



National Aeronautics and
Space Administration

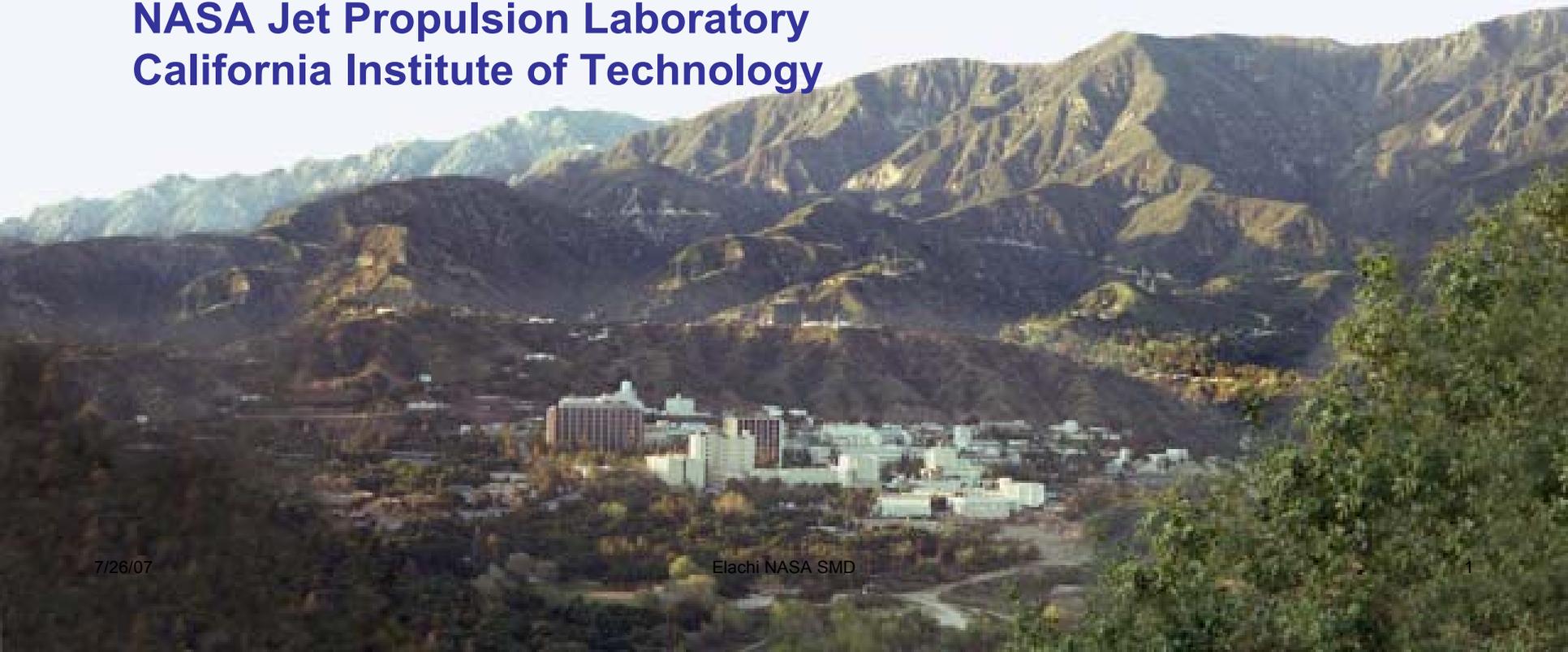
Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California



Jet Propulsion Laboratory Capabilities for Understanding Planet Earth

September 6, 2007

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Earth Sciences Directorate
NASA Jet Propulsion Laboratory
California Institute of Technology





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JPL is part of NASA and Caltech



