Health and Air Quality Applied Sciences Team Meeting

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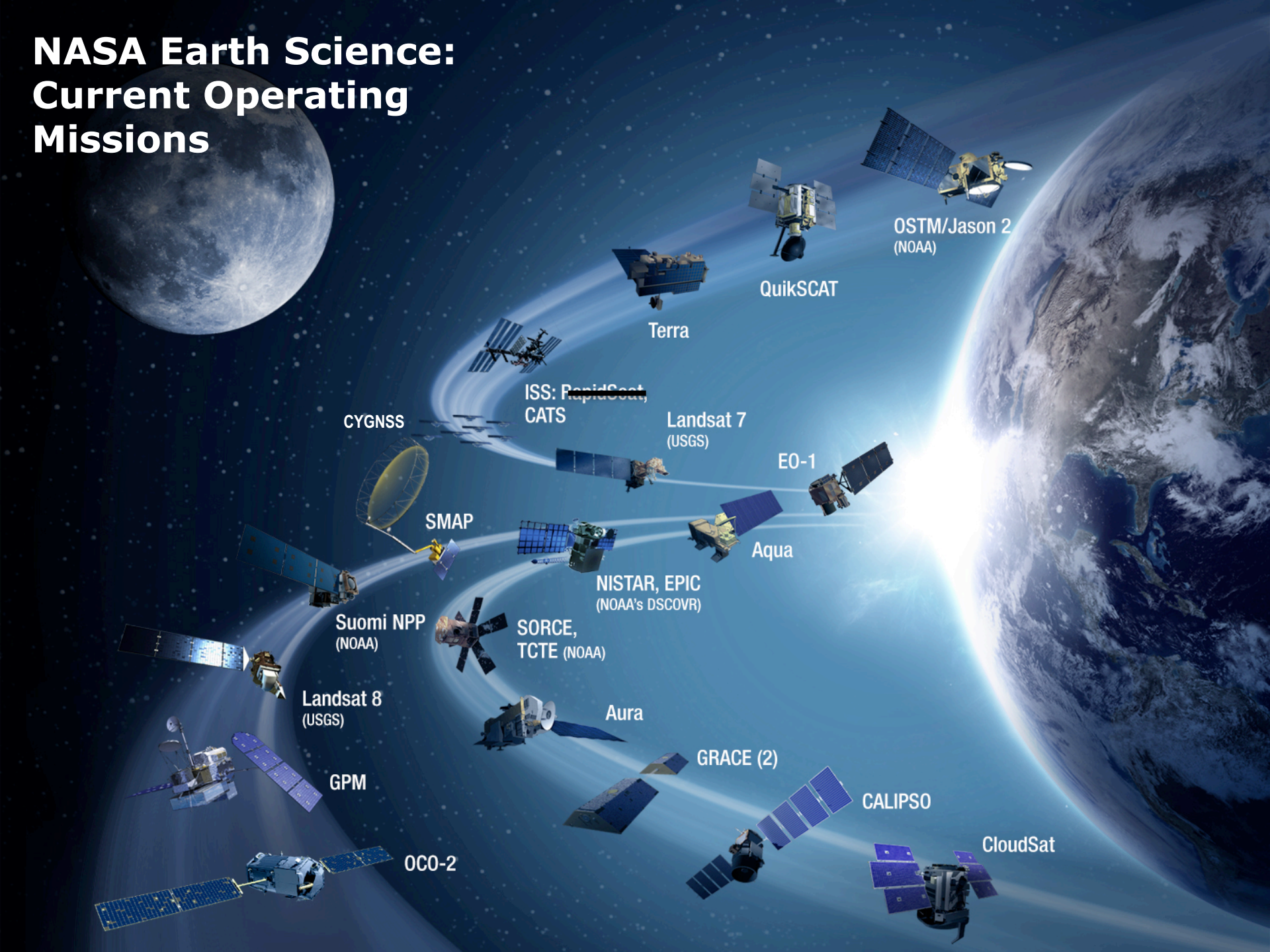
NASA Earth Science: Current Operating Missions

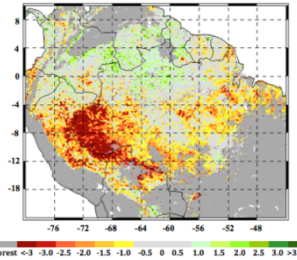


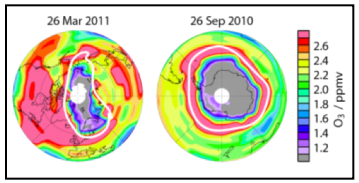
Launch of the Cyclone Global Navigation Satellite System (CYGNSS) mission, which will use radio signals from GPS satellites to measure the wind speed near the ground in the tropics, between 35 degrees north and 35 degrees south where most hurricanes are born. CYGNSS was launched aboard an Orbital ATK Pegasus XL rocket on December 15, 2016.

