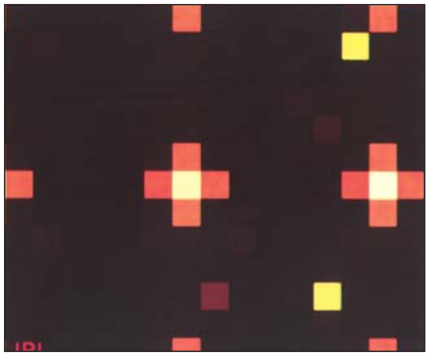
taining detailed information pertaining to all the pixels. Unlike the prior methods, this method does not require flat-field illumination of the array: indeed, the method does not require any illumination.

The method involves a sequence of resets of subarrays of pixels to specified voltages and measurement of the voltage responses of neighboring non-reset pixels. The spacing of the reset pixels is chosen in accordance with the number of neighboring pixels over which the coupling coefficients are sought. The sequence begins with reset of all the pixels in the array to a specified first voltage level. In the next step, a subarray of pixels is reset to a specified second voltage level. Signals consisting of portions of the second reset voltage change are coupled capacitively from the pixels of the reset subarray to adjacent non-second-reset pixels. These signals can be mapped in the form of difference images from the pixel voltages measured immediately before and immediately after the second reset (see figure). The sequence as described thus far can be repeated for different subarrays of pixels, as needed, to acquire data for characterizing all pixels of interest. The entire sequence can be repeated to acquire multiple sets of data that can be combined to reduce measurement noise.



This **Difference Image** from a portion of an image detector containing a rectangular pixel array was generated from two images: one recorded immediately after and one recorded immediately before the second reset. The second-reset pixels were those residing at intersections of rows and columns at seven-pixel intervals.

This work was done by Suresh Seshadri, David M. Cole, and Roger M. Smith of Caltech for NASA's Jet Propulsion Laboratory.

In accordance with Public Law 96-517, the contractor has elected to retain title to this invention. Inquiries concerning rights for its commercial use should be addressed to:

Innovative Technology Assets Management
JPL
Mail Stop 202-233
4800 Oak Grove Drive
Pasadena, CA 91109-8099
E-mail: iaoffice@jpl.nasa.gov

Refer to NPO-45223, volume and number of this NASA Tech Briefs *issue, and the page number.*

Fiber-Based Laser Transmitter for Oxygen A-Band Spectroscopy and Remote Sensing

Goddard Space Flight Center, Greenbelt, Maryland

A fiber-based laser transmitter has been designed for active remote-sensing spectroscopy. The transmitter uses a master-oscillator-power-amplifier (MOPA) configuration with a distributed feedback diode-laser master oscillator and an erbium-doped fiber amplifier. The output from the MOPA is frequency-doubled with a periodically poled nonlinear crystal. The utility of this single-frequency, wavelength-tunable, power-scalable laser has been demonstrated in a spectroscopic measurement of the diatomic oxygen A-band.

The problem that needed to be addressed was how to measure atmospheric state parameters (like temperature and pressure) from space to get local measurements and global coverage. The only successful laser transmitter that had been used for this type of measurement (remote sensing from an airplane) used dye and alexandrite lasers. These devices were both spectroscopically and mechanically unstable and very inefficient. This transmitter design offers many advantages over this technology.

Fiber-based technology vastly improves mechanical alignment issues because optical path is inside a waveguide that is spliced together and no longer contingent on the relative alignment of bulk optical parts. Many of the components are built to telecommunications industry reliability standards.

This work was done by Mark A. Stephen and James B. Abshire of Goddard Space Flight Center. For further information, contact the Goddard Innovative Partnerships Office at (301) 286-5810. GSC-15710-1

Low-Profile, Dual-Wavelength, Dual-Polarized Antenna

This antenna system has uses in remote monitoring of ocean storms and in search and rescue operations.

Goddard Space Flight Center, Greenbelt, Maryland

A single-aperture, low-profile antenna design has been developed that supports dual-polarization and simultaneous operation at two wavelengths. It realizes multiple beams in the elevation plane, and supports radiometric, radar, and conical scanning applications.

This antenna consists of multiple azimuth sticks, with each stick being a multilayer, hybrid design. Each stick forms the h-plane pattern of the C and Ku-band vertically and horizontally polarized antenna beams. By combining several azimuth sticks together, the elevation beam is formed. With a separate transceiver for each stick, the transmit phase and amplitude of each stick can be controlled to synthesize a beam at a specific incidence angle and to realize a particular side-lobe pattern. By changing the transmit phase distribution