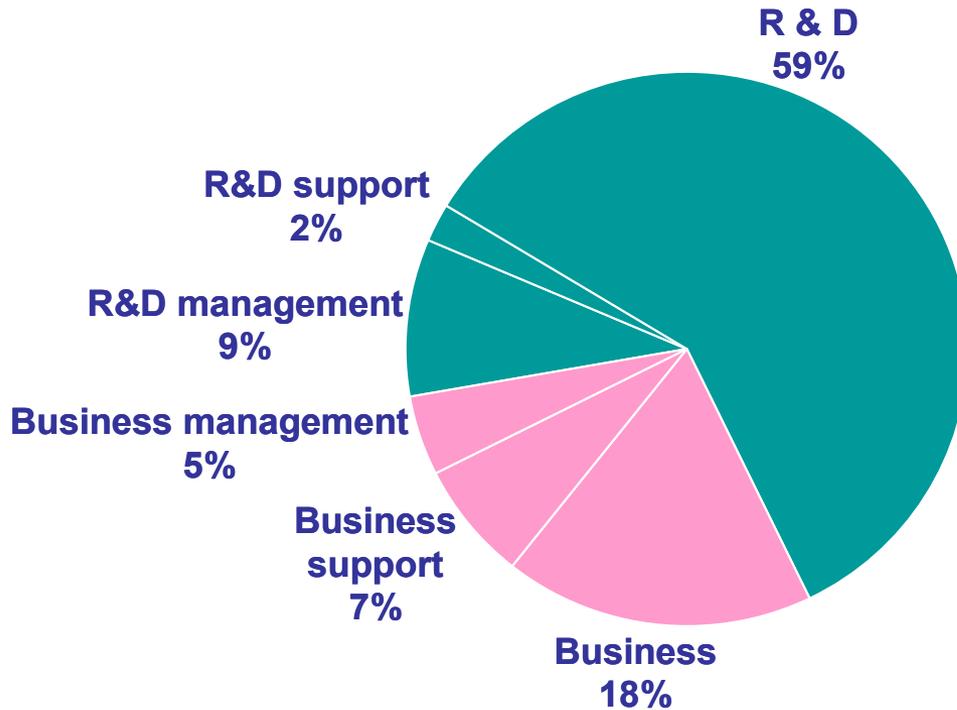
- Federally (NASA)-owned “Federally-Funded Research and Development Center” (FFRDC)
- University (Caltech)-operated
- \$1.5 billion business base
- 5000 employees and contractors
- 177 acres
- 134 buildings and 57 trailers
- 670,000 net square feet of office space
- 860,000 net square feet of non-office space (e.g., labs)



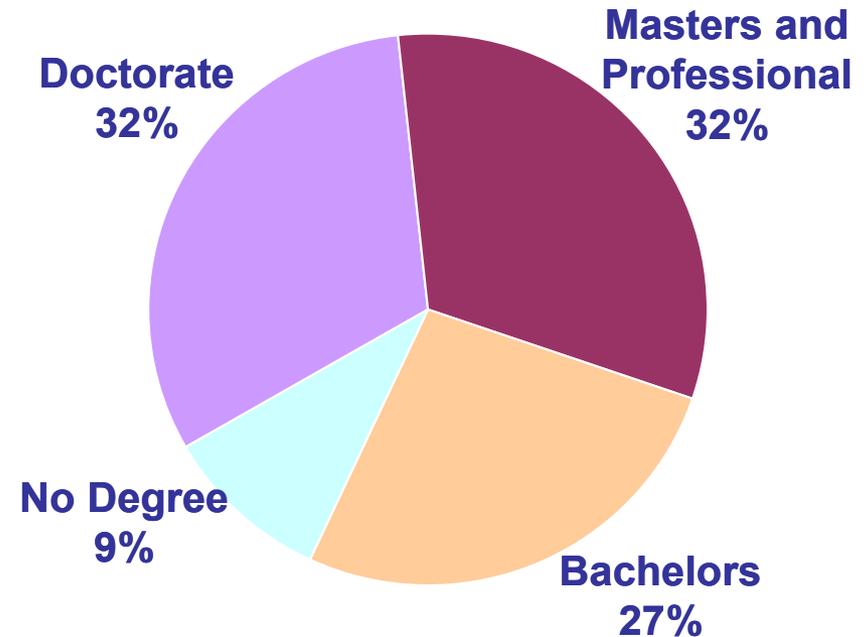
JPL staff composition by job classification and academic degree in Qtr 1 FY 2007



- **Staff composition by job classification for 4956 employees (4884 FTEs)**



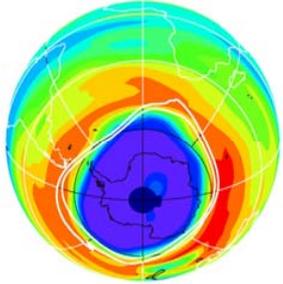
- **R&D staff distribution by academic degree for 3501 employees**





