CEOS
Committee on Earth Observation Satellites

esa

2010 Update - Key Tables

THE EARTH OBSERVATION HANDBOOK

→ www.eohandbook.com

Introduction

The Earth Observation Handbook, prepared by the European Space Agency (ESA) in support of the Committee on Earth Observation Satellites (CEOS), presents the main capabilities of satellite Earth observations, their applications, and a comprehensive overview of present and planned civil space agency Earth observation satellite missions and their instruments. The plans of more than 30 space agencies for missions, instruments and measurements during the coming decades are surveyed and captured in the report - making it the most up-to-date and comprehensive statement of governmental Earth observation programmes available.

The print edition of the EO Handbook is published every few years, and is always keenly anticipated by the space community for its insights into future trends world-wide in remote sensing programmes. The database which serves as the foundation for the missions, instruments, and measurements information at the heart of the Handbook content is updated annually and is always available on-line at:

http://database.eohandbook.com

The CEOS database is the only official, consolidated statement of the Earth observation programmes and plans of all the world's civil space agencies. The database is the cornerstone of the efforts of CEOS coordination on gaps and overlaps to optimise global observations in support of key societal needs such as climate change information.

The 2010 survey of CEOS space agencies is complete as of October 2010, and the database has been updated with the results. The database now features details of 261 Earth observing satellite missions and 775 instruments (416 distinct instruments, some being repeats), which are currently operating or planned for launch in the next 15 years - funded and operated by around 30 space agencies worldwide. The database allows users to filter, export and analyse this information in support of their analyses and planning.

Given the popularity of the print edition of the EO Handbook, and in lieu of a scheduled publication in 2010, the ESA team has prepared this printable PDF of key tables based on the 2010 database contents. It is hoped that this document will provide an interim solution of value to those many users who welcome having a bookshelf reference to hand.

The contents are as follows:

Recent & upcoming launches

7 missions have been launched by CEOS agencies since the start of 2010 through to publication on 1st October 2010:

Mission	Agency	Launch
GOES-15 (Geostationary Operational Environmental Satellite - 15)	NOAA	Mar 2010
CryoSat-2 (CryoSat-2 (Earth Explorer Opportunity Mission))	ESA	Apr 2010
PICARD	CNES	Jun 2010
TanDEM-X (TerraSAR-X Add-on for Digital Elevation Measurements)	DLR	Jun 2010
COMS (Communication, Oceanographic, Meteorological Satellite)	KARI / ASTRIUM / KMA / KORDI	Jun 2010
AISSat-1 (Automatic Identification System Satellite-1)	NSC	Jul 2010
CARTOSAT-2B (Cartography Satellite - 2B)	ISRO	Jul 2010

A further 29 missions are scheduled for launch between 1st October 2010 and the end of 2011:

Mission	Agency	Launch
Sich-2	NSAU	Oct 2010
NigeriaSat-2	NASRDA	Oct 2010
NigeriaSat-X	NASRDA	Oct 2010
COSMO-SkyMed 4 (COnstellation of small Satellites for Mediterranean basin Observation - 4)	ASI / MiD (Italy)	Oct 2010
RASAT (RASAT Remote Sensing Satellite)	TUBITAK	Oct 2010
Glory	NASA	Nov 2010
HY-1D (Ocean color and temperature satellite D)	NSOAS / CAST	Dec 2010
RESOURCESAT-2 (Resource Satellite-2)	ISRO	Dec 2010
KOMPSAT-5 (Korea Multi-Purpose Satellite 5)	KARI / TAS-i	Dec 2010
FY-3B (FY-3B Polar-orbiting Meteorological Satellite)	NRSCC / CMA	Dec 2010
Kanopus-V N1 (Kanopus-V Environmental Satellite N1)	ROSKOSMOS / ROSHYDROMET	Dec 2010
MEGHA-TROPIQUES	CNES / ISRO	Jan 2011
HY-2A (Ocean dynamics satellite A)	NSOAS / CAST	Jan 2011
RISAT-1 (Radar Imaging Satellite)	ISRO	Mar 2011
LARES (LAser RElativity Satellite)	ASI	Mar 2011
Pleiades 1	CNES	Mar 2011
SAC-D/Aquarius	CONAE / NASA	Apr 2011
HY-1C (Ocean color and temperature satellite C)	NSOAS / CAST	Jun 2011
Meteor-M N2 (Meteor-M Meteorological Satellite N2)	ROSHYDROMET / ROSKOSMOS	Jul 2011
INSAT-3D (Indian National Satellite - 3D)	ISRO	Aug 2011
NPP (NPOESS (National Polar-orbiting Operational Environmental Satellite System) Preparatory Project)	NASA / NOAA / DoD (USA)	Sep 2011
SARAL (Satellite with ARgos and ALtiKa)	CNES / ISRO	Oct 2011
CBERS-3 (China Brazil Earth Resources Satellite - 3)	INPE / CRESDA	Oct 2011
Elektro-L N1 (Geostationary Operational Meteorological Satellite - 1)	ROSHYDROMET / ROSKOSMOS	Dec 2011
KOMPSAT-3 (Korea Multi-Purpose Satellite 3)	KARI / ASTRIUM	Dec 2011
HJ-1C (Disaster and Environment Monitoring and Forecast Small Satellite Constellation C)	CRESDA / CAST / NRSCC	Dec 2011
FY-2F (FY-2F Geostationary Meteorological Satellite)	NRSCC	Dec 2011
Resurs P N1 (Resurs P Environmental Satellite N1)	ROSKOSMOS / ROSHYDROMET	Dec 2011
PAZ	CDTI	Dec 2011

A-Z table of satellite missions

CEOS agencies are operating or planning 261 individual satellite Earth observation missions in the 2010 - 2025 period. The table below presents their main characteristics. Please refer to the missions table in the on-line database for the ability to export or analyse this data in more detail:

http://database.eohandbook.com/database/missiontable.aspx

Mission	Status	Launch Date	EOL Date	Applications	Instruments	Orbit Details & URL
3D Winds Three Dimensional Tropospheric Winds from Space Based Lidar NASA	Considered	01 Jan 2030	01 Jan 2033	Phase-2 DS Mission, launch order unknown, 3-year nominal mission. Tropospheric winds for weather forecasting and pollution transport	HDWL (3D Winds)	Type: Sun-synchronous Altitude: 400 km Period: Inclination: 97.03 deg Repeat cycle: 12 days LST: 6:00 Longitude (if geo): Asc/desc: Ascending URL: http://decadal.gsfc.nasa.gov/3dwinds.html
ACE Aerosol Clouds and Ecosystem Mission NASA	Considered	01 Jan 2020	01 Jan 2023	Phase-2 DS Mission, launch order unknown, 3-year nominal mission. Aerosol and cloud profiles for climate and water cycle; ocean color for open ocean biogeochemistry	Cloud radar (ACE), Next Gen APS (ACE), Multi-band UV/VIS Spectrometer (ACE), HSRL (ACE)	Type: Sun-synchronous Altitude: 650 km Period: Inclination: 98.2 deg Repeat cycle: LST: 13:00 Longitude (if geo): Asc/desc: Ascending URL: http://dsm.gsfc.nasa.gov/ace/science.html
ACRIMSAT Active Cavity Radiometer Irradiance Monitor NASA	Currently being flown	20 Dec 1999	30 Sep 2011	5-year nominal mission life, currently in extended operations. Will sustain long-term solar luminosity database by providing measurements of total solar irradiance and the solar constant	ACRIM III	Type: Sun-synchronous Altitude: 716 km Period: 90 mins Inclination: 98.13 deg Repeat cycle: LST: 10:50 Longitude (if geo): Asc/desc: Descending URL: http://acrim.jpl.nasa.gov/
ADM-Aeolus Atmospheric Dynamics Mission (Earth Explorer Core Mission) ESA	Approved	28 Feb 2012	28 May 2015	Will provide wind profile measurements for global 3D wind field products used for study of atmospheric dynamics, including global transport of energy, water, aerosols, and chemicals	ALADIN	Type: Sun-synchronous Altitude: 405 km Period: 92.5 mins Inclination: 97.01 deg Repeat cycle: 7 days LST: 18:00 Longitude (if geo): Asc/desc: Ascending URL: http://www.esa.int/export/esaLP/aeolus.html
AISSat-1 Automatic Identification System Satellite-1 NSC	Currently being flown	12 Jul 2010	01 Aug 2013	Demonstrate and extend access to AIS (Automatic Identification System) signals beyond the land-based AIS system operated by the Norwegian Coastal Administration today. Observe ship traffic in the High North.	SDR	Type: Sun-synchronous Altitude: Period: Inclination: Repeat cycle: LST: TBD Longitude (if geo): Asc/desc: Descending URL:
ALOS Advanced Land Observing Satellite JAXA	Currently being flown	24 Jan 2006	01 Sep 2013	Cartography, digital terrain models, environmental monitoring, disaster monitoring, civil planning, agriculture and forestry, Earth resources, land surface	AVNIR-2, PALSAR, PRISM	Type: Sun-synchronous Altitude: 692 km Period: 98.7 mins Inclination: 98.16 deg Repeat cycle: 46 days LST: 10:30 Longitude (if geo): Asc/desc: Descending URL: http://www.jaxa.jp/projects/sat/alos/index_e.html
ALOS-2 Advanced Land Observing Satellite-2 JAXA	Approved	01 Jan 2013	01 Jan 2017	environmental monitoring, disaster monitoring, civil planning, agriculture and forestry, Earth resources, land surface	L-Band SAR (ALOS-2)	Type: Sun-synchronous Altitude: 628 km Period: 100 mins Inclination: 97.9 deg Repeat cycle: 14 days LST: 12:00 Longitude (if geo): Asc/desc: Descending URL: http://www.jaxa.jp/projects/sat/alos2/index_e.html
ALOS-3 Advanced Land Observing Satellite-3 JAXA	Planned	01 Jan 2014	01 Jan 2018	Cartography, digital terrain models, environmental monitoring, disaster monitoring, civil planning, agriculture and forestry, Earth resources, land surface	Optical or HyperSpectral (TBD)	Type: Sun-synchronous Altitude: Period: Inclination: Repeat cycle: LST: 13:30 Longitude (if geo): Asc/desc: Descending URL:
AMAZONIA-1 Remote Sensing Satellite 1 INPE	Approved	30 Jun 2013	30 Jun 2017	Earth resources, environmental monitoring, land surface	AWFI	Type: Sun-synchronous Altitude: 753 km Period: Inclination: 0 deg Repeat cycle: LST: Longitude (if geo): Asc/desc: Descending URL: http://www.inpe.br/programas/mecb/default.htm
Aqua Aqua (formerly EOS PM-1) NASA / JAXA / BNISS / INPE	Currently being flown	04 May 2002	30 Sep 2011	6-year nominal mission life, currently in extended operations. Atmosphericdynamics/water and energy cycles, cloudformation, precipitationand radiativeproperties, air/seafluxes of energy andmoisture, sea ice extentand heat exchange with the atmosphere. Option of 705km or 438km orbit altitude.	AIRS, MODIS, CERES, HSB, AMSR-E, AMSU-A	Type: Sun-synchronous Altitude: 705 km Period: 98.8 mins Inclination: 98.2 deg Repeat cycle: 16 days LST: 13:30 Longitude (if geo): Asc/desc: Ascending URL: http://www.gsfc.nasa.gov
ASCENDS Active Sensing of CO2 Emissions over Nights, Days, and Seasons NASA	Considered	01 Jan 2020	01 Jan 2023	Phase-2 DS Mission, launch order unknown, 3-year nominal mission. Day/night, all-latitude, all-season CO2 column integrals for climate emissions	CO2 LIDAR (ASCENDS)	Type: Sun-synchronous Altitude: 450 km Period: 97.3 mins Inclination: Repeat cycle: LST: 10:30 Longitude (if geo): Asc/desc: Ascending URL: http://cce.nasa.gov/ascends/index.htm
Aura Aura (formerly EOS Chemistry) NASA / NSO / FMI / BNSC	Currently being flown	15 Jul 2004	30 Sep 2011	5-year nominal mission life, currently in extended operations. Chemistry and dynamics of Earth's atmosphere from the ground through the mesosphere.	MLS (EOS-Aura), TES, HiRDLS, OMI	Type: Sun-synchronous Altitude: 705 km Period: 98.8 mins Inclination: 98.2 deg Repeat cycle: 16 days LST: 13:38 Longitude (if geo): Asc/desc: Ascending URL: http://aura.gsfc.nasa.gov/
AWiFSSAT Advance Wide Field Sensor Satellite ISRO	Considered	01 Jan 2012	01 Jan 2016	Natural resources management; agricultural applications; forestry etc.	AWiFS	Type: Sun-synchronous Altitude: 817 km Period: 102 mins Inclination: 98.72 deg Repeat cycle: 4 days LST: Longitude (if geo): Asc/desc: Descending URL:

Mission	Status	Launch Date	EOL Date	Applications	Instruments	Orbit Details & URL
BJ-1 Beijing-1 Small Satellite NRSCC	Currently being flown	27 Oct 2005	27 Oct 2010	Earth Observation	MSI (BJ-1), PAN (BJ-1)	Type: Sun-synchronous Altitude: 686 km Period: Inclination: 98.17 deg Repeat cycle: LST: Longitude (if geo): Asc/desc: TBD URL: www.blmit.com.cn
CALIPSO Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observations NASA / CNES	Currently being flown	28 Apr 2006	30 Sep 2011	3-year nominal mission life, currently in extended operations. Measurements of aerosol & cloud properties for climate predictions, using a 3 channel lidar and passive instruments in formation with Aqua and CloudSat for coincident observations of radiative fluxes and atmospheric state.	WFC, IIR, CALIOP	Type: Sun-synchronous Altitude: 705 km Period: 98.8 mins Inclination: 98.2 deg Repeat cycle: LST: 13:30 Longitude (if geo): Asc/desc: Ascending URL: http://www-calipso.larc.nasa.gov/
CARTOSAT-1 Cartography Satellite - 1 (IRS P5) ISRO	Currently being flown	05 May 2005	31 Dec 2011	High precision large-scale cartographic mapping of 1:10000 scale and thematic applications (with merged XS data) at 1:4000 scales	PAN (Cartosat-1)	Type: Sun-synchronous Altitude: 618 km Period: 97 mins Inclination: 97.87 deg Repeat cycle: 5 days LST: 10:30 Longitude (if geo): Asc/desc: Descending URL: http://www.isro.org/
CARTOSAT-2 Cartography Satellite - 2 ISRO	Currently being flown	10 Jan 2007	01 Jan 2011	High precision large-scale cartographic mapping of 1:10000 scale and thematic applications (with merged XS data) at 1:4000 scales	PAN (Cartosat-2)	Type: Sun-synchronous Altitude: 635 km Period: 97.4 mins Inclination: 97.87 deg Repeat cycle: 5 days LST: 9:30 Longitude (if geo): Asc/desc: Descending URL: http://www.isro.org/
CARTOSAT-2B Cartography Satellite - 2B ISRO	Currently being flown	12 Jul 2010	01 Jul 2015	High precision large-scale cartographic mapping of 1:10000 scale and thematic applications (with merged XS data) at 1:4000 scales	PAN (Cartosat-2B)	Type: Sun-synchronous Altitude: 635 km Period: 97.4 mins Inclination: 97.87 deg Repeat cycle: 5 days LST: 9:30 Longitude (if geo): Asc/desc: Descending URL:
CARTOSAT-3 Cartography Satellite - 3 ISRO	Planned	01 Jan 2013	01 Jan 2017	Suitable for cadastral and infrastructure mapping and analysis	ULTRAPAN (Cartosat-3)	Type: Sun-synchronous Altitude: Period: Inclination: Repeat cycle: LST: Longitude (if geo): Asc/desc: Descending URL: http://www.isro.org/
CBERS-3 China Brazil Earth Resources Satellite - 3 INPE / CRESDA	Approved	20 Oct 2011	21 Oct 2014	Earth resources, environmental monitoring, land surface	WFI-2, MUX, DCS (CAST), IRS, PAN	Type: Sun-synchronous Altitude: 778 km Period: 100.26 mins Inclination: 98.5 deg Repeat cycle: 26 days LST: 10:30 Longitude (if geo): Asc/desc: Descending URL: http://www.cresda.com/ & http://www.cbers.inpe.br/en/programas/cbers3-4.htm
CBERS-4 China Brazil Earth Resources Satellite - 4 INPE / CRESDA	Approved	20 Oct 2014	20 Oct 2017	Earth resources, environmental monitoring, land surface	WFI-2, MUX, IRS, PAN	Type: Sun-synchronous Altitude: 778 km Period: 100.26 mins Inclination: 98.5 deg Repeat cycle: 26 days LST: 10:30 Longitude (if geo): Asc/desc: Descending URL: http://www.cresda.com/ & http://www.cbers.inpe.br/en/programas/cbers3-4.htm
CHAMP Challenging Mini-Satellite Payload for Geophysical Research and Application DLR	Currently being flown	15 Jul 2000	10 Nov 2010	Gravity field, precise geoid, magnetic field, atmospheric physics	CHAMP Gravity Package (Accelerometer+GPS), CHAMP Magnetometry Package (1 Scalar + 2 Vector Magnetometer), CHAMP GPS Sounder	Type: Inclined, non-sunsynchronous Altitude: 315 km Period: Inclination: 87 deg Repeat cycle: LST: Longitude (if geo): Asc/desc: N/A URL: http://op.gfz-potsdam.de/champ/index_CHAMP.html
CLARREO Climate Absolute Radiance and Refractivity Observatory NASA / NOAA	Considered	30 Oct 2017	30 Oct 2020	Phase-1 DS Mission (follows SMAP and ICESAT-2), 3-year nominal mission. Solar radiation: spectrally resolved forcing and response of the climate system	Occultation GNSS Receiver (CLARREO), IR spectrometer (CLARREO), Solar reflected spectrometer (CLARREO)	Type: Inclined, non-sunsynchronous Altitude: 650 km Period: Inclination: 90 deg Repeat cycle: 365 days LST: Longitude (if geo): Asc/desc: URL: http://nasascience.nasa.gov/missions/clarreo
CloudSat NASA / DoD (USA) / CSA	Currently being flown	28 Apr 2006	30 Sep 2011	3-year nominal mission life, currently in extended operations. CloudSat will use advanced radar to "slice" through clouds to see their vertical structure, providing a completely new observational capability from space. One of first satellites to study clouds on global basis. Will fly in formation with Aqua and CALIPSO.	CPR (CloudSat)	Type: Sun-synchronous Altitude: 705 km Period: 98.8 mins Inclination: 98.2 deg Repeat cycle: LST: 13:30 Longitude (if geo): Asc/desc: Ascending URL: http://cloudsat.atmos.colostate.edu/
COMS Communication, Oceanographic, Meteorological Satellite KARI	Currently being flown	26 Jun 2010	01 Dec 2017	Korea's geostationary meterological satellite series	GOCI, MI	Type: Geostationary Altitude: Period: Inclination: Repeat cycle: LST: Longitude (if geo): Asc/desc: N/A URL:

Mission	Status	Launch Date	EOL Date	Applications	Instruments	Orbit Details & URL
COMS-2A Meteorological Satellite-2A KARI	Considered	01 Jan 2017	01 Jan 2024	Korea's geostationary meterological satellite series	Advanced MI	Type: Geostationary Altitude: Period: Inclination: Repeat cycle: LST: Longitude (if geo): Asc/desc: N/A URL:
COMS-2B Meteorological Satellite-2B KARI	Considered	01 May 2017	30 Apr 2024	Korea's geostationary oceanographic and environmental satellite	Advanced GOCI, GEMS	Type: Altitude: Period: Inclination: Repeat cycle: LST: Longitude (if geo): Asc/desc: URL:
COSMIC-1/FORMOSAT-3 FM1 Constellation Observing System for Meteorology, Ionosphere and Climate-1 NSPO / NOAA / UCAR	Currently being flown	14 Apr 2006	15 Mar 2011	Meteorology, Ionosphere and climate	GOX	Type: Inclined, non-sunsynchronous Altitude: 800 km Period: 100 mins Inclination: 72 deg Repeat cycle: LST: Longitude (if geo): Asc/desc: Ascending URL: http://www.cosmic.ucar.edu/
COSMIC-2/FORMOSAT-3 FM2 Constellation Observing System for Meteorology, Ionosphere and Climate-2 NSPO / NOAA / UCAR	Currently being flown	14 Apr 2006	15 Mar 2011	Meteorology, Ionosphere and climate	GOX	Type: Inclined, non-sunsynchronous Altitude: 800 km Period: 100 mins Inclination: 72 deg Repeat cycle: LST: Longitude (if geo): Asc/desc: Ascending URL: http://www.cosmic.ucar.edu/
COSMIC-3/FORMOSAT-3 FM3 Constellation Observing System for Meteorology, Ionosphere and Climate-3 NSPO / NOAA / UCAR	Currently being flown	14 Apr 2006	15 Mar 2011	Meteorology, Ionosphere and climate	GOX	Type: Inclined, non-sunsynchronous Altitude: 711 km Period: 100 mins Inclination: 72 deg Repeat cycle: LST: Longitude (if geo): Asc/desc: Ascending URL: http://www.cosmic.ucar.edu/
COSMIC-4/FORMOSAT-3 FM4 Constellation Observing System for Meteorology, Ionosphere and Climate-4 NSPO / NOAA / UCAR	Currently being flown	14 Apr 2006	15 Mar 2011	Meteorology, Ionosphere and climate	GOX	Type: Inclined, non-sunsynchronous Altitude: 800 km Period: 100 mins Inclination: 72 deg Repeat cycle: LST: Longitude (if geo): Asc/desc: Ascending URL: http://www.cosmic.ucar.edu/
COSMIC-5/FORMOSAT-3 FM5 Constellation Observing System for Meteorology, Ionosphere and Climate-5 NSPO / NOAA / UCAR	Currently being flown	14 Apr 2006	15 Mar 2011	Meteorology, Ionosphere and climate	GOX	Type: Inclined, non-sunsynchronous Altitude: 800 km Period: 100 mins Inclination: 72 deg Repeat cycle: LST: Longitude (if geo): Asc/desc: Ascending URL: http://www.cosmic.ucar.edu/
COSMIC-6/FORMOSAT-3 FM6 Constellation Observing System for Meteorology, Ionosphere and Climate-6 NSPO / NOAA / UCAR	Currently being flown	14 Apr 2006	15 Mar 2011	Meteorology, Ionosphere and climate	GOX	Type: Inclined, non-sunsynchronous Altitude: 800 km Period: 100 mins Inclination: 72 deg Repeat cycle: LST: Longitude (if geo): Asc/desc: Ascending URL: http://www.cosmic.ucar.edu/
COSMO-SkyMed 1 COnstellation of small Satellites for Mediterranean basin Observation - 1 ASI / MiD (Italy)	Currently being flown	08 Jun 2007	08 Jun 2014	Environmental monitoring, surveillance and risk management applications, environmental resources management, maritime management, earth topographic mapping, law enforcement, informative / science applications	SAR 2000	Type: Sun-synchronous Altitude: 620 km Period: 97.1 mins Inclination: 97.8 deg Repeat cycle: 16 days LST: 6:00 Longitude (if geo): Asc/desc: Ascending URL: http://www.asi.it/en/activity/earth_observation/cosmoskymed
COSMO-SkyMed 2 COnstellation of small Satellites for Mediterranean basin Observation - 2 ASI / MiD (Italy)	Currently being flown	09 Dec 2007	09 Dec 2014	Environmental monitoring, surveillance and risk management applications, environmental resources management, maritime management, earth topographic mapping, law enforcement, informative / science applications	SAR 2000	Type: Sun-synchronous Altitude: 620 km Period: 97.1 mins Inclination: 97.8 deg Repeat cycle: 16 days LST: 6:00 Longitude (if geo): Asc/desc: Ascending URL: http://www.asi.it/en/activity/earth_observation/cosmoskymed
COSMO-SkyMed 3 COnstellation of small Satellites for Mediterranean basin Observation - 3 ASI / MiD (Italy)	Currently being flown	27 Oct 2008	27 Oct 2015	Environmental monitoring, surveillance and risk management applications, environmental resources management, maritime management, earth topographic mapping, law enforcement, informative / science applications	SAR 2000	Type: Sun-synchronous Altitude: 620 km Period: 97.1 mins Inclination: 97.8 deg Repeat cycle: 16 days LST: 6:00 Longitude (if geo): Asc/desc: Ascending URL: http://www.asi.it/en/activity/earth_observation/cosmoskymed
COSMO-SkyMed 4 COnstellation of small Satellites for Mediterranean basin Observation - 4 ASI / MiD (Italy)	Approved	30 Oct 2010	15 Oct 2017	Environmental monitoring, surveillance and risk management applications, environmental resources management, maritime management, earth topographic mapping, law enforcement, informative / science applications	SAR 2000	Type: Sun-synchronous Altitude: 620 km Period: 97.1 mins Inclination: 97.8 deg Repeat cycle: 16 days LST: 6:00 Longitude (if geo): Asc/desc: Ascending URL: http://www.asi.it/en/activity/earth_observation/cosmoskymed

Mission	Status	Launch Date	EOL Date	Applications	Instruments	Orbit Details & URL
CryoSat-2 CryoSat-2 (Earth Explorer Opportunity Mission) ESA	Currently being flown	08 Apr 2010	08 Jul 2013	To determine fluctuations in the mass of the Earth's major land and marine ice fields.	DORIS-NG, SIRAL, Laser Reflectors (ESA)	Type: Inclined, non-sunsynchronous Altitude: 717 km Period: 100 mins Inclination: 92 deg Repeat cycle: 369 days LST: 0.25 degree nodal regression per day Longitude (if geo): Asc/desc: N/A URL: http://www.esa.int/export/esaLP/cryosat.html
CSG-1 COSMO-SkyMed Second Generation - 1 ASI / MiD (Italy)	Approved	30 Apr 2014	30 Oct 2021	Environmental monitoring, surveillance and risk management applications, environmental resources management, maritime management, earth topographic mapping, law enforcement, informative / science applications	SAR-2000 S.G.	Type: Sun-synchronous Altitude: 620 km Period: 97.1 mins Inclination: 97.8 deg Repeat cycle: 16 days LST: 6:00 Longitude (if geo): Asc/desc: Ascending URL: http://www.asi.it
CSG-2 COSMO-SkyMed Second Generation - 2 ASI / MiD (Italy)	Approved	30 Apr 2015	30 Oct 2022	Environmental monitoring, surveillance and risk management applications, environmental resources management, maritime management, earth topographic mapping, law enforcement, informative / science applications	SAR-2000 S.G.	Type: Sun-synchronous Altitude: 620 km Period: 97.1 mins Inclination: 97.8 deg Repeat cycle: 16 days LST: 6:00 Longitude (if geo): Asc/desc: Ascending URL: http://www.asi.it
D/F Climate Mission Methane Remote Sensing LIDAR Mission DLR / CNES	Planned	01 Jan 2014	01 Jan 2017	Global atmospheric Methane concentration.	IPDA LIDAR	Type: Sun-synchronous Altitude: 650 km Period: Inclination: Repeat cycle: LST: Longitude (if geo): Asc/desc: URL:
DEMETER Detection of Electro-Magnetic Emissions Transmitted from Earthquake Regions CNES	Currently being flown	29 Jun 2004	31 Dec 2010	Micro-satellite to study; ionospheric disturbances related to seismic activity, ionospheric disturbances related to human activity, pre and post-seismic effects in the ionosphere, global information on the Earth's electromagnetic environment	ICE, IMSC, IAP, ISL, IDP	Type: Sun-synchronous Altitude: 800 km Period: Inclination: Repeat cycle: LST: 10:30 Longitude (if geo): Asc/desc: TBD URL: http://smsc.cnes.fr/DEMETER/index.htm
DESDynI Deformation, Ecosystem, Structure, and Dynamics of Ice NASA	Considered	30 Oct 2017	30 Oct 2020	Phase-1 DS Mission (follows SMAP and ICESAT-2), 3-year nominal mission. Surface and ice sheet deformation for understanding natural hazards and climate; vegetation structure for ecosystem health	Multi-beam LIDAR (Desdyni), L-band INSAR (DESdynI)	Type: Sun-synchronous Altitude: 400 km Period: Inclination: 97 deg Repeat cycle: 8 days LST: 6:00 Longitude (if geo): Asc/desc: Ascending URL: http://desdyni.jpl.nasa.gov/
Diademe 1&2 CNES	Currently being flown	15 Feb 1967	31 Dec 2050	Geodetic measurements using satellite laser ranging	RRA	Type: Inclined, non-sunsynchronous Altitude: 1200 km Period: 108 mins Inclination: 40 deg Repeat cycle: LST: Longitude (if geo): Asc/desc: TBD URL: http://galileo.crl.go.jp/ilrs/diademe.html
DMSP F-14 Defense Meteorological Satellite Program F-14 NOAA	Currently being flown	04 Apr 1997	01 Oct 2010	The long-term meteorological programme of the US Department of Defense (DoD) - with the objective to collect and disseminate worldwide atmospheric, oceanographic, solar-geophyscial, and cloud cover data on a daily basis.	OLS, SSM/I, SSM/T-1, SSM/T-2, SSB/X-2, SSI/ES-2, SSJ/4, SSM	Type: Sun-synchronous Altitude: 833 km Period: 101 mins Inclination: 98.7 deg Repeat cycle: LST: 20:29 Longitude (if geo): Asc/desc: Ascending URL: http://dmsp.ngdc.noaa.gov/dmsp.html
DMSP F-15 Defense Meteorological Satellite Program F-15 NOAA	Currently being flown	12 Dec 1999	01 May 2013	The long-term meteorological programme of the US Department of Defense (DoD) - with the objective to collect and disseminate worldwide cloud cover data on a daily basis. (Primary operational satellite)	OLS, SSM/I, SSM/T-1, SSM/T-2, SSI/ES-2, SSJ/4, SSM	Type: Sun-synchronous Altitude: 833 km Period: 101 mins Inclination: 98.9 deg Repeat cycle: LST: 20:29 Longitude (if geo): Asc/desc: Ascending URL: http://dmsp.ngdc.noaa.gov/dmsp.html
DMSP F-16 Defense Meteorological Satellite Program F-16 NOAA	Currently being flown	18 Oct 2003	01 Oct 2011	The long-term meteorological programme of the US Department of Defense (DoD) - with the objective to collect and disseminate worldwide cloud cover data on a daily basis.	OLS, SSM/IS, SSM, SSI/ES-3, SSJ/5, SSULI, SSUSI	Type: Sun-synchronous Altitude: 833 km Period: 101 mins Inclination: 98.9 deg Repeat cycle: LST: 21:32 Longitude (if geo): Asc/desc: Ascending URL: http://dmsp.ngdc.noaa.gov/dmsp.html
DMSP F-17 Defense Meteorological Satellite Program F-17 NOAA	Currently being flown	04 Nov 2006	01 Jun 2013	The long-term meteorological programme of the US Department of Defense (DoD) - with the objective to collect and disseminate worldwide cloud cover data on a daily basis.	OLS, SSM/IS, SSM, SSI/ES-3, SSULI, SSUSI	Type: Sun-synchronous Altitude: 850 km Period: 101 mins Inclination: 98.7 deg Repeat cycle: LST: Longitude (if geo): Asc/desc: Ascending URL: http://dmsp.ngdc.noaa.gov/dmsp.html
DMSP F-18 Defense Meteorological Satellite Program F-18 NOAA	Currently being flown	18 Oct 2009	01 Apr 2014	The long-term meteorological programme of the US Department of Defense (DoD) - with the objective to collect and disseminate worldwide cloud cover data on a daily basis.	OLS, SSM/IS, SSM, SSI/ES-3, SSULI, SSUSI	Type: Sun-synchronous Altitude: 850 km Period: 101 mins Inclination: 98.7 deg Repeat cycle: LST: Longitude (if geo): Asc/desc: Ascending URL: http://dmsp.ngdc.noaa.gov/dmsp.html
DMSP F-19 Defense Meteorological Satellite Program F-19 NOAA	Approved	01 Oct 2012	01 Oct 2017	The long-term meteorological programme of the US Department of Defense (DoD) - with the objective to collect and disseminate worldwide cloud cover data on a daily basis.	OLS, SSM/IS, SSM, SSI/ES-3, SSULI, SSUSI	Type: Sun-synchronous Altitude: 833 km Period: 101 mins Inclination: 98.7 deg Repeat cycle: LST: Longitude (if geo): Asc/desc: Ascending URL: http://dmsp.ngdc.noaa.gov/dmsp.html

Mission	Status	Launch Date	EOL Date	Applications	Instruments	Orbit Details & URL
DMSP F-20 Defense Meteorological Satellite Program F-20 NOAA	Approved	05 Jun 2014	01 Jun 2019	The long-term meteorological programme of the US Department of Defense (DoD) - with the objective to collect and disseminate worldwide cloud cover data on a daily basis.	OLS, SSM/IS, SSM, SSI/ES-3, SSULI, SSUSI	Type: Sun-synchronous Altitude: 850 km Period: 101 mins Inclination: 98.7 deg Repeat cycle: LST: Longitude (if geo): Asc/desc: Ascending URL: http://dmsp.ngdc.noaa.gov/dmsp.html
EarthCARE ESA / JAXA	Approved	25 Oct 2013	25 Oct 2016	To Improve the understanding of atmospheric cloud–aerosol interactions and of the Earth's radiative balance towards enhancing climate and numerical weather prediction models. The 2 active and 2 passive instruments of EarthCARE make unique data product synergies possible.	CPR (EarthCARE), ATLID, BBR (EarthCARE), MSI (EarthCARE)	Type: Sun-synchronous Altitude: 393 km Period: Inclination: 97 deg Repeat cycle: 25 days LST: Longitude (if geo): Asc/desc: Descending URL: http://www.esa.int/export/esaLP/earthcare.html
Elektro-L N1 Geostationary Operational Meteorological Satellite - 1 ROSHYDROMET / ROSKOSMOS	Approved	01 Dec 2011	01 Dec 2018	Hydrometeorology, heliogeophysics, climatology, DCS, S&R	MSU-GS, DCS , GGAK-E, S&R	Type: Geostationary Altitude: 36000 km Period: Inclination: Repeat cycle: LST: Longitude (if geo): -76 Asc/desc: N/A URL: http://planet.iitp.ru
Elektro-L N2 Geostationary Operational Meteorological Satellite - 2 ROSHYDROMET / ROSKOSMOS	Approved	31 Dec 2012	31 Dec 2018	Hydrometeorology, heliogeophysics, climatology, DCS, S&R	MSU-GS, DCS , GGAK-E, S&R	Type: Geostationary Altitude: 36000 km Period: Inclination: Repeat cycle: LST: Longitude (if geo): 14.5 Asc/desc: N/A URL: http://planet.iitp.ru
Elektro-L N3 Geostationary Operational Meteorological Satellite - 3 ROSHYDROMET / ROSKOSMOS	Planned	31 Dec 2014	31 Dec 2021	Hydrometeorology, heliogeophysics, climatology, DCS, S&R	MSU-GS, DCS , GGAK-E, S&R	Type: Geostationary Altitude: 36000 km Period: Inclination: Repeat cycle: LST: Longitude (if geo): Asc/desc: N/A URL: http://planet.iitp.ru
EnMAP Environmental Mapping & Analysis Program DLR	Planned	09 May 2014	09 May 2019	Hyperspectral imaging, land surface, geological and environmental investigation.	HSI	Type: Sun-synchronous Altitude: 650 km Period: 97.5 mins Inclination: Repeat cycle: 21 days LST: 11:00 Longitude (if geo): Asc/desc: Descending URL: http://www.enmap.org/
Envisat Environmental Satellite ESA	Currently being flown	01 Mar 2002	31 Dec 2013	Physical oceanography, land surface, ice and snow, atmospheric chemistry, atmospheric dynamics/water and energy cycles	DORIS-NG, MWR, ASAR (image mode), ASAR (wave mode), ENVISAT Comms, MERIS, MIPAS, ASAR, GOMOS, SCIAMACHY, RA-2, AATSR	Type: Sun-synchronous Altitude: 782 km Period: 100.5 mins Inclination: 98.52 deg Repeat cycle: 35 days LST: 10:30 Longitude (if geo): Asc/desc: Descending URL: http://envisat.esa.int/
ERS-2 European Remote Sensing satellite - 2 ESA	Currently being flown	21 Apr 1995	30 Jun 2011	Earth resources plus physical oceanography, ice and snow, land surface, meteorology, geodesy/gravity, environmental monitoring, atmospheric chemistry	MWR, ERS Comms, GOME, RA, ATSR/M, ATSR-2, AMI/SAR/Image, AMI/SAR/Wave, AMI/Scatterometer	Type: Sun-synchronous Altitude: 782 km Period: 100.5 mins Inclination: 98.52 deg Repeat cycle: 35 days LST: 10:30 Longitude (if geo): Asc/desc: Descending URL: http://www.esa.int/ers
FY-1D FY-1D Polar-orbiting Meteorological Satellite NRSCC / CMA	Currently being flown	15 May 2002	31 Dec 2010	Meteorology, Environmental monitoring	MVISR (10 channels)	Type: Sun-synchronous Altitude: 863 km Period: 102.3 mins Inclination: 98.8 deg Repeat cycle: LST: 9:00 Longitude (if geo): Asc/desc: Descending URL:
FY-2C FY-2C Geostationary Meteorological Satellite NRSCC / CMA	Currently being flown	19 Oct 2004	31 Dec 2010	Meteorology and environmental monitoring Data collection and redistribution	IVISSR (FY-2)	Type: Geostationary Altitude: 36000 km Period: Inclination: Repeat cycle: LST: Longitude (if geo): -105 Asc/desc: N/A URL:
FY-2D FY-2D Geostationary Meteorological Satellite NRSCC / CMA	Currently being flown	08 Dec 2006	31 Dec 2010	Meteorology and environmental monitoring Data collection and redistribution	IVISSR (FY-2)	Type: Geostationary Altitude: 36000 km Period: Inclination: Repeat cycle: LST: Longitude (if geo): -105 Asc/desc: N/A URL:
FY-2E FY-2E Geostationary Meteorological Satellite NRSCC / CMA	Currently being flown	26 Dec 2008	31 Dec 2011	Meteorology and environmental monitoring Data collection and redistribution	IVISSR (FY-2)	Type: Geostationary Altitude: 36000 km Period: Inclination: Repeat cycle: LST: Longitude (if geo): -105 Asc/desc: N/A URL:
FY-2F FY-2F Geostationary Meteorological Satellite NRSCC	Approved	31 Dec 2011	31 Dec 2016	Meteorology and environmental monitoring Data collection and redistribution	IVISSR (FY-2)	Type: Geostationary Altitude: 36000 km Period: Inclination: Repeat cycle: LST: Longitude (if geo): -105 Asc/desc: N/A URL:

