

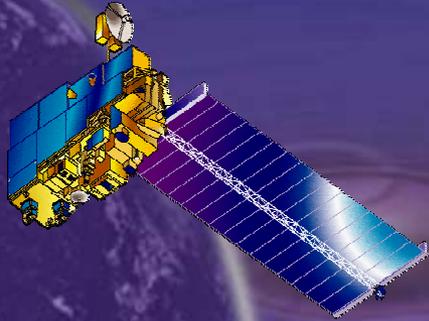


Earth Science Applications

October 2002



The NASA Vision



To improve life here

To extend life to there

To find life beyond.

The NASA Mission

To understand and protect our home planet

To explore the universe and search for life

To inspire the next generation of explorers

...as only NASA can.





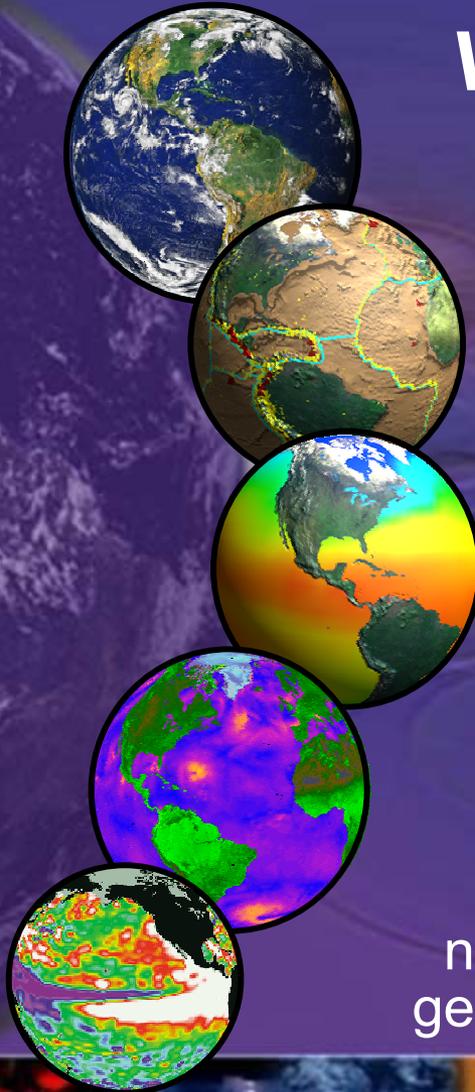
Earth Science Enterprise

Vision

Enable effective applications of Earth science information that benefit the quality of life on Earth.

Mission

Develop a scientific understanding of the Earth system and its response to natural and human-induced changes to enable improved prediction of climate, weather, and natural hazards for present and future generations.





NASA's Earth Science Enterprise Applications Program

Mission

Expand and accelerate the realization of societal and economic benefits from Earth science, information, and technology.

