

National Aeronautics and
Space Administration



EXPLORE EARTH

John Haynes, MS
Program Manager
NASA HAQ Applications

Health and Air Quality Applied Sciences
Team Meeting - 6

July 10, 2019

Launch of OCO-3 on May 4, 2019, from Cape Canaveral



- (Pre)Formulation
- Implementation
- Primary Ops
- Extended Ops

NASA Earth Science

Missions: Present through 2023

ISS Instruments

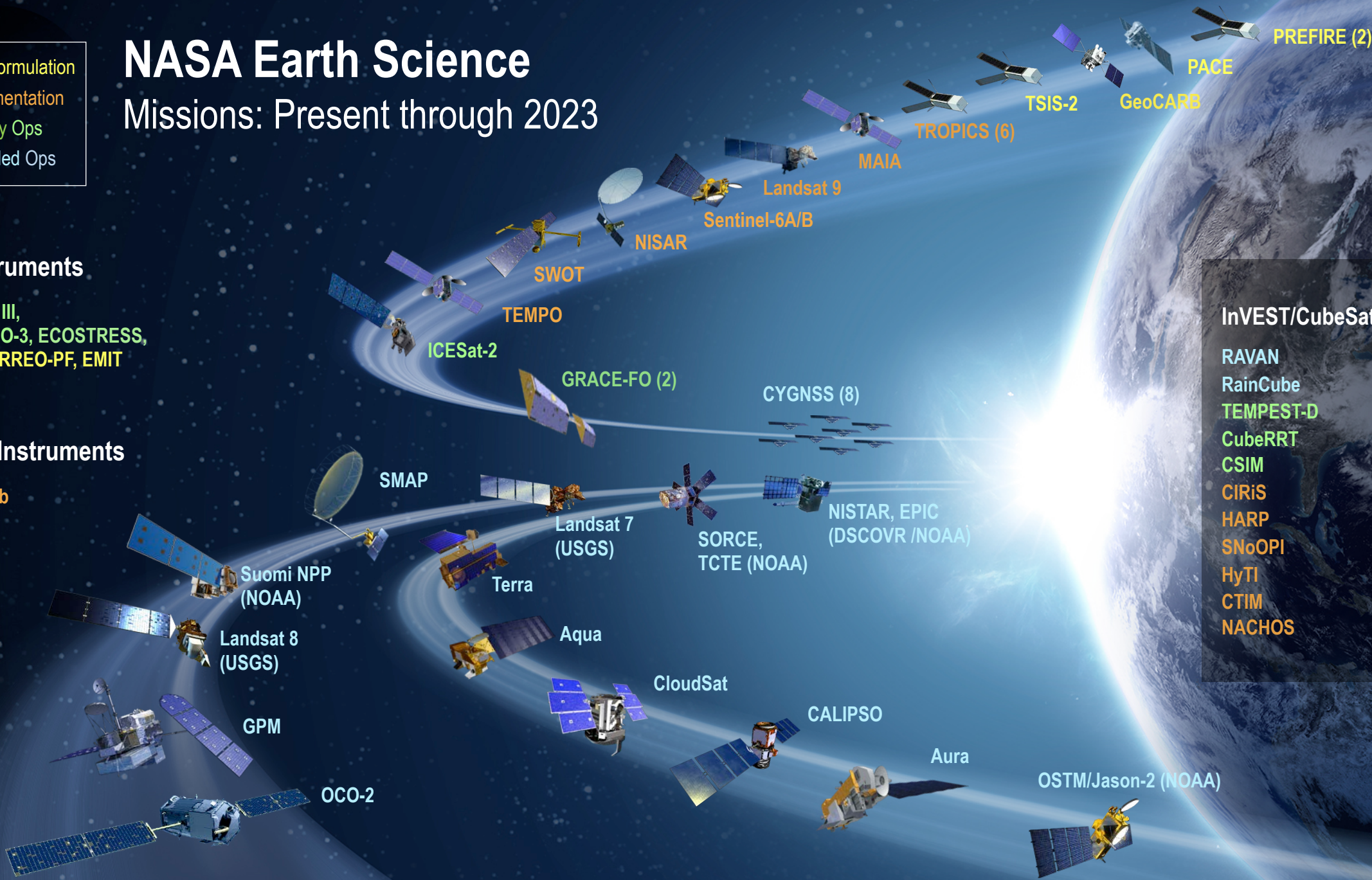
LIS, SAGE III,
 TSIS-1, OCO-3, ECOSTRESS,
 GEDI, CLARREO-PF, EMIT