Mission	Status	Launch Date	EOL Date	Applications	Instruments	Orbit Details & URL
FY-3A FY-3A Polar-orbiting Meteorological Satellite NRSCC / CMA	Currently being flown	27 May 2008	31 May 2011	Meteorology and environmental monitoring data collection and redistribution.	IRAS, MWAS, MWHS, MWRI, VIRR, ERM, MERSI, MWTS, TOU/SBUS, SEM, SIM	Type: Sun-synchronous Altitude: 830 km Period: 101 mins Inclination: 98.753 deg Repeat cycle: LST: 10:10 Longitude (if geo): Asc/desc: Descending URL:
FY-3B FY-3B Polar-orbiting Meteorological Satellite NRSCC / CMA	Approved	31 Dec 2010	31 Dec 2012	Meteorology and environmental monitoring data collection and redistribution. (Experimental pre-cursor to FY-3C)	IRAS, MWAS, MWHS, MWRI, VIRR, ERM, MERSI, MWTS, TOU/SBUS, SEM, SIM	Type: Sun-synchronous Altitude: 830 km Period: 101 mins Inclination: 98.753 deg Repeat cycle: LST: TBD Longitude (if geo): Asc/desc: Descending URL:
FY-3C FY-3C Polar-orbiting Meteorological Satellite NRSCC / CMA	Approved	31 Dec 2012	31 Dec 2016	Meteorology and environmental monitoring data collection and redistribution. (Operational follow-on to FY-3B)	IRAS, IMWAS, MWHS, MIRAS, MWRI, VIRR, ERM, MERSI, MWTS, TOU/SBUS, SIM	Type: Sun-synchronous Altitude: 830 km Period: 101 mins Inclination: 98.753 deg Repeat cycle: LST: TBD Longitude (if geo): Asc/desc: Descending URL:
FY-3D FY-3D Polar-orbiting Meteorological Satellite NRSCC / CMA	Approved	31 Dec 2014	31 Dec 2018	Meteorology and environmental monitoring data collection and redistribution.	IRAS, IMWAS, MWHS, MIRAS, MWRI, VIRR, MERSI, MWTS, TOU/SBUS	Type: Sun-synchronous Altitude: 830 km Period: 101 mins Inclination: 98.753 deg Repeat cycle: LST: TBD Longitude (if geo): Asc/desc: Ascending URL:
FY-3E FY-3E Polar-orbiting Meteorological Satellite NRSCC / CMA	Planned	31 Dec 2016	31 Dec 2020	Meteorology and environmental monitoring data collection and redistribution.	IRAS, IMWAS, MWHS, MIRAS, MWRI, VIRR, ERM, MERSI, MWTS, TOU/SBUS, SIM	Type: Sun-synchronous Altitude: 830 km Period: 101 mins Inclination: 98.753 deg Repeat cycle: LST: TBD Longitude (if geo): Asc/desc: Descending URL:
FY-3F FY-3F Polar-orbiting Meteorological Satellite NRSCC / CMA	Planned	31 Dec 2018	31 Dec 2022	Meteorology and environmental monitoring data collection and redistribution.	IRAS, IMWAS, MWHS, MIRAS, MVIRS, MWRI, VIRR, MERSI, MWTS, TOU/SBUS	Type: Sun-synchronous Altitude: 830 km Period: 101 mins Inclination: 98.753 deg Repeat cycle: LST: TBD Longitude (if geo): Asc/desc: Ascending URL:
FY-3G FY-3G Polar-orbiting Meteorological Satellite NRSCC / CMA	Planned	31 Dec 2020	31 Dec 2024	Meteorology and environmental monitoring data collection and redistribution.	IRAS, IMWAS, MWHS, MIRAS, MVIRS, MWRI, VIRR, MERSI, MWTS, TOU/SBUS	Type: Sun-synchronous Altitude: Period: Inclination: Repeat cycle: LST: TBD Longitude (if geo): Asc/desc: TBD URL:
FY-4 M/A FY-4A Microwave Geostationary Meteorological Satellite NRSCC / CMA	Planned	31 Dec 2015	31 Dec 2020	Meteorology and environmental monitoring data collection and redistribution.	TBD	Type: Geostationary Altitude: 36000 km Period: Inclination: Repeat cycle: LST: Longitude (if geo): -105 Asc/desc: N/A URL:
FY-4 M/B FY-4B Microwave Geostationary Meteorological Satellite NRSCC / CMA	Planned	31 Dec 2018	31 Dec 2023	Meteorology and environmental monitoring data collection and redistribution.	TBD	Type: Geostationary Altitude: 36000 km Period: Inclination: Repeat cycle: LST: Longitude (if geo): -105 Asc/desc: N/A URL:
FY-4 M/C FY-4C Microwave Geostationary Meteorological Satellite NRSCC / CMA	Planned	31 Dec 2022	31 Dec 2027	Meteorology and environmental monitoring data collection and redistribution.	TBD	Type: Geostationary Altitude: 36000 km Period: Inclination: Repeat cycle: LST: Longitude (if geo): -105 Asc/desc: N/A URL:
FY-4 O/A FY-4A Optical Geostationary Meteorological Satellite NRSCC / CMA	Planned	31 Dec 2012	31 Dec 2017	Meteorology and environmental monitoring data collection and redistribution.	LM, MCSI	Type: Geostationary Altitude: 36000 km Period: Inclination: Repeat cycle: LST: Longitude (if geo): -105 Asc/desc: N/A URL:
FY-4 O/B FY-4B Optical Geostationary Meteorological Satellite NRSCC / CMA	Planned	31 Dec 2015	31 Dec 2020	Meteorology and environmental monitoring data collection and redistribution.	LM, MCSI	Type: Geostationary Altitude: 36000 km Period: Inclination: Repeat cycle: LST: Longitude (if geo): -105 Asc/desc: N/A URL:
FY-4 O/C FY-4C Optical Geostationary Meteorological Satellite NRSCC / CMA	Planned	31 Dec 2015	31 Dec 2020	Meteorology and environmental monitoring data collection and redistribution.	LM, MCSI	Type: Geostationary Altitude: 36000 km Period: Inclination: Repeat cycle: LST: Longitude (if geo): -105 Asc/desc: N/A URL:

Mission	Status	Launch Date	EOL Date	Applications	Instruments	Orbit Details & URL
FY-4 O/D FY-4D Optical Geostationary Meteorological Satellite NRSCC / CMA	Planned	31 Dec 2019	31 Dec 2024	Meteorology and environmental monitoring data collection and redistribution.	LM, MCSI	Type: Geostationary Altitude: 36000 km Period: Inclination: Repeat cycle: LST: Longitude (if geo): -105 Asc/desc: N/A URL:
FY-4 O/E FY-4E Optical Geostationary Meteorological Satellite NRSCC / CMA	Planned	31 Dec 2019	31 Dec 2024	Meteorology and environmental monitoring data collection and redistribution.	LM, MCSI	Type: Geostationary Altitude: 36000 km Period: Inclination: Repeat cycle: LST: Longitude (if geo): -105 Asc/desc: N/A URL:
GACM Global Atmospheric Composition Mission NASA	Considered	01 Jan 2030	01 Jan 2033	Phase-2 DS Mission, launch order unknown, 3-year nominal mission. Ozone and related gases for intercontinental air quality and stratospheric ozone layer prediction	UV Spectrometer (GACM), IR Spectrometer(GACM), Microwave limb sounder (GACM)	Type: Sun-synchronous Altitude: Period: Inclination: Repeat cycle: LST: Longitude (if geo): Asc/desc: URL: http://decadal.gsfc.nasa.gov/gacm.html
GCOM-C1 Global Change Observation Mission-C1 JAXA	Approved	01 Feb 2014	01 Feb 2019	Understanding of climate change mechanism	SGLI	Type: Sun-synchronous Altitude: 800 km Period: 98 mins Inclination: 98.6 deg Repeat cycle: LST: 10:30 Longitude (if geo): Asc/desc: Descending URL: http://www.jaxa.jp/projects/sat/gcom/index_e.html
GCOM-C2 Global Change Observation Mission-C2 JAXA	Planned	01 Feb 2018	01 Feb 2023	Understanding of climate change mechanism	SGLI	Type: Sun-synchronous Altitude: 800 km Period: 98 mins Inclination: 98.6 deg Repeat cycle: LST: 10:30 Longitude (if geo): Asc/desc: Descending URL: http://www.jaxa.jp/projects/sat/gcom/index_e.html
GCOM-C3 Global Change Observation Mission-C3 JAXA	Planned	01 Feb 2022	01 Feb 2027	Understanding of climate change mechanism	SGLI	Type: Sun-synchronous Altitude: 800 km Period: 98 mins Inclination: 98.6 deg Repeat cycle: LST: 10:30 Longitude (if geo): Asc/desc: Descending URL: http://www.jaxa.jp/projects/sat/gcom/index_e.html
GCOM-W1 Global Change Observation Mission-W1 JAXA	Approved	01 Feb 2012	01 Feb 2017	Understanding of water circulation mechanism	AMSR-2	Type: Sun-synchronous Altitude: 700 km Period: 98 mins Inclination: 98.2 deg Repeat cycle: LST: 13:30 Longitude (if geo): Asc/desc: Ascending URL: http://www.jaxa.jp/projects/sat/gcom/index_e.html
GCOM-W2 Global Climate Observation Mission-W2 JAXA	Planned	01 Feb 2016	01 Feb 2021	Understanding of water circulation mechanism	AMSR-2	Type: Sun-synchronous Altitude: 700 km Period: 98 mins Inclination: 98.2 deg Repeat cycle: LST: 13:30 Longitude (if geo): Asc/desc: Ascending URL: http://www.jaxa.jp/projects/sat/gcom/index_e.html
GCOM-W3 Global Change Observation Mission-W3 JAXA	Planned	01 Feb 2020	01 Feb 2025	Understanding of water circulation mechanism	AMSR-2	Type: Sun-synchronous Altitude: 700 km Period: 98 mins Inclination: 98.2 deg Repeat cycle: LST: 13:30 Longitude (if geo): Asc/desc: Ascending URL: http://www.jaxa.jp/projects/sat/gcom/index_e.html
GEO-CAPE Geostationary Coastal and Air Pollution Events NASA	Considered	01 Jan 2020	01 Jan 2023	Phase-2 DS Mission, launch order unknown, 3-year nominal mission. Atmospheric gas columns for air quality forecasts; ocean color for coastal ecosystem health and climate emissions	UV/Vis Near IR Wide Imaging Spectrometer (Geo-Cape), Event Imaging Spectrometer from GEO (GeoCape), IR Correlation Radiometer (GeoCape)	Type: Geostationary Altitude: 42000 km Period: Inclination: Repeat cycle: 1 days LST: Longitude (if geo): 80 Asc/desc: N/A URL: http://geo-cape.larc.nasa.gov/
Glory NASA	Approved	22 Nov 2010	22 Nov 2015	3-year nominal mission life, 5-year goal. Concentration and nature of both natural and anthropogenic aerosols (BC, sulfates, etc.) with accuracy and coverage sufficient for quantification of the aerosol effect on climate, the anthropogenic component of this effect, and the long-term change of this effect caused by natural and anthropogenic factors	TIM, APS	Type: Sun-synchronous Altitude: 705 km Period: 98.8 mins Inclination: 98.2 deg Repeat cycle: 16 days LST: 10:33 Longitude (if geo): Asc/desc: Descending URL: http://glory.gsfc.nasa.gov/
GOCE Gravity Field and Steady-State Ocean Circulation Explorer ESA	Currently being flown	17 Mar 2009	17 Apr 2011	Research in steady-state ocean circulation, physics of Earth's interior and levelling systems (based on GPS). Will also provide unique data set required to formulate global and regional models of the Earth's gravity field and geoid.	EGG, Laser Reflectors (ESA), GPS (ESA), SSTI, LRR	Type: Sun-synchronous Altitude: 270 km Period: 90 mins Inclination: 96.7 deg Repeat cycle: 61 days LST: Longitude (if geo): Asc/desc: N/A URL: http://earth.esa.int/goce

Mission	Status	Launch Date	EOL Date	Applications	Instruments	Orbit Details & URL
GOES-11 Geostationary Operational Environmental Satellite - 11 NOAA	Currently being flown	03 May 2000	15 Dec 2011	Meteorology (primary mission), search and rescue, space environment monitoring, data collection platform, data gathering, WEFAX	DCS (NOAA), S&R (GOES), WEFAX, Sounder, Imager, GOES Comms, SEM (GOES), LRIT	Type: Geostationary Altitude: 36000 km Period: Inclination: Repeat cycle: LST: Longitude (if geo): 103 Asc/desc: N/A URL: http://www.oso.noaa.gov/goes/
GOES-12 Geostationary Operational Environmental Satellite - 12 NOAA	Currently being flown	23 Jul 2001	15 Jan 2011	Meteorology (primary mission), search and rescue, space environment monitoring, data collection platform, data gathering, WEFAX	DCS (NOAA), S&R (GOES), WEFAX, SXI, Sounder, Imager, GOES Comms, SEM (GOES), LRIT	Type: Geostationary Altitude: 36000 km Period: Inclination: Repeat cycle: LST: Longitude (if geo): 60 Asc/desc: N/A URL: http://www.oso.noaa.gov/goes/
GOES-13 Geostationary Operational Environmental Satellite - 13 NOAA	Currently being flown	24 May 2006	01 Jun 2015	Meteorology (primary mission), search and rescue, space environment monitoring, data collection platform, data gathering, WEFAX. On-orbit spare.	S&R (GOES), SXI, Sounder, Imager, GOES Comms, SEM (GOES), A-DCS4, LRIT	Type: Geostationary Altitude: 36000 km Period: Inclination: Repeat cycle: LST: Longitude (if geo): 75 Asc/desc: TBD URL: http://www.oso.noaa.gov/goes/http://www.oso.noaa.gov/goes/
GOES-14 Geostationary Operational Environmental Satellite - 14 NOAA	Currently being flown	27 Jun 2009	31 Dec 2016	Meteorology (primary mission), search and rescue, space environment monitoring, data collection platform, data gathering, WEFAX	S&R (GOES), Sounder, Imager, GOES Comms, SEM (GOES), A-DCS4, LRIT	Type: Geostationary Altitude: 36000 km Period: Inclination: Repeat cycle: LST: Longitude (if geo): 105 Asc/desc: N/A URL: http://www.oso.noaa.gov/goes/
GOES-15 Geostationary Operational Environmental Satellite - 15 NOAA	Currently being flown	04 Mar 2010	01 Apr 2020	Meteorology (primary mission), search and rescue, space environment monitoring, data collection platform, data gathering, WEFAX	S&R (GOES), SXI, Sounder, Imager, GOES Comms, SEM (GOES), A-DCS4, LRIT	Type: Geostationary Altitude: 36000 km Period: Inclination: Repeat cycle: LST: Longitude (if geo): 105 Asc/desc: N/A URL: http://www.oso.noaa.gov/goes/
GOES-R Geostationary Operational Environmental Satellite - R NOAA	Approved	01 Oct 2015	01 Mar 2025	Meteorology (primary mission), search and rescue, space environment monitoring, data collection platform, data gathering, WEFAX	ABI, GLM, Magnetometer (NOAA), EXIS, SEISS, SUVI, DCS (GOES-R)	Type: Geostationary Altitude: 36000 km Period: Inclination: Repeat cycle: LST: Longitude (if geo): Asc/desc: N/A URL: http://www.osd.noaa.gov/goes_R/index.htm
GOES-S Geostationary Operational Environmental Satellite - S NOAA	Approved	01 Feb 2017	01 Oct 2028	Meteorology (primary mission), search and rescue, space environment monitoring, data collection platform, data gathering, WEFAX	ABI, GLM, Magnetometer (NOAA), EXIS, SEISS, SUVI, DCS (GOES-R)	Type: Geostationary Altitude: 36000 km Period: Inclination: Repeat cycle: LST: Longitude (if geo): Asc/desc: N/A URL: http://www.osd.noaa.gov/goes_R/index.htm
GOSAT Greenhouse gases Observing SATellite JAXA / MOE (Japan) / NIES (Japan)	Currently being flown	23 Jan 2009	22 Jan 2014	Observation of greenhouse gases	TANSO-CAI, TANSO-FTS	Type: Sun-synchronous Altitude: 666 km Period: 98.18 mins Inclination: 98.06 deg Repeat cycle: 3 days LST: 13:00 Longitude (if geo): Asc/desc: Descending URL: http://www.jaxa.jp/projects/sat/gosat/index_e.html
GPM Constellation Global Precipitation Measurement Mission Constellation spacecraft NASA / JAXA	Planned	01 Nov 2014	01 Nov 2019	3-year nominal mission life, 5-year goal. Study of global precipitation, evaporation, and cycling of water are changing. The mission comprises a primary spacecraft with active and passive microwave instruments, and a number of 'constellation spacecraft with passive microwave instruments.	GMI	Type: Inclined, non-sunsynchronous Altitude: 635 km Period: Inclination: 40 deg Repeat cycle: LST: Longitude (if geo): Asc/desc: TBD URL: http://gpm.gsfc.nasa.gov/
GPM Core Global Precipitation Measurement Mission Core spacecraft NASA / JAXA	Approved	21 Jul 2013	21 Jul 2018	3-year nominal mission life, 5-year goal. Study of global precipitation, evaporation, and cycling of water are changing. The mission comprises a primary spacecraft with active and passive microwave instruments, and a number of 'constellation spacecraft with passive microwave instruments	GMI, DPR	Type: Inclined, non-sunsynchronous Altitude: 407 km Period: 95 mins Inclination: 65 deg Repeat cycle: LST: Longitude (if geo): Asc/desc: TBD URL: http://gpm.gsfc.nasa.gov
GPM-Br Global Precipitation Measurement Satellite INPE / CNES	Planned	01 Dec 2016	01 Dec 2020	Global precipitation measurements	RADIOMETRO, LIS, DCS	Type: Inclined, non-sunsynchronous Altitude: 600 km Period: Inclination: 30 deg Repeat cycle: LST: Longitude (if geo): Asc/desc: TBD URL:
GRACE Gravity Recovery and Climate Experiment NASA / DLR	Currently being flown	17 Mar 2002	30 Sep 2011	5-year nominal mission life, currently in extended operations. Extremely high precision gravity measurements for use in construction of gravity field models. GRACE consists of two satellites (A, B) serving one mission.	GRACE instrument	Type: Inclined, non-sunsynchronous Altitude: 400 km Period: 94 mins Inclination: 89 deg Repeat cycle: LST: Longitude (if geo): Asc/desc: TBD URL: http://www.csr.utexas.edu/grace/

Mission	Status	Launch Date	EOL Date	Applications	Instruments	Orbit Details & URL
GRACE FO Gravity Recovery and Climate Experiment - Follow-on NASA	Approved	31 Dec 2016	31 Dec 2021	5-year nominal mission life, currently in extended operations. Extremely high precision gravity measurements for use in construction of gravity field models. GRACE consists of two satellites (A, B) serving one mission.	GRACE instrument	Type: Inclined, non-sunsynchronous Altitude: Period: Inclination: Repeat cycle: LST: Longitude (if geo): Asc/desc: URL:
GRACE-II Gravity Recovery and Climate Experiment NASA	Considered	01 Jan 2030	01 Jan 2033	Phase-2 DS Mission, launch order unknown, 3-year nominal mission. High temporal resolution gravity fields for tracking large scale water movement	GRACE instrument	Type: Inclined, non-sunsynchronous Altitude: Period: Inclination: Repeat cycle: LST: Longitude (if geo): Asc/desc: URL: http://eospso.gsfc.nasa.gov/eos_homepage/mission_profiles/show_mission.php?id=83
HJ-1A Disaster and Environment Monitoring and Forecast Small Satellite Constellation A CRESDA / CAST / NRSCC	Currently being flown	06 Sep 2008	01 Sep 2011	Disaster and environment monitoring and forecasting	CCD (HJ), HSI (HJ-1A)	Type: Sun-synchronous Altitude: 649 km Period: Inclination: 97.9 deg Repeat cycle: 31 days LST: 10:30 Longitude (if geo): Asc/desc: Descending URL: http://www.cresda.com/
HJ-1B Disaster and Environment Monitoring and Forecast Small Satellite Constellation B CRESDA / CAST / NRSCC	Currently being flown	06 Sep 2008	01 Sep 2011	Disaster and environment monitoring and forecasting	CCD (HJ), IR (HJ-1B)	Type: Sun-synchronous Altitude: 649 km Period: Inclination: 97.9 deg Repeat cycle: 31 days LST: 10:30 Longitude (if geo): Asc/desc: Descending URL: http://www.cresda.com/
HJ-1C Disaster and Environment Monitoring and Forecast Small Satellite Constellation C CRESDA / CAST / NRSCC	Approved	31 Dec 2011	31 Dec 2014	Disaster and environment monitoring and forecasting	S-Band SAR	Type: Sun-synchronous Altitude: 499 km Period: Inclination: 97.3 deg Repeat cycle: 31 days LST: 6:00 Longitude (if geo): Asc/desc: Descending URL: http://www.cresda.com/
HY-1B Ocean color satellite B NSOAS / CAST	Currently being flown	11 Apr 2007	31 Dec 2010	Detecting ocean colour and sea surface temperature	COCTS, CZI	Type: Sun-synchronous Altitude: 798 km Period: Inclination: 98.6 deg Repeat cycle: 7 days LST: 10:30 Longitude (if geo): Asc/desc: Descending URL: http://www.cast.cn/
HY-1C Ocean color and temperature satellite C NSOAS / CAST	Planned	01 Jun 2011	01 Jan 2013	Detecting ocean colour and sea surface temperature	COCTS, CZI	Type: Sun-synchronous Altitude: 798 km Period: Inclination: 98.6 deg Repeat cycle: 7 days LST: 10:31 Longitude (if geo): Asc/desc: Descending URL: http://www.cast.cn/
HY-1D Ocean color and temperature satellite D NSOAS / CAST	Planned	01 Dec 2010	01 Jan 2013	Detecting ocean colour and sea surface temperature	COCTS, CZI	Type: Sun-synchronous Altitude: 798 km Period: Inclination: 98.6 deg Repeat cycle: 7 days LST: 13:30 Longitude (if geo): Asc/desc: Ascending URL: http://www.cast.cn/
HY-2A Ocean dynamics satellite A NSOAS / CAST	Planned	01 Jan 2011	01 Jan 2012	Detecting ocean surface temperature, wind field, wave and topgraphy	RAD, SCAT, ALT	Type: Sun-synchronous Altitude: 963 km Period: Inclination: 99.3 deg Repeat cycle: 14 days LST: 6:00 Longitude (if geo): Asc/desc: Descending URL: http://www.naoas.gov.cn/
HY-3A NSOAS / CAST	Planned	06 Jan 2012	06 Jan 2017	Ocean monitoring, environmental protection, coastal zone survey, etc.	WSAR	Type: Sun-synchronous Altitude: Period: Inclination: Repeat cycle: LST: Longitude (if geo): Asc/desc: URL:
HY-3B NSOAS / CAST	Planned	06 Jan 2017	06 Jan 2022	Ocean monitoring, environmental protection, coastal zone survey, etc.	WSAR	Type: Sun-synchronous Altitude: Period: Inclination: Repeat cycle: LST: Longitude (if geo): Asc/desc: URL:
HY-3C NSOAS / CAST	Planned	06 Jan 2022	06 Jan 2027	Ocean monitoring, environmental protection, coastal zone survey, etc.	WSAR	Type: Sun-synchronous Altitude: Period: Inclination: Repeat cycle: LST: Longitude (if geo): Asc/desc: URL:

Mission	Status	Launch Date	EOL Date	Applications	Instruments	Orbit Details & URL
HyspIRI Hyperspectral Infrared Imager NASA	Considered	01 Jan 2020	01 Jan 2023	Phase-2 DS Mission, launch order unknown, 3-year nominal mission. Land surface composition for agriculture and mineral characterization; vegetation types for ecosystem health	Visible imaging spectrometer (HyspIRI), Multi-spectral thermal infrared imager (HyspIRI)	Type: Sun-synchronous Altitude: 626 km Period: Inclination: 98 deg Repeat cycle: 19 days LST: 11:00 Longitude (if geo): Asc/desc: URL: http://hyspiri.jpl.nasa.gov/
ICESat-II Ice, Cloud, and Land Elevation Satellite II NASA	Planned	31 Oct 2015	31 Oct 2020	Early 2015 launch expected (after SMAP), 3-year nominal mission life. Continue the assessment of polar ice changes and measure vegetation canopy heights, allowing estimates of biomass and carbon in aboveground vegetation in conjunction with related missions, and allow measurements of solid earth properties.	ATLAS	Type: Inclined, non-sunsynchronous Altitude: 600 km Period: 97 mins Inclination: 94 deg Repeat cycle: 183 days LST: Longitude (if geo): Asc/desc: TBD URL: http://icesat.gsfc.nasa.gov/index.php
IMS-1 Indian Mini Satellite-1 ISRO	Currently being flown	28 Apr 2008	28 Apr 2011	Micro-satellite for Third World countries for natural resources monitoring & management	MxT, HySI (IMS-1)	Type: Sun-synchronous Altitude: 632 km Period: 97 mins Inclination: 97.92 deg Repeat cycle: 22 days LST: 9:30 Longitude (if geo): Asc/desc: Descending URL:
Ingenio CDTI / ESA	Approved	31 Dec 2012	31 Dec 2019	Cartography, land use, urban management, water management, environmental monitoring, risk management and security.	PAN+MS (RGB+NIR), UVAS	Type: Sun-synchronous Altitude: 668 km Period: 98 mins Inclination: 98 deg Repeat cycle: 43 days LST: 10:30 Longitude (if geo): Asc/desc: Descending URL:
INSAT-2E Indian National Satellite - 2E ISRO	Currently being flown	03 Apr 1999	04 Mar 2011	Meteorology, data collection and communication, search and rescue	VHRR, CCD camera	Type: Geostationary Altitude: 36000 km Period: Inclination: Repeat cycle: LST: Longitude (if geo): -83 Asc/desc: N/A URL: http://www.isro.org/
INSAT-3A Indian National Satellite - 3A ISRO	Currently being flown	04 Apr 2003	10 Apr 2013	Meteorology, data collection and communication, search and rescue	VHRR, DRT-S&R, CCD camera	Type: Geostationary Altitude: 36000 km Period: Inclination: Repeat cycle: LST: Longitude (if geo): -94 Asc/desc: N/A URL: http://www.isro.org/
INSAT-3D Indian National Satellite - 3D ISRO	Approved	01 Aug 2011	01 Aug 2018	Meteorology, data collection and communication, search and rescue	Imager (INSAT), Sounder (INSAT)	Type: Geostationary Altitude: 36000 km Period: Inclination: Repeat cycle: LST: Longitude (if geo): -93.5 Asc/desc: N/A URL: http://www.isro.org/
ISS/JEM International Space Station/Japanese Experiment Module JAXA	Currently being flown	10 Sep 2009	10 Sep 2010	conducting scientific research activities on orbit	SMILES	Type: Sun-synchronous Altitude: 407 km Period: 93 mins Inclination: 51.6 deg Repeat cycle: LST: Longitude (if geo): Asc/desc: Ascending URL: http://iss.jaxa.jp/iss/index_e.html
ISTAG Indian Satellite for Aerosol and Gases ISRO	Considered	01 Jan 2015	01 Jan 2020	Study of changes in atmospheric aerosol and trace gases	MAPI, MAVELI, MAGIS	Type: Sun-synchronous Altitude: Period: Inclination: Repeat cycle: LST: Longitude (if geo): Asc/desc: TBD URL:
Jason Ocean surface topography NASA / CNES	Currently being flown	07 Dec 2001	30 Sep 2011	3-year nominal mission life, currently in extended operations. Physical oceanography, geodesy/gravity, climate monitoring, marine meteorology	LRA, JMR, DORIS-NG, POSEIDON-2 (SSALT-2), TRSR	Type: Inclined, non-sunsynchronous Altitude: 1336 km Period: 112.4 mins Inclination: 66 deg Repeat cycle: 10 days LST: Longitude (if geo): Asc/desc: N/A URL: http://sealevel.jpl.nasa.gov/mission/jason-1.html
Jason-3 NOAA / CNES / EUMETSAT	Approved	30 Jun 2013	31 Dec 2018	Meteorology, climatology, oceanography		Type: Altitude: Period: Inclination: Repeat cycle: LST: Longitude (if geo): Asc/desc: URL:
JPSS-1 Joint Polar Satellite System - 1 NOAA / EUMETSAT / NASA	Approved	01 Jan 2015	01 Jun 2023	Meteorological, climatic, terrestrial, oceanographic, and solar-geophysical applications; global and regional environmental monitoring, search and rescue, data collection.	CrIS, CERES, VIIRS, ATMS, OMPS, A-DCS4, SARSAT, SEM-N	Type: Sun-synchronous Altitude: 824 km Period: 101 mins Inclination: 98.75 deg Repeat cycle: LST: 13:30 Longitude (if geo): Asc/desc: Ascending URL: http://www.npoess.noaa.gov/
JPSS-2 Joint Polar Satellite System - 2 NOAA / EUMETSAT / NASA	Approved	01 Jan 2018	01 Oct 2026	Meteorological, climatic, terrestrial, oceanographic, and solar-geophysical applications; global and regional environmental monitoring, search and rescue, data collection.	CrIS, VIIRS, ATMS, TSIS, OMPS, A-DCS4, SARSAT, SEM-N, ERBS	Type: Sun-synchronous Altitude: 833 km Period: 101 mins Inclination: 98.75 deg Repeat cycle: LST: 13:30 Longitude (if geo): Asc/desc: Ascending URL: http://www.npoess.noaa.gov/

Mission	Status	Launch Date	EOL Date	Applications	Instruments	Orbit Details & URL
KALPANA-1 Meteorological Satellite ISRO	Currently being flown	12 Sep 2002	09 Dec 2012	Meteorological applications	VHRR, DRT-S&R	Type: Geostationary Altitude: 36000 km Period: Inclination: Repeat cycle: LST: Longitude (if geo): -83 Asc/desc: N/A URL: http://www.isro.org/insat2b.htm
Kanopus-V N1 Kanopus-V Environmental Satellite N1 ROSKOSMOS / ROSHYDROMET	Approved	31 Dec 2010	31 Dec 2015	Land surface, disaster monitoring	PSS, MSS, MSU-200	Type: Sun-synchronous Altitude: 600 km Period: 98 mins Inclination: 98 deg Repeat cycle: 17 days LST: Longitude (if geo): Asc/desc: Ascending URL: http://planet.iitp.ru
Kanopus-V N2 Kanopus-V Environmental Satellite N2 ROSKOSMOS / ROSHYDROMET	Planned	31 Jul 2012	31 Jul 2017	Land surface, disaster monitoring	PSS, MSS, MSU-200	Type: Sun-synchronous Altitude: 600 km Period: Inclination: 98 deg Repeat cycle: LST: Longitude (if geo): Asc/desc: Ascending URL: http://planet.iitp.ru
KOMPSAT-2 Korea Multi-Purpose Satellite 2 KARI	Currently being flown	27 Jul 2006	27 Jun 2011	Cartography, land use and planning, disaster monitoring	MSC	Type: Sun-synchronous Altitude: 685 km Period: 98.5 mins Inclination: Repeat cycle: 28 days LST: 10:50 Longitude (if geo): Asc/desc: Ascending URL: http://kompsat.kari.re.kr/english/index.asp
KOMPSAT-3 Korea Multi-Purpose Satellite 3 KARI	Approved	15 Dec 2011	15 Dec 2015	Cartography, land use and planning, disaster monitoring	AEISS	Type: Sun-synchronous Altitude: 685 km Period: 98.5 mins Inclination: Repeat cycle: 28 days LST: 10:50 Longitude (if geo): Asc/desc: Ascending URL: http://kompsat.kari.re.kr/english/index.asp
KOMPSAT-5 Korea Multi-Purpose Satellite 5 KARI	Approved	15 Dec 2010	31 Dec 2014	Cartography, land use and planning, disaster monitoring	COSI	Type: Sun-synchronous Altitude: 685 km Period: 98.5 mins Inclination: Repeat cycle: 28 days LST: 6:00 Longitude (if geo): Asc/desc: Ascending URL: http://kompsat.kari.re.kr/english/index.asp
LAGEOS-1 Laser Geodynamics Satellite - 1 ASI	Currently being flown	04 May 1976	04 May 2016	Geodesy, crustal motion and gravity field measurements by laser ranging	LRA (LAGEOS)	Type: Inclined, non-sunsynchronous Altitude: 5900 km Period: 226 mins Inclination: 110 deg Repeat cycle: LST: Longitude (if geo): Asc/desc: N/A URL: http://www.asi.it
LAGEOS-2 Laser Geodynamics Satellite - 2 ASI	Currently being flown	22 Oct 1992	22 Oct 2032	Geodesy, crustal motion and gravity field measurements by laser ranging	LRA (LAGEOS)	Type: Inclined, non-sunsynchronous Altitude: 5800 km Period: 223 mins Inclination: 52.6 deg Repeat cycle: LST: Longitude (if geo): Asc/desc: N/A URL: http://www.asi.it
Landsat-5 USGS / NASA	Currently being flown	01 Mar 1984	31 Dec 2012	Earth resources, land surface, environmental monitoring, agriculture and forestry, disaster monitoring and assessment, ice and snow cover	MSS, TM	Type: Sun-synchronous Altitude: 705 km Period: 98.9 mins Inclination: 98.2 deg Repeat cycle: 16 days LST: 10:00 Longitude (if geo): Asc/desc: Descending URL: http://landsat.usgs.gov/
Landsat-7 USGS / NASA	Currently being flown	15 Apr 1999	31 Dec 2012	5-year nominal mission life, currently in extended operations. Earth resources, land surface, environmental monitoring, agriculture and forestry, disaster monitoring and assessment, ice and snow cover	ETM+	Type: Sun-synchronous Altitude: 705 km Period: 98.9 mins Inclination: 98.2 deg Repeat cycle: 16 days LST: 10:05 Longitude (if geo): Asc/desc: Descending URL: http://landsat.usgs.gov/
LARES LAser RElativity Satellite ASI	Approved	31 Mar 2011	01 Jan 2050	Lense-Thirring measurement accuracy improvement, crustal motion and gravity field measurements by laser ranging	LCCRA	Type: Inclined, non-sunsynchronous Altitude: 1450 km Period: 99.1 mins Inclination: 71 deg Repeat cycle: LST: Longitude (if geo): Asc/desc: TBD URL: http://www.asi.it
LDCM Landsat Data Continuity Mission NASA / USGS	Approved	19 Dec 2012	19 Dec 2017	5-year nominal mission life. Earth resources, land surface, environmental monitoring, agriculture and forestry, disaster monitoring and assessment, ice and snow cover	OLI, TIRS	Type: Sun-synchronous Altitude: 705 km Period: 99 mins Inclination: 98.2 deg Repeat cycle: 16 days LST: 10:00 Longitude (if geo): Asc/desc: Descending URL: http://ldcm.nasa.gov/
LIST Lidar Surface Topography NASA	Considered	01 Jan 2030	01 Jan 2033	Phase-2 DS Mission, launch order unknown, 3-year nominal mission. Land surface topography for landslide hazards and water runoff	Laser altimeter (LIST)	Type: Sun-synchronous Altitude: Period: Inclination: Repeat cycle: 365 days LST: Longitude (if geo): Asc/desc: URL: http://decadal.gsfc.nasa.gov/list.html

Mission	Status	Launch Date	EOL Date	Applications	Instruments	Orbit Details & URL
MAPSAR Multi-purpose SAR INPE	Planned	03 Dec 2015	03 Dec 2019	Multi-purpose SAR	SAR (MAPSAR), DCS	Type: Sun-synchronous Altitude: 620 km Period: Inclination: 98 deg Repeat cycle: LST: Longitude (if geo): Asc/desc: Descending URL:
MEGHA-TROPIQUES CNES / ISRO	Approved	01 Jan 2011	01 Apr 2015	Study of the inter-tropical zone and its convective systems (water and energy cycles).	ScaRaB, SAPHIR, MADRAS, ROSA	Type: Inclined, non-sunsynchronous Altitude: 867 km Period: 102.16 mins Inclination: 20 deg Repeat cycle: LST: Longitude (if geo): Asc/desc: Ascending URL: http://www.cnes.fr/espace_pro/communiques/cp2001/5_17_va.html
Meteor-M N1 Meteor-M N1 Meteorological Satellite ROSHYDROMET / ROSKOSMOS	Currently being flown	18 Sep 2009	18 Sep 2014	Hydrometeorology, climatology, heliogeophysics, DCS	MTVZA, MSU-MR, DCS , KMSS, GGAK-M, Severjanin, BRLK	Type: Sun-synchronous Altitude: 835 km Period: 102 mins Inclination: 98.7 deg Repeat cycle: 37 days LST: 09:00 Longitude (if geo): Asc/desc: Ascending URL: http://planet.iitp.ru
Meteor-M N2 Meteor-M Meteorological Satellite N2 ROSHYDROMET / ROSKOSMOS	Approved	01 Jul 2011	01 Jul 2016	Hydrometeorology, climatology, heliogeophysics, DCS	MTVZA, IKFS-2, MSU-MR, DCS , KMSS, GGAK-M, BRLK	Type: Sun-synchronous Altitude: 835 km Period: 102 mins Inclination: 98.7 deg Repeat cycle: 37 days LST: TBD Longitude (if geo): Asc/desc: Ascending URL: http://planet.iitp.ru
Meteor-M N3 Meteor-M Oceanographical Satellite N3 ROSHYDROMET / ROSKOSMOS	Approved	31 Dec 2012	31 Dec 2017	Oceanography, hydrometeorology, climatology	DCS , SAR , Radiomet, OCS, SZS, Scatterometer	Type: Sun-synchronous Altitude: 835 km Period: 102 mins Inclination: 98.7 deg Repeat cycle: 37 days LST: TBD Longitude (if geo): Asc/desc: Ascending URL: http://planet.iitp.ru
Meteor-MP N1 Meteor-MP Meteorological Satellite N1 ROSHYDROMET / ROSKOSMOS	Planned	31 Dec 2014	31 Dec 2019	Hydrometeorology, climatology, heliogeophysics, DCS	Advanced MSU-MR, Advanced KMSS, Advanced IKFS-2, Advanced MTVZA, Advanced Scatterometer , Advanced SAR , Advanced Radiomet, Advanced DCS , Advanced GGAK-M, TGSP	Type: Sun-synchronous Altitude: Period: Inclination: Repeat cycle: LST: Longitude (if geo): Asc/desc: URL: http://planet.iitp.ru
Meteor-MP N2 Meteor-MP Meteorological Satellite N2 ROSHYDROMET / ROSKOSMOS	Planned	31 Dec 2015	31 Dec 2020	Hydrometeorology, climatology, heliogeophysics, DCS	Advanced MSU-MR, Advanced KMSS, Advanced IKFS-2, Advanced MTVZA, Advanced Scatterometer , Advanced SAR , Advanced Radiomet, Advanced DCS , Advanced GGAK-M, TGSP	Type: Sun-synchronous Altitude: Period: Inclination: Repeat cycle: LST: Longitude (if geo): Asc/desc: URL: http://planet.iitp.ru
Meteor-MP N3 Meteor-MP Meteorological Satellite N3 ROSHYDROMET / ROSKOSMOS	Planned	31 Dec 2016	31 Dec 2021	Hydrometeorology, climatology, heliogeophysics, DCS	Advanced MSU-MR, Advanced KMSS, Advanced IKFS-2, Advanced MTVZA, Advanced Scatterometer , Advanced SAR , Advanced Radiomet, Advanced DCS , Advanced GGAK-M, TGSP	Type: Sun-synchronous Altitude: Period: Inclination: Repeat cycle: LST: Longitude (if geo): Asc/desc: URL: http://planet.iitp.ru
Meteosat Third Generation-S1 (sounding) MTG S1 Sounding Satellite 1 EUMETSAT / EC / ESA	Planned	15 Dec 2018	15 Jun 2027	Supporting European atmospheric composition and air quality monitoring services. MTG S1 carries the Sentinel-4 A mission.	IRS	Type: Geostationary Altitude: Period: Inclination: Repeat cycle: LST: Longitude (if geo): 0 Asc/desc: N/A URL: http://www.esa.int/esaLP/LPgmes.html
Meteosat Third Generation-S2 (sounding) MTG S2 Sounding Satellite 2 EUMETSAT / EC / ESA	Planned	15 Dec 2026	15 Jun 2035	Supporting European atmospheric composition and air quality monitoring services. MTG S2 carries the Sentinel-4 B mission.	IRS	Type: Geostationary Altitude: 36000 km Period: Inclination: Repeat cycle: LST: Longitude (if geo): 0 Asc/desc: N/A URL: http://www.esa.int/esaLP/LPgmes.html
Meteosat-6 EUMETSAT / ESA	Currently being flown	20 Nov 1993	31 Dec 2013	Meteorology, climatology, atmospheric dynamics/water and energy cycles. Meteosat 1-7 are first generation. Meteosat 8-11 are second generation and known as MSG in the development phase	Meteosat Comms, MVIRI	Type: Geostationary Altitude: 36000 km Period: Inclination: Repeat cycle: LST: Longitude (if geo): Asc/desc: N/A URL: http://www.eumetsat.de/en/dps/news/spacecraft.html
Meteosat-7 EUMETSAT / ESA	Currently being flown	03 Sep 1997	31 Dec 2013	Meteorology, climatology, atmospheric dynamics/water and energy cycles. Meteosat 1-7 are first generation. Meteosat 8-11 are second generation and known as MSG in the development phase	Meteosat Comms, MVIRI	Type: Geostationary Altitude: 36000 km Period: Inclination: Repeat cycle: LST: Longitude (if geo): 0 Asc/desc: N/A URL: http://www.eumetsat.de/en/mtp/index.html

