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Imaging Spectroscopy Special Issue

Three decades of hyperspectral remote sensing of the Earth: A personal view

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Abstract

Imaging spectrometry, or hyperspectral imaging as it is now called, has had a long history of development and measured acceptance by the scientific community. The impetus for the development of imaging spectrometry came in the 1970's from field spectral measurements in support of Landsat-1 data analysis. Progress required developments in electronics, computing and software throughout the 1980's and into the 1990's before a larger segment of the Earth observation community would embrace the technique. The hardware development took place at NASA/JPL beginning with the Airborne Imaging Spectrometer (AIS) in 1983. The airborne visible/infrared imaging spectrometer (AVIRIS) followed in 1987 and has proved to this day to be the prime provider of high-quality hyperspectral data for the scientific community. Other critical elements for the exploitation of this data source have been software, primarily ENVI, and field spectrometers such as those produced by Analytical Spectral Devices Inc. In addition, atmospheric correction algorithms have made it possible to reduce sensor radiance to spectral reflectance, the quantity required in all remote sensing applications. The applications cover the gambit of disciplines in Earth observations of the land and water. The further exploitation of hyperspectral imaging on a global basis awaits the launch of a high performance imaging spectrometer and more researchers with sufficient resources to take advantage of the vast information content inherent in the data.

Keywords

Imaging spectrometry; Hyperspectral imaging; Spectroscopy; Earth observations; Remote

sensing applications; Sensor development; Historical perspective

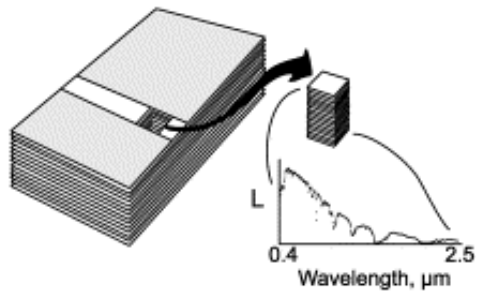


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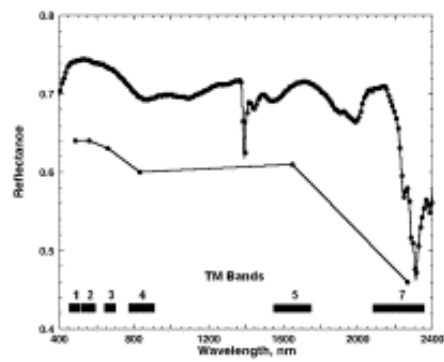


Fig. 2.

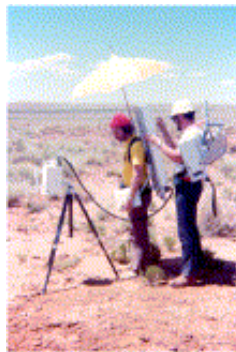


Fig. 3.

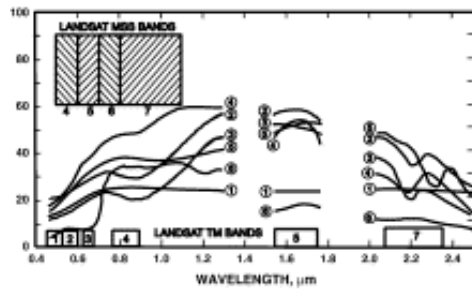


Fig. 4.



Fig. 5.

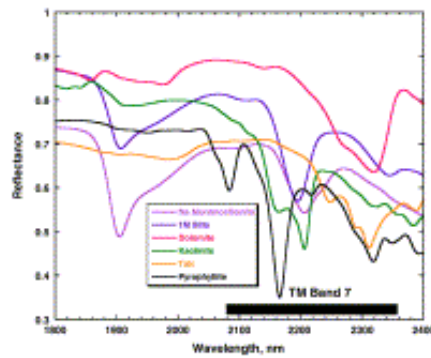


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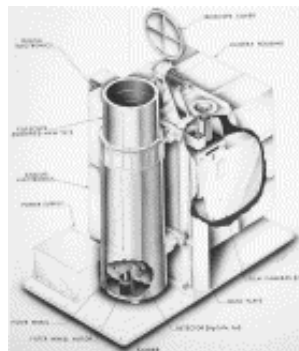


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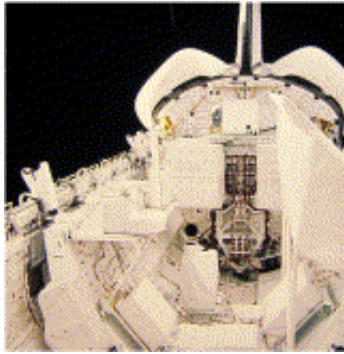