JPSS-2 Instruments

OMPS-Limb

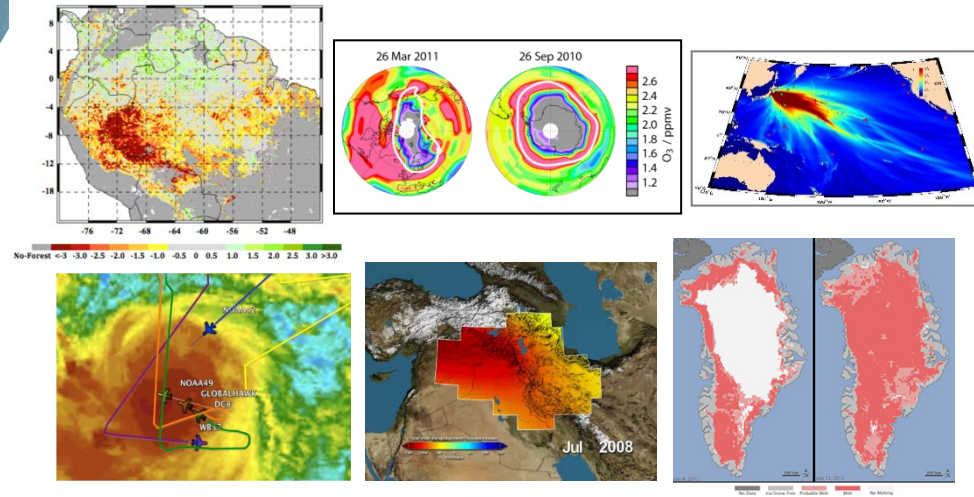
InVEST/CubeSats

- RAVAN
- RainCube
- TEMPEST-D
- CubeRRT
- CSIM
- CIRiS
- HARP
- SNoOPI
- HyTI
- CTIM
- NACHOS

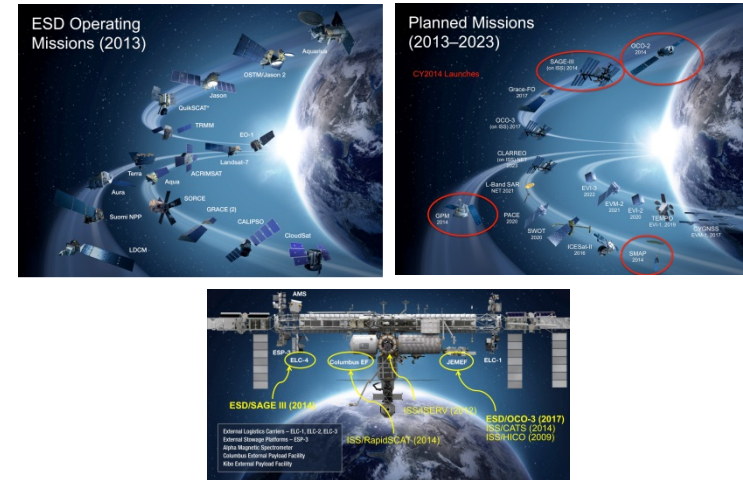


NASA's Earth Science Division

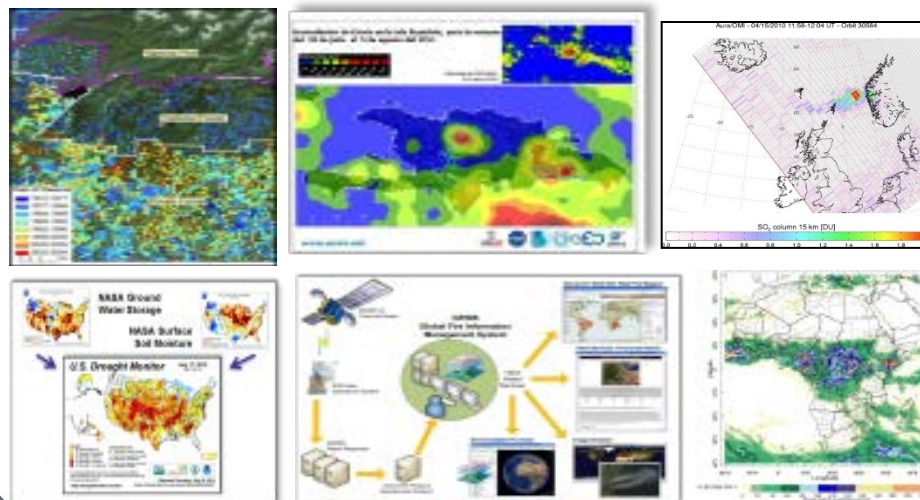
Research



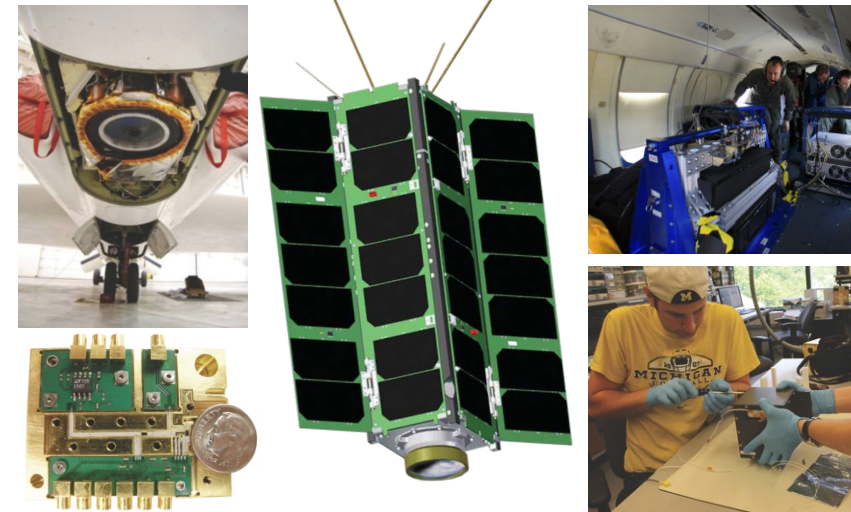
Flight



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.

