Tactical Guidance for Current and Potential Contributors to GEOSS

Purpose of this Document: *This short document is for technical managers (e.g. of information systems or data centres) seeking to contribute to and benefit from the GEOSS, and explains the 'process' to be followed to ensure that systems are compatible and suitably interfaced to the GEOSS. A companion 'Strategic Guidance' document provides high-level advice on systems architecture and data management. For additional information about GEO and the GEOSS, see http://earthobservations.org*

INTRODUCTION

The GEOSS is a federated system that grows ever more useful over time as its constituent GEO Members and Participating Organizations link their contributed GEOSS components together. More details may be found in the "Strategic Guidance" document.

All the GEOSS Components and Services need to be registered respectively in the Component Registry and the Service Registry. This registration process for the new components and services provided by the GEO Members and Participating Organizations is described further down in the present document. Following the registration, the components and services become accessible from a centralized or distributed portal/clearinghouse through interoperability arrangements, respecting some constraints like the interoperability standards or the allocation of resources for operation and maintenance. This accessibility through prescribed interoperability arrangements should be validated via a simple test.

These steps are detailed in the following series of Questions and Answers.

This is a living document constantly updated with new inputs. Definitions of the main technical terms used in this document (e.g. component, service…) are provided in an appendix (Appendix 2) at the end of the document.

1 ARE THERE ANY CONSTRAINTS ON THE NATURE OF CONTRIBUTING ORGANISATIONS?

Component registration is open to all GEO Members and Participating Organisations. Membership in GEO is open to all member States of the United Nations and to the European Commission. GEO also welcomes, as Participating Organizations, intergovernmental, international, and regional organizations with a mandate in Earth observation or related activities, subject to approval by GEO Members. GEO may invite other relevant entities to participate in its activities as observers. Membership and Participation in GEO is contingent upon formal endorsement of the GEOSS 10-Year Implementation Plan. For more information about membership or participation in GEO, please contact the GEO Secretariat at secretariat@geosec.org.

Organisations, including commercial organisations, which do not qualify as a GEO Member or Participating Organization, but wish to contribute a component to GEOSS, are encouraged to participate through their respective Member or Participating Organization.

2 WHAT CONSTITUTES A GEOSS COMPONENT AND SERVICE?

The following definitions are used in the context of GEO and GEOSS offerings:

Component A part of the GEOSS contributed by a GEO Member or Participating Organization. Example types of components include: observing systems, data processing systems, dissemination systems, capacity building, or other initiatives. Components may expose ***service*** interfaces to provide access to earth observation-related functions and/or data. Components are described in the *GEOSS Components Registry*.

Service Functionality provided by a component through component system interfaces. Services communicate primarily using structured messages, based on the Services Oriented Architecture view of complex systems. Services are described, along with information about their operating organizations, in the *GEOSS Service Registry*. Services should reference GEOSS-registered standard or interoperability arrangement contained in the *GEOSS Standards and Interoperability Registry*.

An online component and service registration system (http://uddi.csiss.gmu.edu/geosspub/login.jsp) has been developed to formally register components and services for use in GEOSS. The Component Registration Form (Appendix 1) may be used to nominate components for the GEOSS to the GEO Secretariat at any time. Nominated components can be on any geographic scale – local, national, regional or global.

Components may be initiatives, programmes, or systems of varying complexity. Components can be comprised of an entire end-to-end system – encompassing steps from observation through to data modelling and information dissemination. Components might also comprise smaller parts of such a system. Components that are part of larger registered Components and exhibit service interfaces need not be individually registered as GEOSS components. However, the services of these components should be registered in the Services Registry, referencing the larger component, if these services have not already been registered through another GEOSS component

The overall information flow of the GEOSS component registration is shown in Fig. 1