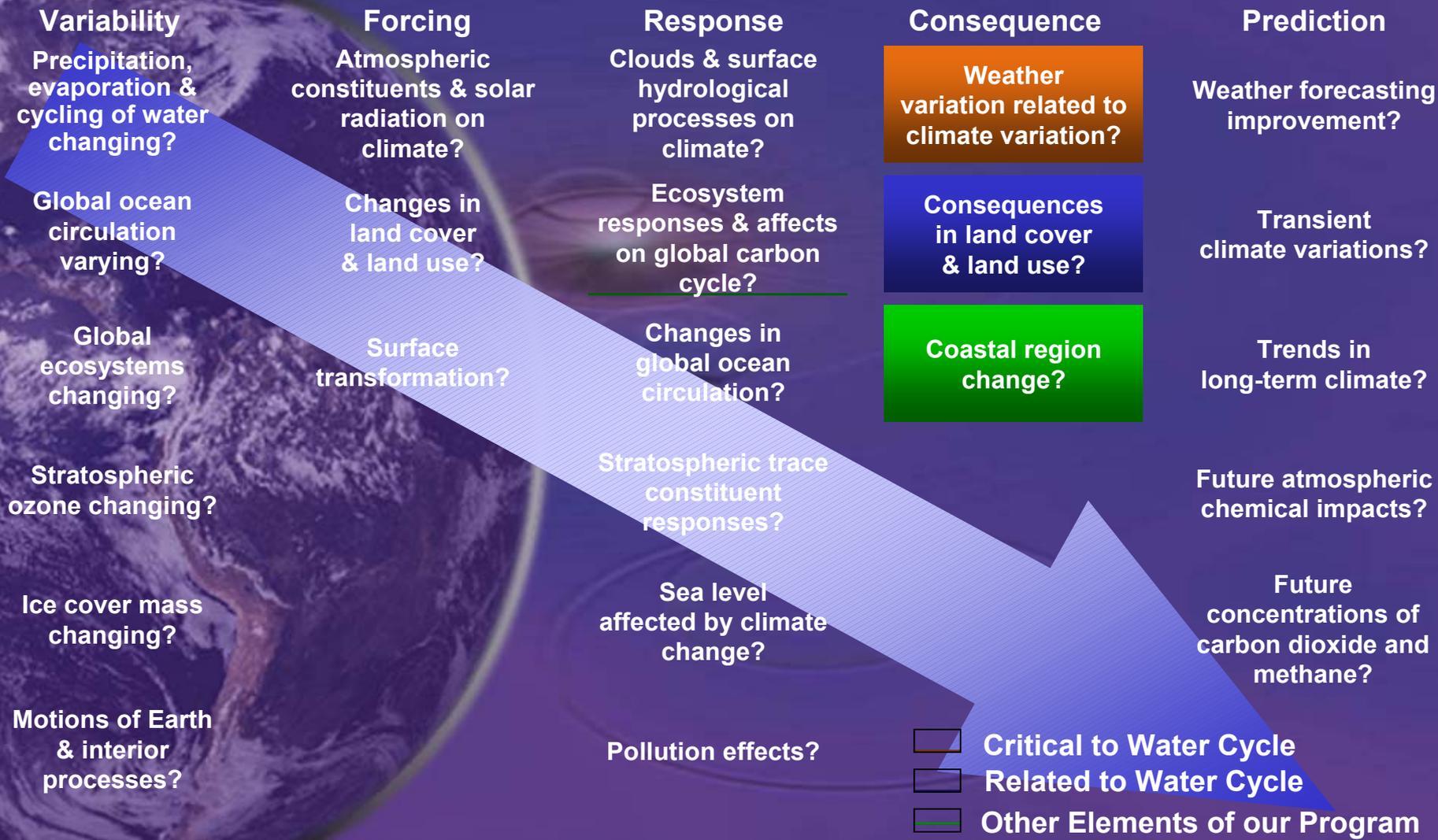




Mission

To optimize benefits from NASA's Earth Science investments through systems engineering to advance decision support tools that serve the Nation.



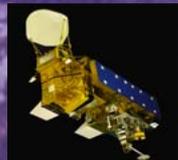




Precipitation, evaporation & cycling of water changing?

Variability

Missions



Aqua



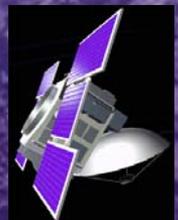
Jason-1



CALIPSO



EO-1



Cloudsat



QuikScat

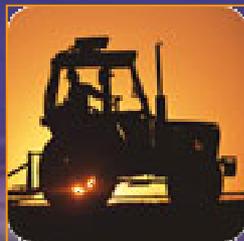


ICESat



Terra

Applications



Agricultural Competitiveness



Air Quality



Aviation Safety



Carbon Management



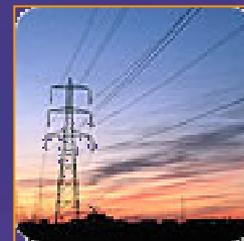
Coastal Management



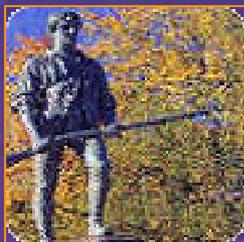
Disaster Preparedness



Community Growth



Energy Forecasting



Homeland Security



Invasive Species



Public Health



Water Management

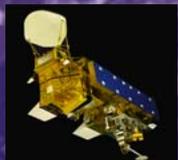




Global ocean circulation varying?

Variability

Missions



Aqua



Jason-1



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QuikScat



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Energy Forecasting

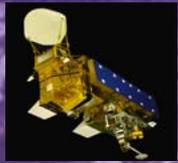




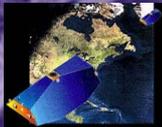
Global Ecosystems Changing?

