

Evaluating SDI Best Practice

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Workshop Agenda

- Terminology: What is SDI – for you – and why does the definition matter?
- SDI preparedness: What is your “SDI Readiness Index”?
- SDI performance evaluation & monitoring
- SDI “Best Practice Guidelines” - some examples
- Developing a SDI “Best Practice Checklist”

Terminology: What is the SDI?

- Why the definition you adopt matters.
- It has a direct impact on:
 - Assessing preparedness, i.e. what are you preparing for?
 - What resources will you need – people and budgets?
 - What good will it do – for you and your users/customers?

Writing Assignment #1

In no more than 100 words – and in the time allowed – write **YOUR** definition of what **“Spatial Data Infrastructure”** means – to you.

Spatial Data Infrastructure – definition 1

SDI Cookbook definition for SDI:

“... the relevant base collection of technologies, policies and institutional arrangements that facilitate the **availability** of - and **access** to - spatial data. The SDI provides a basis for spatial data discovery, evaluation, and application for users and providers within all levels of government, the commercial sector, the non-profit sector, academia, and by citizens in general.”

GSDI Association, 2004

Spatial Data Infrastructure – definition 2

- “a framework of policies, institutional arrangements, technologies, data and people that makes it possible to **share** and **use** effectively geographic information.”
- “common denominator...
 - framework data
 - metadata
 - policy framework
 - coordination”

Craglia & Johnston, AGILE Conference, 2004

Spatial Data Infrastructure – definition 3

Article 3 (1). 'infrastructure for spatial information' means metadata, spatial data sets and spatial data services; network services and technologies; agreements on sharing, access and use; and coordination and monitoring mechanisms, processes and procedures, established, operated or made available in accordance with this Directive;

INSPIRE Directive, European Commission, 2007

What elements from these definitions are in your vision of an SDI?

- data – the heart of the system – 'any data that has a location tag';
- metadata (so you can find data and use it more effectively);
- services (data and network services) and technologies to deliver those services;
- policies (acquisition, ownership, pricing, access, sharing, dissemination, custodianship, preservation, governance, ...);
- agreements (relating to policies and technologies, including standards);
- institutional arrangements, including leadership, coordination, enforcing agreements, etc.;
- financial implications, i.e. resource requirements, cost-benefit;
- monitoring and reporting – how? to whom? why?

SDI definitions vary for good reasons

- Information infrastructures are created in order to serve a purpose, achieve outcomes and impacts, often at great expense and over long periods of time.
- Don't forget that the rationale for a national or regional SDI may not be the same as for an organisation's own (internal) SDI or an institutional/thematic SDI.
- Does your (internal) organisational SDI need to – or be able to – fully mesh with a national or regional SDI?
- The answer is (probably) 'Yes', but perhaps at different levels – and to different degrees.

SDI Preparedness

- Information requirements & information audits
 - What to include in an info audit?
 - When was the last time you did one for your unit, department or agency?
- Assessing SDI maturity levels – review the work of Kate Lance and others regarding levels of SDI Maturity or Institutionalization, based on research completed over the past two years.

Note: Kate is the co-Chair of the GSDI Association Legal & Socioeconomic Working Group for several years now.

SDI Maturity

(from Kate Lance presentation 2006)

- A sign of SDI maturity is when an SDI committee is able to look comprehensively at investments of individual agencies as a unified suite of investments for SDI (an SDI investment portfolio).
- Tracking of investments is a first step in laying the groundwork for cross-agency investment planning... *'fiscal archeology'*.
- A subsequent step would be to link investments to envisioned outputs and outcomes... *'output comapping'* and *'outcome co-mapping'*.

