

MODULE 1

Introduction and History

Week 2: International Coordination and Data Exchange
CEOS – Committee on Earth Observation Satellites
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CEOS Committee on Earth Observation Satellites



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CEOS Background

- Established in 1984 under auspices of G-7 Economic Summit of Industrialized Nations
- Focal point for international coordination of space-related Earth Observation (EO) activities
- Optimize benefits through cooperation of members in mission planning and in development of compatible data products, formats, services, applications, and policies
- Operates through best efforts of Members and Associates via voluntary contributions
- 30 Members (Space Agencies), 23 Associates (UN Agencies, Phase A programs or supporting ground facility programs)
- As the space component of the Global Earth Observation System of Systems (GEOSS), CEOS is implementing high priority actions in support of Group on Earth Observation (GEO) Tasks

MEMBERS

Agenzia Spaziale Italiana (ASI)
Canadian Space Agency (CSA)
Centre National d'Etudes Spatiales (CNES), France
Centro para Desarrollo Tecnológico Industrial (CDTI), Spain
China Center for Resources Satellite Data and Applications (CRESDA)
Chinese Academy of Space Technology (CAST)
Comisión Nacional de Actividades Espaciales (CONAE), Argentina
Commonwealth Scientific & Industrial Research Organisation (CSIRO), Australia
Deutsches Zentrum für Luft- und Raumfahrt (DLR), Germany
European Commission (EC)
European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT)
European Space Agency (ESA)
Geo-Informatics and Space Technology Development Agency (GISTDA), Thailand
Indian Space Research Organisation (ISRO)
Instituto Nacional de Pesquisas Espaciais (INPE), Brazil
Japan Aerospace Exploration Agency/Ministry of Education, Culture, Sports, Science, and Technology (JAXA/MEXT)
Korea Aerospace Research Institute (KARI)
National Aeronautics and Space Administration (NASA), USA
National Oceanic and Atmospheric Administration (NOAA), USA
National Remote Sensing Center of China (NRSCC)
National Satellite Meteorological Center/Chinese Meteorological Administration (NSMC/CMA)
National Space Agency of Ukraine (NKAU)
National Space Research Agency of Nigeria (NASRDA)
Netherlands Space Office (NSO)
Russian Federal Space Agency (ROSKOSMOS)
Russian Federal Service for Hydrometeorology and Environmental Monitoring (ROSHYDROMET)
South African National Space Agency (SANSA)
Scientific and Technological Research Council of Turkey (TÜBITAK)
United Kingdom Space Agency (UKSA)
United States Geological Survey (USGS)

ASSOCIATES

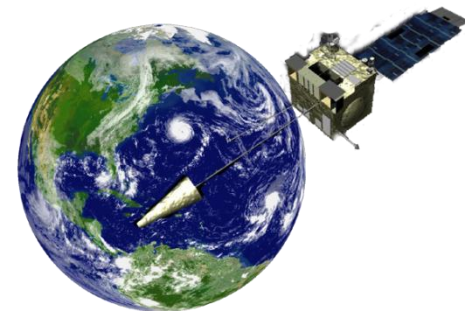
Belgian Federal Science Policy Office (BELSPO)
Canada Centre for Remote Sensing (CCRS)
Council for Scientific and Industrial Research (CSIR)
Crown Research Institute (CRI), New Zealand
Earth Systems Science Organisation (ESSO), India
Global Climate Observing System (GCOS)
Global Geodetic Observing System (GGOS)
Global Ocean Observing System (GOOS)
Global Terrestrial Observing System (GTOS)
Intergovernmental Oceanographic Commission (IOC)
International Council for Science (ICSU)
International Geosphere-Biosphere Programme (IGBP)
International Ocean Colour Coordinating Group (IOCCG)
International Society of Photogrammetry and Remote Sensing (ISPRS)
Norwegian Space Center (NSC)
Swedish National Space Board (SNSB)
United Nations Economic and Social Commission for Asia and the Pacific (ESCAP)
United Nations Educational, Scientific and Cultural Organization (UNESCO)
United Nations Environment Programme (UNEP)
United Nations Food and Agriculture Organization (FAO)
United Nations Office for Outer Space Affairs (UNOOSA)
World Climate Research Programme (WCRP)
World Meteorological Organization (WMO)

