

CEOS Chair's Update

Presented by James G. Yoe

WGCV-21

Beijing, China

October 15, 2003

A Decade of Environmental Observations

**In the next 10 years, there will be
100 new satellite platforms...but
no integrated plans to utilize this
data and transfer its benefits to
society**



Understanding Earth from Space

Since the dawn of time, the Earth has been a planet in constant change. Humanity has been subject to these changes, often without understanding what was happening or knowing how to predict what would happen next. With an increasing global population and greater pressure on resources, we need to understand how the Earth's systems of land, air, water and life interact to make life possible, and to understand how humans may be impacting these systems.

Overview

The **Committee on Earth Observation Satellites (CEOS)** was created in 1984, in response to a recommendation from a Panel of Experts on Remote Sensing from Space, under the aegis of the Economic Summit of Industrialised Nations Working Group on Growth, Technology and Employment. This group recognized the multidisciplinary nature of satellite Earth observation and the value of coordination across all proposed missions. Thus, **CEOS** combined the previously existing groups for Coordination on Ocean Remote-Sensing Satellites (CORSS) and Coordination on Land Observation Satellites (CLOS), and established a broad framework for coordinating all spaceborne Earth observation missions.

Understanding a planet as complex as Earth clearly requires a global effort. In 1984, as scientists were beginning to frame the critical questions that needed to be answered, several spacefaring nations created the **Committee on Earth Observation Satellites (CEOS)**, to coordinate internationally all civil space-borne missions designed to observe and study our planet.

Purpose

CEOS coordinates civil spaceborne observations of the Earth. Participating agencies strive to address critical scientific questions and not to plan satellite missions which unnecessarily overlap each other.

CEOS has three primary objectives in pursuing this goal:

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

Committee on Earth Observation Satellites

CEOS Chairs

2000: Brazil / INPE

**2001: Japan / NASDA /
MEXT**

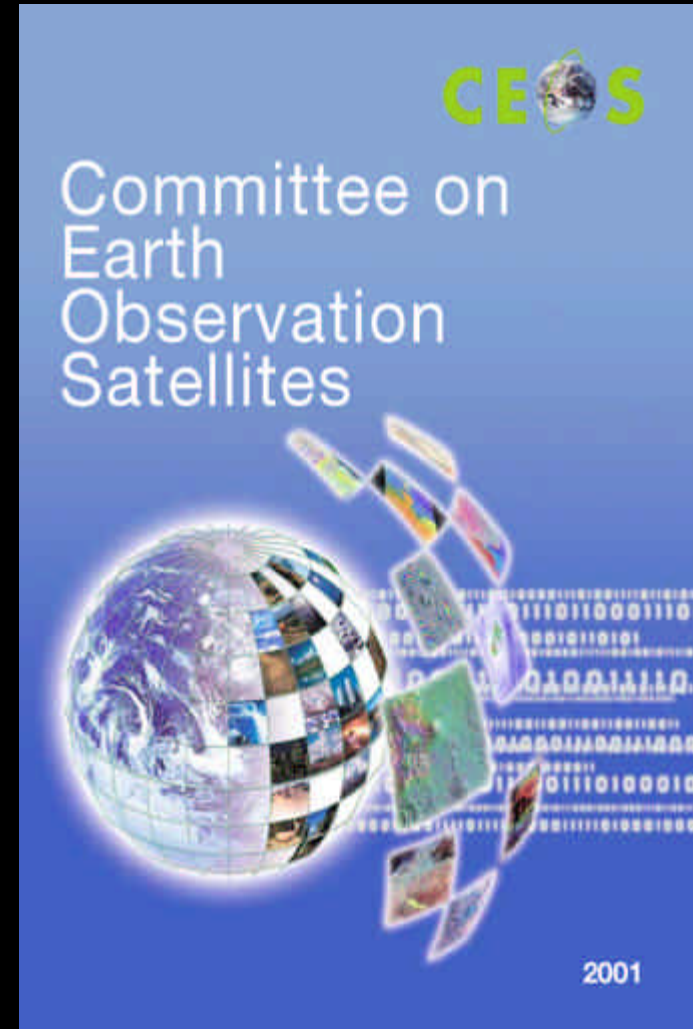
2002: ESA

2003: USA / NOAA

2004: China

2005: UK

2006: Argentina



2003 CEOS Goals

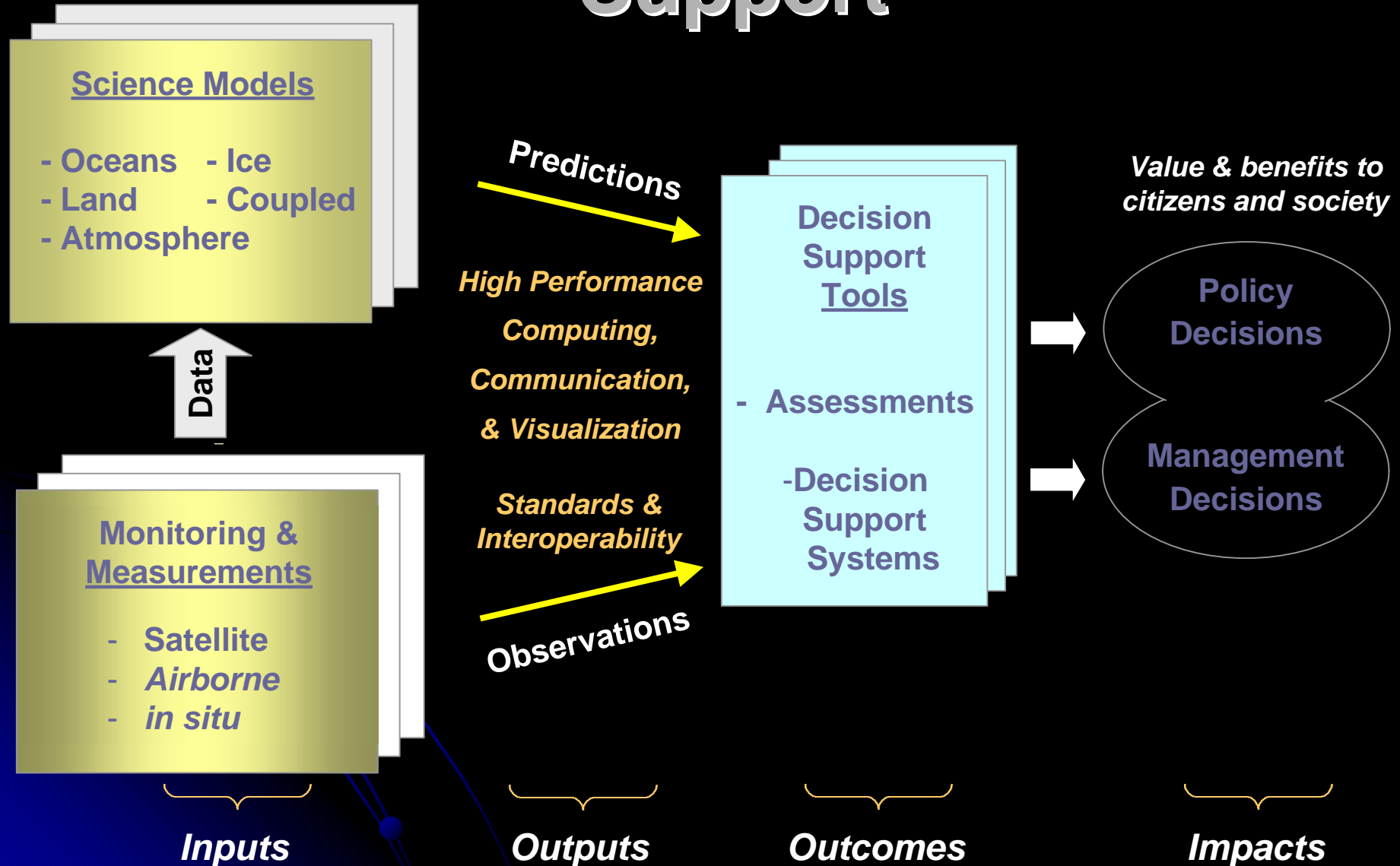
- **Focus on Data Utilization**
 - **Developed a CEOS Utilization Team**
- **Focus on CEOS Follow-up to WSSD**
 - **Supporting a significant effort to focus on the role of providers of Earth observation data, as an outcome of WSSD.**
- **Focus on IGOS Themes**
- **Harmonization among different Earth observation coordinating bodies**