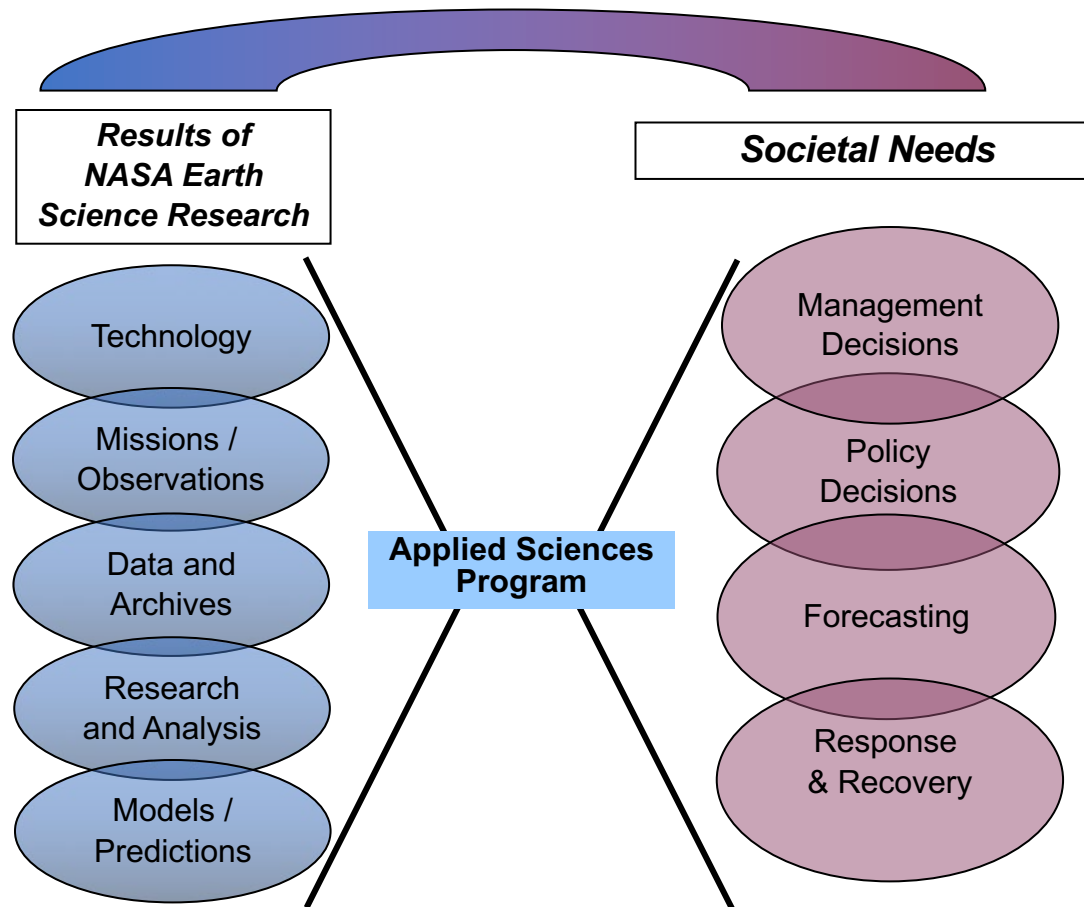
Capacity Building

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

Areas of Applications Emphasis



Health &
Air Quality



Water
Resources



Ecological
Forecasting



Disasters



