

Canada has joined the 12 European Space Agency nations as a full partner in the design and construction of ERS-1, scheduled for launch at the end of the 1980s. With microwave sensors, this satellite will be used primarily for experiments in ocean, ice and weather surveillance. The Gatineau station will be expanded to receive and process ERS-1 data.

### National co-operation

The CCRS, through an effective national committee network, ensures that remote sensing in Canada is co-ordinated among government departments and with agencies in the provinces and territories, many of which have their own remote sensing centres. There are 12 applications and technology oriented working groups with representatives from all sectors — government, industry and the universities.

### Private sector encouragement

As the lead agency, CCRS has from the beginning stimulated and fostered the development of private sector capabilities in manufacturing and services.

### Main activities

The major areas of CCRS activities which support the national program are the following:

**Applications.** New uses for remote sensing data are developed and demonstrated. Projects are undertaken in co-operation with users.

**Satellite operations.** Satellite data are received, processed and distributed.

**Airborne operations.** Specially equipped aircraft are operated for Canadian scientific investigators.

**Research and development.** New data analysis methods, new sensors and data acquisition systems are developed. Funding is provided to the private sector for hardware and applications development.

**User services.** Facilities and technical information are made available to users on a routine basis.

### Applications

CCRS scientists co-operate with user groups to develop suitable ways for applying remote sensing data to the management of Canada's renewable and non-renewable natural resources. Applications in forestry, agriculture, land use, water resources, mineral exploration, oceanography, Arctic ice reconnaissance and the environment are being further developed and demonstrated.

Working space, where resource managers can use the latest sophisticated analytical equipment, is provided at the centre's data analysis laboratories, and is available to all users who cannot otherwise access it in private industry. Visiting scientists from government agencies and the private sector work closely with the experienced scientific and technical staff at CCRS.

Equipment available includes conventional analogue photo-interpretation installations and computer-controlled systems for analysis of satellite and airborne data.

CCRS's Prince Albert satellite receiving station receives LANDSAT MSS, TM, SPOT and NOAA data, and fully processes all data.

### Satellite data products

The Prince Albert and Gatineau stations receive and process satellite data into photographic image or digital computer forms and distribute these products to users. Among these products are the following:

**Black and white or colour images.** Typical products include black and white images of any one of the spectral bands. Colour composites, which combine three of the spectral bands into one colour image, are also available.

**Digital data.** Data are provided in digital form on magnetic tape that is compatible with the user's computer — known as a computer-compatible tape or CCT.

**Geocoded products.** For users who wish to superimpose satellite data directly over conventional maps, the satellite image is projected onto a flat surface, using the standard map projection of the National Topographic System of Canada. A high-precision product, known as a "geocoded CCT" is produced. The product can be entered readily into a digital database or can be used to generate a map-compatible image.

Geocoding also facilitates the comparison of images of the same site obtained on different dates, possibly from different satellites, or in combination from satellites and aircraft. Any change from image to image can be detected and analyzed. Geocoding now allows the combination of data from as many sensors as desired, each sensor providing unique information.

**Enhanced products.** Users interested in the visual analysis of satellite data can have images processed to bring out specified features. Enhancements have been produced for forestry, geology and rangeland applications.

### Research and development

CCRS maintains a strong research effort in data acquisition systems and sensor development, data processing, data analysis and applications development. Research work is usually conducted in co-operation with private industry. This continuing association has resulted in a generation of high-quality, world-class products supported by CCRS research and development (R&D).

Research projects are conducted in association with potential end users and often receive the support of other interested federal and provincial agencies. Industry's participation continues to be encouraged since it facilitates the ongoing process of commercial development of promising applications.

Areas of interest include agriculture, forestry, geological exploration, surveys and mapping, ice reconnaissance, fisheries, water resources and environmental monitoring.