- 1972 - Coordination Group for Meteorological Satellites (CGMS)
- 1984 - Committee on Earth Observation Satellites (CEOS)
- 1986-1996 - International Coordination Working Group (ICWG) of the Space Station Partners
- 1998-2008 - Integrated Global Observing Strategy (IGOS)
- 2000 - International Charter on Space and Major Disasters
- 2000 - World Meteorological Organization Consultative Meetings on High-Level Policy on Satellite Matters
- 2003 - Group on Earth Observations (GEO); established as an Intergovernmental GEO in 2005

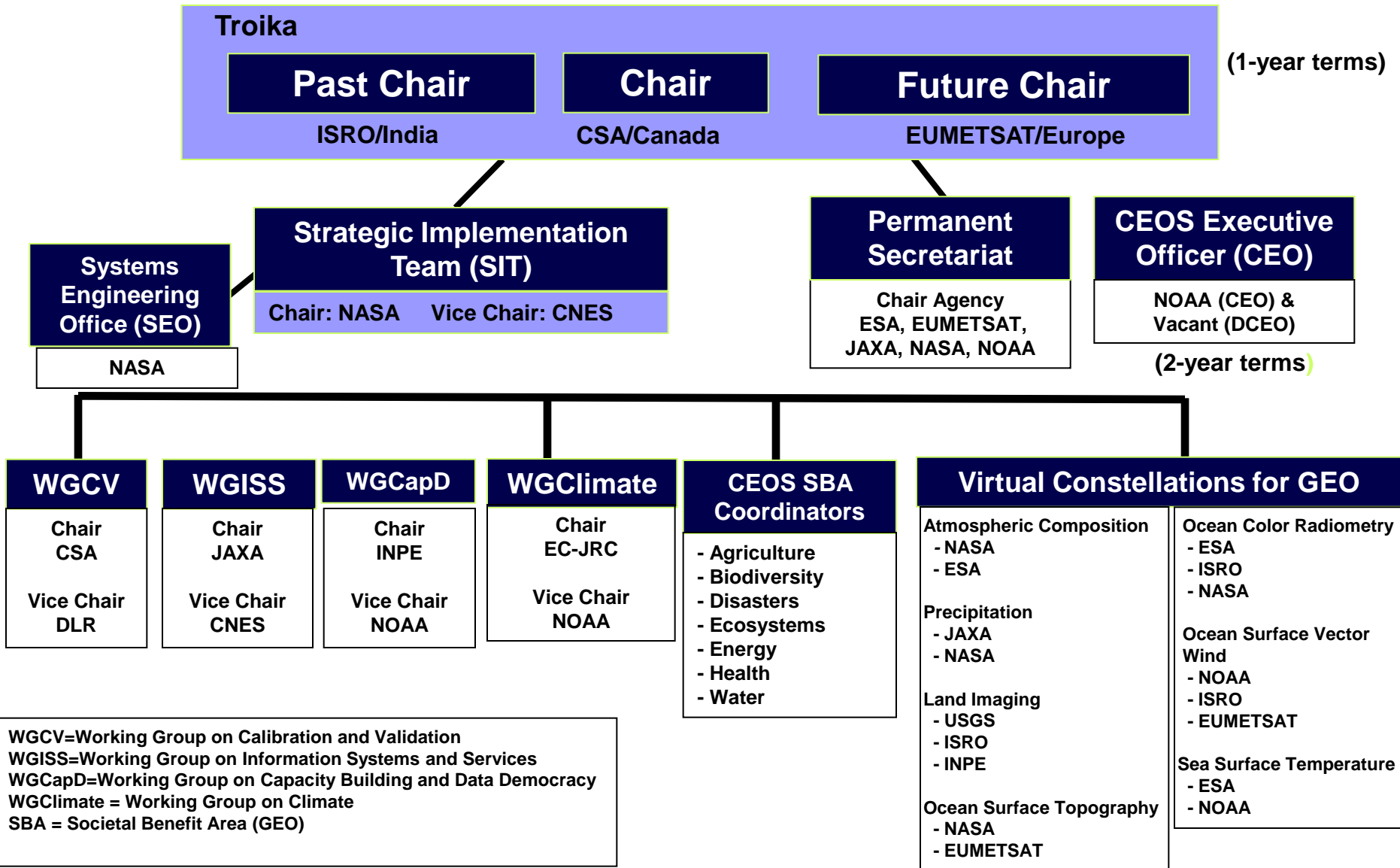


Primary Objectives of CEOS

1. To optimize benefits of space-borne Earth observations through:
 - Cooperation of its Members in mission planning
 - Development of compatible data products, formats, services, applications, and policies;
2. To serve as a focal point for international coordination of space-related Earth observation activities;
3. To exchange policy and technical information to encourage complementarity and compatibility of observation and data exchange systems.



CEOS Structure 2012-2013



Strategic Implementation Team (SIT)

- Created in 1996 to advance the involvement of CEOS in the development of the Integrated Global Observing System (IGOS)
- Plays a central role in coordination of existing and future missions of CEOS Agencies in support of GEO, GCOS, WMO, UNFCCC, etc.
- Comprised of the Principals of CEOS Member Agencies and some Associates with the authority to commit Agency support to initiatives
- **SIT Chair Key Responsibilities**
 - Lead CEOS interaction with GEO/GEOSS and strengthen linkages to GEO and GEOSS
 - Lead CEOS Virtual Constellation for GEO development and implementation activities
 - Assist CEOS interaction with GEO Committees

SIT Objective: To define, characterize, and develop the vision for CEOS participation in GEO and strengthen CEOS linkages to GEOSS

CEOS Virtual Constellations for GEO

- CEOS Virtual Constellations for GEO demonstrate the value of collaborative partnerships in addressing key observational gaps and bridging multiple GEO Societal Benefit Areas while maintaining the independence of individual contributions
