



CEOS

A Briefing on the Activities of the Committee on Earth Observation Satellites (CEOS)

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**Workshop on Developing an Agricultural
Monitoring System of Systems
Beijing, China
February 12, 2009**



CEOS Background

- **Established in 1984 from the Economic Summit of Industrialized Nations**
 - Recognized value of cross-disciplinary efforts
 - Need to coordinate Earth observation satellite missions
- **Consists of space agencies who run research and operational programs and major user community representatives, 6 UN organizations and affiliates (e.g. UNESCO, UNEP, FAO, WMO, ESCAP, OOSA)**
- **47 Members and associates – CRESDA one of the most recent members:**
- **Partners with other international organizations, systems, and coordination groups**
 - World Meteorological Organization
 - Global Climate, Oceanic, and Terrestrial Observing Systems
 - Coordination Group for Meteorological Satellites
- **Operates through best efforts of Members and Associates via voluntary contributions**
- **Space segment provider for the Group on Earth Observations (GEO)**



UN Framework Convention on Climate Change (UNFCCC)

- Actions from COP - 10, 11, 12, and 13
- **“Satellite Observation of the Climate System: The CEOS Response to the GCOS Implementation Plan”**
- Response covers atmospheric, oceanic and terrestrial domains, as well as cross-cutting issues
- 59 actions identify additional resources needed to fill gaps
- Calls for a major, sustained satellite component





GCOS 26 Essential Climate Variables (ECVs)

- | | | | |
|-----------|--|-----------|---------------------------------------|
| A. | Atmosphere | O. | Oceans |
| A.1 | Surface Wind Speed and Direction | O.1 | Sea Ice |
| A.2 | Upper-Air Temperature | O.2 | Sea Level |
| A.3 | Water Vapour | O.3 | Sea Surface Temperature |
| A.4 | Cloud properties | O.4 | Ocean Colour |
| A.5 | Precipitation | O.5 | Sea State |
| A.6 | Earth Radiation Budget | O.6 | Ocean Reanalysis |
| A.7 | Ozone | O.7 | Ocean Salinity |
| A.8 | Atmospheric Reanalysis (multiple ECVs) | | |
| A.9 | Aerosols | T. | Terrestrial |
| A.10 | Carbon Dioxide, Methane and other Greenhouse Gases | T.1 | Lakes |
| A.11 | Upper-Air Wind | T.2 | Glaciers and Ice Caps, and Ice Sheets |
| | | T.3 | Snow Cover |
| | | T.4 | Albedo |
| | | T.5 | Land Cover |
| | | T.6 | fAPAR |
| | | T.7 | LAI |
| | | T.8 | Biomass |
| | | T.9 | Fire Disturbance |
| | | T.10 | Soil moisture |

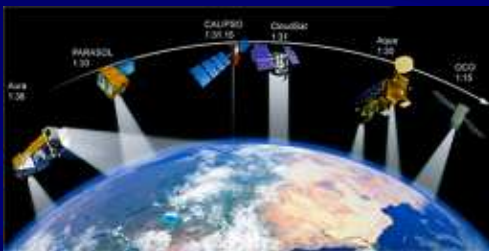




Connecting Satellite Observation Systems to GEOSS



- Integrate observing systems, nationally and internationally, to benefit from the increased number and distribution of observations of any given event



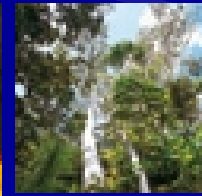
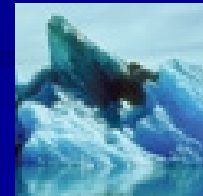
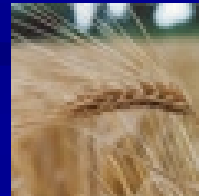
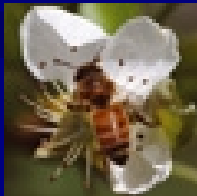
- Identify measures to minimize data gaps – to move toward a comprehensive, coordinated, and sustained Global Earth Observation “System of Systems”





CEOS Space Segment Support to GEO

- **Implementation Plan for Space-Based Observations for GEOSS**
- **CEOS-GEO Actions Table**
- **Virtual Constellations Initiative**
- **Dedicated Staff Support**
 - **CEOS Executive Officer**
 - **GEO SBA Coordinators**
 - **Working Group Chairs**





CEOS Space Segment Support to GEO

■ Actions Table

- 133 ‘actionable’ actions among the SBAs with an attached priority (only Priority 1 actions are tracked)**
- Member agencies are assigned the actions and are held accountable at SIT meetings**
- Member agencies will be recruited for the actions by 25 February, 2009**
- 2009 actions will be reviewed and assigned at SIT-23 (March 4-5, 2009)**



