Terms of Reference - GEO User Interface Committee

Goal

• To engage users in the development and implementation of a sustained GEOSS that provides the data and information required within and among the nine societal benefit areas as specified by user groups on national, regional and global scales.

Also a specific goal to address cross-cutting issues and oversee the Communities of Practice (CPs), ensuring continuity & avoiding duplication.
The GEOSS Architecture

Users and Scientific Communities Served By
GEOSS Common Approaches       Systems within their Mandates

UIC Goal
Organize this side of the GEOSS Architecture
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.
The User Requirements Gathering Processes
• Presentation by Dr. Lawrence Friedl

User Needs and System Performance Utility (UNSPU) Proposed Functional Specifications
• Presentation by Dr. Hans-Peter Plag
User Requirements in Support of System Design

Output Goal(s) Definition

Process Definition
- Who
- How
- Based on What

Collect Information
(SBA Teams)

Design Definition
- Functional Specifications
- Architecture

Building Infrastructure
(ADC)

Database
- Common templates for all SBAs
- Overarching, cross-cutting

Analysis
- Comparison of products and UR
- Gap identification
- Identification of unused data

Output: Prioritization
- Critical observations
Overview of the Process

Goal: User Requirements in Support of System Design
Populating and Updating the UNSPU

Consider the User-related Part of UNSPU:

- **Harvesting from existing databases** (*WMO, NASA, NOAA, ...*)
- **GEO UIC**: *Ad hoc* SBA Teams (Lawrence Friedl et al.). *Broadly user-driven?*
- **GEO STC**: Considering the need for comprehensive monitoring, the spatial and temporal characteristics of the quantities determine the necessary monitoring system. *Specific user group driven, science-based.*
- **GEO ADC**: Looking from GEOSS to the user needs in the SBAs. *Provider-drive?*
- **GEO CoPs**: Bring together a lot of specific expertise and understanding of the observational needs: *Good test case: Air Quality!*

Goal should be a Transition:

*Provider-Active to Customer-Active
Offer-Based to Demand-Based*
User - Architecture Committee Link: The Information Interoperability Stack

Shared Knowledge
Joint Decisions

Social Software
Connecting Humans

User Engagement Comm.

Data Sharing
Data Standards, SOA

Architecture, Data Comm.

TCP/IP
GEO Best Practice Wiki (wiki.ieee-earth.org)

User Engagement

Best practices for User Engagement include:
- User Identification (Finding)
- User Interaction (Connecting)
- User Support (Enabling)

User Interactions

Practices for User-User Interactions:
- Community Workspaces

Practice Example

Community Workspaces

Subject area/Theme:
Short summary of Best Practice:
Explain why there is a need for this Best Practice?
Provide an example of Best Practice?
How widely deployed is this practice (if applicable)?
Owner (Originator) / Organisation:
Submitter Contact Information:
Detailed Description of Best Practice

Structure by Template
Exceptional Air Pollution Event Analysis Community Workspace

Exceptional Event (EE):

An air quality exceedance that would not have occurred but for the presence of a natural/nonrecurring event.

What's New

- 2007-11-11: EPA EE Categories, Discussions
- 2007-11-10: Space-Time Trend of PM Compliance
- 2007-11-09: Required Evidence for Flagging EEs
- 2007-11-08: Analysed Exceptional Events
- 2007-10-22: Southern California Wildfires
- 2007-10-11: EE Wiki Up, Telecon EE by Region | EE Analyses

EE Context

Regulatory
- EE Rule
- Talking Points
- EPA Docs
- 1999 EPA Guide

Issues
- Regulatory
- Scientific
- Technical
- Other

People
- People interested in Exceptional Event Analyses

EE-Related Resources

Tools and Methods
- Datasets
- Reports, Papers
- Websites

Air Pollution Events

Illustrative EE Analyses
- Smoke
- Dust
- July 4th
- Candidate Events by EPA Region
- Region 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10
- General EE Catalog

This open community wiki space has been established and is managed by Rudolf Husar, who is working as an EPA contractor. Any information presented on this website or any contribution by EPA personnel to the discussion on this website should not be construed as representing the Agency's position on these issues.
GEOSS Architecture for the Air Quality Community (March 2008)

GEOSS

- GEOSS Clearinghouse
- GEOSS Comp. Registry
- Standards; SIF Registry

Community

- Community AQ Portal(s)
- Community AQ Catalog(s)

Service Offerors, Users, Community of Practice

- Catalog User
- Service Workflow
- Data Analyst
- Policy Analyst
- Decision Maker

- Service Offeror
- Community Of Practice

- Catalog lists, harvests
- Services offers, invokes
- Visualizes
- Reports to
- Informs

Adopted from Percivall, Feb 2008 by R. Husar, March 2008
Facilitating Tools and Methods for GEOSS Framework

Earth System Models
- Weather
- Climate
- Atmosphere
- Others...

