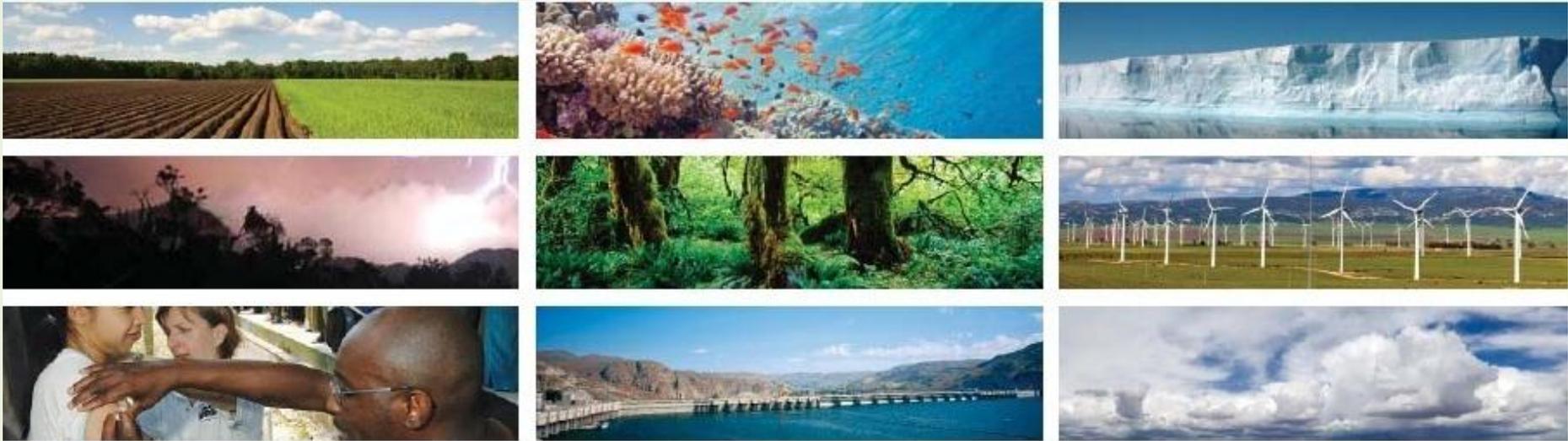


NASA Science Mission Directorate Earth Science Division



Lawrence Friedl
Director, Applied Sciences Program
ESIP Federation • Partnership Panel
2012 Winter Meeting



NASA Earth Science: Applied Sciences Program

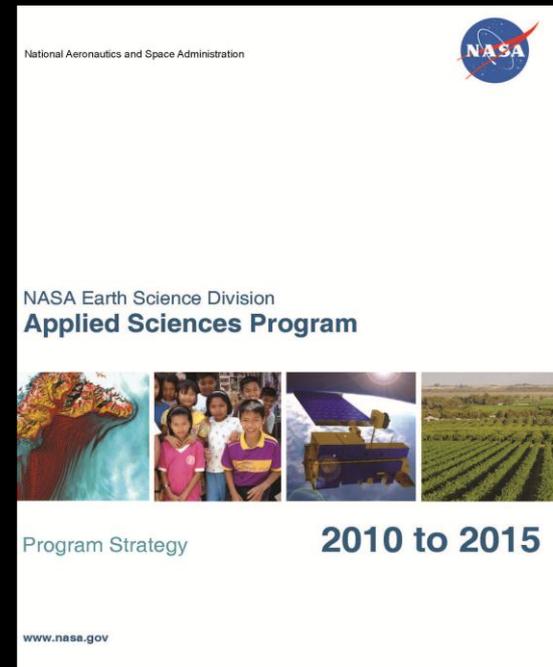


Discovering and demonstrating innovative and practical applications of Earth Science

The Applied Sciences Program funds projects that enable uses of Earth observations and NASA Earth science in organizations' policy, business, and management decisions.