Mission	Status	Launch Date	EOL Date	Applications	Instruments	Orbit Details & URL
Meteosat-8 Meteosat Second Generation-1 EUMETSAT / ESA	Currently being flown	13 Aug 2002	30 Jun 2011	Meteorology, climatology, atmospheric dynamics/water and energy cycles. Meteosat 1-7 are first generation. Meteosat 8-11 are second generation and known as MSG in the development phase	MSG Comms, SEVIRI, GERB	Type: Geostationary Altitude: 36000 km Period: Inclination: Repeat cycle: LST: Longitude (if geo): 0 Asc/desc: N/A URL: http://www.eumetsat.de/en/area4/topic1.html
Meteosat-9 Meteosat Second Generation-2 EUMETSAT / ESA	Currently being flown	21 Dec 2005	30 Jun 2014	Meteorology, climatology, atmospheric dynamics/water and energy cycles. Meteosat 1-7 are first generation. Meteosat 8-11 are second generation and known as MSG in the development phase	MSG Comms, SEVIRI, GERB	Type: Geostationary Altitude: 36000 km Period: Inclination: Repeat cycle: LST: Longitude (if geo): 0 Asc/desc: N/A URL: http://www.eumetsat.de/en/area4/topic1.html
Meteosat-10 Meteosat Second Generation-3 EUMETSAT / ESA	Approved	31 Jan 2012	31 Jan 2019	Meteorology, climatology, atmospheric dynamics/water and energy cycles. Meteosat 1-7 are first generation. Meteosat 8-11 are second generation and known as MSG in the development phase	MSG Comms, SEVIRI, GERB	Type: Geostationary Altitude: 36000 km Period: Inclination: Repeat cycle: LST: Longitude (if geo): 0 Asc/desc: N/A URL: http://www.eumetsat.de/en/area4/topic1.html
Meteosat-11 Meteosat Second Generation-4 EUMETSAT / ESA	Approved	31 Jan 2014	31 Jan 2021	Meteorology, climatology, atmospheric dynamics/water and energy cycles. Meteosat 1-7 are first generation. Meteosat 8-11 are second generation and known as MSG in the development phase	SEVIRI, GERB	Type: Geostationary Altitude: 36000 km Period: Inclination: Repeat cycle: LST: Longitude (if geo): 0 Asc/desc: N/A URL: http://www.eumetsat.de/en/area4/topic1.html
Metop-A Meteorological Operational Polar Satellite - A EUMETSAT / ESA	Currently being flown	19 Oct 2006	30 Apr 2012	Meteorology, climatology	SEM (POES), ARGOS, S&R (NOAA), MHS, IASI, GRAS, GOME-2, ASCAT, AMSU-A, AVHRR/3, HIRS/4	Type: Sun-synchronous Altitude: 840 km Period: 107.1 mins Inclination: 98.8 deg Repeat cycle: 29 days LST: 9:30 Longitude (if geo): Asc/desc: N/A URL: http://www.eumetsat.de/en/area4/topic2.html
Metop-B Meteorological Operational Polar Satellite - B EUMETSAT / ESA	Approved	02 Apr 2012	01 May 2017	Meteorology, climatology	SEM (POES), ARGOS, S&R (NOAA), MHS, IASI, GRAS, GOME-2, ASCAT, AMSU-A, AVHRR/3, HIRS/4	Type: Sun-synchronous Altitude: 840 km Period: 101.7 mins Inclination: 98.8 deg Repeat cycle: 29 days LST: 9:30 Longitude (if geo): Asc/desc: N/A URL: http://www.eumetsat.de/en/area4/topic2.html
Metop-C Meteorological Operational Polar Satellite - C EUMETSAT / ESA	Approved	02 Apr 2016	01 Dec 2021	Meteorology, climatology	SEM (POES), ARGOS, MHS, IASI, GRAS, GOME-2, ASCAT, AMSU-A, AVHRR/3, A DCS4	Type: Sun-synchronous Altitude: 840 km Period: 101.7 mins Inclination: 98.8 deg Repeat cycle: 29 days LST: 9:30 Longitude (if geo): Asc/desc: N/A URL: http://www.eumetsat.de/en/area4/topic2.html
MIOSAT Piccola MIssione Ottica basata su microSATellite ASI	Approved	01 Jan 2013	01 Jan 2016	Land surface, agriculture and forestry, regional geology, land use studies, water resources, vegetation studies, coastal studies and soils and atmospheric composition	PAN CAM, ALISEO, Mach-Zehnder Micro-interferometer	Type: Sun-synchronous Altitude: 650 km Period: 97.8 mins Inclination: 97.8 deg Repeat cycle: 29 days LST: 10:30 Longitude (if geo): Asc/desc: Descending URL: http://www.asi.it/en/activity/earth_observation/miosat_
Monitor-E ROSKOSMOS	Currently being flown	26 Aug 2005	31 Dec 2010	Agriculture and forestry, hydrology, environmental monitoring, hydrometeorology, ice and snow, land surface, meteorology	PSA, RDSA	Type: Sun-synchronous Altitude: 540 km Period: Inclination: 97.5 deg Repeat cycle: LST: 5:40 Longitude (if geo): Asc/desc: TBD URL:
MTG-I1 (imaging) Meteosat Third Generation - Imaging Satellite 1 EUMETSAT / ESA	Approved	15 Dec 2016	15 Jun 2025	Meteorology, climatology, Atmospheric dynamics/water and energy cycles	FCI, LI	Type: Geostationary Altitude: 36000 km Period: Inclination: Repeat cycle: LST: Longitude (if geo): 0 Asc/desc: N/A URL: http://www.eumetsat.int/Home/Main/What_We_Do/Satellites/Future_Satellites/Meteosat_Third_Generation/index.htm
MTG-I2 (imaging) Meteosat Third Generation - Imaging Satellite 2 EUMETSAT / ESA	Approved	15 Jun 2021	15 Dec 2029	Meteorology, climatology, Atmospheric dynamics/water and energy cycles	FCI, LI	Type: Geostationary Altitude: 36000 km Period: Inclination: Repeat cycle: LST: Longitude (if geo): 0 Asc/desc: N/A URL: http://www.eumetsat.int/Home/Main/What_We_Do/Satellites/Future_Satellites/Meteosat_Third_Generation/index.htm

Mission	Status	Launch Date	EOL Date	Applications	Instruments	Orbit Details & URL
MTG-I3 (imaging) Meteosat Third Generation - Imaging Satellite 3 EUMETSAT / ESA	Approved	15 Jan 2025	15 Jul 2033	Meteorology, climatology, Atmospheric dynamics/water and energy cycles	FCI, LI	Type: Geostationary Altitude: 36000 km Period: Inclination: Repeat cycle: LST: Longitude (if geo): 0 Asc/desc: N/A URL: http://www.eumetsat.int/Home/Main/What_We_Do/Satellites/Future_Satellites/Meteosat_Third_Generation/index.htm
MTG-I4 (imaging) Meteosat Third Generation - Imaging Satellite 4 EUMETSAT / ESA	Approved	15 Jun 2029	15 Dec 2037	Meteorology, climatology, Atmospheric dynamics/water and energy cycles	FCI, LI	Type: Geostationary Altitude: 36000 km Period: Inclination: Repeat cycle: LST: Longitude (if geo): 0 Asc/desc: N/A URL: http://www.eumetsat.int/Home/Main/What_We_Do/Satellites/Future_Satellites/Meteosat_Third_Generation/index.htm
MTSAT-1R Multi-functional Transport Satellite JMA / JCAB	Currently being flown	26 Feb 2005	01 Jan 2015	Meteorology, aeronautical applications. As of 2010 satellite on stand-by operational.	MTSAT Comms, JAMI/MTSAT-1R, MTSAT DCS	Type: Geostationary Altitude: 36000 km Period: Inclination: Repeat cycle: LST: Longitude (if geo): -140 Asc/desc: N/A URL:
MTSAT-2 Multi-functional Transport Satellite JMA / JCAB	Currently being flown	18 Feb 2006	01 Jan 2017	Meteorology, aeronautical applications	IMAGER/MTSAT-2, MTSAT Comms, MTSAT DCS	Type: Geostationary Altitude: 36000 km Period: Inclination: Repeat cycle: LST: Longitude (if geo): -145 Asc/desc: N/A URL:
NigeriaSat-1 NASRDA	Currently being flown	27 Sep 2003	31 Dec 2010	Small satellite mission with technical and scientific objectives (environmental) monitoring	NigeriaSat Medium Resolution	Type: Sun-synchronous Altitude: 686 km Period: 97 mins Inclination: 98 deg Repeat cycle: 3 days LST: Longitude (if geo): Asc/desc: Ascending URL: http://www.nasrda.net
NigeriaSat-2 NASRDA	Approved	29 Oct 2010	29 Oct 2017	Small satellite mission with technical and scientific objectives (environmental) monitoring	NigeriaSat Medium and High Resolution	Type: Sun-synchronous Altitude: 700 km Period: 97 mins Inclination: 98 deg Repeat cycle: 4 days LST: Longitude (if geo): Asc/desc: Descending URL: http://www.nasrda.net
NigeriaSat-X NASRDA	Planned	29 Oct 2010	29 Oct 2017	Small satellite mission with technical and scientific objectives(capability demonstration)	NigeriaSat Medium Resolution	Type: Sun-synchronous Altitude: 700 km Period: 97 mins Inclination: 98 deg Repeat cycle: LST: Longitude (if geo): Asc/desc: Descending URL: http://www.nasrda.net
NMP EO-1 New Millenium Program Earth Observing-1 NASA	Currently being flown	21 Nov 2000	30 Sep 2011	1.5-year nominal mission life, currently in extended operations. Land surface, earth resources	ALI, Hyperion, LEISA AC	Type: Sun-synchronous Altitude: 705 km Period: 99 mins Inclination: 98.2 deg Repeat cycle: 16 days LST: 10:00 Longitude (if geo): Asc/desc: Descending URL: http://eo1.gsfc.nasa.gov/
NOAA-15 National Oceanic and Atmospheric Administration - 15 NOAA	Currently being flown	01 May 1998	31 Dec 2010	Meteorology, agriculture and forestry, environmental monitoring, climatology, physical oceanography, Volcanic eruption monitoring, ice and snow cover, space environment, solar flux analysis, search and rescue	ARGOS, S&R (NOAA), ATOVS (HIRS/3 + AMSU + AVHRR/3), AMSU-A, HIRS/3, AMSU-B, AVHRR/3, NOAA Comms	Type: Sun-synchronous Altitude: 813 km Period: 101.4 mins Inclination: 98.6 deg Repeat cycle: LST: 7:08 Longitude (if geo): Asc/desc: Descending URL: http://www.oso.noaa.gov/poes/
NOAA-16 National Oceanic and Atmospheric Administration - 16 NOAA	Currently being flown	21 Sep 2000	31 Dec 2012	Meteorology, agriculture and forestry, environmental monitoring, climatology, physical oceanography, Volcanic eruption monitoring, ice and snow cover, total ozone studies, space environment, solar flux analysis, search and rescue	SEM (POES), ARGOS, S&R (NOAA), ATOVS (HIRS/3 + AMSU + AVHRR/3), AMSU-A, HIRS/3, SBUV/2, AMSU-B, AVHRR/3, NOAA Comms	Type: Sun-synchronous Altitude: 870 km Period: 102 mins Inclination: 98.8 deg Repeat cycle: LST: 13:54 Longitude (if geo): Asc/desc: Ascending URL: http://www.oso.noaa.gov/poes/
NOAA-17 National Oceanic and Atmospheric Administration - 17 NOAA	Currently being flown	24 Jun 2002	31 Dec 2014	Meteorology, agriculture and forestry, environmental monitoring, climatology, physical oceanography, Volcanic eruption monitoring, ice and snow cover, total ozone studies, space environment, solar flux analysis, search and rescue	SEM (POES), ARGOS, S&R (NOAA), AMSU-A, HIRS/3, SBUV/2, AMSU-B, AVHRR/3, NOAA Comms	Type: Sun-synchronous Altitude: 833 km Period: 101.4 mins Inclination: 98.75 deg Repeat cycle: LST: 10:00 Longitude (if geo): Asc/desc: Descending URL: http://www.oso.noaa.gov/poes/
NOAA-18 National Oceanic and Atmospheric Administration - 18 NOAA	Currently being flown	20 May 2005	31 Dec 2015	Meteorology, agriculture and forestry, environmental monitoring, climatology, physical oceanography, Volcanic eruption monitoring, ice and snow cover, total ozone studies, space environment, solar flux analysis, search and rescue	SEM (POES), ARGOS, S&R (NOAA), MHS, AMSU-A, SBUV/2, AVHRR/3, NOAA Comms, HIRS/4	Type: Sun-synchronous Altitude: 870 km Period: 102.1 mins Inclination: 98.75 deg Repeat cycle: LST: 14:00 Longitude (if geo): Asc/desc: Ascending URL: http://www.oso.noaa.gov/poes/

Mission	Status	Launch Date	EOL Date	Applications	Instruments	Orbit Details & URL
NOAA-19 National Oceanic and Atmospheric Administration - 19 NOAA	Currently being flown	04 Feb 2009	01 Mar 2016	Meteorology, agriculture and forestry, environmental monitoring, climatology, physical oceanography, Volcanic eruption monitoring, ice and snow cover, total ozone studies, space environment, solar flux analysis, search and rescue	SEM (POES), ARGOS, S&R (NOAA), MHS, SBUV/2, AVHRR/3, NOAA Comms, HIRS/4, A-DCS4, LRIT	Type: Sun-synchronous Altitude: 870 km Period: 102.1 mins Inclination: 98.75 deg Repeat cycle: LST: 14:00 Longitude (if geo): Asc/desc: Ascending URL: http://www.oso.noaa.gov/poes/
NPP NPOESS (National Polar-orbiting Operational Environmental Satellite System) Preparatory Project NASA / NOAA / DoD (USA)	Approved	23 Sep 2011	23 Sep 2016	5-year nominal mission life. Operational Polar weather and climate measurements	CrIS, CERES, VIIRS, ATMS, OMPS	Type: Sun-synchronous Altitude: 824 km Period: 101 mins Inclination: Repeat cycle: LST: 13:30 Longitude (if geo): Asc/desc: Ascending URL: http://jointmission.gsfc.nasa.gov/
OCEANSAT-1 Ocean Satellite-1 ISRO	Currently being flown	26 May 1999	31 Dec 2010	Ocean and atmosphere applications	OCM, MSMR	Type: Sun-synchronous Altitude: 720 km Period: 99.31 mins Inclination: 98.28 deg Repeat cycle: 2 days LST: Longitude (if geo): Asc/desc: Descending URL:
OCEANSAT-2 Ocean Satellite-2 ISRO	Currently being flown	24 Sep 2009	24 Sep 2014	Ocean and atmosphere applications	OCM, Scatterometer, ROSA	Type: Sun-synchronous Altitude: 720 km Period: 99.31 mins Inclination: 98.28 deg Repeat cycle: 2 days LST: 12:00 Longitude (if geo): Asc/desc: Descending URL: http://www.isro.org/
OCEANSAT-3 Ocean Satellite-3 ISRO	Considered	01 Jan 2014	01 Jan 2019	Ocean and atmosphere applications	Scatterometer, Altimeter (OCEANSAT-3), TIR (OCEANSAT-3), PMR, OCM (OCEANSAT-3)	Type: Sun-synchronous Altitude: 720 km Period: 99.31 mins Inclination: 98.28 deg Repeat cycle: 2 days LST: Longitude (if geo): Asc/desc: Descending URL: http://www.isro.org/
OCO-2 Orbiting Carbon Observatory-2 NASA	Planned	15 Dec 2013	15 Dec 2016	High resolution carbon dioxide measurements to characterize sources and sinks on regional scales and quantify their variability over the seasonal cycle.	Spectrometer (OCO-2)	Type: Sun-synchronous Altitude: 705 km Period: 98.8 mins Inclination: 98.2 deg Repeat cycle: LST: Longitude (if geo): Asc/desc: Ascending URL: http://oco.jpl.nasa.gov/
Odin SNSB / TEKES / CNES / CSA	Currently being flown	20 Feb 2001	31 Dec 2012	Atmospheric research, stratospheric ozone chemistry, mesospheric ozone science, summer mesospheric science	OSIRIS, SMR	Type: Sun-synchronous Altitude: 590 km Period: 97.6 mins Inclination: 97.8 deg Repeat cycle: LST: 18:00 Longitude (if geo): Asc/desc: Ascending URL: http://www.ssc.se/?id=7180
Ørsted (Oersted) DNSC / CNES	Currently being flown	21 Nov 1999	31 Dec 2010	Earth magnetic field mapping	Overhauser Magnetometer, CSC FVM, SI, GPSRO (Oersted)	Type: Inclined, non-sunsynchronous Altitude: Period: Inclination: Repeat cycle: LST: Longitude (if geo): Asc/desc: TBD URL: http://web.dmi.dk/projects/oersted/
OSTM (Jason-2) Ocean Surface Topography Mission NASA / NOAA / CNES / EUMETSAT	Currently being flown	20 Jun 2008	31 Dec 2013	3-year nominal mission life. Physical oceanography, geodesy/gravity, climate monitoring, marine meteorology	LRA, JMR, DORIS-NG, POSEIDON-3, AMR, GPSP	Type: Inclined, non-sunsynchronous Altitude: 1336 km Period: 112.4 mins Inclination: 66 deg Repeat cycle: 10 days LST: Longitude (if geo): Asc/desc: N/A URL: http://sealevel.jpl.nasa.gov/mission/ostm.html
PACE Preliminary Aerosol, Cloud, Ecosystem NASA	Considered	01 Jan 2018	01 Jan 2021	Phase-2 DS Mission, launch order unknown, 3-year nominal mission. Aerosol and cloud profiles for climate and water cycle; ocean color for open ocean biogeochemistry	Next Gen APS (ACE), OES	Type: Sun-synchronous Altitude: 650 km Period: Inclination: 98.2 deg Repeat cycle: LST: Longitude (if geo): Asc/desc: Ascending URL: http://dsm.gsfc.nasa.gov/ace/index.html
PARASOL Polarization and Anisotropy of Reflectances for Atmospheric Science coupled with Observations from a LIDAR CNES	Currently being flown	01 Dec 2004	30 Jun 2011	Micro-satellite with the aim of characterisation of the clouds and aerosols microphysical and radiative properties, needed to understand and model the radiative impact of clouds and aerosols.	POLDER-P	Type: Sun-synchronous Altitude: 700 km Period: 98.8 mins Inclination: Repeat cycle: LST: 12:00 Longitude (if geo): Asc/desc: TBD URL: http://smsc.cnes.fr/PARASOL/index.htm
PATH Precipitation and All-weather Temperature and Humidity NASA	Considered	01 Jan 2030	01 Jan 2033	Phase-2 DS Mission, launch order unknown, 3-year nominal mission. High frequency, all-weather temperature and humidity soundings for weather forecasting and SST	GeoSTAR	Type: Geostationary Altitude: 42000 km Period: Inclination: Repeat cycle: LST: Longitude (if geo): 0 Asc/desc: N/A URL: http://decadal.gsfc.nasa.gov/path.html
PAZ CDTI	Approved	31 Dec 2011	31 Dec 2016	Security, land use, urban management, environmental monitoring, risk management	Paz SAR-X	Type: Sun-synchronous Altitude: 510 km Period: 90 mins Inclination: 98 deg Repeat cycle: LST: Longitude (if geo): Asc/desc: Ascending URL:

Mission	Status	Launch Date	EOL Date	Applications	Instruments	Orbit Details & URL
PCW-1 Polar Communications and Weather-1 CSA	Planned	01 Sep 2016	01 Mar 2024	Continuous meteorological observation and communications service to the Arctic	PCWMP	Type: Highly elliptical Altitude: Period: 718 mins Inclination: 63.4 deg Repeat cycle: 1 days LST: N/A Longitude (if geo): Asc/desc: N/A URL: http://www.asc-csa.gc.ca/eng/satellites/pcw/default.asp
PCW-2 Polar Communications and Weather-2 CSA	Planned	01 Dec 2016	01 Jun 2024	Continuous meteorological observation and communications service to the Arctic	PCWMP	Type: Highly elliptical Altitude: Period: 718 mins Inclination: 63.4 deg Repeat cycle: 1 days LST: N/A Longitude (if geo): Asc/desc: N/A URL: http://www.asc-csa.gc.ca/eng/satellites/pcw/default.asp
PICARD CNES	Currently being flown	15 Jun 2010	01 Dec 2011	Simultaneous measurements of solar diameter, differential rotation, solar constant, and variability.	SODISM, SOVAP, PREMOS	Type: TBD Altitude: Period: Inclination: Repeat cycle: LST: Longitude (if geo): Asc/desc: TBD URL: http://smsc.cnes.fr/PICARD/
Pleiades 1 CNES	Approved	31 Mar 2011	31 Mar 2016	Cartography, land use, risk, agriculture and forestry, civil planning and mapping, digital terrain models, defence	HiRI	Type: Sun-synchronous Altitude: 694 km Period: Inclination: Repeat cycle: 26 days LST: 10:15 Longitude (if geo): Asc/desc: Descending URL: http://smsc.cnes.fr/PLEIADES/Fr/index.htm
Pleiades 2 CNES	Approved	31 Mar 2012	31 Mar 2017	Cartography, land use, risk,agriculture and forestry, civil planning and mapping, digital terrain models, defense	HiRI	Type: Sun-synchronous Altitude: 694 km Period: Inclination: Repeat cycle: LST: 10:15 Longitude (if geo): Asc/desc: Descending URL: http://smsc.cnes.fr/PLEIADES/Fr/index.htm
Post-EPS Meteorological Operational Polar Satellite (Post-EPS) EUMETSAT / EC / ESA	Planned	01 Dec 2019	01 Dec 2024	In early stages of mission definition. Other payloads will be added. Post-EPS carries the Sentinel-5 mission.		Type: Sun-synchronous Altitude: Period: Inclination: Repeat cycle: LST: Longitude (if geo): Asc/desc: N/A URL: http://www.esa.int/esaLP/LPgmes.html
PRISMA PRecursore IperSpettrale della Missione Applicativa ASI	Approved	01 Jan 2012	01 Jan 2017	Land surface, agriculture and forestry, regional geology, land use studies, water resources, vegetation studies, coastal studies and soils	HYC, PAN CAMERA	Type: Sun-synchronous Altitude: 650 km Period: 97.8 mins Inclination: 97.8 deg Repeat cycle: 29 days LST: 10:30 Longitude (if geo): Asc/desc: Descending URL: http://www.asi.it/en/activity/earth_observation/prisma_
PROBA Project for On-Board Autonomy ESA	Currently being flown	22 Oct 2001	31 Dec 2012	PROBA is a technology experiment to demonstrate the on-board autonomy of a generic platform suitable for small scientific or application missions. A number of earth observation instruments are included. CHRIS - a hyperspectral imager provides data related to Earth Ressources science and applications	CHRIS	Type: Sun-synchronous Altitude: 615 km Period: 96.97 mins Inclination: 97.9 deg Repeat cycle: 7 days LST: 10:30 Longitude (if geo): Asc/desc: Descending URL: http://earth.esa.int/proba/
QuikSCAT Quick Scatterometer NASA	Currently being flown	19 Jun 1999	30 Sep 2011	3-year nominal mission life, currently in extended operations. Acquires accurate, high-resolution, global measurements of sea-surface wind vectors in 1 to 2 day repeat cycles for studies of tropospheric dynamics and air-sea interaction processes, including air-sea momentum transfer.	SeaWinds	Type: Sun-synchronous Altitude: 803 km Period: 101 mins Inclination: 98.6 deg Repeat cycle: LST: 6:00 Longitude (if geo): Asc/desc: Ascending URL: http://winds.jpl.nasa.gov/missions/quikscat/index.cfm
RADARSAT C-1 RADARSAT CONSTELLATION-1 CSA	Approved	01 Aug 2014	01 Aug 2021	Ecosystem monitoring, Maritime surveillance, Disaster management	SAR (RCM), AIS (RCM)	Type: Sun-synchronous Altitude: 600 km Period: 96.4 mins Inclination: 97.7 deg Repeat cycle: 12 days LST: 18:00 Longitude (if geo): Asc/desc: Ascending URL: http://www.asc-csa.gc.ca/eng/satellites/radarsat/default.asp
RADARSAT C-2 RADARSAT CONSTELLATION-2 CSA	Approved	01 Apr 2015	01 Apr 2022	Ecosystem monitoring, Maritime surveillance, Disaster management	SAR (RCM), AIS (RCM)	Type: Sun-synchronous Altitude: 600 km Period: 96.4 mins Inclination: 97.7 deg Repeat cycle: 12 days LST: 18:00 Longitude (if geo): Asc/desc: Ascending URL: http://www.asc-csa.gc.ca/eng/satellites/radarsat/default.asp
RADARSAT C-3 RADARSAT CONSTELLATION-3 CSA	Approved	01 Jun 2015	01 Jun 2022	Ecosystem monitoring, Maritime surveillance, Disaster management	SAR (RCM), AIS (RCM)	Type: Sun-synchronous Altitude: 600 km Period: 96.4 mins Inclination: 97.7 deg Repeat cycle: 12 days LST: 18:00 Longitude (if geo): Asc/desc: Ascending URL: http://www.asc-csa.gc.ca/eng/satellites/radarsat/default.asp

Mission	Status	Launch Date	EOL Date	Applications	Instruments	Orbit Details & URL
RADARSAT-1 CSA	Currently being flown	04 Nov 1995	31 Mar 2012	Environmental monitoring, physical oceanography, ice and snow, land surface	SAR (RADARSAT)	Type: Sun-synchronous Altitude: 798 km Period: 100.7 mins Inclination: 98.594 deg Repeat cycle: 24 days LST: 18:00 Longitude (if geo): Asc/desc: Ascending URL: http://www.asc-csa.gc.ca/eng/satellites/radarsat1/default.asp
RADARSAT-2 CSA	Currently being flown	14 Dec 2007	17 Apr 2015	Environmental monitoring, physical oceanography, ice and snow, land surface. Note: Ownership of RADARSAT-2 has been transferred to MDA Corporation. CSA investment in the project is paid back with the data generated by the satellite since it entered operations.	SAR (RADARSAT-2)	Type: Sun-synchronous Altitude: 798 km Period: 100.7 mins Inclination: 98.6 deg Repeat cycle: 24 days LST: 18:00 Longitude (if geo): Asc/desc: Ascending URL: http://www.asc-csa.gc.ca/eng/satellites/radarsat2/default.asp
RapidEye DLR	Currently being flown	29 Aug 2008	30 Aug 2015	System of 5 satellites for cartography, land surface, digital terrain models, disaster management, environmental monitoring.	MSI	Type: Sun-synchronous Altitude: 622 km Period: Inclination: 98.7 deg Repeat cycle: 1 days LST: 11:00 Longitude (if geo): Asc/desc: Descending URL: http://www.rapideye.de/
RASAT RASAT Remote Sensing Satellite TUBITAK	Approved	30 Oct 2010	15 Oct 2013	Cartography, land cover/land use, city planning, disaster mitigation/monitoring, environmental monitoring.	RASAT VIS Panchromatic, RASAT VIS Multispectral	Type: Sun-synchronous Altitude: 700 km Period: 98.8 mins Inclination: 98.21 deg Repeat cycle: 4 days LST: 10:30 Longitude (if geo): Asc/desc: Ascending URL: http://www.uzay.tubitak.gov.tr/
RESOURCESAT-1 Resource Satellite-1 ISRO	Currently being flown	17 Oct 2003	10 Dec 2010	Natural resources management; agricultural applications; forestry etc.	AWiFS, LISS-IV, LISS-III (RESOURCESAT)	Type: Sun-synchronous Altitude: 817 km Period: 102 mins Inclination: 98.72 deg Repeat cycle: 26 days LST: 10:30 Longitude (if geo): Asc/desc: Descending URL: http://www.isro.org/
RESOURCESAT-2 Resource Satellite-2 ISRO	Approved	12 Dec 2010	12 Dec 2014	Natural resources management; agricultural applications; forestry etc.	AWiFS, LISS-IV, LISS-III (RESOURCESAT)	Type: Sun-synchronous Altitude: 817 km Period: 102 mins Inclination: 98.72 deg Repeat cycle: 26 days LST: Longitude (if geo): Asc/desc: Descending URL: http://www.isro.org/
RESOURCESAT-3 Resource Satellite-3 ISRO	Considered	01 Jul 2014	01 Jul 2019	Natural resources management; agricultural applications; forestry etc.	WS LISS III, ATCOR	Type: Sun-synchronous Altitude: 817 km Period: 102 mins Inclination: 98.72 deg Repeat cycle: 26 days LST: Longitude (if geo): Asc/desc: Descending URL: http://www.isro.org/
Resurs DK 1 Resurs DK Environmental Satellite 1 ROSKOSMOS / ROSHYDROMET	Currently being flown	15 Jun 2006	30 Jun 2011	Land surface	Geoton-L1, Pamela, Arina	Type: Inclined, non-sunsynchronous Altitude: 600 km Period: 92 mins Inclination: 70 deg Repeat cycle: 17 days LST: Longitude (if geo): Asc/desc: Ascending URL: http://planet.iitp.ru
Resurs P N1 Resurs P Environmental Satellite N1 ROSKOSMOS / ROSHYDROMET	Planned	31 Dec 2011	31 Dec 2016	Land surface	Geoton-L1, Pamela, Arina	Type: Altitude: Period: Inclination: Repeat cycle: LST: Longitude (if geo): Asc/desc: URL:
Resurs P N2 Resurs P Environmental Satellite N2 ROSKOSMOS / ROSHYDROMET	Planned	31 Dec 2013	31 Dec 2018	Land surface	Geoton-L1, Pamela, Arina	Type: Altitude: Period: Inclination: Repeat cycle: LST: Longitude (if geo): Asc/desc: URL:
RISAT-1 Radar Imaging Satellite ISRO	Approved	25 Mar 2011	25 Mar 2015	Land surface, agriculture and forestry, regional geology, land use studies, water resources, vegetation studies, coastal studies and soils - Specially during cloud season	SAR (RISAT)	Type: Sun-synchronous Altitude: 610 km Period: 96.5 mins Inclination: 97.844 deg Repeat cycle: 12 days LST: 6:00 Longitude (if geo): Asc/desc: Descending URL: http://www.isro.org/
RISAT-1F Radar Imaging Satellite ISRO	Considered	01 Jan 2012	01 Jan 2018	Land surface, agriculture and forestry, regional geology, land use studies, water resources, vegetation studies, coastal studies and soils - Specially during cloud season	SAR-L	Type: Sun-synchronous Altitude: Period: 96.5 mins Inclination: 97.844 deg Repeat cycle: 12 days LST: Longitude (if geo): Asc/desc: Descending URL: http://www.isro.org/

Mission	Status	Launch Date	EOL Date	Applications	Instruments	Orbit Details & URL
RISAT-2 Radar Imaging Satellite ISRO	Currently being flown	20 Apr 2009	20 Apr 2013	For research and disaster management applications purpose	SAR-X	Type: Sun-synchronous Altitude: 550 km Period: 90 mins Inclination: Repeat cycle: LST: 6:00 Longitude (if geo): Asc/desc: Descending URL: http://www.isro.org/
RISAT-2F Radar Imaging Satellite ISRO	Approved	01 Jan 2013	01 Jan 2017	For research and disaster management applications purpose	SAR-X	Type: Sun-synchronous Altitude: 550 km Period: 90 mins Inclination: Repeat cycle: LST: 6:00 Longitude (if geo): Asc/desc: Descending URL: http://www.isro.org/
RISAT-3L Radar Imaging Satellite ISRO	Considered	01 Jan 2014	01 Jan 2020	Land surface, agriculture and forestry, regional geology, land use studies, water resources, vegetation studies, coastal studies and soils - Specially during cloud season	SAR-L	Type: Sun-synchronous Altitude: Period: 96.5 mins Inclination: 97.844 deg Repeat cycle: 12 days LST: Longitude (if geo): Asc/desc: Descending URL: http://www.isro.org/
SAC-C CONAE	Currently being flown	21 Nov 2000	01 Jan 2012	Earth Observation, studies the structure and dynamics of the Earth's surface, atmosphere, ionosphere and geomagnetic field.	MMRS, HRTC, HSTC, MMP, GOLPE, IST, INES, ICARE, WTE, DCS (SAC-C)	Type: Sun-synchronous Altitude: 705 km Period: 98 mins Inclination: 98.2 deg Repeat cycle: 9 days LST: 10:25 Longitude (if geo): Asc/desc: Descending URL: http://www.conae.gov.ar/
SAC-D/Aquarius CONAE / NASA	Approved	01 Apr 2011	01 Apr 2017	Earth observation studies; measurement of ocean salinity; atmospheric and environmental parameters,emergency management	Lagrange, MWR, HSC, SODAD/CARMEN-1, NIRST, CARMEN-1, DCS (SAC-D), ROSA, TDP, Aquarius L-Band radiometer, Aquarius L-Band Scatterometer	Type: Sun-synchronous Altitude: 657 km Period: 98 mins Inclination: 98 deg Repeat cycle: 7 days LST: Longitude (if geo): Asc/desc: Ascending URL: http://www.conae.gov.ar/
SAC-E/SABIA/mar CONAE / INPE	Approved	01 Jan 2014	01 Jan 2019	Food production;environmental monitoring; inner coastal and water quality	MOC	Type: Sun-synchronous Altitude: Period: Inclination: Repeat cycle: 9 days LST: 10:15 Longitude (if geo): Asc/desc: Descending URL: http://www.conae.gov.ar/
SAGE-III Stratospheric Aerosol and Gas Experiment NASA	Planned	31 May 2014	19 May 2019	Refurbishment of the SAGE-III instrument and of a hexapod pointing platform, and accommodation studies. This mission flies on the ISS.	SAGE-III	Type: Sun-synchronous Altitude: 425 km Period: Inclination: 51 deg Repeat cycle: LST: Longitude (if geo): Asc/desc: URL: http://www-sage3.larc.nasa.gov/missions/
SAOCOM 1A CONAE / ASI	Approved	01 Dec 2012	01 Dec 2017	Earth observation and emergency management with an L-band SAR	SAR-L	Type: Sun-synchronous Altitude: 620 km Period: 97.2 mins Inclination: 97.89 deg Repeat cycle: 16 days LST: 6:12 Longitude (if geo): Asc/desc: Ascending URL: http://www.conae.gov.ar/
SAOCOM 1B CONAE / ASI	Approved	01 Jun 2013	01 Jun 2018	Earth observation and emergency management with an L-band SAR	SAR-L	Type: Sun-synchronous Altitude: 620 km Period: 97.2 mins Inclination: 97.89 deg Repeat cycle: 16 days LST: 6:12 Longitude (if geo): Asc/desc: Ascending URL: http://www.conae.gov.ar/
SAOCOM-2A CONAE	Planned	01 Jan 2015	01 Jan 2020	Earth observation and emergency management with an L-band SAR	SAR-L	Type: Sun-synchronous Altitude: 620 km Period: Inclination: 98 deg Repeat cycle: 16 days LST: 6:00 Longitude (if geo): Asc/desc: Descending URL: http://www.conae.gov.ar/
SAOCOM-2B CONAE	Planned	01 Jan 2016	01 Jan 2021	Earth observation and emergency management with an L-band SAR	SAR-L	Type: Sun-synchronous Altitude: 620 km Period: Inclination: 98 deg Repeat cycle: 16 days LST: 6:00 Longitude (if geo): Asc/desc: Descending URL: http://www.conae.gov.ar/
SARAL Satellite with ARgos and ALtiKa CNES / ISRO	Approved	01 Oct 2011	01 Oct 2013	This will provide precise, repetitive global measurements of sea surface height, significant wave heights and wind speed	ARGOS, AltiKa	Type: Sun-synchronous Altitude: 799 km Period: 100.59 mins Inclination: 98.55 deg Repeat cycle: 35 days LST: Longitude (if geo): Asc/desc: Descending URL:
SARE-1 CONAE	Planned	01 Jan 2012	01 May 2014	Earth observation studies, technology testing	High Resolution Panchromatic Camera, Panchromatic High Sensitivity Camera, SAR components testing	Type: Altitude: Period: Inclination: Repeat cycle: LST: Longitude (if geo): Asc/desc: URL:

Mission	Status	Launch Date	EOL Date	Applications	Instruments	Orbit Details & URL
SCATSAT Scatterometer Satellite ISRO	Considered	01 Jan 2013	01 Jan 2017	Ocean and atmosphere applications, Wind speed over oceans	Scatterometer	Type: TBD Altitude: Period: Inclination: Repeat cycle: LST: Longitude (if geo): Asc/desc: URL:
SCD-1 Data Collecting Satellite 1 INPE	Currently being flown	09 Feb 1993	01 Dec 2010	Data collection and communication	DCS	Type: Inclined, non-sunsynchronous Altitude: 750 km Period: 100 mins Inclination: 25 deg Repeat cycle: LST: Longitude (if geo): Asc/desc: TBD URL: http://www.inpe.br/programas/mecb/default.htm
SCD-2 Data Collecting Satellite 2 INPE	Currently being flown	22 Oct 1998	01 Dec 2012	Data collection and communication	DCS	Type: Inclined, non-sunsynchronous Altitude: 750 km Period: 100 mins Inclination: 25 deg Repeat cycle: LST: Longitude (if geo): Asc/desc: TBD URL: http://www.inpe.br/programas/mecb/default.htm
SCISAT-1 SCISAT-I/ACE CSA	Currently being flown	12 Aug 2003	01 Apr 2013	To improve our understanding of the depletion of the ozone layer, particularly over Canada and the Arctic.	ACE-FTS, MAESTRO	Type: Inclined, non-sunsynchronous Altitude: 650 km Period: 97.7 mins Inclination: 74 deg Repeat cycle: 365 days LST: Longitude (if geo): Asc/desc: N/A URL: http://www.asc-csa.gc.ca/eng/satellites/scisat/default.asp
SCLP Snow and Cold Land Processes NASA	Considered	01 Jan 2030	01 Jan 2033	Phase-2 DS Mission, launch order unknown, 3-year nominal mission. Snow accumulation for fresh water availability	Ku and X-band radars (SCLP), K band radiometers (SCLP)	Type: Sun-synchronous Altitude: Period: Inclination: Repeat cycle: 15 days LST: Longitude (if geo): Asc/desc: URL: http://decadal.gsfc.nasa.gov/sclp.html
Sentinel-1 A ESA / EC	Approved	15 Dec 2012	15 Mar 2020	Providing continuity of C-band SAR data for operational applications notably in the following areas: monitoring of sea ice zones and the arctic environment, surveillance of marine environment, monitoring of land surface motion risks and mapping in support of humanitarian aid in crisis situations	C-Band SAR	Type: Sun-synchronous Altitude: 693 km Period: 98.74 mins Inclination: 98.19 deg Repeat cycle: 12 days LST: 18:00 Longitude (if geo): Asc/desc: Ascending URL: http://www.esa.int/esaLP/LPgmes.html
Sentinel-1 B ESA / EC	Approved	15 Dec 2014	15 Mar 2022	Providing continuity of C-band SAR data for operational applications notably in the following areas: monitoring of sea ice zones and the arctic environment, surveillance of marine environment, monitoring of land surface motion risks and mapping in support of humanitarian aid in crisis situations	C-Band SAR	Type: Sun-synchronous Altitude: 693 km Period: 98.74 mins Inclination: 98.19 deg Repeat cycle: 12 days LST: 18:00 Longitude (if geo): Asc/desc: Ascending URL: http://www.esa.int/esaLP/LPgmes.html
Sentinel-1 C ESA / EC	Considered	31 Mar 2019	30 Jun 2026	Providing continuity of C-band SAR data for operational applications notably in the following areas: monitoring of sea ice zones and the arctic environment, surveillance of marine environment, monitoring of land surface motion risks and mapping in support of humanitarian aid in crisis situations	C-Band SAR	Type: Sun-synchronous Altitude: 693 km Period: 98.74 mins Inclination: 98.19 deg Repeat cycle: 12 days LST: 18:00 Longitude (if geo): Asc/desc: Ascending URL: http://www.esa.int/esaLP/LPgmes.html
Sentinel-2 A ESA / EC	Approved	01 May 2013	01 Aug 2020	Supporting land monitoring related services, including: generation of generic land cover maps, risk mapping and fast images for disaster relief, generation of leaf coverage, eaf chlorophyll content and leaf water content	MSI (Sentinel-2)	Type: Sun-synchronous Altitude: 786 km Period: 100.7 mins Inclination: 98.62 deg Repeat cycle: 10 days LST: 10:30 Longitude (if geo): Asc/desc: Descending URL: http://www.esa.int/esaLP/LPgmes.html
Sentinel-2 B ESA / EC	Approved	31 Dec 2014	31 Mar 2022	Supporting land monitoring related services, including: generation of generic land cover maps, risk mapping and fast images for disaster relief, generation of leaf coverage, eaf chlorophyll content and leaf water content	MSI (Sentinel-2)	Type: Sun-synchronous Altitude: 786 km Period: 100.7 mins Inclination: 98.62 deg Repeat cycle: 10 days LST: 10:30 Longitude (if geo): Asc/desc: Descending URL: http://www.esa.int/esaLP/LPgmes.html
Sentinel-2 C ESA / EC	Considered	01 Jan 2020	01 Apr 2027	Supporting land monitoring related services, including: generation of generic land cover maps, risk mapping and fast images for disaster relief, generation of leaf coverage, eaf chlorophyll content and leaf water content	MSI (Sentinel-2)	Type: Sun-synchronous Altitude: 786 km Period: 100.7 mins Inclination: 98.62 deg Repeat cycle: 10 days LST: 10:30 Longitude (if geo): Asc/desc: Descending URL: http://www.esa.int/esaLP/LPgmes.html
Sentinel-3 A ESA / EC	Approved	15 Apr 2013	15 Aug 2020	Supporting global land and ocean monitoring services, in particular: sea/land colour data and surface temperature; sea surface and land ice topography; coastal zones, inland water and sea ice topography; vegetation products	OLCI, SLSTR, SRAL	Type: Sun-synchronous Altitude: 814 km Period: 100 mins Inclination: 98.65 deg Repeat cycle: 27 days LST: 10:00 Longitude (if geo): Asc/desc: Descending URL: http://www.esa.int/esaLP/LPgmes.html

