

# *IGS Symposium 3 - 4 March 2004*

## *Role of IGS - National Mapping Agency Perspective*

*by*

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Natural Resources Canada*

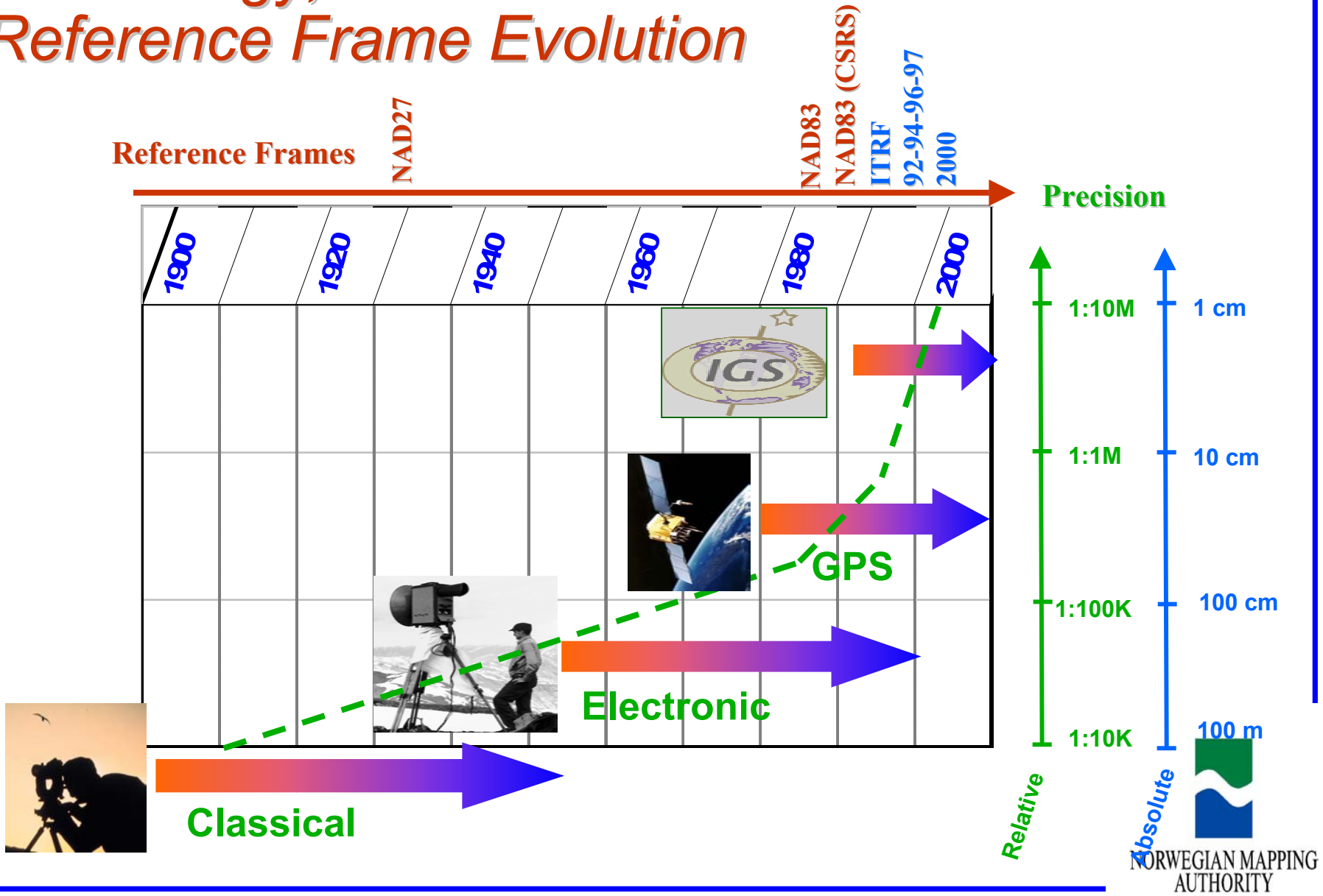


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- ***National Geodetic Authority tasks***
- ***Support to IGS***
- ***An important political initiative***
- ***A vision for the future***

