

## MODTRAN®6 Multiple Line-of-Sight (MLOS) Option

Alexander Berk<sup>1</sup> and Christopher Rice<sup>2</sup>

<sup>1</sup>Spectral Sciences, Inc. Burlington, Massachusetts

<sup>2</sup>Air Force Institute of Technology Wright-Patterson AFB, Ohio

### Abstract

The MODTRAN6 radiative transfer model enjoys widespread use throughout the remote sensing community. The DISORT multiple scattering model provides a first-principles general solution to the scalar, vertically inhomogeneous atmosphere radiative transfer equation for both thermal and solar sources. This general solution is utilized by MODTRAN to introduce a multiple line-of-sight option that dramatically increases processing time when spectral transmittances and radiances are required for multiple paths within a fixed scene. The option is demonstrated for three applications: (1) modeling residuals between plane-parallel and spherical earth atmosphere hemispherical fluxes; (2) computing wave boundary layer weighting functions; and (3) generating look-up tables for simulating an airborne visible through shortwave infrared hyperspectral sensor.

Index Terms: MODTRAN radiative transfer, DISORT multiple scattering, hemispherical flux, wave boundary layer, weighting functions, hyperspectral sensor look-up table