



GROUP ON EARTH OBSERVATIONS

GEO User Interface Committee Task US-06-01

**UIC Member Task Leads:
Lawrence Friedl, USA-NASA
Hans-Peter Plag, U.Nevada-Las Vegas**

**UIC Co-Chair Task Lead:
Ellsworth LeDrew, IEEE (Canada)**

UIC Meeting • Sept. 22-24, 2008 • Boulder, Colorado



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Task US-06-01

GEO Task US-06-01:

Establish a GEO process for identifying critical Earth observation priorities common to many GEOSS societal benefit areas, involving scientific and technical experts, taking account of socio-economic factors, and building on the results of existing systems' requirements development processes.



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Current & Future States of Critical Earth Observation Priorities

Critical Earth Observation Priorities		Currently Available	
		Yes	No
Available in Future	Planned	Good situation	In waiting
	No Plan	Possible crisis	Major gap



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“Critical Earth Observation Priorities”

Critical: Fundamental & enabling; feasible

Earth observations:

Physical, Chemical, Biological, etc. parameters

Priorities: High impact; “Needs before Wants”;
Those Common to Many SBAs



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Parameters & Characteristics

Earth Observations: Notional Examples of Parameters

Atmosphere:

Air temperature
Precipitation
Air pressure
Sea level pressure
Surface radiation
Wind profiles (speed and direction)
Aerosol distribution
Water vapor profiles
Cloud base height
Trace gas concentrat.

Oceans:

Sea surface temperature
Sea surface salinity
Ocean color
Carbon dioxide partial pressure ($p\text{CO}_2$)
Currents
Wave period
Ocean evaporation
Mixed layer depth

Land, Ice & Hydrology:

Soil moisture
Snow pack extent/depth
Wildfire burn area
Forest cover
Forest type
Stream flow
Sea ice thickness
Soil properties
Evapotranspiration
Ice sheet elevation
Phenological state
Standing biomass



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Since some GEO Members and Participating Organizations have already conducted activities to identify Earth observation needs, this process seeks to incorporate and build on those activities.

The process “harvests” observation needs expressed in existing documents. This process tries to avoid the duplication of efforts that GEO Members and Participating Organizations have or will perform as part of their responsibilities.

This process should be viewed as a meta-analysis exercise.

The GEO 10-year Implementation Plan provides a description and summary of topics within each SBA – the IPTT identified some initial observation priorities for each SBA. This process incorporates those IPTT priorities.

Identify critical observations for each SBA then
analyze to identify those common to all or several SBAs



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Earth Observations: Documents, Reports, etc.

Need to examine wide range of sources: International, Regional, National, Projects, etc. The following are examples for Water SBA:

International:

- IGOS-P Integrated Global Water Cycle Observations Theme Report (2003)
- Report from UN/Austria/ESA Symposia on “Space Solutions for Water Management” (2003-2005)
- Report from GEO Inland and Nearshore Coastal Water Quality Workshop (3/2007)
- Reports from World Water Fora and World Water Congresses

Regional & National:

- Workshop on Applications in Public Health for the Indian Ocean Region (2006; drinking water quality)
- Europe: GMES Building an Information Capacity for Environmental Protection and Security
- USA: Earth Science & Applications from Space (2007); Water Availability & Quality Strategic Plan (2006)
- Japan: Earth Observation Satellite Development Plan and Data Utilization Strategy (2005).

Project Reports and Documentation:

- Reports on ESA Earth Obs. for Integrated Water Resource Management in Africa (TIGER; 2004-2006)
- Project on the use of satellite imagery for flood mitigation in the Mekong river delta
- UN project on mapping tsunami-affected coastal aquaculture areas in northern Sumatra



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UIC's Refined Process: Nine Steps

- The process lists the steps serially, yet some of them can be done in parallel.
- With some concurrent activities, this process spans at least 6-7 months.
- Analyst and Advisory Group for each SBA will develop a detailed schedule, milestones, etc.

Step 1: UIC Members identify Advisory Groups and Analysts for each SBA

Step 2: Determine scope of topics for the current priority-setting activity

Step 3: Identify existing documents regarding observation priorities for the SBA

Step 4: Develop analytic methods and priority-setting criteria

Step 5: Review and analyze documents for priority Earth observations needs

Step 6: Combine the information and develop a preliminary report on the priorities

Step 7: Gather feedback on the preliminary report

Step 8: Perform any additional analysis

Step 9: Complete the report on Earth observations for the SBA

When all SBA analyses complete, UIC will compare across them.



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General structure:

An “Advisory Group” and an “Analyst” work together to analyze and report the priorities within each SBA.

Advisory Group (1 per SBA)

Functions:

- Will help to identify documents
- Comment on analytic methods and priority-setting criteria
- Review the analysts’ findings, priorities, and reports.

Approximately 6-10 people from developed and developing countries that represent experts in an SBA

The UIC Communities of Practice and IPTT members may constitute part of this group.

Analyst (1 or multiple across the SBAs)

Functions:

- Will read and analyze the documents
- Develop an analytic method and priority-setting criteria
- Conduct the meta-analysis to identify common priorities within a SBA.

The analyst will be the primary coordinator and organizer of the activity to meet the schedules and deadlines.

