OVERVIEW OF THE ACE-FTS INSTRUMENT

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The Atmospheric Chemistry Experiment (ACE) is the mission on-board Canadian Space Agency's science satellite, SCISAT-1. ACE consists of a suite of instruments in which the primary element is an infrared Fourier Transform Spectrometer (FTS) coupled with an auxiliary 2-channel visible (525 nm) and near infrared imager (1020 nm). A secondary instrument, MAESTRO, provides spectrographic data from the near ultra-violet to the near infrared, including the visible spectral range. In combination, the instrument payload nearly covers the spectral range from 0.25 to 13.3 microns. A comprehensive set of simultaneous measurements of trace gases, thin clouds, aerosols and temperature are being made by solar occultation from this satellite in low earth orbit. The ACE mission measures and analyses the chemical and dynamical processes that control the distribution of ozone in the upper troposphere and stratosphere. A high inclination (74°), low earth orbit (650 km) allows coverage of tropical, mid-latitude and polar regions. The ACE/SciSat-1 spacecraft was launched by NASA on August 12th, 2003.

This paper presents an overview of the ACE-FTS instrument. The design of the instrument will be presented, with a particular focus on the optical layout. The principal design drivers and trade-offs will be covered as well as system engineering approaches to optimize the performance of the instrument. The on-orbit performance of the instrument will be presented in terms of key parameters such as signal-to-noise ratio, accuracy and resolution (ILS). The latest on-orbit status of the satellite will also be presented.