SDI Investment Maturity

Maturity Level	Description
Level 0 – Non-existent	There is no thought-through rationale for budgeting SDI.
Level 1 – Initial (Ad Hoc)	Creating investment awareness, but as yet ad hoc, unstructured, and unpredictable investment processes characterize this stage. Budgeting of SDI-relevant activities is an agency-specific process undertaken with little to no knowledge of what other agencies are planning/budgeting.
Level 2 – Repeated (Aware)	Building the investment foundation; agency 'geospatial investment portfolios' are being compiled; basic SDI project/activity selection capabilities are being driven by the development of selection criteria, including benefit and risk criteria, and an awareness of SDI priorities when identifying activities for funding. Executive oversight is applied on a project-by-project or activity-by-activity basis.
Level 3 – Defined (Refined)	Developing a complete investment portfolio: an SDI committee has a clear picture of what is taking place across all agencies; a cross-agency portfolio has been developed, and a well-defined investment process has been development for future investments based upon collective selection criteria and integrated selection, control and evaluation processes. Executive oversight is applied to SDI development as a whole.
4 – Quantitatively managed	Quantitatively managing investments/improving the investment process: organizations are focused on evaluation techniques, such as performance measurement, to improve investment processes and portfolio(s), while maintaining mature selection and control techniques.
5 – Optimizing	Optimizing: the SDI committee has mastered the selection, control, and evaluation processes and now seeks to shape its strategic outcomes by benchmarking its geospatial investment processes relative to other 'best-in-class' countries.

INSPIRE Monitoring & Reporting

Concepts and methodology

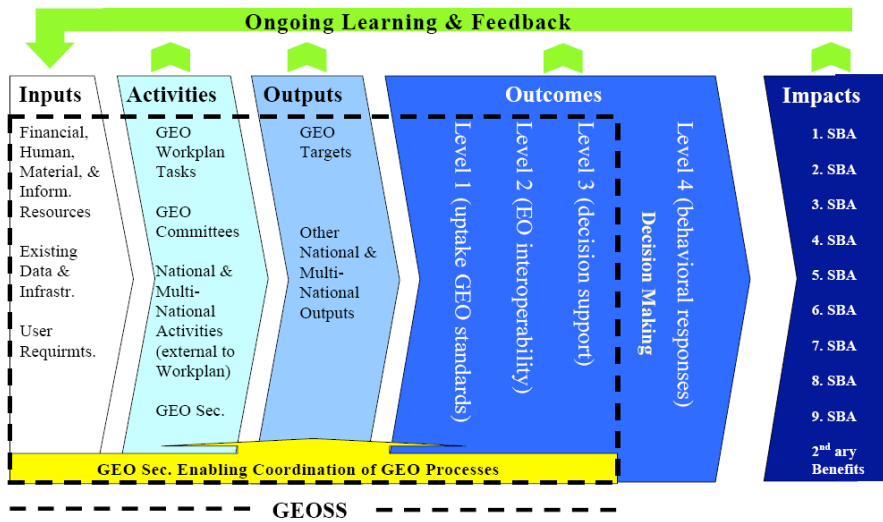
1. A **monitoring mechanism** shall be set-up by the Member States to collect raw data from all the appropriate stakeholders at various levels of public authority. The raw data collected shall be used to calculate the indicators of these implementing rules for each Member State at the national level.
2. The **basis for monitoring** at Member State level is a list of spatial data sets grouped per theme and by Annex as defined in the Directive, and a list of spatial data services grouped by service type in the Directive. These lists shall be established and updated annually by the Member State.
3. The **indicators** described in these implementing rules have been chosen in order to be clear to Member States, measurable, capable of showing progress of the main elements and goals of the Directive and of practical use, particularly to the Member States and the Commission.

INSPIRE Monitoring & Reporting

What is monitored?

1. Existence of metadata
2. Conformity of metadata (to standards)
3. Extent of spatial data sets
4. Conformity of spatial data sets
5. Accessibility of metadata
6. Accessibility of spatial datasets (via services)
7. Use and conformance of spatial data services
8. Organisation, coordination and quality assurance
9. Stakeholders contribution to, and use of, the infrastructure
10. Data sharing arrangements & cost-benefit aspects

Table 1: GEOSS Conceptual Framework for Performance Monitoring and Evaluation



SDI Preparedness – What is your “SDI Readiness Index”?