Agriculture /
Food Security

Support opportunities in additional areas



Energy



Urban
Development

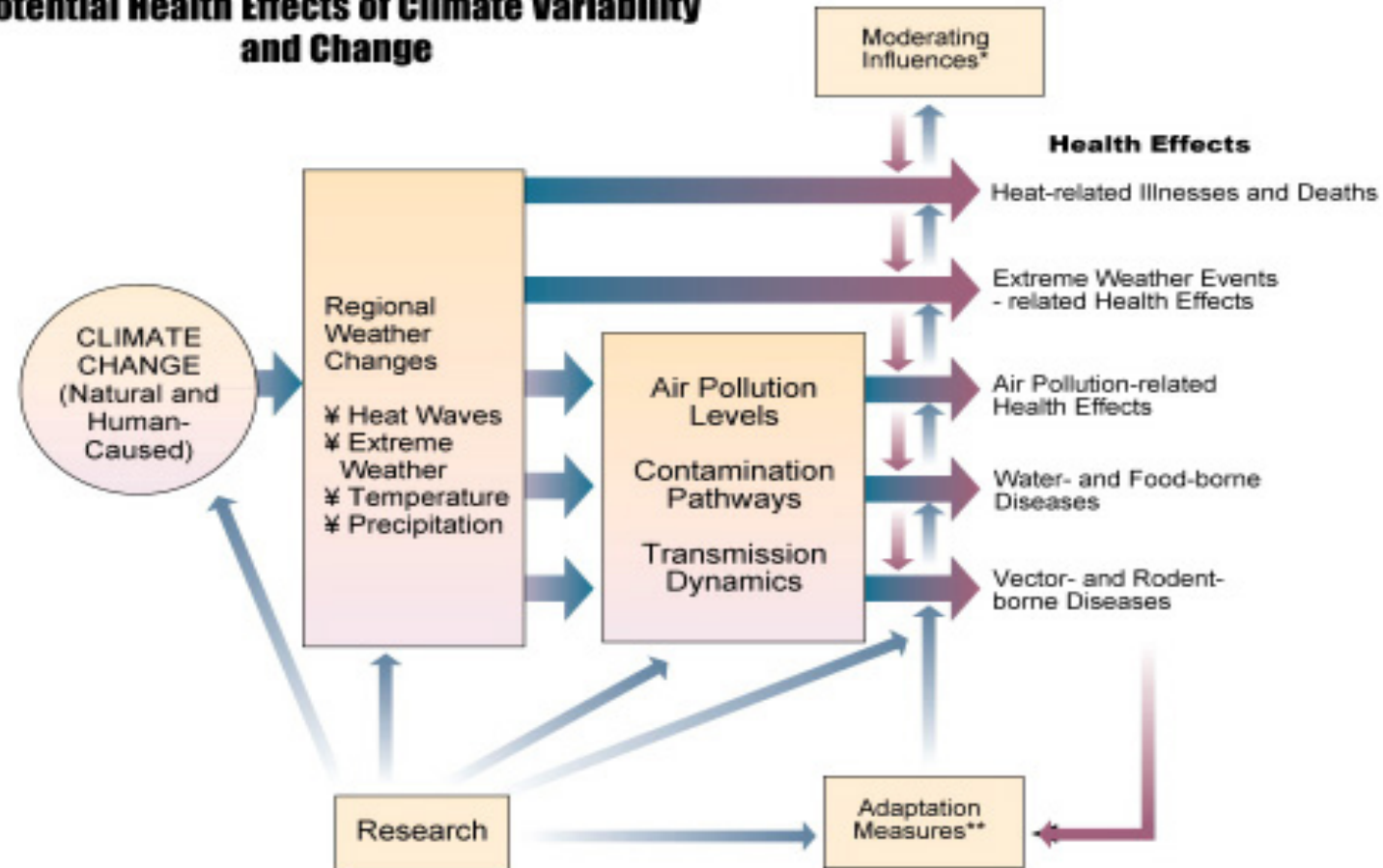


Transportation /
Infrastructure

Climate & weather cross-cut all areas

Why Health & Air Quality?