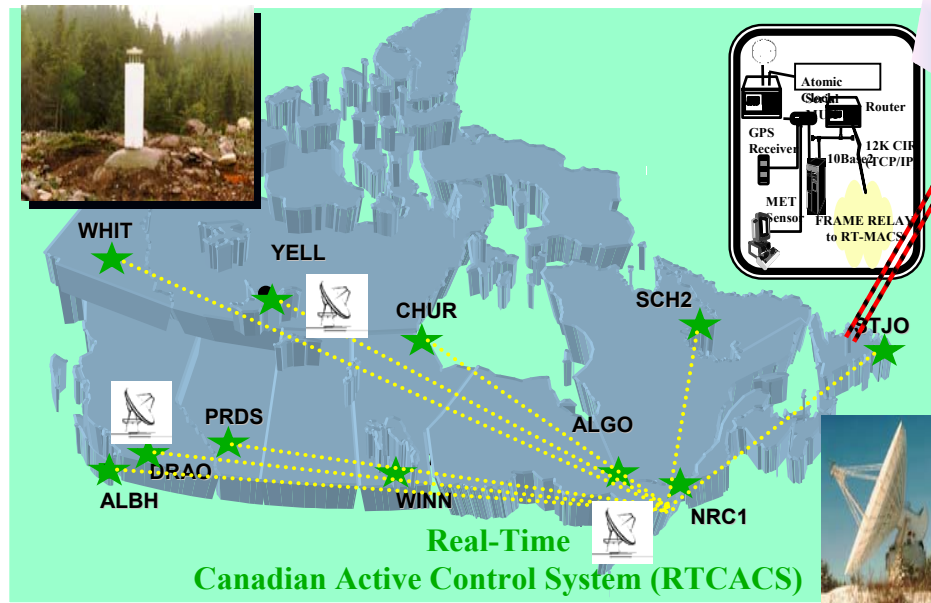
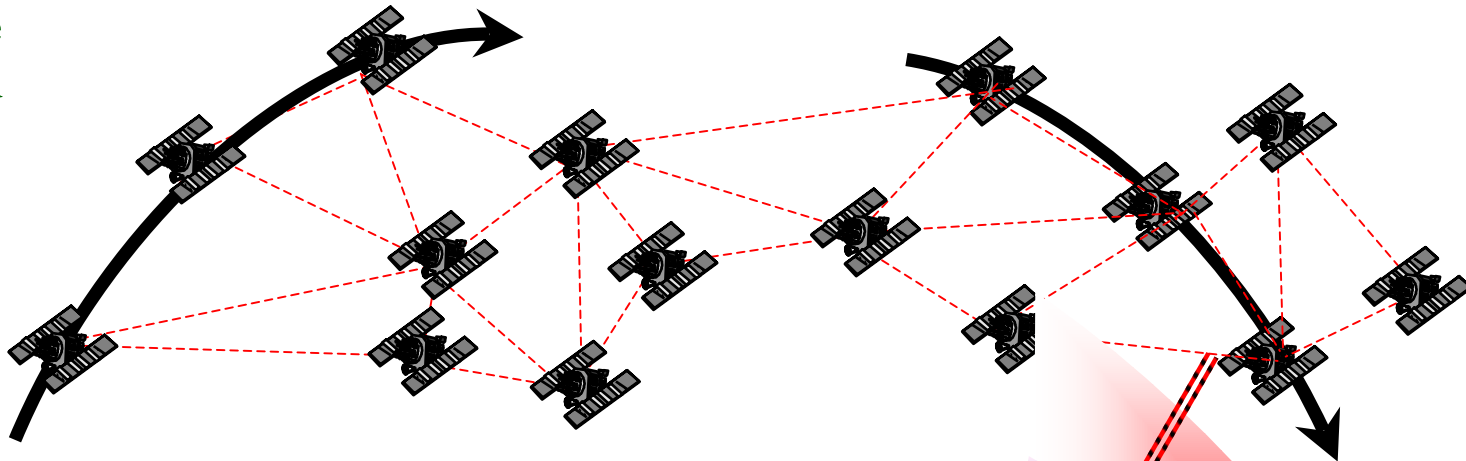


