Trace Gas Remote Sensing

The Trace Gas Remote Sensing group develops state-of-the-art algorithms to support end-to-end modeling studies used in the design of sensors to measure the distribution of trace gases in the atmosphere. These data provide key information for the characterization of air pollution and atmospheric change on a global scale. We have also developed a set of tools specifically for grating spectrometer and Fabry-Perot and Michelson interferometer sensor simulations. Our group works in close collaboration with other AER groups, including the Infrared Remote Sensing and Radiation and Climate groups, to improve the forward and inverse models used in remote sensing retrieval algorithms. Much of our work also leverages AER's chemical modeling expertise to provide realistic profiles of atmospheric composition and our overall understanding of the needs of the data user community through use of satellite and aircraft sensor data in other geophysical models.

Our core capabilities include:

- End-to-end simulation for sensor performance characterization
- Development of fast radiative transfer models for hyperspectral applications in clear and cloudy atmospheres
- Development and implementation of atmospheric correction algorithms
- Development and implementation of algorithms for retrieving geophysical parameters from remote sensing data