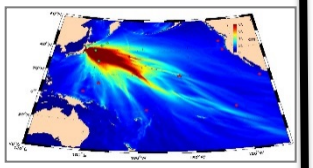
Launch of SAGE-III, an Earth-monitoring tool that will look for ozone in the atmosphere, and the Lightning Imaging Sensor to the ISS on February 19, 2017, aboard a SpaceX Falcon 9 from KSC.

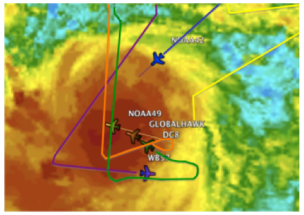
NASA's Earth Science Division

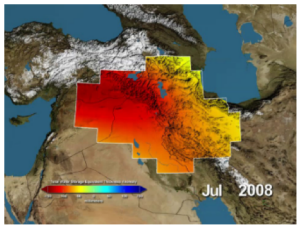
Research

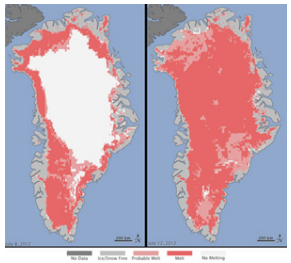




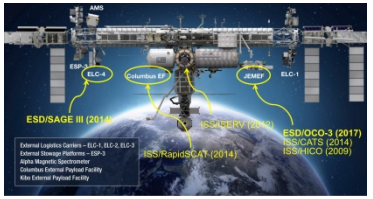




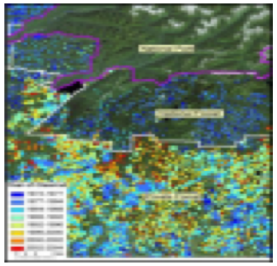


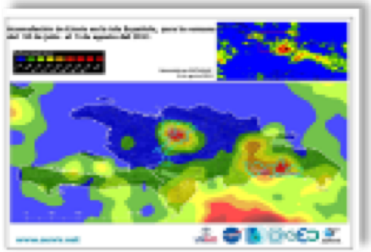


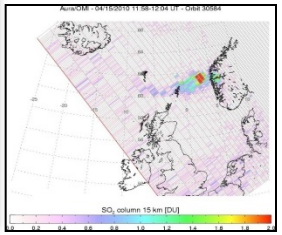
Flight

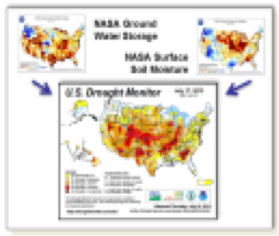


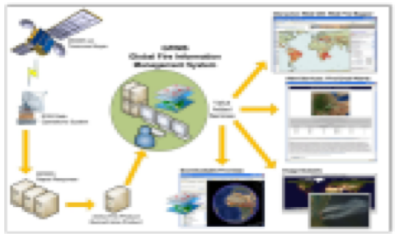
Applied Sciences

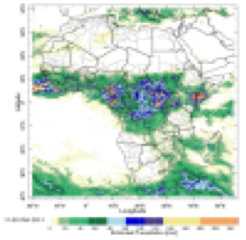




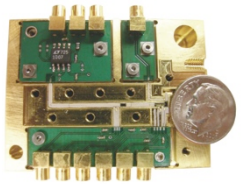


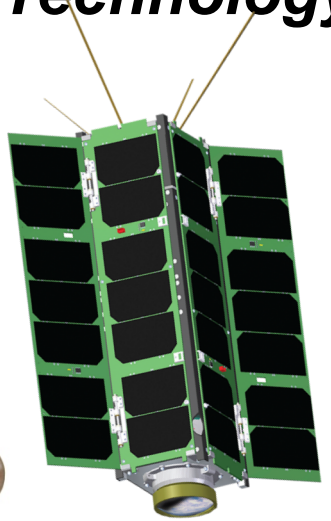






Technology





ESD/Applied Sciences Program

Discovering and demonstrating innovative and practical uses of Earth observations in organizations' policy, business, and management decisions.