Mission	Status	Launch Date	EOL Date	Applications	Instruments	Orbit Details & URL
Sentinel-3 B ESA / EC	Approved	31 Dec 2014	30 Apr 2022	Supporting global land and ocean monitoring services, in particular: sea/land colour data and surface temperature; sea surface and land ice topography; coastal zones, inland water and sea ice topography; vegetation products	OLCI, SLSTR, SRAL	Type: Sun-synchronous Altitude: 814 km Period: 100 mins Inclination: 98.65 deg Repeat cycle: 27 days LST: 10:00 Longitude (if geo): Asc/desc: Ascending URL: http://www.esa.int/esaLP/LPgmes.html
Sentinel-3 C ESA / EC	Considered	01 Jan 2020	01 May 2027	Supporting global land and ocean monitoring services, in particular: sea/land colour data and surface temperature; sea surface and land ice topography; coastal zones, inland water and sea ice topography; vegetation products	OLCI, SLSTR, SRAL	Type: Sun-synchronous Altitude: 814 km Period: 100 mins Inclination: 98.65 deg Repeat cycle: 27 days LST: 10:00 Longitude (if geo): Asc/desc: Ascending URL: http://www.esa.int/esaLP/LPgmes.html
Sentinel-4 A ESA / EC	Planned	15 Dec 2018	15 Jun 2027	Supporting European atmospheric composition and air quality monitoring services. The Sentinel-4 A mission is carried on MTG S1.	UVN (Sentinel-4), IRS	Type: Geostationary Altitude: Period: Inclination: Repeat cycle: LST: Longitude (if geo): 0 Asc/desc: N/A URL: http://www.esa.int/esaLP/LPgmes.html
Sentinel-4 B ESA / EC	Planned	15 Dec 2026	15 Jun 2035	Supporting European atmospheric composition and air quality monitoring services. The Sentinel-4 B mission is carried on MTG S2.	UVN (Sentinel-4), IRS	Type: Geostationary Altitude: Period: Inclination: Repeat cycle: LST: Longitude (if geo): 0 Asc/desc: N/A URL: http://www.esa.int/esaLP/LPgmes.html
Sentinel-5 ESA	Planned	01 Dec 2019	01 Dec 2026	In early stages of mission definition. Other payloads will be added. The Sentinel-5 mission is carried on post-EPS.	IRS, METimage, UVNS (post-EPS)	Type: Sun-synchronous Altitude: Period: Inclination: Repeat cycle: LST: Longitude (if geo): Asc/desc: N/A URL: http://www.esa.int/esaLP/LPgmes.html
Sentinel-5 precursor ESA / NSO	Approved	01 Oct 2014	01 Jan 2020	Supporting global atmospheric composition and air quality monitoring services. It will bridge the gap between Envisat and Sentinel-5	UVNS (Sentinel-5 precursor)	Type: Sun-synchronous Altitude: 824 km Period: 17 mins Inclination: 98.742 deg Repeat cycle: LST: 13:30 Longitude (if geo): Asc/desc: Ascending URL: http://www.esa.int/esaLP/LPgmes.html
Sich-2 NSAU	Approved	01 Oct 2010	01 Apr 2014	Land Observation	MBEI, MIREI	Type: Sun-synchronous Altitude: 668 km Period: 98 mins Inclination: 98 deg Repeat cycle: 5 days LST: 10:50 Longitude (if geo): Asc/desc: Descending URL:
SMAP Soil Moisture Active Passive NASA	Planned	30 Nov 2014	30 Nov 2017	Late 2014 launch expected, 3-year nominal mission life. Global soil moisture mapping	L-band Radar (SMAP), L-band Radiometer (SMAP)	Type: Sun-synchronous Altitude: 685 km Period: Inclination: 98 deg Repeat cycle: LST: 18:00 Longitude (if geo): Asc/desc: Ascending URL: http://smap.jpl.nasa.gov/
SMOS Soil Moisture and Ocean Salinity (Earth Explorer Opportunity Mission) ESA / CDTI / CNES	Currently being flown	02 Nov 2009	02 Nov 2012	Overall objectives are to provide global observations of two crucial variables for modelling the weather and climate, Soil Moisture and Ocean Salinity. It will also monitor the vegetation water content, snow cover and ice structure.	MIRAS (SMOS)	Type: Sun-synchronous Altitude: 758 km Period: 100.075 mins Inclination: 98.44 deg Repeat cycle: 23 days LST: 6:00 Longitude (if geo): Asc/desc: Ascending URL: http://www.esa.int/export/esaLP/smos.html
SORCE Solar Radiation and Climate Experiment NASA	Currently being flown	25 Jan 2003	30 Sep 2011	5-year nominal mission life, currently in extended operations. Continues the precise, long-term measurements of total solar irradiance at UV and VNIR wavelengths. Daily measurements of solar UV. Precise measurements of visible solar irradiance for climate studies.	SOLSTICE, SIM, TIM, XPS	Type: Inclined, non-sunsynchronous Altitude: 600 km Period: Inclination: 40 deg Repeat cycle: LST: Longitude (if geo): Asc/desc: URL: http://lasp.colorado.edu/sorce/
SPOT-4 Satellite Pour l'Observation de la Terre - 4 CNES	Currently being flown	24 Mar 1998	01 Jun 2013	Cartography, land surface, agriculture and forestry, civil planning and mapping, digital terrain models, environmental monitoring	HRVIR, VEGETATION, DORIS (SPOT)	Type: Sun-synchronous Altitude: 832 km Period: 101 mins Inclination: 98.7 deg Repeat cycle: 26 days LST: 10:30 Longitude (if geo): Asc/desc: Descending URL: http://www.spot.com/home/system/introsat/welcome.htm
SPOT-5 Satellite Pour l'Observation de la Terre - 5 CNES	Currently being flown	04 May 2002	01 Jun 2014	Cartography, land surface, agriculture and forestry, civil planning and mapping, digital terrain models, environmental monitoring	HRG, VEGETATION, HRS, DORIS-NG (SPOT)	Type: Sun-synchronous Altitude: 832 km Period: 101 mins Inclination: 98.7 deg Repeat cycle: 26 days LST: 10:30 Longitude (if geo): Asc/desc: Descending URL: http://www.spotimage.fr/home/system/future/spot5/welcome.htm

Mission	Status	Launch Date	EOL Date	Applications	Instruments	Orbit Details & URL
STARLETTE CNES	Currently being flown	06 Feb 1975	31 Dec 2050	Geodesy/gravity study of the Earth's gravitational field and its temporal variations	Laser Reflectors	Type: Inclined, non-sunsynchronous Altitude: 812 km Period: 104 mins Inclination: 49.83 deg Repeat cycle: LST: Longitude (if geo): Asc/desc: N/A URL:
STELLA CNES	Currently being flown	30 Sep 1993	31 Dec 2050	Geodesy/gravity study of the Earth's gravitational field and its temporal variations	Laser Reflectors	Type: Inclined, non-sunsynchronous Altitude: 830 km Period: 101 mins Inclination: 98 deg Repeat cycle: LST: Longitude (if geo): Asc/desc: N/A URL:
SumbandilaSat Sumbandila Satellite SANSA / Uni of Stellenbosh	Currently being flown	18 Sep 2009	18 Sep 2014	Primary payload (imager) will be used to support decision making in natural resource management, disaster management, agriculture, urban planning and other applications.	SumbandilaSat Imager	Type: Sun-synchronous Altitude: Period: Inclination: Repeat cycle: LST: Longitude (if geo): Asc/desc: URL:
Swarm Earth's Magnetic Field and Environment Explorers; ESA / CNES / CSA	Approved	17 Jan 2012	17 May 2016	To provide the best ever survey of the geomagnetic field and its temporal evolution, and gain new insights into improving our knowledge of the Earth's interior and climate.	Laser Reflectors (ESA), ASM, VFM, STR, EFI, ACC, GPS Receiver (Swarm)	Type: Inclined, non-sunsynchronous Altitude: Period: Inclination: Repeat cycle: LST: Longitude (if geo): Asc/desc: N/A URL: http://www.esa.int/export/esaLP/swarm.html
SWOT Surface Water Ocean Topography NASA / CNES	Considered	01 Jan 2020	01 Jan 2023	Phase-2 DS Mission, launch order unknown, 3-year nominal mission. Ocean, lake, and river water levels for ocean and inland water dynamics	CO Sensor (ASCENDS), Ka-band Radar INterferometer (KaRIN)	Type: Inclined, non-sunsynchronous Altitude: 970 km Period: Inclination: 78 deg Repeat cycle: 22 days LST: Longitude (if geo): Asc/desc: URL: http://bprc.osu.edu/water/index.php
TanDEM-X TerraSAR-X Add-on for Digital Elevation Measurements DLR	Currently being flown	21 Jun 2010	31 Dec 2015	Cartography, land surface, civil planning and mapping, digital terrain models, environmental monitoring.	X-Band SAR	Type: Sun-synchronous Altitude: 514 km Period: 94.85 mins Inclination: 97.4 deg Repeat cycle: 11 days LST: Longitude (if geo): Asc/desc: Ascending URL: http://www.dlr.de/hr/desktopdefault.aspx/tabid-2317/3669_read-5488/
Terra Terra (formerly EOS AM-1) NASA / JAXA / CSA	Currently being flown	18 Dec 1999	30 Sep 2011	6-year nominal mission life, currently in extended operations. Atmospheric dynamics/water and energy cycles, atmospheric chemistry, physical and radiative properties of clouds, air-land exchanges of energy, carbon and water, vertical profiles of CO and methane vulcanology	MOPITT, MODIS, MISR, CERES, ASTER	Type: Sun-synchronous Altitude: 705 km Period: 99 mins Inclination: 98.2 deg Repeat cycle: 16 days LST: 10:30 Longitude (if geo): Asc/desc: Descending URL: http://terra.nasa.gov/
TerraSAR-X DLR	Currently being flown	15 Jun 2007	31 Dec 2012	Cartography, land surface, civil planning and mapping, digital terrain models, environmental monitoring.	X-Band SAR, GPSRO (Terra-SAR)	Type: Sun-synchronous Altitude: 514 km Period: 94.85 mins Inclination: 97.4 deg Repeat cycle: 11 days LST: 18:00 Longitude (if geo): Asc/desc: Ascending URL: http://www.terrasar.de/
TerraSAR-X2 TerraSAR-X follow-on DLR	Planned	01 Jan 2013	01 Jan 2018	Commercial follow-on mission to TerraSAR-X operated by Infoterra. Cartography, land surface, civil planning and mapping, digital terrain models, environmental monitoring.	X-Band SAR	Type: Sun-synchronous Altitude: Period: Inclination: Repeat cycle: LST: Longitude (if geo): Asc/desc: Ascending URL:
TES Technology Experimental Satellite on Cartography ISRO	Currently being flown	22 Oct 2001	31 Dec 2010	For demonstrating many satellite technologies for future Cartosat satellites	TES PAN	Type: Sun-synchronous Altitude: Period: Inclination: Repeat cycle: LST: Longitude (if geo): Asc/desc: Descending URL: http://www.isro.org/
TES-HYS Technology Experimental Satellite on Hyperspectral ISRO	Considered	01 Jan 2013	01 Jan 2014	For demonstrating many satellite technologies for future Hyperspectral satellites	HySI (TES-HYS)	Type: Sun-synchronous Altitude: Period: Inclination: Repeat cycle: LST: Longitude (if geo): Asc/desc: TBD URL:
THEOS Thailand Earth Observation System GISTDA	Currently being flown	01 Oct 2008	01 Oct 2013	Earth resources, land surface and disaster monitoring, civil planning	PAN (GISTDA), MS (GISTDA)	Type: Sun-synchronous Altitude: 822 km Period: 101 mins Inclination: 98.7 deg Repeat cycle: 26 days LST: 10:00 Longitude (if geo): Asc/desc: Descending URL: http://www.gistda.or.th

Mission	Status	Launch Date	EOL Date	Applications	Instruments	Orbit Details & URL
TopSat Optical Imaging Satellite BNSC	Currently being flown	27 Oct 2005	31 Dec 2010	Prototype low-cost high-resolution imager	TOPSAT Telescope	Type: Sun-synchronous Altitude: 600 km Period: Inclination: 98 deg Repeat cycle: LST: 10:30 Longitude (if geo): Asc/desc: Ascending URL: http://www.bnsc.gov.uk/content.aspx?nid=5907
TRMM Tropical Rainfall Measuring Mission NASA / JAXA	Currently being flown	27 Nov 1997	30 Sep 2011	3-year nominal mission life, currently in extended operations. Atmospheric dynamics/water and energy cycles	LIS, PR, CERES, VIRS, TMI	Type: Inclined, non-sunsynchronous Altitude: 405 km Period: 93.5 mins Inclination: 35 deg Repeat cycle: LST: Longitude (if geo): Asc/desc: N/A URL: http://trmm.gsfc.nasa.gov/
UK-DMC UK Disaster Monitoring Constellation BNSC	Currently being flown	27 Sep 2003	31 Dec 2010	Wide area, medium resolution optical imaging for mapping, crop monitoring, environmental resource and disaster management	SLIM-6	Type: Sun-synchronous Altitude: 686 km Period: 98.4 mins Inclination: 98.2 deg Repeat cycle: 5 days LST: 9:00 Longitude (if geo): Asc/desc: Ascending URL: http://www.sstl.co.uk/index.php?loc=113
UK-DMC2 UK Disaster Monitoring Constellation 2 BNSC	Currently being flown	29 Jul 2009	29 Jul 2014	Wide area, medium resolution optical imaging for mapping, crop monitoring, environmental resource and disaster management	SLIM-6-22	Type: Sun-synchronous Altitude: 670 km Period: 98.5 mins Inclination: 98.14 deg Repeat cycle: 5 days LST: 10:45 Longitude (if geo): Asc/desc: Ascending URL: http://www.dmcii.com
VENUS Vegetation and Environment monitoring on a New Micro-Satellite CNES / ISA	Approved	31 Jan 2013	31 Jan 2016	Vegetation, agriculture monitoring, water management	VSC	Type: Sun-synchronous Altitude: 720 km Period: Inclination: 98.27 deg Repeat cycle: 2 days LST: Longitude (if geo): Asc/desc: Descending URL: http://smsc.cnes.fr/VENUS/index.htm

A-Z table of satellite instruments

CEOS agencies are operating or planning 775 satellite instruments (416 distinct instruments, some being repeats) on their Earth observation missions in the 2010 - 2025 period. The table below presents their main characteristics. Please refer to the instruments table in the on-line database for the ability to export or analyse this data in more detail:

http://database.eohandbook.com/database/instrumenttable.aspx

Instrument & agency (& any partners)	Missions	Status	Type	Measurements & applications	Technical characteristics
A-DCS4 ARGOS-Data Collection System NOAA	GOES-13, GOES-14, GOES-15, JPSS-1, JPSS-2, Metop-C, NOAA-19	Operational	Data collection	Data collection and communication system for receiving and retransmitting data from ocean and land-based remote observing platforms/transponders	Waveband: UHF Spatial resolution: Swath width: Accuracy:
AATSR Advanced Along-Track Scanning Radiometer BNSC	Envisat	Operational	Imaging multi-spectral radiometers (vis/IR) and multiple direction/polarisation radiometers	Measurements of sea surface temperature, land surface temperature, cloud top temperature, cloud cover, aerosols, vegetation, atmospheric water vapour and liquid water content	Waveband: VIS - NIR: 0.555 µm, 0.659 µm, 0.865 µm, SWIR: 1.6 µm, MWIR: 3.7 µm, TIR: 10.85 µm, 12 µm Spatial resolution: IR ocean channels: 1 x 1 km, Visible land channels: 1 x 1 km Swath width: 500 km Accuracy: Sea surface temperature: <0.5 K over 0.5 x 0.5 deg (lat/long) area with 80% cloud cover Land surface temperature: 0.1 K (relative)
ABI Advanced Baseline Imager NOAA	GOES-R, GOES-S	Being developed	Imaging multi-spectral radiometers (vis/IR)	Detects clouds, cloud properties, water vapour, land and sea surface temperatures, dust, aerosols, volcanic ash, fires, total ozone, snow and ice cover, vegetation index	Waveband: 16 bands in vis, NIR and IR ranging from 0.47 µm to 13.3 µm Spatial resolution: 0.5 km in 0.64 µm band; 2.0 km in long wave IR and in the 1.378 µm band; 1.0 km in all others Swath width: Accuracy: Varies by product
ACC Accelerometer ESA	Swarm	Being developed	Precision orbit and space environment	Measurement of the spacecraft non-gravitational accelerations, linear accelerations range: +/- 2*10-4 m/s2; angular measurement range: +/- 9.6* 10-3 rad/s2; measurement bandwidth: 10-4 to 10-2 Hz; Linear resolution: 1.8*10-10 m/s2; angular resolution: 8*10-9 rad/s2	Waveband: N/A Spatial resolution: 0.1 nm/s2 Swath width: N/A Accuracy: overall instrument random error: <10-8 m/s2
ACE-FTS Atmospheric Chemistry Experiment (ACE) Fourier Transform Spectrometer CSA	SCISAT-1	Operational	Atmospheric chemistry	Measure and understand the chemical processes that control the distribution of ozone in the Earth's atmosphere, especially at high altitudes.	Waveband: SWIR - TIR: 2 - 5.5 µm, 5.5 - 13 µm (0.02 cm-1 resolution) Spatial resolution: Swath width: Accuracy:
ACRIM III Active Cavity Radiometer Irradiance Monitor NASA	ACRIMSAT	Operational	Earth radiation budget radiometers	Measurements of solar luminosity and solar constant. Data used as record of time variation of total solar irradiance, from extreme UV through to infrared	Waveband: UV - MWIR: 0.15 - 5 µm Spatial resolution: 5 deg FOV Swath width: 71 mins per orbit of full solar disk data Accuracy: 0.1% of full scale
Advanced DCS Advanced Data Collection System ROSHYDROMET (ROSKOSMOS)	Meteor-MP N1, Meteor-MP N2, Meteor-MP N3	Proposed	Data collection	Collects data on temperature (air/water), atmospheric pressure, humidity and wind speed/direction, speed and direction of ocean and river currents	Waveband: Spatial resolution: Swath width: Accuracy:
Advanced GGAK-M Advanced Module for Geophysical Measurements (SEM) ROSHYDROMET (ROSKOSMOS)	Meteor-MP N1, Meteor-MP N2, Meteor-MP N3	Proposed	Space environment and magnetic field	Space Environmental Monitoring (SEM)	Waveband: Spatial resolution: Swath width: Accuracy:
Advanced GOCI Advanced Geostationary Ocean Colour Imager KARI	COMS-2B	Proposed	Ocean colour instruments	Ocean colour information, coastal zone monitoring, land resources monitoring	Waveband: VIS - NIR: 0.40 - 0.88 µm (8 channels) Spatial resolution: 236m x 360m Swath width: 1440 km Accuracy:
Advanced IKFS-2 Advanced Fourier spectrometer ROSHYDROMET (ROSKOSMOS)	Meteor-MP N1, Meteor-MP N2, Meteor-MP N3	Proposed	Atmospheric temperature and humidity sounders	Atmospheric temperature/humidity profiles, data on cloud parameters, water vapour&ozone column amounts, surface temperature	Waveband: 5 - 15 µm, more then 5000 spectral channels Spatial resolution: 35 -100 km Swath width: 1000/2000 km Accuracy: 0.5 K
Advanced KMSS Advanced Multispectral Imager (VIS) ROSHYDROMET (ROSKOSMOS)	Meteor-MP N1, Meteor-MP N2, Meteor-MP N3	Proposed	Imaging multi-spectral radiometers (vis/IR)	Multispectral images of land & sea surfaces and ice cover	Waveband: 0.4 - 0.9 µm, 6 channels Spatial resolution: 60 m - 100 m Swath width: 900 km Accuracy:
Advanced MI Advanced Meteorological Imager KARI	COMS-2A	Proposed	Imaging multi-spectral radiometers (vis/IR)	Continuous monitoring capability for the near realtime generation of high-resolution meteorological products and long-term change analysis of sea surface temperature and cloud coverage.	Waveband: 1: VIS, 0.55 - 0.80 µm; 2: SWIR: 3.50 - 4.00 µm; 3: WV (Waver Vapor): 6.50 - 7.00 µm; 4: TIR1 (Thermal Infrared 1): 10.3 - 11.3 µm, 5: TIR2 (Thermal Infrared 2): 11.5 - 12.5 µm Spatial resolution: VIS: 0.5, 1 km, IR: 2 km Swath width: Full Earth disk Accuracy:
Advanced MSU-MR Advanced Multispectral scanning imager-radiometer ROSHYDROMET (ROSKOSMOS)	Meteor-MP N1, Meteor-MP N2, Meteor-MP N3	Proposed	Imaging multi-spectral radiometers (vis/IR)	Parameters of clouds, snow, ice and land cover, vegetation, surface temperature, fire detection	Waveband: VIS: 0.5 - 0.7 µm; NIR: 0.7 - 1.1 µm; SWIR: 1.6 - 1.8 µm; MWIR: 3.5 - 4.1 µm; TIR: 10.5 - 11.5 µm, 11.5 - 12.5 µm Spatial resolution: 1 km Swath width: 3000 km Accuracy: VIS: 0.5%; IR: 0.1-0.2K
Advanced MTVZA Advanced Scanning microwave imager-sounder ROSHYDROMET (ROSKOSMOS)	Meteor-MP N1, Meteor-MP N2, Meteor-MP N3	Proposed	Imaging multi-spectral radiometers (passive microwave)	Atmospheric temperature and humidity profiles, precipitation, sea-level wind speed, snow/ice coverage	Waveband: 10.6 - 183.3 GHz, 26 channels Spatial resolution: 12 - 75 km Swath width: 2600 km Accuracy: 0.4 - 2.0 K depending on spectral band
Advanced Radiomet Advanced Radio-occultation receiver ROSHYDROMET (ROSKOSMOS)	Meteor-MP N1, Meteor-MP N2, Meteor-MP N3	Proposed	Atmospheric temperature and humidity sounders	Atmospheric temperature and humidity profiles with high vertical resolution	Waveband: Spatial resolution: Swath width: Accuracy:
Advanced SAR Advanced Synthetic Aperture Radar X band ROSHYDROMET (ROSKOSMOS)	Meteor-MP N1, Meteor-MP N2, Meteor-MP N3	Proposed	Imaging microwave radars	High resolution microwave radar images for ice watch	Waveband: X-Band Spatial resolution: 1 m, 5 m, 50 m, 200 m, 500 m Swath width: 10 km, 50 km, 130 km, 600 km, 750 km Accuracy: 1 dB
Advanced Scatterometer ROSHYDROMET (ROSKOSMOS)	Meteor-MP N1, Meteor-MP N2, Meteor-MP N3	Proposed	Scatterometers	Ocean surface wind measurements	Waveband: C (or X) - band, TBD Spatial resolution: 25 km Swath width: 1800 km Accuracy: Wind speed: 2 m/s, direction: 20 grad
AEISS Advanced Electronic Image Scanning System KARI	KOMPSAT-3	Being developed	High resolution optical imagers	High resolution imager for land applications of cartography and disaster monitoring	Waveband: Spatial resolution: Swath width: 15km Accuracy:

Instrument & agency (& any partners)	Missions	Status	Type	Measurements & applications	Technical characteristics
AIRS Atmospheric Infra-red Sounder NASA	Aqua	Operational	Atmospheric temperature and humidity sounders	High spectral resolution measurement of temperature and humidity profiles in the atmosphere. Long-wave Earth surface emissivity. Cloud diagnostics. Trace gas profiles. Surface temperatures.	Waveband: VIS - TIR: 0.4 - 1.7 µm, 3.4 - 15.4 µm, Has approximately 2382 bands from VIS to TIR Spatial resolution: 1.1 degree (13 x 13 km at nadir) Swath width: +/-48.95 degrees Accuracy: Humidity: 20%, Temperature: 1 K
AIS (RCM) Automated Identification System (RADARSAT Constellation) CSA	RADARSAT C-1, RADARSAT C-2, RADARSAT C-3	Being developed	Data collection	Ship identification (name, location, heading, cargo etc.)	Waveband: VHF (162 MHz) Spatial resolution: N/A Swath width: 800 km Accuracy: Better than 90% ship detection, for Class A ships, when ships are in view for a minimum of 5 minutes.
ALADIN Atmospheric Laser Doppler Instrument ESA	ADM-Aeolus	Being developed	Lidars	Global wind profiles (single line-of-sight) for an improved weather prediction	Waveband: UV: 355 nm Spatial resolution: One wind profile every 200 km along track, averaged over 50 km Swath width: Along line 285 km parallel to satellite ground track Accuracy: Wind speed error below 2 m/s
ALI Advanced Land Imager NASA	NMP EO-1	Operational	High resolution optical imagers	Measurement of Earth surface reflectance. Will validate new technologies contributing to cost reduction and increased capabilities for future missions. ALI comprises a wide field telescope and multispectral and panchromatic instrument	Waveband: 10 bands: VIS and NIR: 0.480 - 0.690 µm, 0.433 - 0.453 µm, 0.450 - 0.515 µm, 0.525 - 0.605 µm, 0.630 - 0.690 µm, 0.775 - 0.805 µm, 0.845 - 0.890 µm, 1.200 - 1.300 µm, SWIR: 1.550 - 1.750 µm, 2.080 - 2.350 µm Spatial resolution: PAN: 10 m, VNIR and SWIR: 30 m Swath width: 37 km Accuracy: SNR @ 5% surf refl Pan:220, Multi 1: 215, Multi 2: 280, Multi 3: 290, Multi 4:240, Multi 4':190, Multi 5':130, Multi 5:175, Multi 7:170 (prototype instrument exceeds ETM+ SNR by a factor of 4 - 8)
ALISEO SAGNAC imaging spectrometer ASI	MIOSAT	Being developed	Imaging multi-spectral radiometers (vis/IR)	mutli-spectrometer data for complex land ecosystem studies	Waveband: 400-1000 nm Spatial resolution: 8-10 x 8-10 m - 10 x 10 km Swath width: 10 km Accuracy:
ALT Radar Altimeter NSOAS (CAST)	HY-2A	Being developed	Radar altimeters	Global ocean topography, sea level and gravity field measurements	Waveband: 13.58 GHz and 5.25 GHz Spatial resolution: 16 km Swath width: 16 km Accuracy: < 4 cm
AltiKa Ka-band Altimeter CNES	SARAL	Being developed	Radar altimeters	Sea surface height	Waveband: 35.5 - 36 GHz Spatial resolution: Swath width: Accuracy:
Altimeter (OCEANSAT-3) Ku-band Altimeter ISRO	OCEANSAT-3	Being developed	Radar altimeters	Mainly sea state applications including SWH, Geoid etc., establishment of global databases.	Waveband: 1306 GHz Spatial resolution: 1 km Swath width: 1500 m Accuracy:
AMI/SAR/Image Active Microwave Instrumentation. Image Mode ESA	ERS-2	Operational	Imaging microwave radars	All-weather images of ocean, ice and land surfaces. Monitoring of coastal zones, polar ice, sea state, geological features, vegetation (including forests), land surface processes, hydrology.	Waveband: Microwave: 5.3 GHz, C band, VV polarisation, bandwidth 15.5 ± 0.06 MHz Spatial resolution: 30 m Swath width: 100 km Accuracy: Landscape topography: 3 m, Bathymetry: 0.3 m, Sea ice type: 3 classes
AMI/SAR/Wave Active Microwave Instrumentation. Wave mode ESA	ERS-2	Operational	Imaging microwave radars	Measurements of ocean wave spectra	Waveband: Microwave: 5.3 GHz (C-band), VV polarisation Spatial resolution: 30 m Swath width: Accuracy: Sea surface wind speed: 3 m/s, Significant wave height: 0.2 m
AMI/Scatterometer Active Microwave Instrumentation. Wind mode ESA	ERS-2	Operational	Scatterometers	Measurements of wind fields at the ocean surface, wind direction (range 0 - 360 deg), wind speed (range 1 - 30 m/s)	Waveband: Microwave: 5.3 GHz (C-band), VV polarisation Spatial resolution: Cells of 50 x 50 km at 25 km intervals Swath width: 500 km Accuracy: Sea surface wind speed: 3 m/s, Sea ice type: 2 classes
AMR Advanced Microwave Radiometer NASA	OSTM (Jason-2)	Operational	Imaging multi-spectral radiometers (passive microwave)	Altimeter data to correct for errors caused by water vapour and cloud-cover. Also measures total water vapour and brightness temperature	Waveband: Microwave: 18.7 GHz, 23.8 GHz, 34 GHz Spatial resolution: 41.6 km at 18.7 GHz, 36.1 km at 23.8 GHz, 22.9 km at 34 GHz Swath width: 120 deg cone centred on nadir Accuracy: Total water vapour: 0.2 g/sq cm, Brightness temperature: 0.15 K
AMSR-2 Advanced Microwave Scanning Radiometer -2 JAXA	GCOM-W1, GCOM-W2, GCOM-W3	Approved	Imaging multi-spectral radiometers (passive microwave)	Measurements of water vapour, cloud liquid water, precipitation, winds, sea surface temperature, sea ice concentration, snow cover, soil moisture	Waveband: Microwave: 6.925 GHz, 7.3 GHz, 10.65 GHz, 18.7 GHz, 23.8 GHz, 36.5 GHz, 89.0 GHz Spatial resolution: 5 - 50 km (dependent on frequency) Swath width: 1450 km Accuracy: Sea surface temparature: 0.5 K, Sea ice cover: 10%, Cloud liquid water: 0.05 kg/m2, Precipitation rate: 10%, Water vapour: 3.5 kg/m2 through total column, Sea surface wind speed 1.5 m/s
AMSR-E Advanced Microwave Scanning Radiometer-EOS JAXA (NASA)	Aqua	Operational	Imaging multi-spectral radiometers (passive microwave)	Measurements of water vapour, cloud liquid water, precipitation, winds, sea surface temperature, sea ice concentration, snow cover and soil moisture	Waveband: Microwave: 6.925 GHz, 10.65 GHz, 18.7 GHz, 23. 8 GHz, 36.5 GHz, 89.0 GHz Spatial resolution: 5 - 50 km (dependent on frequency) Swath width: 1445 km Accuracy: Sea surface temparature: 0.5 K, Sea ice cover: 10%, Cloud liquid water: 0.05 kg/m2, Precipitation rate: 10%, Water vapour: 3.5 kg/m2 through total column, Sea surface wind speed 1.5 m/s
AMSU-A Advanced Microwave Sounding Unit-A NASA	Aqua	Operational	Atmospheric temperature and humidity sounders	All-weather night-day temperature sounding to an altitude of 45 km	Waveband: Microwave: 15 channels, 23.8 - 89.0 GHz Spatial resolution: 48 km Swath width: 2054 km Accuracy: Temperature profile: 2 K, humidity: 3 kg/m2, ice & snow cover: 10%

Instrument & agency (& any partners)	Missions	Status	Type	Measurements & applications	Technical characteristics
AMSU-A Advanced Microwave Sounding Unit-A NOAA (BNSC)	Metop-A, Metop-B, Metop-C, NOAA-15, NOAA-16, NOAA-17, NOAA-18	Operational	Atmospheric temperature and humidity sounders	All-weather night-day temperature sounding to an altitude of 45 km	Waveband: Microwave: 15 channels, 23.8 - 89.0 GHz Spatial resolution: 48 km Swath width: 2054 km Accuracy: Temperature profile: 2 K, humidity: 3 kg/m2, ice & snow cover: 10%
AMSU-B Advanced Microwave Sounding Unit-B NOAA (BNSC)	NOAA-15, NOAA-16, NOAA-17	Operational	Atmospheric temperature and humidity sounders	All-weather night-day humidity sounding	Waveband: Microwave: 89 GHz, 150 GHz, 183.3± 1.0 GHz (2bands), 183.3± 3.0 GHz (2bands), 183.3± 7.0 GHz (2bands) Spatial resolution: 16 km Swath width: 2200 km Accuracy: Humidity profile: 1 kg/m2,
APS Aerosol Polarimetry Sensor NASA	Glory	Proposed	Multiple direction/polarisation radiometers	Global distribution of natural and anthropogenic aerosols for quantification of the aerosol effect on climate, the anthropogenic component of this effect, and the long-term change of this effect caused by natural and anthropogenic factors	Waveband: 9 bands: VIS and SWIR: 0.412 µm, 0.488 µm, 0.555 µm, 0.672 µm, 0.910 µm, 0.865 µm, 1.378 µm, 1.610 µm, 2.250 µm Spatial resolution: 10 km Swath width: 10 km Accuracy: AOT Ocean .02, land .04
Aquarius L-Band radiometer NASA (CONAE)	SAC-D/Aquarius	Being developed	Imaging multi-spectral radiometers (passive microwave)	L-band passive microwave radiometer measures brightness temperature of ocean to retrieve salinity	Waveband: L-band (1.4 GHz) Spatial resolution: 100 km Swath width: 300 km Accuracy: 0.2 psu
Aquarius L-Band Scatterometer NASA (CONAE)	SAC-D/Aquarius	Being developed	Scatterometers	L-band scatterometer to provide roughness corection to brightness temperature	Waveband: L-Band (1.2 GHz) Spatial resolution: 100 km Swath width: 300 km Accuracy: 0.2 psu
ARGOS CNES (NASA)	Metop-A, Metop-B, Metop-C, NOAA-15, NOAA-16, NOAA-17, NOAA-18, NOAA-19, SARAL	Operational	Data collection	Location data by Doppler measurements	Waveband: Spatial resolution: Swath width: Accuracy:
Arina ROSKOSMOS	Resurs DK 1, Resurs P N1, Resurs P N2	Operational	Space environment	Insights into electromagnetic field variations as the precursors of Earth quakes	Waveband: Spatial resolution: Swath width: Accuracy:
ASAR Advanced Synthetic-Aperture Radar ESA	Envisat	Operational	Imaging microwave radars	All-weather images of ocean, land and ice for monitoring of land surface processes, sea and polar ice, sea state, and geological and hydrological applications. Has 2 stripmap modes (Image and Wave (for ocean wave spectra)) and 3 ScanSAR modes	Waveband: Microwave: C-band, with choice of 5 polarisation modes (VV, HH, VV/HH, HV/HH, or VH/VV) Spatial resolution: Image, wave and alternating polarisation modes: approx 30 x 30 m, Wide swath mode: 150 x 150 m, Global monitoring mode: 950 m x 950 m Swath width: Image and alternating polarisation modes: up to 100 km, Wave mode: 5 km, Wide swath and global monitoring modes: 400 km or more Accuracy: Radiometric resolution in range: 1.5 - 3.5 dB, Radiometric accuracy: 0.65 dB
ASAR (image mode) Advanced Syntetic Aperture Radar (Image mode) ESA	Envisat	Operational	Imaging microwave radars	All-weather images of ocean, land and ice for monitoring of land surface processes, sea and polar ice, sea state, and geological and hydrological applications	Waveband: Spatial resolution: Swath width: Accuracy:
ASAR (wave mode) Advanced Syntetic Aperture Radar (Wave mode) ESA	Envisat	Operational	Imaging microwave radars	Measurements of ocean wave spectra	Waveband: Spatial resolution: Swath width: Accuracy:
ASCAT Advanced Scatterometer EUMETSAT (ESA)	Metop-A, Metop-B, Metop-C	Operational	Scatterometers	Sea ice cover, sea ice type and wind speed over sea surface measurements. Air pressure over ocean, polar ice contours, ice/snow imagery, soil moisture.	Waveband: Microwave: C Band, 5.256 GHz Spatial resolution: Hi-res mode: 25 - 37 km, Nominal mode: 50 km Swath width: Continuous; 2 x 500 km swath width Accuracy: Wind speeds in range 4 - 24 m/s: 2 m/s and direction accuracy of 20 deg
ASM Absolute Scalar Magnetometer CNES	Swarm	Being developed	Magnetic field	Absolute calibration of Vector Field Magnetometer on board Swarm satellites	Waveband: N/A Spatial resolution: 0.1 nT Swath width: N/A Accuracy: 0.1 nT
ASTER Advanced Spaceborne Thermal Emission and Reflection Radiometer METI (NASA)	Terra	Operational	High resolution optical imagers	Surface and cloud imaging with high spatial resolution, stereoscopic observation of local topography, cloud heights, volcanic plumes, and generation of local surface digital elevation maps. Surface temperature and emissivity	Waveband: VIS and NIR: 3 bands in 0.52 - 0.86 µm, SWIR: 6 bands in 1.6 - 2.43 µm, TIR: 5 bands in 8.125 - 11.65 µm Spatial resolution: VNIR: 15 m, stereo: 15 m horizontally and 25 m vertical, SWIR: 30 m, TIR: 90 m Swath width: 60 km Accuracy: VNIR and SWIR: 4% (absolute), TIR: 4 K, Geolocation: 7 m
ATCOR Atmospheric correction ISRO	RESOURCESAT-3	Proposed	Other	Atmospheric correction	Waveband: Spatial resolution: Swath width: Accuracy:
ATLAS Advanced Topographic Laser Altimeter System NASA	ICESat-II	Proposed	Lidars	Provision of data on ice sheet height/thickness, land altitude, aerosol height distributions, cloud height and boundary layer height	Waveband: VIS-NIR: Laser emits at 1064 nm (for altimetry) and 532 nm (for atmospheric measurements) Spatial resolution: 66 m spots separated by 170 m Swath width: Accuracy: Aerosol profile: 20%, Ice elevation: 20 cm, Cloud top height: 75 m, Land elevation: 20 cm, geoid: 5 m
ATLID ATmospheric LIDar ESA	EarthCARE	Approved	Lidars	Derivation of cloud and aerosol properties - Measurement of molecular and particle backscatter in Rayleigh, co-polar and cross-polar Mie channels	Waveband: Laser at 355 nm Spatial resolution: 300 m horizontal (TBC) Swath width: Accuracy:
ATMS Advanced Technology Microwave Sounder NASA (NOAA)	JPSS-1, JPSS-2, NPP	Being developed	Atmospheric temperature and humidity sounders	Collects microwave radiance data that when combined with the CrIS data will permit calculation of atmospheric temperature and water vapor profiles.	Waveband: Microwave: 22 bands, 23-184 GHz Spatial resolution: 5.2 - 1.1 deg Swath width: 2300 km Accuracy: 0.75 K - 3.60 K