- Focus dialogue from “all topics/all agencies” to smaller, more specialized groups
- Guidance for design and development of future systems to meet the broad spectrum of EO requirements
- Avoid duplication and overlap in EO efforts
- Close information gaps for GEO SBAs
- Establish and sustain global EO coverage and data availability

Atmospheric Composition	Land Surface Imaging (LSI)	Ocean Surface Topography	Precipitation	Ocean Colour Radiometry	Ocean Surface Vector Wind
Co-Leads: NASA and ESA	Co-Leads: USGS, ISRO, and INPE	Co-Leads: NASA and EUMETSAT	Co-Leads: NASA and JAXA	Co-Leads: ESA, ISRO, and NASA	Co-Leads: NOAA, ISRO, and EUMETSAT
Sea Surface Temperature					
Co-Leads: ESA and NOAA					

CEOS Working Groups

Working groups enhance technical cooperation among CEOS Agencies in specific topical areas with broad international benefit.

- **Working Group on Calibration and Validation (WGCV)**
 - To ensure long-term confidence in the accuracy and quality of Earth observation data and products
- **Working Group on Information Systems and Services (WGISS)**
 - To coordinate the development of Earth observation satellite systems and services which manage and supply the data and information from CEOS Agencies' missions
- **Working Group on Capacity Building and Data Democracy (WGCapD)**
 - To increase the capacity of institutions in less developed countries for effective use of Earth Observation data for the benefit of society and to achieve sustainable development
- **Working Group on Climate (WGClimate)**
 - To facilitate the use of Essential Climate Variable (ECV) time-series through coordination Member Agencies' initiatives and activities



Improved Coordination of Space Agency Activities Related to Climate

- CEOS Response to 2010 GCOS IP and improvement in coordinated outputs for monitoring of ECVs
- CEOS Input to Systematic Observation Requirements for GCOS Satellite Supplement
- Development of FCDRs and related data sets (WG Climate)
- Cooperation with GEO, WMO, and CGMS on space-based system to support climate information and adaptation
- Further alignment of VCs to contribute to GCOS IP

