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# NASA TECH BRIEF



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## Infrared Spectroradiometer for Rocket Exhaust Analysis

A spectroradiometer system has been developed to perform high-resolution spectral absorption and emission measurements along predetermined lines of sight through the exhaust plumes of large rocket engines undergoing static firing tests. The measurements provide temperature and concentration profiles of specific chemical species in radially symmetric zones of an exhaust plume delineated by the directed lines of sight.

The system consists of an internal blackbody calibration source, external radiation sources for absorption measurements, spectral and spatial scanning mechanisms, power supplies, and recording equipment. All components used during engine firings, with the exception of the power supplies and recording equipment, can be operated in a vacuum environment. This arrangement permits the study of exhausts from engines operated in altitude simulation chambers.

The spectroradiometer is equipped to operate in the 0.8- to 3.5-micron spectral range, with one channel of low spectral resolution and one channel having the moderately high resolution afforded by a quarter-meter grating monochromator. Additional gratings

and detectors can extend the spectral range of the instrument through the visible and ultraviolet to 0.3 micron or further into the infrared.

### Notes:

1. This instrument should be of interest to experimentalists concerned with the zonal analysis of spectral absorption, emission, temperature, and concentration of chemical species associated with gaseous combustion products and spatially resolved plasmas.
2. Inquiries concerning this instrument may be directed to:

Technology Utilization Officer  
Marshall Space Flight Center  
Huntsville, Alabama 35812  
Reference: B68-10081

### Patent status:

No patent action is contemplated by NASA.

Source: W. F. Herget  
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Category 02