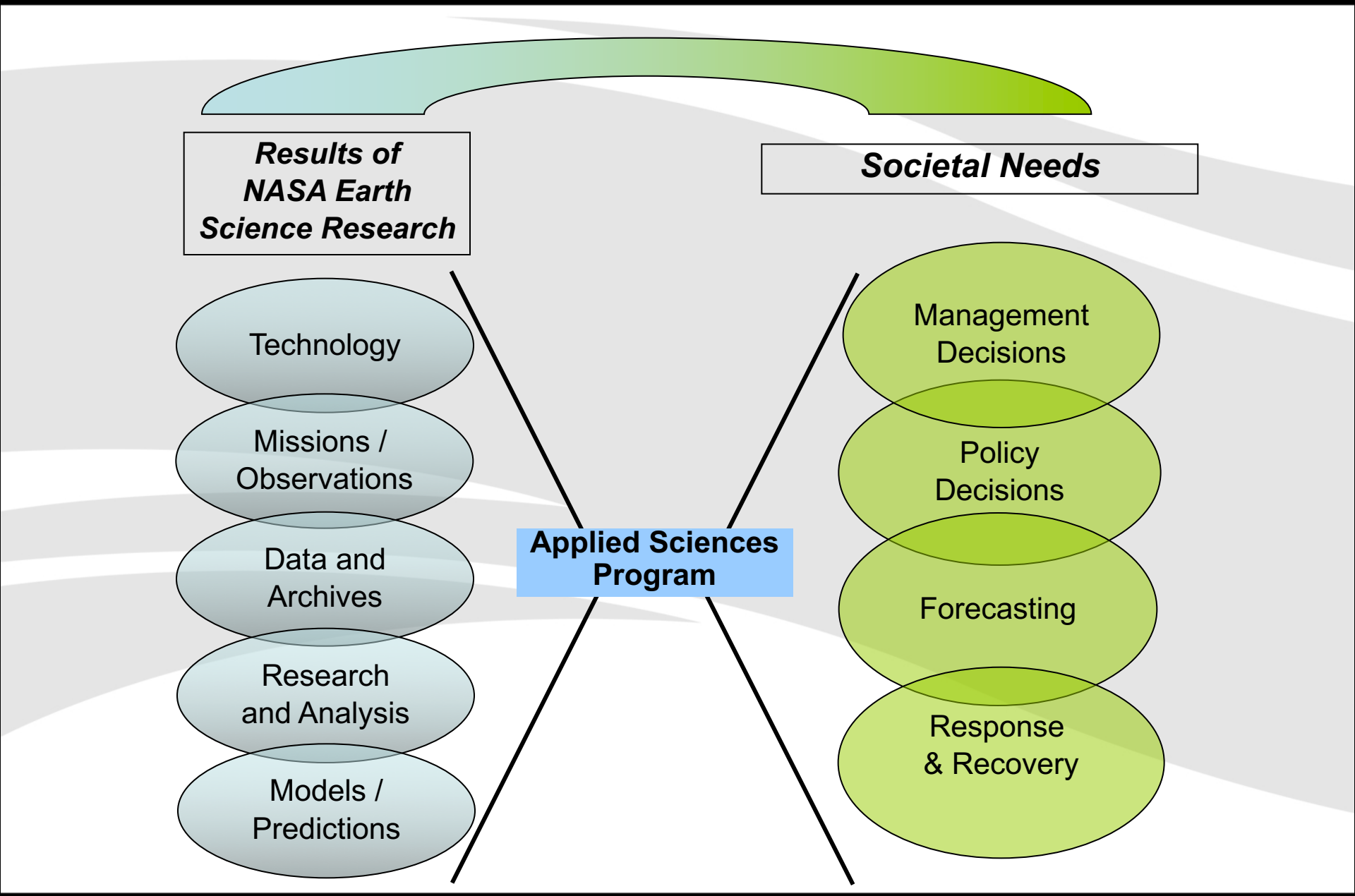
http://AppliedSciences.NASA.gov

Applications
Prove-out, develop, and transition applications ideas for sustained uses of Earth obs. in decision making.

Capacity Building
Build skills and capabilities in US and developing countries to access Earth observations to benefit society.