Applications

Hands-on projects and studies to prove-out and demonstrate applications ideas targeted at integrating Earth observations in specific decision-making activities



<http://AppliedSciences.NASA.gov>

Capacity Building

Projects and activities to build skills, users, and capabilities in the US and developing countries on how to access and apply environmental satellite data to benefit society

NASA Earth Science: Applied Sciences Program



Goal 1: Enhance Applications Research

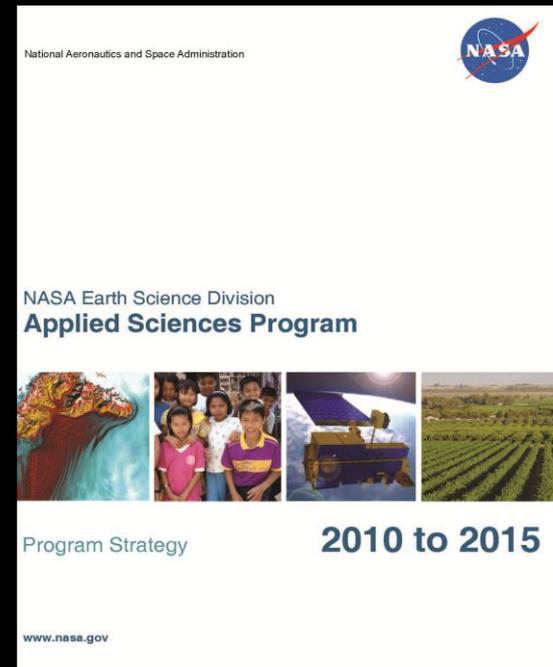
Identify priority needs, conduct applied research to generate innovative applications, and support projects that demonstrate uses of NASA Earth science.

Goal 2: Increase Collaboration

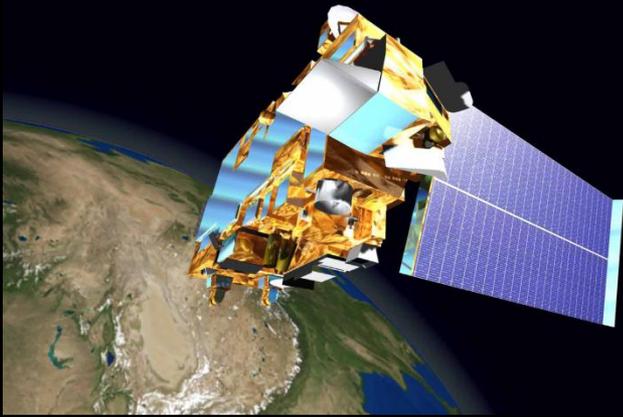
Pursue partnerships to leverage resources and risks and extend the program's reach and impact.

Goal 3: Accelerate Applications

Enable identification of applications early in satellite mission lifecycle and facilitate effective ways to integrate end-user needs into satellite mission planning.



<http://AppliedSciences.NASA.gov>



General Types of Projects

Integrate and transition Earth observations into an existing decision support system of an organization

Create a new decision support system (using Earth obs) and transition to an organization for on-going operations



New: ***Feasibility Studies-to-Decision Support Projects***

Objective:

Identify and prioritize high-reward applications ideas and committed partners

Year 1 Fund a set of Feasibility Studies; partner funding ideal but optional

Years 2-4 Select a subset of Projects to continue; increased funds from partner

Project	Stage	Activity	NASA Share	Partner Share
Year 1	Feasibility	Prove out application potential	100%	Optional
Year 2	Decision Support	Develop application	~80-85%	~15-20%
Year 3	Decision Support	Continue development	~60-70%	~30-40%
Year 4	Decision Support	Complete application and transition	~30-40%	~60-70%

Partner is responsible for costs to run its decision support system in subsequent years. If additional activities are needed to assist in the sustained use of the Earth obs., NASA will support additional efforts with in-kind support as possible.



Future Satellite Missions: Study on Latency

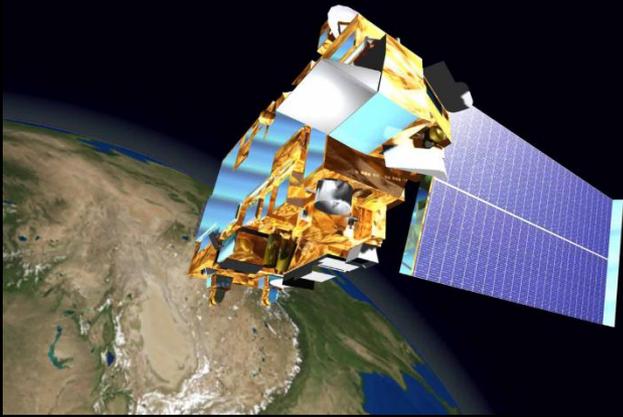
Issue: Data latency is a major factor in the utility of data products for applied and operational uses and some scientific investigations. Many missions have data products that may be extremely valuable if they can reach the applied communities quickly after collection.