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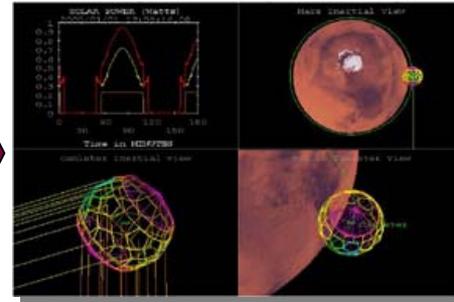
End-to-end capabilities needed to implement missions



Science Requirements



Project Formulation - Team X



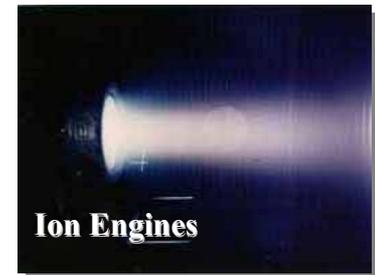
Mission Design



Mars Rovers



Large Structures - SRTM



Ion Engines



Integration and Test



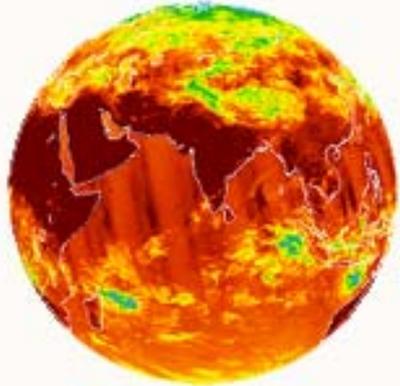
Real Time Operations



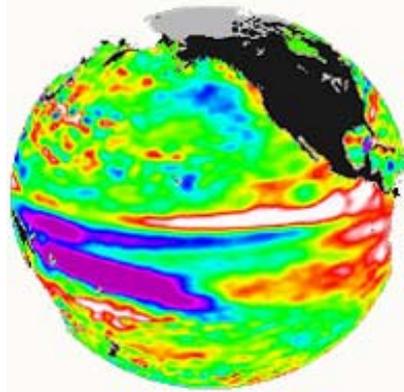


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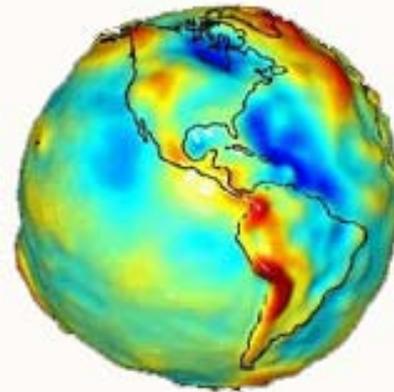
New ways to see a changing Earth



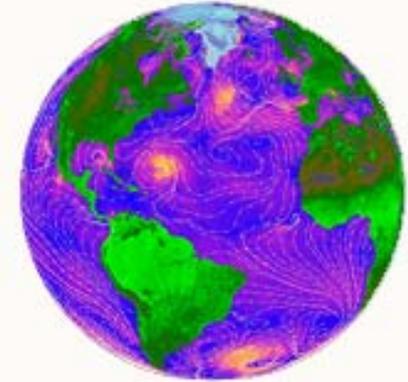
Atmospheric Infrared Sounder (AIRS) provides monthly global temperature maps



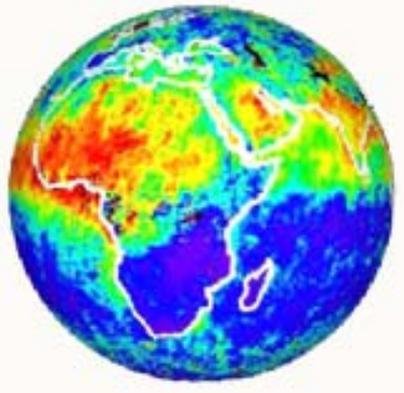
Jason provides global sea surface height maps every 10 days