Variability

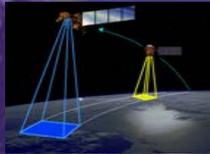
Missions



Aqua



GRACE



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Aura



ICESat



QuikScat



CALIPSO



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Terra



Cloudsat



Landsat 7

Applications



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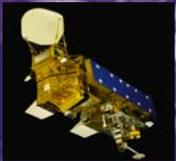




Stratospheric Ozone Changing?

Variability

Missions



Aqua



Terra



Aura



Triana



CALIPSO

Applications



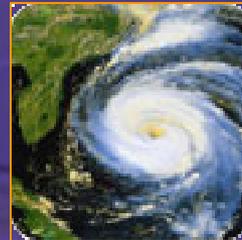
Air Quality



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Public Health

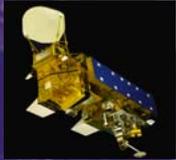




Ice Cover Mass changing?

Variability

Missions



Aqua



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Applications



Agricultural Competitiveness



Air Quality



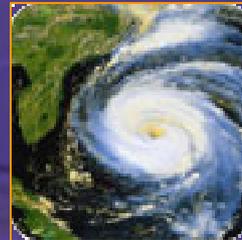
Aviation Safety



Carbon Management



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Invasive Species



Public Health



Water Management

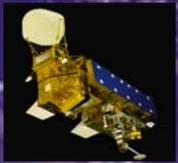




Motions of Earth & Interior Processes?

Variability

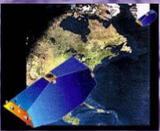
Missions



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SRTM

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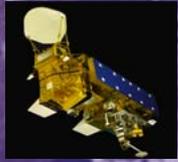




Atmospheric Constituents & Solar Radiation on Climate?

Forcing

Missions



Aqua



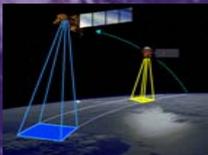
Aura



ICESat



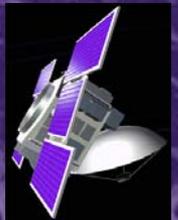
Landsat 7



EO-1



CALIPSO



Cloudsat

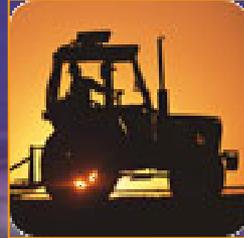


Terra



Triana

Applications



Agricultural Competitiveness



Air Quality



Aviation Safety



Carbon Management



Coastal Management



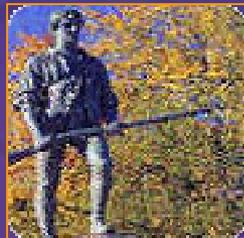
Disaster Preparedness



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Water Management

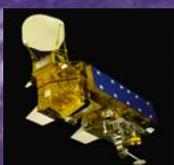




Changes in Land Cover & Land Use?

Forcing

Missions



Aqua



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QuikScat



Aura



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SRTM



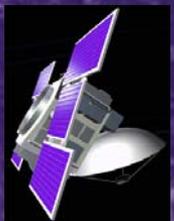
CALIPSO



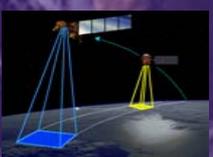
Landsat 7



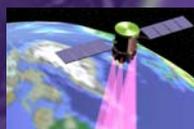
Triana



Cloudsat

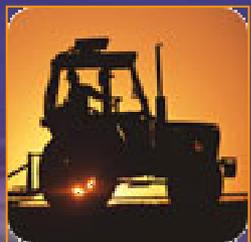


EO-1



VCL

Applications



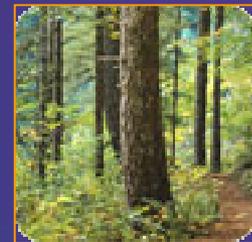
Agricultural Competitiveness



Air Quality



Aviation Safety



Carbon Management



Coastal Management



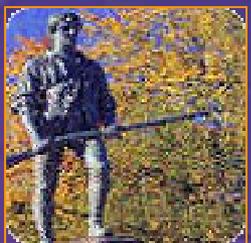
Disaster Preparedness



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Public Health



Water Management

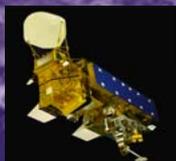




Surface Transformation?