Mission Planning
Identify applications early in mission lifecycle and integrate end-user needs in mission design and development.

NASA Applied Sciences Architecture



Applications Areas

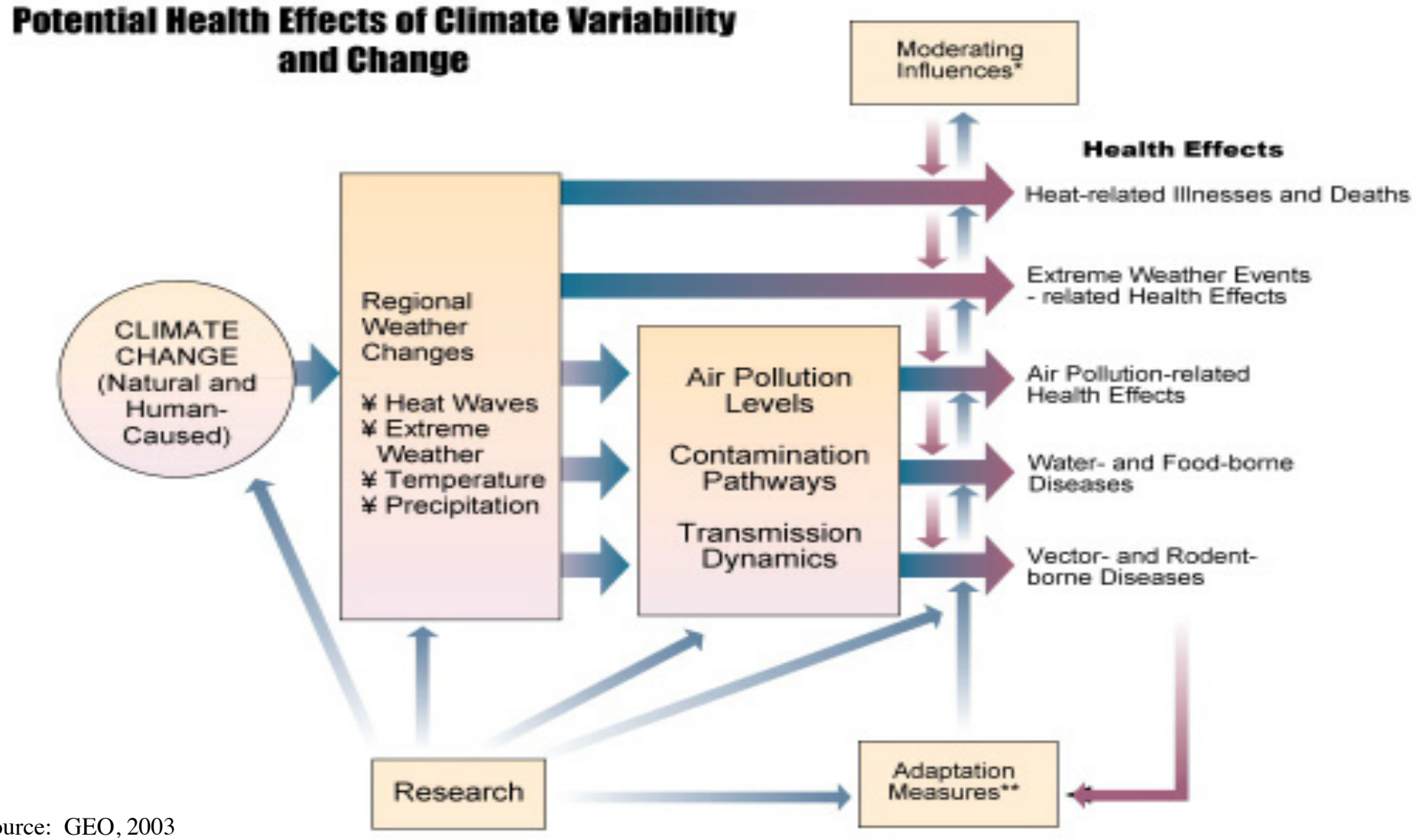
Emphasis in 4 Applications Areas

- Health & Air Quality
- Water Resources
- Disasters
- Ecological Forecasting

Support opportunities in 5 additional areas

- Agriculture
- Climate
- Weather
- Energy
- Oceans

Why Health & Air Quality?



