HysplRI Science and Applications Workshop

Objectives, Overview and Update

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HyspIRI

Key Science and Science Applications

Climate: Ecosystem biochemistry, condition & feedback; spectral albedo; carbon/dust on snow/ice; biomass burning; evapotranspiration

Ecosystems: *Global* biodiversity, plant functional types, physiological condition, and biochemistry including agricultural lands

Fires: Fuel status; fire frequency, severity, emissions, and patterns of recovery *globally*

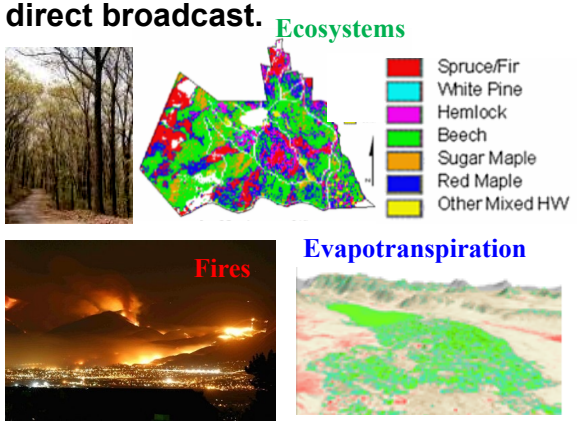
Coral reef and coastal habitats: *Global* composition and status

Volcanoes: Eruptions, emissions, regional and *global* impact

Geology and resources: *Global* distributions of surface mineral resources and improved understanding of geology and related hazards

Mission Urgency

The HyspIRI science and applications objectives are critical today and uniquely addressed by the combined imaging spectroscopy, thermal infrared measurements, and IPM direct broadcast.



Measurement

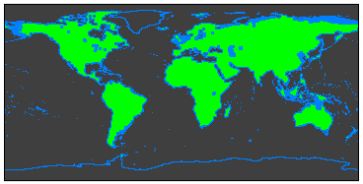
Imaging Spectrometer (VSWIR)

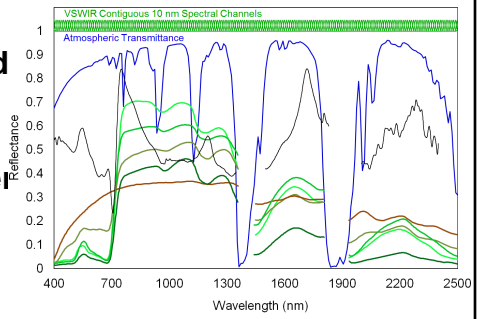
- **380 to 2500nm in ≤10nm band**
- **60 m spatial sampling***
- **19 days revisit***
- **Global land and shallow water**

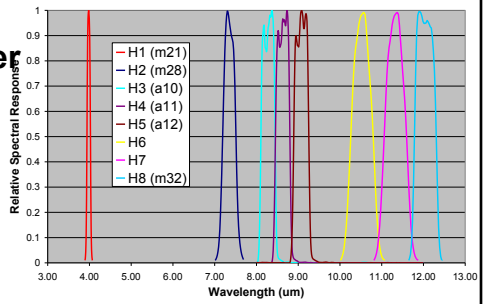
Thermal Infrared (TIR):

- **8 bands between 4-12 µm**
- **60 m spatial sampling**
- **5 days revisit; day/night**
- **Global land and shallow water**

IPM-Low Latency data subsets







Mission Concept Status

Level 1 Measurement Requirements: Vetted by community and stable

Payload: VSWIR Imaging Spectrometer, **TIR** multi-spectral radiometer, and **Intelligent Payload Module (IPM)**

Full Mission original option: Mature

Separate Small Mission option: Pegasus-based solutions identified and studied

***SLI Support:** HyspIRI VSWIR evolving to 30m at 185km swath

ECOSTRESS TIR: Selected EVI for ISS

VSWIR Dyson Option: Technology/Science ISS Demonstration

Summary: The HyspIRI mission measurement requirements and baseline instruments approach are mature and stable with good heritage, low risk and modest cost. Now exploring a range of instrument and data options to save cost and provide near-term products, per guidance letter.