Study:

The study will support the Earth Science community to assess options for meeting latency desires on the missions and inform trade-off decisions regarding mission costs and design.

Latency & User Needs. Assess the probable data latency targets for the suite of NASA ESD planned missions

Latency & Technical Capabilities. Examine possible methods and mechanisms for delivering data that meets data latency targets

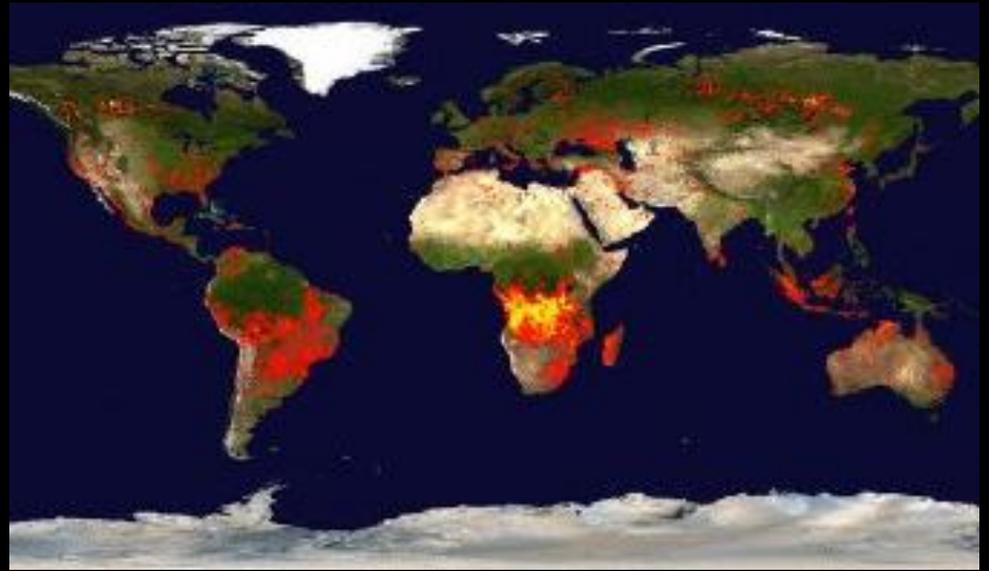


Partnerships

Alignment of incentives & interests

Organizational culture

Nature of the relationship



Opportunity for a
Partnership within the
Earth Science Community

Customer Service Standards and Expectations

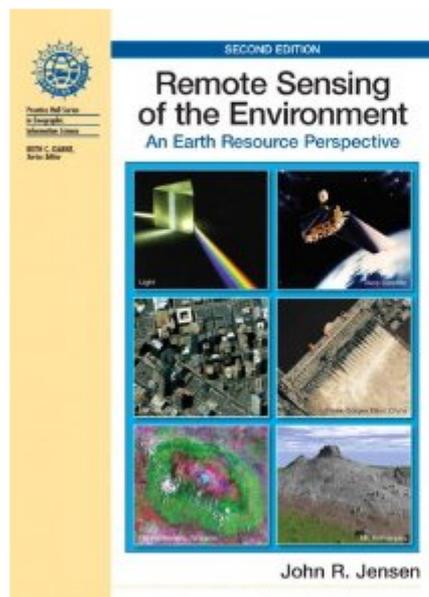
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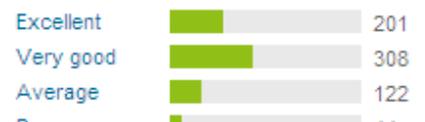
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- "Cable car" (13)
- "View lounge" (5)
- "Very nice" (12)
- "Great location" (11)

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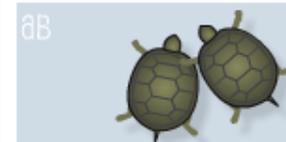
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Group on Earth Observations



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Group on Earth Observations added 104 new photos to the album GEO VI Plenary ~ Washington, DC ~ November 2009.



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On July 28, 2011, Dominica's Matthieu Dam was breached, damaging

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Customer Service Standards and Expectations

Do we follow them?

Do we meet them?