Potential Health Effects of Climate Variability and Change



Source: GEO,
2003

AIR POLLUTION – THE SILENT KILLER



Every year, around
7 MILLION DEATHS
are due to exposure
from both outdoor
and household air
pollution.

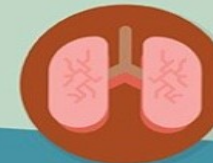
Air pollution is a major environmental risk to health. By reducing air pollution levels, countries can reduce:



Stroke



**Heart
disease**



**Lung cancer, and
both chronic and acute
respiratory diseases,
including asthma**

REGIONAL ESTIMATES ACCORDING TO WHO REGIONAL GROUPINGS:



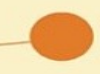
Over 2 million
in South-East Asia Region



Over 2 million
in Western Pacific Region



Nearly 1 million
in Africa Region



About 500 000
deaths in Eastern Mediterranean Region



About 500 000
deaths in European Region



More than 300 000
in the Region of the Americas

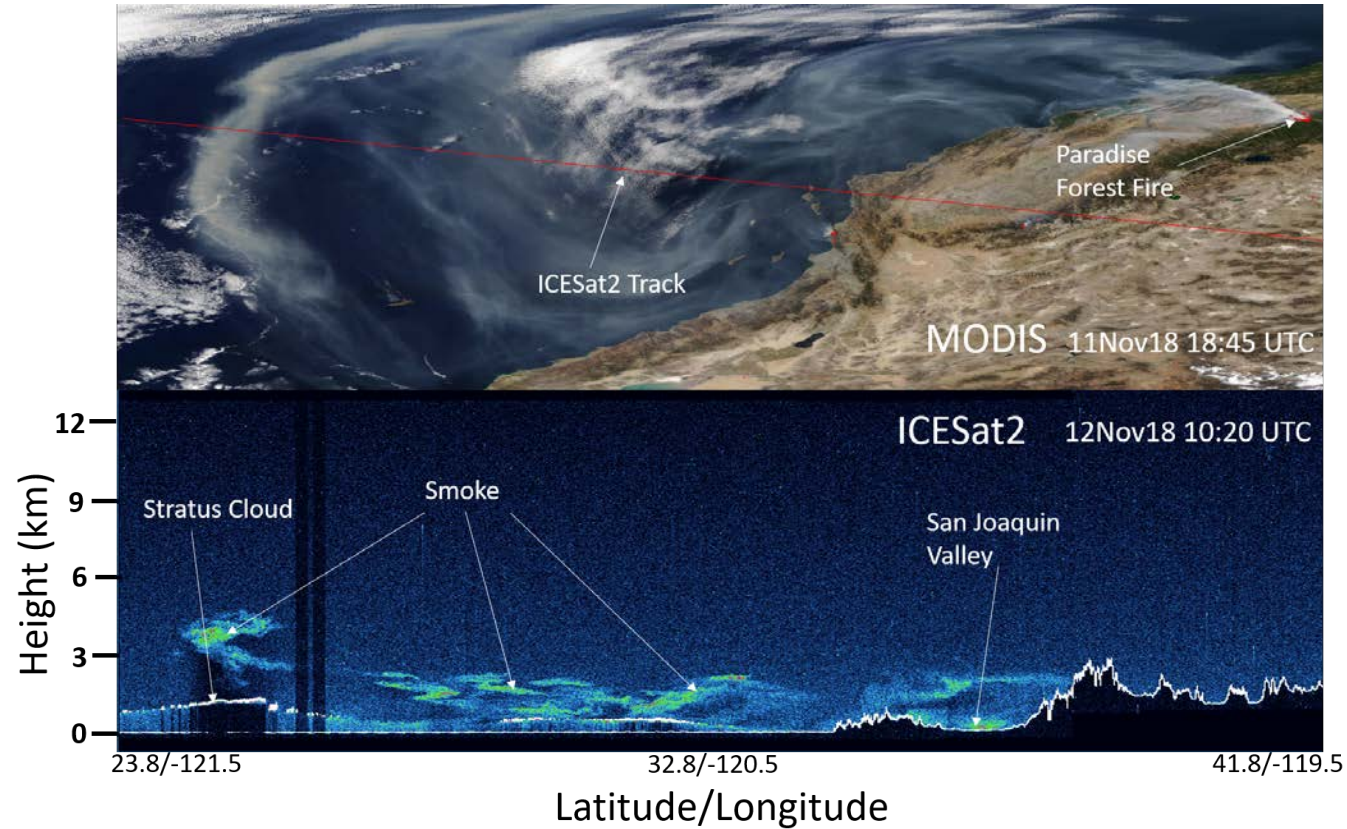
CLEAN AIR FOR HEALTH

#AirPollution



**World Health
Organization**

New Environmental Threats



Observations of the Paradise wildfire in California from MODIS and ICESat-2 on November 11-12, 2018. The Paradise wildfire was the deadliest wildfire in the US in 100 years, with over 85 casualties.



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.

Stoplight/Costing

Technical			Budget/Cost			Schedule			Performance			Overall	
Prev	This		Prev	This		Prev	This		Prev	This		Prev	This
Review	Review		Review	Review		Review	Review		Review	Review		Review	Review
G	G		G	G		G	G		G	G		G	G

Technical:

- The portfolio is technically performing very well.

Budget/Cost:

- Portfolio has considerably improved its burden of uncosted funds. Associates are working diligently with PIs to uncover issues at their particular institutions. Many times this appears to be an issue of “invoice lag” between NASA and the institution. However, significant progress has been made – FY17 uncosted funds are down ~97% from a year ago. FY18 uncosted funds are down ~30% from a year ago.

Schedule:

- Overall the portfolio has a good track record for remaining on schedule, with NCEs approved on a case-by-case basis.

Performance:

- Overall performance of the portfolio meets or exceeds expectations.

Overall:

- The Health and AQ program is performing satisfactorily.