# Technology, Precision and Reference Frame Evolution



# Reference Frame Delivery: The GPS/IGS Revolution

Space Based



Ionosphere  
Troposphere

Ground Based



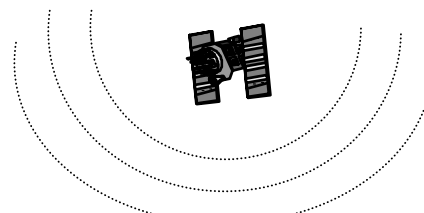
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# ***Enabling Near Real Time (NRT) Geodesy***

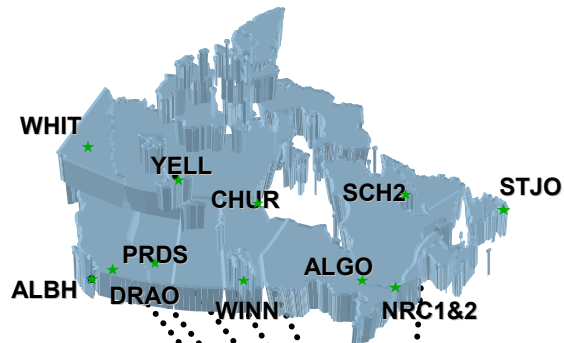
- IGS ultra rapid orbits;***
- NRT Access to wide-area/global GPS observations;***
- Robust code/carrier network processing;***
- High-resolution correction format;***
- Multiple delivery mechanisms and channels;***
- Single/dual frequency user applications.***



# Real-Time Precise Satellite Clocks



## NRCan RTCACS GPS Network



### RTACP Clock

ALBH	HM(Passive)
ALGO	HM(Active)
CHUR	Cs
DRAO	HM(Passive)
NRC1	HM(Active)
NRC2	HM(Passive)
PRDS	Cs
SCH2	Rb
STJO	Cs
WINN	Cs
WHIT	Rb
YELL	HM(Active)

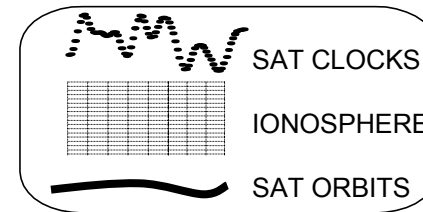
FRAME RELAY  
to/from  
RTACP<->RTMACS

Real-Time  
Observations



INTERNET

Ultra-rapid  
Predicted Orbits



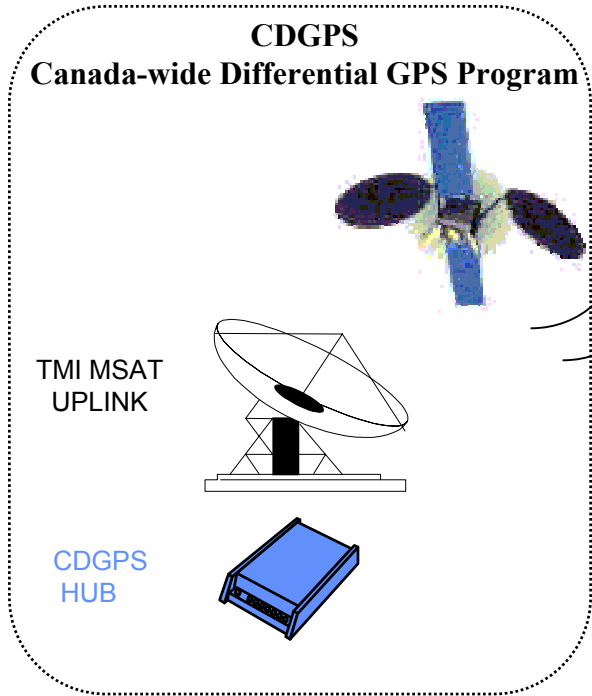
Code/Carrier  
Wide-Area  
Processing Software

