



**The Global Geodetic Observing System:**  
**Meeting the Requirements of a Global Society**  
**on a Changing Planet in 2020**

**The Reference Document (V0.18)**

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# GGOS 2020 Reference Document

- Geodesy (Earth's geometry, gravity field, rotation, etc.) provides essential measurements for the observation and understanding of the dynamics of the Earth system,
- These dynamics have a very significant “hazard” impact on society;
- Geodetic applications play an important role in our economy and our livelihood;
- Growing awareness that sustainable development cannot be achieved without sufficient knowledge of the state, trends and processes in the Earth system.
- Geodesy is essential for exploring the planets, solar system and beyond;
- GGOS can provide the geodetic reference frame and geodetic products necessary to support these Earth and planetary observations;
- Space techniques give us new, powerful means to understand the the Earth System and to address issues of global change and other societal benefits;
- Essential geodetic measurements require an appropriate geodetic infrastructure (measurement, networks, satellites, analysis, models, etc) and the generation of reliable data products;
- GGOS is the IAG entity to organize and provide these measurements;
- GGOS 2020 Reference is intended to describe the need and the specifications for a global geodetic observing system; its concepts, conventions, and the infrastructure, and services required to address the need;

# GGOS2020 Reference Document

- provides comprehensive background and rationale for GGOS for those who are involved in either implementing and maintaining GGOS or in using observation and products made available through GGOS;
- provides detail background on the requirements, specifications, design and implementation of GGOS;
- written by a team of Chapter Lead Authors, who are supported by Chapter Writing Teams. The authors do not come from geodetic fields alone, but cover in their expertise all fields of Earth sciences and Earth observation.
- provides two-way communication supporting the linkage between GGOS and GEOSS
  - to inform the users in Earth observation (in particular, GEO), science and society about the potential of GGOS, and
  - to ensure that the community developing and operating GGOS is aware of the users' needs and of the requirements to integrate GGOS into GEOSS for maximum mutual benefit.

# Nurture Close Relationships with Key Organizations

- **Intimately tied to Group on Earth Observations (GEO)** which is facilitating the implementation of the *Global Earth Observation System of Systems* (GEOSS), which is trying to decide how to make proper decisions and take proper actions to benefit society in a coordinated, comprehensive and sustained manner
- **Major contribution of GGOS will be the geodetic reference frame and geodetic products to support Earth observations;** GEO has included a specific task AR-07-03 “Global geodetic reference frames” in its Work Plan for 2007-2009.
- **Work closely with funding agencies** so that they understand and support the development and operation of a stable core infrastructure;
- **Work with the satellite missions** so that they understand the importance of operational monitoring of the Earth system.

# Reference Document Chapters

1. Introduction
2. The goals, achievements, and tools of modern geodesy – measurement;
3. Understanding a dynamic planet: Earth science requirements for geodesy;
4. Maintaining a modern society
5. Earth observation: Serving the needs of an increasingly global society;
6. Geodesy: foundation for exploring the planets, the solar system and beyond;
7. Integrated scientific and societal user requirements and functional specifications for GGOS;
8. The future geodetic reference frame;
9. The future Global Geodetic Observing System (GGOS);
10. Towards GGOS in 2020;
11. Recommendations

<b>REVISION HISTORY</b>		
<b>Rev.</b>	<b>Description</b>	<b>Date</b>
1	Version 0.01: Outline of Contents	April 25, 2006
2	Version 0.02: Revision after discussion during EC Telecon	May 3, 2006
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4	Version 0.04: Minor changes according to discussion at GGOS ETC16	June 1, 2006
5	Version 0.05: Minor changes according to discussion on June 7, in Paris	June 11, 2006
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7	Version 0.07: Updates on authors	June 21, 2006
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12	Version 0.12: Updates on authors	September 1, 2006
13	Version 0.13: Updates on authors, draft versions of most chapters included	September 28, 2006
14	Version 0.14: Further edits of all chapters	October 5, 2006
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16	Version 0.16: Chapters 2 and 7 completed, other parts revised	February 17, 2007
17	Version 0.17: Completely revised version	May 24, 2007
18	Version 0.18: Revised based on IAG Hearing results	March 20, 2008

# Scope of the GGOS 2020 Reference Document

- A fresh look at the user requirements and the underlying concepts and infrastructure for the geodetic observations and products, and the design of the future system, which would make use of the maturing space-geodetic and imaging techniques.
- Provides direction for a responsive geodetic observing system – what kinds of tools are available, we would need, and how it would fit together.
- This report provides:
  - an account of the scientific and societal problems as well as practical applications that benefit directly or indirectly from geodetic observations, services and products;
  - a comprehensive overview of the user requirements for geodetic observations and products as derived from a broad range of societal benefit areas and scientific requirements;
  - the functional specifications for a geodetic observing system meeting the user requirements; a concept for future realizations of a (terrestrial) reference systems to meet the user requirements;
  - the design description of a system matching the functional specifications, in terms of conventions, techniques, infrastructure, and data analysis; and
  - considerations and recommendations for the system implementation.

# Plan for GGOS

- Success depends upon finding the most cost effective way to do the job (Scientific and Societal); lots of infrastructure exists, more is needed, more will be provided, but no one is going to give us everything we want;
- Need to work the best strategies for development and implementation, and measuring progress;
- Success will require carefully planned transition from “here” to “there”?
- The development of the GGOS System will require funded research;
- The Program will be built on international cooperation;
- GGOS is being built on the existing IAG Services – they are doing the heavy lifting;
- On the other hand – GGOS is refortifying the mission of the Services;



# **GGOS2020 Strategy Document**

- provides the main vision and an overview of the key elements and strategy of GGOS;**
- aimed towards decision makers, politicians setting priorities, funding agencies deciding on support for infrastructure, research and development, and international and national agencies deciding on infrastructure and monitoring programs.**

## Key points

- Need to build a long term, operational “core” infrastructure
- User requirements for geodetic observations and products are very demanding
- Will require full exploitation of the potential;
- Going to take a lot of convincing