Beyond Traditional Scientific and Academic Data Utilization

Today, satellite data is being used by a diverse set of users for making business decisions, such as:

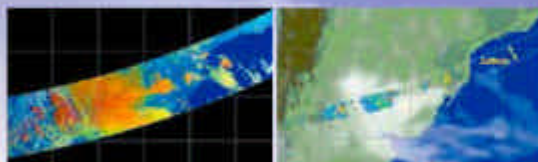
- **Natural resource managers**
- **Disaster managers and responders**
- **Tourism industry**

From Observation to Decision Support

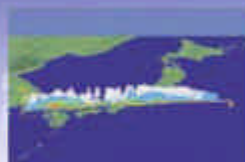


CEOS Data Utilization Events

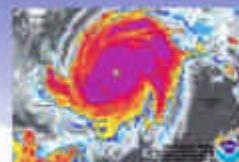
- CEOS/NASDA Workshop, Awaji, Japan, March 13-14
- 3rd World Water Forum in Osaka, Japan, March 18-19
- IUGG – CEOS Discussion on Global Satellite Data Utilization Supporting Environmental Research, Sapporo, Japan. July 2003



Simultaneous images of East coast, Northeast Argentina in December 21, 1997 by VHRR (left) and VH (right).
[NASA/CRL/NASDA]
VHRR: RGB color composite. VH: Horizontal cross-section of rain at 5.0 km height



TIAM 3-D image [NASA/CRL/NASDA]



Hurricane Mitch [NOAA]



Hurricane Mitch, Weyler
[NASDA] [CSA/CCHS]



Distribution of volcanic ash from Mt. Pin.
[SPOT2]



WCOG Global Fire Database
November 28, 2002 (Courtesy MOSES-NASDA)

CEOS' Ad-Hoc Data Utilization Team:

Why is achieving utilization so easy sometimes and so difficult at others?

Scope of CEOS Ad-Hoc Utilization Team:

- Identification of impediments of implementation
- Identification of the right preconditions for adoption of implementation measures
- Facilitating adoption of implementation

CEOS Involvement at WSSD

The 54-page **WSSD Plan of Implementation**, adopted by Heads of State, contains **12** specific **references** to the need for global/satellite/Earth observation



CEOS to Address WSSD Objectives in 5 Module Areas

- 1) **Education, Training and Capacity Building;**
- 2) **Water Resource Management;**
- 3) **Disaster Management and Conflicts;**
- 4) **Climate Change; and**
- 5) **Global Mapping, Land-use Monitoring and Geographic Information Systems**



CEOS WSSD Follow-up Program

- CEOS has a **WSSD Follow-up Team** to coordinate activities and outcomes
- CEOS hosting an **African Stakeholders Workshop** 10/03 in Stellenbosch, SA to design CEOS sustainable development strategy for training and support in various Module areas
- CEOS hosting **Water Resource Management Workshop** in Rabat, Morocco 10/03
- 2004 WS (Asia) on Water Resources

