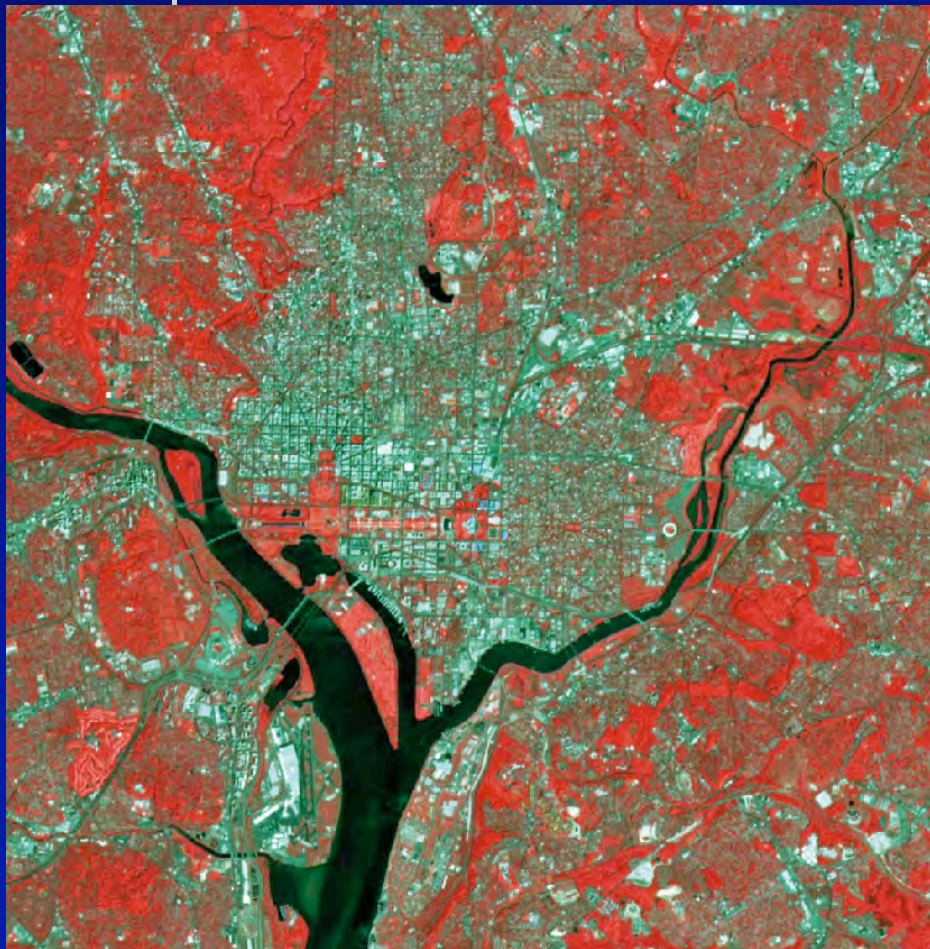




Future of Land Imaging – PUBLIC WORKSHOP - July 26, 2006



FUTURE OF LAND IMAGING



Washington, DC

PUBLIC WORKSHOP: U.S. Land Imaging Needs & Long-Term Continuity

July 26, 2006

Future of Land Imaging
Interagency Working Group
(FLI-IWG)

U.S. Group on Earth Observations
Committee on Environment and Natural Resources
National Science and Technology Council
Executive Office of the President



POPULATION IS GROWING

.... LAND IS NOT GROWING.....