Health and Air Quality: Portfolio

May 2019

Project Portfolio – 20 Active Projects**

ARL 1-3: 11 projects
ARL 4-6: 4 projects
ARL 7-9: 5 projects

Mean: ARL 4.4
Median: ARL 3
Mode: 3

Performance since May 2018:

78% of projects active in May 2018 increased by at least 1 ARL, and 33% increased by 2 or more ARLs.

****13 additional projects are HAQAST, which are not reporting ARLs. ROSES 2016 GEO projects' ARLs are included.**

2

ARL 9

—

0

ARL 8

—

3

ARL 7

—

1

ARL 6

—

1

ARL 5

—

2

ARL 4

—

8

ARL 3

—

2

ARL 2

—

1

ARL 1

Major News Items in the ESD/ASP

- Social media campaign and web features for National Public Health Week, April 1-7 (<https://science.nasa.gov/earth-science/applied-sciences/making-space-for-earth/public-health-week-feature>), and National Mosquito Control Awareness Week, June 23-29 (<https://science.nasa.gov/earth-science/applied-sciences/making-space-for-earth/fighting-mosquitoes-from-space>).
- Update presented on EO4HEALTH Initiative Plan at the GEO Symposium in Geneva, May 27-29.
- **ARSET Advanced Webinar: High Resolution NO₂ Monitoring From Space with TROPOMI**, May 28 – June 3, 2019.
- Presentations at the American Meteorological Society Annual Meeting (Phoenix), the American Mosquito Control Association (AMCA)'s Annual Washington Conference (Alexandria, VA), the American Thoracic Society Annual Meeting (Dallas), the Air and Waste Management Association Annual Conference (Quebec City), and the National Drought and Public Health Summit (Atlanta).
- CDC Tracking Meeting and Celebration of 15 years in Partnership with NASA (Atlanta, September 4-6).
- 2019 Health and AQ Applications Annual Team Meeting set for September 10-11 in Rapid City, SD.
- “Space for U.S.” web portal launched: <http://nasa.gov/spaceforus>
- 2018 Health and Air Quality Applications Annual Report posted to ASP website, along with newsletters.
- **Personnel:**
 - Sandra Cauffman continues as Acting Director of ESD; Paula Bontempi named as Acting Deputy Director of ESD.
 - Advertised for new APM for the AQ portfolio. Decision expected by August 2019.
 - Emily Sylak-Glassman accepted a position as a Program Manager in ASP and began in June.
 - Aries Keck named as the ASP Communications Manager with the U.Group team.

