Section 7

Science Validation Team Activities

. . . Stephen G. Ungar
NASA GSFC Code 923

Science Validation Team

- ***Instrument Team***
  - ***Validate/re-establish and refine pre-launch characterizations***
  - ***Provide technology validation***
  - ***Participate on Science Validation Team (SVT)***

- ***NASA Selected Investigators***
  - ***Conduct scene based instrument performance characterizations***
  - ***Measure ability of instruments to make Landsat-like observations***
  - ***Assess capability for addressing earth remote sensing applications***
  - ***Assist in technology validation***
  - ***Facilitate Commercial Applications (CRSP/SSC)***

- ***International Collaborators***
  - ***Argentina, Australia, Canada, Italy, Japan, Singapore***

Investigator Research Topics (1 of 3)

Research Topic	Principal Investigator
Forest Logging in Amazonia	**Asner, G. P.,** University of Colorado
Desertification	**Asner, G. P.,** University of Colorado
Forest Composition & Function	**Martin, M.,** University of New Hampshire
Inter-Sensor Calibration	**Huete, A. R.,** University of Arizona, Tucson
Arid Vegetation Abundance	**Mustard, J. F.,** Brown University.
Tropical Forest Burn Scars	**Liew, S. C.,** National University of Singapore
Forest Composition/Structure	**Townsend, P. A.,** University of Maryland
Land Cover/Land Use	**White, W. A., Crawford, M.,** University of Texas at Austin
Sustainable Forest Development	**Goodenough, D. G.,** Natural Resources Canada
Monitoring Forest & Rangeland	**Gong, P.,** University of California, Berkeley
Non-Native Plant Species	**McGwire, K.** Desert Research Institute

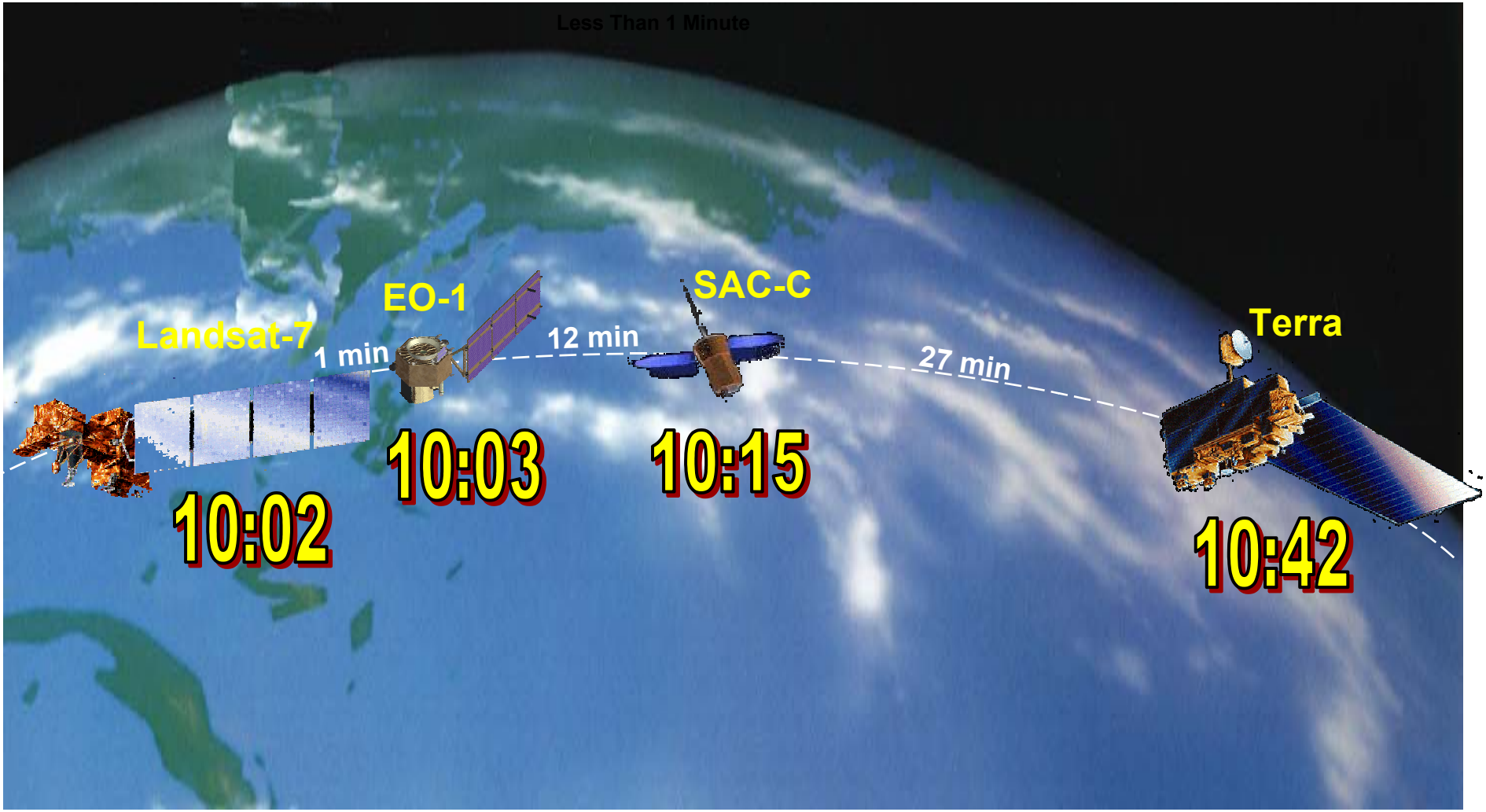
Investigator Research Topics (2 of 3)

Research Topic	*Principal Investigator*
Invasive Plants: Chinese Tallow	***Ramsey III, E. W.,*** *USGS, Denver*
Invasive Leafy Spurge	***Root, R.,*** *USGS*
Agricultural Monitoring	***Liang, S.,*** *USDA, Maryland*
Inter-Satellite Comparison	***Moran, M. S.*** *USDA, Tucson, Arizona.*
Fire Hazard Assessment	***Roberts, D. A.,*** *University of California, Santa Barbara*
Geologic Validation of Hyperion	***Kruse, F. A.,*** *AIG, Boulder, Colorado*
Volcanic Debris flow Hazards	***Crowley, J. K.,*** *USGS, Reno, Nevada*
Analysis of Hot Spots	***Flynn, L.,*** *University of Hawaii.*
Environmental Monitoring of Coastal/Inland Water in Japan	***Matsunaga, T.,*** *Tokyo Institute of Technology.*
Oceanography, Pollution and Urban Mapping	***Abrams, M. J.,*** *JPL, California;* ***R. Bianchi and L. Alberotanza,*** *NRC, Italy.*
Glaciological Applications	***Bindschadler, R.,*** *NASA/GSFC, Maryland*