Source: GEO, 2003

Health & Air Quality

Objectives:

- NASA's Health & Air Quality Applications Area supports the use of Earth observations in air quality management and public health, particularly regarding **infectious disease and environmental health** issues.
- The area addresses issues of toxic and pathogenic exposure and health-related hazards and their effects for risk characterization and mitigation.
- The area promotes uses of Earth observing data and models regarding **implementation of air quality standards, policy, and regulations** for economic and human welfare.
- The Health & Air Quality Applications Area also addresses **effects of climate change on public health and air quality** to support managers and policy makers in their planning and preparations.

Major News Items in the ESD/ASP

» NASA session at the American Society of Tropical Medicine and Hygiene Annual Meeting in Atlanta in November. Session attendance of ~250 people!
» Air Quality and Health Showcase at NASA GSFC on November 17. Over 50 members of the community were present. Future showcases are being planned, either in person or virtually.
» Multiple portfolio PIs presented at the 2016 AGU Fall Meeting in San Francisco, December 12-16, including Hyperwall presentations.
» 2017 Earth Science Senior Review preparation underway. Thirteen missions invited to propose for extension. National Interests Panel will be held April 11-13 in Arlington, VA.
» ARSET Public Health trainings planned for Spring/Summer 2017.
» Gupta to lead NASA Space Apps Challenge in 2017. More information to follow.
» Revitalized GEO Health Community of Practice underway with "Earth Observations for Health" added as a Community Activity to the 2017-2019 Work Programme. NASA Applied Sciences released a solicitation to support this Work Programme (A.50 of ROSES 2016) with proposals due March 10.
» EO-1 will decommission by the end of March 2017.
» NASA H/AQ Applications Newsletters are being published.
» FY18 Budget: No budget guidance from OMB is expected until April or May. Operating under a CR through April 28.
» New AQAST and Applied Sciences Videos:
  – Satellite Data and Models: https://www.youtube.com/watch?v=qFnQV6QPV6E

- **Personnel**
- Robert Lightfoot named Acting NASA Administrator.

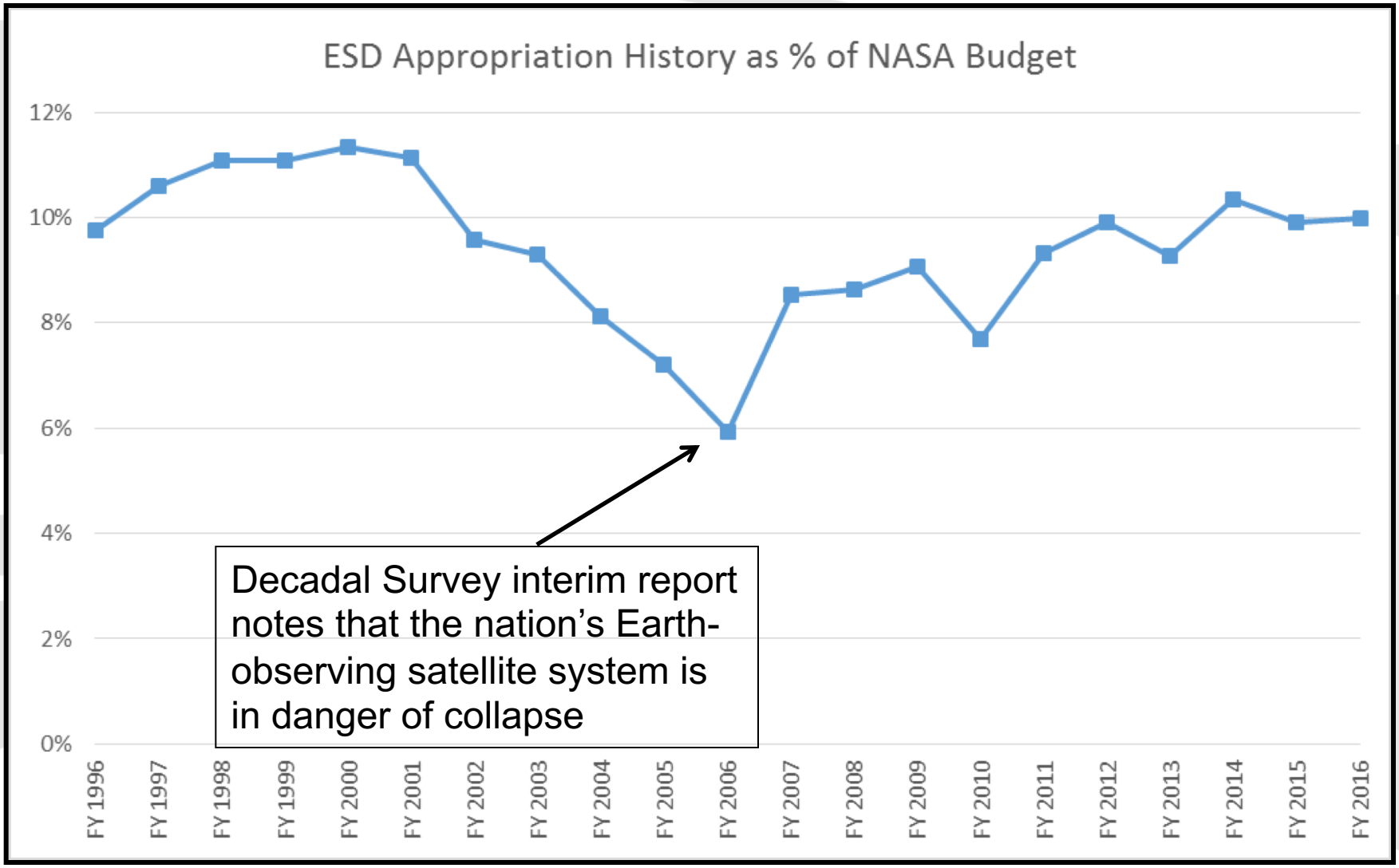
- **NASA Health/AQ Sessions at the following conferences:**
  – AMS Annual Meeting (January 2017)
  – National Council on Science and the Environment (NCSE) Annual Meeting (January 2017)
  – Association for the Sciences of Limnology and Oceanography Annual Meeting (February 2017)
  – ATS Annual Meeting (May 2017)
  – AWMA Annual Meeting (June 2017)