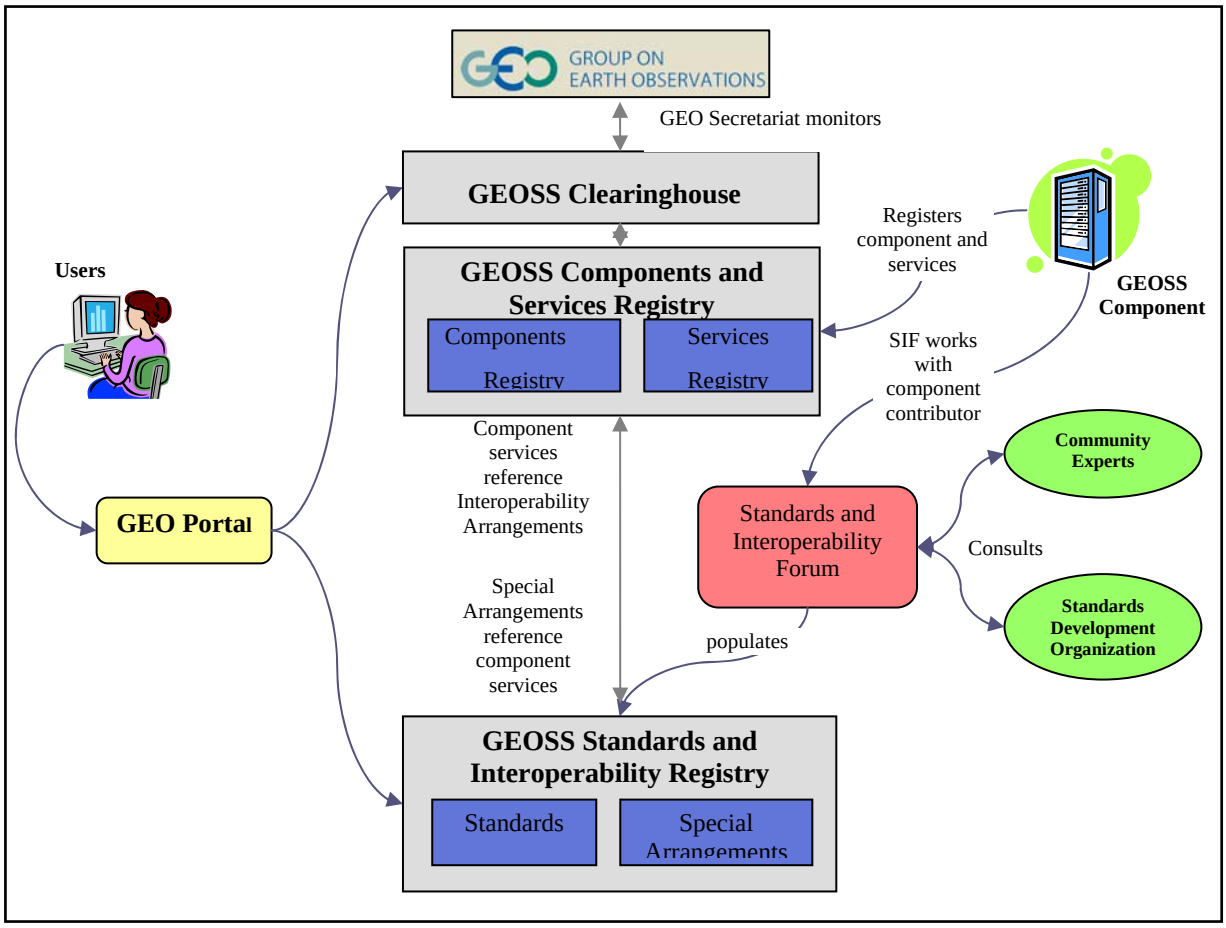

Fig. 1: Overall information flow of the GEOSS component registration

User can access to the GEOSS Clearinghouse through the GEO Portal (http://TBD) which will link to the Component Registry. Users can register components in the Components Registry and then its services in the Services Registry. In registering services, the user can refer to the Standard Registry and the Special Arrangements Registry in the GEOSS Standards and Interoperability Registry (http://seabass.ieee.org/groups/geoss/). The scope of standards and interoperability arrangements cover not only those related to clearinghouse/services, metadata/data format, but also those related to observing, processing, storage and dissemination capabilities (e.g. GEONETcast).

