

ACE Fourier Transform Spectrometer

The principle of ACE measurement is the solar occultation technique. A high inclination (74 degrees), low earth orbit (650 km) provides ACE coverage of tropical, mid-latitudes and polar regions.



The primary scientific goal of the Atmospheric Chemistry Experiment (ACE) is to measure and understand the chemical and dynamical processes that control the distribution of ozone in the upper troposphere and stratosphere with a special emphasis on the changes occurring over Canada and the Arctic.

ABB was the prime contractor for the design and manufacturing of the ACE-FTS instrument on-board the Canadian Space Agency's SciSat-1 satellite launched on August 12, 2003. The ACE-FTS instrument is the main payload of the space craft. Originally intended to last two years, SciSat-1 is still in orbit and its performance has far exceeded the expectations of the scientific community.

The ACE FTS

The ACE main instrument is an infrared Fourier Transform Spectrometer (FTS) coupled with an auxiliary 2-channel visible and near infrared imager. The FTS, operating from 2.4 to 13.3 microns, measures at high spectral resolution (0.02 cm^{-1}) the infrared absorption signals that contain information on different atmospheric layers to provide vertical profiles of atmospheric constituents.

The spectrometer is an adapted version of the classical Michelson interferometer using an optimized optical layout. Its highly folded double-pass optical design results in a very high performance instrument with a compact size. A signal-to-noise ratio (SNR) better than 100 is achieved, with a field-of-view (FOV) of 1.25 mrad and an aperture diameter of 100 mm. A semiconductor laser is used as the metrology source of the interferometer sub-system.

The auxiliary Visible/Near-infrared Imager (VNI) monitors aerosols based on the extinction of solar radiation using two filtered detectors at 0.525 and 1.02 microns. The instrument also includes a suntracker mechanism providing fine pointing toward the radiometric center of the sun with stability better than 3 μrad .

SCISAT Team, received the 2009 Alouette Award

The Canadian Aeronautics and Space Institute (CASI) presented the 2009 Alouette Award to the SCISAT team for outstanding contributions to advancement in Canadian space technology, applications, science and engineering that goes to leaders of the development of the outstandingly successful Canadian SCISAT satellite.

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