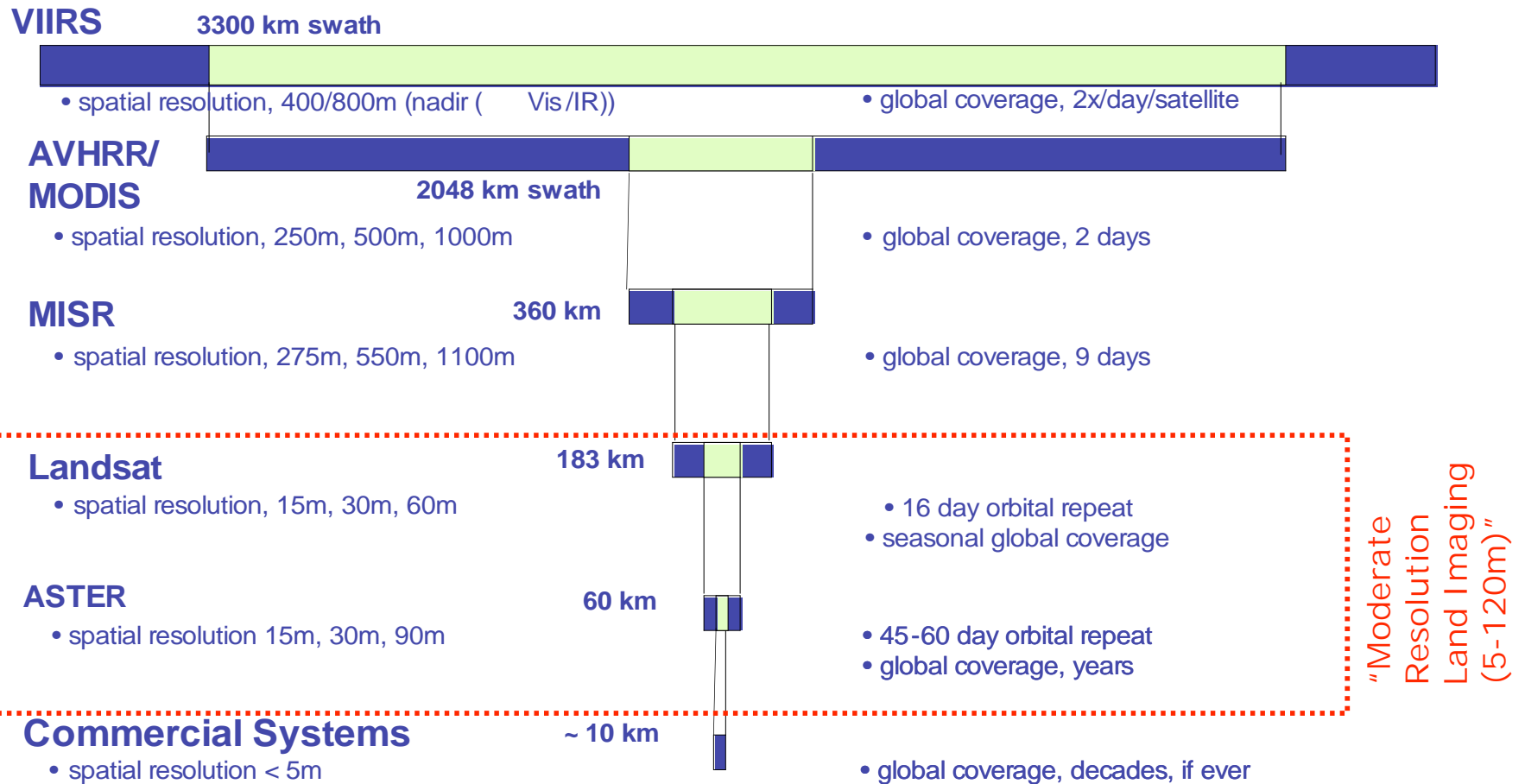
...AND THE LAND IS CHANGING

Thanks, Kass.



TOOLS FOR OBSERVING THE LAND

Resolution and coverage for different needs...





Moderate Resolution Imagery is Important because ...

Observations from space of Earth's geology, hydrology, climatology, ecology, oceanography, and other natural systems, as well as human structures:



Directly Benefits Society

- Agriculture and Forestry
- Land Use Planning and Management
- Water Resource Management
- Emergency / Disaster Management
- Coastal Zone Management
- Ecological Forecasting
- National / Homeland Security support
- Transportation Management and Infrastructure Planning

26-July-2006



BACKGROUND

Land Imaging Policy History

- 1972 U.S. launched first Landsat (ERTS-A, July 23, 1972)
- 1979 attempted, but failed, to commercialize Landsat
- 1992 Land Remote Sensing Policy Act
 - Suspended commercialization attempts and authorized Landsat 7
 - Adopted the Landsat Data Availability Policy
 - International Open Skies Treaty
 - Non-Discriminatory User Access
 - Provided for Commercial Licensing, Advanced Technology, and Applications Research Programs
- 2003 attempted, but failed, to establish a Public-Private Partnership for Landsat Data Continuity