Instrument & agency (& any partners)	Missions	Status	Type	Measurements & applications	Technical characteristics
ATOVS (HIRS/3 + AMSU + AVHRR/3) Advanced TIROS Operational Vertical Sounder NOAA	NOAA-15, NOAA-16	Operational	Atmospheric temperature and humidity sounders	Advanced TIROS Operational Vertical Sounder insturment suite	Waveband: Spatial resolution: Swath width: Accuracy:
ATSR-2 Along Track Scanning Radiometer - 2 BNSC (CSIRO)	ERS-2	Operational	Imaging multi-spectral radiometers (vis/IR) and multiple direction/polarisation radiometers	Measurements of sea surface temperature, land surface temperature, cloud top temperature and cloud cover, aerosols, vegetation, atmospheric water vapour and liquid water content	Waveband: VIS - SWIR: 0.65 µm, 0.85 µm, 1.27 µm, and 1.6 µm, SWIR-TIR: 1.6 µm, 3.7 µm, 11 µm and 12 µm, Microwave: 23.8 GHz, 36.5 GHz (bandwidth of 400 MHz) Spatial resolution: IR ocean channels: 1 x 1 km, Microwave near-nadir viewing: 20 km instantaneous field of view Swath width: 500 km Accuracy: Sea surface temperature to <0.5 K over 0.5 x 0.5 deg (lat/long) area with 80% cloud cover, Land surface temperature: 0.1 K
ATSR/M CNES	ERS-2	Operational	Imaging multi-spectral radiometers (passive microwave)	Belongs to ATSR payload on board ERS1 and ERS2	Waveband: Spatial resolution: Swath width: Accuracy:
AVHRR/3 Advanced Very High Resolution Radiometer/3 NOAA	Metop-A, Metop-B, Metop-C, NOAA-15, NOAA-16, NOAA-17, NOAA-18, NOAA-19	Operational	Imaging multi-spectral radiometers (vis/IR)	Measurements of land and sea surface temperature, cloud cover, snow and ice cover, soil moisture and vegetation indices. Data also used for volcanic eruption monitoring	Waveband: VIS: 0.58 - 0.68 µm, NIR: 0.725 - 1.1 µm, SWIR: 1.58 - 1.64 µm, MWIR: 3.55 - 3.93 µm, TIR: 10.3 - 11.3 µm, 11.5 - 12.5 µm Spatial resolution: 1.1 km Swath width: 3000 km approx, Ensures full global coverage twice daily Accuracy:
AVNIR-2 Advanced Visible and Near Infra-red Radiometer type 2 JAXA	ALOS	Operational	High resolution optical imagers	High resolution multi-spectral imager for land applications which include environmental monitoring, agriculture and forestry, disaster monitoring	Waveband: VIS: 0.42 - 0.50 µm, 0.52 - 0.60 µm, 0.61 - 0.69 µm, NIR: 0.76 - 0.89 µm Spatial resolution: 10 m Swath width: 70 km Accuracy: Surface Resolution:10 m (Nadir) Radiometric: Band1-3 3%RMS, Band4 7%RMS
AWFI Advanced Wide Field Imager INPE	AMAZÔNIA-1	Approved	Imaging multi-spectral radiometers (vis/IR)	Used for fire extent detection measurement, coastal and vegetation monitoring, land cover and land use mapping	Waveband: VIS: 0.45 - 0.50 µm, 0.52 - 0.57 µm, 0.63 - 0.69 µm, NIR: 0.76 - 0.90 µm, MWIR: 3.4 - 4.2 µm Spatial resolution: VIS - NIR: 100 m, MIR: 300 m Swath width: 2200 km (equatorial belt from latitude 5N to 15S) Accuracy:
AWiFS Advanced Wide Field Sensor ISRO	AWiFSSAT, RESOURCESAT-1, RESOURCESAT-2	Operational	Imaging multi-spectral radiometers (vis/IR)	Vegetation and crop monitoring, resource assessment (regional scale), forest mapping, land cover/ land use mapping, and change detection	Waveband: VIS: 0.52 - 0.59 µm and 0.62 - 0.68 µm, NIR: 0.77 - 0.86 µm, SWIR: 1.55 - 1.7 µm Spatial resolution: 55 m Swath width: 730 km Accuracy: 10 bit data
BBR (EarthCARE) BroadBand Radiometer (EarthCARE) ESA	EarthCARE	Approved	Earth radiation budget radiometers	Top of the atmosphere radiances and radiative flux	Waveband: Shortwave channel: 0.2 - 4 µm, Total channel 0.2 - 50 µm Spatial resolution: 10 x 10 km ground pixel size for each of the three views Swath width: Accuracy: flux retrieval accuracy 10 Wm-2
BRLK Synthetic Aperature Radar ROSHYDROMET (ROSKOSMOS)	Meteor-M N1, Meteor-M N2	Operational	Imaging microwave radars	Microwave radar images for ice watch	Waveband: X-Band Spatial resolution: 400 - 700 m Swath width: 600 km Accuracy: 1 dB
C-Band SAR C-Band Synthetic Aperture Radar ESA	Sentinel-1 A, Sentinel-1 B, Sentinel-1 C	Being developed	Imaging microwave radars	Marine core services, land monitoring and emergency services. Monitoring sea ice zones and arctic environment. Surveillance of marine environment, monitoring land surface motion risks, mapping of land surfaces (forest, water and soil, agriculture), mapping in support of humanitarian aid in crisis situations	Waveband: C-band: 5.405 GHz; HH, VV, HH+HV, VV+VH; Incidence angle: 20-45 Spatial resolution: Strip mode: 9 m, Interferometric wide swath mode: 20 m, extra-wide swath mode: 50 m, wave mode: 50 m Swath width: Strip mode: 80 km; Interferometric wide swath mode: 250 km, extra-wide swath mode: 400 km, Wave mode: sampled images of 20 x 20 km at 100 km intervals Accuracy: NESZ: -22 dB; PTAR: -25 dB; DTAR: -22 dB; Radiometric accuracy 1 dB (3 sigma); Radiometric stability: 0.5 dB (3 sigma)
CALIOP Cloud-Aerosol Lidar with Orthogonal Polarization NASA	CALIPSO	Operational	Lidars	Two-wavelength, polarisation lidar capable of providing aerosol and cloud profiles and properties	Waveband: 532 nm (polarization-sensitive), 1064 nm, VIS - NIR Spatial resolution: Vertical sampling: 30 m, 0 – 40 km Swath width: 333 m along-track Accuracy: 5% (532 nm)
CARMEN-1 CNES (CONAE)	SAC-D/Aquarius	Being developed	Space environment	Studying space environment effects	Waveband: Spatial resolution: Swath width: Accuracy:
CCD (HJ) CCD camera CAST	HJ-1A, HJ-1B	Operational	High resolution optical imagers	Multispectral measurements of Earth's surface for natural enviroment and disaster applications	Waveband: 0.43 - 0.90 µm (4 bands) Spatial resolution: 30 m Swath width: 360 km (per set), 720 km (two sets) Accuracy:
CCD camera Charged Coupled Device Camera ISRO	INSAT-2E, INSAT-3A	Operational	Imaging multi-spectral radiometers (vis/IR)	Cloud and vegetation monitoring	Waveband: VIS: 0.62 - 0.68 µm; NIR: 0.77 - 0.86 µm; SWIR: 1.55 - 1.69 µm Spatial resolution: 1 x 1 km Swath width: Normal: 6000 (N-S) X 6000 km (E-W) anywhere on earth disc, Program: 6000 (N-S) X (n X 300) km (E-W) : n and number of frames programmable Accuracy:
CERES Cloud and the Earth's Radiant Energy System NASA	Aqua, JPSS-1, NPP, Terra, TRMM	Operational	Earth radiation budget radiometers	Long term measurement of the Earth's radiation budget and atmospheric radiation from the top of the atmosphere to the surface; provision of an accurate and self-consistent cloud and radiation database.	Waveband: 3 channels: 0.3-5 µm, 0.3 - 100 µm, 8 - 12 µm Spatial resolution: 20 km Swath width: Accuracy: 0.5%, 1%, 0.3% (respectively for the 3 channels)
CHAMP GPS Sounder GPS TurboRogue Space Receiver (TRSR) NASA (DLR)	CHAMP	Operational	Atmospheric temperature and humidity sounders and precision orbit	Temperature and water vapour profiles	Waveband: Spatial resolution: Swath width: Accuracy:

Instrument & agency (& any partners)	Missions	Status	Type	Measurements & applications	Technical characteristics
CHAMP Gravity Package (Accelerometer+GPS) STAR Accelerometer CNES	CHAMP	Operational	Gravity instruments	Earth gravity field measurements	Waveband: Spatial resolution: Swath width: Accuracy:
CHAMP Magnetometry Package (1 Scalar + 2 Vector Magnetometer) Overhauser Magnetometer and Fluxgate Magnetometer DLR	CHAMP	Operational	Magnetic field	Earth magnetic field measurements	Waveband: Spatial resolution: Swath width: Accuracy:
CHRIS Compact High Resolution Imaging Spectrometer ESA (BNSC)	PROBA	Operational	Imaging multi-spectral radiometers (vis/IR)	Supports a range of land, ocean and atmospheric applications, including agricultural science, forestry, environmental science, atmospheric science and oceanography	Waveband: VIS - NIR: 400 - 1050 nm (63 spectral bands at a spatial resolution of 36 m; or 18 bands at full spatial resolution (18 m)) Spatial resolution: 36 m or 18 m depending on wavebands selected. Swath width: 14 km Accuracy: S/N 200 @ target albedo of 0.2. 12 bits digitisation.
Cloud radar (ACE) NASA	ACE	Proposed	Cloud profile and rain radars	Radar measurement for cloud droplets and precipitation	Waveband: Dual frequency: 35 and 94 GHz Spatial resolution: Vertical: 250 m, Cross-track: 1.4 km, Along-track: 2.5 km Swath width: Instantaneous Footprint < 1 km Accuracy: TBD
CO Sensor (ASCENDS) NASA	SWOT	Proposed	Atmospheric chemistry	Measure the total column CO concentration.	Waveband: 2.3 µm Spatial resolution: Swath width: 200 m Accuracy:
CO2 LIDAR (ASCENDS) NASA	ASCENDS	Proposed	Lidars	Measure the number density of Carbon Dioxide (CO2) in the column. Measure length of the column using a laser altimeter and measure ambient air pressure and temperature.	Waveband: 1.57 µm Spatial resolution: Swath width: 200 m Accuracy: 1 ppm CO2; 2K for temperature
COCTS China Ocean Colour & Temperature Scanner CAST	HY-1B, HY-1C, HY-1D	Operational	Ocean colour instruments	Ocean chlorophyll, ocean yellow substance absorbance, Sea-ice surface temperature	Waveband: B1: 0.402 - 0.422 µm, B2: 0.433 - 0.453 µm, B3: 0.480 - 0.500 µm, B4: 0.510 - 0.530 µm, B5: 0.555 - 0.575 µm, B6: 0.660 - 0.680 µm, B7: 0.740 - 0.760 µm, B8: 0.845 - 0.885 µm, B9: 10.30 - 11.40 µm, B10: 11.40 - 12.50 µm Spatial resolution: 1.1 km Swath width: 3083 km Accuracy:
COSI Corea SAR Instrument KARI	KOMPSAT-5	Being developed	Imaging microwave radars	SAR for land applications of cartography and disaster monitoring	Waveband: microwave Spatial resolution: High: 1m Swath width: 100km Accuracy:
CPR (CloudSat) Cloud Profiling Radar NASA	CloudSat	Operational	Cloud profile and rain radars	Primary goal to provide data needed to evaluate and improve the way clouds are represented in global climate models. Measures vertical profile of clouds	Waveband: Microwave: 94 GHz Spatial resolution: Vertical: 500 m, Cross-track: 1.4 km, Along-track: 2.5 km Swath width: Instantaneous Footprint < 2 km Accuracy: detects ice clouds optical depth >1, water clouds optical depth >3, ice content to +100%, -50%, liquid content to <50%, in-cloud heating to within 1K day-1 km-1
CPR (EarthCARE) Cloud Profiling Radar (EarthCARE) JAXA (NICT)	EarthCARE	Approved	Cloud profile and rain radars	Measurement of cloud properties, light precipitation, vertical motion	Waveband: Microwave: 94 GHz Spatial resolution: 500 m horizontal Swath width: Accuracy:
CrIS Cross-track Infrared Sounder NOAA	JPSS-1, JPSS-2, NPP	Being developed	Atmospheric temperature and humidity sounders	Daily measurements of vertical atmospheric distribution of temperature, moisture, and pressure	Waveband: MWIR - TIR: 3.92 - 4.4 µm, 5.7 - 8.62 µm, 9.1 - 14.7 µm, 1300 spectral channels Spatial resolution: IFOV 14 km diameter, 1 km vertical layer resolution Swath width: 2200 km Accuracy: Temperature profiles: to 0.9 K, Moisture profiles: 20 - 35%, Pressure profiles: 1%
CZI Coastal Zone Imager CAST	HY-1B, HY-1C, HY-1D	Operational	Imaging multi-spectral radiometers (vis/IR)	Imagery of coastal regions - estuaries, tidal regions, etc.	Waveband: B1: 0.433 - 0.453, B2: 0.555 - 0.575, B3: 0.655 - 0.675, B4: 0.675 - 0.695 µm Spatial resolution: 250 m Swath width: 500 km Accuracy:
DCS Data Collecting Plataform Transponder INPE	SCD-1, SCD-2	Operational	Data collection	Data collection	Waveband: Spatial resolution: Swath width: Accuracy:
DCS Data Collecting System INPE	GPM-Br	Approved	Data collection	Support to Data Collection Platforms	Waveband: Spatial resolution: Swath width: Accuracy:
DCS Data Collecting System INPE	MAPSAR	Approved	Data collection	Support to Data Collection Platforms	Waveband: Spatial resolution: Swath width: Accuracy:
DCS Data Collection System ROSHYDROMET (ROSKOSMOS)	Elektro-L N1, Elektro-L N2, Elektro-L N3, Meteor-M N1, Meteor-M N2, Meteor-M N3	Operational	Data collection	Collects data on temperature (air/water), atmospheric pressure, humidity and wind speed/direction, speed and direction of ocean and river currents	Waveband: Spatial resolution: Swath width: Accuracy:
DCS (CAST) Data Collecting System Transponder (CAST) CAST	CBERS-3	Operational	Data collection	Data collection and communication	Waveband: Spatial resolution: Swath width: Accuracy:
DCS (GOES-R) Data Collection System (NOAA, GOES-R) NOAA	GOES-R, GOES-S	Approved	Data collection	Collects data on temperature (air/water), atmospheric pressure, humidity and wind speed/direction, speed and direction of ocean and river currents	Waveband: Spatial resolution: Swath width: Accuracy:
DCS (NOAA) Data Collection System (NOAA) NOAA	GOES-11, GOES-12	Operational	Data collection	Collects data on temperature (air/water), atmospheric pressure, humidity and wind speed/direction, speed and direction of ocean and river currents	Waveband: Spatial resolution: Swath width: Accuracy:

Instrument & agency (& any partners)	Missions	Status	Type	Measurements & applications	Technical characteristics
DCS (SAC-C) Data Collection System CONAE	SAC-C	Operational	Communications	DCS is able to receive data from 200 meteorological and environmental stations for re-transmission of all the data to Cordoba Ground Station	Waveband: Spatial resolution: Swath width: Accuracy:
DCS (SAC-D) Data Collection System CONAE	SAC-D/Aquarius	Being developed	Data collection	Environmental and meteorological data collection from ground platforms (UHF 401.55 MHz uplink)	Waveband: Spatial resolution: Swath width: Accuracy:
DORIS (SPOT) Doppler Orbitography and Radio-positioning Integrated by Satellite (on SPOT) CNES	SPOT-4	Operational	Precision orbit	Orbit determination	Waveband: Spatial resolution: Swath width: Accuracy: Orbit error ~2.5 cm
DORIS-NG Doppler Orbitography and Radio-positioning Integrated by Satellite-NG CNES	CryoSat-2, Envisat, Jason, OSTM (Jason-2)	Operational	Precision orbit	Precise orbit determination; Real time onboard orbit determination (navigation)	Waveband: Spatial resolution: Swath width: Accuracy: Orbit error ~1 cm
DORIS-NG (SPOT) Doppler Orbitography and Radio-positioning Integrated by Satellite-NG (on SPOT) CNES	SPOT-5	Operational	Precision orbit	Precise orbit determination; Real time onboard orbit determination (navigation)	Waveband: Spatial resolution: Swath width: Accuracy: Orbit error ~1 cm
DPR Dual-frequency Precipitation Radar JAXA	GPM Core	Being developed	Cloud profile and rain radars	Measures precipitation rate classified by rain and snow, in latitudes up to 65 degrees.	Waveband: Microwave: 13.6 GHz (Ku band) and 35.5 GHz (Ka band) Spatial resolution: Range resolution: 5 km Horizontal Swath width: 245 km (Ku-band), 125 km (Ka band) Accuracy: Rainfall rate 0.2 mm/h
DRT-S&R ISRO	INSAT-3A, KALPANA-1	Operational	Communications	Relay of search and rescue information	Waveband: Spatial resolution: Swath width: Accuracy:
EFI Electric Field Instrument ESA (CSA)	Swarm	Being developed	Space environment and gravity instruments	Suprathermal ion imager and Langmuir probe to measure ion temp, electron temp, ion density, electron density, spacecraft potential and ion incident angle	Waveband: N/A Spatial resolution: 0.3 mV/m Swath width: N/A Accuracy: <3 mV/m
EGG 3-Axis Electrostatic Gravity Gradiometer ESA	GOCE	Operational	Gravity instruments and precision orbit	Main objective to measure the 3 components of the gravity-gradient tensor (i.e. gradiometer data).	Waveband: Spatial resolution: Swath width: Accuracy:
ENVISAT Comms Communications package on ENVISAT ESA	Envisat	Operational	Communications	Communication package onboard ENVISAT series satellites	Waveband: Spatial resolution: Swath width: Accuracy:
ERBS Earth Radiation Budget Sensor NOAA (NASA)	JPSS-2	TBD	Earth radiation budget radiometers	Long term measurement of the Earth's radiation budget and atmospheric radiation from the top of the atmosphere to the surface; provision of an accurate and self-consistent cloud and radiation database. Presently planned as a follo-on sensor to CERES. All technical parameters are to be determined.	Waveband: TBD Spatial resolution: TBD Swath width: Accuracy: TBD
ERM Earth Radiation Measurement NRSCC (CAST)	FY-3A, FY-3B, FY-3C, FY-3E	Operational	Earth radiation budget radiometers	Measures Earth radiation gains and losses on regional, zonal and global scales	Waveband: 0.2 - 3.8 µm, 0.2 - 50 µm Spatial resolution: 25 km Swath width: 2200 km Accuracy: DLR/DSR10 watts/m2 net solar 3 w/m2 OLR 5 w/m2
ERS Comms Communication package for ERS ESA	ERS-2	Operational	Communications	Communication package onboard ERS series satellites	Waveband: Spatial resolution: Swath width: Accuracy:
ETM+ Enhanced Thematic Mapper Plus USGS (NASA)	Landsat-7	Operational	Imaging multi-spectral radiometers (vis/IR)	Measures surface radiance and emittance, land cover state and change (eg vegetation type). Used as multi-purpose imagery for land applications	Waveband: VIS - TIR: 8 bands: 0.45 - 12.5 µm Spatial resolution: PAN: 15 m, VIS - SWIR: 30 m, TIR: 60 m Swath width: 185 km Accuracy: 50 - 250 m systematically corrected geodetic accuracy
Event Imaging Spectrometer from GEO (GeoCape) NASA	GEO-CAPE	Proposed	High resolution optical imagers	Predictions of impacts from oil spills, fires, water pollution from sewage and other sources, fertilizer runoff, and other environmental threats. Detection and tracking of waterborne hazardous materials. Monitoring and improvement of coastal health	Waveband: UV/VIS (310-481 nm) and the VIS/NIR (500-900 nm) Spatial resolution: 250 m spatial resolution, 20-50 nm (MODIS-like) spectral bands Swath width: 300 km swath width coastal regions an targets of opportunity Accuracy:
EXIS Extreme Ultraviolet and X-ray Irradiance Sensors NOAA	GOES-R, GOES-S	Being developed	Other	Monitors the whole-Sun X-ray irradiance in two bands and the whole-Sun EUV irradiance in five bands	Waveband: Spatial resolution: N/A Swath width: Accuracy:

Instrument & agency (& any partners)	Missions	Status	Type	Measurements & applications	Technical characteristics
FCI Flexible Combined Imager EUMETSAT (ESA)	MTG-I1 (imaging), MTG-I2 (imaging), MTG-I3 (imaging), MTG-I4 (imaging)	Being developed	Imaging multi-spectral radiometers (vis/IR)	Measurements of cloud cover, cloud top height, precipitation, cloud motion, vegetation, radiation fluxes, convection, air mass analysis, cirrus cloud discrimination, tropopause monitoring, stability monitoring, total ozone and sea surface temparature	Waveband: VIS0.4=0.414-0.474 µm, VIS0.5=0.49-0.53 µm, VIS0.6=0.615-0.665 µm, VIS0.8=0.84-0.89 µm, VIS0.9=0.904-0.924 µm, NIR1.3=1.365-1.395 µm, NIR1.6=1.585-1.635 µm, NIR2.2=2.225-2.275 µm, IR3.8=3.6-4 µm, WV6.3=5.8-6.8 µm, WV7.3=7.1-7.6 µm, IR8.7=8.5-8.9 µm, IR9.7=9.51-9.81 µm, IR10.5=10.15-10.85 µm, IR12.3=12.05-12.55 µm, IR13.3=13-13.6 µm (measured at FWHM) Spatial resolution: VIS0.4=1.0 km, VIS0.5=1.0 km, VIS0.6=1.0 km, & 0.5 km, VIS0.8=1.0 km, VIS0.9=1.0 km, NIR1.3=1.0 km, NIR1.6=1.0 km, NIR2.2=1.0 km, & 0.5 km, IR3.8=2.0 km, & 1.0 km, WV6.3=2.0 km, WV7.3=2.0 km, IR8.7=2.0 km, IR9.7=2.0 km, IR10.5=2.0 km, & 1.0 km, IR12.3=2.0 km, IR13.3=2.0 km (spatial sampling distance at SSP) Swath width: 200 km swath moved alternatlly W-E and E-W, moving up S-N a swath width at the end of each swath. Full Disc Coverage (FDC) or Local Area Coverage (LAC) possible. Accuracy: Cloud cover: 10%, Cloud top height: 1 km, Cloud top temparature: 1 K, Cloud type: 8 classes, Surface temparature: 0.7-2.0K, Specific humidity profile: 10%, Wind profile (horizontal component): 2 - 10 m/s, Long wave Earth surface radiation: 5 W/m2
GEMS Geostationary Environmental Monitoring Spectrometer KARI	COMS-2B	Proposed	Atmospheric chemistry	Measurements of atmospheric chemistry, precursors of aerosols and ozone in particular, in high temporal and spatial resolution over Asia	Waveband: UV/VIS : 0.3 - 0.5 µm Spatial resolution: 5km x 15km Swath width: Accuracy:
GeoSTAR MW Array Spectrometer (PATH) NASA	PATH	Proposed	Imaging multi-spectral radiometers (passive microwave)	High frequency, all-weather temperature and humidity soundings for weather forecasting and SST	Waveband: 50 - 57 GHz, 165 - 183 GHz, and possibly 118 - 125 GHz Spatial resolution: Temporal resolution is 15 to 30 minutes; 25 - 50 km at nadir Swath width: Temporal resolution is 15 to 30 minutes; 25 - 50 km at nadir Accuracy: <.5 K (brightness temperature)
Geoton-L1 ROSKOSMOS (ROSHYDROMET)	Resurs DK 1, Resurs P N1, Resurs P N2	Operational	High resolution optical imagers	Multispectral images of land surfaces	Waveband: 0.58 - 0.8 µm; 0.5 - 0.6 µm; 0.6 - 0.7 µm; 0.7 - 0.8 µm Spatial resolution: 1-3 m Swath width: 30 km within swath band 400 km Accuracy:
GERB Geostationary Earth Radiation Budget EUMETSAT (ESA)	Meteosat-10, Meteosat-11, Meteosat-8, Meteosat-9	Operational	Earth radiation budget radiometers	Measures long and short wave radiation emitted and reflected from the Earth's surface, clouds and top of atmosphere. Full Earth disk, all channels in 5 mins	Waveband: SW: 0.32 - 4.0 µm, LW 4.0 - 30 µm (by subtraction) Spatial resolution: 44.6 x 39.3 km Swath width: Single column moved alternatlly W-E and E-W to cover the complete earth disc Accuracy: SW=1.2 Wm-2, LW=7.5 Wm-2
GGAK-E Module for Geophysical Measurements ROSHYDROMET (ROSKOSMOS)	Elektro-L N1, Elektro-L N2, Elektro-L N3	Prototype	Space environment and magnetic field	Monitoring and forecasting of solar activity, of radiation and magnetic field in the near-Earth space, monitoring of natural and modified magnetosophere, ionosphere and upper atmosphere	Waveband: Spatial resolution: Swath width: Accuracy:
GGAK-M Module for Geophysical Measurements (SEM) ROSHYDROMET (ROSKOSMOS)	Meteor-M N1, Meteor-M N2	Operational	Space environment and magnetic field	Space Environmental Monitoring (SEM)	Waveband: Spatial resolution: Swath width: Accuracy:
GLM GEO Lightning Mapper NOAA	GOES-R, GOES-S	Being developed	Lightning imager	Detect total lightning flash rate over near full disk	Waveband: Spatial resolution: 10 km Swath width: Accuracy: 70%
GMI GPM Microwave Imager NASA	GPM Constellation, GPM Core	Being developed	Imaging multi-spectral radiometers (passive microwave)	Measures rainfall rates over oceans and land, combined rainfall structure and surface rainfall rates with associated latent heating. Used to produce three hour, daily, and monthly total rainfall maps over oceans and land.	Waveband: Microwave: 10.65 GHz, 19.4 GHz, 21.3 GHz, 37 GHz, and 85.5 GHz Spatial resolution: Horizontal: 36 km cross-track at 10.65 GHz (required - Primary Spacecraft, goal - Constellation Spacecraft); 10 km along-track and cross-track (goal - Primary Spacecraft) Swath width: 800 km (Primary Spacecraft) 1300 km (Constellation Spacecraft) Accuracy: NEDT 0.5 K - 1.0 K
GOCI Geostationary Ocean Colour Imager KARI	COMS	Being developed	Ocean colour instruments	Ocean colour information, coastal zone monitoring, land resources monitoring	Waveband: VIS - NIR: 0.40 - 0.88 µm (8 channels) Spatial resolution: 236m x 500m Swath width: 1440 km Accuracy:
GOES Comms Communications package on GOES NOAA	GOES-11, GOES-12, GOES-13, GOES-14, GOES-15	Operational	Communications		Waveband: Spatial resolution: Swath width: Accuracy:
GOLPE GPS Occultation and Passive reflection Experiment NASA (CONAE)	SAC-C	Operational	Atmospheric temperature and humidity sounders and precision orbit	Measurements of atmospheric effects on GPS signals, and precise positioning information to assist gravitational measurements.	Waveband: Spatial resolution: Swath width: Accuracy:
GOME Global Ozone Monitoring Experiment ESA	ERS-2	Operational	Atmospheric chemistry	Measures concentration of O3, NO, NO2, BrO, H2O, O2/O4, plus aerosols and polar stratospheric clouds, and other gases in special conditions	Waveband: UV-NIR: 0.24 - 0.79 µm (resolution 0.2 - 0.4 nm) Spatial resolution: Vertical: 5 km (for O3), Horizontal: 40 x 40 km to 40 x 320 km Swath width: 120 - 960 km Accuracy:
GOME-2 Global Ozone Monitoring Experiment - 2 EUMETSAT (ESA)	Metop-A, Metop-B, Metop-C	Operational	Atmospheric chemistry	Measurement of total column amounts and stratospheric and tropospheric profiles of ozone. Also amounts of H20, NO2, OClO, BrO, SO2 and HCHO.	Waveband: UV - NIR: 0.24 - 0.79µm (resolution 0.2 - 0.4 nm) Spatial resolution: Horizontal: 40 x 40 km (960 km swath) to 40 x 5 km (for polarization monitoring) Swath width: 120 - 960 km Accuracy: Cloud top height: 1 km (rms), Outgoing short wave radiation and solar irradiance: 5 W/m2, Trace gas profile: 10 - 20%, Specific humidity profile: 10 - 50 g/kg

Instrument & agency (& any partners)	Missions	Status	Type	Measurements & applications	Technical characteristics
GOMOS Global Ozone Monitoring by Occultation of Stars ESA	Envisat	Operational	Atmospheric chemistry	Stratospheric profiles of temparature and of ozone, NO2, H20, aerosols and other trace species	Waveband: Spectrometers: UV - VIS: 248 - 371 nm and 387 - 693 nm, NIR: 750 - 776 nm and 915 - 956 nm, Photometers: 644 - 705 nm and 466 - 528 nm Spatial resolution: 1.7 km vertical Swath width: Not applicable Accuracy:
GOX Global Positioning Satellite Occultation Experiment (GOX) NASA, NSPO (JPL)	COSMIC-1/FORMOSAT-3 FM1, COSMIC-2/FORMOSAT-3 FM2, COSMIC-3/FORMOSAT-3 FM3, COSMIC-4/FORMOSAT-3 FM4, COSMIC-5/FORMOSAT-3 FM5, COSMIC-6/FORMOSAT-3 FM6	Operational	Atmospheric temperature and humidity sounders	Each instrument equipped with 4 GPS antennas to receive the L1 and L2 radio wave signals transmitted from the 24 US GPS satellites. Based on the signal transmission delay caused by the electric density, temperature, pressure, and water content in the ionosphere and atmosphere, information about ionosphere and atmosphere can be derived.	Waveband: L1/L2 Spatial resolution: Vertical: 0.3 - 1.5 m; Horizontal: 300 - 600 km Swath width: Accuracy:
GPS (ESA) GPS Receiver ESA	GOCE	Operational	Precision orbit	Satellite positioning	Waveband: Spatial resolution: Swath width: Accuracy:
GPS Receiver (Swarm) GPSR (Swarm) ESA	Swarm	Being developed	Precision orbit		Waveband: Spatial resolution: L1 C/A code range error better than 0.5 m RMS; L1/L2 P-code range error better than 0.25 m RMS; L1 carrier phase error better than 5 mm Swath width: Accuracy:
GPSP Global Positioning System Payload NASA	OSTM (Jason-2)	Operational	Precision orbit	Precision orbit determination	Waveband: Spatial resolution: Swath width: Accuracy:
GPSRO (Oersted) GPS Radio Occultation System NASA	Ørsted (Oersted)	Operational	Atmospheric temperature and humidity sounders	Measurements of atmospheric temperature, pressure and water vapor content.	Waveband: Spatial resolution: Swath width: Accuracy:
GPSRO (Terra-SAR) GPS Radio Occultation System NASA	TerraSAR-X	Operational	Atmospheric temperature and humidity sounders	Measurements of atmospheric temperature, pressure and water vapor content.	Waveband: Spatial resolution: Swath width: Accuracy:
GRACE instrument NASA (DLR)	GRACE, GRACE FO, GRACE-II	Operational	Gravity instruments	Includes BlackJack Global Positioning System (Turbo Rogue Space Receiver) and 'High Accuracy Inter-satellite Ranging System (aka K-band Ranging System) for 'Inter-satellilite ranging system estimestes for global models of the mean and time variable Earth gravity field	Waveband: Microwave: 24 GHz and 32 GHz Spatial resolution: 400 km horizontal, N/A vertical Swath width: N/A Accuracy: 1 cm equivilant water
GRAS GNSS Receiver for Atmospheric Sounding EUMETSAT (ESA)	Metop-A, Metop-B, Metop-C	Operational	Atmospheric temperature and humidity sounders and precision orbit	GNSS receiver for atmospheric temperature and humidty profile sounding	Waveband: Spatial resolution: Vertical: 150 m (trophosphere) and 1.5 km (stratosphere), Horizontal: 100 km approx (troposphere), 300 km approx (stratosphere) Swath width: Altitude range of 5 - 30 km Accuracy: Temperature sounding to 1 K rms
HDWL (3D Winds) NASA	3D Winds	Proposed	Lidars	"Tropospheric winds for weather forecasting and pollution transport	Waveband: 2.051 µm and 0.355 µm Spatial resolution: 300 km along track horizontal resolution Swath width: View 45 degrees of nadir at four azimuth angles: 45, 135, 225, 315 deg. Accuracy: 2-3 m/s LOS wind accuracy projected into horizontal from all effects including sampling error
High Resolution Panchromatic Camera CONAE	SARE-1	TBD	High resolution optical imagers		Waveband: Spatial resolution: Swath width: Accuracy:
HiRDLS High Resolution Dynamics Limb Sounder NASA (BNSC)	Aura	No longer operational	Atmospheric chemistry	Measures atmospheric temperature, concentrations of ozone, water vapour, methane, NOx, N2O, CFCs and other minor species, aerosol concentration, location of polar stratospheric clouds and cloud tops. Currently not collecting data on Aqua.	Waveband: TIR: 6.12 - 17.76 µm (21 channels) Spatial resolution: Vertical: 1 km, Horizontal: 10 km Swath width: Accuracy: Trace gas: 10%, Temparature: 1 K, Ozone: 10%
HiRI High-Resolution Imager CNES	Pleiades 1, Pleiades 2	Being developed	High resolution optical imagers	Cartography, land use, risk, agriculture and forestry, civil planning and mapping, digital terrain models, defence	Waveband: 4 bands + PAN: Near IR (0.77 - 0.91 µm), Red (0.61 - 0.71 µm), Green (0.50 - 0.60 µm), Blue (0.44 - 0.54 µm), Pan (0.47 - 0.84 µm) Spatial resolution: 0.70m Swath width: 20 km swath at nadir. Agile platform giving ±50 deg off-track Accuracy:
HIRS/3 High Resolution Infra-red Sounder/3 NOAA	NOAA-15, NOAA-16, NOAA-17	Operational	Atmospheric temperature and humidity sounders	Atmospheric temperature profiles and data on cloud parameters, humidity soundings, water vapour, total ozone content, and surface temperatures	Waveband: VIS - TIR: 0.69 - 14.95 µm (20 channels) Spatial resolution: 20.3 km Swath width: 2240 km Accuracy:
HIRS/4 High Resolution Infra-red Sounder/4 NOAA	Metop-A, Metop-B, NOAA-18, NOAA-19	Operational	Atmospheric temperature and humidity sounders	Atmospheric temperature profiles and data on cloud parameters, humidity soundings, water vapour, total ozone content, and surface temperatures. Same as HIRS/3, with 10 km IFOV	Waveband: VIS - TIR: 0.69 - 14.95 µm (20 channels) Spatial resolution: 20.3 km Swath width: 2240 km Accuracy:
HRG CNES	SPOT-5	Operational	High resolution optical imagers	High resolution multispectral mapper. 2 HRG instruments on this mission can be processed to produce simulated imagery of 2.5 m. Images are 60 x 60 km in size	Waveband: VIS: B1: 0.50 - 0.59 µm, B2: 0.61 - 0.68 µm, NIR: B3: 0.79 - 0.89 µm, SWIR: 1.50 - 1.75 µm, Panchromatic: 0.49 - 0.69 µm Spatial resolution: Panchromatic: 5 m, Multispectral: 10 m Swath width: 60 km (1 instrument), 117 km (2 instruments). Same as SPOT 4 with off-track steering capability (±27 deg) Accuracy:
HRS High Resolution Stereoscope CNES	SPOT-5	Operational	High resolution optical imagers	High resolution stereo instrument	Waveband: Panchromatic: VIS 0.49 - 0.69 µm Spatial resolution: Panchromatic: 10 m, Altitude: 15 m Swath width: 120 km Accuracy:

Instrument & agency (& any partners)	Missions	Status	Type	Measurements & applications	Technical characteristics
HRTC High Resolution Panchromatic Camera CONAE	SAC-C	Operational	High resolution optical imagers	High resolution earth imagery to complement MMRS on the same mission	Waveband: VIS - NIR: 400-900 nm Spatial resolution: 35 m Swath width: 90 km Accuracy:
HRVIR High Resolution Visible and Infra-red CNES (SNSB)	SPOT-4	Operational	High resolution optical imagers	2 HRVIR instruments provide 60 x 60 km images for a range of land and coastal applications	Waveband: VIS: B1: 0.50 - 0.59 µm, B2: 0.61 - 0.68 µm, NIR: 0.79 - 0.89 µm, SWIR: 1.58 - 1.75 µm, Panchromatic:(B2) 0.61 - 0.68 µm Spatial resolution: 10 m (0.64 µm) or 20 m Swath width: 117 km (i.e. 60 km + 60 km with 3 km overlap). Steerable up to ±27 deg off-track Accuracy:
HSB Humidity Sounder/Brazil INPE (NASA)	Aqua	No longer operational	Atmospheric temperature and humidity sounders	Humidity soundings for climatological and atmospheric dynamics applications	Waveband: Microwave: 5 discreet channels in the range of 150-183 MHz Spatial resolution: 13.5 km Swath width: 1650 km Accuracy: Temperature: 1.0-1.2 K coverage of land and ocean surfaces, Humidity: 20%
HSC High Sensitivity Camera CONAE	SAC-D/Aquarius	Being developed	Imaging multi-spectral radiometers (vis/IR)	High Sensitivity Camera (HSC) measures top of atmosphere radiance in the VIS spectral range measured by a high sensitivity sensor detects: urban lights, electric storms, polar regions, snow cover, forest fires, sea surviellance	Waveband: PAN (VIR-NIR): 450 - 900 nm Spatial resolution: 200 - 300 m Swath width: 1600 km Accuracy:
HSI Hyperspectral Imager DLR	EnMAP	Approved	High resolution optical imagers	Detailed monitoring and characterization of rock and soil targets, vegitation, inland and coastal waters on a global scale	Waveband: 420 - 2450 nm Spatial resolution: GSD 30 m Swath width: 30 km Accuracy: Radiometric: <5%
HSI (HJ-1A) Hyper Spectrum Imager CAST	HJ-1A	Operational	Imaging multi-spectral radiometers (vis/IR)	Hyperspectral measurements for environment and disaster management operations	Waveband: 0.45 - 0.95 µm (128 bands) Spatial resolution: 100 m Swath width: 50 km Accuracy:
HSRL (ACE) NASA	ACE	Proposed	Lidars	Measurement of aerosol heights, cloud top heights and aerosol properties	Waveband: 532 nm (polarization-sensitive), 1064 nm, 355 nm Spatial resolution: Vertical sampling: 30-60 m, -2 to 40 km Swath width: 333 m along-track Accuracy:
HSTC High Sensitivity Technological Camera CONAE	SAC-C	Operational	Imaging multi-spectral radiometers (vis/IR)	Monitors forest fires, electrical storms and geophysical studies of aurora borealis	Waveband: PAN: VIS - NIR: 450-850 nm Spatial resolution: 300 m Swath width: 700 km Accuracy:
HYC HYperspectral Camera ASI	PRISMA	Approved	Imaging multi-spectral radiometers (vis/IR)	Hyperspectral data for complex land ecosystem studies	Waveband: HYC: VIS - NIR: 400 - 900 nm, 400 - 1000 nm; SWIR: 900 - 2500 nm; Spectral resolution 10 nm, 220 bands Spatial resolution: 30 m Swath width: 30 km Accuracy: radiometric: '5%
Hyperion Hyperspectral Imager NASA	NMP EO-1	Operational	Imaging multi-spectral radiometers (vis/IR)	Hyperspectral imaging of land surfaces	Waveband: VIS - NIR: 400 - 1000 nm; NIR - SWIR: 900 - 2500 nm; 10 nm spectral resolution for 220 bands Spatial resolution: 30 m Swath width: 7.5 km Accuracy: SNR @ 10% refl target: vis 10-40 swir 10-20
HySI (IMS-1) Hyperspectral Imager (IMS-1) ISRO	IMS-1	Operational	Imaging multi-spectral radiometers (vis/IR)	Ocean and atmosphere study of Earth surface	Waveband: 64 bands of 8 nm seperation between 400 - 950 nm spectral range Spatial resolution: 505.6 m Swath width: 125.5 km Accuracy:
HySI (TES-HYS) Hyperspectral Imager (TES-HYS) ISRO	TES-HYS	Being developed	Imaging multi-spectral radiometers (vis/IR)	Ocean and atmosphere study of Earth surface	Waveband: 200 Channel of 5 nanometer width Spatial resolution: 15 m Swath width: 30 km Accuracy:
IAP Instrument for plasma analysis CNES	DEMETER	Operational	Space environment	Density, temperatures, speeds of major ions	Waveband: Spatial resolution: Swath width: Accuracy: Ion density: +5%, Temperature +5%, Speed +5%
IASI Infrared Atmospheric Sounding Interferometer CNES (EUMETSAT)	Metop-A, Metop-B, Metop-C	Operational	Atmospheric temperature and humidity sounders and atmospheric chemistry	Measures tropospheric moisture and temperature, column integrated contents of ozone, carbon monoxide, methane, dinitrogen oxide and other minor gases which affect tropospheric chemistry. Also measures sea surface and land temperature	Waveband: MWIR - TIR: 3.4 - 15.5 µm with gaps at 5 µm and 9 µm Spatial resolution: Vertical: 1 - 30 km, Horizontal: 25 km Swath width: 2052 km Accuracy: Temperature: 0.5 - 2 K, specific humidity: 0.1 - 0.3 g/kg, ozone, trace gas profile: 10%
ICARE Influence of Space Radiation on Advanced Components CNES (CONAE)	SAC-C	Operational	Space environment	Improvement of risk estimation models on latest generation of integrated circuits technology	Waveband: Spatial resolution: Swath width: Accuracy:
ICE Instrument for Electric Field CNES	DEMETER	Operational	Space environment	Electric field	Waveband: DC to 3 MHz Spatial resolution: Swath width: Accuracy: DC field +3 mV/m
IDP Instrument For Plasma Detection CNES	DEMETER	Operational	Space environment	Energy spectrum of electrons	Waveband: Spatial resolution: Swath width: Accuracy:
IIR Imaging Infrared Radiometer CNES	CALIPSO	Operational	Imaging multi-spectral radiometers (vis/IR)	Radiometer optimised for combined IIR/lidar retrievals of cirrus particle size	Waveband: TIR: 8.7 µm, 10.5 µm, and 12.0 µm (0.8 µm resolution) Spatial resolution: 1 km Swath width: 64 km Accuracy: 1 K
IKFS-2 Fourier spectrometer ROSHYDROMET (ROSKOSMOS)	Meteor-M N2	Prototype	Atmospheric temperature and humidity sounders	Atmospheric temperature/humidity profiles, data on cloud parameters, water vapour&ozone column amounts, surface temperature	Waveband: 5 - 15 µm, more then 5000 spectral channels Spatial resolution: 35 -100 km Swath width: 1000/2000 km Accuracy: 0.5 K