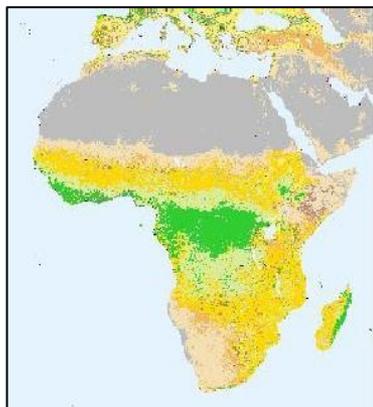
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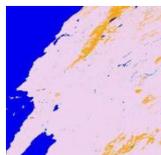


Land Cover Type Yearly L3 Global 1km SIN Grid

[Terra-MODIS](#)☆☆☆☆☆ [\(13,769 user reviews\)](#)**Level 3.**

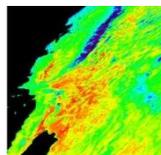
Ships from Land Processes DAAC

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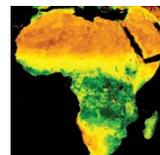
Burned Area

☆☆☆☆☆



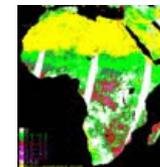
Emissivity (LST)

☆☆☆☆☆



Vegetation (NDVI)

☆☆☆☆☆



Leaf Area Index (FPAR)

☆☆☆☆☆

Editorial Reviews

MODIS Science Team

The MODIS Land Cover Type product contains multiple classification schemes, which describe land cover properties derived from observations spanning a year's input of Terra data. The primary land cover scheme identifies 17 land cover classes defined by the International Geosphere Biosphere

Programme (IGBP), which includes 11 natural vegetation classes, 3 developed and mosaicked land classes, and three non-vegetated land classes.

The MODIS Terra Land Cover Type Yearly L3 Global 1 km SIN Grid product incorporates five different land cover classification schemes, derived through a supervised decision-tree classification method.

[See all Editorial Reviews](#)

Product Details

Product code: [MOD12Q1](#)

Platform: [Terra](#)

Raster Type: Tile

Resolution: 1000m

Temporal Granularity: Annual

Earth Science Best Sellers Rank: #142

Customer Reviews

Average Customer Review:  (278 customer reviews)

Most Helpful Customer Reviews

78 of 81 people found the following review helpful:

Latest product is based on MODIS v.5; found that the urban classification is underrepresented but otherwise a great product.

› [See all 278 customer reviews...](#)

Users, Behaviors, Preferences

Where and how
do people get
their data and
information?

What are
demographics
and user
characteristics?

attitudes

satisfaction

perceptions

factors

technographics

aversion to new
information
sources

familiarity with
Earth observations

user traits

existing value
chains

consumer information

disposition to
technology

expected level
of service and
support

psychographics

lifestyle

trusted sources

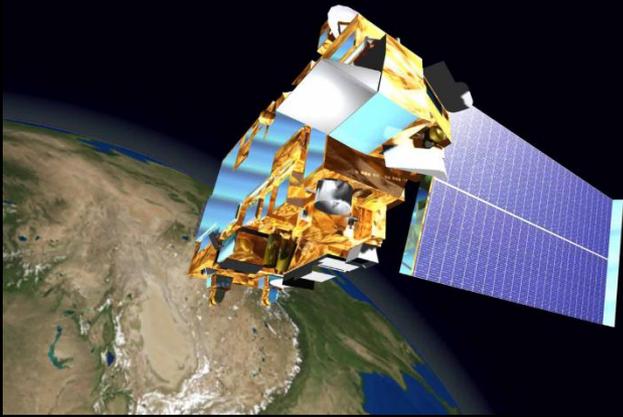
preferences

Challenges to the ESIP Federation:

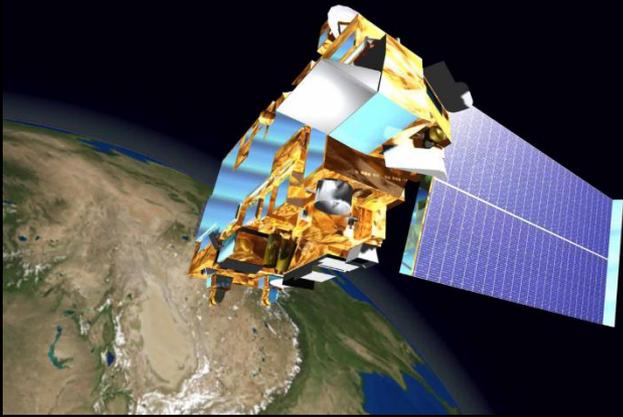
Self-assessment within Earth science
and applications community on
customer service standards

