Overview of AVIRIS Acquisitions in Argentina as Part of the NM EO-1 Campaign in 2001

Robert O. Green, Mike Eastwood, Ian McCubbin, Chris Chovit, Jim Raney, Jack Holbrook

Jet Propulsion Laboratory
California Institute of Technology

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Overview

- Imaging Spectroscopy Approach
- AVIRIS Instrument and Data
- Calibration and SNR
- Argentina Campaign
- Summary
AVIRIS: The Imaging Spectroscopy Approach

Spectroscopic Example
Three materials detected
Three materials identified
Expressed concentrations derived

Multi Spectral Example

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AVIRIS Measurement of the Spectrum

Example Atmospheric Transmittance Spectrum

MODIS Multi-Spectral Bands

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AVIRIS Instrument

AVIRIS Technology Status
- Thermal control 1997
- Low Altitude 1998
- INU/GPS 1998
- Geo rectification 1998
- Onboard calibrator 1999
- Detector arrays 2000
- Digital signal chain 2001
- Onboard data storage 2001

AVIRIS is designed with 200 μm detectors and F/1 optics.

It is hard to imagine larger detectors or faster optics.

The AVIRIS design is in the advanced technology zone of the physics of spectroscopic measurements.

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AVIRIS: PEARL HARBOR, HAWAII

Spectral
Range 370 to 2500
Sampling 9.8 nm
Accuracy 0.5 nm

Radiometric
Range 0 to Max Lambertian
Sampling 12 bits
Accuracy 96 percent

Spatial (ER-2 / Twin Otter aircraft)
Swath 11/2.2 km ER-2/TO
Sampling 20/4 m ER-2/TO
Accuracy 20/4 m ER-2/TO

Full INU/GPS geo rectification

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Excellent calibration and high precision ($SNR$) are required for NASA Code Y science.

- AVIRIS calibration is within 96% of an independent prediction.

- AVIRIS SNR ranges from 1000 to 500 in the continuum regions of the spectrum.

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Argentina 2001

- In September/October 2000 it was proposed that AVIRIS deploy to Argentina in January to support NM EO-1 with summer underflight and validation acquisitions.

- On the 30th of December 2000 the Twin Otter left Las Vegas headed for Buenos Aires at 140 knots.

- On the 3rd of January 2001 AVIRIS was shipped to Buenos Aries.

- On the 13th of January AVIRIS collected the first image in Argentina onboard the Twin Otter.
Argentina 2001 First Image January 13th
AVIRIS Argentina 2001

- AVIRIS began imaging on the 13 of January
- AVIRIS finished on the 20th of February
- AVIRIS flew 25 days and collected more than 125 flight lines
- More than 216 gigabytes of data were measured
- Two simultaneous under flights of NM EO-1
- Two simultaneous under flights of SAC-C
- The data have been calibrated and delivered investigators

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