3 WHAT ARE THE REQUIREMENTS FOR CONTRIBUTING A COMPONENT TO GEOSS?

Contributors must ensure that the component is compliant with basic GEOSS interoperability principles, as described in the Component Registration document (Reference here). Interfaces to the component must be clearly defined and should be conformant to one of the standards in the GEOSS Standard Registry or be listed as a “GEOSS Interface Special Arrangement (GISA)” in the Special Arrangement Registry.

4 HOW DO I ENSURE OUR SYSTEMS ARE COMPATIBLE WITH AND SUITABLY INTERFACED TO THE GEOSS?

Simply by following the 'Registration Process' summarized in Fig. 2 and explained step-by-step below (Steps follow the numbering in the diagram):

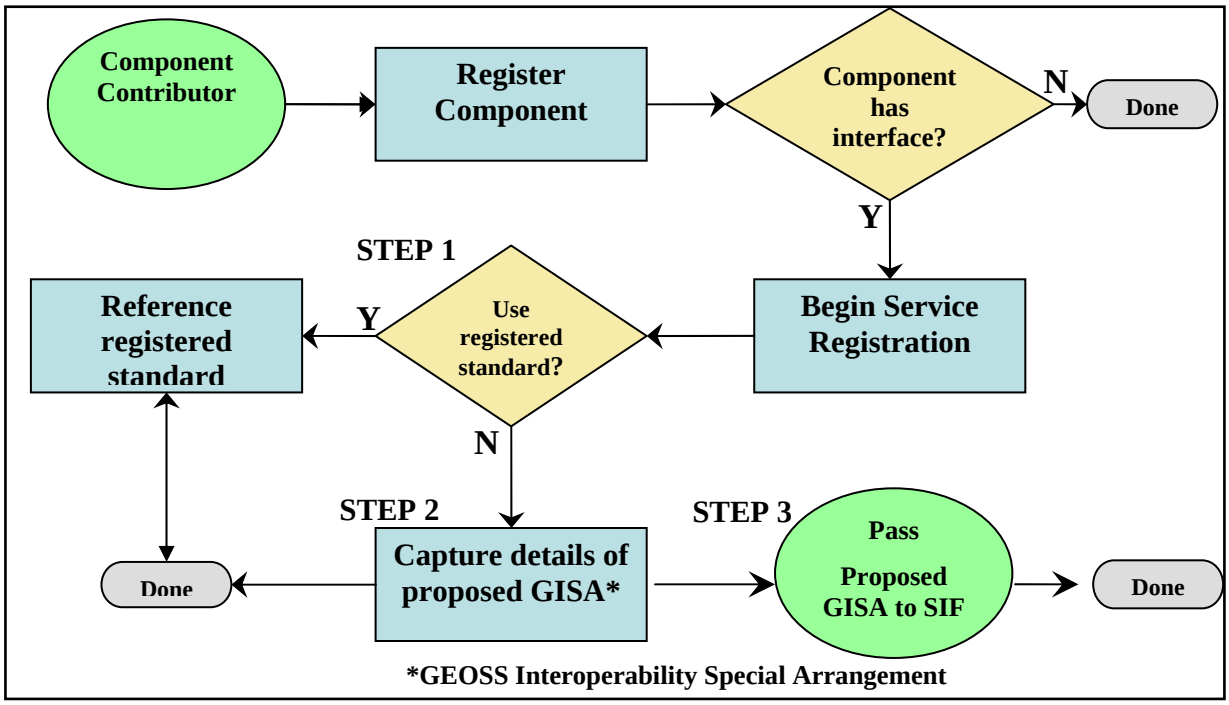

Fig. 2: GEOSS component and service registration

STEP 1: Determine whether existing GEOSS-registered standards or interoperability special arrangements apply to this service.

First, identify the specific services (and associated products) of the component at each major external interface that is to be shared. No further action is needed if those identified services are already documented in one of the existing standards with which GEOSS interoperates. This can be verified by searching the GEOSS Standards Registry through the GEO Portal (http://TBD) or another of the other interoperable portals.