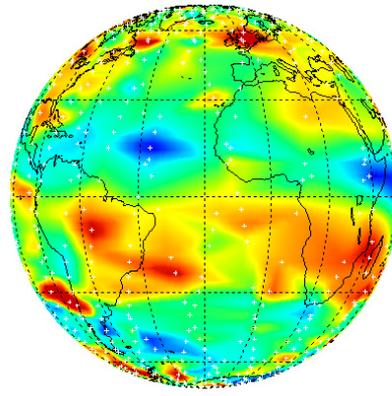
Gravity Recovery and Climate Experiment (GRACE) provides monthly maps of Earth's gravity



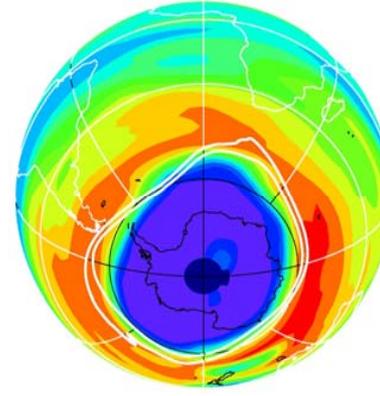
QuikSCAT provides near global (90%) ocean surface wind maps every 24 hours



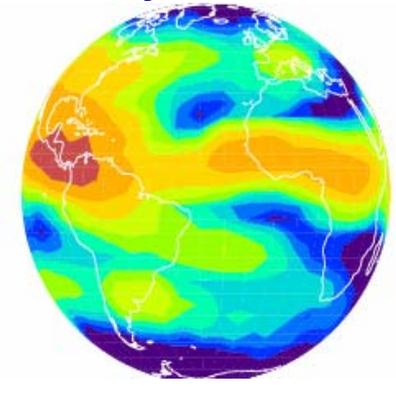
Multi-angle Imaging Spectro Radiometer (MISR) provides monthly global aerosol maps



Tropospheric Emission Spectrometer (TES) provides monthly global maps of Ozone



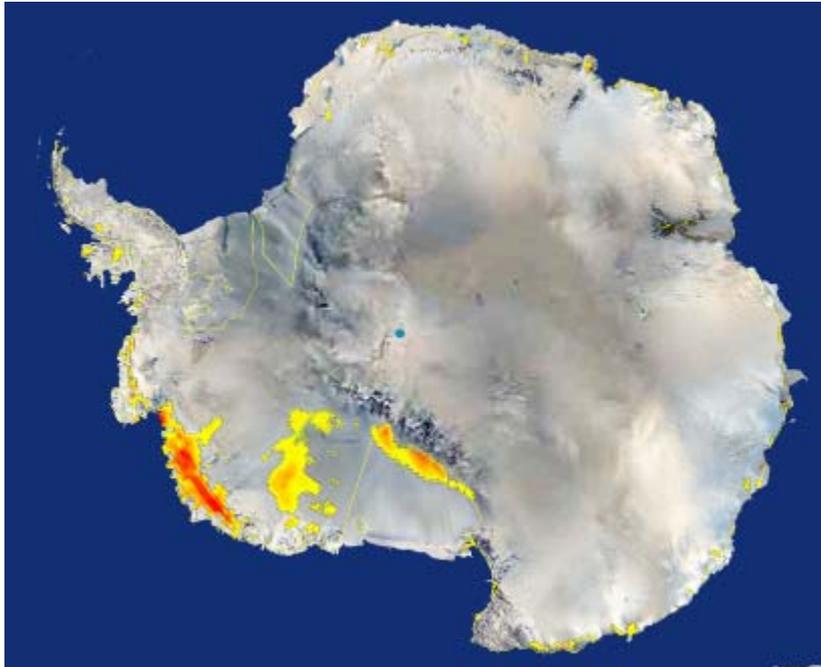
Microwave Limb Sounder (MLS) provides daily maps of stratospheric chemistry