1. Understanding the information requirement (info audit).
2. Expressing the vision, strategy, expected outputs, outcomes, and impacts.
3. Policy readiness (data & info policy, h/w & s/w policy).
4. Technology readiness (ICT skills, resources and infrastructure; standards understanding and adoption).
5. Data readiness (availability, capture capabilities, processing capacity, experience with dissemination).
6. Resource readiness (people, budgets, skills/capacity building measures, leveraging what already exists).
7. ‘Customer’ readiness - are your users going to benefit from implementing the SDI elements that you are proposing?
8. Cultural readiness (info culture, governance, leadership, etc.)

The SDI Readiness Index Calculator

- This is an attempt to assess - and record - how different stakeholders view the readiness of their governments and organisations (agencies and departments) in regard to the many different types of 'readiness' that apply to implementing any information infrastructure, including SDI.
- The 'scoring' system is left purposely vague at this stage, as it is up to the organisation to decide what elements of 'readiness' are most important for it. In practice, a group of stakeholders would decide what 'score' to attach to each 'readiness' question before the questionnaire was put to use. "1" is lowest value and "10" is highest value, for example.
- Then, a simple "Yes" or "No" determines what the 'score' is for a specific element of 'readiness'.
- The higher the final score, the more prepared an organisation is to implement a successful SDI!

Let's work through the "SDI Readiness Index Calculator" in your handouts.

SDI Best Practice Guidelines GSDI Association [1]

To be designated as an ***SDI Best Practice Implementation*** by the Global Spatial Data Infrastructure Association, an implementation should:

1. meet minimum interoperability requirements by implementing and adhering to a set of core standards in a ***Recommended Minimum Software Standards Suite for Spatial Data Infrastructure***, and
2. meet minimum accessibility requirements by implementing and adhering to the ***Spatial Data Infrastructure Minimum Accessibility Requirements***.

SDI Best Practice Guidelines GSDI Association [2]

2008 Recommended Minimum Software Standards Suite for Spatial Data Infrastructure (SDI-REMSSS 2008)

Software Products.

- A single software product may meet the standards in one or more of the three categories of standards listed in Table 1 in the reference document.
- For example, a single software product might meet both the requirements of OGC WMS 1.1.1 and OGC WMS 1.3, since many products that support a recent standard also support previous versions of the same standard.

SDI Best Practice Guidelines GSDI Association [3]

SDI-REMSSS 2008 Core Standards

- **OGC Web Map Service 1.1.1**
 - **OGC Web Feature Service 1.0**
 - **OGC Filter Encoding 1.1 (used in conjunction with WFS)**
 - **OGC Geography Markup Language 3.1.1**
- plus**
- **OGC Catalogue Service 2.0 HTTP protocol binding, CS-W and**
 - **OpenGIS Catalogue Services Specification 2.0.2 - ISO Metadata Application Profile (1.0.0) (Note: supports ISO Metadata Standard 19115:2003 and ISO DTS 19139:2006)**
- or**
- **OGC Catalogue Service 2.0 Z39.50 protocol binding and**
 - **FGDC Content Standard for Digital Geospatial Metadata (CSDGM, 1998)**

SDI Best Practice Guidelines GSDI Association [4]

SDI-REMSSS 2008 Supplemental Standards

- OGC Styled Layer Descriptor 1.0: SLD 1.1.0
- OGC Web Map Context 1.1: WMC 1.1
- OGC Web Coverage Service 1.0: WCS 1.0 or WCS 1.0.0
- OpenGIS Sensor Model Language 1.0.0: SensorML 1.0.0
- OpenGIS Sensor Observation Service 1.0.0: SOS 1.0.0
- KML 2.2 Reference – An OGC Best Practice: KML 2.2

Future Candidate Core Standards

- OGC Web Map Service 1.3: WMS 1.3.0
- OGC Web Feature Service 1.1: WFS 1.1
- OGC Geography Markup Language 3.2: GML 3.2.1

SDI Best Practice Guidelines GSDI Association [5]

SDI-REMSSS 2008 - *Implementations.*

- An SDI implementation designated as an ***SDI Best Practice Implementation*** must support at a minimum the ***core standards*** set by the Association (previous slide).
- The implementation may also support supplemental standards and future candidate core standards as shown in the reference document, as well as other standards not listed; however, these are not required to gain designation as an ***SDI Best Practice Implementation.***

SDI Best Practice Guidelines GSDI Association [6]

Spatial Data Infrastructure Minimum Accessibility Requirements for *Implementations*.