Lead a collaboration on User
Characterization





Back-up Materials



Partnerships & Collaborations:

Applications Perspective

*Partnership Opportunity in
Earth Science Community*



Applied Sciences Program Applications Readiness Levels

ARLs

9. Approved, Operational Deployment and Use in Decision Making.
8. Application Completed and Qualified.
7. Application Prototype in Partners' Decision Making.
6. Demonstrate in Relevant Environment.
5. Validation in Relevant Environment.
4. Initial Integration and Verification (in Laboratory Environment).
3. Proof of Application Concept.
2. Application Concept .
1. Basic Research.

*Partner
Demonstration
and Transition*

*Development, Test,
and Validation*

*Discovery and
Feasibility*



GEO and GEOSS

The vision for the Global Earth Observation System-of-System (GEOSS) is to realize a future wherein decisions and actions for the benefit of humankind are informed by coordinated, comprehensive and sustained Earth observations and information.



Global Earth Observation System of Systems

Is GEOSS this vision or is it a means to a vision?

A physical entity?

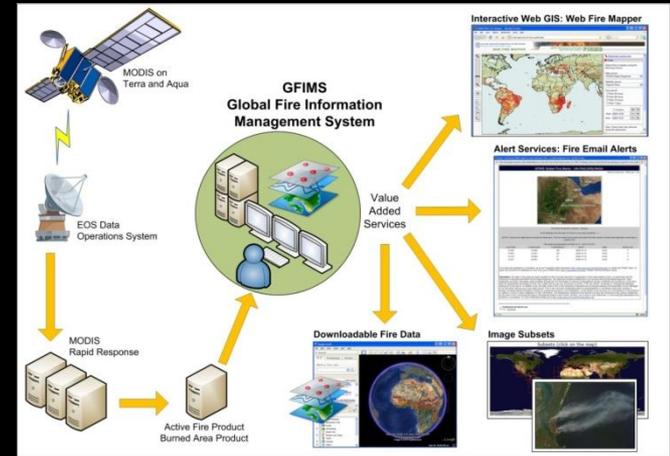
A concept to motivate an enabling infrastructure of technical standards, policies, and international principles?

NASA Earth Science: Applied Sciences Program

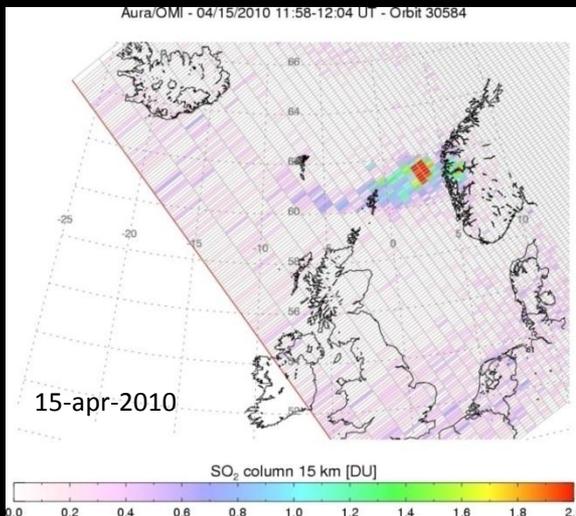


Global active fire locations from MODIS Fire/Thermal Anomalies product are processed in rapid response. SMS/text messages sent out to emails & cell phones with key info (fire coordinates, time, distance to reference point). For example, park managers use alerts to reduce illegal clearing and respond to wildfires.

August 2010: Transitioned to UN FAO for on-going operational support.



System Configuration



OMI SO₂ – Iceland Volcano

Projects developed and demonstrated reliable detection of volcanic ash clouds using Aura/OMI SO₂ data and other NASA Earth science satellite sensors. Proven utility led to its operational use by NOAA to formulate Volcanic Ash Advisories. Products used extensively in Iceland volcano eruption in April 2010.

February 2011: The NASA satellite data were used to produce volcanic ash advisories for aviators across the Gulf of Mexico due to the Feb.1 eruption of the Popocatepetl volcano in Mexico.