

TES CRYOCOOLER SYSTEM DESIGN AND DEVELOPMENT

S.A. Collins and J.I. Rodriguez
Jet Propulsion Laboratory
Pasadena, California, U.S.A 91109

JPL's Tropospheric Emission Spectrometer (TES) is designed to measure the three-dimensional distribution of ozone and its precursors in the lower atmosphere on a global scale. The instrument is a high-resolution infrared imaging Fourier transform spectrometer with spectral coverage of 3.2 to 15.4 μm at a spectral resolution of 0.1 cm^{-1} (nadir view) or 0.025 cm^{-1} (limb view). TES has been selected for flight on NASA's EOS-CHEM spacecraft.

TES contains four focal plane arrays in two separate housings that are cooled to 65 K by a pair of TRW pulse-tube coolers. The instrument also includes a two-stage passive radiator to cool the optical bench to 180 K. The cryocooler system design is tightly coupled with the overall thermal control design to maximize performance of the TES instrument.

This paper describes the cryogenic system design and its integration into TES, including the cryogenic loads, thermal performance margins, and mass properties for the cryocoolers. Test results are presented from recent integration activities that focused on the critical interface with the focal plane subsystem.

Simon A. Collins
Jet Propulsion Laboratory
M/S 157-316, 4800 Oak Grove Dr.
Pasadena, California, U.S.A 91109
e-mail:

Phone (818) 393-1846
Fax (818) 393-4206

Prefer Oral
simon.collins@jpl.nasa.gov