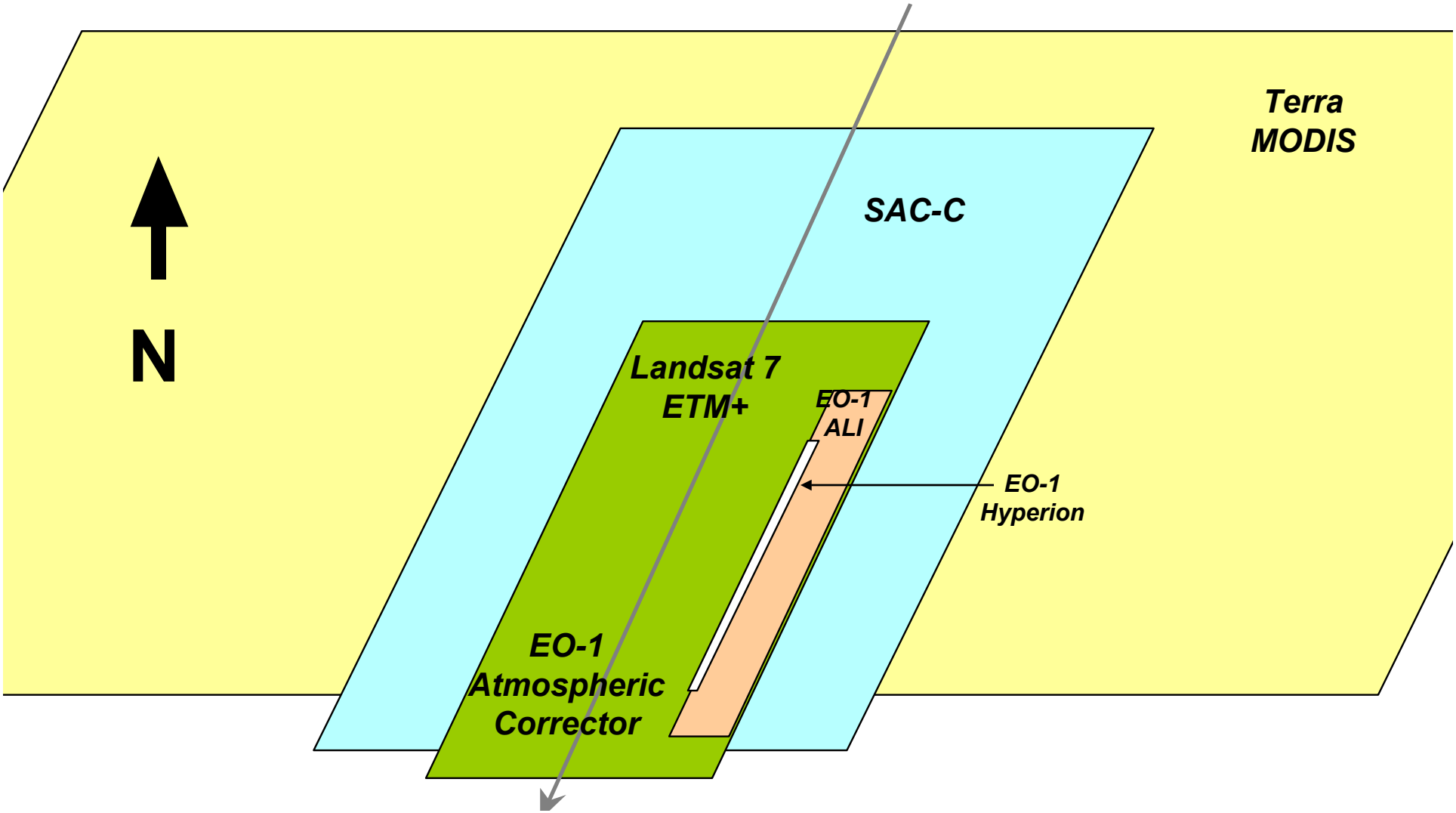
Investigator Research Topics (3 of 3)

Research Topic	Principal Investigator
Ecological Applications in Yellowstone National Park	**Boardman, J. W., AIG,** Colorado
Commercial Applications	**Cassady, P. E.,** Boeing, Washington
Radiometric and Spatial Evaluation of ALI and Hyperion	**Biggar, S. F.,** University of Arizona
Atmospheric Correction	**Carlson, B. E.,** NASA /GISS, New York
Atmospheric Correction and Sparse Vegetation Mapping	**Goetz, A. F. H.,** University of Colorado
Australian Hyperspectral Calibration and Validation Sites	**Jupp, D. L. B.,** CSRIO, Australia
Integrated Assessment of EO-1 and Landsat Instrument Suites	**Meyer, D. J.,** EDC, South Dakota
Canopy Temperature Estimation	**Smith, J. A.,** NASA GSFC, Maryland
Lunar Calibration	**Kieffer, H.,** USGS, Flagstaff, AZ