CEOS Space Segment Support to GEO

Microsoft Excel - CEOS-GEO Actions Table 28 January 2009

New 2009-2011 CEOS-GEO Action Number

	E	C	D	E	F	K	L	M	N	O	P	Q	R	T
	New 2009-2011 CEOS-GEO Action Number	Former 2007-2008 CEOS-GEO Action Number	GEO 2009-2011 new Task Id	CEOS SBA Team Allocation	Action Status (OPEN / CLOSED)	CEOS Action Category: (1 to 4)	Action Descriptions	Due Date	POC	POC Email Address	Proposed Lead Agency	All Agency and Organization Participation	CEOS Working Group and Constellation Participation	Planned Deliverables & Milestones
1	AG-06-02_1	AG-06-02_1	AG-06-02		CLOSED		CEOS participation in GEO Societal Applications in Fisheries & Aquaculture using Remote Sensing Imagery (SAFARI activity).	24/03/2008				NOAA, NASA, ISRO, ESA	LSI	Cannot identify specific actions and deliverables until working with SAF group and negotiating actions. Waiting for SAFARI reply
2	AG-06-02_2	NEW	AG-06-02	Agriculture	OPEN		Publish an IOCCG monograph on "Applications of Remote Sensing in Fisheries and Aquaculture"	31/12/2009	James Yoder	yoder@whoi.edu	IOCCG	CSA	OCR	1. 26-28 March 2008 - International Workshop on the Use of Remote Sensed Data as an Aid to Fisheries Deliverable - outline of monograph 2. May 2009 - Final draft of IOCCG monograph 3. December 2009 - final publication and distribution of IOCCG monograph (IOCCG Report 8)
3	AG-06-02_3	NEW	AG-06-02	Agriculture	OPEN		Development of EO tools for Ecosystem-based Marine Management	Fall 2011	Paul Briand	paul.briand@scc-csa.gc.ca	CSA		OCR	Operational physical-biological-optical model of St-Lawrence assimilating colour data; Report detailing use of EO data as indicator of shrimp productivity in NW Atlantic Report indicating utility of SAR imagery for predicting seal whelping areas
4	AG-07-03a_3	AG-07-03a_3	AG-07-03a		CLOSED		Participate in IGOL workshop on cropped area and in GOFPC/GOLD workshop (Beijing 2009)	01/02/2009	Brad Reed	reed@usgs.gov	USGS	USGS, IGOL, FAO		February 2009: Participation in meeting and task activities as needed
5	AG-07-03a_4	NEW	AG-07-03a	Agriculture	OPEN		Integrating remote sensing data into selected models to enhance operational decision support for crops, drought and agricultural water management	Fall 2011	Paul Briand	paul.briand@scc-csa.gc.ca	CSA			Methodologies to process and deliver EO, agr-climate, soil and other geospatial data through interoperable web services for various models an applications of crop, drought and water monitoring and decision making; Applications for integrating higher-resolution remote sensing and other th data into selected models; Cross-validation of soil moisture information acquired at various spatial & temporal scales. DATES ?
6	AG-07-03b_1	AG-07-02_1	AG-07-03b		CLOSED		Continue support of early warning projects and drought monitoring					NASA, NOAA, USGS, ESA	LSI	
7	AG-07-03c_1	AG-06-07_1	AG-07-03c	Transverse	OPEN		Preparation and delivery of training resources for GEO CBC activities. This is dependent on development of GEO portal and GEO NET cost services	July 2009, then regular	Gordon Bridge	Gordon.Bridge@eumetsat.int	EUMETSAT	EUMETSAT, China, ISRO	V/GEds, SBA Experts and Constellations, as	Published events/activities schedules on website/portal

Legend / Column Descriptions / All Cat. OPEN / All Cat. CLOSED / GEO 2009-2011

Ready

NUM



CEOS Virtual Constellations Initiative

- **Contribution to GEO observational requirements**
- **Synergies among national and regional satellite programs**
 - Atmospheric Composition
 - Ocean Surface Topography
 - Precipitation
 - Land Surface Imaging
- **Common guidelines**
- **Optimal end-to-end capabilities**
- **Coordinated user requirements for future systems**





Brief Overview

- Activities of the CEOS Land Surface Imaging (LSI) Constellation are conducted under the direction of the LSI Constellation Study Team.
 - Established in late 2006.
 - Members represent nearly all CEOS agencies that operate LSI satellite systems, as well as the land remote sensing user community.
 - Certain activities are led by Working Groups of the Study Team.
- 2008 LSI Constellation activities included ongoing tasks and 2 new undertakings
 - Continuing tasks focused on increasing the cooperation of CEOS agencies in the operation of their existing mid-resolution, optical satellite systems
 - A new radar focus area was initiated, led by the Working Group on Radar
 - A second working group; the Working Group on Regional Data Set Compilation, was established to compile regional data sets of mid-resolution data to become initial contributions to Global Land Survey 2010 (GLS2010)