Forcing

Missions



Aqua



EO-1



ICESat



SRTM



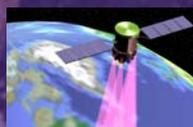
Jason-1



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Applications



Agricultural Competitiveness



Air Quality



Aviation Safety



Carbon Management



Coastal Management



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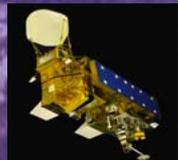




Clouds & Surface Hydrological Processes on Climate?

Response

Missions



Aqua



ICESat



QuikScat



Aura



Jason-1



Terra



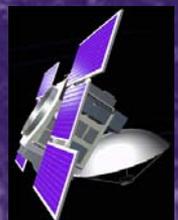
CALIPSO



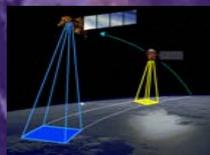
Landsat 7



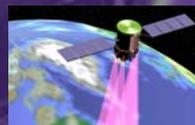
Triana



Cloudsat

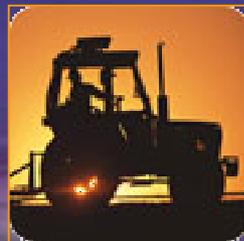


EO-1

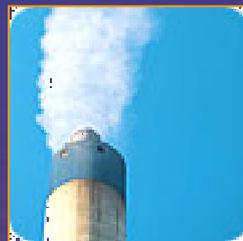


VCL

Applications



Agricultural Competitiveness



Air Quality



Aviation Safety



Carbon Management



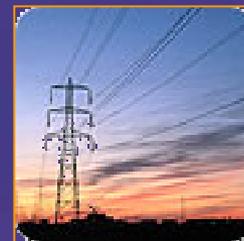
Coastal Management



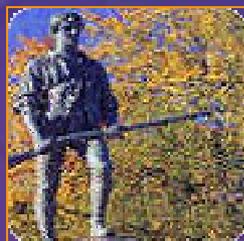
Disaster Preparedness



Community Growth



Energy Forecasting



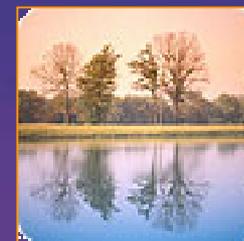
Homeland Security



Invasive Species



Public Health



Water Management





Ecosystem Responses & Affects on Global Carbon Cycle?

Response

Missions



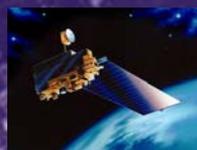
Aqua



EO-1



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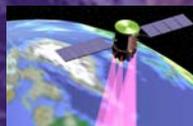
Terra



Landsat 7

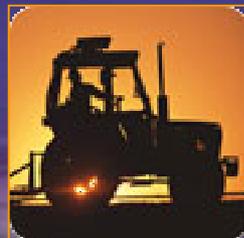


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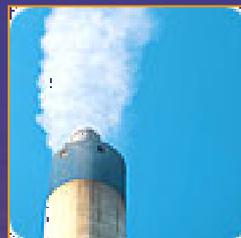


VCL

Applications



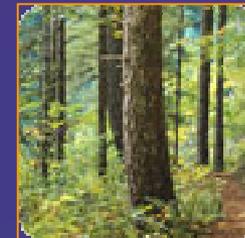
Agricultural Competitiveness



Air Quality



Aviation Safety



Carbon Management



Coastal Management



Disaster Preparedness



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Public Health



Water Management

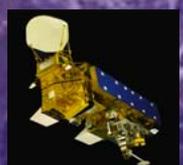




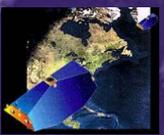
Changes in Global Ocean Circulation?

Response

Missions



Aqua



GRACE



Aura



ICESat



CALIPSO



Jason-1



Terra

Applications



Air Quality



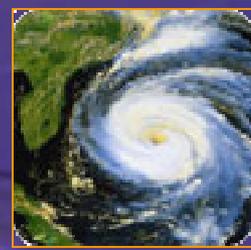
Aviation Safety



Carbon Management



Coastal Management



Disaster Preparedness



Community Growth



Energy Forecasting



Public Health



Water Management

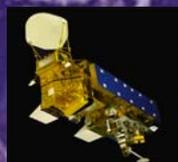




Sea Level Affected by Climate Change?