- The SDI implementation must support at a minimum the ***GEOSS Data Sharing Principles*** for its Web Map Service, Web Feature Service and Catalogue Service as applied to significant proportions of the SDI's data holdings.
- Ideally, the Association highly recommends and encourages adherence to the GEOSS Data Sharing Principles for ***all*** SDI holdings with appropriate exceptions as noted in the principles.

European SDI “State of Play” Reporting

Information Categories - I. Organisational issues Level of SDI

The approach and territorial coverage of the SDI is truly national.

Degree of operationality

One or more components of the SDI have reached a significant level of operationality.

The officially recognised or de facto coordinating body of the SDI is a NDP, i.e. a NMA or a comparable organisation (Cadastral or Land Survey Agency, i.e. a major producer of GI).

The officially recognised or de facto coordinating body for the SDI is an organisation controlled by data users.

Coordination

An organisation of the type ‘national GI Association’ is involved in the coordination of the SDI.

Producers and users of spatial data are participating in the SDI Participants.

Only public sector actors are participating in the SDI.

European SDI “State of Play” Reporting

II. Legal Issues & Funding - *Legal framework*

- There is a legal instrument or framework determining the SDI-strategy or – development. Public-private partnerships (PPP).
- There are true PPP’s or other co-financing mechanisms between public and private sector bodies with respect to the development and operation of the SDI related projects. Policy and legislation on access to public sector information (PSI).
- There is a freedom of information (FOI) act which contains specific FOI legislation for the GI-sector. Legal protection of GI by intellectual property rights.
- GI can specifically be protected by copyright. Restricted access to GI further to the legal protection of privacy.
- Privacy laws are actively being taken into account by the holders of GI

European SDI “State of Play” Reporting

II. Legal Issues & Funding - *Legal framework*

- There is a framework or policy for sharing GI between public institutions. **Data licensing**.
- There are simplified and **standardised licences** for personal use.
- The **long-term financial security** of the SDI initiative is secured. Funding model for the SDI and pricing policy exists.
- There is a **pricing framework** for trading, using and/or commercialising GI.

European SDI “State of Play” Reporting

Reference Data & Core Thematic Data

Scale and resolution

- Geodatasets exist which provide a basis for contributing to the coverage of pan-Europe for the INSPIRE-selected data themes and components. Geodetic reference systems and projections have been agreed.
- The geodetic reference system and projection systems are standardised, documented and interconvertable. Quality of reference data & core thematic data.
- There is a documented data quality control procedure applied at the level of the SDI Interoperability.
- Concern for interoperability goes beyond conversion between different data formats.
- The national language is the operational language of the SDI. Language and culture issues are recognised and accommodated.
- English is used as secondary language.

European SDI “State of Play” Reporting

Metadata for reference data and core thematic data

Availability of metadata

- Metadata are produced for a significant fraction of geodatasets of reference data and core thematic data. Metadata catalogue availability + standard.
- One or more standardised metadata catalogues are available covering more than one data producing agency. Metadata implementation.
- There is a coordinating authority for metadata implementation at the level of the SDI.

European SDI “State of Play” Reporting

V. Access and other services for reference data, core thematic data and metadata

Metadata

- There are one or more on-line access services for metadata on reference data and core thematic data.

Data

- There are one or more on-line access services for reference data and core thematic data Web mapping.
- There are one or more web mapping services available for reference data and core thematic data.

VI. Standards

Standards

- The SDI-initiative is devoting significant attention to standardisation issues.

