and evaluate the environmental impact of bleached eucalypt kraft mills. To keep everyone up to date, an important function will be communication with the industry and public.

A variety of CSIRO Divisions will be involved in the research, along with a range of universities and other research institutions. The Division of Forest Products will examine the composition of effluents, as well as the pulping and bleaching technology used in mills. The Division of Chemicals and Polymers will assess alternative means of making effluents environmentally benign by adapting some existing treatment strategies.

The Division of Oceanography, using knowledge of currents and water movements, will provide advanced models to simulate the dispersal of effluent, while the Centre for Advanced Analytical Chemistry in the Division of Fuel Technology will research a bioassay system able to detect contaminants in the environment. And finally, CSIRO's Biometrics Unit in Adelaide will work on applying the mathematical techniques of risk-assessment — developed originally for economic and human health problems — to the environmental issues involved.



Illustration: Brian Gosnell