Response

Missions



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Applications



Agricultural Competitiveness



Air Quality



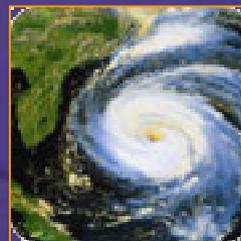
Aviation Safety



Carbon Management



Coastal Management



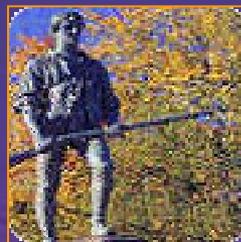
Disaster Preparedness



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Public Health

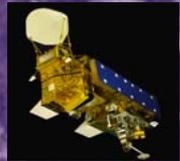




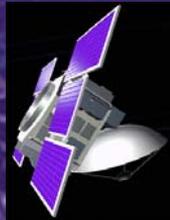
Pollution Effects?

Response

Missions



Aqua



Cloudsat



Aura



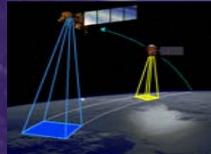
ICESat



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Jason-1



EO-1

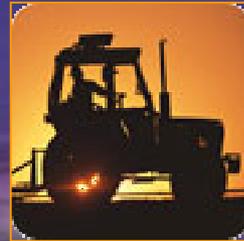


QuikScat



Terra

Applications



Agricultural Competitiveness



Air Quality



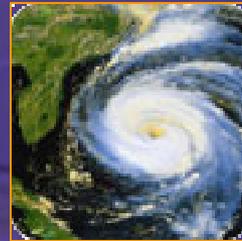
Aviation Safety



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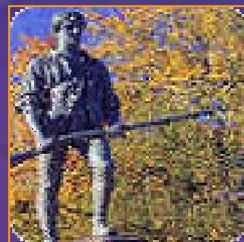
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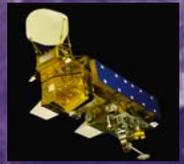




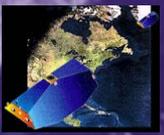
Weather Variation Related to Climate Variation?

Consequences

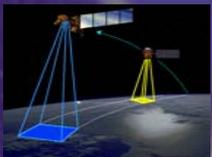
Missions



Aqua



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EO-1



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ICESat



SRTM



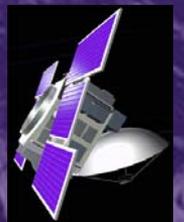
CALIPSO



Jason-1



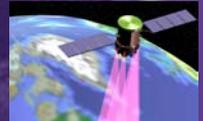
Terra



Cloudsat



Landsat 7



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Applications



Agricultural Competitiveness



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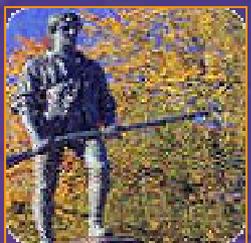
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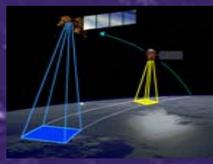
Consequences in Land Cover & Land Use?

Consequences

Missions



Aqua



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ICESat



SRTM

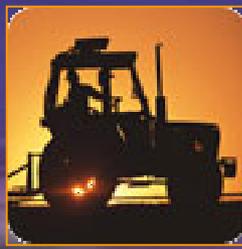


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Applications



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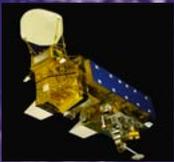




Coastal region change?

Consequences

Missions



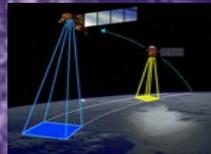
Aqua



Landsat 7



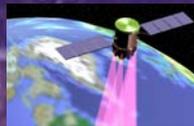
ICESat



EO-1



Jason-1



VCL

Applications



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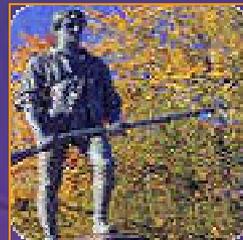
Disaster Preparedness



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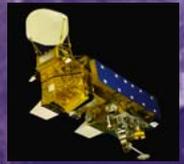




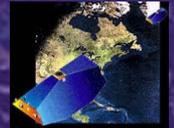
Weather Forecasting Improvement?