The EOS AM Constellation Alignment for November 21, 2000 Launch

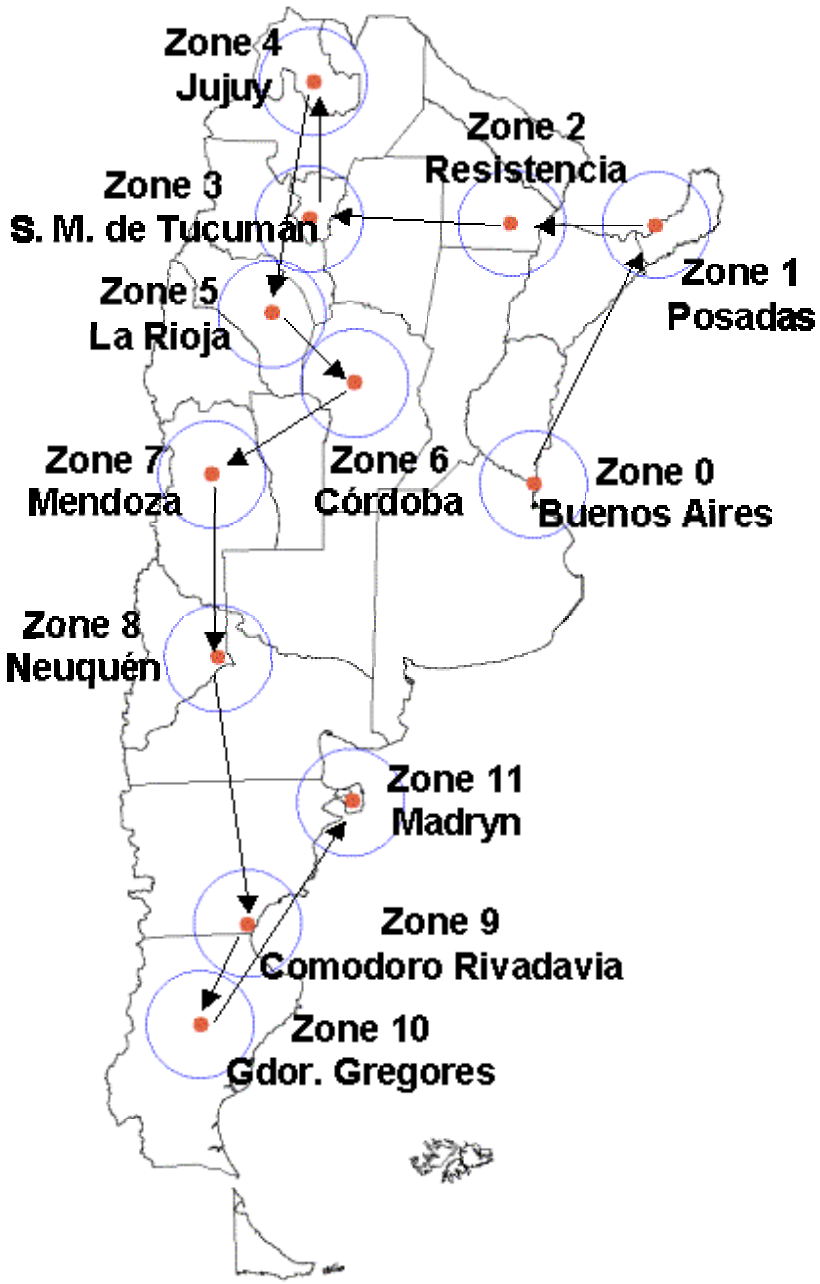


AM Constellation Descending Orbit Ground Tracks



Argentina Validation Site Zone Map

for AVIRIS and EO-1/SAC-C overflights



AVIRIS Argentina 2001

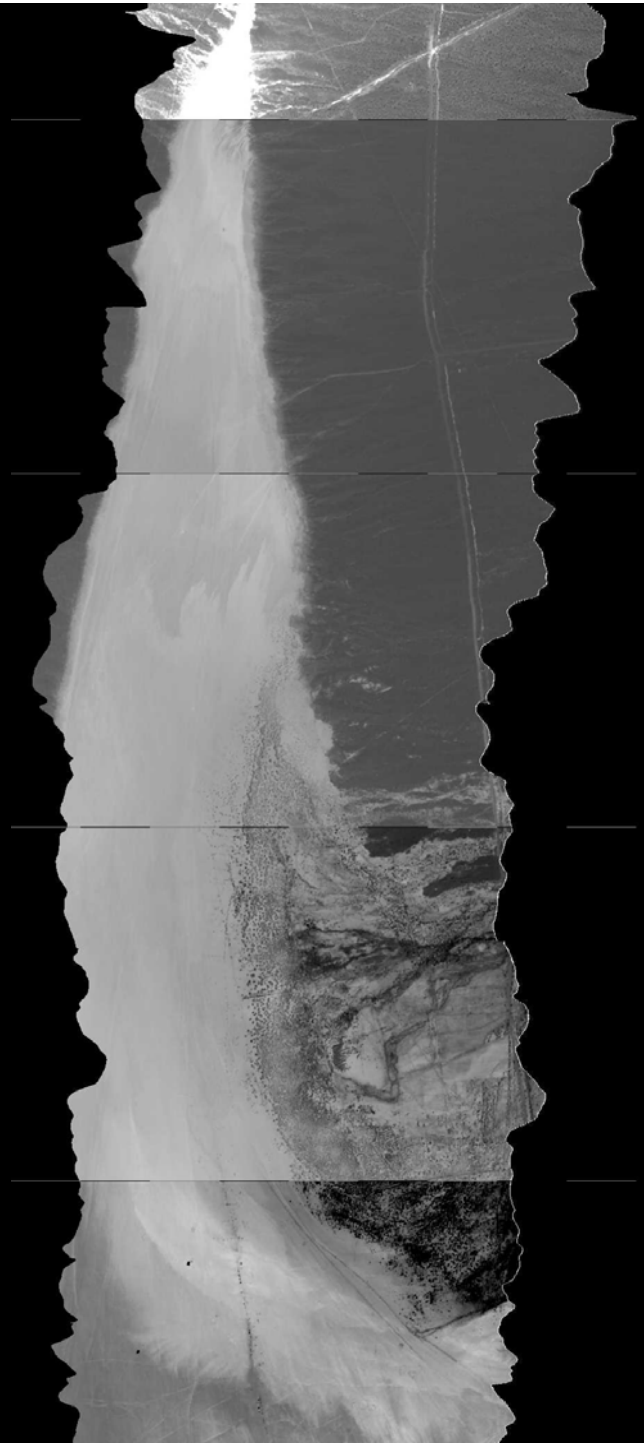
- ***AVIRIS began imaging on the 13 of January***
- ***AVIRIS finished on the 20th of February***
- ***AVIRIS flew 25 days and collected more than 125 flight lines***
- ***More than 216 gigabytes of data***
- ***Two simultaneous under flights of NM EO-1***
- ***Two simultaneous under flights of SAC-C***
- ***~ 70 Calibrated/georectified data sets delivered to investigators to date***