Second, for those specific services (and associated products) to be shared but not yet documented in the Standards Registry, identify the type of service at that external interface. For instance, common service types on the Internet include FTP (File Transfer Protocol), HTTP (HyperText Transfer Protocol), and RSS (Really Simple Syndication), among many others. If any interface is not a standard service type (as seen in the Standards Registry), check if it has already been documented in the Special Arrangements Registry.

In the event that there are existing interoperability arrangements that apply to the component interface under consideration, the Service Registry entry will reference this entry in the GEOSS Special Arrangements Registry as the relevant interoperability arrangement.

Where arrangements do not exist, proceed to STEP 2.

STEP 2: Capture details of proposed "GEOSS Interoperability Special Arrangements (GISA)"

If services are not identified in either the Standards Registry or Special Arrangements Registry, the contributor will enter details on a proposed "GEOSS Interoperability Special Arrangements (GISA)".

This information will be passed to the GEOSS Standards and Interoperability Forum (SIF), which will manage entries into the Special Arrangement Register hosted by the IEEE.

STEP 3: Standards and Interoperability Forum study

The SIF will review and recommend entry of GISAs as GEOSS Registered Standard or Special Arrangement, as appropriate.

5 WHAT IS THE STANDARD AND INTEROPERABILITY FORUM (SIF) AND HOW DOES IT OPERATE?

The SIF is one of the Architecture and Data Committee's functions that help the identification and promotion of standards and special arrangements required to achieve GEOSS interoperability objectives. It provides support and access to experts and internationally recognized standards organizations to carry out impartial review of GEOSS interoperability issues and to recommend solutions.

The SIF will review initial registries of the standards to the Standards Registry and process suggestions for additions of standards that are not currently in the Standard Registry. The SIF also reviews proposed GEOSS Interoperability Special Arrangements (GISA) and makes recommendations for their disposition. When a proposed GISA is received via the GEOSS service registration process, the SIF will review it and make recommendations for its disposition to the Architecture and Data Committee. The proposed GISA can only be associated with the interfaces used by the component that nominates it, until it is reviewed by the SIF and registered to the Special Arrangements Registry.

6 WHAT ARE THE OBLIGATIONS FOR A COMPONENT CONTRIBUTOR TO CONFORM TO THE GEOSS INTEROPERABILITY?

The component contributor is encouraged to use its system engineering team for integrating its component to the GEOSS. In case of a problem during integration, limited technical support will be provided by GEO Secretariat or Architecture and Data Committee experts, who are accessed through links in the GEO Portal (http://TBD). Component contributors are required to fill out and submit the Component Registration Form (Appendix 1) to the GEO Secretariat if they are unable to use the online Component and Services Registration system. Component contributors are required to allocate resources to operate and maintain the component, its corresponding services and its links to the GEOSS.

7 HOW CAN THE INTEROPERABILITY OF THE PROPOSED COMPONENT FOR CONTRIBUTION BE TESTED AND VERIFIED?

The component contributor is encouraged to make a test for verification of the interoperability of the proposed component for contribution to GEOSS. The Architecture and Data Committee will provide guidelines for test procedures for test and verification. Any component for which there is no existing test procedure, the component contributor needs to perform its own test and verification and submit relevant test and verification report to the GEO Secretariat for review. The Architecture and Data Committee may propose a very simple "GEOSS Interoperability Report".

8 HOW WILL THE INTEGRITY AND EVOLUTION OF GEOSS ARCHITECTURE AND SERVICES BE ENSURED?

The GEO committees will devise ways to monitor the overall status of component and service registration, as well as that of the overall GEOSS architecture and service registries. The GEOSS

Architecture and Data Roadmap (Reference here) which is derived from the GEOSS 10 Year Implementation Plan Reference Document's 2 year, 6 year and 10 year targets from the architecture and data point of view, will provide guidance for the evolution of the GEOSS architecture and services for organizations that are contributing components.

A system of system approach (needs to be discussed further) will be applied to the evolution of the GEOSS. The approach will enable GEOSS to play a role in:

1) A system of converging observation systems

The system of systems approach will support enhancement of observation systems worldwide, expanding spatial and temporal coverage of observations, through gap analysis between established user requirements and existing and future capabilities, satellite mission coordination and in-situ observation network establishment, etc.

