National Aeronautics and Space Administration

NASA's Earth-Observing Missions

Characterize

How is the global Earth system changing?

Understand

What are the sources of change in the Earth system and their magnitudes and trends?

Predict

How will the Earth system change in the future?

Apply

How can Earth system science improve mitigation of and adaption to global change?

Scan for more information

National Aeronautics and Space Adminsitration

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NASA's Earth-Observing Missions

To study the Earth as a whole system and understand how it is changing, NASA works with its domestic and international partners to support a large number of Earth-observing satellite missions. These missions provide Earth science researchers the necessary data to address key questions about global climate change.

Operating Missions

Operating missions are those missions that are currently active and providing science data to researchers and operational users. Operating missions may be in their primary or extended operations phase. Currently NASA operates nineteen Earth-observing satellite missions, as well as a number of flight (i.e., airborne) missions, that provide both focused and long-term global observations of the land surface, biosphere, solid Earth, atmosphere, ocean, and cryosphere. Data from these missions enables an improved understanding of the Earth as an integrated system.

Future Missions

Missions begin with a study phase during which the key science objectives of the mission are identified, and designs for spacecraft and instruments are analyzed. Following a successful study phase, missions enter a development phase whereby all aspects of the mission are developed and tested to ensure objectives will be met.

Data

To access and download Earth-observing satellite data, visit NASA's Earth Observing System Data and Information System (EOSDIS) at *earthdata.nasa.gov*.

Airborne Missions

(partial list)

Earth Venture Sub-Orbital 2 (EVS-2)

ACT-America

ATom

NAAMES

OMG

ORACLES

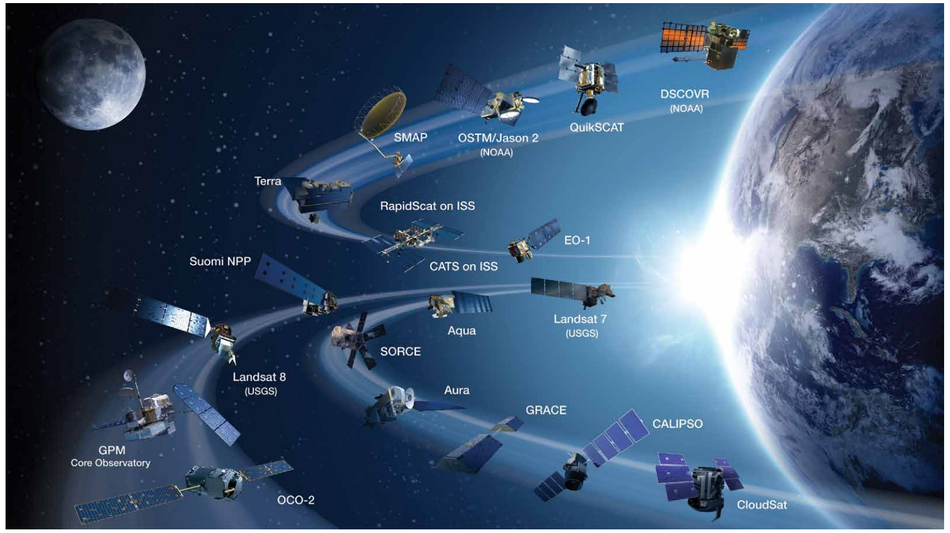
ACT-America	Atmospheric Carbon and Transport - America *science.nasa.gov/missions/act-america*
ATom	Atmospheric Tomography Mission *science.nasa.gov/missions/atom*
NAAMES	North Atlantic Aerosols and Marine Ecosystems Study *science.nasa.gov/missions/naames*
OMG	Oceans Melting Greenland *science.nasa.gov/missions/omg*
ORACLES	ObseRvations of Aerosols Above Clouds and Their IntEractionS *science.nasa.gov/missions/oracles*

Operation IceBridge

Operation IceBridge	*nasa.gov/icebridge*

Operating Satellite Missions

(including partnerships, as of October 2015)

