



GEO
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**Global Earth Observation System of Systems (GEOSS)
Will Transform Understanding of the Environment, Management of Earth's Resources,
and Mitigation of Major Disasters**

58 Countries and EC Support Implementation of GEOSS

A new international partnership, known as the Group on Earth Observations (GEO), is leading a worldwide effort to build a Global Earth Observation System of Systems (GEOSS) over the next 10 years. GEO involves 58 countries, the European Commission, and 47 international organizations. The GEOSS vision, articulated in a 10-Year Implementation Plan, represents the consolidation of a global scientific and political consensus: the assessment of the state of the Earth requires continuous and coordinated observation of our planet at all scales. The programmatic approach of considering the Earth as an integrated system facing major common challenges represents a significant breakthrough, an intentional departure from earlier approaches looking at individual components of the Earth's system.

As a "system of systems," GEOSS will work with and build upon existing national, regional, and international systems to provide comprehensive, coordinated Earth observations from thousands of instruments worldwide, transforming the data they collect into vital information for society. GEOSS will yield a broad range of basic societal benefits, including the reduction of loss of life and property from tsunamis, hurricanes, and other natural disasters; improved water resource and energy management; and improved understanding of environmental factors significant to public health.

What is Earth Observation?

Sound, rational management of the Earth system, in both its natural and human aspects, requires relevant and timely information about our ever-changing planet. Such information is obtained through observations of the Earth, collected through satellites, buoys, seismometers, and other devices, which are transformed through powerful computers into forecasts, maps, and other decision support tools. These tools provide valuable, often life-saving information to end users, including decision-makers, emergency responders, industry, scientists, the media, and the general public.

The need is acute:

- Between 1990-1999, **disasters** killed 500,000 people and caused \$750 billion in damage. Although damage cannot be completely avoided, better coordination of observation systems and data will improve preparedness and thus reduce these losses and help protect other resources. Improved monitoring of hazards and delivery of information about them are critical to prevent hazards from becoming disasters.

- In 1995, the World Bank reported that 80 countries, with 40 percent of the world's population, faced water scarcity, a percentage expected to increase with population growth. This problem persists, particularly in developing countries where water shortages make a major contribution to human misery. Food security and economic well-being depend on reliable supplies of clean water. Yet current water cycle monitoring capability is inadequate for anticipating long-term changes in the global water system.
- The changing pattern of the global climate has important consequences in many areas, including human health, water availability, food security, and energy management. Better short-term and seasonal forecasting, in the range of 1 day to 6 months, will provide essential information for predicting the outbreak of environment-related diseases, improving preparedness for hurricanes and other extreme weather hazards, and optimizing the management of energy resources.

User Focus:

The ultimate objective of GEOSS is to develop the use of Earth observations by a broad range of user communities – from both developed and developing countries and ranging from decision- and policy-makers to scientists, industry, international governmental, and non-governmental organizations. Engagement of these communities to identify their needs for new or improved data is essential to enhancing the adequacy of provided services and products for a wide diversity of applications.

“System of Systems”:

GEOSS aspires to involve all countries of the world, and to cover *in situ* observations as well as airborne and space-based observations. It will develop as a “system of systems,” with components consisting of existing and future Earth observation systems across the processing cycle, from primary observation to information production. Earth observing systems participating in GEOSS retain their existing mandates and governance arrangements, supplemented by their involvement in GEOSS. Through GEOSS, they will share observations and products with the system as a whole and take such steps as are necessary to ensure that shared observations and products are accessible, comparable and understandable, by supporting common standards and adaptation to user needs.

Societal Benefit Areas:

Clear societal benefits will be derived from GEOSS. It is anticipated that the following areas will evolve over time, and that new societal benefit areas may be added:

- Reducing loss of life and property from natural and human-induced disasters.
- Understanding environmental factors affecting human health and well-being.
- Improving management of energy resources.
- Understanding, assessing, predicting, mitigating, and adapting to climate variability and change.
- Improving water resource management through better understanding of the water cycle.
- Improving weather information, forecasting and warning.
- Improving the management and protection of terrestrial, coastal and marine ecosystems.
- Supporting sustainable agriculture and combating desertification.
- Understanding, monitoring and conserving biodiversity.

Governance

The Group on Earth Observations (GEO) is comprised of 58 member countries, the European Commission and 47 participating international organizations. The GEO Secretariat was established in Geneva in May 2005, and the first Director, José Achache, assumed leadership in September 2005. The Secretariat will serve as the center of international coordination for the worldwide GEOSS effort.

The GEO leadership includes a regionally elected 12-member Executive Committee as follows:

Americas

United States (co-chair: Vice Admiral Conrad C. Lautenbacher, USN-Ret.)

Brazil

Honduras

Europe

European Commission (co-chair: Prof. Achilleas Mitsos)

Italy

Germany

Africa

South Africa (co-chair: Dr. Rob Adam)

Morocco

Asia/Oceania

China (co-chair: Dr. Zheng Guoguang)

Japan

Thailand

Commonwealth of Independent States

Russian Federation

Summits Leading to the Creation of GEO and GEOSS

- The World Summit on Sustainable Development, Johannesburg 2002 (WSSD), highlighted the urgent need for coordinated observations relating to the state of the Earth.
- A meeting of the Heads of State of the Group of 8 Industrialized Countries Summit in June 2003 in Evian, France, affirmed the importance of Earth Observation as a priority activity.
- The First Earth Observation Summit was convened in Washington, DC in July 2003, and adopted a Declaration establishing the *ad hoc* intergovernmental Group on Earth Observations (*ad hoc* GEO) to draft a 10-Year Implementation Plan.
- The Second Earth Observation Summit in Tokyo, Japan in April 2004 adopted a Framework Document defining the scope and intent of a Global Earth Observation System of Systems (GEOSS).
- The Third Earth Observation Summit, held in Brussels in February of 2005, endorsed the GEOSS 10-Year Implementation Plan and established the intergovernmental Group on Earth Observations (GEO) to carry it out.
- Heads of State further supported GEOSS in the G-8 Gleneagles Plan of Action released in July 2005.