

National Aeronautics and Space Administration

LYNDON B. JOHNSON SPACE CENTER
WHITE SANDS TEST FACILITY



APPLIED OPTICS AND SPECTROSCOPY RESEARCH AND DEVELOPMENT

SUMMARY

Many tasks undertaken by the Laboratories Department at the White Sands Test Facility (WSTF) are of an investigative nature and require unique, nonintrusive, remote, or *in situ* measurements of physical parameters in harsh or restrictive environments. Standard instrumentation methods for such measurements usually are not available but must be developed for the specific application or requirements at hand. In the WSTF Electro-optics Laboratory, experiment and test requirements that involve optically measurable quantities are developed and demonstrated using optical and spectroscopic techniques. An instrumentation system developed in the laboratory is then used in the field for short-term investigations or to demonstrate feasibility as the prototype for a new standard test at WSTF.

LABORATORY CAPABILITIES

Parameters such as temperature, reflectance, emittance, gas-flow velocity, propellant concentration, and surface contamination have been measured optically in various environments. These environments include vacuum and high-pressure chambers, combustion chambers, explosions, and rocket-exhaust plumes. Laboratory equipment available to the scientific staff is listed below.

- Grating spectrographs
- Fabry-Perot interferometer
- Argon-ion laser
- CO₂ laser
- Fiber optics
- Optical fiber sensors
- UV-vis-near-IR diode array detectors
- Mid-IR Michelson interferometers
- Nitrogen/dye laser
- IR and near-IR diode lasers
- Optical tables and breadboards

EXPERIENCE

The WSTF Laboratories Department includes a staff of scientists with experience in optics, optical and nuclear spectroscopy, nondestructive evaluation testing, spacecraft design and testing, electronic design, and software development. This unique combination of experience and laboratory equipment enables research ranging from basic scientific investigations to design and fabrication of systems for field evaluation.

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