GPS•C  
High-Resolution  
Correction Format

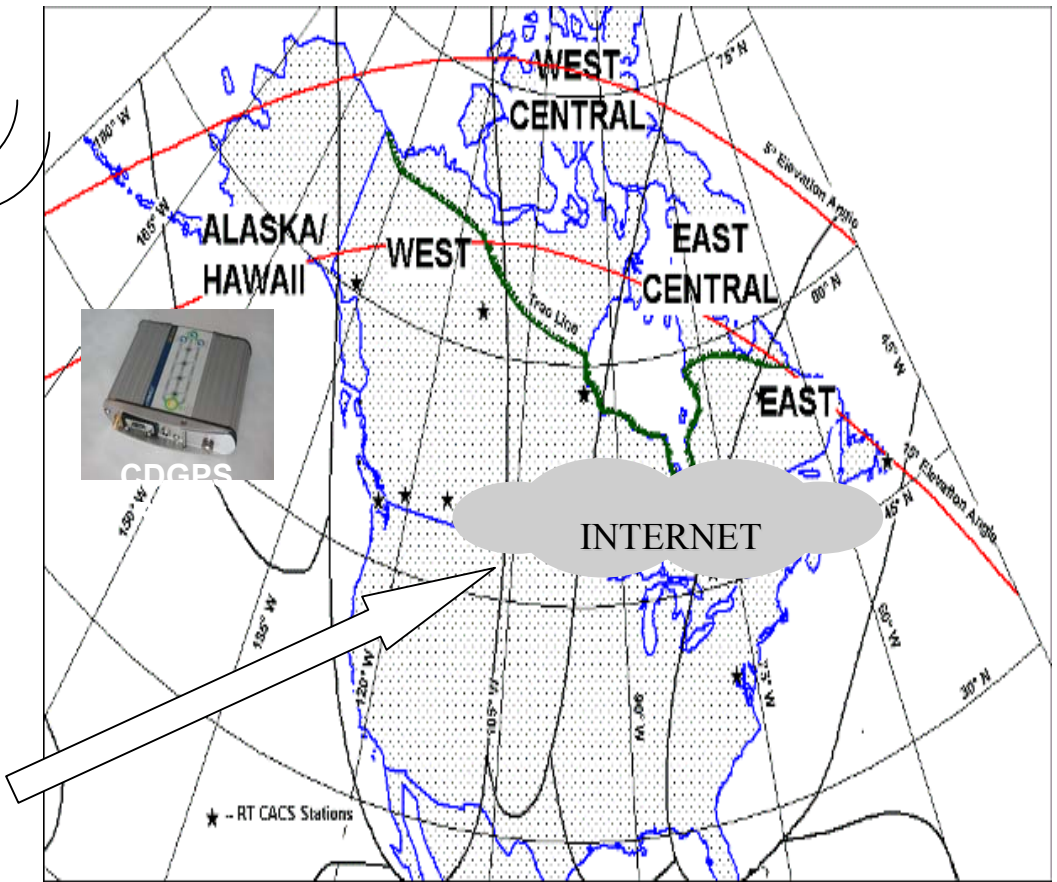
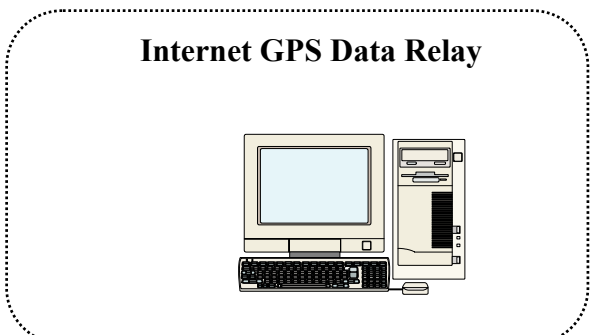


