Canadian Network for Space Research/U. of Calgary Polar Camera

The CNSR/U. of C. Polar Camera is a pair of CCD-based all-sky imagers for airglow and auroral studies. Each of the imagers has a fish-eye objective lens, telecentric fore-optics, a five-position filter wheel, and an unintensified CCD detector thermoelectrically cooled to below -40 C. Such cooling, combined with advanced readout technology, provides extremely low-noise images. Both imagers are controlled by a 80386-based PC which provides fully automatic turn-on and turn-off, data acquisition, and data archiving to 4-mm DAT. Each of the imagers and its electronics is sealed in an insulated enclosure purged with dry nitrogen, and is capable of operating outdoors continuously through the four-month-long polar night.

The imagers differ only in the filters through which they image the sky. A primary mission of the Polar Camera is to obtain simultaneous images of the near-IR OH airglow in two adjacent wavelength bands (829 nm and 835 nm), from which the temperature at the mesopause (~85 km altitude) may in principle be deduced. In auroras the Polar Camera images simultaneously the [OI] 630.0 nm line and the N2+ Meinel (2,0) band to allow diagnosis of the mean energy of the precipitating auroral electrons. In high-altitude auroras the same information may be obtained from simultaneous [OI] 630.0 nm and [OI] 557.7 nm images, which are also obtained. In addition to these emissions, the Polar Camera images the continuous backgrounds at 608 nm, 714 nm, and 820 nm, and can image auroral emissions at 520.0 nm ([NI]) and 668 nm (N2 1 Positive (5,2) band).

David P. Steele
1 November 1993
•