BACKGROUND

OSTP Memoranda

- In August 2004, OSTP modified Landsat Strategy
 - Validated the importance of Landsat-type Imagery to U.S. economic, environmental, and national security interests
 - Directed Landsat to be a sustained operational program
 - Placed a Landsat-type instrument on the National Polar Operational Environmental Satellite System (NPOESS)
- In December 2005, OSTP revised the Strategy
 - Removed Landsat from NPOESS due to design complexities
 - Authorized procurement Landsat “free-flyer” satellite (LDCM)
 - Initiated a study to identify Future Needs and Options for U.S. Land Imaging through the Future of Land Imaging Interagency Working Group (FLI IWG)



EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF SCIENCE AND TECHNOLOGY POLICY
WASHINGTON, D.C. 20502

December 23, 2005

MEMORANDUM FOR THE SECRETARY OF STATE
THE SECRETARY OF DEFENSE
THE SECRETARY OF THE INTERIOR

Future of Land imaging

Ensuring long-term continuity

It remains the goal of the U.S. Government to transition the Landsat program from a series of independently planned missions to a sustained operational program funded and managed by a U.S. Government operational agency or agencies, international consortium, and/or commercial partnership. Concurrent with the actions cited above, the National Science and Technology Council, in coordination with NASA, DOI/USGS, and other agencies and EOP offices as appropriate, will lead an effort to develop a long-term plan to achieve technical, financial, and managerial stability for operational land imaging in accord with the goals and objectives of the U.S. Integrated Earth Observation System.

FROM: JOHN H. MARBURGER, III
DIRECTOR

SUBJECT: Landsat Data Continuity Strategy Adjustment

A handwritten signature in black ink, appearing to read "John H. Marburger, III".

26-July-2006



THE NSTC STUDY PROCESS

Scope and Charter of the FLI-IWG



- Led by the National Science and Technology Council, with representatives from multiple Federal agencies
- Conduct Fact-Finding, Analysis, and Needs Assessment
 - Why does the U.S. need moderate-resolution land imagery?
 - What are the key societal benefits of moderate resolution land imaging?
 - What are the options for acquiring these capabilities or data?
 - How should U.S. land imaging be managed and governed?
- Produce “a long-term plan... in accord with the goals and objectives of the U.S. Integrated Earth Observation System.”
- Final Report and recommendations in early 2007



WHAT IS REQUIRED FOR OPERATIONAL LAND IMAGING DATA?

- The required characteristics of satellite imaging:
 - Accurate spectral and spatial information
 - Precise geo-referenced data for mapping and monitoring
 - Scalable geospatial information across global, hemispheric, continental, regional, and local geographies
- Data calibrated to a national standard over time for measuring real physical changes to the Earth
- Frequent synoptic coverage of the entire Earth



WHAT IS REQUIRED..... ? The starting point.....(non-negotiables?)

- Continuity of the U.S. Land Data Record shall be maintained
- ... but Landsat will not constrain future U.S. Land Imaging capabilities and designs
- Alternatives should meet the Landsat Data Continuity Standard while addressing additional U.S. needs
 - Greater spatial or spectral resolution
 - Greater frequency of coverage and “steerable” imaging
 - Consider Multi-purpose Imaging Systems (Radar, Radar hybrids, Hyperspectral)



THE NSTC STUDY PROCESS

Needs Analysis – What are the Societal Benefits ?