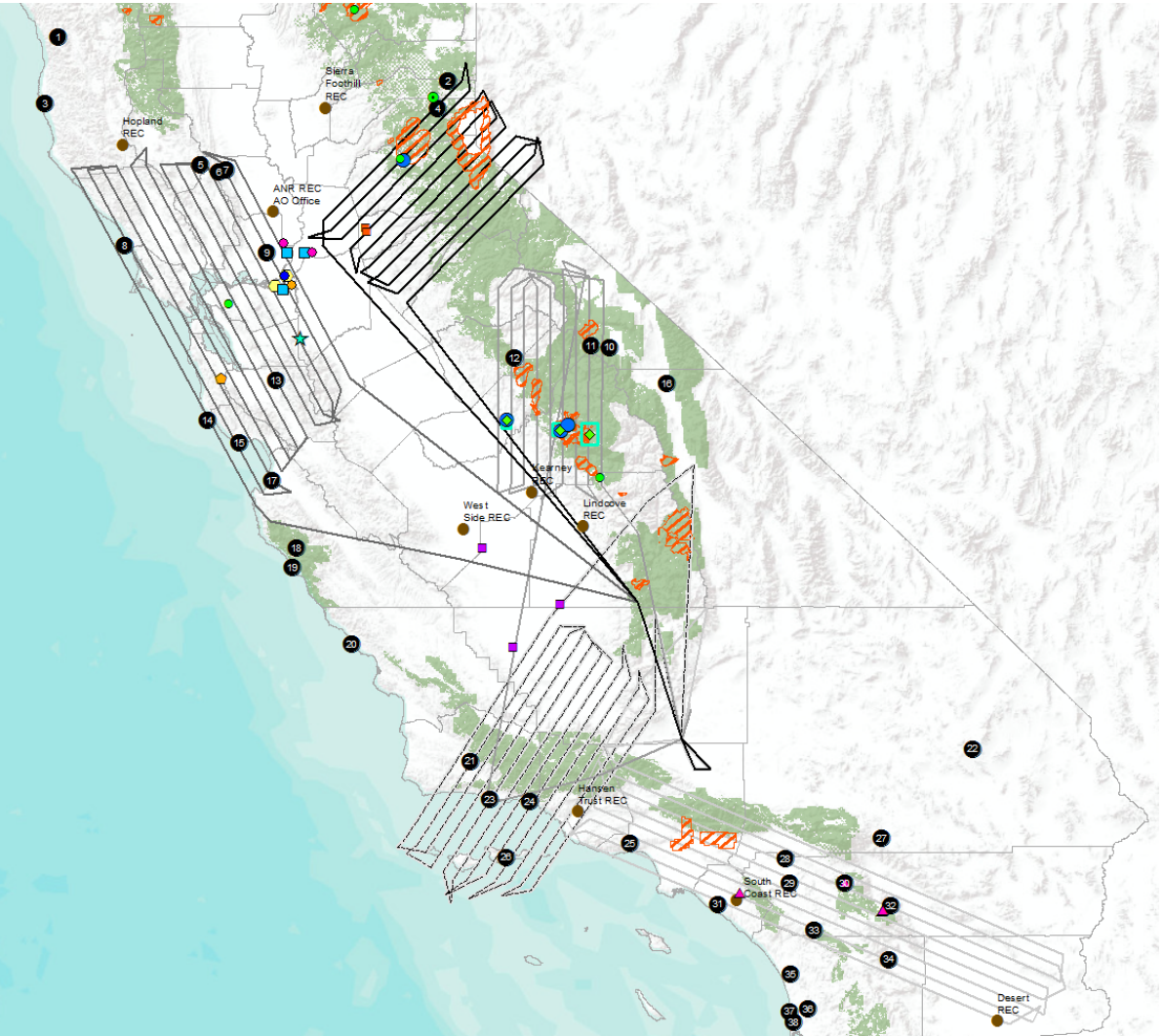
Workshop Objectives

- Review Advances of Past Year
  - Comprehensive Report on past 6 years of HyspIRI pre-formulation activities
  - Smallsat studies for VSWIR and TIR
  - Preparatory Airborne Mission Science and L2 Product Development
  - Other Science (e.g., Dimensions of Biodiversity, COMEX, HASG, Snow/Ice)
  - ECOSTRESS
  - VSWIR Spectrometer on Space Station Study
  - Intelligent Payload Module
  - Results from AVIRIS-ng, HyTES, PRISM
- Plan for 2015
- Consider preparations for next Decadal Survey