**Call for Abstracts
AGU Fall Meeting
December 9-13, 2019
San Francisco, CA**

Session ID: 78469

Session Title: Satellites at the Intersection of Health and Air Quality: Seeing What You Breathe and Understanding Disease Exposures: NASA Earth Observation Systems and Applications for Public Health, Air Quality, Environmental Management, and Public Outreach

Section: GeoHealth

Session Details: <https://agu.confex.com/agu/fm19/gateway.cgi>

Due Date: July 31, 2019

Please contact Sue Estes for more details (sue.m.estes@nasa.gov)

FY20 President's Budget Request

Science

EARTH SCIENCE

Budget Authority (in \$ millions)	Actual FY 2018	Enacted FY 2019	Request FY 2020	FY 2021	FY 2022	FY 2023	FY 2024
Earth Science Research	461.6	--	447.9	466.9	484.1	508.1	532.4
Earth Systematic Missions	899.4	--	719.2	701.5	664.1	501.5	481.3
Earth System Science Pathfinder	242.0	--	275.4	255.1	253.0	265.2	248.3
Earth Science Data Systems	204.4	--	214.4	229.0	239.3	250.1	267.7
Earth Science Technology	60.4	--	69.6	79.2	82.8	84.6	86.4
Applied Sciences	53.2	--	53.3	53.9	56.3	57.0	58.5
Total Budget	1921.0	--	1779.8	1785.6	1779.7	1666.5	1674.6

FY20 President's Budget Request

SMD/Earth Science Division - Applied Sciences

Budget FY14-FY24 (in millions)

	Enacted						FY20 President's Request				
Applied Sciences Program Budget	FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24
	\$35.0	\$40.4	\$47.6	\$39.4	\$53.2	\$55.1	\$53.3	\$53.9	\$56.3	\$57.0	\$58.5

Note: NASA Operating Plan change increased FY15 by \$4M to \$40.4M.

Note: FY17 harvested funds to improve costing; rephased in Operating Plans to FY18-20.

Note: FY19 enacted was \$53.1M; \$2M additional is proposed in NASA's Operating Plan Request for FY19.

Earth Decadal Survey

ESD Leadership is conducting bi-weekly Division-wide listening sessions (*for ESD staff to convey what they want to share about the Dec.Survey*).

ESD is holding monthly telecons with NASA Center leadership.

ESD is holding community forums at 4-month intervals to a) inform public about progress, decisions, and plans and b) respond to public questions.

Engagement with interagency and international partners.

Town Halls at professional society meetings.

NASA Earth Science Decadal Website

<https://science.nasa.gov/earth-science/decadal-surveys>

Provides information to community and a conduit for public to pose questions and read responses.

On the website:

Earth Science Decadal Inputs

- > [Send us your questions about the Decadal](#)
- > [Decadal Survey Questions](#)
- > [Decadal Survey Community Forums](#)
- > [Presentations and Other Materials](#)