Integrated Global Observation Strategy



Building Blocks for an Integrated Global Observing System

THEMES	Lead Partner	Other Involved Partners	Involved Space Agencies	Observing System(s)
Ocean	CEOS, GOOS	IOC, WMO, others	NASA, CNES, others	GOOS
Carbon	IGBP	GTOS, GOOS	NASA, others	GTOS, GOOS, GAW, others TBD
Water	WCRP	CEOS, others	NASDA, ESA	TBD
GeoHazards	UNESCO, CEOS	others	ESA	GARS Proposed
Atmospheric Chemistry	WMO	CEOS	ESA, NASA, others	GAW, TBD
Coastal Coral	CEOS, GOOS, GTOS UNEP (Coral)	IGBP, UNEP	NASA, NOAA, others	GOOS, GTOS
Atmosphere	WMO	IOC, others	WMO Consultative Group Space Agencies	WWW/GOS

Harmonization

- Working to facilitate ‘harmonization’ among various Earth observing satellite coordination groups, including CGMS, the WMO Consultative Groups, and CEOS.
- Dr. Tillman Mohr, Director-General of EUMETSAT, leads the CEOS Strategic Implementation Team (SIT) in evaluating how best to achieve common goals among these groups, so that we can more effectively coordinate common objectives.

EARTH BSERVATION SUMMIT

Washington, D.C., July 31, 2003

Earth Observation Summit Purpose

- Promote the development of a comprehensive, coordinated, and sustained Earth observation system or systems among governments and the international community to understand and address global environmental and economic challenges.
- Begin a process to develop a conceptual framework and implementation plan for building this comprehensive, coordinated, and sustained Earth observation system or systems.

EO Summit Declaration

- Affirm the need for timely, quality, long-term, global information as a basis for sound decision making.
- We recognize the **need to support**:
 - **Improved coordination of strategies and systems** for observations of the Earth and identification of measures to minimize data gaps, with a view to moving toward a comprehensive, coordinated, and sustained Earth observation system or systems;
 - A **coordinated effort to involve and assist developing countries** in improving and sustaining their contributions to observing systems, as well as their access to and effective utilization of observations, data and products, and the related technologies by addressing capacity-building needs related to Earth observations;
 - The **exchange of observations recorded from *in situ*, aircraft, and satellite networks**, dedicated to the purposes of this Declaration, in a full and open manner with minimum time delay and minimum cost, recognizing relevant international instruments and national policies and legislation; and
 - **Preparation of a 10-year Implementation Plan**, building on existing systems and initiatives, with the Framework being available by the Tokyo ministerial conference on Earth observations to be held during the second quarter of 2004, and the Plan being available by the ministerial conference to be hosted by the European Union during the fourth quarter of 2004.
- To effect these objectives, we **establish an *ad hoc* Group on Earth Observations** and commission the group to proceed, taking into account the existing activities aimed at developing a global observing strategy in addressing the above.
- We invite other governments to join us in this initiative.
- We also invite the governing bodies of international and regional organizations sponsoring existing Earth observing systems to endorse and support our action, and to facilitate participation of their experts in implementing this Declaration.