DATA REQUIREMENTS TIED TO SOCIETAL BENEFITS

- The FLI-IWG will assess the societal benefits of Land Imaging and how they can best be achieved
- Societal Benefits are a core feature of the International Global Earth Observing System of Systems and the U.S. Integrated Earth Observing System
 - Weather
 - Natural Disasters
 - Ocean Resources
 - Climate Variability and Change
 - Agriculture and Forestry
 - Human Health and Well-Being
 - Ecological Forecasting
 - Water Resource Management
 - Energy Resource Management
- There are other Societal Benefits not captured by GEOSS and IEOS that are important to meeting U.S. economic and national security interests
 - Land Use Planning and Management
 - Public Lands Conservation / Management
 - National Security Operations*
 - Transportation Planning / Management
 - Property Valuation
 - Flood Plain Assessment
 - Foreign Agricultural Assessment
 - Infrastructure Planning / Management
- The Vitality and Competitiveness of the U.S. Aerospace Industry is also a Primary Consideration

* Separate classified annex will be prepared to address defense and IC needs



THE NSTC STUDY PROCESS

Options for Meeting U.S. Land Imaging Needs

- What will be the best long-term solution(s) for meeting U.S. operational land imaging needs?
 - Solutions may vary over time as technical, fiscal, and political landscape changes.
 - Solutions should be flexible and focus on providing national needs for land imaging data.



THE NSTC STUDY PROCESS

Options for Meeting U.S. Land Imaging Needs

Data acquisition solutions to be considered.....



- Government-Owned Satellite

The U.S. Government owns and operates a U.S. satellite and maintains an archive and distribution capability.

- Public-Private Partnership

The U.S. Government shares responsibility with the private sector. Costs are shared in proportion to the value of the data.



- International Partnership

The U.S. Government shares capabilities and data with foreign partners.

- Commercial Program

The U.S. acquires all data from the private sector which retains rights to U.S. Land Imaging data.



- A Combination of these Options

A primary solution may be complemented or supplemented by a secondary solution.



THE NSTC STUDY PROCESS

Options for Meeting U.S. Land Imaging Needs

- What will be the best long-term management and governance structure for meeting U.S. operational land imaging needs?



THE NSTC STUDY PROCESS

Governance Options

Governance and management structures to be considered.....



- Single Agency

A single U.S. Federal Agency is responsible for all aspects of Land Imaging.



- Multiple Agency

Two or more Federal Agencies are responsible for all aspects of Land Imaging.

- Integrated Program Office

An IPO reporting to multiple Federal Agencies is responsible for all aspects of Land Imaging.