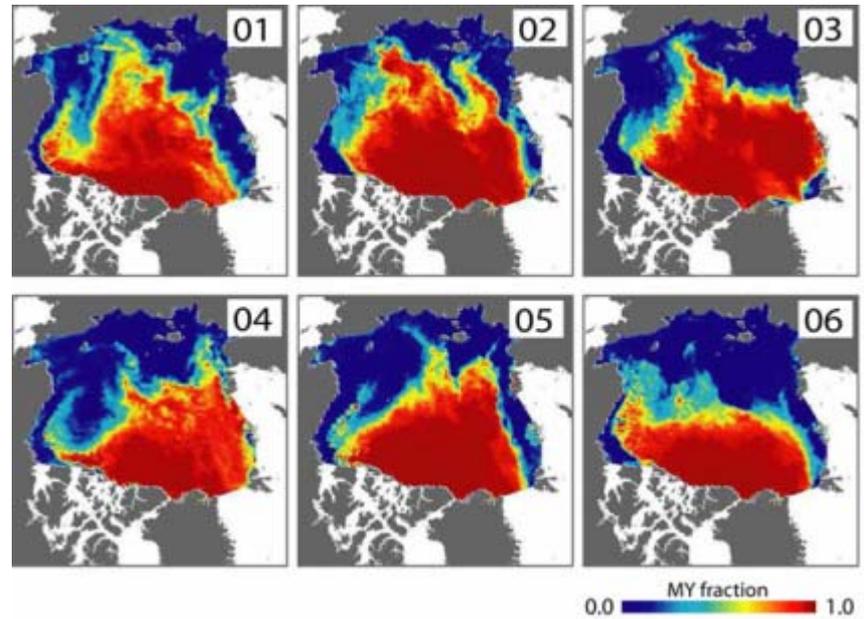
CloudSat provides monthly maps of cloud ice water content



Recent Earth science mission results



**QuikScat measures
Antarctica ice loss**



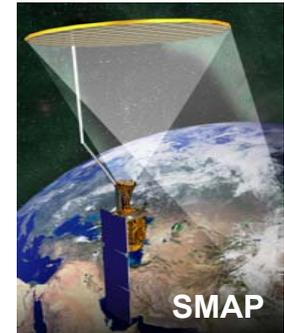
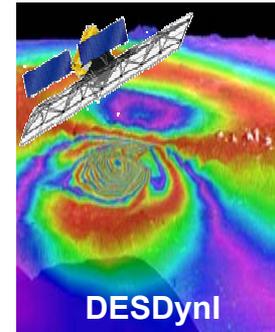
**QuikScat studies Arctic
Ocean sea ice loss**



Earth science mission studies (atmosphere, oceans, land, biosphere, cryosphere)

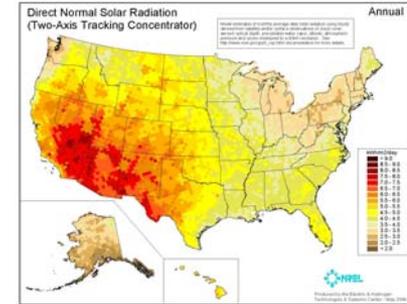
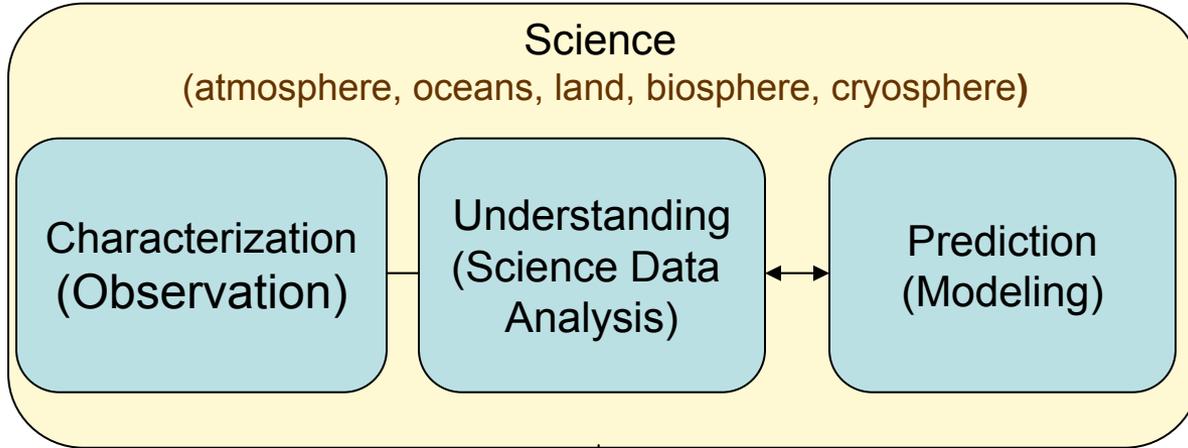