Earth Observation Systems
- Remotely-sensed
- In situ

Predictions

Decision Support

Policy Decisions

Personal Decisions

Management Decisions

Societal Decisions

Wiki Workspaces

接続のソフトウェア

User Engagement Comm.

Core Architecture

Subject Access, Service Region

Catalogues

Offerers

Standards, Special Arrangements, Registries

GEO Web Portal and other Clients

GEO Component, Service Region

GEOSS Cleaninghouse

Services

Networking

Community Workspaces

Shared Knowledge Joint Decisions

Data Sharing Data Standards, SOA

Humanware

Software

Software

Humanware

Humanware

Hardware

TCP/IP

GEOSS AP AQ Scenario
UIC Objective – Engage Users

- Enable GEO to address in a systematic, targeted, focused and comprehensive way the needs and concerns of a broad range of user communities in developing and developed countries, across issues and trans-disciplinary needs, with a particular focus on fostering new or less organized communities.

- Enable GEO, in the implementation of GEOSS, to engage a continuum of users, from producers to the final beneficiaries of the data and information.
Potential UIC “call for participation”

Suggestions for three project types:
1. New projects that engage, or needed by, or identified by, developing countries
2. Existing projects needing help identifying, accessing, and applying Earth observations
3. Existing or completed projects wanting an international forum to present their applications

These are for user engagements on application-type projects, which also can provide UIC some insights on user requirements. This requires coordination with CBC and ADC.

Recommendations:

• Provide international applications workshops that will bring together individuals who will be doing the projects and experts who can help facilitate the work
  – Possibly co-sponsored by ISPRS and IEEE
• UIC will need to play a brokering role between user communities and GEOSS resources
User engagement at Workshops
THE SPECTRUM OF USERS

From observations

Earth observations & earth system models
Data-to-Information archiving & services
Decision support tool development
Decision making

Assessment of benefits

Requirements well known

Earth system scientists and modelers
Earth system service providers
Environmental process modelers & researchers
Policy Makers & Environmental managers
Public officials, advocacy groups and the Public

To societal benefits

Not aware that observational Requirements are even needed
Linking Biodiversity Change to Lyme disease Risk (U.S.)
(EPA-CDC-Yale-NASA Ames)

Figure from LoGuidice et al. 2003.
Linking Biodiversity Change to Lyme disease Risk

- Building on an existing CDC-Yale spatial modeling project to test new hypotheses linking tick density and infection rates with new data on meteorology, mammalian, and bird diversity:
  - Does pathogen prevalence reveal spatial patterns that are dependent on climate and landscape characteristics?
  - How does pathogen prevalence respond to changes in habitat structure, vertebrate communities, or other indicators of biodiversity?

- Use of NASA Terrestrial Observation and Prediction System (TOPS)
- Surface map of human risk for infection from Lyme disease throughout the range of the primary vector, *Ixodes scapularis*
- CDC and EPA are collaborators
Linking Biodiversity Change to Lyme disease Risk

• **Who are the users?**
  – State and local health department managers, general public (particularly those living in the higher-risk Northeastern U.S.)

• **What data do they use?**
  – Spatial risk model/map outputs identifying areas of highest risk of Lyme disease in the U.S., based on tick density and rates of ticks infected with the Lyme disease pathogen

• **How do they use these data?**
  – Inform prevention/mitigation guidance to public
  – Assess risk trends over time (LD is the most prevalent vector-borne disease in the U.S.)