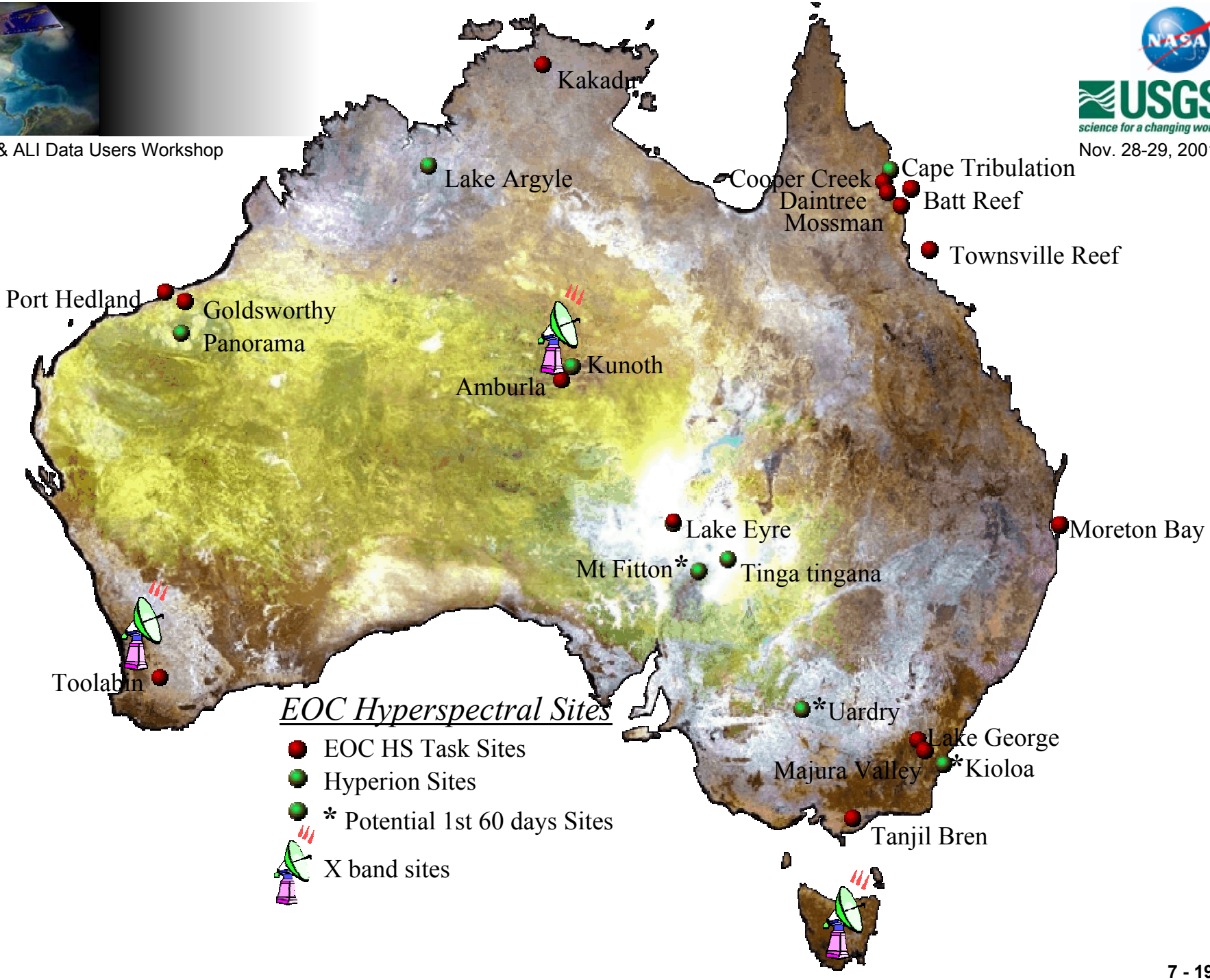
RESTRICTED
NO SMOKING
CLOSED
CLOSED
OPEN

Earth Observing-1

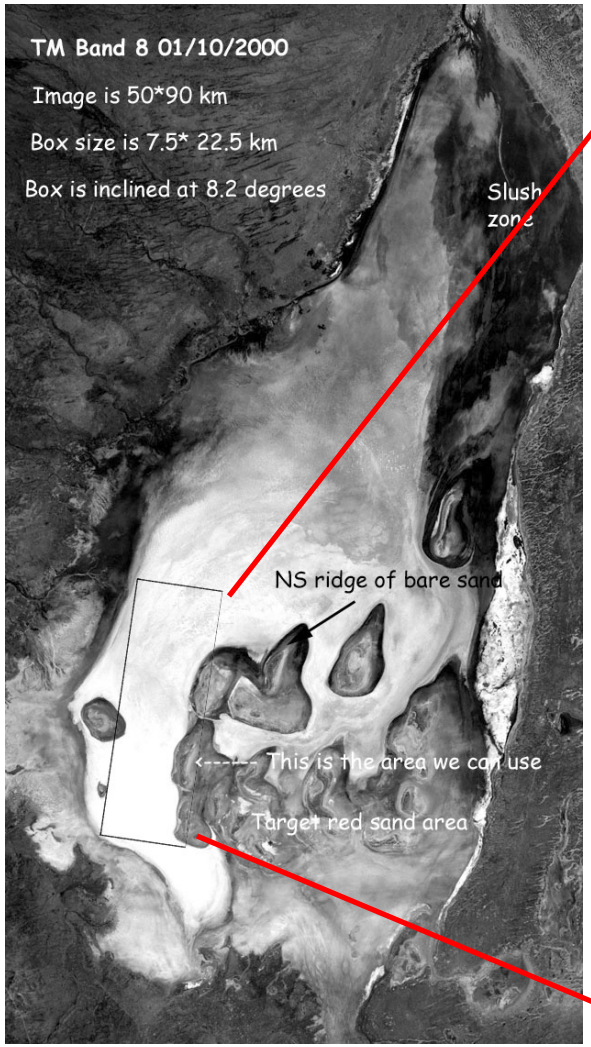
Earth Observing-1

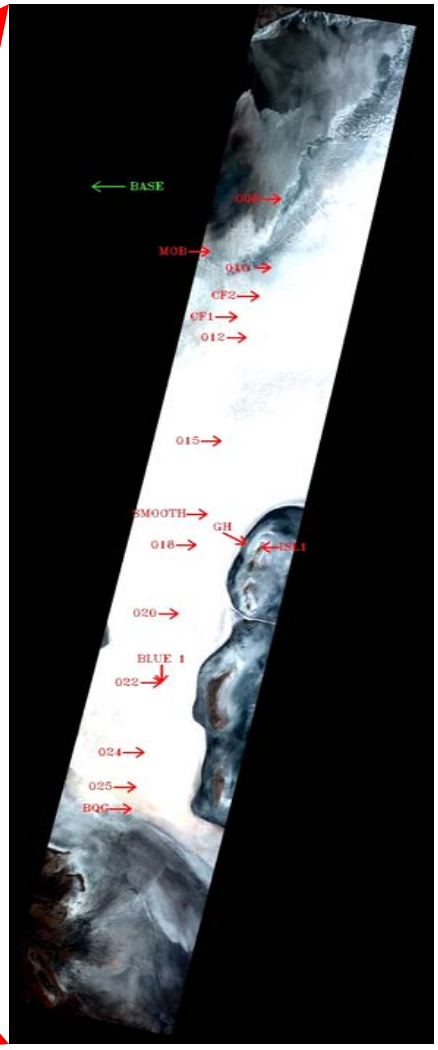
Earth Observing-1




Kakadu
Lake Argyle
Cooper Creek
Cape Tribulation
Daintree
Batt Reef
Mossman
Townsville Reef
Port Hedland
Goldsworthy
Panorama
Kunoth
Amburla
Lake Eyre
Moreton Bay
Mt Fitton*
Tinga tingana
Toolabin
EOC Hyperspectral Sites
EOC HS Task Sites
Hyperion Sites
* Potential 1st 60 days Sites
X band sites
*Uardry
Lake George
Majura Valley
*Kioloa
Tanjil Bren