Prediction

Missions



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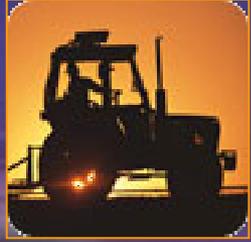


Jason-1



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Applications



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Public Health



Water Management

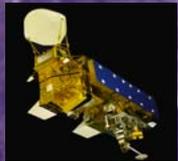




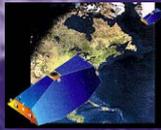
Transient Climate Variations?

Prediction

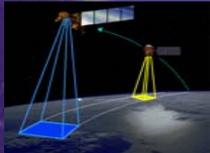
Missions



Aqua



GRACE



EO-1



Aura



ICESat



QuikScat



CALIPSO



Jason-1



Cloudsat



Landsat 7



Terra



VCL

Applications



Agricultural Competitiveness



Air Quality



Aviation Safety



Carbon Management



Coastal Management



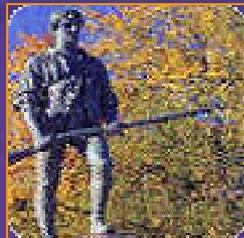
Disaster Preparedness



Community Growth



Energy Forecasting



Homeland Security



Invasive Species



Public Health



Water Management

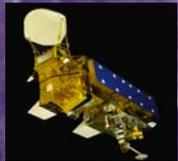




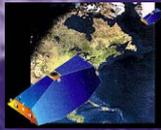
Trends in Long-Term Climate:

Prediction

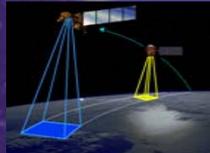
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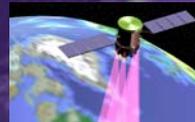
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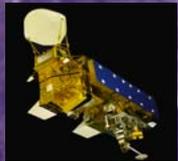




Future Atmospheric Chemical Impacts?

Prediction

Missions



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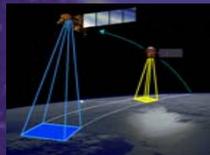
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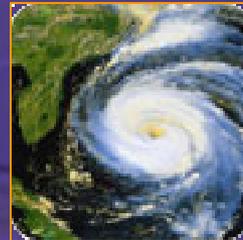
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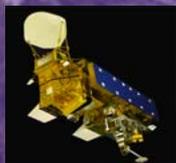




Future Concentrations of Carbon Dioxide and Methane?

Prediction

Missions



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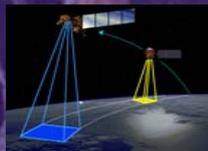
Landsat 7



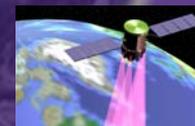
Triana



Cloudsat

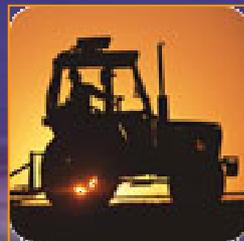


EO-1

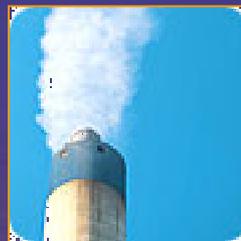


VCL

Applications



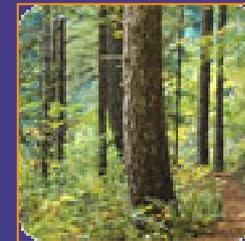
Agricultural Competitiveness



Air Quality



Aviation Safety



Carbon Management



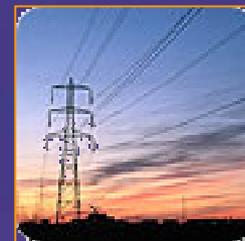
Coastal Management



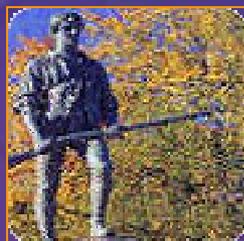
Disaster Preparedness



Community Growth



Energy Forecasting



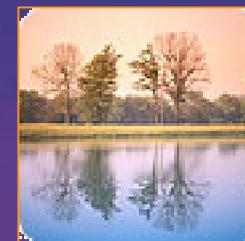
Homeland Security



Invasive Species



Public Health



Water Management





Missions Defined by Questions



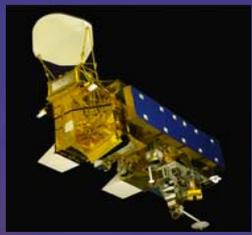
Longer-term Missions - Observation of Key Earth System Interactions