• **What types of data do they need to do their work better?**
  – We hypothesize that the inclusion of real-time data on forest fragmentation, and earth observation surrogates for mammalian diversity and bird diversity can improve the spatial risk model to provide better estimates of disease risk at a finer scale. Surrogates to be tested. Pilot study results expected December 2008.
Global Avian Influenza Network for Surveillance (GAINS)  
(USAID, CDC, USDA, Wildlife Conservation Society)

To improve the understanding of the epidemiology of influenza viruses in wild birds, both captive and free-ranging  
To share data on avian influenza to all levels of governments, international organizations, the private sector and the general public.
GAINS in Practice

(OFFLU)

Global Network of Diagnostic Labs

Samples

Lab Results

Comprehensive disease and animal data

Survey and Migration Data

GAINS Data Center

Training in sample and data collection

GAINS Field Training Unit

Global Network of monitoring sites (International NGO partners)

Data users and policy makers (WHO, FAO, OIE, USDA, CDC, HHS, local officials, private industry, individuals, etc.)
• **Who are the users?**
  – Health managers and policy makers (WHO, CDC, HHS, USDA, FAO), local officials

• **What data do they use?**
  – Avian Influenza strain types in wild birds sampled across Asia, Africa, and the Americas

• **How do they use these data?**
  – to identify locations of avian influenza viral strains; identify genetic changes in virus isolates; enhance links with wild bird distribution and migration information; and provide an early warning system for global spread of highly pathogenic avian influenza (HPAI) that threatens domestic poultry and human health as well as biodiversity (particularly avian)

• **What types of data do they need to do their work better?**
  – More timely analyses of collected samples
  – More AI strain identification data to increase spatial coverage of areas at risk
Healthy People in a Healthy Environment (Madagascar) (USAID)

Intersection of human and ecosystem health in Madagascar

Slash and burn agriculture

Increasing population

Migration

3% per year

Significant deforestation

Change in rainfall

Erosion

Decreased soil fertility

Species extinction

200-400 tons /ha/year

Silting up of rice fields = 10,000 ha

Threatened species

Food Insecurity - Malnutrition - Disease

Figure from Lynne Gaffikin, Presentation to COHAB2 Side Session, 27 February 2008, Galway, Ireland
Healthy People in a Healthy Environment
(Madagascar)

- People with limited resources, especially in rural areas, cannot exercise adequate stewardship over natural resources upon which their lives depend unless their basic needs are met for: **health, nutrition, livelihood**
- NGO consortium worked together to facilitate access to health care, better nutrition through promotion of breastfeeding and natural resource management guidance
- Communities engaged through “Champion Community” “Farmer to Farmer” and “Child to Community” approaches
- This integrated approach has proven to be an efficient way of providing multi-sectoral services to remote areas, resulting in measurably improved basic maternal and child health, and environmental management (compared to when issues addressed independently).

*Slide adapted from Presentation by Lynne Gaffikin, COHAB2 Side Session, 27 February 2008, Galway, Ireland.*
Healthy People in a Healthy Environment

• **Who are the data users?**
  – Project intervention managers, local environmental managers, local health care managers, project evaluators

• **What data do they use?**
  – Indicator data on basic maternal (HIV/AIDS, antenatal care), child health (vaccination, vitamin A coverage), disease prevalence (diarrhea, fever, acute respiratory infections), natural resource management (reforestation, reported slash and burn), household livelihood, year-round food security (agricultural production)

• **How do they use these data?**
  – Assess conditions and trends
  – Raise awareness
  – Track progress toward goals
  – Prioritize issues
  – Address data gaps
  – Evaluate program performance
  – Inform strategic planning

• **What types of data do they need to do their work better?**
  – Prospective, long-term data on health and environmental indicators, covering many communities across different landscape conditions
  – Indicator data at regional and national levels (by scaling up cross-sectoral community-based strategies)
A user-led community of stakeholders, from providers to the final beneficiaries of Earth observation data and information, with a common interest in specific aspects of societal benefits to be realized by GEOSS implementation.

The Communities of Practice will be self organized and will include stakeholders required to achieve benefits.
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End-to-End Tasks in SBAs
A new SBA theme CoP team?
What’s Next

• Completion of the first round of user requirements gathering by Sept. 2008,
• With the UNUSP databases filled in.
• Discussion on the new WorkPlan; how the UIC can engage in the new end-to-end tasks

• Next meetings of the UIC
  – Boulder, Colorado, September 22-24, 2008, Co-located with ADC and C4 meetings
The GEOSS Architecture

Users and Scientific Communities Served By
GEOSS Common Approaches       Systems within their Mandates

Earth System Models
- Oceans
- Ice
- Land
- Atmosphere
- Solid Earth
- Biosphere

Data

Earth Observation Systems
- Remotely-sensed
- In situ

Predictions
- High Performance Computing, Communication, & Visualization

Standards & Interoperability

Observations

Decision Support Systems
- Assessments
- Decision Support Systems

Societal Benefits
- Policy Decisions
- Management Decisions

Success begins and ends on this side of the architecture

Ongoing feedback to optimize value and reduce gaps

User Requirements