HysplRI Airborne Preparatory Mission

3 Seasonal Flights Over 5 Boxes/Soda Straw in 2013 and 2014 To Simulate HysplRI Satellite Imagery

ER-2 Altitude	AVIRIS Resolution	AVIRIS Swath	MASTER Resolution	MASTER Swath
65,000 ft	20 m	12 km	50 m	35 km



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2014 Guidance Memo

1. Continue to build broad community understanding and support through workshops and data symposia

2. Complete the science white paper specifying the value of the individual science measurements and the potential science return of individual instruments on separate platforms, including the ISS, if appropriate

3. Use the planned airborne activities and resulting data to generate HyspIRI-like Level 2 data products (e.g., large-area 60m data sets providing surface reflectance, surface temperature and surface emissivity) to define the instrument capabilities and explore high-volume data management issues related to the HyspIRI VSWIR and TIR instruments

4. Carry out instrument mission trade studies, including smallsat and ISS opportunities, to provide lower cost and more adaptable instrument and/or mission approaches

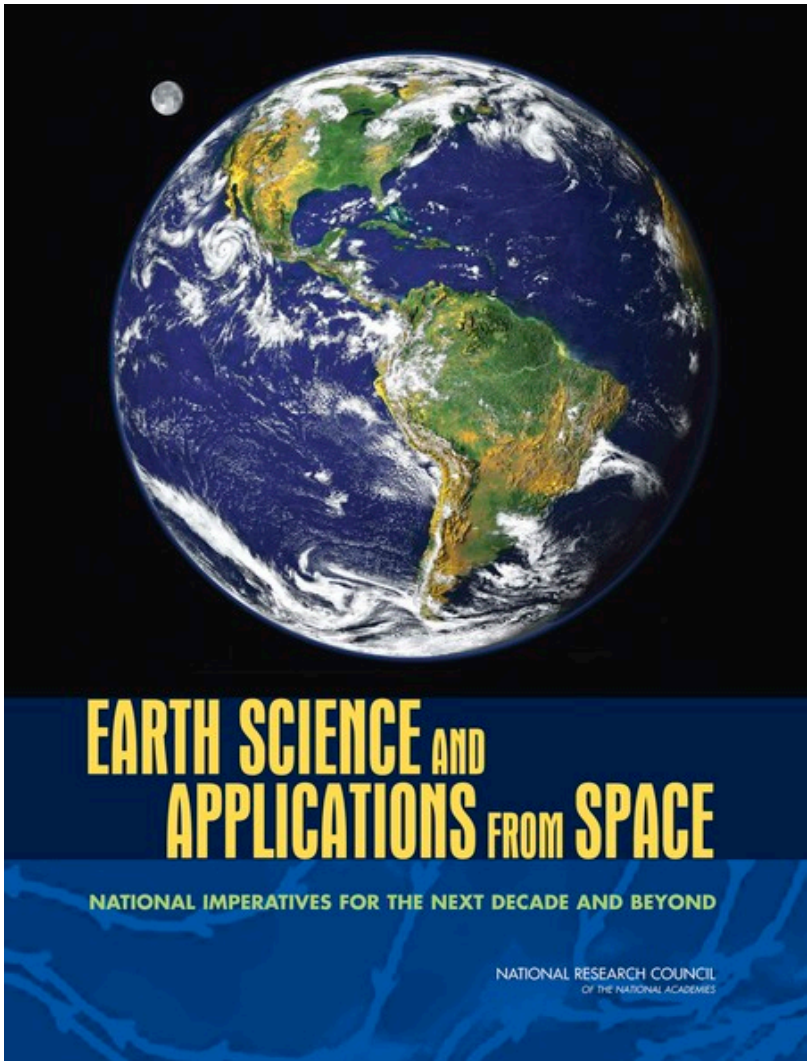
5. Explore options to ensure the HyspIRI VSWIR and TIR instruments meet the Sustainable Land Imaging measurement requirement, including compatibility with heritage data product resolution

6. Engage potential international and domestic partners in opportunities to lower the cost of a potential mission while maintaining Level 1mission requirements

7. Support the Earth Systematic Missions (ESM) Systems Engineering Working Group (SEWG) studies on TRL definition and instrument cost studies

8. Complete comprehensive development report of the HyspIRI mission study activities

The Next Decadal Survey



Thank You