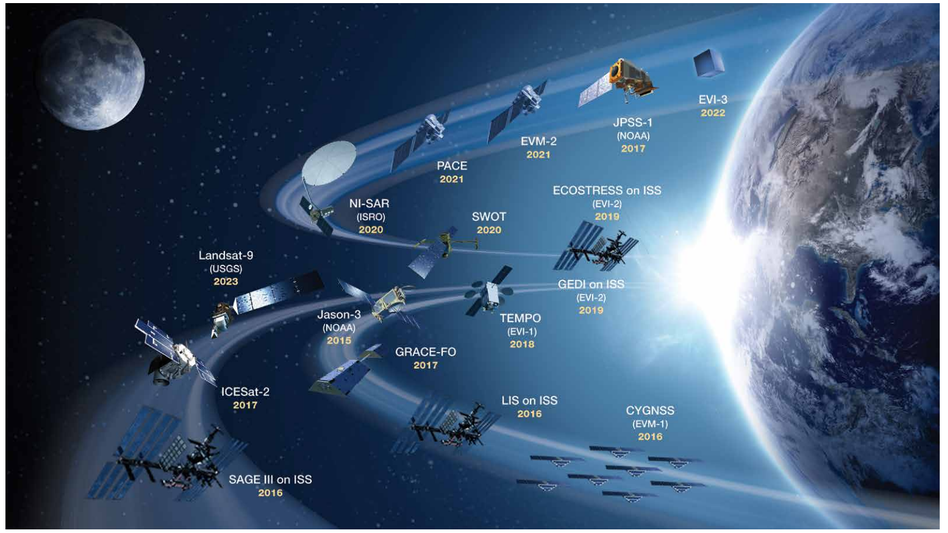


This graphic depicts NASA's operating Earth science satellite missions as of October 2015. Image credit: NASA/Jenny Mottar

OPERATING MISSIONS		LAUNCH DATE	SCIENCE FOCUS
Aqua	*aqua.nasa.gov*	2002	Water Cycle
Aura	*aura.gsfc.nasa.gov*	2004	Atmospheric Chemistry
CALIPSO[1]	*www-calipso.larc.nasa.gov*	2006	Clouds and Aerosols
CATS[2] **on ISS**[16]	*cats.gsfc.nasa.gov*	2014	Clouds and Aerosols
CloudSat	*cloudsat.atmos.colostate.edu*	2006	Cloud Structure
DSCOVR[4] **(NOAA**[20]**)**	*nesdis.noaa.gov/DSCOVR*	2015	Space Weather and Earth Observations
EO-1[6]	*eo1.gsfc.nasa.gov*	2000	Land Imaging
GPM[11] **Core Observatory**	*pmm.nasa.gov/GPM*	2014	Precipitation
GRACE[12]	*grace.jpl.nasa.gov*	2002	Earth's Gravity Field
Landsat 7 (USGS[32]**)**	*landsat.gsfc.nasa.gov*	1999	Land Imaging
Landsat 8 (USGS)	*landsat.gsfc.nasa.gov*	2013	Land Imaging
OCO-2[21]	*oco.jpl.nasa.gov*	2014	Atmospheric Carbon Dioxide
OSTM/Jason-2[22] **(NOAA)**	*sealevel.jpl.nasa.gov/missions/ostmjason2*	2008	Ocean Surface Topography
QuickSCAT[24]	*winds.jpl.nasa.gov/missions/quikscat*	1999	Near-Surface Ocean Winds
RapidScat[25] **on ISS**	*winds.jpl.nasa.gov/missions/RapidScat*	2014	Near-Surface Ocean Winds
SMAP[26]	*smap.jpl.nasa.gov*	2014	Soil Moisture
SORCE[27]	*lasp.colorado.edu/sorce/index.htm*	2003	Solar Radiation
Suomi NPP[28]	*npp.gsfc.nasa.gov*	2011	EOS[7] Data Continuity and Operational Uses
Terra	*terra.nasa.gov*	1999	Land Processes

Future Missions

(including partnerships, as of October 2015)



This graphic depicts the majority of NASA's planned (i.e., future) Earth science missions as of October 2015, extending out to 2023. Image credit: NASA/Jenny Mottar