Recent Accomplishments and Activities

- Toward Completing Unfinished Tasks.
 - More than 125 scenes of mid-resolution, optical satellite data were contributed to the FRA2010 Project by CEOS member agencies.
 - A prototype *LSI Constellation Portal for Mid-Resolution Optical LSI Satellite System Information and Enhanced Data Access* was developed in cooperation with CEOS WGISS, and demo'ed at GEO V in Bucharest.
- The Working Group on Radar (WGR), being established to lead LSI Constellation radar activities, likely will focus initially on:
 - Facilitating the application of CEOS agency radar data to the Forest Carbon Tracking sub-task of the 2009-2011 GEO Work Plan.
 - Promotion of operational polarimetric SAR systems.
- The Working Group on Regional Data Set Compilation (WGRDSC) currently is working to assemble initial data sets.
 - Regional areas in South America, Africa, and SE Asia have been defined.
 - Most agencies responded positively to the WGRDSC solicitation of interest in contributing data, and follow-up discussions are underway.



CEAS

Regional Data Set Compilation Areas





Future Plans

- During the past two years, the LSI Constellation has realized some important accomplishments, but much more remains to be achieved.
 - Greater cooperation among CEOS agencies in the operation of their existing systems is possible and needed to expand and enhance the use of land remotely sensed data to the benefit of our global society.
 - Optimal “standards” (guidelines) for future LSI satellite systems need to be determined by the agencies, and their user communities, to ensure that the best possible data are available in the years ahead to address the many compelling problems that will continue to face us in the future.
- The LSI Constellation Study Team will develop its 2009 Work Plan in the near future.
- Participation and support from the CEOS agencies with land surface imaging interests, as well as from members of their user communities, will be critical to achieving LSI Constellation goals for 2009 and beyond.



Strategies for Effectiveness

■ Timing

- Come out of this workshop with specific recommendations that can be delivered before Feb 25 (deadline for Actions Table entries for consideration by SIT-23)
- Prioritize items that can be accomplished in 2009
- For larger issues, break them down into smaller goals that can be accomplished in the short term

■ Pilot studies that Working Groups can accomplish

- Training materials
- Data deliverability
- Data access



Prototype LSI Constellation Portal



Land Surface Imaging Portal - Windows Internet Explorer

http://wgiss.ceos.org/lcip/

Land Surface Imaging Portal

CEOS Land Surface Imaging Constellation Portal

for
Mid-Resolution Optical LSI Satellite System Information and Enhanced Data Access

[Satellites and Sensors](#)

[Direct Access to Data](#)

[About the LSI Constellation](#)

[About this Portal](#)

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Prototype LSI Constellation Portal



LSI Portal - Windows Internet Explorer
http://wgiss.ceos.org/lsip/satellites_midres1.shtml

CEOS Land Surface Imaging Constellation Portal

for
Mid-Resolution Optical LSI Satellite System Information and Enhanced Data Access

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Overview

- CEOS Agency Mid-Resolution Optical Satellite Systems
- Satellites**
 - Satellites & Sensors
 - Status & Launches
 - Orbit Information
- Sensors**
 - Band Information
 - Visible & NIR Bands
 - SWIR Bands
 - Thermal Bands
 - Panchromatic Bands
 - Hyperspectral Bands
 - Radiometric & Geometric Characteristics
 - Geographic Characteristics
- Data**
 - Data Access
 - Documentation

CEOS Agency Current and Former Mid-Resolution Optical Satellites & Sensors

Satellite	Sensors	Agencies
ADEOS-1	AVNIR-1	JAXA
ALOS	AVNIR-2	JAXA
CBERS-1	HRCC, IRMSS	CAST, INPE
CBERS-2	HRCC, IRMSS	CAST, INPE
CBERS-2B	HRCC	CAST, INPE
EO-1	ALI, Hyperion	NASA, USGS
IMS-1	MX-T	ISRO
IRS-1A	LISS-I, LISS-II	ISRO
IRS-1B	LISS-I, LISS-II	ISRO
IRS-1C	LISS-III A	ISRO
IRS-1D	LISS-III A	ISRO
IRS-P2	LISS-III A	ISRO
IRS-P6	LISS-III B, AWIFS	ISRO
JERS-1	OPS	JAXA
Landsat 1	MSS	NASA, USGS
Landsat 2	MSS	NASA, USGS
Landsat 3	MSS-B	NASA, USGS
Landsat 4	MSS, TM	NASA, USGS
Landsat 5	MSS, TM	NASA, USGS
Landsat 7	ETM+	NASA, USGS
SAC-C	HRTC	CONAE
SPOT-1	HRV	CNES
SPOT-2	HRV	CNES
SPOT-3	HRV	CNES
SPOT-4	HRVIR	CNES
SPOT-5	HRG	CNES
Terra	ASTER	METI, NASA
THEOS	MS	GISTDA

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