Two key points to remember:

-- Earth observations and Earth science data are objective, transparent, and policy-neutral.

-- NASA Earth Science (and by extension HAQAST) doesn't develop or prescribe policy. Other agencies and organizations use the data and scientific results in their policy analysis and development.

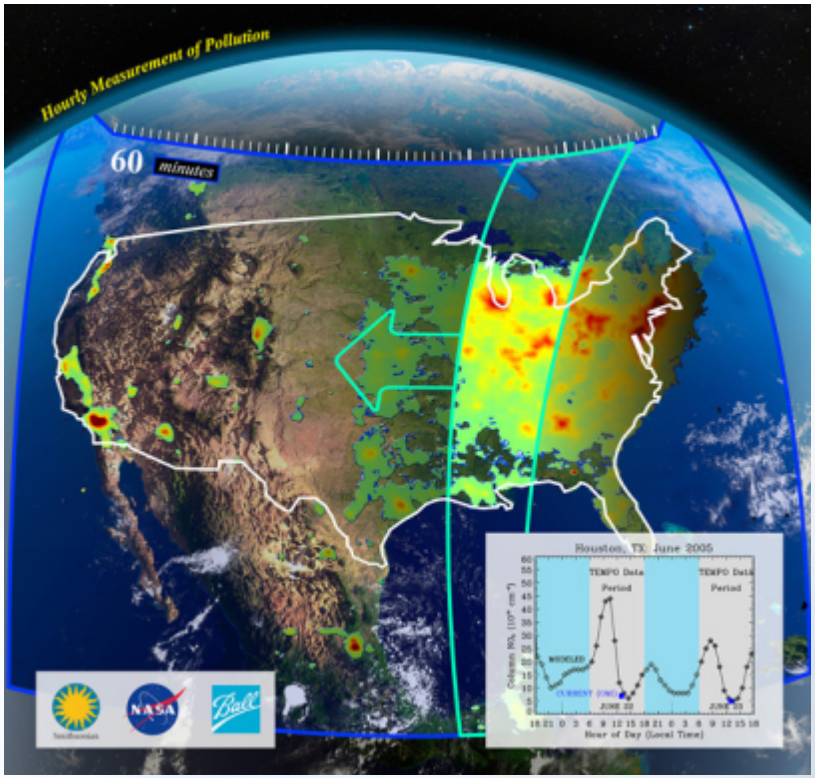
ESD Appropriation Time Series




Formulation
Implementation
Primary Ops
Extended Ops
MAIA (~2021)
TROPICS (~2021)
GeoCARB (~2021)
Sentinel-6A/B (2020, 2025)
Earth Science Instruments on ISS:
CATS, (2020)
LIS, (2017)
SAGE III, (2017)
TSIS-1, (2018)
ECOSTRESS, (2017)
GEDI, (2018)
OCO-3, (2018)
CLARREO-PF, (2020)
TSIS-2 (2020)
Landsat 9 (2020)
PACE (2022)
NISAR (2022)
SWOT (2021)
TEMPO (2018)
JPSS-2 (NOAA)
RBI, OMPS-Limb (2018)
GRACE-FO (2) (2017)
ICESat-2 (2017)
CYGNSS (2016)
ISS
SORCE, (2017)
TCTE (NOAA)
NISTAR, EPIC (2019)
(NOAA'S DSCOVR)
QuikSCAT (2017)
EO-1 (2017)
Landsat 7 (USGS) (~2022)
SMAP (>2022)
Terra (>2021)
Aqua (>2022)
Suomi NPP (NOAA) (>2022)
CloudSat (~2018)
Landsat 8 (USGS) (>2022)
CALIPSO (>2022)
GPM (>2022)
Aura (>2022)
GRACE (2) (2018)
OSTM/Jason 2 (>2022) (NOAA)
OCO-2 (>2022)

Earth Venture Instrument-1:
Tropospheric Emissions: Monitoring of Pollution (TEMPO)

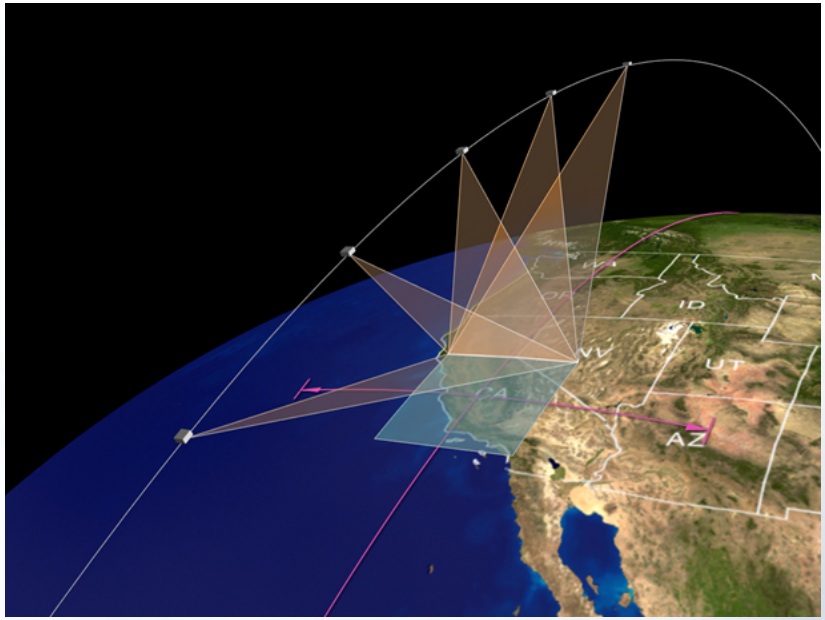
- ***TEMPO is a pathfinder to using hosted commercial payloads from GEO***
- Tropospheric pollution observations from Geostationary Orbit
  - Ozone, NO_2, and CH_2O.
- Forms a global Air Quality constellation in GEO with EU Sentinel 4 and Korean GEMS.
- EPA and NOAA are part of the science team.
- Instrument delivery in 2018; Launch NLT 2021