Lake Frome Calibration Site





Hyperion Addresses a Broad Range of Issues and World-wide Sites

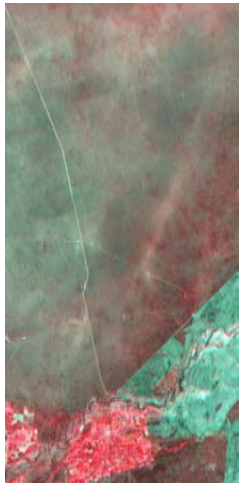
Forests

Canada

Minerals

United States

Grasslands



Argentina

Glaciers

Antarctica

Deserts

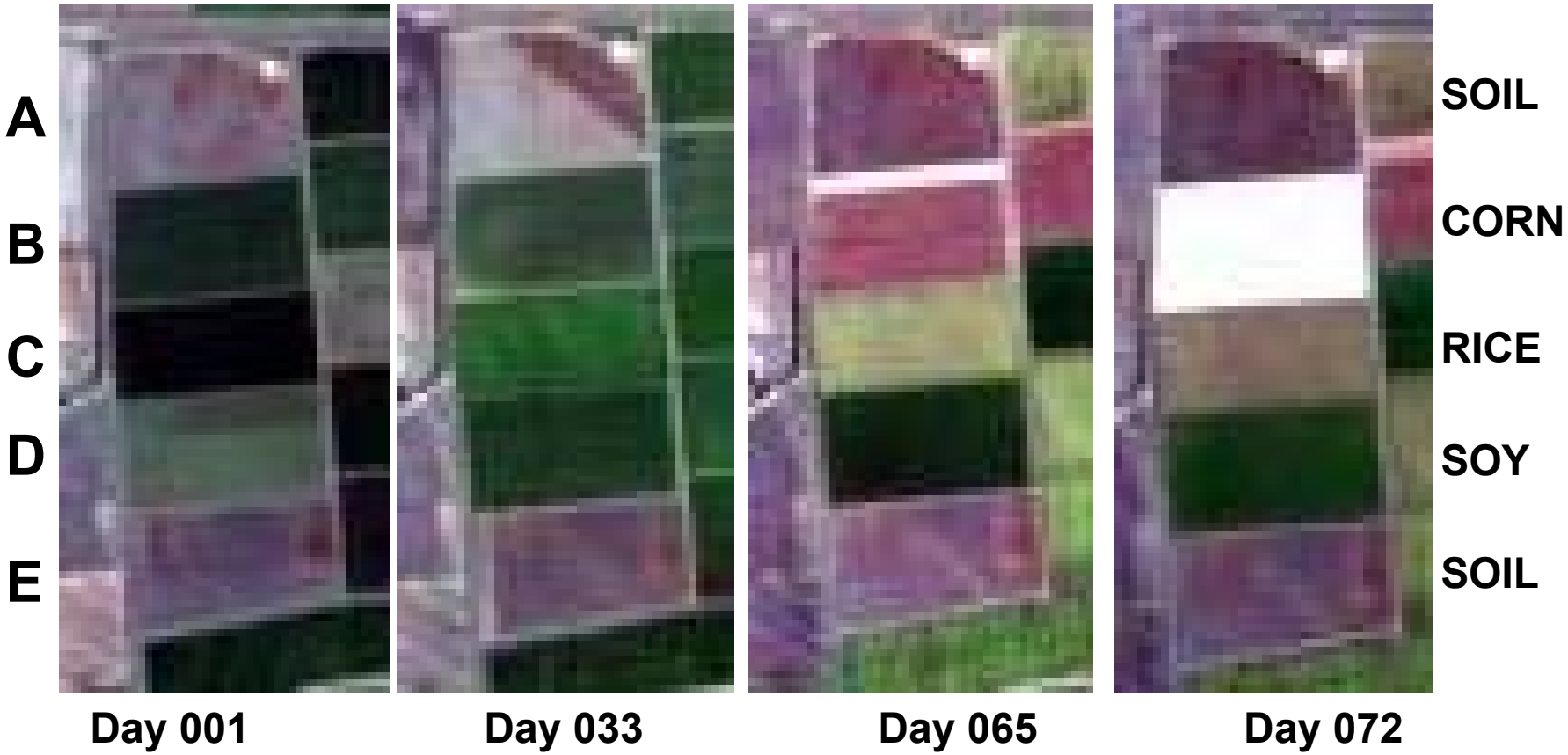
Sahara

Agriculture

Australia

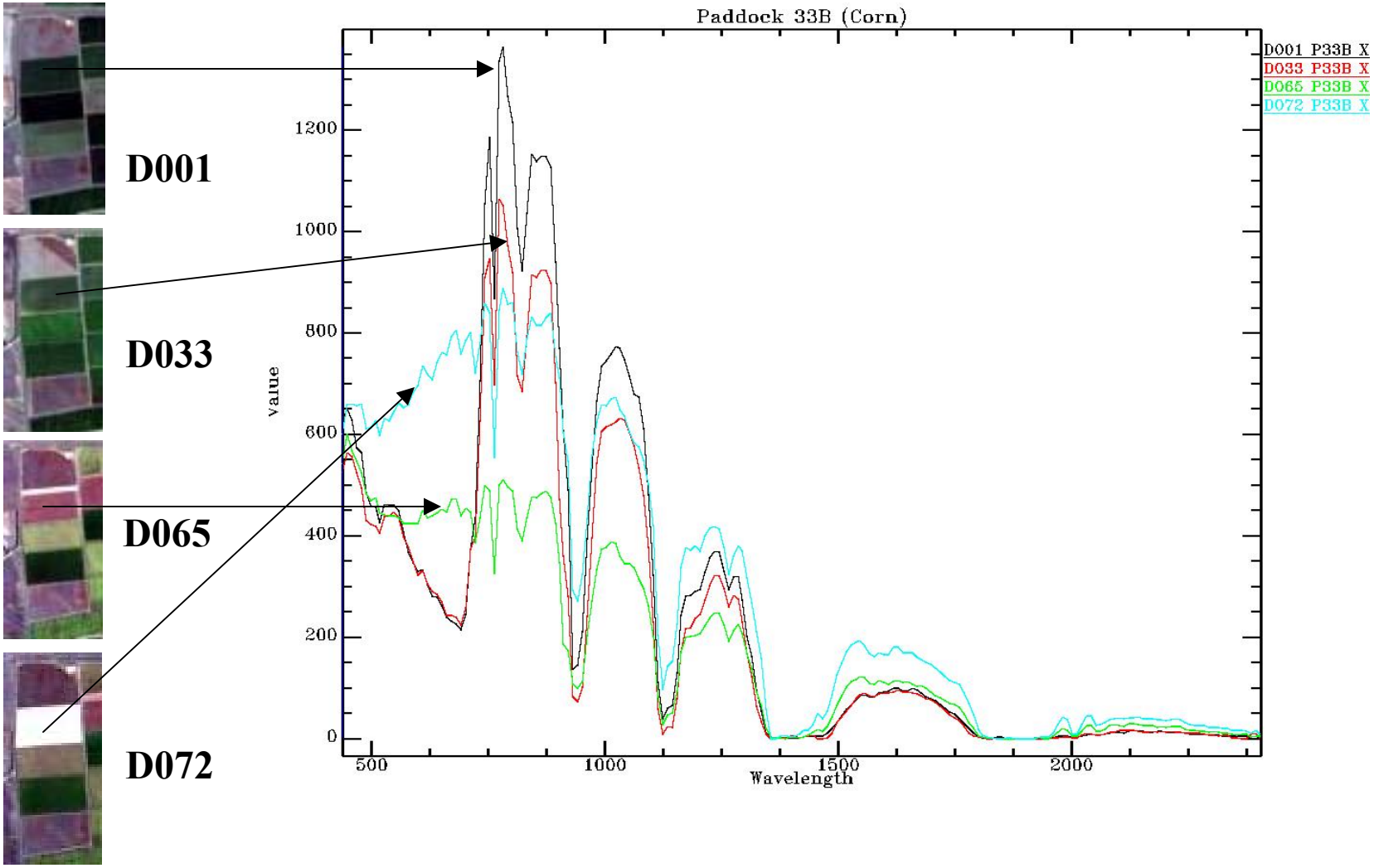
Temporal Sequence of Hyperion Images

Coleambally Irrigation Area