VII. Thematic environmental data

Thematic Environmental data

- Thematic environmental data are covered by the described SDI-initiative or there is an independent thematic environmental SDI.

European SDI “State of Play” Reporting

The latest 5th SDI State of Play reports (2007) are now available for all 27 EU Member States, the four EFTA countries (Norway, Iceland, Liechtenstein, and Switzerland) and the EU Candidate country Turkey - on the EC’s INSPIRE web site at:

http://inspire.jrc.ec.europa.eu/state_of_play.cfm

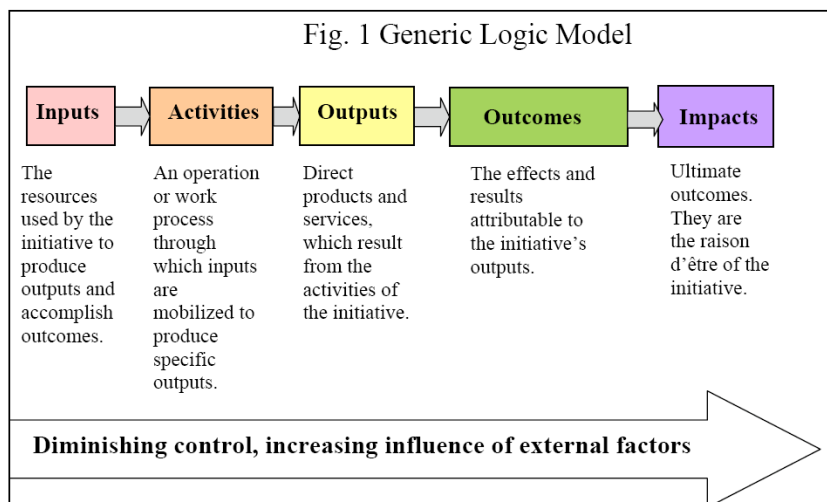
and the analysis and summary report (62 pages) is at:

<http://inspire.jrc.ec.europa.eu/reports/stateofplay2007/INSPIRE-SoP-2007v4.pdf>

Note: From the INSPIRE web site, you can also download the EU SDI State of Play reports for 2003, 2004, 2005 and 2006

GEO/GEOSS Best Practice Developments

Figure 1 shows a preliminary definition of a generic Logic Model.



GEO/GEOSS Best Practice Developments

Four levels of outcome were preliminarily identified to properly address GEOSS maturation:

- Level 1 - Uptake and application of GEOSS standards, etc., and implementation of GEO recommendations
- Level 2 - Improvement of information systems interoperability and information accessibility
- Level 3 - Increase of the use of Earth observation information by end users as valuable inputs to decision support systems
 - Changes (increase in number and improvement in performance) to decision support products and services
- Level 4 - Effects of the use of improved decision

GEO/GEOSS Best Practice Developments

- Let's take a short detour through the GEOSS 'Best Practice' development approach, using their newly instituted wiki.
- Slides courtesy of Ruth Duerr, Jay Pearlman, and Siri Jodha Singh Khalsa from their report to the GEO committee in February 2008.
- Note that the wiki is now up and running – and moderators are begin actively solicited!

<http://wiki.ieee-earth.org/>

Best Practices Wiki

**Ruth Duerr NSIDC, IEEE
Jay Pearlman, IEEE
Siri Jodha Singh Khalsa, IEEE**

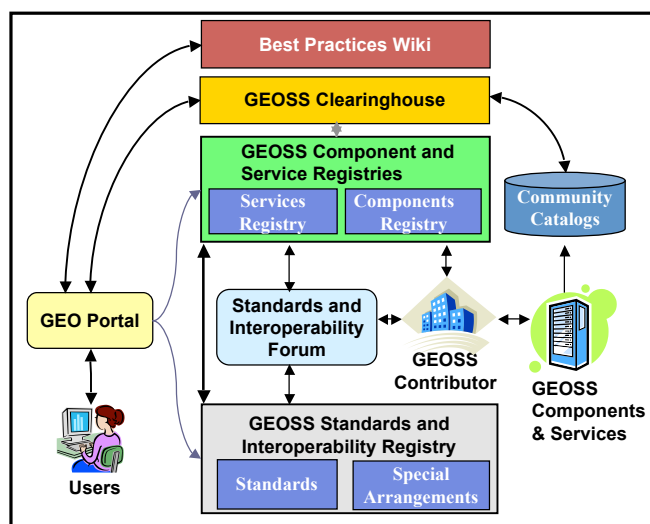
Report to GEO Committees

February 2008

What is a best practice?