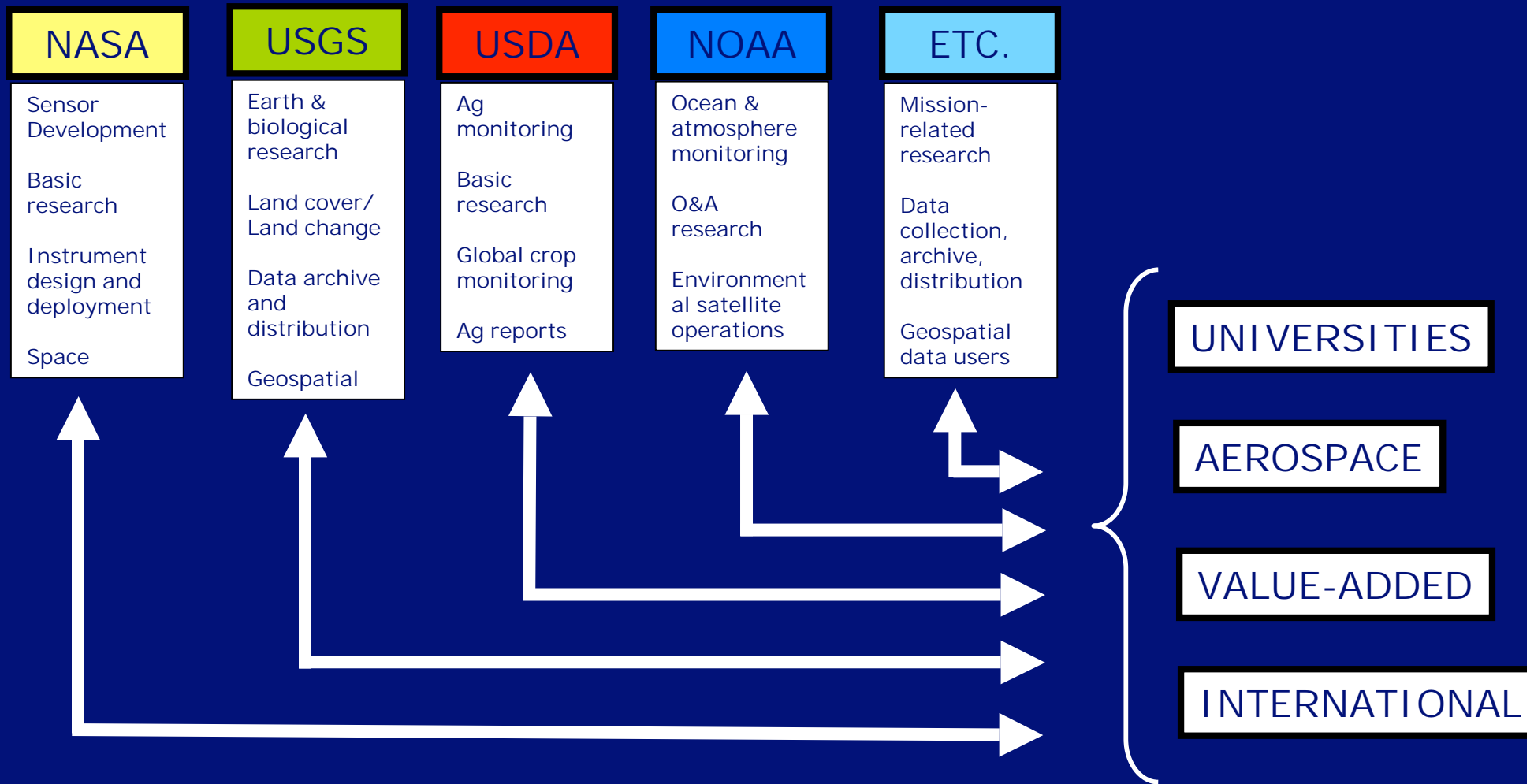
- U.S. National Commission

A U.S. National Commission manages the U.S. Land Imaging Program, assigning responsibility for Land Imaging.

- No U.S. Government Manager

The U.S. acquires all Land Imaging data commercially or from international sources. No U.S. Federal Agency is assigned responsibility.

Land Imaging/Landsat: Current situation is ad hoc





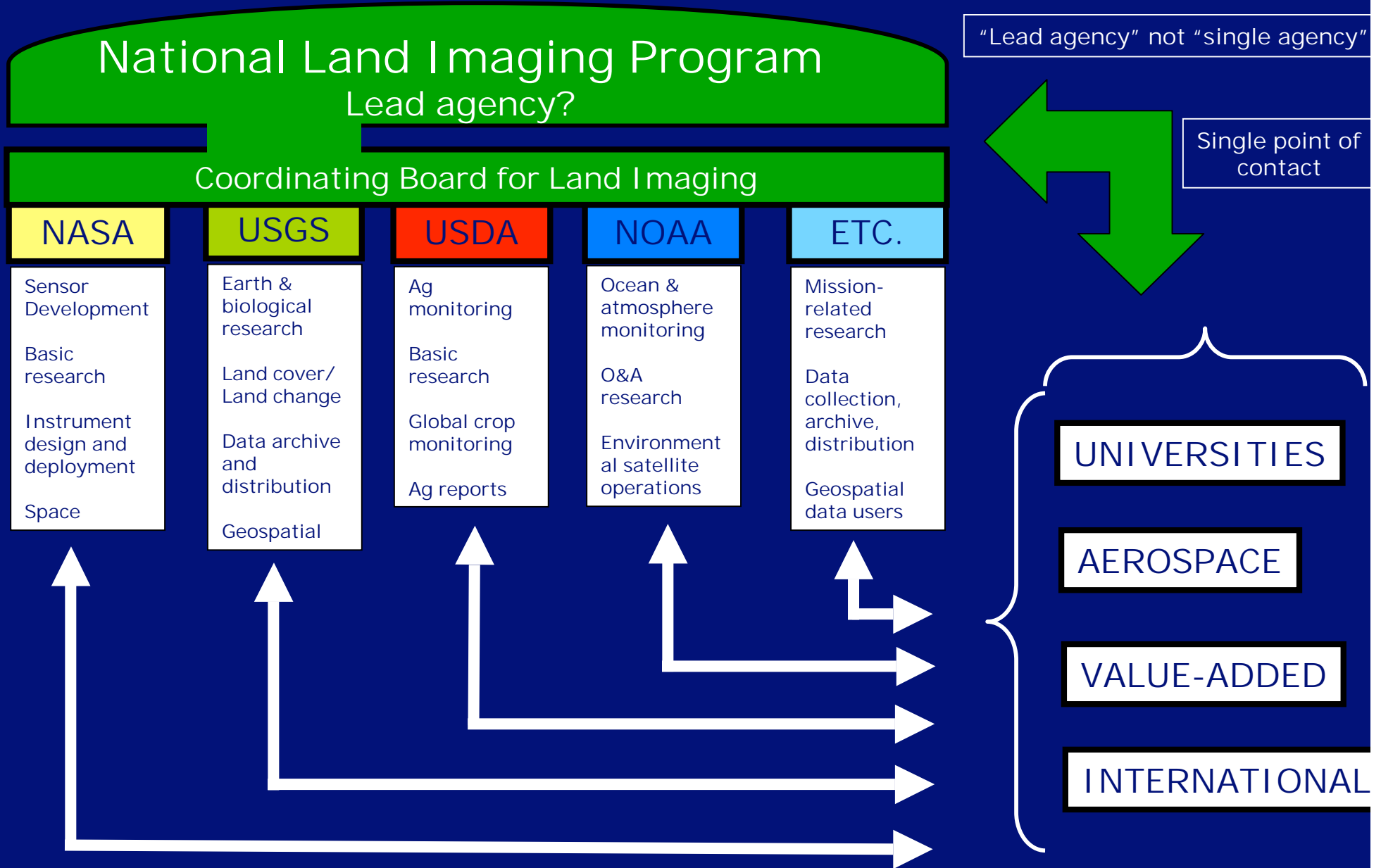
National Land Imaging Functions:

WHAT WE NEED (BUT DON'T HAVE):

- Focused Federal leadership for U.S. land imaging community
- Unified planning and operations responsibility
- Coordination responsibility for
 - determining land imaging needs
 - data acquisition and distribution, QC
 - technology and system acquisition
- Single point of contact for non-government users and contractors
- Single point of contact for international partnerships and negotiation
- Point of accountability for performance
- Flexibility in leadership as technical, fiscal, and political variables change

The land imaging enterprise is too large and complex for "single agency" to do it all. But we need a lead agency.

With a National Land Imaging Program....





National Land Imaging Program Functions:

WHAT NLIP WOULD PROVIDE:

- Focused Federal leadership for U.S. land imaging community
- Unified planning and operations responsibility
- Coordination responsibility for
 - determining land imaging needs
 - data acquisition and distribution, QC
 - technology and system acquisition
- Single point of contact for non-government users and contractors
- Single point of contact for international partnerships and negotiation
- Point of accountability for performance
- Flexibility in leadership as technical, fiscal, and political variables change



NLIP Context: other organizations and activities

- U.S. Group on Earth Observations*
- Group on Earth Observations (GEO) – Global Earth Observation System of Systems (GEOSS)*
- Federal Geospatial Data Committee (FGDC) (infrastructure, standards)*
- Geospatial One-Stop – geodata.gov (access)*
- International advances and capabilities
- Federal agency programs and projects
- Private sector land imaging activities



HOW COMMUNITY CAN HELP DETERMINE THE FUTURE OF LAND IMAGING

View Future of Land Imaging information at
<http://www.landimaging.gov>

E-mail views and opinions to
survey@landimaging.gov

- Please help us show the value of Landsat land imaging by sending us your:
 - Anecdotes of land imaging value
 - Qualitative information about value of land image in your sector
 - Quantitative metrics: studies and analyses of value
 - Understanding of trends on the horizon: what visions will emerge?



HOW COMMUNITY CAN BECOME INVOLVED

.....some questions:

- What are the future societal benefits of moderate resolution imagery.
- What is your vision of the future of moderate resolution imagery?
 - Who provides it?
 - What are the data policies?
 - What are the technologies?
- If you could implement your vision for the future of moderate resolution land imagery, if you were able to realize what you believe to be the best governance/technology/policy combination for moderate resolution imagery.
- What would be different in the future and what would be the benefits?