Instrument & agency (& any partners)	Missions	Status	Type	Measurements & applications	Technical characteristics
Imager NOAA	GOES-11, GOES-12, GOES-13, GOES-14, GOES-15	Operational	Imaging multi-spectral radiometers (vis/IR)	Measures cloud cover, atmospheric radiance, winds, atmospheric stability, rainfall estimates. Used to provide severe storm warnings/ monitoring day and night (type, amount, storm features)	Waveband: GOES 8 - 11: VIS: 1 channel (8 detectors), IR: 4 channels: 3.9 µm, 6.7 µm, 10.7 µm and 12 µm, GOES 12 - Q: VIS: 1 channel (8 detectors), IR: 4 channels: 3.9 µm, 6.7 µm, 10.7 µm and 13.3 µm Spatial resolution: 10 km Swath width: Full Earth disk Accuracy:
Imager (INSAT) Very High Resolution Radiometer ISRO	INSAT-3D	Being developed	Imaging multi-spectral radiometers (vis/IR)	Cloud cover, severe storm warnings/monitoring day and night (type, amount, storm features), atmospheric radiance winds, atmospheric stability rainfall	Waveband: VIS: 0.55 - 0.75 µm; SWIR: 1.55 - 1.7 µm; MWIR: 3.80 - 4.00 µm, 6.50 - 7.00 µm; TIR: 10.2 - 11.3 µm, 11.5 - 12.5 µm Spatial resolution: 1 x 1 km (VIS and SWIR), 4 x4 km (MWIR, TIR), 8 x 8 km (in 6.50 - 7.00 µm) Swath width: Full Earth disc and space around, Normal Frame (50 deg. N to 40 deg. S and full E-W coverage), Program Frame (Programmable, E-W Full coverage) Accuracy:
IMAGER/MTSAT-2 Imager/MTSAT JMA	MTSAT-2	Operational	Imaging multi-spectral radiometers (vis/IR)	Measures cloud cover, cloud motion, cloud height, water vapour, rainfall, sea surface temparature and Earth radiation	Waveband: VIS - SWIR: 0.55 - 0.80 µm, MWIR - TIR: 3.5 - 4 µm, 6.5 - 7 µm, 10.3 - 11.3 µm, 11.5 - 12.5 µm Spatial resolution: Visible: 1 km, TIR: 4 km Swath width: Full Earth disk every hour Accuracy:
IMSC Instrument Search Coil Magnetometer CNES	DEMETER	Operational	Magnetic field	Magnetic field	Waveband: 10 Hz - 17.4 kHz Spatial resolution: Swath width: Accuracy:
IMWAS Improved MicroWave Atmospheric Sounder NRSCC (CAST)	FY-3C, FY-3D, FY-3E, FY-3F, FY-3G	Operational	Atmospheric temperature and humidity sounders	Atmospheric sounding measurements	Waveband: Microwave: 19.35 - 89.0 GHz (8 channels) Spatial resolution: Swath width: Accuracy:
INES Italian Navigation Experiment ASI (CONAE)	SAC-C	Operational	Precision orbit	Composed of GPS Tensor and GNSS Lagrange Receiver to perform navigation experiment on precise orbit determination.	Waveband: Spatial resolution: Swath width: Accuracy:
IPDA LIDAR Integrated Path Differential Absorption Light Detection and Ranging Instrument DLR (CNES)	D/F Climate Mission	Proposed	Atmospheric chemistry	“Active“ optical remote sensing instrument for atmospheric parameters or trace gases. Global information on atmospheric Methane concentration (Methane column density measurements).	Waveband: Two lasers, mean wavelength 1645 µm Spatial resolution: 500 km (threshold), 200 km (goal) Swath width: Accuracy: <2%
IR (HJ-1B) Infrared Camera CAST	HJ-1B	Operational	Imaging multi-spectral radiometers (vis/IR)	Infrared measurements for environment and natural disaster monitoring	Waveband: 0.75 - 1.10 µm, 1.55 - 1.75 µm, 3.50 - 3.90 µm, 10.5 - 12.5 µm Spatial resolution: 300 m (10.5 - 12.5 µm), 150 m (the other bands) Swath width: 720 km Accuracy:
IR Correlation Radiometer (GeoCape) NASA	GEO-CAPE	Proposed	Imaging multi-spectral radiometers (vis/IR)	the near-IR and thermal-IR data will describe vertical CO, an excellent tracer of long-range transport of pollution. Identifying large scale vegetation burning events. Characterizing the oxidizing capacity of the atmosphere.	Waveband: 2.3, 4.6 µm Spatial resolution: 7 km horizontal spatial resolution, 2-3 layers in vertical resolution; < 0.2 um spectral resolution. Swath width: 2-d image of continental domain (north or south America). Accuracy: CO precision: 1 x 10^17 cm^ (-2)
IR spectrometer (CLARREO) NASA	CLARREO	Proposed	Earth radiation budget radiometers	Absolute spectrally-resolved measurements of terrestrial thermal emission with an absolute accuracy of 0.1 K in brightness temperature. The measurements cover most of the thermal spectrum.	Waveband: 200 to 2000 cm-1 Spatial resolution: 1 cm-1; 100 km footprint Swath width: 100 km Accuracy: .1K 3σ brightness temperature
IR Spectrometer(GACM) NASA	GACM	Proposed	Atmospheric chemistry	Daytime column measurements of CO in SWIR at 2.4 µm	Waveband: 2.4 and 4.6 µm Spatial resolution: Swath width: Accuracy:
IRAS InfraRed Atmospheric Sounder NRSCC (CAST)	FY-3A, FY-3B, FY-3C, FY-3D, FY-3E, FY-3F, FY-3G	Operational	Atmospheric temperature and humidity sounders	Atmospheric sounding for weather forecasting	Waveband: VIS - TIR: 0.65 - 14.95 µm (26 channels) Spatial resolution: 14 km Swath width: 952km Accuracy: 17km
IRS Infra-Red Sounder EUMETSAT (ESA)	Meteosat Third Generation-S1 (sounding), Meteosat Third Generation-S2 (sounding), Sentinel-4 A, Sentinel-4 B, Sentinel-5	Being developed	Atmospheric temperature and humidity sounders	Measurements of vertically resolved clear sky atmospheric motion vectors, temperature and water vapour profiles	Waveband: LWIR: 700 - 1210 cm^-1, MWIR: 1600 - 2175 cm^-1 Spatial resolution: Horiontal: 4 km at SSP, Vertical: 1 km Swath width: 640 km x 640 km dwells, step and stare, moving alternatly E-W and W-E moving up S-N one dwell step at the end of each row of dwells. Each disc is divided in 4 areas of Local Area Coverage (LAC). Accuracy: clear sky AMVs: 2 m/s, temperature profile: 1 K, water vapour profile: 5%
IRS Infrared scanner CAST (INPE)	CBERS-3, CBERS-4	Prototype	Imaging multi-spectral radiometers (vis/IR)	Used for fire detection, fire extent and temperature measurement	Waveband: 0.5 - 0.9 µm; 1.55 - 1.75 µm, 2.08 - 2.35 µm; 10.4 - 12.5 µm Spatial resolution: PAN, SWIR: 40 m, TIR: 80 m Swath width: 120 km Accuracy:
ISL Langmuir probes CNES	DEMETER	Operational	Other	Density of the plasma and electron temperature	Waveband: Spatial resolution: Swath width: Accuracy: Relative ion and electron density <5%, Absolute temperature <5%, Potential 10 mV Ion direction +15°
IST Italian Star Tracker ASI (CONAE)	SAC-C	Operational	Precision orbit	Test of a fully autonomous system for attitude and orbit determination using a star tracker	Waveband: Spatial resolution: Swath width: Accuracy:
IVISSR (FY-2) Improved Multispectral Visible and Infra-red Scan Radiometer (5 channels) NRSCC (CAST)	FY-2C, FY-2D, FY-2E, FY-2F	Operational	Imaging multi-spectral radiometers (vis/IR)	Meteorological	Waveband: VIS - TIR: 0.5 - 12.5 µm (5 channels) Spatial resolution: 5 km Swath width: Full Earth disk Accuracy: 1.25~5km

Instrument & agency (& any partners)	Missions	Status	Type	Measurements & applications	Technical characteristics
JAMI/MTSAT-1R Japanese Advanced Meteorological Imager JMA	MTSAT-1R	Operational	Imaging multi-spectral radiometers (vis/IR)	Measures cloud cover, cloud motion, cloud height, water vapour, rainfall, sea surface temparature and Earth radiation	Waveband: VIS - SWIR: 0.55 - 0.90 µm, MWIR - TIR: 3.5 - 4 µm, 6.5 - 7 µm, 10.3 - 11.3 µm, 11.5 - 12.5 µm Spatial resolution: Visible: 1 km, TIR: 4 km Swath width: Full Earth disk every hour Accuracy:
JMR JASON Microwave Radiometer NASA	Jason, OSTM (Jason-2)	Operational	Imaging multi-spectral radiometers (passive microwave)	Altimeter data to correct for errors caused by water vapour and cloud-cover. Also measures total water vapour and brightness temperature	Waveband: Microwave: 18.7 GHz, 23.8 GHz, 34 GHz Spatial resolution: 41.6 km at 18.7 GHz, 36.1 km at 23.8 GHz, 22.9 km at 34 GHz Swath width: 120 deg cone centred on nadir Accuracy: Total water vapour: 0.2 g/sq cm, Brightness temperature: 0.15 K
K band radiometers (SCLP) NASA	SCLP	Proposed	Imaging multi-spectral radiometers (passive microwave)	Snow accumulation for fresh water availability	Waveband: Spatial resolution: Spatial resolution of 50 to 100m 15 day temporal resolution Swath width: Accuracy:
Ka-band Radar INterferometer (KaRIN) NASA (CNES)	SWOT	Proposed	Radar altimeters	Swath mapping radar altimeter that provides measurements for surface water	Waveband: Spatial resolution: Vertical resolution is 2cm Swath width: Vertical resolution is 2cm Accuracy:
KMSS Multispectral Imager (VIS) ROSHYDROMET (ROSKOSMOS)	Meteor-M N1, Meteor-M N2	Operational	Imaging multi-spectral radiometers (vis/IR)	Multispectral images of land & sea surfaces and ice cover	Waveband: 0.4 - 0.9 µm, 6 channels Spatial resolution: 60 m - 100 m Swath width: 900 km Accuracy:
Ku and X-band radars (SCLP) NASA	SCLP	Proposed	Imaging microwave radars	Snow accumulation for fresh water availability	Waveband: Spatial resolution: Spatial resolution of 50 to 100m; 15 day temporal resolution Swath width: Accuracy:
L-band INSAR (DESdynI) NASA	DESDynI	Proposed	Radar altimeters	L-Band InSAR is dedicated to ecosystem structure and allows for estimation of forest height and structure and biomass.	Waveband: Spatial resolution: 35m spatial resolution Swath width: 340km Accuracy:
L-band Radar (SMAP) NASA	SMAP	Proposed	Other	Soil moisture	Waveband: Microwave Spatial resolution: Swath width: Accuracy:
L-band Radiometer (SMAP) NASA	SMAP	Proposed	Imaging multi-spectral radiometers (passive microwave)		Waveband: Spatial resolution: Radiometer has 40 km footprint Swath width: Soil moisture will be estimated optimally at a resolution of 10 km and freeze-thaw state at a resolution of 1-3 km. The provision of constant incidence angle across the 1000-km swath simplifies the data processing and enables accurate repeat-pass estimation of soil moisture and freeze/thaw change Accuracy:
L-Band SAR (ALOS-2) L-Band Synthetic Aperture Radar (ALOS-2) JAXA (METI)	ALOS-2	Operational	Imaging microwave radars	High resolution microwave imaging of land and ice for use in environmental monitoring, agriculture and forestry, disaster monitoring, Earth resource management and interferometry	Waveband: Microwave: L-Band 1270 MHz Spatial resolution: Spotlight mode (1 to 3 m), high resolution mode (3 to 10 m). Swath width: High resolution mode: 70 km, Scan SAR mode: 250 - 360 km, Polarimetry: 30 km Accuracy: Surface Resolution:10 m (Fine Mode); Surface Resolution:100 m (Scan Mode); Radiometric: ±1 dB
Lagrange LABEN GNSS Receiver for Advanced Navigation, Geodesy and Experiments ASI	SAC-D/Aquarius	Being developed	Atmospheric temperature and humidity sounders	GPS Receiver including specialised version equipped with limb sounding antenna and dedicated signal tracking capability for meteorological, climate and space weather applications..	Waveband: Spatial resolution: Swath width: Accuracy:
Laser altimeter (LIST) NASA	LIST	Proposed	Lidars	New technology laser system that performs spatial mapping of Earth's surface from an orbital platform	Waveband: Spatial resolution: Swath width: Accuracy:
Laser Reflectors CNES	STARLETTE, STELLA	Operational	Precision orbit	Measures distance between the satellite and the laser tracking stations	Waveband: Spatial resolution: Swath width: Accuracy:
Laser Reflectors (ESA) Laser Reflectors ESA	CryoSat-2, GOCE, Swarm	Operational	Precision orbit	Measures distance between the satellite and the laser tracking stations	Waveband: Spatial resolution: Swath width: Accuracy:
LCCRA Laser Corner Cube Reflector Assembly ASI	LARES	Operational	Precision orbit	Accuracy measuments on Lense-Thirring effect and baseline tracking data for precision geodesy. Also for calibration of radar altimeter bias.	Waveband: Spatial resolution: Swath width: Accuracy: 2 cm overhead ranging
LEISA AC LEISA Atmospheric Corrector NASA	NMP EO-1	Operational	Imaging multi-spectral radiometers (vis/IR)	Corrects high spatial resolution multispectral imager data for atmospheric effects	Waveband: 256 bands, NIR - SWIR: 0.89 - 1.58 µm Spatial resolution: 250 m Swath width: 185 km Accuracy:
LI Lightning Imager EUMETSAT (ESA)	MTG-I1 (imaging), MTG-I2 (imaging), MTG-I3 (imaging), MTG-I4 (imaging)	Being developed	Lightning imager	Real time lightning detection (cloud-to-cloud and cloud-to-ground strokes, with no discrimination between the two), lightning location	Waveband: NIR neutral oxygen ligthning emission features at 777.4 nm Spatial resolution: < 10 km at 45°N Swath width: Fixed view of 80% of visible earth disc, all EUMETSAT member states Accuracy: Detection Efficiency: 90% at 45N, SSP longitude, 70% on average over the area of coverage (for lightning signals 6.7 mWm-2sr-1 during the night, 16.7 mWm-2sr-1 during the day), Radiance accuracy: 10% for radiances higher than 70 mWm-2sr-1, 7 mWm-2sr-1 for radiances lower than 70 mWm-2sr-1
LIS Lightning Imager Sensor INPE	GPM-Br	TBD	Lightning imager	Atmospheric electrical discharge imager	Waveband: 0.7774 µm Spatial resolution: 3 - 6 km Swath width: 600 km Accuracy:

Instrument & agency (& any partners)	Missions	Status	Type	Measurements & applications	Technical characteristics
LIS Lightning Imaging Sensor NASA	TRMM	Operational	Lightning imager	Global distribution and variability of total lightning. Data can be related to rainfall to study hydrological cycle	Waveband: NIR: 0.7774 µm Spatial resolution: 4 km Swath width: FOV: 80 x 80 deg Accuracy: 90% day and night detection probability
LISS-III (RESOURCESAT) Linear Imaging Self Scanner - III (RESOURCESAT) ISRO	RESOURCESAT-1, RESOURCESAT-2	Operational	High resolution optical imagers	Data used for vegetation type assessment, resource assessment, crop stress detection, crop production forecasting, forestry, land use and land cover change	Waveband: VIS: Band 2: 0.52 - 0.59 µm, Band 3: 0.62 - 0.68 µm, NIR: Band 4: 0.77 - 0.86 µm, SWIR: Band 5: 1.55 - 1.75 µm Spatial resolution: 23.5 m Swath width: 141 km Accuracy:
LISS-IV Linear Imaging Self Scanner - IV ISRO	RESOURCESAT-1, RESOURCESAT-2	Operational	High resolution optical imagers	Vegetation monitoring, improved crop discrimination, crop yield, disaster monitoring and rapid assessment of natural resources	Waveband: VIS: 0.52 - 0.59 µm, 0.62 - 0.68 µm, NIR: 0.77 - 0.86 µm Spatial resolution: 5.8 m Swath width: 70 km Accuracy:
LM Lightning Mapper NRSCC (CAST)	FY-4 O/A, FY-4 O/B, FY-4 O/C, FY-4 O/D, FY-4 O/E	Approved	Lightning imager	Lightning mapping for locating thunder storms in flooding season, CCD camear operating 0.77 µm to count flashes and intensity	Waveband: 0.774 µm Spatial resolution: 10 km Swath width: Full Earth disk Accuracy: 8km
LRA Laser Retroreflector Array NASA (ASI)	Jason, OSTM (Jason-2)	Operational	Precision orbit	Baseline tracking data for precision orbit determination and/or geodesy. Also for calibration of radar altimeter bias. Several types used on various missions. (ASI involved in LAGEOS 2 development)	Waveband: Spatial resolution: Swath width: Accuracy: 2 cm overhead ranging
LRA (LAGEOS) Laser Retroreflector Array ASI	LAGEOS-1, LAGEOS-2	Operational	Precision orbit	Baseline tracking data for precision geodesy. Also for calibration of radar altimeter bias. Several types used on various missions. (ASI involved in LAGEOS 2 development)	Waveband: Spatial resolution: Swath width: Accuracy: 2 cm overhead ranging
LRIT Low-Rate Information Transmission NOAA	GOES-11, GOES-12, GOES-13, GOES-14, GOES-15, NOAA-19	Operational	Communications	Follow-on from the Weather Facsimile (WEFAX) Processing System	Waveband: Spatial resolution: Swath width: Accuracy:
LRR Laser retro-Reflector ESA	GOCE	Operational	Precision orbit	Satellite Laser Ranging of GOCE, used for precise positioning and for geodynamics on GOCE	Waveband: Spatial resolution: Swath width: Accuracy:
Mach-Zehnder Micro-interferometer ASI	MIOSAT	Being developed	Atmospheric chemistry	Spectral radiance. Detection of the atmospheric gases	Waveband: 400-4500 nm Spatial resolution: Ground Spot = 5 km Swath width: 5 km Accuracy:
MADRAS Microwave Analysis and Detection of Rain and Atmospheric Structures ISRO (CNES)	MEGHA-TROPIQUES	Being developed	Imaging multi-spectral radiometers (passive microwave)	To estimate rainfall, atmospheric water parameters and ocean surface winds in the equatorial belt	Waveband: 18.7 GHz, 23.8 GHz, 36.5 GHz, 89 GHz, 157 GHz Spatial resolution: 40 km Swath width: 1700 km Accuracy:
MAESTRO Measurements of Aerosol Extinction in the Stratosphere and Troposphere Retrieved by Occultation CSA	SCISAT-1	Operational	Atmospheric chemistry	Chemical processes involved in the depletion of the ozone layer.	Waveband: UV - NIR: 0.285 - 1.03 µm (1 - 2 nm spectral resolution) Spatial resolution: Approx 1 - 2 km vertical Swath width: Accuracy:
MAGIS Measurement of Atmospheric Gases using Infrared Sp ISRO	ISTAG	Being developed	Atmospheric chemistry	To study the regional/global distribution of carbon monoxide (CO)	Waveband: Spatial resolution: Swath width: Accuracy:
Magnetometer (NOAA) Magnetometer NOAA	GOES-R, GOES-S	Approved	Magnetic field		Waveband: Spatial resolution: Swath width: Accuracy:
MAPI Multi-Angle Polarisation Imager ISRO	ISTAG	Being developed	Multiple direction/polarisation radiometers	Measurement of column integrated aerosol spectral optical depth	Waveband: Spatial resolution: Swath width: Accuracy:
MAVELI Measurements of Aerosols by Viewing Earth's Limb ISRO	ISTAG	Being developed	Atmospheric chemistry	Vertical profiles of aerosols, ozone and water vapour in the free troposphere and stratosphere and cloud top height	Waveband: Spatial resolution: Swath width: Accuracy: <1.0 K temperature, 0.2 g/kg Humidity
MBEI Multi-band Earth Imager NSAU	Sich-2	Being developed	High resolution optical imagers	Multispectral scanner images of land surface	Waveband: VIS - NIR: 0.51 - 0.90 µm; VIS: 0.51 - 0.59 µm, 0.61 - 0.68 µm; NIR: 0.80 - 0.89 µm Spatial resolution: 7.8 m Swath width: 46.6 km pointable ±35° from nadir Accuracy: 8 bits
MCSI Multiple Channel Scanning Imager NRSCC (CAST)	FY-4 O/A, FY-4 O/B, FY-4 O/C, FY-4 O/D, FY-4 O/E	Approved	Imaging multi-spectral radiometers (vis/IR)	Multipurpose visible/IR imagery and wind derivation	Waveband: 12 channeles from 0.55 - 13.8 µm Spatial resolution: 1 km VIS, 2 km NIR, 4 km TIR Swath width: Full Earth disk Accuracy: 0.5~4.0km
MERIS Medium-Resolution Imaging Spectrometer ESA	Envisat	Operational	Imaging multi-spectral radiometers (vis/IR)	Main objective is monitoring marine biophysical and biochemical parameters. Secondary objectives are related to atmospheric properties such as cloud and water vapour and to vegetation conditions on land surfaces	Waveband: VIS - NIR: 15 bands selectable across range: 0.4 - 1.05 µm (bandwidth programmable between 0.0025 and 0.03 µm) Spatial resolution: Ocean: 1040 x 1200 m, Land & coast: 260 x 300 m Swath width: 1150 km, global coverage every 3 days Accuracy: Ocean colour bands typical S:N = 1700
MERSI Medium Resolution Spectral Imager NRSCC (CAST)	FY-3A, FY-3B, FY-3C, FY-3D, FY-3E, FY-3F, FY-3G	Operational	Imaging multi-spectral radiometers (passive microwave)	Measurement of vegetation indexes and ocean colour	Waveband: 25 channeles from 0.47~12.0 µm Spatial resolution: 250 m for broadband channels, 1 km for narrowband channels Swath width: 2800 km Accuracy: 0.25~1.0km
Meteosat Comms Communications package for Meteosat EUMETSAT	Meteosat-6, Meteosat-7	Operational	Communications	Communication package onboard Meteosat series satellites	Waveband: Spatial resolution: Swath width: Accuracy:

Instrument & agency (& any partners)	Missions	Status	Type	Measurements & applications	Technical characteristics
METimage Multi Spectral Imager EUMETSAT (DLR)	Sentinel-5	Proposed	Imaging multi-spectral radiometers (vis/IR)	operational multi spectral imager for meteorological Post-EPS VIS/IR Imaging Mission (VII)	Waveband: UV-TIR (No of Channels and center wavelengths tbd by EUMETSAT Post-EPS MRD) Spatial resolution: 250 - 500 m (TBD by EUMETSAT Post-EPS MRD) Swath width: 2800 km (+/-55°) (TBD by EUMETSAT Post-EPS MRD) Accuracy:
MHS Microwave Humidity Sounder EUMETSAT	Metop-A, Metop-B, Metop-C, NOAA-18, NOAA-19	Operational	Atmospheric temperature and humidity sounders	Atmospheric humidity profiles, cloud cover, cloud liquid, water content, ice boundaries and precipitation data	Waveband: Microwave: 89 GHz, 166 GHz and 3 channels near 183 Ghz Spatial resolution: Vertical: 3 - 7 km, Horizontal: 30 - 50 km Swath width: 1650 km Accuracy: Cloud water profile: 10 g/m2, specific humidity profile: 10 - 20%
MI Meteorological Imager KARI	COMS	Being developed	Imaging multi-spectral radiometers (vis/IR)	Continuous monitoring capability for the near realtime generation of high-resolution meteorological products and long-term change analysis of sea surface temperature and cloud coverage.	Waveband: 1: VIS, 0.55 - 0.80 µm; 2: SWIR: 3.50 - 4.00 µm; 3: WV (Waver Vapor): 6.50 - 7.00 µm; 4: TIR1 (Thermal Infrared 1): 10.3 - 11.3 µm, 5: TIR2 (Thermal Infrared 2): 11.5 - 12.5 µm Spatial resolution: VIS: 1 km, IR: 4 km Swath width: Full Earth disk Accuracy:
Microwave limb sounder (GACM) NASA	GACM	Proposed	Atmospheric chemistry	Limb-viewing measurements of O3, N2O, temperature, water vapor, CO, HNO3, ClO, and volcanic SO2 in the	Waveband: Spatial resolution: Swath width: Accuracy:
MIPAS Michelson Interferometric Passive Atmosphere Sounder ESA	Envisat	Operational	Atmospheric temperature and humidity sounders and atmospheric chemistry	Data on stratosphere chemistry (global/polar ozone), climate research (trace gases/clouds), transport dynamics, tropospheric chemistry. Primary/secondary species: O3, NO, NO2, HNO3, N2O5, ClONO2, CH4	Waveband: MWIR-TIR: between 4.15 and 14.6 µm Spatial resolution: Vertical resolution: 3 km, vertical scan range 5 - 150 km, Horizontal: 3 x 30 km, Spectral resolution: 0.035 lines/cm Swath width: Accuracy: Radiometric precision: 685 - 970 cm-1: 1%, 2410 cm-1: 3%
MIRAS Multichannel Infrared Atmospheric Sounder NRSCC (CAST)	FY-3C, FY-3D, FY-3E, FY-3F, FY-3G	Prototype	Imaging multi-spectral radiometers (passive microwave)		Waveband: Spatial resolution: Swath width: Accuracy:
MIRAS (SMOS) Microwave Imaging Radiometer using Aperture Synthesis (MIRAS) ESA	SMOS	Operational	Imaging multi-spectral radiometers (passive microwave) and multiple direction/polarisation radiometers	Objective is to demonstrate observations of sea surface salinity and soil moisture in suport of climate, meteorology, hydrology, and oceanography applications.	Waveband: L-Band 1.41 GHz Spatial resolution: 33 - 50 km depending on the position in the swath - resampled to 15 km grid Swath width: Hexagone shape, nominal width 1050 km allowing a 3 day revisit time at the equator Accuracy: 2.6 K absolute accuracy, RMS 1.6-4 K depending on the scene and the position within the swath
MIREI Middle IR Earth Imager NSAU	Sich-2	Being developed	Imaging multi-spectral radiometers (vis/IR)	Scanner images of land surface in middle infra-red range	Waveband: NIR: 1.55 - 1.7 µm Spatial resolution: 46.0 m Swath width: 55.3 km pointable ±35° from nadir Accuracy: 8 bits
MISR Multi-angle Imaging SpectroRadiometer NASA	Terra	Operational	Multiple direction/polarisation radiometers	Measurements of global surface albedo, aerosol and vegetation properties. Also provides multi-angle bidirectional data (1% angle-to-angle accuracy) for cloud cover and reflectances at the surface and aerosol opacities. Global and local modes.	Waveband: VIS: 0.44 µm, 0.56 µm, 0.67 µm, NIR: 0.86 µm Spatial resolution: 275 m, 550 m or 1.1 km, Summation modes available on selected cameras/bands: 1 x 1, 2 x 2, 4 x 4, 1 x 4. 1 pixel = 275 x 275 m Swath width: 380 km common overlap of all 9 cameras Accuracy: 0.03% hemispherical albedo, 10% aerosol opacity, 1-2% angle to angle accuracy in bidirectional reflectance
MLS (EOS-Aura) Microwave Limb Sounder (EOS-Aura) NASA	Aura	Operational	Atmospheric temperature and humidity sounders	Measures lower stratospheric temperature and concentration of H2O, O3, ClO, HCl, OH, HNO3, N2O and SO2	Waveband: Microwave: 118 GHz, 190 GHz, 240 GHz, 640 GHz and 2.5 THz Spatial resolution: 3 x 300 km horizontal x 1.2 km vertical Swath width: Limb scan 2.5 - 62.5 km Limb to limb Accuracy: Temparature: 4 K, Ozone: 50%
MMP Magnetic Mapping Payload JPL, DNSC (CONAE)	SAC-C	Operational	Magnetic field	Measurement of the Earth's magnetic field with a vector and a scalar magnetometer	Waveband: Spatial resolution: Swath width: Accuracy:
MMRS Multispectral Medium Resolution Scanner CONAE	SAC-C	Operational	Imaging multi-spectral radiometers (vis/IR)	Applications related to agriculture, environment, forestry, hydrology, oceanography, mineralogy and geology, desertification, contamination and protection of ecosystems.	Waveband: VIS - NIR: 480 - 500 nm, 540-560 nm, 630-690 nm, 795-835 nm, SWIR: 1550-1700 nm Spatial resolution: 175 m Swath width: 360 km Accuracy:
MOC Multi-spectral Optical Camera CONAE	SAC-E/SABIA/mar	Approved	Imaging multi-spectral radiometers (vis/IR)	Sea and coastal studies	Waveband: Optical and Thermal Infrared Cameras, up to 15 bands Spatial resolution: Swath width: Accuracy:
MODIS MODerate-Resolution Imaging Spectroradiometer NASA	Aqua, Terra	Operational	Imaging multi-spectral radiometers (vis/IR) and ocean colour instruments	Data on biological and physical processes on the surface of the Earth and in the lower atmosphere, and on global dynamics. Surface temperatures of land and ocean, chlorophyll fluorescence, land cover measurements, cloud cover (day and night)	Waveband: VIS - TIR: 36 bands in range 0.4 - 14.4 µm Spatial resolution: Cloud cover: 250 m (day) and 1000 m (night), Surface temperature: 1000 m Swath width: 2330 km Accuracy: Long wave radiance: 100 nW/m2, Short wave radiance: 5%, Surface temperature of land: <1 K, Surface temperature of ocean: <0.2 K, Snow and ice cover: 10%
MOPITT Measurements Of Pollution In The Troposphere CSA (NASA)	Terra	Operational	Atmospheric chemistry	Measurements of CO in the troposphere	Waveband: SWIR-MWIR: 2.3 µm, 2.4 µm and 4.7 µm Spatial resolution: CO profile: 4 km vertical, 22 x 22 km horizontal, CO, CH4 column: 22x22 km horizontal Swath width: 616 km Accuracy: Carbon monoxide (4 km layers): 10%

Instrument & agency (& any partners)	Missions	Status	Type	Measurements & applications	Technical characteristics
MS (GISTDA) Multi spectral imager GISTDA	THEOS	Operational	Imaging multi-spectral radiometers (vis/IR)	THEOS MS consists of 4 spectral bands (R,G,B, NIR) with resolution 15 m and swath width at 90 km. The applications which are suitable for this instrument such as cartography, land use, land cover change management, agricultural and natural resources management, etc.	Waveband: 0.45 - 0.52 µm, 0.53 - 0.60 µm, 0.62 - 0.69 µm, 0.77 - 0.90 µm Spatial resolution: 15 m Swath width: 90 km Accuracy: GSD for MS = 15 m +/- 10% MTF for MS > 0.12 in each band
MSC Multi-Spectral Camera KARI	KOMPSAT-2	Operational	High resolution optical imagers	High resolution imager for land applications of cartography and disaster monitoring	Waveband: Panchromatic VIS: 0.50 - 0.90 µm, VIS: 0.45 - 0.52 µm, 0.52 - 0.60 µm, 0.63 - 0.69 µm, NIR: 0.76 - 0.90 µm Spatial resolution: Pan: 1 m; VNIR: 4 m Swath width: 15 km Accuracy:
MSG Comms Communications package for MSG EUMETSAT	Meteosat-10, Meteosat-8, Meteosat-9	Operational	Communications	Communication package onboard MSG series satellites	Waveband: Spatial resolution: Swath width: Accuracy:
MSI Multi Spectral Imager DLR	RapidEye	Operational	High resolution optical imagers	High resolution images with short observing cycle for commercial and scientific applications	Waveband: 4 VIS + 1 NIR band: 440 - 510 nm, 520 - 590 nm, 630 - 685 nm, 690 - 730 nm, 760 - 850 nm Spatial resolution: 6.5 m Swath width: 78 km Accuracy: 2-3%
MSI (BJ-1) Multispectral Imager NRSCC (CAST)	BJ-1	Operational	Imaging multi-spectral radiometers (vis/IR)	To provide multispectral analysis of hydrological, oceanographic, land use and meteorological parameters.	Waveband: Green 520 - 600 nm; Red 630 - 690 nm; NIR 760 - 900 nm Spatial resolution: 32 m Swath width: 600 km Accuracy: 800 m
MSI (EarthCARE) Multi-Spectral Imager (EarthCARE) ESA	EarthCARE	Approved	Imaging multi-spectral radiometers (vis/IR)	Observation of cloud properties and aerosol (aerosols to be confirmed)	Waveband: VIS - NIR: Band1: VIS, 670 nm, Band2: NIR, 865 nm, Band3: SWIR-1, 1.67 µm, Band4: SWIR-2, 2.21 µm, Thermal Infrared: Band5: 8.8 µm, Band6: 10.8µm, Band7: 12.0 µm Spatial resolution: 500 x 500 m Swath width: 150 km swatch with, asymmetrically; 35 km to 115 km versus nadir point Accuracy:
MSI (Sentinel-2) Multi-Spectral Instrument (Sentinel-2) ESA (EC)	Sentinel-2 A, Sentinel-2 B, Sentinel-2 C	Being developed	High resolution optical imagers	Optical high spatial resolution imagery over land and coastal areas for GMES operational services.	Waveband: 13 bands in the VNIR-SWIR Spatial resolution: 10m for 4 bands in VNIR, 60 m for 3 dedicated atmospheric correction bands, 20 m for remaining bands Swath width: 290 km Accuracy: Absolute radiometric accuracy for Level 1C data: 3-5%
MSMR Multifrequency Scanning Microwave Radiometer ISRO	OCEANSAT-1	Operational	Imaging multi-spectral radiometers (passive microwave)	Sea surface temperature, ocean surface winds, cloud liquid water, precipitation over ocean	Waveband: Microwave: 6.6 GHz, 10.6 GHz, 18 GHz and 21 GHz Spatial resolution: 40 m at 21 GHz to 120 m at 6.6 GHz, Wind speed: 75 x 75 km, Sea surface temparature: 146 x 150 km Swath width: 1360 km Accuracy: Sea surface temparature: 1.5 K, Sea surface wind speed: 1.5 m/s
MSS Multispectral imaging system ROSKOSMOS (ROSHYDROMET)	Kanopus-V N1, Kanopus-V N2	Prototype	High resolution optical imagers	Multispectral images of land & sea surfaces and ice cover	Waveband: 0.5 - 0.6 µm; 0.6 - 0.7 µm; 0.7 - 0.8 µm; 0.8 - 0.9 µm Spatial resolution: 12 m Swath width: 20 km Accuracy:
MSS Multispectral Scanner USGS (NASA)	Landsat-5	Operational	Imaging multi-spectral radiometers (vis/IR)	Measures surface radiance. Data mostly used for land applications	Waveband: VIS - NIR: 4 bands: 0.5 - 1.1 µm Spatial resolution: VIS-NIR: 80 m Swath width: 185 km Accuracy:
MSU-200 Multispectral high resolution scanner (VIS) ROSKOSMOS (ROSHYDROMET)	Kanopus-V N1, Kanopus-V N2	Prototype	High resolution optical imagers	Multispectral images of land & sea surfaces and ice cover	Waveband: 0.54 - 0.86 µm Spatial resolution: 25 m Swath width: 250 km Accuracy:
MSU-GS Multispectral scanning imager-radiometer ROSHYDROMET (ROSKOSMOS)	Elektro-L N1, Elektro-L N2, Elektro-L N3	Prototype	Imaging multi-spectral radiometers (vis/IR)	Measurements of cloud cover, cloud top height, precipitation, cloud motion, albedo, vegetation, convection, air mass analysis, tropopause monitoring, stability monitoring, total ozone and surface temparature, fire detection	Waveband: VIS: 0.5 - 0.65 µm, 0.65 - 0.8 µm (broadband), NIR: 0.9 µm, MWIR: 3.5 - 4.01 µm, TIR: 5.7 - 7.0 µm, 8 µm, 8.7 µm, 9.7 µm, 10.2 - 11.2 µm, 11.2 - 12.5 µm Spatial resolution: 1 km for VIS and 4 km for IR channels Swath width: Full Earth disk Accuracy: VIS: 5%; IR: 0.35 K
MSU-MR Multispectral scanning imager-radiometer ROSHYDROMET (ROSKOSMOS)	Meteor-M N1, Meteor-M N2	Operational	Imaging multi-spectral radiometers (vis/IR)	Parameters of clouds, snow, ice and land cover, vegetation, surface temperature, fire detection	Waveband: VIS: 0.5 - 0.7 µm; NIR: 0.7 - 1.1 µm; SWIR: 1.6 - 1.8 µm; MWIR: 3.5 - 4.1 µm; TIR: 10.5 - 11.5 µm, 11.5 - 12.5 µm Spatial resolution: 1 km Swath width: 3000 km Accuracy: VIS: 0.5%; IR: 0.1-0.2K
MTSAT Comms Communications package for MTSAT JMA	MTSAT-1R, MTSAT-2	Operational	Communications		Waveband: Spatial resolution: Swath width: Accuracy:
MTSAT DCS Data Collection System for MTSAT JMA	MTSAT-1R, MTSAT-2	Operational	Communications		Waveband: Spatial resolution: Swath width: Accuracy:
MTVZA Scanning microwave imager-sounder ROSHYDROMET (ROSKOSMOS)	Meteor-M N1, Meteor-M N2	Operational	Imaging multi-spectral radiometers (passive microwave)	Atmospheric temperature and humidity profiles, precipitation, sea-level wind speed, snow/ice coverage	Waveband: 10.6 - 183.3 GHz, 26 channels Spatial resolution: 12 - 75 km Swath width: 2600 km Accuracy: 0.4 - 2.0 K depending on spectral band
Multi-band UV/VIS Spectrometer (ACE) NASA	ACE	Proposed	Ocean colour instruments	Ocean color spectrometer for measuring ocean leaving light which contains information on biological components	Waveband: Spatial resolution: Swath width: Accuracy:
Multi-beam LIDAR (Desdyni) NASA	DESDynI	Proposed	Lidars	Accurately measures the distance between canopy top and bottom elevation, the size distribution of vegetation components within the vertical distribution.	Waveband: Spatial resolution: 25m spatial resolution; 1m vertical resolution Swath width: 25m footprint, 30m spacing Accuracy: 10 tc/ha