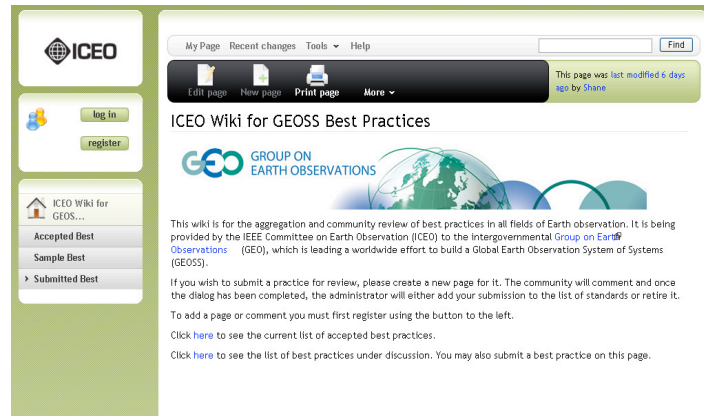
- Best practices can be in outreach and capacity building, observation techniques or models and analysis
- They can be very simple or complex
- They can be local, regional or global
- They can be determined by peer acceptance

Best Practices within the Architecture



Best Practices Wiki

- Objective: facilitate population of an open access repository of accepted best practices for GEOSS

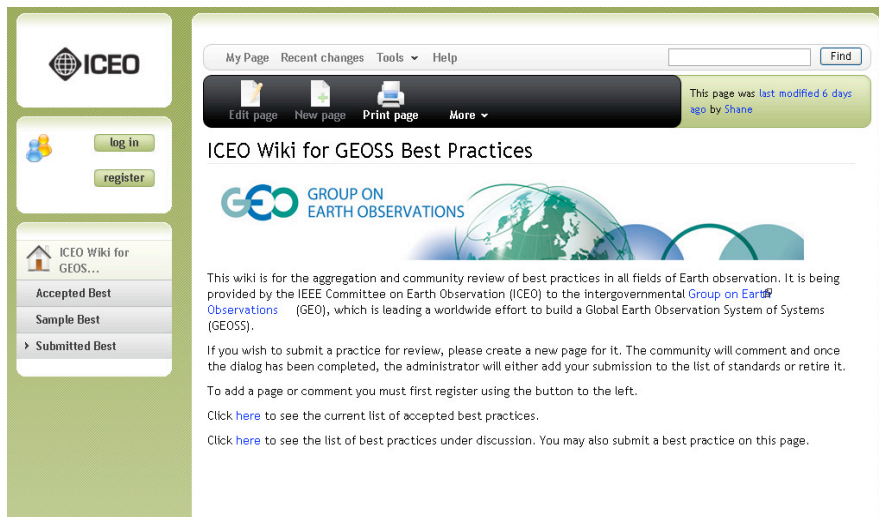


15 June 2009

WIKI.IEEE-EARTH.ORG
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Best Practices Wiki