- A DESDynI (Deformation, Ecosystem Structure, and Dynamics of Ice) mission will measure:
 - Motions at depth responsible for earthquakes, volcanic activity, and landslides;
 - Ice motion and its impact on climate, climate change, and habitability;
 - Biomass.
- A SMAP (Soil Moisture Active-Passive) will address:
 - Water and energy cycles;
 - Decision support systems for forecast and mitigation of flash-floods, severe storms, and regional droughts.
- A SWOT advanced altimeter mission will acquire elevations of the ocean and water bodies on land at spatial and temporal scales necessary to answer key questions concerning:
 - Ocean circulation;
 - Coastal ocean processes;
 - Distribution of fresh water.
- HypsIRI will address characterization of land surface and vegetation types at high resolution by using hyperspectral imagers in UV-NIR (near infrared) and TIR (thermal infrared).
- XOVWM (Extended Ocean Vector Winds Mission) is a follow-on mission to QuikSCAT for measuring ocean vector winds at a higher resolution.

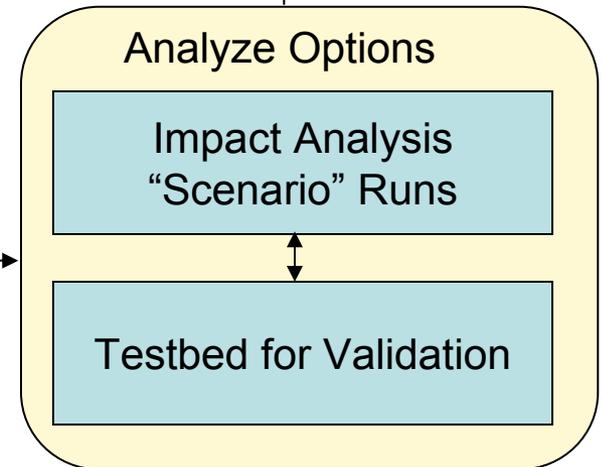
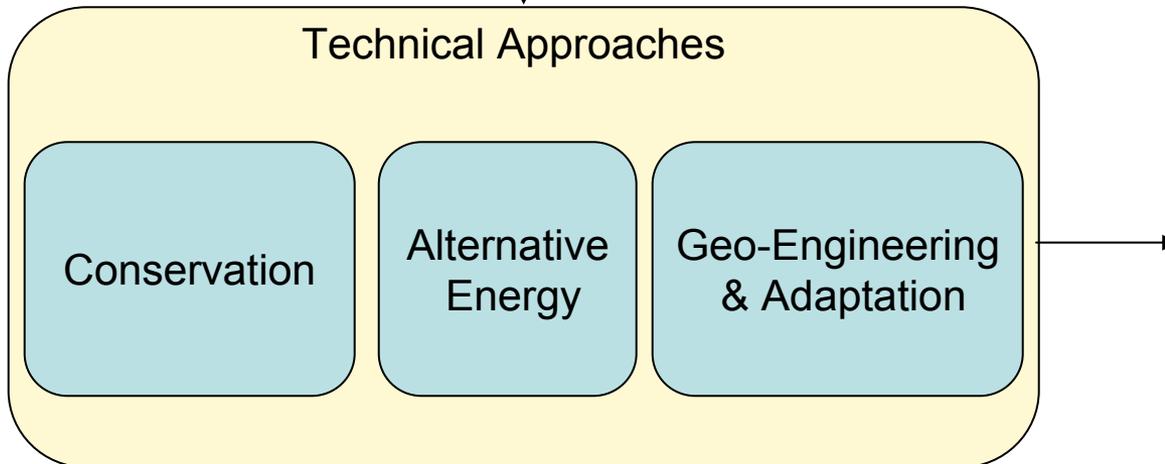




Climate Change Mitigation



Recommendations





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JPL Vision Forward



JPL offers:

- **Robust teams of atmospheric, ocean, and land scientists**
- **Robust teams of systems engineers and technologists...**
- **Track record of earth science collaborations with industry, academia and international partners**
- **Strong participation in science planning with NASA, NOAA and the earth science community**

JPL is seeking to:

- **Collaborate with the State of California in climate science and scenario analysis**
- **Collaborate with partners to build a more robust decision support infrastructure**