

SPIR Notes

Special Projects in Radiometry (SPIR) is a division dedicated to providing turnkey systems in spectral radiometry and optical remote-sensing instrumentation. Our team includes over 80 highly qualified engineers, scientists and technicians.

Expanding ABB Bomem's excellence in building state-of-the-art instru

- Optical instruments for use on aircrafts, balloons or satellites
- Hyperspectral imagers
- Optical calibration systems
- Software for data processing and instrument modeling

Large Array Imaging FT-Spectrometer SPIM

Spectral imagers including hyperspectral imagers is a technology in growing demand worldwide. The purpose of this work conducted in 1998 was to investigate the use of Fourier Transform Spectrometers (FTS) as spectral imagers.

The work was divided into two parts, a paper study on the use of FTS for spaceborne spectral imager applications and the development of a laboratory FTS prototype.

The paper study focuses on a promising application for spaceborne FTS spectral imager: *geostationary weather sounding*. The conclusion is that it is quite straightforward to build such an instrument using current FTS and 2D multiplexed array technologies. As common FTS designs often reimage the scene onto the detector, transformation into an hyperspectral imager consist merely in just adding pixels at the focal plane.

Detailed sensitivity and design analyses show that an FTS spectral imager can readily meet the requirements of weather sounding can also be used advantageously in staring mode, an imaging mode that is unavailable to dispersive spectrometers.

On the experimental side, a fully functional imaging FTS prototype was designed, around a standard MB interferometer. An Amber AE4256 256x256 3-5 μm Infrared camera was borrowed from the Canadian Space Agency for use in the prototype. The purpose of the work was to demonstrate the use of large format 2D multiplexed arrays in FTS. The main challenge resides in the OPD sweep method.

Typically, focal plane arrays of large dimension have a frame rate in the order of 10Hz, this is too slow for fast-scanning FTS.

A step scanning servo system using a stepper motor as mirror actuator was developed. The imaging quality, spectral resolution as well as sensitivity was verified. Hyperspectral data was also acquired on geological samples.

This study paved the road to the development of imaging FTS at ABB for astrophysics and remote-sensing.

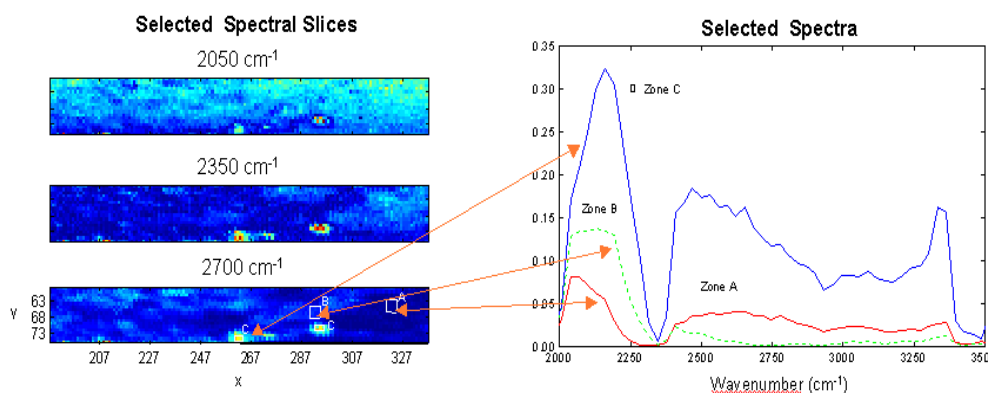


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