Instrument & agency (& any partners)	Missions	Status	Type	Measurements & applications	Technical characteristics
Multi-spectral thermal infrared imager (HyspIRI) NASA	HyspIRI	Proposed	Imaging multi-spectral radiometers (vis/IR)	Ecosystem focused mission with measurements of surface and cloud imaging with high spatial resolution, stereoscopic observation of local topography, cloud heights, volcanic plumes, and generation of local surface digital elevation maps, surface temperature and emissivity.	Waveband: 3-5 µm, 7.5-12 µm Spatial resolution: 60 m at nadir; 1 week revisit time Swath width: 600 km Accuracy: 0.1 K, <.01 µm
MUX Multispectral CCD Camera INPE (CAST)	CBERS-3, CBERS-4	Prototype	Imaging multi-spectral radiometers (vis/IR)	Earth resources, environmental monitoring, land use	Waveband: 0.45 - 0.52 µm, 0.52 - 0.59 µm, 0.63 - 0.69 µm, 0.77 - 0.89 µm Spatial resolution: 20 m Swath width: 120 km Accuracy:
MVIRI METEOSAT Visible and Infra-Red Imager EUMETSAT (ESA)	Meteosat-6, Meteosat-7	Operational	Imaging multi-spectral radiometers (vis/IR)	Measures cloud cover, motion, height, upper tropospheric humidity and sea surface temperature	Waveband: VIS - NIR: 0.5 - 0.9 µm, TIR: 5.7 - 7.1 µm (water vapour), 10.5 - 12.5 µm Spatial resolution: Visible: 2.5 km, Water vapour: 5 km (after processing), TIR: 5 km Swath width: Full Earth disk in all three channels, every 30 minutes Accuracy: Cloud top height: 0.5 km, Cloud top/ sea surface temperature: 0.7 K, Cloud cover 15%
MVIRS Moderate Resolution Visible and Infrared Imaging Spectroradiometer NRSCC (CAST)	FY-3F, FY-3G	Approved	Imaging multi-spectral radiometers (vis/IR)	Measures surface temparature and cloud and ice cover. Used for snow and flood monitoring and surface temperature	Waveband: VIS - TIR: 0.47 - 12.5 µm (20 channels) Spatial resolution: Swath width: Accuracy:
MVISR (10 channels) Multispectral Visible and Infra-red Scan Radiometer (10 channels) NRSCC (CAST)	FY-1D	Operational	Imaging multi-spectral radiometers (vis/IR)	To provide multispectral analysis of hydrological, oceanographic, land use and meteorological parameters. Global imager & SST. Ocean colour	Waveband: 10 channels: VIS: 0.43 - 0.48 µm, 0.48 - 0.53 µm, 0.53 - 0.58 µm, 0.58 - 0.68 µm, NIR: 0.84 - 0.89 µm, NIR - SWIR: 0.90 - 0.965µm, 1.58 - 1.68 µm, 3.55 - 3.93 µm, TIR: 10.3 - 11.3 µm, 11.5 - 12.5 µm Spatial resolution: 1.1 km Swath width: 3200 km Accuracy: 1.1km
MWAS MicroWave Atmospheric Sounder NRSCC (CAST)	FY-3A, FY-3B	Operational	Atmospheric temperature and humidity sounders	Meteorological applications	Waveband: Microwave: 19.35 - 89.0 GHz (8 channels) Spatial resolution: Swath width: Accuracy:
MWHS MicroWave Humidity Sounder NRSCC (CAST)	FY-3A, FY-3B, FY-3C, FY-3D, FY-3E, FY-3F, FY-3G	Operational	Atmospheric temperature and humidity sounders	Meteorological applications	Waveband: Microwave: 19.35 - 89.0 GHz (8 channels) Spatial resolution: 15 km at media, 41 x 27 km at outer edge Swath width: 2700 km Accuracy: 15 km
MWR MicroWave Radiometer CONAE	SAC-D/Aquarius	Being developed	Multiple direction/polarisation radiometers	Precipitation rate, wind speed, sea ice concentration, water vapour, clouds liquid water	Waveband: (K Band) 23.8 GHz V Pol and 36.5 GHz H and V Pol Eight beams per frequency Spatial resolution: <54 km Swath width: 380 km Accuracy: .1 K
MWR Microwave Radiometer ESA	Envisat, ERS-2	Operational	Imaging multi-spectral radiometers (passive microwave) and atmospheric temperature and humidity sounders	To provide multispectral analysis of hydrological, oceanographic, land use and meteorological parameters. Global imager & SST. Ocean colour	Waveband: Microwave: 23.8 GHz and 36.5 GHz Spatial resolution: 20 km Swath width: 20 km Accuracy: Temparature: 2.6 K
MWRI MicroWave Radiation Imager NRSCC (CAST)	FY-3A, FY-3B, FY-3C, FY-3D, FY-3E, FY-3F, FY-3G	Operational	Imaging multi-spectral radiometers (passive microwave)	All weather observations of precipitation, cloud features, vegetation, soil moinsture, sea ice, etc.	Waveband: 12 channels, 6 frequencies: 10.65 GHz, 18.7 GHz, 23.8 GHz, 36.5 GHz, 89 GHz, 150 GHz Spatial resolution: 7.5 x 12 km at 150 GHz to 51 x 85 km at 10.65 GHz Swath width: 1400 km Accuracy:
MWTS Microwave Temperature Sounder NRSCC	FY-3A, FY-3B, FY-3C, FY-3D, FY-3E, FY-3F, FY-3G	Operational	Atmospheric temperature and humidity sounders	Temperature sounding in nearly all weather conditions	Waveband: 50.3 GHz, 53.6 GHz, 54.94 GHz, 57.29 GHz Spatial resolution: 62 km Swath width: 750-1125km Accuracy: 50-75Km
MxT Multi-spectral CCD Camera ISRO	IMS-1	Operational	Imaging multi-spectral radiometers (vis/IR)	Natural resources management	Waveband: VIS: Band 1: 0.45 - 0.52 µm, Band 2: 0.52 - 0.59 µm, Band 3: 0.62 - 0.68 µm, NIR: Band 4: 0.77 - 0.86 µm Spatial resolution: 37 m Swath width: 151 km Accuracy:
Next Gen APS (ACE) NASA	ACE, PACE	Proposed	Multiple direction/polarisation radiometers	Polarimeter for measuring aerosol optical properties and aerosol types	Waveband: Spatial resolution: Swath width: Accuracy:
NigeriaSat Medium and High Resolution NigeriaSat Remote Sensing (Medium and High Resolution) NASRDA	NigeriaSat-2	Approved	High resolution optical imagers	High resolution images for monitoring of land surface and coastal processes and for agricultural, geological and hydrological applications	Waveband: NIR: ~0.75 µm - ~1.3 µm,VIS: ~0.40 µm - ~0.75 µm Spatial resolution: 2.5 PAN, 5m multispectral (red blue green,NIR), 32 m multispectral (red, green, NIR) Swath width: 20 x 20 km , 300 x 300 km Accuracy: 35-45m
NigeriaSat Medium Resolution NigeriaSat Remote Sensing (medium resolution) NASRDA	NigeriaSat-1	Operational	Imaging multi-spectral radiometers (vis/IR)	Medium resolution images for monitoring of land surface and coastal processes and for agricultural, geological and hydrological applications	Waveband: NIR: ~0.75 µm - ~1.3 µm,VIS: ~0.40 µm - ~0.75 µm Spatial resolution: 32 m multispectral (red, green, NIR) Swath width: 600 x 600 km Accuracy: 150 - 300 m
NigeriaSat Medium Resolution NigeriaSat Remote Sensing (Medium Resolution) NASRDA	NigeriaSat-X	Approved	Imaging multi-spectral radiometers (vis/IR)	High resolution images for monitoring of land surface and coastal processes and for agricultural, geological and hydrological applications	Waveband: NIR: ~0.75 µm - ~1.3 µm,VIS: ~0.40 µm - ~0.75 µm Spatial resolution: 22 meter mulispectral (red, green and NIR) Swath width: 600 x 600 km Accuracy: 150-300m

Instrument & agency (& any partners)	Missions	Status	Type	Measurements & applications	Technical characteristics
NIRST New Infrared Sensor Technology CONAE (CSA)	SAC-D/Aquarius	Being developed	Imaging multi-spectral radiometers (vis/IR)	NIRST detects High Temperature Events (HTE), caused by biomass fires, volcanic eruptions, and other phenomena in order to measure their temperatures, and their released energy over land (fires & volcanic events). Supplementary measurements of land surface (LST) and sea surface temperatures (SST) of the coasts of South America and other targets of opportunity with 180 km swath, overlapping the Aquarius inner beams	Waveband: Infrared push-broom scanner based on 2 linear uncooled microbolometric arrays sensitive to Mid-Wave Infra-Red (3.8 µm) and Long-Wave Infra-Red (10.85 and 11.85 µm) spectral bands respectively Spatial resolution: Space resol: 350 m; less burned area detectable: 200 sqm Swath width: Instant: 182 km; Extended: 1000 km Accuracy: 0.6 ºC
NOAA Comms Communications package for NOAA NOAA	NOAA-15, NOAA-16, NOAA-17, NOAA-18, NOAA-19	Operational	Communications		Waveband: Spatial resolution: Swath width: Accuracy:
Occultation GNSS Receiver (CLARREO) NASA	CLARREO	Proposed	Earth radiation budget radiometers	Independent measurements of atmospheric temperature, pressure, and humidity using Global Positioning System (GPS) occultation measurements of atmospheric refraction.	Waveband: IR:200 - 2000 cm-1; UV,VIS, and near IR: 380 to 2500nm Spatial resolution: Spectral resolution in the UV, VIS, and near IR of 15 nm; in the IR of 1cm-1 Swath width: VIS: 1km IFOV over 100km swath; 100km FOV Accuracy: .1K
OCM Ocean Colour Monitor ISRO	OCEANSAT-1, OCEANSAT-2	Operational	Ocean colour instruments	Ocean colour data, Estimation of phytoplankton concentration, identification of potential fishing zones, assessment of primary productivity	Waveband: VIS - NIR: 0.40 - 0.88 µm (8 channels) Spatial resolution: 236 x 360m Swath width: 1440 km Accuracy:
OCM (OCEANSAT-3) Ocean Colour Monitor (OCEANSAT-3) ISRO	OCEANSAT-3	Proposed	Ocean colour instruments	Ocean colour data, Estimation of phytoplankton concentration, identification of potential fishing zones, assessment of primary productivity	Waveband: 12 channel Spatial resolution: Swath width: Accuracy:
OCS Ocean colour scanner ROSHYDROMET (ROSKOSMOS)	Meteor-M N3	Being developed	Ocean colour instruments	Ocean color data, estimation of phytoplankton concentration	Waveband: 0.41 - 0.9 µm, 8 channels Spatial resolution: 1 km Swath width: 3000 km Accuracy: TBD
OES Ocean Ecosystem Spectrometer NASA	PACE	Proposed	Ocean colour instruments	Ocean color spectrometer for measuring ocean leaving light which contains information on biological components	Waveband: Near UV-Vis (360-710nm); NIR (748-865nm); SWIR (1245, 1640, 2135 nm) Spatial resolution: 1 km Swath width: 2500 km swath Accuracy:
OLCI Ocean and Land Colour Imager ESA (EC)	Sentinel-3 A, Sentinel-3 B, Sentinel-3 C	Approved	Imaging multi-spectral radiometers (passive microwave)	Marine and land services	Waveband: 21 bands in VNIR/SWIR Spatial resolution: 300 m Swath width: 1270 km, across-track tilt 12.2 deg to the West Accuracy: 2% abs, 0.1% rel.
OLI Operational Land Imager NASA (USGS)	LDCM	Being developed	Imaging multi-spectral radiometers (vis/IR)	Measures surface radiance and emittance, land cover state and change (eg vegetation type). Used as multi-purpose imagery for land applications	Waveband: VIS - SWIR: 9 bands: 0.43 - 2.3 µm Spatial resolution: Pan: 15 m, VIS - SWIR: 30 m Swath width: 185 km Accuracy: Absolute geodetic accuracy of 65 m; relative geodetic accuracy of 25 m (excluding terrain effects); geometric accuracy of 12 m or better
OLS Operational Linescan System NOAA (DoD (USA))	DMSP F-14, DMSP F-15, DMSP F-16, DMSP F-17, DMSP F-18, DMSP F-19, DMSP F-20	Operational	Imaging multi-spectral radiometers (vis/IR)	Day and night cloud cover imagery	Waveband: VIS - NIR: 0.4 - 1.1 µm, TIR: 10.0 - 13.4 µm, and 0.47 - 0.95 µm Spatial resolution: 0.56 km (fine), 5.4 km (stereo products) Swath width: 3000 km Accuracy:
OMI Ozone Measuring Instrument NSO (NASA)	Aura	Operational	Atmospheric chemistry	Mapping of ozone columns, key air quality components (NO2, SO2, BrO, OClO and aerosols), measurements of cloud pressure and coverage, global distribution and trends in UV-B radiation	Waveband: UV: 270 - 314 nm and 306 - 380 nm, VIS: 350 - 500 nm Spatial resolution: 13 x 24 km or 36 x 48 km depending on the product. Also has zoom modes (13 x 13 km) for example for urban pollution detection Swath width: 2600 km Accuracy:
OMPS Ozone Mapping and Profiler Suite NOAA	JPSS-1, JPSS-2, NPP	Being developed	Atmospheric chemistry	Measures total amount of ozone in the atmosphere and the ozone concentration variation with altitude	Waveband: Nadir Mapper: UV 0.3 - 0.38 µm, Nadir profiler: UV 0.25 - 0.31 µm, Limb soundings: UV - TIR 0.29 - 10 µm Spatial resolution: Mapper: 50 km, Profiler: 250 km, Limb: 1 km vertical Swath width: Mapper: 2800 km, Profiler: 250 km, Limb: 3 vertical slits along track +/- 250 km Accuracy: Total Ozone 15 Dobson units. Profile Ozone 10% between 15 and 60 km; 20% between Tropopause and 15 km
Optical or HyperSpectral (TBD) JAXA	ALOS-3	Proposed	TBD		Waveband: Spatial resolution: Swath width: Accuracy:
OSIRIS Optical Spectrograph and Infra-Red Imaging System CSA (SNSB)	Odin	Operational	Atmospheric chemistry	Detects aerosol layers and abundance of species such as O3, NO2, OClO, and NO. Consists of spectrograph and IR imager. Measures temperature for altitudes above 30km.	Waveband: Spectrograph: UV - NIR: 0.28 - 0.80 µm; IR Imager: NIR: 1.26 µm, 1.27 µm, 1.52 µm Spatial resolution: Spectrograph 1 km at limb, Imager 1 km in vertical Swath width: N/A, but measures in the altitude range 5 - 100 km Accuracy: Depends on species
Overhauser Magnetometer OM CNES	Ørsted (Oersted)	Operational	Magnetic field	Measurements of the strength of the Earth's magnetic field	Waveband: Spatial resolution: Swath width: Accuracy:
PALSAR Phased Array type L-band Synthetic Aperture Radar JAXA (METI)	ALOS	Operational	Imaging microwave radars	High resolution microwave imaging of land and ice for use in environmental monitoring, agriculture and forestry, disaster monitoring, Earth resource management and interferometry	Waveband: Microwave: L-Band 1270 MHz Spatial resolution: (depending on looks, incident angle and bandwidth) Hi-res: 7 - 44 m or 14 - 88 m, ScanSAR mode: 35 - 77 m or 70 - 154 m, Polarimetry: 24 - 88 m Swath width: High resolution mode: 70 km, Scan SAR mode: 250 - 360 km, Polarimetry: 30 km Accuracy: Surface Resolution:10 m (Fine Mode); Surface Resolution:100 m (Scan Mode); Radiometric: ±1 dB

Instrument & agency (& any partners)	Missions	Status	Type	Measurements & applications	Technical characteristics
Pamela ROSKOSMOS	Resurs DK 1, Resurs P N1, Resurs P N2	Operational	Space environment	Cosmic ray research	Waveband: Spatial resolution: Swath width: Accuracy:
PAN Panchromatic and multispectral imager CAST (INPE)	CBERS-3, CBERS-4	Prototype	High resolution optical imagers	Earth resources, environmental monitoring, land use, urban studies	Waveband: 0.52 - 0.59 µm, 0.63 - 0.69 µm, 0.77 - 0.89 µm, 0.51 - 0.85 µm Spatial resolution: 5 m panchromatic and 10 m multispectral Swath width: 60 km Accuracy:
PAN (BJ-1) Panchromatic Imager NRSCC (CAST)	BJ-1	Operational	High resolution optical imagers	To provide panchromatica analysis of hydrological, oceanographic, land use and meteorological parameters.	Waveband: 500 - 800 nm Spatial resolution: 4 m Swath width: 24 km Accuracy: 100 m
PAN (Cartosat-1) Panchromatic sensor ISRO	CARTOSAT-1	Operational	High resolution optical imagers	High resolution stereo images for study of topography, urban areas, development of DTM, run-off models etc. Urban sprawl, forest cover/timber volume, land use change	Waveband: Panchromatic VIS: 0.5 - 0.75 µm Spatial resolution: 2.5 m Swath width: 30 km Accuracy:
PAN (Cartosat-2) Panchromatic Camera ISRO	CARTOSAT-2	Operational	High resolution optical imagers	High resolution stereo images for large scale (better than 1:0000) mapping applications, urban applications, GIS ingest	Waveband: VIS: 0.5 - 0.75 µm Spatial resolution: 1 m Swath width: 10 km Accuracy:
PAN (Cartosat-2B) Panchromatic Camera ISRO	CARTOSAT-2B	Operational	High resolution optical imagers	High resolution stereo images for large scale (better than 1:0000) mapping applications, urban applications, GIS ingest	Waveband: VIS: 0.5 - 0.75 µm Spatial resolution: 1 m Swath width: 10 km Accuracy:
PAN (GISTDA) Panchromatic imager GISTDA	THEOS	Operational	High resolution optical imagers	THEOS PAN is an optical instrument with resolution 2 m and swath width at 22 km. It can be used in several applications such as cartography, land use planning and management, national security, etc.	Waveband: 0.45 - 0.90 µm Spatial resolution: 2 m Swath width: 22 km Accuracy: GSD for PAN = 2 m +/- 10% MTF for PAN > 0.10
PAN CAM Panchromatic Camera ASI	MIOSAT	Being developed	High resolution optical imagers	Pancromatic data	Waveband: 400-900 nm Spatial resolution: 2 x 2 m - 10 x 10 km Swath width: 10 km Accuracy:
PAN CAMERA Pancromatic camera ASI	PRISMA	Approved	High resolution optical imagers	Pancromatic data	Waveband: PAN CAM: 400-750 nm Spatial resolution: 5 m Swath width: 30 km Accuracy:
PAN+MS (RGB+NIR) Ingenio PAN+MS (RGB+NIR) CDTI (ESA)	Ingenio	Being developed	High resolution optical imagers	High resolution multi–spectral land optical images for applications in cartography, land use, urban management, water management, environmental monitoring, risk management and security.	Waveband: VIS+NIR band: 450 - 680 nm, 450 - 520 nm, 520 - 600 nm, 630 - 690 nm, 760 - 900 nm Spatial resolution: PAN: 2.5 m, MS: 10 m Swath width: Swath will move between 55 and 60 Km depending on latitude. Accuracy: SNR: 100 in PAN and 120 in MS. Geo-location < 25m at level 1b (2σ).
Panchromatic High Sensitivity Camera CONAE	SARE-1	TBD	Imaging multi-spectral radiometers (vis/IR)		Waveband: Spatial resolution: Swath width: Accuracy:
Paz SAR-X X Band Synthetic Aperture Radar CDTI	PAZ	Being developed	Imaging microwave radars	High resolution x-band radar for security, land use, urban management, environmental monitoring, risk management. Different acquisition modes: Spotlight (5x5-10 km SSD =<1m), Scansar (100 x100 km, SSD <=15m); Stripmode(strips of 30x30km with SSD 3 m)	Waveband: The Radar will use a frequency close to 9.65 GHz Spatial resolution: Resoluction will move between <1m and 15 m depending on acquisition modes Swath width: Swath will vary according to the acquisition mode: 5x5 km to 100 km x 100 km . Accuracy: "Pixel Localization: 1,1 m to 8.5 m (1σ) depending of the mode.
PCWMP PCW Meteorological Payload (1 on each PCW S/C) CSA	PCW-1, PCW-2	Proposed	Imaging multi-spectral radiometers (vis/IR)	Continuous high-temporal resolution measurements of atmospheric properties over the Arctic. Associated observations, using additional instruments include in situ space weather and also broadband radiometry of Earth.	Waveband: Multiple bands, non-continuous, from 0.45 µm to 14.5 µm Spatial resolution: Band dependent, varies from 0.5 km GSD (goal) for some of the VNIR bands to 2 km GSD for TIR bands. Swath width: Field of Regard for each full acquisition is the entire Earth disc Accuracy: Cal/Val requirements currently being developed
PMR Passive Microwave Radiometer ISRO	OCEANSAT-3	Being developed	Imaging multi-spectral radiometers (passive microwave)	Mainly for ocean biology and sea state applications including SWH, geoid etc., establishment of global databases, meteorological applications	Waveband: 18 GHz, 21 GHz, 37 GHz Spatial resolution: 20 km, 17 km, 10 km Swath width: 1500 km Accuracy:
POLDER-P POLarization and Directionality of the Earth's Reflectances (PARASOL version) CNES	PARASOL	Operational	Multiple direction/polarisation radiometers	Measures polarisation, and directional and spectral characteristics of the solar light reflected by aerosols, clouds, oceans and land surfaces	Waveband: VIS - NIR: 0.490 µm, 0.670 µm and 0.865 µm at 3 polarisations, and 0.49 µm, 0.565 µm, 0.763 µm, 0.765 µm, 0.91 µm, and 1.02 µm with no polarisation Spatial resolution: 5.5 x 5.5 km Swath width: 1600 km Accuracy: Radiation budget, land surface, Reflectance: 2%
POSEIDON-2 (SSALT-2) Positioning Ocean Solid Earth Ice Dynamics Orbiting Navigator (Single frequency solid state radar altimeter) CNES	Jason	Operational	Radar altimeters	Nadir viewing sounding radar for provision of real-time high precision sea surface topography, ocean circulation and wave height data	Waveband: Microwave: Ku-band (13.575 GHz), C-band (5.3 GHz) Spatial resolution: Basic measurement: 1/sec (6 km along track), Raw measurement: 10/sec (600 m along track) Swath width: On baseline TOPEX/POSEIDON orbit (10 day cycle): 300 km between tracks at equator Accuracy: Sea level: 3.9 cm, Significant waveheight: 0.5 m, Horizontal sea surface wind speed: 2 m/s
POSEIDON-3 Positioning Ocean Solid Earth Ice Dynamics Orbiting Navigator (Single frequency solid state radar altimeter) CNES	OSTM (Jason-2)	Operational	Radar altimeters	Nadir viewing sounding radar for provision of real-time high precision sea surface topography, ocean circulation and wave height data	Waveband: Microwave: Ku-band (13.575 GHz), C-band (5.3 GHz) Spatial resolution: Basic measurement: 1/sec (6 km along track), Raw measurement: 10/sec (600 m along track) Swath width: On baseline TOPEX/POSEIDON orbit (10 day cycle): 300 km between tracks at equator Accuracy: Sea level: 3.9 cm, Significant waveheight: 0.5 m, Horizontal sea surface wind speed: 2 m/s

Instrument & agency (& any partners)	Missions	Status	Type	Measurements & applications	Technical characteristics
PR Precipitation Radar JAXA (NASA)	TRMM	Operational	Cloud profile and rain radars	Measures precipitation rate in tropical latitudes	Waveband: Microwave: 13.796 GHz and 13.802 GHz Spatial resolution: Range resolution: 250 m Horizontal resolution: 4.3 km at nadir (post-boost:5km) Swath width: 215 km (post-boost: 245 km) Observable range: from surface to approx 15 km altitude Accuracy: Rainfall rate 0.7 mm/h at storm top
PREMOS PREcision Monitoring of Solar Variability CNES	PICARD	Being developed	Earth radiation budget radiometers	Solar UV and visible flux in selected wavelength bands.	Waveband: UV: 230 nm, 311 nm, 402 nm; VIS: 548 nm Spatial resolution: Swath width: Accuracy:
PRISM Panchromatic Remote-sensing Instrument for Stereo Mapping JAXA	ALOS	Operational	High resolution optical imagers	High resolution panchromatic stereo imager for land applications which include cartography, digital terrain models, civil planning, agriculture and forestry	Waveband: VIS - NIR: 0.52 - 0.77 µm (panchromatic) Spatial resolution: 2.5 m Swath width: 35 km (triplet stereo observations), 70 km (nadir observations+35 km backward) Accuracy: Surface Resolution:2.5 m Radiometric: 3%RMS
PSA Panchromatic imaging system ROSKOSMOS	Monitor-E	Operational	Imaging multi-spectral radiometers (vis/IR)	Earth surface monitoring	Waveband: VIS - NIR: 0.51 - 0.85 µm Spatial resolution: 8 m Swath width: 90/780 km Accuracy:
PSS Panchromatic imaging system ROSKOSMOS (ROSHYDROMET)	Kanopus-V N1, Kanopus-V N2	Prototype	High resolution optical imagers	Panchromatic data for environmental monitoring, agriculture and forestry	Waveband: 0.5 - 0.8 µm Spatial resolution: 2.5 m Swath width: 20 km Accuracy:
RA Radar Altimeter ESA	ERS-2	Operational	Radar altimeters	Measures wind speed, significant wave height, sea surface elevation, ice profile, land and ice topography,and sea ice boundaries	Waveband: Microwave: Ku-band: 13.8 GHz Spatial resolution: Footprint is 16 - 20 km Swath width: Accuracy: Wave height: 0.5 m or 10% (whichever is smaller) Sea surface elevation: better than 10 cm
RA-2 Radar Altimeter - 2 ESA	Envisat	Operational	Radar altimeters	Measures wind speed, significant wave height, sea surface elevation, ice profile, land and ice topography, and sea ice boundaries	Waveband: Microwave: 13.575 GHz (Ku-Band) and 3.2 GHz (S-Band) Spatial resolution: Swath width: Accuracy: Altitude: better than 4.5 cm, Wave height: better than 5% or 0.25 m
Radiomet Radio-occultation receiver ROSHYDROMET (ROSKOSMOS)	Meteor-M N3	Approved	Atmospheric temperature and humidity sounders	Atmospheric temperature and humidity profiles with high vertical resolution	Waveband: Spatial resolution: Swath width: Accuracy:
RADIOMETRO Scanning Radiometer INPE	GPM-Br	Proposed	Imaging multi-spectral radiometers (passive microwave)	Precipitation estimation	Waveband: 18-20 GHz, 21-24 GHz, 35-37 GHz, 85-89 GHz Spatial resolution: 26 / 15 / 10 / 6 Swath width: 1000 km Accuracy:
RASAT VIS Multispectral RASAT VIS Multispectral camera TUBITAK	RASAT	Being developed	Imaging multi-spectral radiometers (vis/IR)	High resolution images for monitoring of land surface and coastal processes and for agricultural, geological and hydrological applications	Waveband: Band 1: 0.42 - 0.55 µm, Band 2: 0.55 - 0.63 µm, Band 3: 0.58 - 0.73 µm Spatial resolution: 15 m Swath width: 30 km Accuracy:
RASAT VIS Panchromatic RASAR VIS Panchromatic camera TUBITAK	RASAT	Being developed	Imaging multi-spectral radiometers (vis/IR)	High resolution images for monitoring of land surface and coastal processes and for agricultural, geological and hydrological applications	Waveband: 0.42 - 0.73 µm Spatial resolution: 7.5 m Swath width: 30 km Accuracy:
RDSA Multispectral Imager ROSKOSMOS	Monitor-E	Operational	Imaging multi-spectral radiometers (vis/IR)	Multispectral Earth surface monitoring	Waveband: VIS - NIR: 0.54 - 0.59 µm, 0.63 - 0.68 µm, 0.79 - 0.9 µm Spatial resolution: 20/40 m Swath width: 160/890 km Accuracy:
ROSA Radio Occultation Sensor for Atmosphere ISRO	MEGHA-TROPIQUES	Being developed	Other	Enables measurement of water vapour and temperature profiles in the tropics	Waveband: Spatial resolution: Swath width: Accuracy:
ROSA Radio Occultation Sounder for the Atmosphere ASI (CONAE)	SAC-D/Aquarius	Approved	Atmospheric temperature and humidity sounders and precision orbit	Climate change studies. High-vertical resolution temperature-humidity sounding for NWP. Space weather	Waveband: Around 1600 MHz (L1) and 1200 GHz (L2). Spatial resolution: 300 km (horizontal), 0.5 km (vertical). Swath width: N/A (occultation); about 650 soundings/day. Accuracy: Bending angle: 0.5 µ rad
ROSA Radio Occultation Sounder for the Atmosphere ASI (ISRO)	OCEANSAT-2	Operational	Atmospheric temperature and humidity sounders and precision orbit	Climate change studies. High-vertical resolution temperature-humidity sounding for NWP. Space weather	Waveband: Around 1600 MHz (L1) and 1200 GHz (L2). Spatial resolution: 300 km (horizontal), 0.5 km (vertical). Swath width: N/A (occultation); about 300 soundings/day. Accuracy: Bending angle: 0.5 µ rad
RRA Retroreflector Array CNES	Diademe 1&2	Operational	Precision orbit	Satellite laser ranging for geodynamic measurements	Waveband: Spatial resolution: Swath width: Accuracy:
S-Band SAR S-Band Synthetic Aperture Radar CAST	HJ-1C	Being developed	Imaging microwave radars	Radar measurements for natural and disaster monitoring	Waveband: S-Band SAR Spatial resolution: 20 m (4 looks) Swath width: 100 km Accuracy: 3 dB
S&R Search and Rescue ROSKOSMOS	Elektro-L N1, Elektro-L N2, Elektro-L N3	Being developed	Other	For emergency calls	Waveband: Spatial resolution: Swath width: Accuracy:
S&R (GOES) Search and Rescue NOAA	GOES-11, GOES-12, GOES-13, GOES-14, GOES-15	Operational	Other	Satellite and ground based system to detect and locate aviators, mariners, and land-based users in distress.	Waveband: Spatial resolution: Swath width: Accuracy:

Instrument & agency (& any partners)	Missions	Status	Type	Measurements & applications	Technical characteristics
S&R (NOAA) Search and Rescue Satellite Aided Tracking NOAA	Metop-A, Metop-B, NOAA-15, NOAA-16, NOAA-17, NOAA-18, NOAA-19	Operational	Other	Satellite and ground based system to detect and locate aviators, mariners, and land-based users in distress.	Waveband: Spatial resolution: Swath width: Accuracy:
SAGE-III Stratospheric Aerosol and Gas Experiment NASA	SAGE-III	Being developed	Atmospheric chemistry	Limb-viewing measurements of aerosols, O3, OClO, N2O NO3, H2O, temperature and pressure in the straosphere and mesophere	Waveband: Nine spectral regions between 290 - 1550 nm Spatial resolution: 1-2 km vertical Swath width: N/A Accuracy: Aerosol profile: 5%, H20: 10 - 15%; NO2: 10-15%; NO3: 10%; O3: 5%; OClO: 25%; Pressure: 2%; Temperature Profile; 2K
SAPHIR Sondeur Atmospherique du Profil'd'Humidite Intertropicale par Radiometrie CNES	MEGHA-TROPIQUES	Being developed	Atmospheric temperature and humidity sounders	Cross-track sounder with the objective of measuring water vapour profiles in the troposphere in six layers from 2-12km altitudes.	Waveband: Microwave: 183.3 GHz (6 channels) Spatial resolution: 10 km Swath width: 2200 km Accuracy:
SAR Synthetic Aperture Radar X band ROSHYDROMET (ROSKOSMOS)	Meteor-M N3	Being developed	Imaging microwave radars	High resolution microwave radar images for ice watch	Waveband: X-Band Spatial resolution: 1 m, 5 m, 50 m, 200 m, 500 m Swath width: 10 km, 50 km, 130 km, 600 km, 750 km Accuracy: 1 dB
SAR (MAPSAR) Synthetic Aperture Radar (MAPSAR) INPE	MAPSAR	Proposed	Imaging microwave radars	Multi-Application Purpose Radar	Waveband: Spatial resolution: Swath width: Accuracy:
SAR (RADARSAT-2) Synthetic Aperture Radar (CSA) C band CSA	RADARSAT-2	Operational	Imaging microwave radars	All-weather images of ocean, ice and land surfaces. Used for monitoring of coastal zones, polar ice, sea ice, sea state, geological features, vegetation and land surface processes	Waveband: Microwave: C band 5.405 GHz. HH, VV, HV, VH polarization - includes Quad polarization imaging modes. Spatial resolution: Standard: 27-18 x 25 m (4 looks); Wide: 40-19 x 25 m (4 looks); Fine: 10-7 x 8 m (1 look); ScanSAR (N/W): 80-38 x 60 m / 160-172 x 100 m (4/8 looks); Extended (H/L): 18-16 x 25 m / 60-23 x 25 m (4 looks); Ultra-Fine: 4.6-2.1 x 2.8 m (1 look); Fine Quad-Pol: 14-8 x 8 m (1 look); Standard Quad-Pol: 24-17 x 8 m (1 look); Multi-Look Fine: 10-7 x 8 m (4 looks); Spotlight: 4.6-2.1 x 0.8 m (1 look). Swath width: Standard: 100 km (inc.: 20-49deg); Wide: 150 km (inc.: 20-45deg); Fine: 50 km (inc.: 30-50deg); ScanSAR (N/W): 300/500 km (inc.: 20-46 / 20-49deg); Extended (H/L): 75/170 km (inc.: 49-60 / 10-23deg); Ultra-Fine: 20 km (inc.: 20-49deg); Quad-Pol (Standard and Fine): 25 km (inc.: 20-41deg); Multi-Look Fine: 50 km (inc.: 30-50deg). Left- and right-looking capability. Accuracy: Relative Radiometric Accuracy (within a 100km scene): <1 dB
SAR (RADARSAT) Synthetic Aperture Radar (CSA) C band CSA	RADARSAT-1	Operational	Imaging microwave radars	All-weather images of ocean, ice and land surfaces. Used for monitoring of coastal zones, polar ice, sea ice, sea state, geological features, vegetation and land surface processes	Waveband: Microwave: C band 5.3 GHz, HH polarization. Spatial resolution: Nominal resolutions: Standard: 30m (4 looks); Wide: 30m (4 looks); Fine: 8m (1 look); ScanSAR (N/W): 50m / 100m (4/8 looks); Extended (H/L): 18-27m / 30m (4/4 looks). Swath width: Standard: 100 km (inc.: 20-49deg); Wide: 150 km (inc.: 20-45deg), Fine: 45 km (inc.: 37-47deg); ScanSAR (N/W): 300/500 km (inc.: 20-49deg); Extended (H/L): 75/170 km (inc.: 52-58 / 10-22deg). Accuracy: Geometric distortion: < 40 m Relative Radiometric Accuracy (within a 100km scene): <1 dB
SAR (RCM) Synthetic Aperture Radar (CSA) C band CSA	RADARSAT C-1, RADARSAT C-2, RADARSAT C-3	Being developed	Imaging microwave radars	All-weather, C-band data to support ecosystem monitoring, maritime surveillance and disaster management.	Waveband: Microwave: C band 5.405 GHz: HH, VV, HV, VH polarization - includes Quad polarization imaging mode and compact polarimetry. Spatial resolution: Low Resolution 100m: 100 x 100m (8 looks); Medium Resolution 50m: 50 x 50m (4 looks); Medium Resolution 16m: 16 x 16m (4 looks); Medium Resolution 30m: 30 x 30m (4 looks); High-Resolution 5m: 5 x 5m (1 look); Very High Resolution 3m: 3(@35deg) x 3m (1 look); Spotlight: 3(@35deg) x 1m (1 look); Low Noise: 100 x 100m (8 looks); Ship Detection: Variable. Swath width: Low Resolution 100m: 500 km; Medium Resolution 50m: 350 km; Medium Resolution 16m: 30 km; Medium Resolution 30m: 125 km; High-Resolution 5m: 30 km; Very High Resolution 3m: 20 km; Low Noise: 350 km; Ship Detection: 350 km. Accuracy: Absolute Radiometric Accuracy: +/- 1.0 dB Scansar discontinuities: 0.2 dB
SAR (RISAT) Synthetic Aperature Radiometer (RISAT) ISRO	RISAT-1	Being developed	Imaging microwave radars	Radar backscatter measurements of land, water and ocean surfaces for applications in soil moisture, crop applications (under cloud cover), terrain mapping etc	Waveband: C-Band (5.350 Ghz) Spatial resolution: 3-6 m (FRS-1), 9-12 m (FRS-2), 25/50 m (MRS/CRS) Swath width: 30 km (HRS), 30 km (FRS-1/FRS-2), 120/240 km (MRS/CRS) Accuracy:
SAR 2000 Synthetic Aperture Radar - 2000 ASI (MiD (Italy))	COSMO-SkyMed 1, COSMO-SkyMed 2, COSMO-SkyMed 3, COSMO-SkyMed 4	Operational	Imaging microwave radars	All-weather images of ocean, land and ice for monitoring of land surface processes, ice, environmental monitoring, risk management, environmental resources, maritime management, Earth topographic mapping.	Waveband: Microwave: X-band, 9.6 GHz, with choice of 5 polarisation modes (VV, HH, HV, VH, HH/HV + VV/VH) Spatial resolution: Single polarisation modes; Spotlight: 1 m. Stripmap: 3-15 m, ScanSAR: 30 or 100 m. Two polarisation mode (PING-PONG): 15 m. Swath width: Single polarisation modes: Spotlight: 10 km. Stripmap;40 km. ScanSAR: 100 or 200 m - Two polarisation mode (PING-PONG): 30 km. Accuracy:

Instrument & agency (& any partners)	Missions	Status	Type	Measurements & applications	Technical characteristics
SAR components testing CONAE	SARE-1	TBD	TBD		Waveband: Spatial resolution: Swath width: Accuracy:
SAR-2000 S.G. SAR-2000 Second Generation ASI (MiD (Italy))	CSG-1, CSG-2	Being developed	Imaging microwave radars	All-weather images of ocean, land and ice for monitoring of land surface processes, ice, environmental monitoring, risk management, environmental resources, maritime management, Earth topographic mapping.	Waveband: Microwave: X-band, single- and dual-polarization Spatial resolution: Single polarisation modes: Spotlight: < 1 m. Stripmap: 2 or 4 km. ScanSAR: 4x15 or 6x25 or 9x35 km. Two polarisation mode (PING-PONG): TBD Swath width: Single polarisation modes: Spotlight: 10 km. Stripmap 40 or 60 km. ScanSAR 100 or 200 or 320 km. Two polarisation mode (PING-PONG): TBD Accuracy: N/A
SAR-L L-Band Synthetic Aperture Radar CONAE	SAOCOM 1A, SAOCOM 1B, SAOCOM-2A, SAOCOM-2B	Being developed	Imaging microwave radars	Land, ocean, emergencies, soil moisture, interferometry, others	Waveband: L-band (1.275 GHz) Spatial resolution: 10 x 10 m – 100 x 100 m Swath width: 20 – 350 km Accuracy: 0.5 dB
SAR-L Synthetic Aperture Radiometer (L band) ISRO	RISAT-1F, RISAT-3L	Proposed	Imaging multi-spectral radiometers (passive microwave)	Studies related to soil moisture and ocean salinity	Waveband: L Band Spatial resolution: Swath width: Accuracy:
SAR-X Synthetic Aperature Radiometer (RISAT-2) ISRO	RISAT-2, RISAT-2F	Operational	Imaging microwave radars	For disaster management applications.	Waveband: X Band (9.0 Ghz) Spatial resolution: 3-8 m Swath width: 10 km, 50 km Accuracy:
SARSAT Search and Rescue Satellite Aided Tracking NOAA	JPSS-1, JPSS-2	Operational	Data collection	Satellite and ground based system to detect and locate aviators, mariners, and land-based users in distress.	Waveband: UHF 406.0 MHZ Spatial resolution: Swath width: Accuracy:
SBUV/2 Solar Backscattter Ultra-Violet Instrument/2 NOAA	NOAA-16, NOAA-17, NOAA-18, NOAA-19	Operational	Atmospheric chemistry	Data on trace gases including vertical profile ozone, and solar irradiance and total ozone concentration measurements	Waveband: UV: 0.16 - 0.4 µm (12 channels) Spatial resolution: 170 km Swath width: Accuracy: Absolute accuracy: 1%
ScaRaB Scanner for Earth's Radiation Budget CNES	MEGHA-TROPIQUES	Being developed	Earth radiation budget radiometers	Measures top-of-atmosphere shortwave radiation (0.2 - 4.0 µm) and total radiation (0.2 - 50 µm). Two additional narrow-band channels (0.5 - 0.7 µm and 11 - 12 µm) allow cloud detection and scene identification	Waveband: VIS window channel: 0.5 - 0.7 µm, Solar channel UV - SWIR: 0.2 - 4 µm, Total channel UV - FIR: 0.2 - 50 µm, Thermal window channel: 10.5 - 12.5 µm Spatial resolution: 40 km Swath width: 2200 km Accuracy: Absolute: ± 2.5 W/m2/sr, Relative: ± 0.7 W/m2/sr
Scatterometer ISRO	OCEANSAT-2, OCEANSAT-3, SCATSAT	Operational	Scatterometers	Ocean surface wind measurements	Waveband: 13.515 GHz Spatial resolution: 50 km Swath width: 1400 - 1840 km Accuracy:
Scatterometer ROSHYDROMET (ROSKOSMOS)	Meteor-M N3	Approved	Scatterometers	Ocean surface wind measurements	Waveband: C (or X) - band, TBD Spatial resolution: 25 km Swath width: 1800 km Accuracy: Wind speed: 2 m/s, direction: 20 grad
SCIAMACHY Scanning Imaging Absorption Spectrometer for Atmospheric Chartography ESA (DLR)	Envisat	Operational	Atmospheric chemistry	Measures middle atmosphere temperature. Provides tropospheric and stratospheric profiles of O2, O3, O4, CO, N2O, NO2, CO2, CH4, H2O, and tropospheric and stratospheric profiles of aerosols and cloud altitude	Waveband: UV - SWIR: 240 - 314 nm, 309 - 3405 nm, 394 - 620 nm, 604 - 805 nm, 785 - 1050 nm, 1000 - 1750 nm, 1940 - 2040 nm and 2265 - 2380 nm Spatial resolution: Limb vertical 3 x 132 km, Nadir horizontal 32 x 215 km Swath width: Limb and nadir mode: 1000 km (max) Accuracy: Radiometric: <4%
SDR Software Defined Radio NSC	AISSat-1	Being developed	Communications	Software Defined Radio (SDR) for reception of VHF AIS (Automatic Identification System)	Waveband: VHF Spatial resolution: Swath width: Accuracy: Modelling shows that the instrument should detect more than 95% of the vessels carrying AIS within the satellite's field of view in the High North each orbit.
SeaWinds NASA	QuikSCAT	Operational	Scatterometers	Measurement of surface wind speed and direction	Waveband: Microwave: 13.402 GHz Spatial resolution: 25 km Swath width: 1600 km Accuracy: Speed: 2 - 3.5 m/s Direction: 20 deg
SEISS Space Environment In Situ Suite NOAA	GOES-R, GOES-S	Being developed	Space environment	Monitor proton, electron, and alpha particle fluxes	Waveband: 30 eV - 500 MeV Spatial resolution: 15 deg, 30 deg, 60 deg, 90 deg Swath width: Accuracy: 25%
SEM Space Environment Monitor NRSCC (CAST)	FY-3A, FY-3B	Operational	Space environment	Measures space environment parameters to support space craft operations	Waveband: Spatial resolution: Swath width: Accuracy:
SEM (GOES) Space Environment Monitor NOAA	GOES-11, GOES-12, GOES-13, GOES-14, GOES-15	Operational	Space environment	Used for equipment failure analysis, solar flux measurement, solar storm warning, and magnetic and electric field measurement at satellite	Waveband: Spatial resolution: Swath width: Accuracy:
SEM (POES) Space Environment Monitor NOAA	Metop-A, Metop-B, Metop-C, NOAA-16, NOAA-17, NOAA-18, NOAA-19	Operational	Space environment	Used for equipment failure analysis, solar flux measurement, solar storm warning, and magnetic and electric field measurement at satellite	Waveband: Senses and quantifies intensity in the sequentially selected energy bands, with energies ranging from 0.05 - 20 keV. Senses protons, electrons, and ions with energies from 30 keV to levels exceeding 6.9 MeV Spatial resolution: Swath width: Accuracy:
SEM-N Space Environment Monitor - NPOESS NOAA	JPSS-1, JPSS-2	Being developed	Space environment	Used for equipment failure analysis, solar flux measurement, solar storm warning, and magnetic and electric field measurement at satellite	Waveband: Senses and quantifies intensity in the sequentially selected energy bands, with energies ranging from 0.05 - 20 keV. Senses protons, electrons, and ions with energies from 30 keV to levels exceeding 6.9 MeV. Spatial resolution: Swath width: Accuracy:

Instrument & agency (& any partners)	Missions	Status	Type	Measurements & applications	Technical characteristics
Severjanin X-band Synthetic Aperature Radar ROSHYDROMET	Meteor-M N1	Operational	Imaging microwave radars		Waveband: Spatial resolution: Swath width: Accuracy:
SEVIRI Spinning Enhanced Visible and Infra-Red Imager EUMETSAT (ESA)	Meteosat-10, Meteosat-11, Meteosat-8, Meteosat-9	Operational	Imaging multi-spectral radiometers (vis/IR)	Measurements of cloud cover, cloud top height, precipitation, cloud motion, vegetation, radiation fluxes, convection, air mass analysis, cirrus cloud discrimination, tropopause monitoring, stability monitoring, total ozone and sea surface temperature	Waveband: VIS0.6=0.5975-0.6725 µm, VIS0.8=0.775-0.845 µm, NIR1.6=1.57-1.71 µm, IR3.9=3.7-4.14 µm, WV6.3=5.8-6.7 µm, WV7.3=7.1-7.6 µm, IR8.7=8.5-8.9 µm, IR9.7=9.52-9.8 µm, IR10.8=10.3-11.3 µm, IR12.0=11.5-12.5 µm, IR13.4=12.9-13.9 µm, HRV=~0.48-0.91 µm =unfiltered Si (measured at FWHM) Spatial resolution: HRV=1 km, All other channels=3 km (spatial sampling distance at SSP) Swath width: 9 km swath scannig E-W, moving up S-N a swath width at the end of each swath. Full Disc Coverage (FDC) or Local Area Coverage (LAC) possible. Accuracy: Cloud cover: 10%, Cloud top height: 1 km, Cloud top temperature: 1 K, Cloud type: 8 classes, Surface temperature: 0.7 - 2.0 K, Specific humidity profile: 10%, Wind profile (horizontal component): 2-10 m/s, Long wave Earth surface radiation: 5 W/m2
SGLI Second-generation Global Imager JAXA		Approved	Imaging multi-spectral radiometers (vis/IR) and ocean colour instruments	Medium resolution multi-spectral imaging of land, ocean and atmosphere	Waveband: VIS - NIR: 0.38 - 0.865 µm, SW: 1.05 - 2.21 µm; TIR: 10.8 - 12.0 µm Spatial resolution: 250 m, 500 m, 1000 m Swath width: 1150 km (VNR), 1400 km (IRS) Accuracy:
SIM Solar Irradiation Monitor NRSCC (CAST)	FY-3A, FY-3B, FY-3C, FY-3E	Operational	Earth radiation budget radiometers	Solar irradiance monitoring	Waveband: 0.2-50µm Spatial resolution: Swath width: Accuracy:
SIM Spectral Irradiance Monitor NASA	SORCE	Operational	Earth radiation budget radiometers	Measures solar spectral irradiance in the 200 - 2000 nm range.	Waveband: UV - SWIR: 200 - 2000 nm Spatial resolution: Swath width: Accuracy:
SIRAL SAR Interferometer Radar Altimeter ESA	CryoSat-2	Being developed	Radar altimeters	Marine ice and terrestrial ice sheet thickness measurement	Waveband: Microwave: 13.575 GHz (Ku-Band) Spatial resolution: Range resolution 45 cm, along-track resolution 250 m Swath width: Footprint 15 km Accuracy: Arctic sea-ice: 1.6cm/year for 300kmx300km cells, Land ice (small scale): 3.3 cm/year for 100 x 100 km cells, Land ice (large scale): 0.17 cm/year for Antarctica size area
SLIM-6 Surrey Linear Imager - 6 channel BNSC	UK-DMC	Operational	High resolution optical imagers	Visible and NIR imagery in support of disaster management - part of the Disaster Management constellation	Waveband: VIS: 0.63-0.69 µm, 0.52-0.60 µm; NIR: 0.77-0.90 µm. Spatial resolution: 32 m Swath width: Two imaging banks each with a 340km swath. The two swaths overlap by 16km, providing a total swath up to 648km Accuracy: S/N 100:1 @ target albedo of 0.1.
SLIM-6-22 Surrey Linear Imager - 6 channel - 22m resolution BNSC	UK-DMC2	Approved	High resolution optical imagers	Visible and NIR imagery in support of disaster management - part of the Disaster Management constellation	Waveband: VIS: 0.63-0.69 µm, 0.52-0.61 µm; NIR: 0.77-0.90 µm. Spatial resolution: 22 m Swath width: Two imaging banks each with a 330km swath. The two swaths overlap by 11km, providing a total swath up to 638km Accuracy: S/N 150:1 @ target albedo of 0.1.
SLSTR Sea and Land Surface Temperature Radiometer ESA (EC)	Sentinel-3 A, Sentinel-3 B, Sentinel-3 C	Approved	Imaging multi-spectral radiometers (passive microwave)	Marine and land services	Waveband: 9 bands in VNIR/SWIR/TIR Spatial resolution: 500 m (VNIR/SWIR), 1 km (TIR) Swath width: 1675 km (near-nadir view), 750km (backward view) Accuracy: 0.2 K abs., 80 mK rel.
SMILES Superconducting Submillimeter-Wave Limb-Emission Sounder JAXA	ISS/JEM	Operational	Atmospheric chemistry	High-sensitivity observation of stratospheric minor gases related to ozone depletion	Waveband: 624.32 - 625.52GHz, 625.12 - 626.32GHz, 649.12 - 650.32GHz Spatial resolution: Swath width: Accuracy: O3: less than 5%(15-60km), 1%(~30km) HCl: less than 10%(15-50%) ClO: less than 30%(25-50km)
SMR Submillimetre Radiometer SNSB	Odin	Operational	Atmospheric temperature and humidity sounders and atmospheric chemistry	Measures global distributions of ozone and species of importance for ozone chemisty, ClO, HNO3, H2O, N2O, (HO2, H2O2). Measures temperature in the height range 15-100km.	Waveband: Microwave: 118.7 GHz + 4 bands in the region 480 - 580 GHz: Tunable measures 2 - 3 x 1 GHz regions at a time; ~0.1 cm - ~0.3 cm Spatial resolution: Vertical resolution 1.5 - 3 km, along track 600 km Swath width: Altitudes of 5 - 100 km Accuracy: 2 - 40% depending on species and altitude
SODAD/CARMEN-1 Orbital System for an Active Detection of Debris CNES (CONAE)	SAC-D/Aquarius	Operational	Space environment	Space Debris Studies	Waveband: Spatial resolution: Swath width: Accuracy:
SODISM SOlar Diameter Imager and Surface Mapper CNES	PICARD	Being developed	Earth radiation budget radiometers	Measures diameter and differential rotation of the sun - a whole Sun imager	Waveband: UV: 230 nm, VIS: 548 nm, Active regions: 160 nm plus Lyman alpha detector Spatial resolution: Swath width: Accuracy:
Solar reflected spectrometer (CLARREO) NASA	CLARREO	Proposed	Earth radiation budget radiometers	Solar reflected spectrometer (CLARREO)	Waveband: 300 to 2000 nm. Spatial resolution: Swath width: Accuracy: 3 parts per 100
SOLSTICE SOLar STellar Irradiance Comparison Experiment NASA	SORCE	Operational	Earth radiation budget radiometers	Data on UV and charged particle energy inputs, and on time variation of full-disk solar UV spectrum. Measures solar UV radiation (115 - 430 nm) with resolution of 0.12 nm. Compares solar UV output with UV radiation of stable bright blue stars	Waveband: UV: 115 - 180 nm and 170 - 320 nm Spatial resolution: Swath width: Accuracy: 1%
Sounder NOAA	GOES-11, GOES-12, GOES-13, GOES-14, GOES-15	Operational	Atmospheric temperature and humidity sounders	Atmospheric soundings and data on atmospheric stability and thermal gradient winds	Waveband: VIS - TIR: 19 channels Spatial resolution: 10 km Swath width: Horizon to horizon Accuracy:

Instrument & agency (& any partners)	Missions	Status	Type	Measurements & applications	Technical characteristics
Sounder (INSAT) IR Sounder ISRO	INSAT-3D	Being developed	Atmospheric temperature and humidity sounders	Atmospheric soundings, atmospheric stability, thermal gradient winds	Waveband: SWIR: 3.74 - 4.74 µm; MWIR: 6.51 - 11.03 µm; TIR: 12.02 - 14.71 µm; VIS: 0.55 - 0.75 µm Spatial resolution: 10 x 10 km Swath width: Full (Full Earth disc sounding), Program (Options provided for for Sector Scans) Accuracy:
SOVAP SOlar Variability Picard radiometer CNES	PICARD	Being developed	Earth radiation budget radiometers	Total solar irradiance measurements	Waveband: Total irradiance Spatial resolution: Swath width: Accuracy:
Spectrometer (OCO-2) NASA	OCO-2	Being developed	Atmospheric chemistry	Global measurements of atmospheric CO2 needed to describe the variability of CO2 sources and sinks	Waveband: 0.76 µm, 1.61 µm, 2.06 µm Spatial resolution: Swath width: Accuracy:
SRAL SAR Radar Altimeter ESA (EC)	Sentinel-3 A, Sentinel-3 B, Sentinel-3 C	Approved	Radar altimeters	Marine and land services	Waveband: Dual freq radar altimeter, Ku-band, C-band Spatial resolution: 300 m Swath width: Profiling Accuracy: 3 cm in range (1 s average, 2 m SWH incluiding atm. corrections)
SSB/X-2 Special Sensor Gamma Ray Particle Detector NOAA (DoD (USA))	DMSP F-14	Operational	Space environment	Detects the location, intensity, and spectrum of X-rays emitted from the Earth's atmosphere	Waveband: Spatial resolution: Swath width: Accuracy:
SSI/ES-2 Special Sensor Ionospheric Plasma Drift/Scintillation Meter NOAA (DoD (USA))	DMSP F-14, DMSP F-15	Operational	Space environment	Measurement of the ambient electron density and temperatures, the ambient ion density, and ion temperature and molecular weight	Waveband: Spatial resolution: Swath width: Accuracy:
SSI/ES-3 Special Sensor Ionospheric Plasma Drift/Scintillation Meter NOAA (DoD (USA))	DMSP F-16, DMSP F-17, DMSP F-18, DMSP F-19, DMSP F-20	Operational	Space environment	Measurement of the ambient electron density and temperatures, the ambient ion density, and ion temperature and molecular weight	Waveband: Spatial resolution: Swath width: Accuracy:
SSJ/4 Special Sensor Precipitating Plasma Monitor NOAA (DoD (USA))	DMSP F-14, DMSP F-15	Operational	Magnetic field	Measurement of transfer energy, mass, and momentum of charged particles through the magnetosphere-ionosphere in the Earth's magnetic field	Waveband: Spatial resolution: Swath width: Accuracy:
SSJ/5 Special Sensor Precipitating Plasma Monitor NOAA (DoD (USA))	DMSP F-16	Operational	Magnetic field	Measurement of transfer energy, mass, and momentum of charged particles through the magnetosphere-ionosphere in the Earth's magnetic field	Waveband: Spatial resolution: Swath width: Accuracy:
SSM Special Sensor Magnetometer NOAA (DoD (USA))	DMSP F-14, DMSP F-15, DMSP F-16, DMSP F-17, DMSP F-18, DMSP F-19, DMSP F-20	Operational	Magnetic field	Measures geomagnetic fluctuations associated with solar geophysical phenomena. With SSIES and SSJ provides heating and electron density profiles in the ionosphere	Waveband: Spatial resolution: Swath width: Accuracy:
SSM/I Special Sensor Microwave Imager NOAA (DoD (USA))	DMSP F-14, DMSP F-15	Operational	Imaging multi-spectral radiometers (passive microwave)	Measures atmospheric, ocean and terrain microwave brightness temperatures to provide: sea surface winds, rain rates, cloud water, precipitation, soil moisture, ice edge, ice age.	Waveband: Microwave: 19.35 GHz, 22.235 GHz, 37 GHz, 85 GHz Spatial resolution: 15.7 x 13.9 km to 68.9 x 44.3 km (depends on frequency) Swath width: 1400 km Accuracy:
SSM/IS Special Sensor Microwave Imager Sounder NOAA (DoD (USA))	DMSP F-16, DMSP F-17, DMSP F-18, DMSP F-19, DMSP F-20	Operational	Atmospheric temperature and humidity sounders	Measures thermal microwave radiation. Global measurements of air temp profile, humidity profile, ocean surface winds, rain overland/ocean, ice concentration/age, ice/snow edge, water vapour/clouds over ocean, snow water content, land surface temperature.	Waveband: Microwave: 19 - 183 GHz (24 frequencies) Spatial resolution: Varies with frequency: 25 x 17 km to 70 x 42 km Swath width: 1700 km Accuracy:
SSM/T-1 Special Sensor Microwave Temperature Sounder NOAA (DoD (USA))	DMSP F-14, DMSP F-15	Operational	Atmospheric temperature and humidity sounders	Measures Earth's surface and atmospheric emission in the 50 - 60 GHz oxygen band	Waveband: Microwave: 7 channels in the 50 - 60 GHz range Spatial resolution: 174 km diameter beam Swath width: 1500 km Accuracy:
SSM/T-2 Special Sensor Microwave Water Vapor Sounder NOAA (DoD (USA))	DMSP F-14, DMSP F-15	Operational	Atmospheric temperature and humidity sounders	Water vapour profiler	Waveband: Microwave: 91.6, 150, 183.31 (3 channels) (Total 5 channels) Spatial resolution: Approx 48 km Swath width: 1500 km Accuracy:
SSTI Satellite-to-Satellite Tracking Instrument ESA	GOCE	Operational	Precision orbit	Measurements of low-frequency (coarse-scale) gravity field variations as well as highly precise positioning on GOCE	Waveband: Spatial resolution: Swath width: Accuracy:
SSULI Special Sensor Ultraviolet Limb Imager NOAA	DMSP F-16, DMSP F-17, DMSP F-18, DMSP F-19, DMSP F-20	Operational	Space environment	Measures vertical profiles of the natural airglow radiation from atoms, molecules and ions in the upper atmosphere and ionosphere	Waveband: Spatial resolution: Swath width: Accuracy:
SSUSI Special Sensor Ultraviolet Spectrographic Imager NOAA	DMSP F-16, DMSP F-17, DMSP F-18, DMSP F-19, DMSP F-20	Operational	Space environment	Monitors the composition and structure of the upper atmosphere and ionosphere, as well as auroral energetic particle inputs, with spectrographic imaging and photometry.	Waveband: Spatial resolution: Swath width: Accuracy:
STR Star Tracker Set (3) ESA	Swarm	Being developed	Precision orbit	Precise attitude determination from the combination of two or three star trackers	Waveband: N/A Spatial resolution: <1 arcsec Swath width: N/A Accuracy: < 3 arcsec pointing accuracy around all STR axes
SumbandilaSat Imager SANSA (Uni of Stellenbosh)	SumbandilaSat	Operational	Imaging multi-spectral radiometers (vis/IR)	Primary payload (imager): Support decision making in natural resource management, disaster management, agriculture, urban planning and other applications.	Waveband: Blue 440 - 510 nm, XAN 520 - 540 nm, Green 520 - 590 nm, Red 630 - 685 nm, RedEdge 690 - 730 nm, NIR 845 - 890 nm Spatial resolution: 6.25 m GSD Swath width: Swath width : 45 km; Off-nadir: 530 km Accuracy:

Instrument & agency (& any partners)	Missions	Status	Type	Measurements & applications	Technical characteristics
SUVI Solar Ultraviolet Imager NOAA	GOES-R, GOES-S	Being developed	Other	The SUVI will monitor the entire dynamic range of solar x-ray features, including coronal holes and solar flares, and will provide quantitative estimates of the physical conditions in the Sun's atmosphere	Waveband: Spatial resolution: Swath width: Accuracy:
SXI Solar X-ray Imager NOAA (USAF)	GOES-12, GOES-13, GOES-15	Operational	Earth radiation budget radiometers	Obtains data on structure of solar corona. Full disk imagery also provides warnings of geomagnetic storms, solar flares, and information on active regions of sun and filaments	Waveband: Spatial resolution: Swath width: Accuracy:
SZS Shore Zone Scanner ROSHYDROMET (ROSKOSMOS)	Meteor-M N3	Approved	Ocean colour instruments	Coastal zone data, estimation of phytoplankton concentration	Waveband: 0.4 - 0.79 µm, 4 channels Spatial resolution: 80 m Swath width: 800 km Accuracy:
TANSO-CAI Thermal And Near infrared Sensor for carbon Observation - Cloud and Aerosol Imager JAXA (MOE (Japan), NIES (Japan))	GOSAT	Operational	Imaging multi-spectral radiometers (vis/IR)	Measurement of cloud and aerosol for calibration of TANSO-FTS	Waveband: 0.380 µm, 0.678 µm, 0.870 µm, 1.62 µm Spatial resolution: 0.5 km (0.380, 0.678, 0.870 µm bands), 1.5 km (1.62 µm band) Swath width: 1000 km (0.380 µm, 0.678 µm, 0.870 µm bands), 750 km (1.62 µm band) Accuracy:
TANSO-FTS Thermal And Near infrared Sensor for carbon Observation - Fourier Transform Spectrometer JAXA (MOE (Japan), NIES (Japan))	GOSAT	Operational	Atmospheric temperature and humidity sounders and atmospheric chemistry	CO2 and methane distribution	Waveband: 0.758 - 0.775 µm, 1.56 - 1.72 µm, 1.92 - 2.08 µm, 5.56 - 14.3 µm Spatial resolution: 10.5 km Swath width: 160 km Accuracy:
TBD NRSCC (CAST)	FY-4 M/A, FY-4 M/B, FY-4 M/C	TBD	TBD		Waveband: Spatial resolution: Swath width: Accuracy:
TDP Technological Development Package CONAE	SAC-D/Aquarius	Being developed	Precision orbit	Develop, test, and operate the Technological Demonstration Package (TDP) for demonstrating a newly developed GPS receiver for position, velocity, and time determination and an Inertia Reference Unit (IRU) to measure inertial angular velocity	Waveband: Spatial resolution: Swath width: Accuracy:
TES Tropospheric Emission Spectrometer NASA	Aura	Operational	Atmospheric chemistry	3D profiles on a global scale of all infra-red active species from surface to lower stratosphere. Measures greenhouse gas concentrations, tropospheric ozone, acid rain precursors, gas exchange leading to stratospheric ozone depletion	Waveband: SWIR-TIR: 3.2 - 15.4 µm Spatial resolution: In limb mode: 2.3 km vertical resolution. In down-looking mode: 50 x 5 km (global), 5 x 0.5 km (local) Swath width: Limb mode: global: 50 x 180 km, local: 5 x 18 km Accuracy: Ozone: 20 ppb, Trace gases: 3 - 500 ppb
TES PAN Panchromatic sensor ISRO	TES	Operational	High resolution optical imagers	High resolution images for study of topography, urban areas etc.	Waveband: Panchromatic VIS: 0.5 - 0.75 µm Spatial resolution: 1 m Swath width: Accuracy:
TGSP Trace Gas Spectrometer ROSHYDROMET (ROSKOSMOS)	Meteor-MP N1, Meteor-MP N2, Meteor-MP N3	Proposed	TBD		Waveband: Spatial resolution: Swath width: Accuracy:
TIM Total Irradiance Monitor NASA	Glory, SORCE	Operational	Earth radiation budget radiometers	Measurement of total solar irradiance directly traceable to SI units with an absolute accuracy of 0.03% abd relative accuracy of 0.001% per year	Waveband: Spatial resolution: Swath width: Looks at the sun every orbit, providing 15 measurements per day Accuracy:
TIR (OCEANSAT-3) Thermal Infrared Radiometer (OCEANSAT-3) ISRO	OCEANSAT-3	Being developed	Imaging multi-spectral radiometers (vis/IR)	TIR and OCM combination will support joint analysis for operational potential fishing zones.	Waveband: 5 bands Spatial resolution: 1 km Swath width: 1500 km Accuracy:
TIRS Thermal Infrared Sensor NASA (USGS)	LDCM	Being developed	Imaging multi-spectral radiometers (vis/IR)	Measures surface radiance and emittance, lands cover state and change (eg vegetation type). Used as multipurpose imagery for land applications	Waveband: TIR 10.5um and 12um Spatial resolution: 100m Swath width: 185 km Accuracy:
TM Thematic Mapper USGS (NASA)	Landsat-5	Operational	Imaging multi-spectral radiometers (vis/IR)	Measures surface radiance and emittance, lands cover state and change (eg vegetation type). Used as multipurpose imagery for land applications	Waveband: VIS - TIR: 7 bands: 0.45 - 12.5 µm Spatial resolution: VIS - SWIR, 30 m; TIR: 120 m Swath width: 185 km Accuracy:
TMI TRMM Microwave Imager NASA	TRMM	Operational	Imaging multi-spectral radiometers (passive microwave)	Measures rainfall rates over oceans (less reliable over land), combined rainfall structure and surface rainfall rates with associated latent heating. Used to produce monthly total rainfall maps over oceans	Waveband: Microwave: 10.7 GHz, 19.4 GHz, 21.3 GHz, 37 GHz, and 85.5 GHz Spatial resolution: Vertical: 2.5 km approx; Horizontal: 18 km Swath width: 790 km Accuracy: Liquid water: 3 mg/cm3, Humidity: 3 mg/cm3, Ocean wind speed: 1.5 m/s
TOPSAT Telescope BNSC	TopSat	Operational	High resolution optical imagers	Experimental medium-resolution imaging satellite supporting a range of possible land applications.	Waveband: Panchromatic imagery. Resolution 2.8 m Spatial resolution: Multi-spectral imagery (RGB). resolution 5.6 m Swath width: Panchromatic imagery 17 x 17 km; Multi Spectral - Swath 12 x 18 km Accuracy:
TOU/SBUS Total Ozone Unit & Solar Backscatter Ultraviolet Sounder NRSCC (CAST)	FY-3A, FY-3B, FY-3C, FY-3D, FY-3E, FY-3F, FY-3G	Operational	Atmospheric temperature and humidity sounders	Ozone total column vertical profile measurements	Waveband: TOU: 6 channels in the range 308 - 360 nm, SBUS: in the range 252 - 340 nm Spatial resolution: TOU: 50 km total ozone, SBUS: 200 km total ozone Swath width: TOU: 3000 km, SBUS: nadiar only Accuracy: 50km
TRSR Turbo-Rogue Space Receiver NASA	Jason	Operational	Atmospheric temperature and humidity sounders and precision orbit	Precise continuous tracking data of satellite to decimeter accuracy	Waveband: Spatial resolution: Swath width: Accuracy:
TSIS Total Solar and Spectral Irradiance Sensor NOAA	JPSS-2	Being developed	Earth radiation budget radiometers	0.2 - 2 µm solar spectral irradiance monitor	Waveband: UV - SWIR: 0.2 - 2 µm Spatial resolution: Swath width: Accuracy: 1.5 w/m2

Instrument & agency (& any partners)	Missions	Status	Type	Measurements & applications	Technical characteristics
ULTRAPAN (Cartosat-3) Panchromatic sensor ISRO	CARTOSAT-3	Being developed	High resolution optical imagers	High resolution images for study of topography, urban areas, development of DTM, run-off models etc. Urban sprawl, forest cover/timber volume, land use change	Waveband: Panchromatic VIS: 0.5 - 0.75 µm Spatial resolution: 0.3 m Swath width: 15 km Accuracy:
UV Spectrometer (GACM) NASA	GACM	Proposed	Atmospheric chemistry	Daytime measurements of O3, NO2, SO2, CH2O, and aerosols	Waveband: 305-320 nm and 500-650 nm Spatial resolution: Swath width: Accuracy:
UV/Vis Near IR Wide Imaging Spectrometer (Geo-Cape) NASA	GEO-CAPE	Proposed	Imaging multi-spectral radiometers (vis/IR)	Measures natural and human-produced gases and aerosols in the atmosphere, including those that react in sunlight to form polluting low-level ozone.	Waveband: 315-600nm Spatial resolution: 7 km spatial resolution, single layer vertical resolution, 0.9 nm spectral resolution Swath width: typically uses 2D data array with 1-D north to south in space (7 km wide) and 1D for (oversampled) spectral intervals/bins. The spatial domain is mechanically scanned for east to west to cover a continental domain (either north or south America). Accuracy: ozone precision: 1.3 x 10^16 cm^(-2);NO2 precision: 5 x 10^14 cm^(-2)
UVAS UVAS (Ultraviolet Visible and near-infrared Atmospheric Sounder) CDTI	Ingenio	Approved	Atmospheric chemistry	The main scientific objectives of the UVAS mission are: - Observe with unprecedented high spatial resolution observations of air quality gases ozone (O3, nitrogen dioxide (NO2), sulphur dioxide (SO2), formaldehyde (HCHO) and glyoxal (CHO-CHO), and aerosols over selected urban areas. - Produce highly-spatially resolved observations of the major greenhouse gases: carbon dioxide (CO2), methane (CH4) and water vapor (H2O) over selected observation areas. - Combine high spatial resolution observations with atmospheric models to better quantify sources and sinks of specific gases. - Assimilate the remote sensing measurements into global chemistry-climate models to examine the processes linking atmospheric composition and climate.	Waveband: NIR 1500-1750 nm O2 A-band 650 to 770 nm UV/VIS 290 to 490 nm Spatial resolution: 20Km nominal, 5Km zoom Swath width: Accuracy:
UVN (Sentinel-4) UV-visible- near infrared imaging spectrometer (Sentinel-4) ESA (EC)	Sentinel-4 A, Sentinel-4 B	Proposed	Atmospheric chemistry	Supporting atmospheric composition and air quality monitoring services	Waveband: UV-1: 290 - 308 nm, UV-2: 308 - 400 nm, VIS: 400 - 500 nm, NIR: 750 - 775 nm Spatial resolution: < 5 km at SSP, possibly relaxed to 50 km for wavelengths < 308 nm Swath width: FOV E-W: 30°W-45°E @ 40°N, N-S: 30°N-65°N Accuracy: TBD
UVNS (post-EPS) UV-visible-near infrared-shortwave infrared imaging spectrometer (post-EPS) ESA (EC)	Sentinel-5	Proposed	Atmospheric chemistry	Supporting atmospheric composition and air quality monitoring services	Waveband: UV-1: 270 - 300 nm, UV-2: 300-400 nm, VIS: 400-500 nm, NIR: 710-775 nm, SWIR-1: 1593-1672 nm, SWIR-2: 1940-2030 nm, SWIR-3: 2305-2385 nm Spatial resolution: 5 - 15 km at SSP, possibly relaxed to 50 km for wavelengths < 300 nm Swath width: Daily global coverage Accuracy: TBD
UVNS (Sentinel-5 precursor) UV-visible- near infrared imaging spectrometer (Sentinel-5 precursor) ESA (EC, NSO)	Sentinel-5 precursor	Proposed	Atmospheric chemistry	Supporting atmospheric composition and air quality monitoring services	Waveband: UV-1: 270 - 300 nm, UV-2: 300 - 400 nm, VIS: 400 - 500 nm, NIR: 710 - 775 nm, SWIR-3: 2305 - 2385 nm Spatial resolution: 5 - 15 km at SSP, possibly relaxed to 50 km for wavelengths < 300 nm Swath width: Daily global coverage Accuracy: TBD
VEGETATION CNES (SNSB, EC)	SPOT-4, SPOT-5	Operational	Imaging multi-spectral radiometers (vis/IR)	Data of use for crop forecast and monitoring, vegetation monitoring, and biosphere/ geosphere interaction studies	Waveband: Operational mode: VIS: 0.61 - 0.68 µm, NIR: 0.78 - 0.89 µm, SWIR: 1.58 - 1.75 µm, Experimental mode: VIS: 0.43 - 0.47 µm Spatial resolution: 1.15 km at nadir - minimal variation for off-nadir viewing Swath width: 2200 km Accuracy:
VFM Vector Field Magnetometer ESA	Swarm	Being developed	Magnetic field	Magnetic field vector measurments	Waveband: N/A Spatial resolution: <0.1nT Swath width: N/A Accuracy: <0.5 nT/15days
VHRR Very High Resolution Radiometer ISRO	INSAT-2E, INSAT-3A, KALPANA-1	Operational	Imaging multi-spectral radiometers (vis/IR)	Cloud cover, rainfall, wind velocity, sea surface temperature, outgoing longwave radiation, reflected solar radiation in spectral band 0.55 - 0.75 µm, emitted radiation in 10.5 - 12.5 µm range	Waveband: VIS: 0.55 - 0.75 µm, NIR: 5.7 - 7.1 µm, TIR: 10.5 - 12.5 µm Spatial resolution: 2 km in visible, 8 km in IR Swath width: Full Earth disk every 30 minutes Accuracy:
VIIRS Visible/Infrared Imager Radiometer Suite NOAA (NASA)	JPSS-1, JPSS-2, NPP	Being developed	Imaging multi-spectral radiometers (vis/IR) and ocean colour instruments	Global observations of land, ocean, and atmosphere parameters: cloud/weather imagery, sea-surface temperature, ocean colour, land surface vegetation indices	Waveband: VIS - TIR: 0.4 - 12.5 µm (22 channels) Spatial resolution: 400 m - 1.6 km Swath width: 3000 km Accuracy: SST 0.35 K
VIRR Multispectral Visible and Infra-red Scan Radiometer (10 channels) NRSCC (CAST)	FY-3A, FY-3B, FY-3C, FY-3D, FY-3E, FY-3F, FY-3G	Operational	Imaging multi-spectral radiometers (vis/IR)	Multispectral Visible and Infra-red Scan Radiometer	Waveband: Instrument features 10 channels over 0.43 - 10.5 µm Spatial resolution: 1.1 km at nadiar Swath width: 2800 km Accuracy: 1.1km
VIRS Visible Infra-red Scanner NASA	TRMM	Operational	Imaging multi-spectral radiometers (vis/IR)	Data to be used in conjunction with data from CERES instrument to determine cloud radiation. Will enable 'calibration' of precipitation indices derived from other satellite sources	Waveband: VIS: 0.63 µm, SWIR - MWIR: 1.6 µm and 3.75 µm, TIR: 10.8 µm and 12 µm Spatial resolution: 2 km at nadir Swath width: 720 km Accuracy:
Visible imaging spectrometer (HyspIRI) NASA	HyspIRI	Proposed	Imaging multi-spectral radiometers (vis/IR)		Waveband: 400-2500 nm Spatial resolution: 60 m at nadir; 3 week revisit time Swath width: 90 km Accuracy: Spectral accuracy < .5nm

Instrument & agency (& any partners)	Missions	Status	Type	Measurements & applications	Technical characteristics
VSC Venus Superspectral Camera CNES (ISA)	VENUS	Being developed	Imaging multi-spectral radiometers (vis/IR)	High resolution superspectral images (12 spectral bands) for vegetation and landcover applications	Waveband: 420 nm centre wavelength (width: 40 nm); 443 nm (40); 490 nm (40); 555 nm (40); 620 nm (40); 620 nm (40); 667 nm (30); 702 nm (24); 742 nm (16); 782 nm (16); 865 nm (40); 910 nm (20) Spatial resolution: 5.3 m spatial resolution with 27 km swath Swath width: 27 km Accuracy:
WEFAX Weather Facsimile NOAA	GOES-11, GOES-12	Operational	Communications	Weather Facsimile	Waveband: Spatial resolution: Swath width: Accuracy:
WFC Wide Field Camera NASA	CALIPSO	Operational	Imaging multi-spectral radiometers (vis/IR)	Acquires high spatial resolution imagery for meteorological context	Waveband: VIS: 620 to 670 nm Spatial resolution: 125 m Swath width: 60 km Accuracy:
WFI-2 Wide Field Imager-2 INPE (CAST)	CBERS-3, CBERS-4	Prototype	Imaging multi-spectral radiometers (vis/IR)	Earth resources, environmental monitoring, land use	Waveband: 0.45 - 0.52 µm, 0.52 - 0.59 µm, 0.63 - 0.69 µm; 0.77 - 0.89 µm Spatial resolution: 64 m Nadir Swath width: 866 km Accuracy:
WS LISS III Wide Scan LISS III ISRO	RESOURCESAT-3	Proposed	Imaging multi-spectral radiometers (vis/IR)	For crops and vegetation dynamics, natural resources census, disaster management and large scale mapping of themes	Waveband: 3 bands in VNIR and 1 band in SWIR Spatial resolution: 23.5 m, 10 m Swath width: 700 km Accuracy:
WSAR NSOAS (CAST)	HY-3A, HY-3B, HY-3C	Proposed	Imaging microwave radars	High resolution radar measurements of land and ocean features	Waveband: X-Band: 8 - 12 GHz Spatial resolution: 3 modes: 1 m, 5 m, 10 m Swath width: 3 swaths: 40 km, 80 km, 150 km Accuracy:
WTE Whale Tracker Experiment CONAE	SAC-C	Operational	Data collection	Tracking of Eubalean Australis and environmental data collection system	Waveband: Spatial resolution: Swath width: Accuracy:
X-Band SAR X-Band Synthetic Aperture Radar DLR	TanDEM-X, TerraSAR-X, TerraSAR-X2	Operational	Imaging microwave radars	High resolution images for monitoring of land surface and coastal processes and for agricultural, geological and hydrological applications	Waveband: 9.65 GHz, 300 MHz bandwidth, all 4 polarisation modes Spatial resolution: Spotlight: 1.2 x 1 - 4 m Stripmap: 3 x 3 - 6 m ScanSAR: 16 x 16 m Swath width: Spotlight: 5-10km x 10 km, Stripmap: 30 km, ScanSAR: 100 km Accuracy:
XPS XUV Photometer System NASA	SORCE	Operational	Other	Objective is to measure the extreme UV solar irradiance from 1 - 35 nm	Waveband: UV: 1 - 35 nm Spatial resolution: Swath width: Accuracy:

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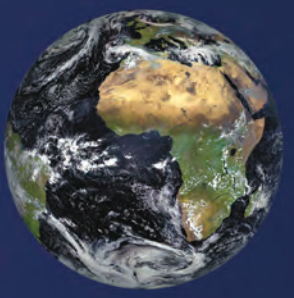

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