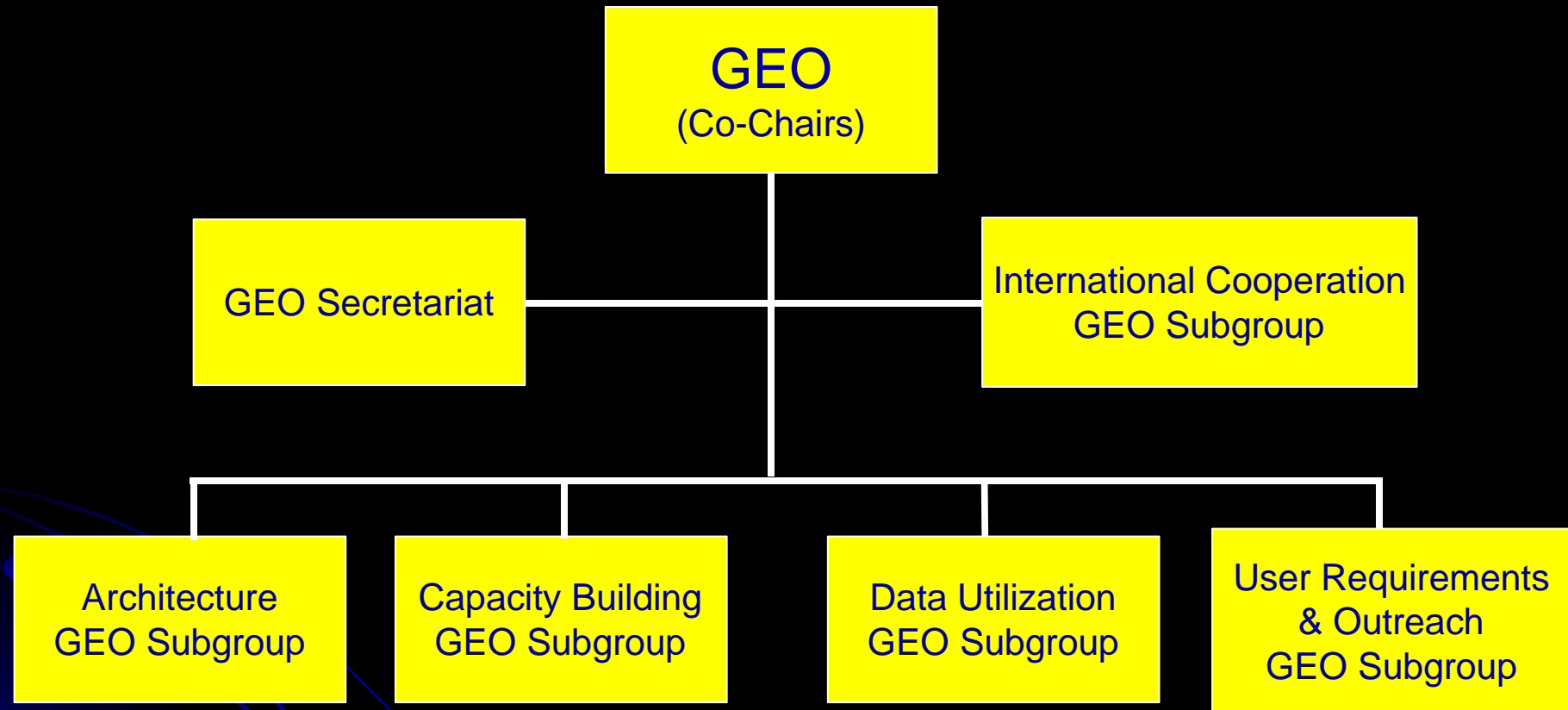
Participating Governments

- Argentina
- Australia
- Belize
- Brazil
- Canada
- China
- Denmark
- Egypt
- European Commission
- France
- Gabon
- Germany
- India
- Ireland
- Israel
- Italy
- Japan
- Kazakhstan
- Mexico
- Morocco
- Netherlands
- New Zealand
- Norway
- Republic of Congo
- Republic of Korea
- Russian Federation
- South Africa
- Spain
- Sweden
- Switzerland
- Thailand
- Ukraine
- United Kingdom
- United States