FUTURE MISSIONS		LAUNCH DATE	SCIENCE FOCUS
CYGNSS[3] **(EVM**[9]**-1)**	*aoss-research.engin.umich.edu/missions/cygnss*	2016	Ocean Winds, Extreme Weather Prediction
ECOSTRESS[5] **(EVI**[8]**-2) on ISS**[16]	*ecostress.jpl.nasa.gov*	2019	Evapotranspiration
EVI[8]**-3**	*TBD*	2022	TBD
EVM[9]**-2**	*TBD*	2021	TBD
GEDI[10] **(EVI-2) on ISS**	*science.nasa.gov/missions/gedi*	2019	Land Use and Ecosystems
GRACE-FO[13]	*grace.jpl.nasa.gov*	2017	Earth's Gravity Field
ICESat-2[14]	*icesat.gsfc.nasa.gov/icesat2*	2017	Polar Ice
Jason-3 (NOAA[20]**)**	*sealevel.jpl.nasa.gov/missions/jason3*	TBD	Ocean Surface Topography
JPSS-1[17] **(NOAA)**	*www.jpss.noaa.gov*	2017	EOS[7] Data Continuity and Operational Uses
Landsat 9 (USGS[32]**)**	*landsat.gsfc.nasa.gov*	2023	Land Imaging
LIS[18] **on ISS**	*thunder.nsstc.nasa.gov/lis*	2016	Lightning Distribution and Variability
NI-SAR[19] **(ISRO**[15]**)**	*nisar.jpl.nasa.gov*	2020	Solid Earth
PACE[23]	*eospso.gsfc.nasa.gov/missions/pre-aerosol-clouds-and-ocean-ecosystem*	2021	Ocean Biology and Ecology
SAGE III[29] **on ISS**	*sage.nasa.gov/SAGE3ISS*	2016	Stratospheric Ozone and Aerosols
SWOT[30]	*swot.jpl.nasa.gov*	2020	Surface Water and Ocean Topography
TEMPO[31] **(EVI-1)**	*science.nasa.gov/missions/tempo*	2018	Atmospheric Pollution

1 CALIPSO stands for Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observation.
2 CATS stands for Cloud-Aerosol Transport System.
3 CYGNSS stands for Cyclone Global Navigation Satellite System.
4 DSCOVR stands for Deep Space Climate Observatory.
5 ECOSTRESS stands for ECOsystem Spaceborne Thermal Radiometer Experiment on Space Station.
6 EO-1 stands for Earth Observing-1.
7 Earth Observing System (EOS) data continuity and operations will continue measurements that began with flagship EOS missions (Aqua, Aura, Terra).
8 EVI stands for Earth Venture Instrument series (e.g., TEMPO is EVI-1; ECOSTRESS and GEDI are EVI-2).
9 EVM stands for Earth Venture Full Orbital Mission series (e.g., CYGNSS is EVM-1).
10 GEDI stands for Global Ecosystem Dynamics Investigation.
11 GPM stands for Global Precipitation Measurement.
12 GRACE stands for Gravity Recovery and Climate Experiment.
13 GRACE-FO stands for Gravity Recovery and Climate Experiment-Follow On.
14 ICESat-2 stands for the second Ice, Cloud, and land Elevation Satellite.
15 ISRO stands for Indian Space Research Organisation.
16 ISS stands for International Space Station.
17 JPSS-1 stands for Joint Polar Satellite System.
18 LIS stands for Lightning Image Sensor.
19 NI-SAR stands for NASA-ISRO Synthetic Aperture Radar.
20 NOAA stands for National Oceanic and Atmospheric Administration.
21 OCO-2 stands for the second Orbiting Carbon Observatory.
22 OSTM/Jason-2 stands for Ocean Surface Topography Mission on Jason-2.
23 PACE stands for Pre-Aerosol, Clouds, and ocean Ecosystem.
24 QuickSCAT stands for Quick Scatterometer.
25 RapidScat stands for Rapid Scatterometer.
26 SMAP stands for Soil Moisture Active Passive.
27 SORCE stands for Solar Radiation and Climate Experiment.
28 Suomi NPP stands for Suomi National Polar-orbiting Partnership.
29 SAGE III stands for the third Stratospheric Aerosol and Gas Experiment.
30 SWOT stands for Surface Water and Ocean Topography.
31 TEMPO stands for Tropospheric Emissions: Monitoring of Pollution.
32 USGS stands for United States Geological Survey.