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# Multiple Delivery Channels



## GPS•C High-Resolution Correction Format



# SATREF®

- ❑ SATREF® consists of a network of 27 GNSS Base Stations distributed across the mainland of Norway and Svalbard + 13 ESTB stations distributed across Europe + 7 temporary ESTB in Africa and China.
- ❑ SATREF® is the national service of the Norwegian Mapping Authority for precise positioning based on GPS.
- ❑ SATREF® delivers GPS- and DGPS-data for navigation, positioning and geodetic survey.





# SATREF® Network GPS

- ❑ SATREF® produces corrections for GPS based on various networks of stations
- ❑ Different types of GPS network solutions with different properties. *NMA is currently operating*

Egnos System Test Bed (ESTB),  
(meter level accuracy)

MPOS (meter level accuracy)

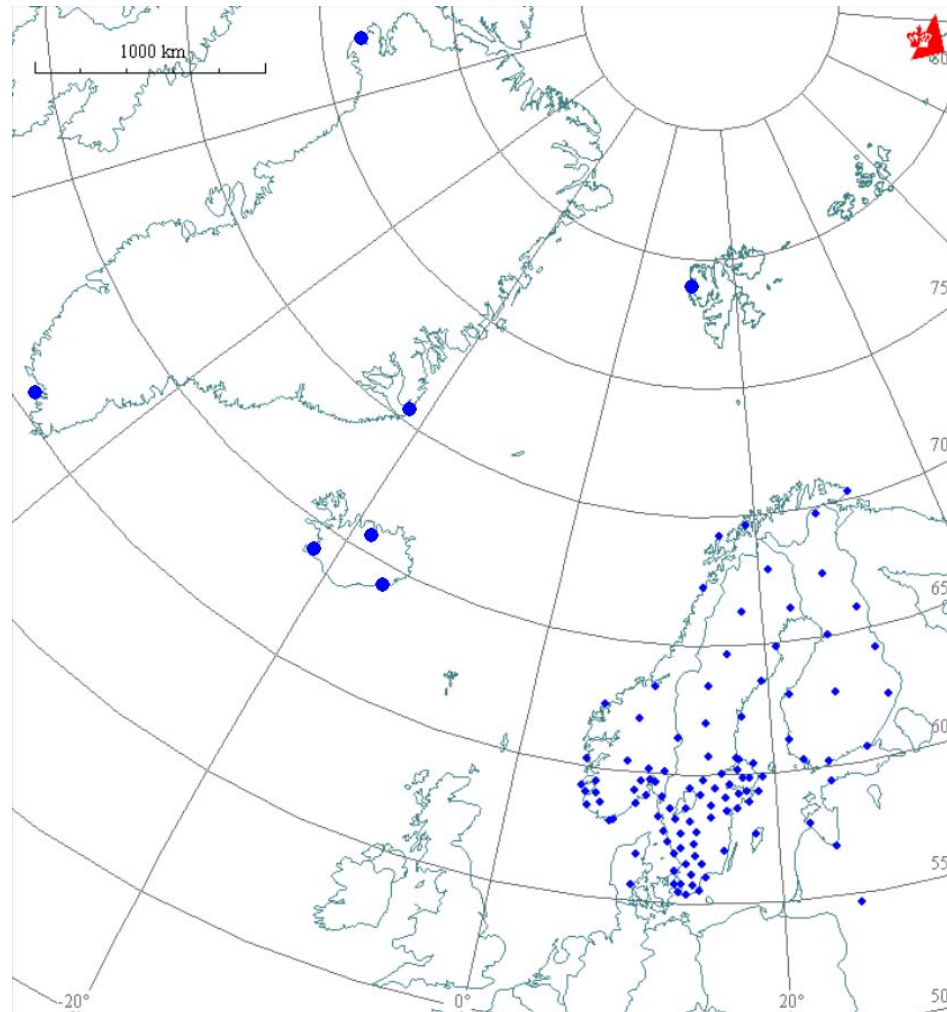
DPOS (decimeter level accuracy)