"Inside NASA" Web Page for Decadal

<https://inside.nasa.gov/2017ESAS>

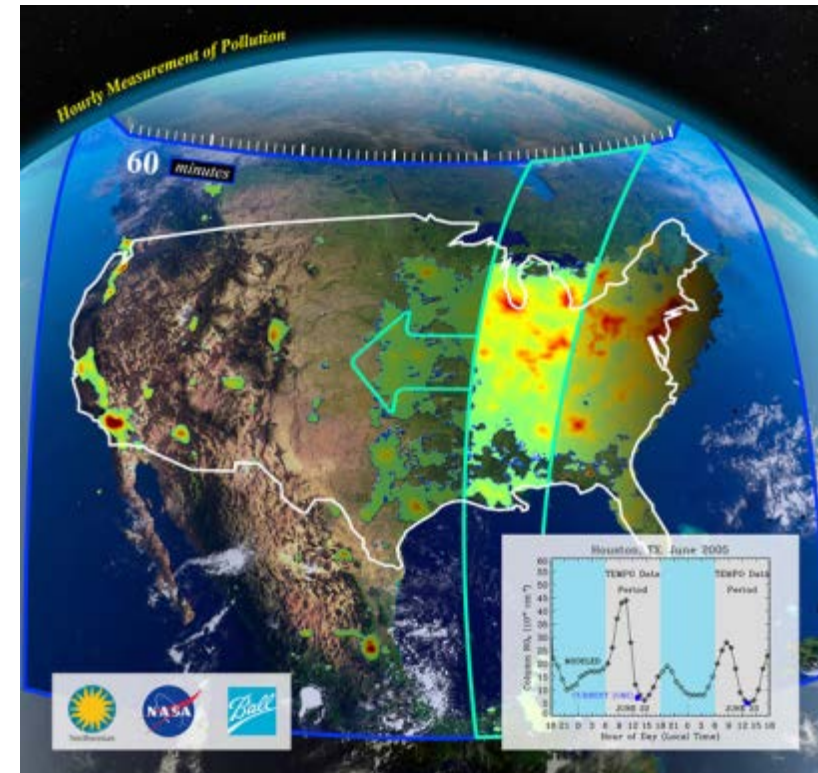
<< has copy of slides shown at Community Forums

Earth Venture Instrument-1:

Tropospheric Emissions: Monitoring of Pollution (TEMPO)

“Monitoring the air we breathe, hour by hour”

- ***TEMPO is a pathfinder to using hosted commercial payloads from GEO***
- Tropospheric pollution observations from Geostationary Orbit
 - Ozone, NO₂, and CH₂O.
- Forms a global Air Quality constellation in GEO with Copernicus Sentinel 4 and Korean GEMS.
- EPA and NOAA are part of the science team.
- Instrument delivered in 2018; Launch scheduled for 2022.



Earth Venture Instrument-3:



Multi-Angle Imager for Aerosols

Associating airborne particle types with adverse health outcomes

Salient Features:

MAIA is PI-led NASA Earth Ventures Instrument (EVI-3 selection)

Category 3 mission per NPR 7120.5E

Risk Classification C per NPR 8705.4

Cost capped at \$100.1M

Host platform: General Atomics Orbital Test Bed (OTB) - 2

Payload delivery: September 2020

Orbit: 370-830 km, 50-130° inclination, sun-synch preferred

Launch: Scheduled for 2022

Nominal Mission: 3 yr baseline; 2 yr threshold after 90-day IOC

Principal Investigator: Dr. David Diner (JPL)

Project Manager: Kevin Burke (JPL)

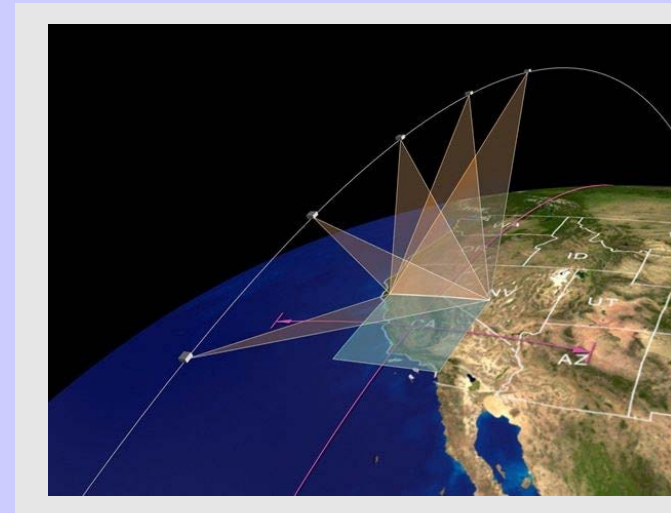
ESSP Program Manager: Greg Stover, Msn Mgr: Diane Hope

JPL Program Manager: Dr. Steven Bard, Deputy: Amit Sen

Program Scientist: Dr. Hal Maring, NASA HQ

Program Executive: Barbara Hilton, NASA HQ

Program Applications: John Haynes, NASA HQ



Mission Objectives: Assess linkages between different airborne particulate matter (PM) types and adverse birth outcomes, cardiovascular and respiratory disease, and premature deaths.

Instrument: Multi-angle spectropolarimetric imaging instrument for operation in a sun-synchronous Earth orbit to measure the particle types, sizes, concentrations, and geolocation of atmospheric aerosols.



National Aeronautics and
Space Administration



Questions:

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Health & Air Quality Applications
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<http://AppliedSciences.NASA.gov>