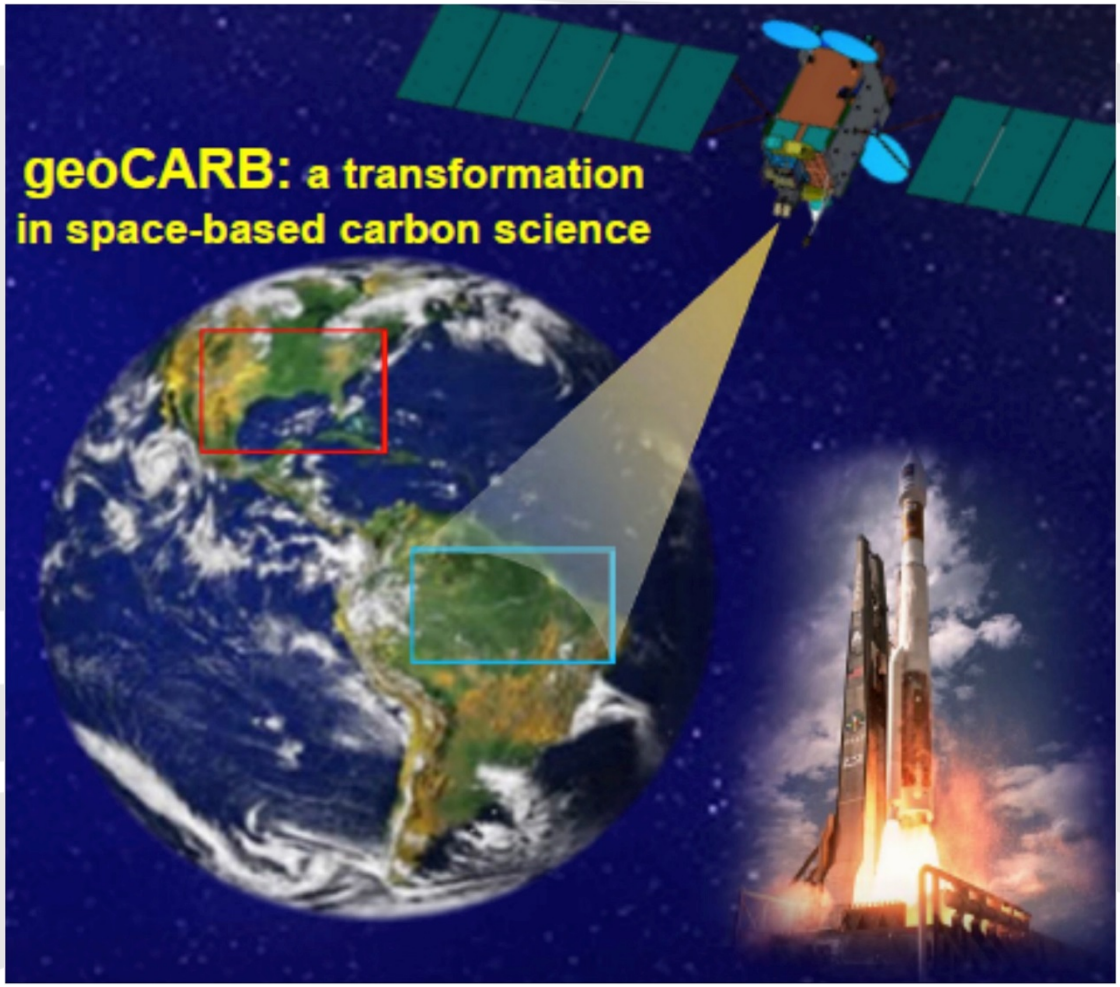
PI: Kelly Chance, Smithsonian Astrophysical Observatory
PE: Betsy Edwards; **PS:** Barry Lefer
Instrument Development: Ball Aerospace
Project Management: LaRC
RY$: 93.2M
Orbit requirements: ***Geostationary Orbit.*** Hosted on a commercial communication satellite

Earth Venture Instrument -3: Multi-Angle Imager for Aerosols (MAIA)

- Selection announced in March 2016
- PI: David Diner (JPL); PE: Betsy Edwards
- Instrument: Two pushbroom spectropolarimetric cameras (Class C)
- Delivery Date: TBD
- Stage: Formulation (A)
- MAIA uses a twin-camera instrument that will make radiometric and polarimetric measurements needed to characterize the sizes, compositions and quantities of particulate matter in air pollution. As part of the MAIA investigation, researchers will combine MAIA measurements with population health records to better understand the connections between aerosol pollutants and health problems such as adverse birth outcomes, cardiovascular and respiratory diseases and premature deaths.



GeoCARB Selected for Earth Venture Mission-2



Berrien Moore, PI
University of Oklahoma

- First geostationary measurements of CO_2, CO, CH_4, and Solar Induced Fluorescence; 5-10 km resolution
- Hosted payload on an SES commercial communication satellite (PI-arranged hosting)
- Lockheed Martin Advanced Technology Center (Palo Alto);
  Colorado State University (Fort Collins); ARC; GSFC; JPL

National Aeronautics and
Space Administration

Questions:

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http://AppliedSciences.NASA.gov