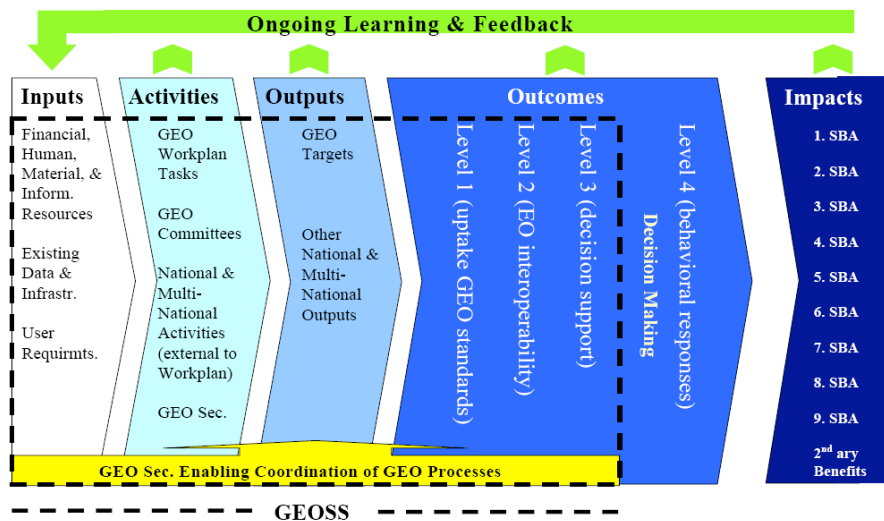


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Table 1: GEOSS Conceptual Framework for Performance Monitoring and Evaluation



BP Wiki Concept of Operations

- Individual or organization proposes a practice for consideration as a “best” practice by submitting an entry in the wiki.
- Submitted practices undergo an open peer review process.
 - Comments in the wiki are publicly accessible, facilitating a moderated community dialog.
- Facilitators work with SMEs to encourage dialog and submission of comments
- Facilitators also assure that malicious insertions are eliminated.
 - Original contributors should also monitor activities

ISSUES (I)

- How to handle “best” practices that have already been accepted by other international organizations?
 - **For example, after a CODATA committee on data management best practices completes its work in Nov. 2008, upon approved by the full committee these practices will be submitted as best practices for GEOSS. How would CODATA address the responses?**
- Should submitters be expected to place the full text of their practice on a Wiki page or may they supply a full description of the practice as attached files? Some of the considerations are:
 - **Allowing attachments greatly simplifies the submission process thereby increasing the likelihood of submissions at the likely expense to users that are searching for practices on a particular topic.**

Best Practices Wiki - Summary

- Wiki is on-line at <http://wiki.ieee-earth.org>
- Expert volunteers in the pilot subjects are being solicited
- Entries are welcome in the pilot phase subject areas
- Comments on the process should be provided to Ruth Duerr at ruth.duerr@ieee.org
- Your participation is important. Exposure of the Wiki through Members and Organizations and the GEO Secretariat is critical to Best Practice utility

Drawing up a 'Best Practice' List

- Best Practice in relation to SDI development can vary across institutions, due to a number of variables:
 - Size of the organisation (and geographic distribution)
 - Resources (human and budgets)
 - Remit/mandate
 - Primary type of work in which you are involved

GEOSS Data Sharing Principles

- **There will be within GEOSS, recognizing relevant full and open exchange of data, metadata and products shared international instruments and national policies and legislation.**
- **All shared data, metadata and products will be made available with minimum time delay and at minimum cost.**
- **All shared data, metadata and products being free of charge or no more than cost of reproduction will be encouraged for research and education.**

All new members of GEO are required to endorse the Plan and therefore these Principles. The Plan notes that "use of data or products does not necessarily imply agreement with, or endorsement of the purpose behind the gathering of such data."

**see:
http://www.iho.int/INT_ORGS/GEOSS_DRAFT_WHITE_PAPER_17_May.pdf**

Developing the SDI “Best Practice Checklist”

- What constitutes an “SDI Best Practice Checklist” ?
- Yours will (probably) not look the same, although the ultimate goal is to arrive at a single, consistent checklist that can be used by all.
- The checklist has multiple uses – to inform yourself and your senior management and to inform national and regional developers.

The Strawman SDI Best Practice Checklist

Over to you - again!

- More homework - key elements to include in an SDI Best Practice Checklist.
- Policy
 - data sharing, use and re-use (exploitation)
- Technology
 - standards
- Monitoring & reporting

Thank you for your attention

For comments or further questions, please feel free to contact:

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