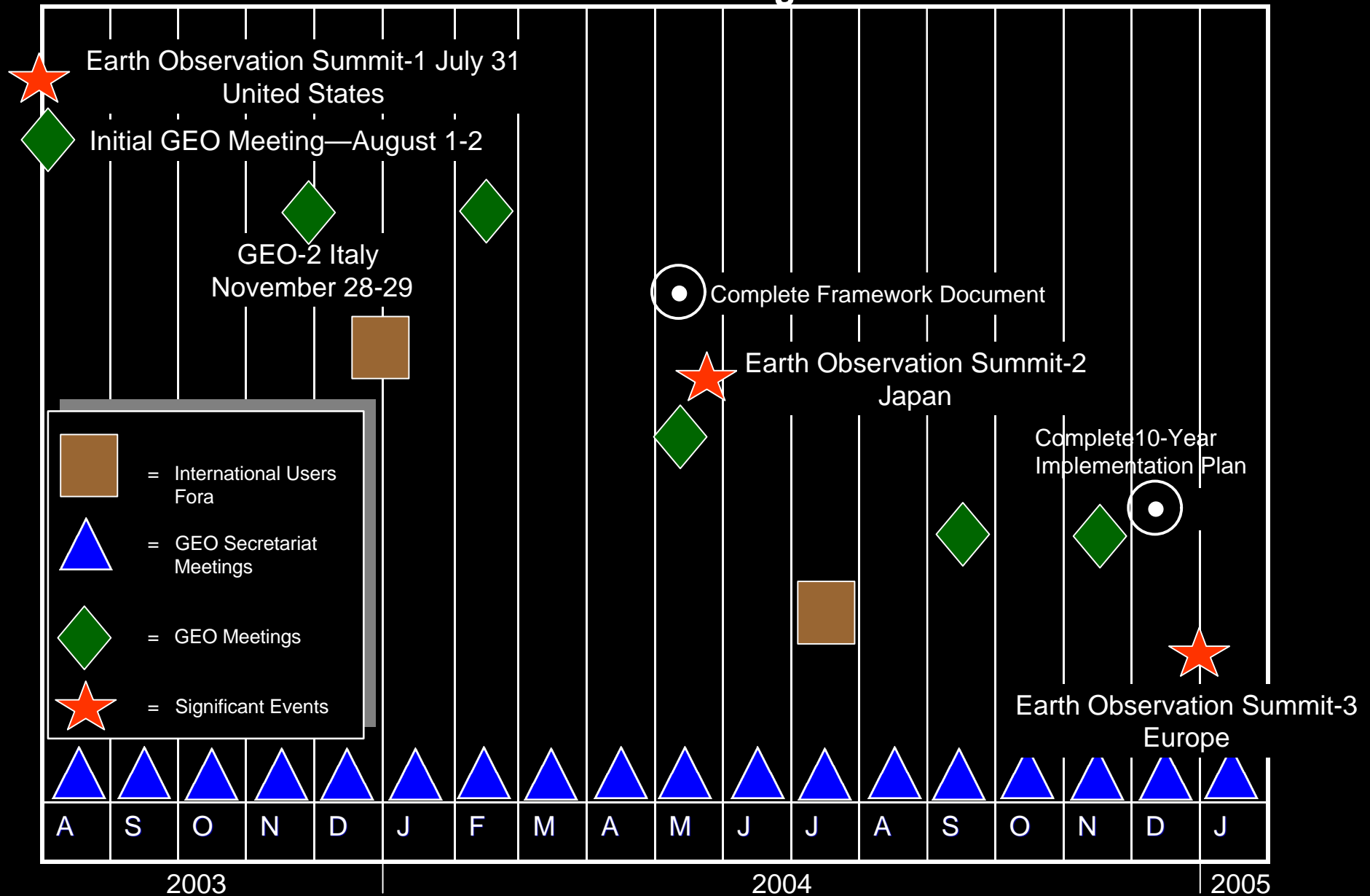
Participating International Organizations

- Central American Commission for the Environment and Development (SICA/CCAD)
- Committee on Earth Observation Satellites (CEOS)
- European Centre for Medium-Range Weather Forecasting (ECMWF)
- European Space Agency (ESA)
- European Organization for the Exploitation of Meteorological Satellites (EUMETSAT)
- Global Climate Observing System (GCOS)
- Global Ocean Observing System (GOOS)
- Global Terrestrial Observing System (GTOS)
- Integrated Global Observing Strategy Partnership (IGOS-P)
- Intergovernmental Oceanographic Commission (IOC)
- International Agency for the Development of Environmental Information (ADIE)
- International Council for Science (ICSU)
- International Geosphere-Biosphere Program (IGBP)
- International Group of Funding Agencies for Global Change Research (IGFA)
- Food and Agriculture Organization of the United Nations (FAO)
- United Nations Educational, Scientific and Cultural Organization (UNESCO)
- United Nations Environment Programme (UNEP)
- United Nations Framework Convention on Climate Change (UNFCCC)
- World Bank (IBRD)
- World Climate Research Programme (WCRP)
- World Meteorological Organization (WMO)