CPOS (centimeter level accuracy)



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# *Nordic Permanent GPS installations*









## ***Request from North Sea Oil Industry:***

***Can the National Geodetic Authority guarantee the accuracy of the reference frame in open ocean areas to 1 mm per year over a period of 50 years***





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***The most cost effective solution for the national geodetic authorities is to support international cooperation as IGS and the other services***



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***To what extent will national geodetic authorities be able to support IGS, IVS and other services in the future?***



## ***Need***

- ***better VISIBILITY***
- ***clear ROLE***
- ***active LEADERSHIP***





*From the declaration of the Earth Observation Summit held in Washington, DC, on July 31, 2003:*

***Summit Purpose:***

***PROMOTE THE DEVELOPEMENT OF A COMPREHENSIVE, COORDINATED, AND SUSTAINED EARTH OBSERVATION SYSTEM OR SYSTEMS AMONG GOVERNMENT AND THE INTERNATIONAL COMMUNITY TO UNDERSTAND AND ADDRESS GLOBAL ENVIRONMENT AND ECONOMIC CHALLENGES.***

***BEGIN A PROGRESS TO DEVELOPE A CONCEPTUAL FRAMEWORK AND IMPLEMENTATION PLAN FOR BUILDING THIS COMPREHENSIVE, COORDINATED AND SUSTAINED EARTH OBSERVATION SYSTEM OR SYSTEMS.***



## *The ad hoc Group on Earth Observation (GEO)*

***As a result of the Earth Observation Summit, an ad hoc Group on Earth Observation (GEO), was established to prepare a 10-year implementation plan for a coordinated, comprehensive and sustained Earth observation system or systems***



## ***INTEGRATED GLOBAL OBSERVING STRATEGY PARTNERSHIP (IGOS)***

***The IGOS Partnership, created formally in June 1998 include the:***

- ***Global observing systems***
  - ***Global Climate Observing System (GCOS)***
  - ***Global Ocean Observing System (GOOS)***
  - ***Global Observing System and Global Atmospheric Watch of the WMO (GOS/GAW)***
  - ***Global Terrestrial Observing System (GTOS)***
- ***Sponsors of the global observing systems***
  - ***World Meteorological Organization (WMO)***
  - ***U.N. Educational, Scientific, and Cultural Organization (UNESCO)***
  - ***U.N. Environment Programme (UNEP)***
  - ***Intergovernmental Oceanographic Organization (IOC)***
  - ***International Council for Science (ICSU)***
  - ***Food and Agriculture Organization (FAO)***
- ***Committee on Earth Observation Satellites (which includes all national and regional government agencies with an Earth observing satellite system)***
- ***Global change research programs***
  - ***International Geosphere-Biosphere Programme (IGBP)***
  - ***World Climate Research Programme (WCRP)***
- ***International Group of Funding Agencies for Global Change Research (IGFA)***



**EOS - Earth Observation Summit**

**GEO - Group on Earth Observation**

**IGOS - Integrated Global Observing System**

**IGGOS - Integrated Global Geodetic Observing System**

**EPPIGGOS - European Partners in the Integrated  
Geodetic Observing System**

**NGOS - Nordic Geodetic Observing System**

**National Initiativ and Support**



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# ***The IGOS Themes***

- ***The Ocean Theme***
- ***The Global Carbon Theme***
- ***The Global Water Cycle Theme***
- ***The Geohazard Theme***
- ***The Atmospheric Chemistry Theme***
- ***The Coastal Theme/Coral Reef Sub-theme***



***Should IGS apply for  
Team Membership in the  
IGOS Ocean Theme  
and maybe also in the  
IGOS Geohazard Theme?***