Will interact with and utilize the Advisory Group for each SBA



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Task US-06-01: Status

Agriculture SBA

Analyst: Michael Brady
(Funding by Canada)
Forest COP involved

UIC Rep.: Michael Brady

Status:

- Temporary Analyst for 4 months; seeking replacement
- Gathering documents for analysis
- GEO Forest Workshop

Biodiversity SBA

Analyst: Greg Susanke and
Biodiversity COP
(Funding by US-EPA for
Susanne)

UIC Rep.: Gary Foley, Doug
Muchoney

Status:

- Initial analysis
- Advisory Group unclear
- Gathering documents for analysis



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Task US-06-01: Status

Climate SBA

Analyst: Molly Macauley
(Resources for the Future) and
team from Battelle Memorial
Institute
(Funding by USA-NASA)

UIC Rep.: Lawrence Friedl

Status:

- Forming the Advisory Group
- Gathering documents for analysis

Disasters SBA

Analyst: Team from Battelle
Memorial Institute
(Funding by USA-NASA)

UIC Rep.: Lawrence Friedl

Status:

- Forming the Advisory Group
- Gathering documents for analysis



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Task US-06-01: Status

Energy SBA

Analyst: Team from Battelle Memorial Institute
(Funding by USA-NASA)

UIC Rep.: Ellsworth LeDrew

Status:

- Initial work in 2007 by LeDrew & Energy COP
- Forming the Advisory Group
- Gathering documents for analysis

Ecosystems SBA

Analyst: Team from Battelle Memorial Institute
(Funding by USA-NASA)

UIC Rep.: Lawrence Friedl

Status:

- Forming the Advisory Group
- Gathering documents for analysis



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Task US-06-01: Status

Human Health SBA:
Air Quality

Analyst: U.S. EPA rep.
(Funding by USA-EPA)

UIC Rep.: Gary Foley

Status:
- Organizing activities

Human Health SBA:
Infectious Disease

Analyst: Montira Pongsiri, U.S.
EPA (Funding by USA-EPA)

UIC Rep.: Gary Foley

Status:
- Initiating efforts



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Task US-06-01: Status

Water SBA

Analyst: S. Unninayar and
Water COP

UIC Rep.: Rick Lawford

Status:

- Water COP significant part of the Advisory Group
- Workshop discussed

Weather SBA

Analyst: None currently

UIC Rep.: Uncertain

Status:

- Some work by ECMWF
- Some offers by WMO to support an advisory group when it is formed
- WMO documents may suffice



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Parameters & Characteristics

Earth Observations: Parameters

The US-06-01 activity must focus on identifying and gathering specific parameters and their characteristics. Observable or derived parameters.

The US-06-01 activity must avoid gathering general statements of vague, overly-qualitative descriptions of observations

The US-06-01 activity need not address system processing characteristics (e.g., data format, data outlets)



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Parameters & Characteristics

Earth Observations: Parameter Characteristics

Need Quantitative Statements regarding

Coverage/Extent (Global, Regional-Poles, etc.)

Frequency

Resolution (vertical and horizontal)

Timeliness

Accuracy/Precision

The analysts should note whether the parameters are observed or derived



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Parameters & Characteristics

Earth Observations: Examples of Parameter Characteristics

Observation description:

Measurements of Temperature, Ozone, HNO₃, and CH₄ above 10-50km with vertical resolution of 2km and global coverage at 70% accuracy.

Monthly measurements (or more frequent) for CH₄ and HNO₃; daily for Temperature and Ozone.



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Task US-06-01: Example of Input to Analysis

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Example of Data Gathering from US-06-01 Analysis for a Generic SBA

Priority Earth Observation Parameter Geo/Phys/Chem/Bio	Report A	Report B	Report C
	<i>Characteristics</i>	<i>Characteristics</i>	<i>Characteristics</i>
Precipitation	10km every 12hrs.	50km every 3 hrs.	5km every 24hrs.
Sea Surface Temperature	$\pm 1^{\circ}\text{C}$ at 1 deg. grid every 3days	$\pm 3^{\circ}\text{C}$ at 1/4 deg. grid every day	Not mentioned
Land Cover	250m daily	Not mentioned	100m every 5 days
etc.	etc.	etc.	etc.

The Analyst and Advisory Group would identify the priority Earth Observations for the particular SBA.

The UIC would then do a meta-analysis across all the individual SBA priorities to identify those that are common.



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Parameters & Characteristics

Earth Observations: Parameters

The US-06-01 activity must avoid gathering general statements of vague, overly-qualitative descriptions of observations

Examples of vague statements of observation needs:

- Observations to detect Tsumanis
- Land cover measurements to support biodiversity assessments

These are too vague to be useful in a US-06-01 analysis



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Task US-06-01: Next Steps

Next Steps:

Draft and send letter from GEO Secretariat

- Announce US-06-01 analysts
- Request documents & ideas for advisory group members
- Special need for documents, reports, etc. from developing countries

Hold initial telecon with all the SBA Analysts

- Review process and ensure some consistency and commonality across the analyses
- Review schedule

Mid-term reports by March 2009; reports for all SBAs by August 2009

Deliver to Plenary VI in 2009



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Comments?
Please send them to:

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