GEO Structure



Ad Hoc Inter-governmental Group on Earth Observation (GEO) Draft Tasking



Agreed Framework Outline

- Introduction
- Purpose
- Benefits/Requirements
- Elements of Earth observation “system”
- Architecture for the Future
- Capacity Building
- International Cooperation
- Challenges

Upcoming GEO Actions


- Members provide response on draft terms of reference for each subgroup by September 19, 2003.
- Secretariat provides annotated draft Framework outline, including Subgroup assignments, to GEO members and participants by September 19, 2003.
- Subgroups begin work no later than October 1, 2003.
- Secretariat prepares website and draft briefing package on GEO by October 14, 2003.
- Secretariat completes draft introduction and purpose sections of Framework by October 31, 2003.
- Draft chapters due to Secretariat from Subgroups by October 31, 2003.
- Secretariat to compile and distribute to members and participants the chapters for first draft framework document by November 14, 2003.
- GEO-2 meeting 28-29 November 2003, Italy.

Fitting It All Together...

- To have an integrated Earth observation system, you must include both **space-based** observations and *in situ* observations.
- CEOS is a key component of IGOS
- IGOS is a **strategy**, which has laid a lot of groundwork for GEO
- GEO will help build a true **system** – the first of its kind on a global scale

Backup Slides

Purpose, Objective, Approach and
Membership of GEO Secretariat
and Subgroups



Secretariat

- Purpose
 - Support the work of GEO under the direction of the Co-Chairs
- Notional functions
 - Organizing and supporting GEO meetings
 - Establishing and maintaining website, e-mail, and associated communication mechanisms
 - Tracking and coordinating work among GEO and its subgroups
 - Provide for technical expertise for the subgroups
 - Draft for the subgroups
 - Introduction and Purpose
 - Annotated Framework Document Outline

GEO Secretariat Membership

- EC*
- Japan*
- South Africa*
- USA*
- Canada
- CEOS
- ESA
- EUMETSAT
- France
- IGOS
- IOC
- Italy
- WMO

International Cooperation Subgroup

- The International Cooperation Subgroup was conceived as an “organizational subgroup”
- Its Terms of Reference have not yet been finalized/publicized

International Cooperation Subgroup Membership

- Australia*
- IOC*
- USA*
- Argentina
- Brazil**
- Canada
- CEOS
- EC
- ESA
- EUMETSAT
- IGOS
- IOC/GOOS
- Israel
- Italy
- Japan
- Russia
- South Africa
- Spain
- Switzerland
- UNESCO
- WMO

Architecture Subgroup

Purpose

- Recommend long-term Integrated Earth Observation System (IEOS) architecture development strategy for GEO.

Objectives

- Reach GEO consensus on the definition, purpose, scope and boundaries of an IEOS Architecture
- Use a structured systems engineering and architecting approach to developing the 10-year IEOS implementation plan

Architecture Subgroup Approach

- Systematically structure the IEOS architecture problem
 - Identify architecture desired outcomes
 - Identify architecture functional requirements that are free of assumed implementation approaches
 - Assess current international Earth observation system capabilities (inventory)
 - Identify shortfalls in current Earth observation capabilities (gap analysis)
- Develop several IEOS concepts of operation
 - Assess the cost and technical feasibility of the conceptual alternatives
 - Evaluate the capability of each concept to meet required functions
- Develop a set of alternative architecture solutions
 - Identify strengths and weaknesses of alternatives considered
 - Assess alternatives with respect to meeting desired outcomes and required functions
- Recommend long-term IEOS architecture development strategy for GEO