Julian calendar day of 2001

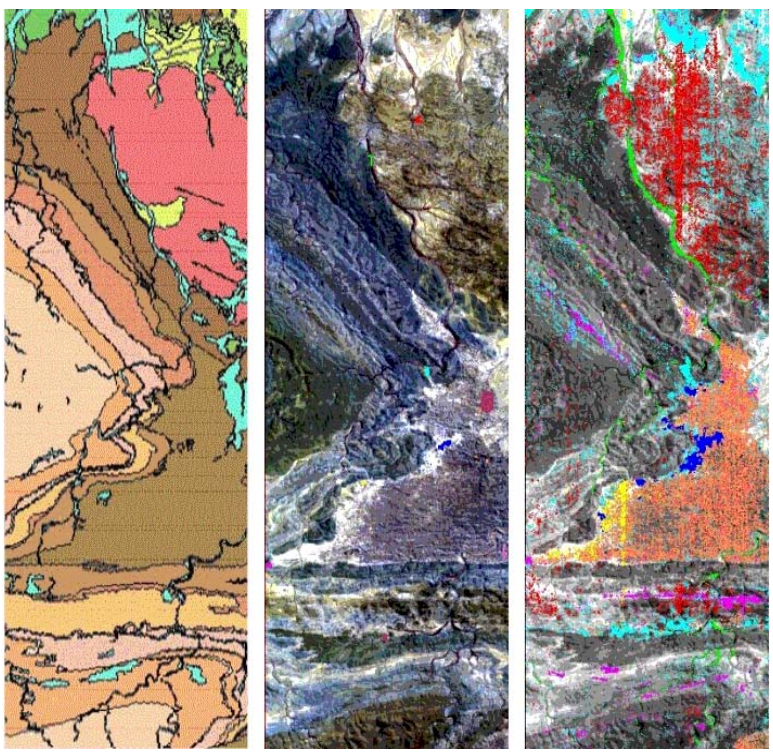
Corn (Paddock 33B)



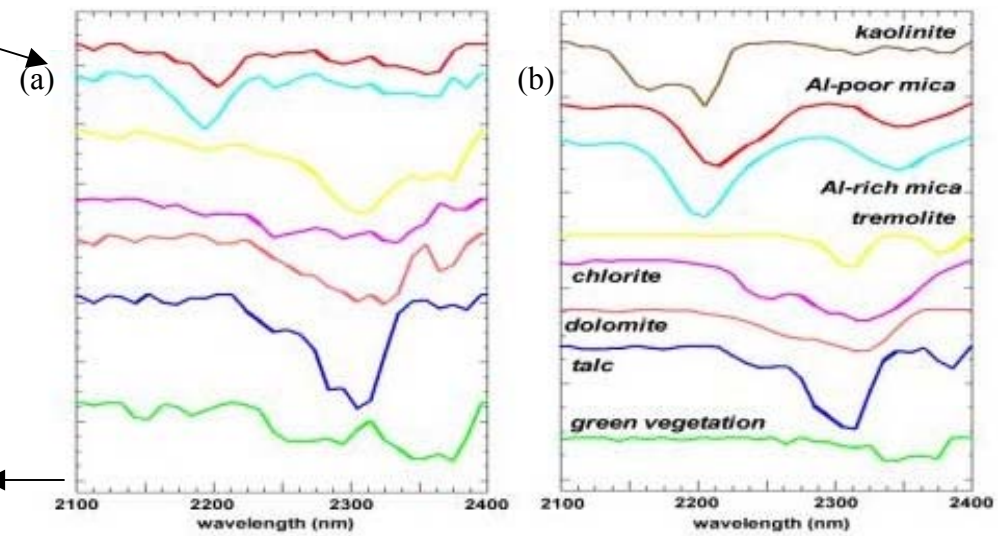
Hyperion Maps
Mt. Fitton Geology

Hyperion-based apparent reflectance compares with library reference spectra

(1) (2) (3)



Hyperion Spectra **Reference Spectra**



Hyperion surface composition map agrees with known geology of Mt. Fitton in South Australia