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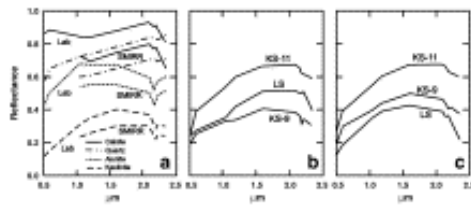


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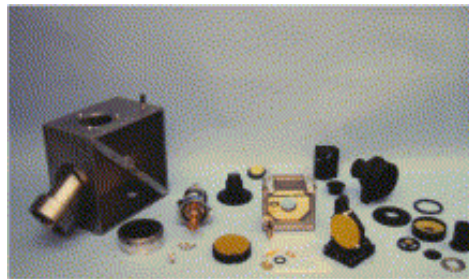


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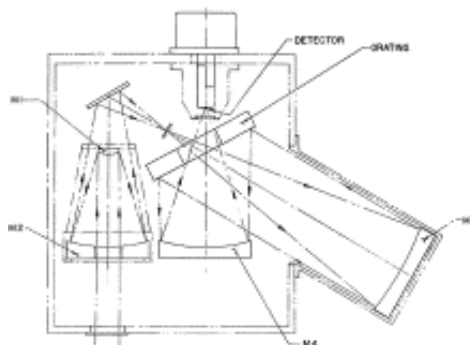


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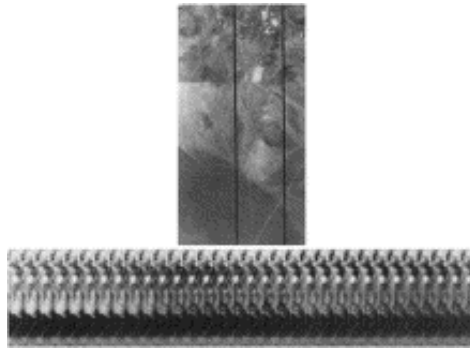


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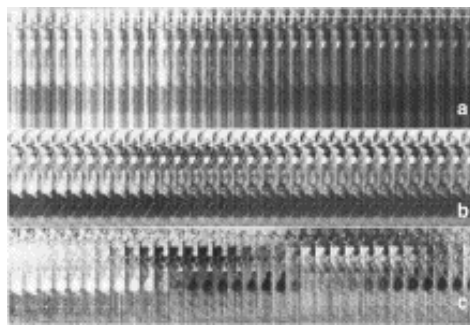


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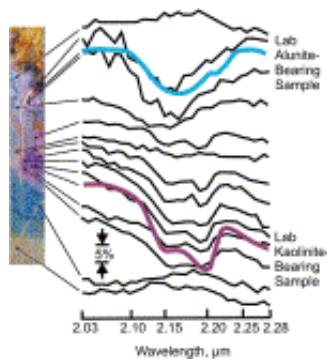


Fig. 14.



Fig. 15.

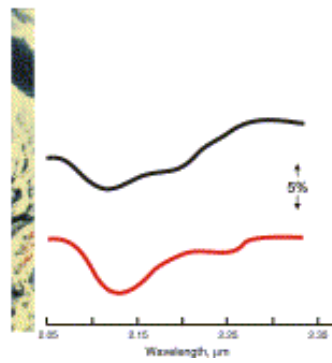


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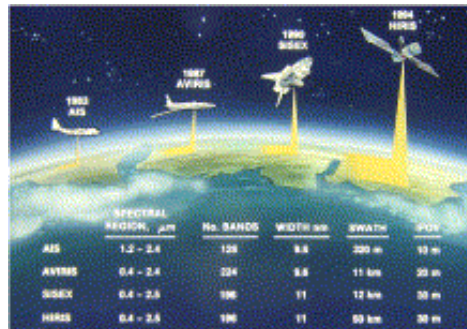


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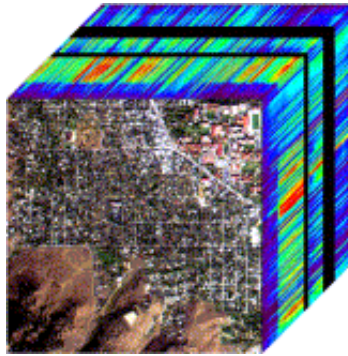


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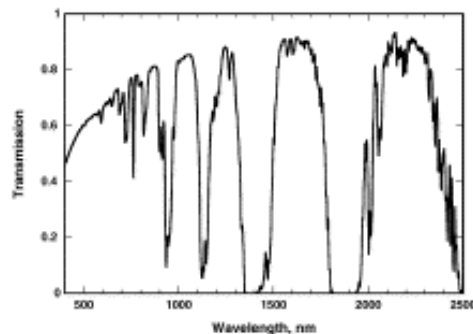


Fig. 19.

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