Architecture Subgroup Membership

- Japan*
- France*
- WMO*
- Argentina
- Australia
- Canada
- CEOS
- China
- EC
- ESA
- EUMETSAT
- Germany
- IGOS
- IOC/GOOS
- Israel
- Italy
- Norway
- Russia
- South Africa
- Spain
- Switzerland
- USA
- UK

Capacity Building Subgroup

Purpose

- Recommend long-term capacity building strategy for GEO

Objectives

- Establish a framework within GEO to facilitate integration of Earth observation technology in knowledge systems and structures in national institutions
- Develop communication mechanisms for local, national and regional coordination of Earth observation capacity building efforts, efficiently using limited resources while avoiding duplication and competition among planned activities.
- Break cycles of donor dependency which undercut, or override, goals of sustainable development

Capacity Building Subgroup Approach

- Assess and harmonize definitions and concepts as required
- Identify and examine existing and proposed Earth observation capacity building activities by national governments and institutions
- Identify priority areas in which Earth observation capacity building would have the greatest impact and benefit to local and national societies
- Identify resources for leveraging, developing and coordinating Earth observation capacity building initiatives
- Recommend a long-term capacity building approach to GEO

Capacity Building Subgroup Membership

- Argentina*
- Belize/CCAD* (Jorge Cabrera)
- Brazil*
- Israel*
- Republic of Congo* (Henri Djombo)
- USA*
- Canada
- CEOS
- EC
- Egypt
- IGOS
- IOC/GOOS
- India
- Italy
- Japan
- Norway
- South Africa
- Spain
- Thailand
- UNESCO
- WMO

Data Utilization Subgroup

Purpose

- Recommend long-term data utilization strategy for GEO to incorporate into 10-year Integrated Earth Observation System implementation plan

Objectives

- Understand various international Earth observation data policies
- Minimize barriers to data accessibility and utility
- Encourage the development and use of common data standards and formats and consistent calibration methodologies
- Understand complexities of various data sources
- Address associated data utilization challenges and requirements

Data Utilization Subgroup Approach

- Develop a GEO data utilization model and strategy for the next decade
- Identify and prioritize the resources required to develop the strategy
- Identify data utilization desired outcomes and required functions
- Identify and evaluate existing data utilization processes from all venues for suitability and viability for GEO use
 - Identify strengths and weaknesses of alternatives considered
 - Evaluate alternatives with respect to meeting desired outcomes and required functions
- Recommend long-term data utilization approach to GEO

Data Utilization Subgroup Membership

- Brazil*
- Canada *
- ECMWF*
- Argentina
- Australia
- CEOS
- China
- EC
- ESA
- Egypt
- France
- GCOS
- Germany
- IGOS
- IOC/GOOS
- Israel
- Italy
- Japan
- Norway
- Russia
- South Africa
- Spain
- Thailand
- USA
- UK
- WCRP
- WMO

User Requirements & Outreach Subgroup

Purpose

- Provide effective mechanism for capture of high priority requirements for current and future Earth observations

Objectives

- Address priority stakeholder requirements in highly visible manner
- Attain and maintain effective dialogue with those stakeholders requiring Earth observations

User Requirements & Outreach Subgroup Approach

- Conduct International Users Fora to engage stakeholders representing decision makers with priority requirements for solutions requiring Earth observations

User Requirements & Outreach

Subgroup Membership

- Canada*
- Italy*
- UK*
- Argentina
- Australia
- CEOS
- EC
- ECMWF
- Egypt**
- ESA
- GCOS
- Germany
- IGBP
- IGOS
- India
- IOC/GOOS
- Japan
- Norway
- South Africa
- Spain
- UNESCO
- USA
- WCRP
- WMO