Progress Toward Established GEO-CEOS Priorities

- ❖ CEOS leadership within and support to the GEO Global Forest Observation Task (including GFOI IP and SDCG)
- ❖ Continued development of the CEOS Strategy for Carbon Observations from Space
- ❖ **Advancement of CEOS Data Democracy activities within the reorganized WGCapD**
- ❖ Further alignment of the CEOS VC objectives/activities to GEO 2012-2015 Work Plan Tasks

Progress Toward Established GEO-CEOS Priorities (cont'd)

- Continued support to development and operationalization of the GEOSS Common Infrastructure (GCI) and its elements
- The development of a more integrated approach in the areas of disaster mitigation and disaster management
- Continued support to the Joint Experiments on Crop Assessment and Monitoring (JECAM) initiative
- Continued CEOS leadership of/support to the QA4EO initiative

Considering CEOS Support to Further Key GEO Priority Initiatives

- Exploratory dialogue on data requirements and CEOS Agency capacities to support the G20/GEO Global Agricultural Monitoring (GLAM) initiative
- Continued dialogue on potential CEOS contributions to integrated water cycle products and services
- Continued dialogue on potential CEOS contributions to the GEO Biodiversity Observation Network (GEO BON)

Continued and Enhanced CEOS Outreach to Key Stakeholders: GEO, COP, UNFCCC, SBSTA, G8/G20

- Maintenance to CEOS online services such as the CEOS website and Missions, Instruments and Measurements (MIM) database
- Publication of the CEOS Newsletter
- CEOS inputs for Rio+20 Summit, including a print update of the CEOS Earth Observation Handbook

Further review/adoption of CSS recommendations

- Preparatory materials for, and discussion at, SIT-27



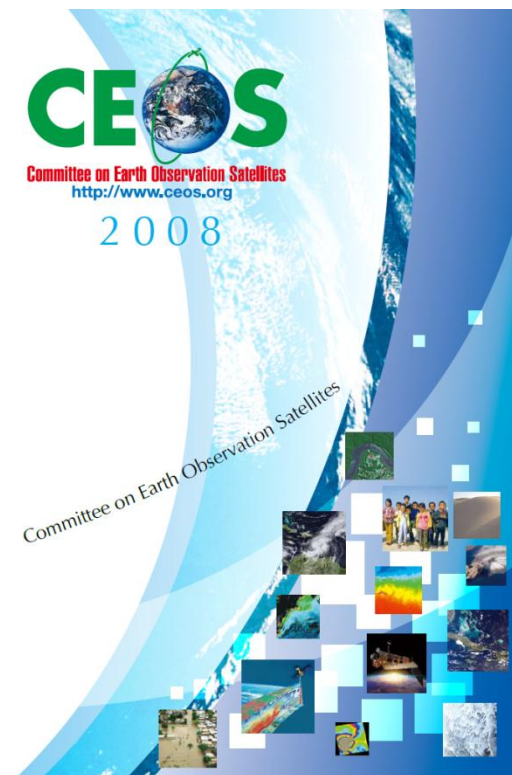
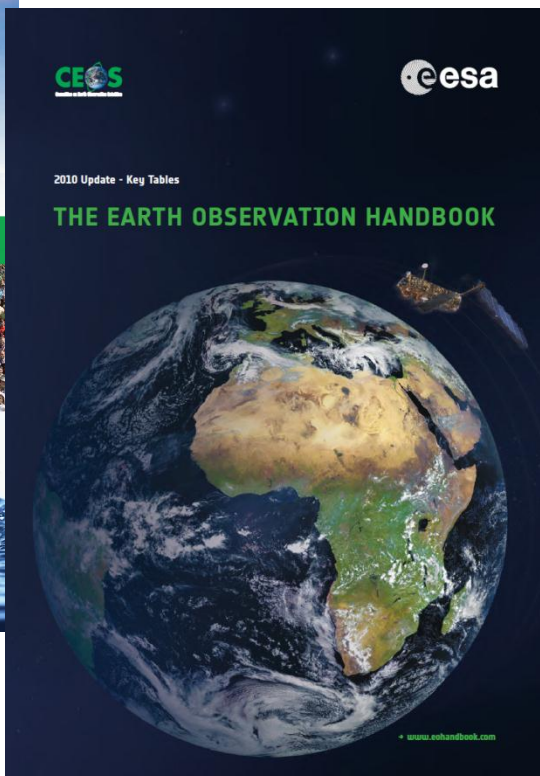
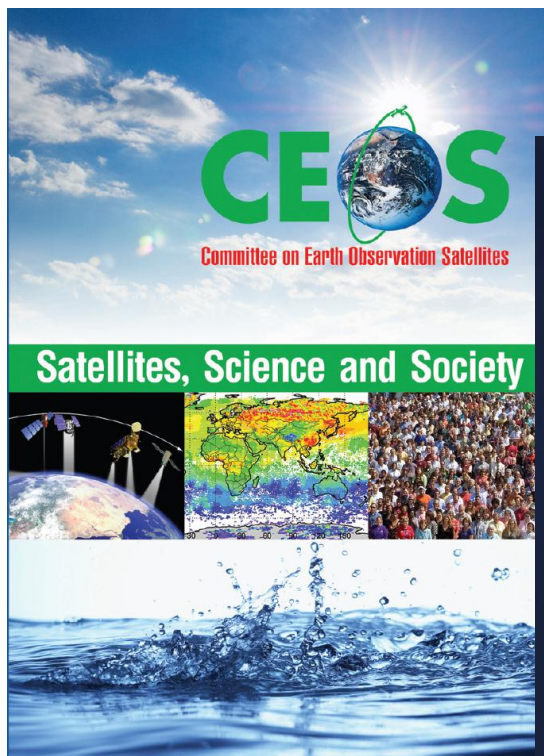
- **CEOS is a GEO Participating Organization**
- Unique and important role in space-based observations
- Integrate observing systems to benefit from the increased number and distribution of observations of any given event
- Minimize data gaps – toward a comprehensive, coordinated, and sustained GEOSS
- CEOS Implementation Plan for Space-based Observations for GEOSS
- Routine and detailed consultations among CEOS technical experts and GEO Secretariat staff