(1) Published Geologic Survey Map

(2) Hyperion three color image (visible) showing regions of interest

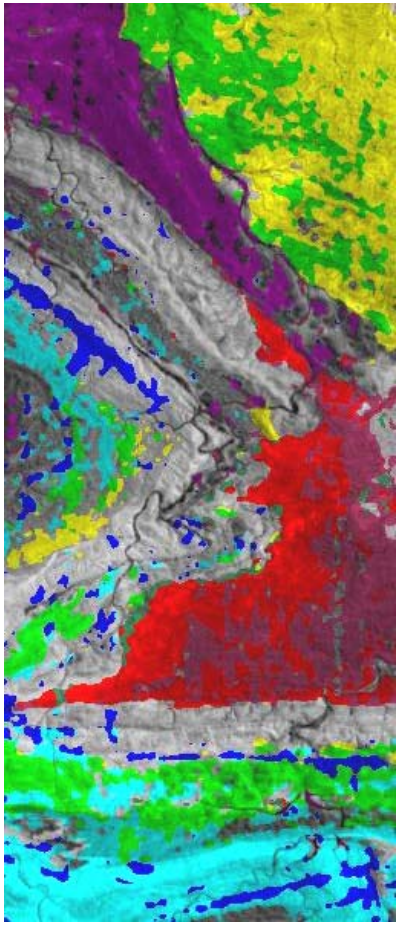
(3) Hyperion surface composition map using SWIR spectra above

Courtesy of CSIRO, Australia

Hyperion Maps
Mt. Fitton Geology

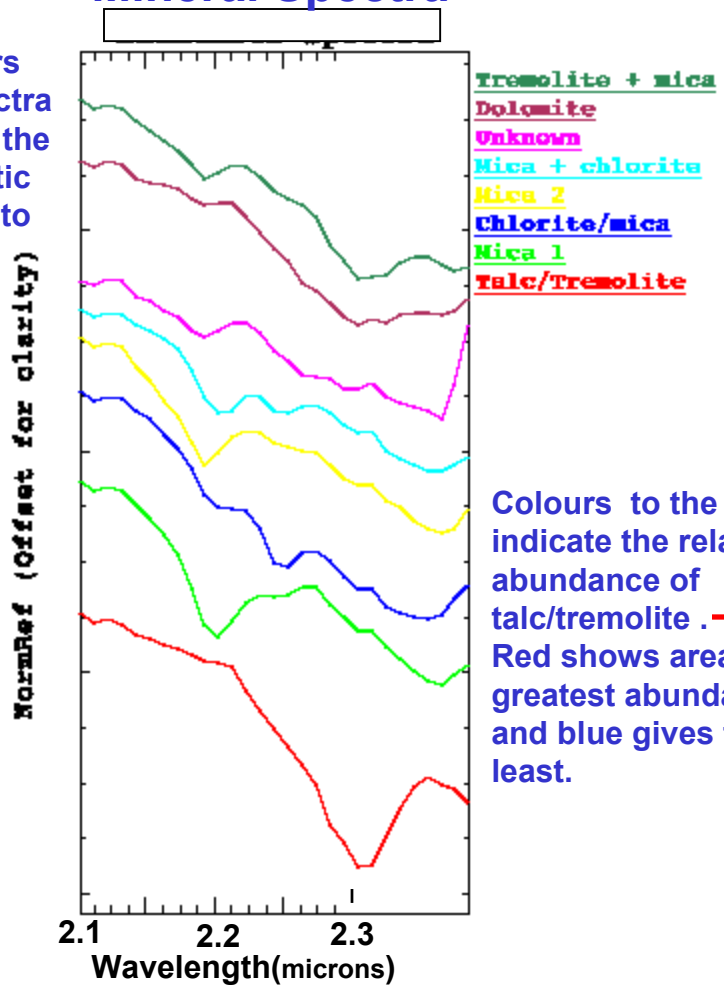
Automatic mineral mapping algorithm creates, in 30 seconds, a quick-look mineral map (left & centre). More precise detail is on right. *(Courtesy of CSIRO Australia)*

Mineral Map



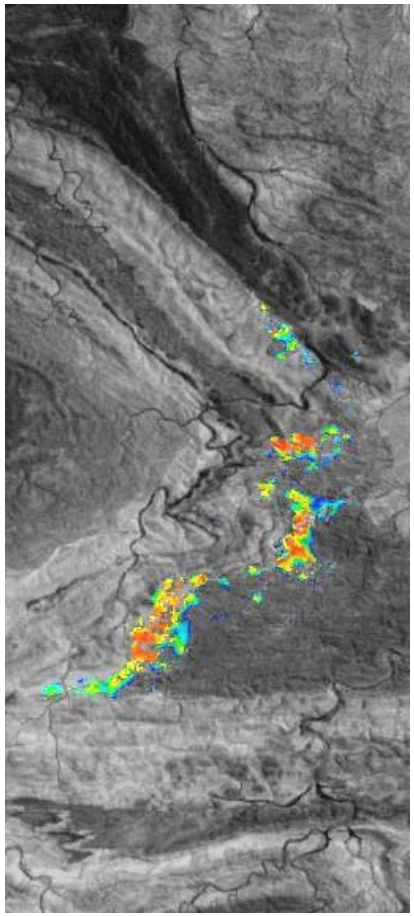
Colours of spectra match the thematic image to left.

Mineral Spectra



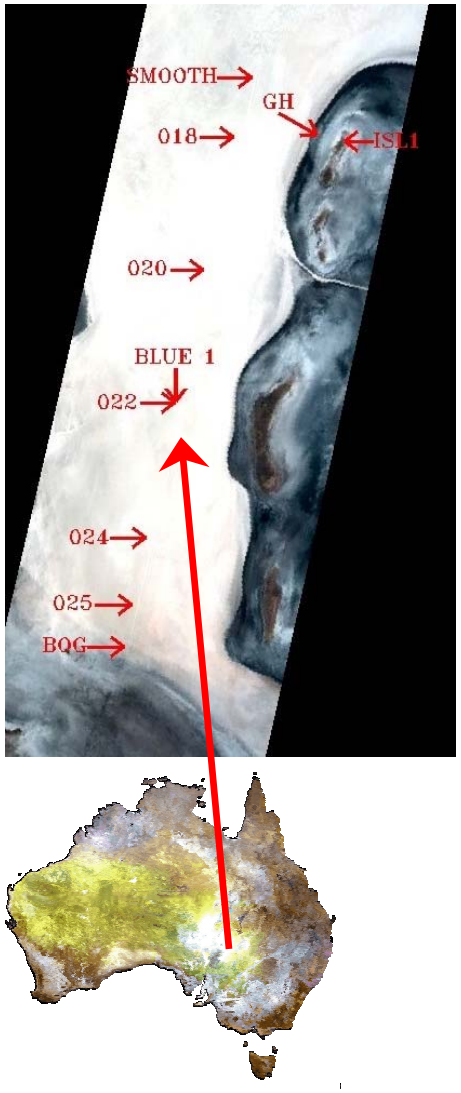
Colours to the right indicate the relative abundance of talc/tremolite . → Red shows areas of greatest abundance and blue gives the least.