Terra



Landsat 7



Aqua



Aura



QuikScat

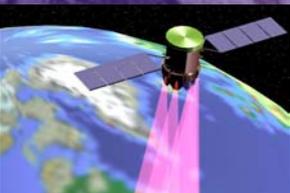


ICESat

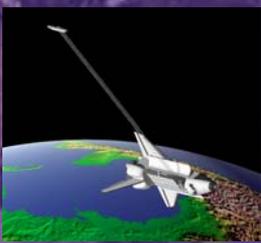


Jason-1

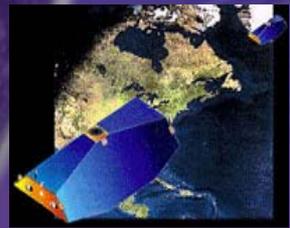
Exploratory - Explore Specific Earth System Processes and Parameters and Demonstrate Technologies



VCL



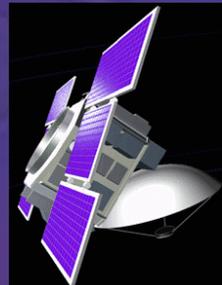
SRTM



GRACE



CALIPSO



Cloudsat

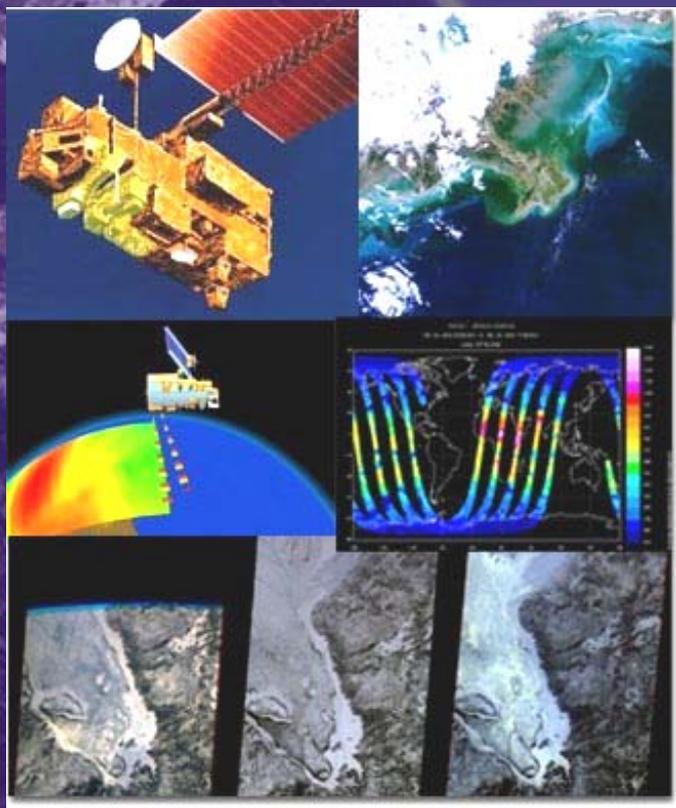


Triana



EO-1





Terra (Formerly EOM AM-1)

Provides global data on the state of the atmosphere, land, and oceans, as well as their interactions with solar radiation and with one another. Japan and Canada provided instruments for this mission. Regional to global land cover and land cover change and atmospheric constituents - agricultural competitiveness, air quality, carbon management, coastal zone management, invasive species management, water management and conservation, early warning for homeland security, and public health.

LAUNCH:

- Date: December 18, 1999
- Launch Site: Western Test Range, Vandenberg Air Force

ORBIT:

- Altitude: 705 km
- Inclination: 98.2 degrees
- Repeat Cycle: 16 days Polar

VITAL STATISTICS:

- Weight: 5,190 kg
- Size: 3.5
- Power: 2,530 watts
- Design Life: 5 years

INSTRUMENTS:

- CERES
- MISR
- MODIS
- MOPITT
- ASTER

<http://terra.nasa.gov>