- CEOS Virtual Constellations support to Global Climate Observing System (GCOS) Essential Climate Variables (ECVs)
- Respond to critical needs of the global user community
- More coordinated Earth observations for enhanced societal benefit



CEOS Plenaries

Plenary	Year	Venue	Host		Plenary	Year	Venue	Host
1 st	1984	Washington DC, USA	NOAA		15 th	2001	Kyoto, Japan	MEXT/NASDA
2 nd	1986	Frascati, Italy	ESA		16 th	2002	Frascati, Italy	ESA
3 rd	1988	Ottawa, Canada	CSA		17 th	2003	Colorado Springs, USA	NOAA
4 th	1990	Sao Jose dos Campos, Brazil	INPE		18 th	2004	Beijing, China	NRSCC
5 th	1991	Washington DC, USA	NASA/NOAA		19 th	2005	London, UK	BNSC
6 th	1992	London, UK	BNSC		20 th	2006	Buenos Aires, Argentina	CONAE
7 th	1993	Tsukuba, Japan	MEXT/NASDA		21 st	2007	Kona, Hawaii, USA	USGS
8 th	1994	Berlin, Germany	DARA		22 nd	2008	George, South Africa	CSIR
9 th	1995	Montreal, Canada	CSA		23 rd	2009	Phuket, Thailand	GISTDA
10 th	1996	Canberra, Australia	CSIRO		24 th	2010	Rio de Janeiro, Brazil	INPE
11 th	1997	Toulouse, France	CNES		25 th	2011	Lucca, Italy	ASI
12 th	1998	Bangalore, India	ISRO		26 th	2012	Bangalore, India	ISRO
13 th	1999	Stockholm, Sweden	EUMETSAT		27 th	2013	Montreal, Canada	CSA
14 th	2000	Rio de Janeiro, Brazil	INPE					



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