Detailed Talc-Tremolite Map



Desert Sites used for Vicarious Calibration

Lake Frome

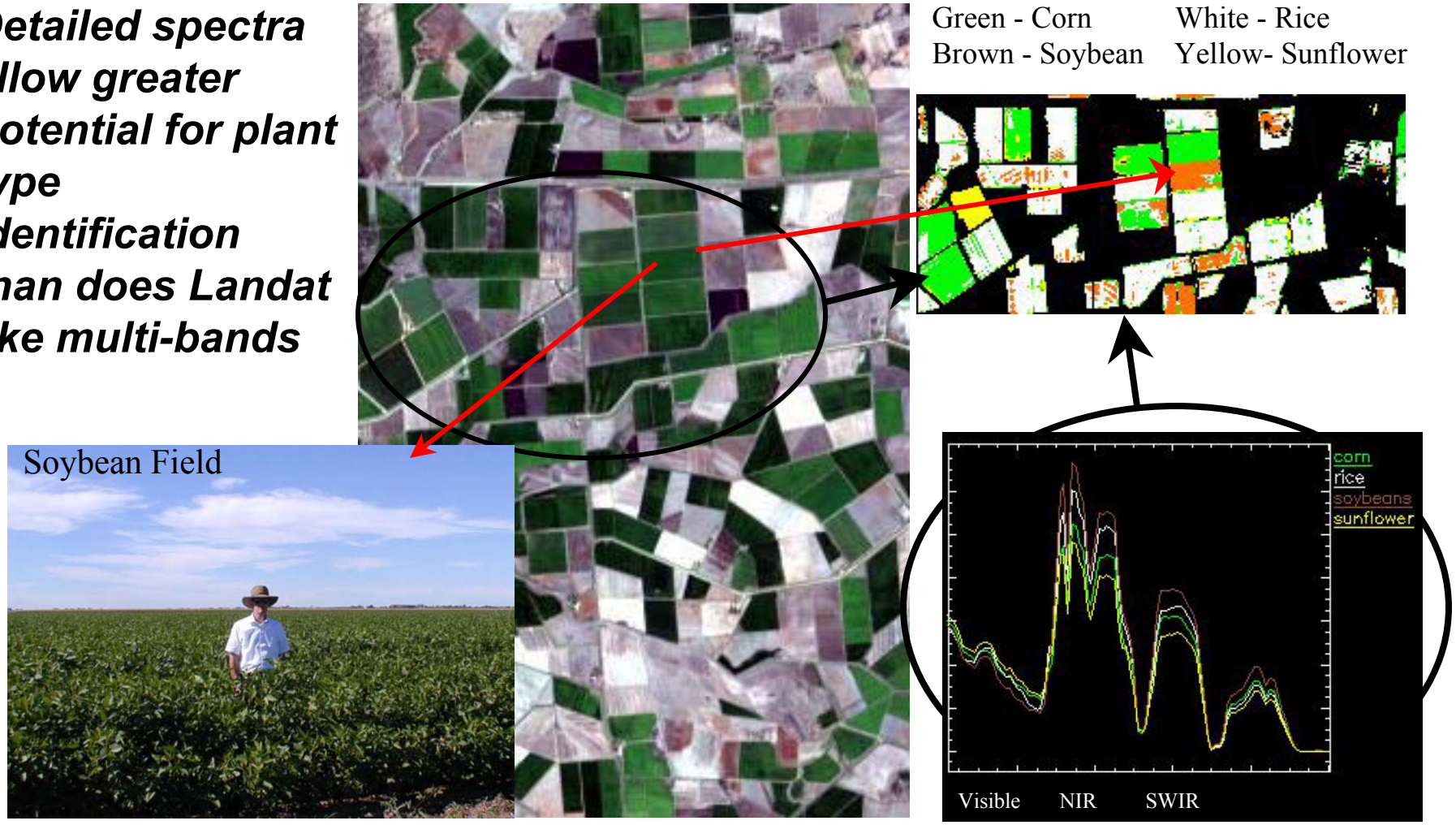


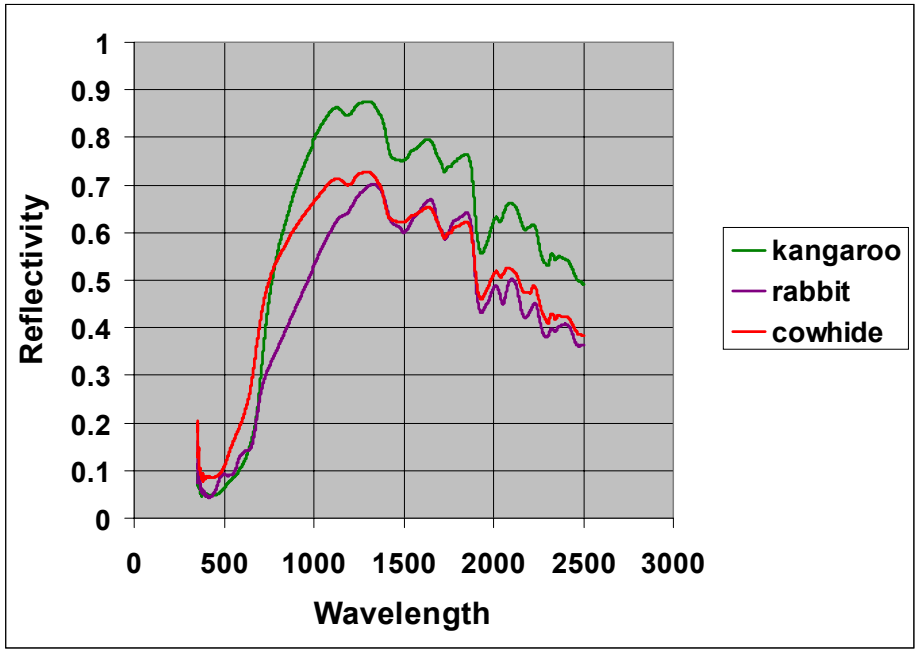
RR Valley

Arizaro/Barreal Blanco

EO-1 Hyperion Distinguishes Crop Types

Detailed spectra allow greater potential for plant type identification than does Landat like multi-bands



Ground Data Teams

Long Term Directions