2) A system of integrating observation, modelling and data management systems

The system of systems will coordinate the integration and modelling of observational data, leading to more accurate and useful information and predictions, through integration of space-based data and in-situ data, inter-comparison of observational data with model output data, and assimilation and data reprocessing.

3) A system of coordinating among societal benefit areas

The system of systems approach will support coordination among the nine societal benefit areas, promoting more effective sharing of data and information across very different communities, through identification of products and datasets common among societal benefit areas, and linking among data and information systems among societal benefit areas.

Prototyping and demonstration projects are another approach for establishing interoperability of any system or component within GEOSS. Any GEO Committees, Members and Participating Organizations are encouraged to plan and conduct such prototyping or demonstration projects within the GEOSS framework. The Architecture Implementation Pilots (Reference here) and the Interoperability Process Pilot Projects (Reference here) are examples of such efforts. GEO Members and Participating Organizations will be advised of such opportunities and GEO Committees will provide guidance and necessary technical support if requested.

9 WILL THE DATA AND PRODUCTS PROVIDED BY MY SYSTEMS BE SUBJECT TO A PARTICULAR DATA POLICY APPLIED BY GEO?

The societal benefits of Earth observations cannot be achieved without data sharing. The following are the GEOSS data-sharing principles:

- There will be full and open exchange of data, metadata and products shared within GEOSS, recognizing relevant 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.

Use of data or products does not necessarily imply agreement with, or endorsement of the purpose behind the gathering of such data. Data providers may apply their own particular policies relating to supply and use of their data. However, data providers may be encouraged to do the best effort to apply above principles to meet the needs from each Societal Benefit Area.

10 IS TECHNICAL SUPPORT AVAILABLE TO FACILITATE THE CONTRIBUTION OF OUR SYSTEMS TO GEOSS?

As explained above, the GEO Standards and Interoperability Forum (SIF) will be pleased to assist component contributors to resolve interoperability challenges. For information on further technical assistance, contact the GEO Secretariat at secretariat@geosec.org.

APPENDIX 1

GEOSS COMPONENT REGISTRATION FORM

To nominate a GEOSS Component, provide information as shown in the form below and send it by e-mail to secretariat@geosec.org

New Registration …….. Renew Registration …….. Withdraw Registration ……..

GEOSS Component Name (required): …….

GEOSS Component Abbreviation (optional): …….

Alternative names for the component (if applicable)

GEO Sponsor (required; repeat if sponsored by multiple GEO Members or Participating Organizations):

[ ] GEO Member: …….

Responsible Organization within GEO Member: …….

[ ] GEO Participating Organization: …….

Responsible Organization within

GEO Participating Organization (optional): …….

GEOSS Component Category (required; include all that apply):

[ ] Observing System [ ] Modelling and Data Processing Center

[ ] Data Exchange and Dissemination System [ ] Capacity Building

[ ] Other - Describe …….

GEOSS Component Status (required; select one):

[ ] Continuously Operational [ ] Intermittently Operational

[ ] Not Operational [ ] Demonstration

[ ] Termination Date (Optional) State date

GEOSS Societal Benefit Areas that may be relevant (required; include all that apply):

[ ] Agriculture [ ] Biodiversity [ ] Climate [ ] Disasters [ ] Ecosystems

[ ] Energy [ ] Health [ ] Water [ ] Weather

GEOSS Component Description (required):

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GEOSS Component Contact

Name (required): …….

Organization (required): …….

E-mail address (required): …….

GEOSS Component Website (optional): …….

APPENDIX 2

DEFINITIONS

This section provides the definitions of the main terms used throughout the 'tactical guidance' document.

Component	A part of GEOSS contributed by a GEO Member or Participating organization. Example types of components include observing systems, data processing systems, dissemination systems, capacity building, or other initiatives. Components may expose *service* interfaces to provide access to earth observation-related functions and/or data. Components are described in the *GEOSS Component Registry*.
Service	Functionality provided by a component through component system interfaces. Services communicate primarily using structured messages, based on the Services Oriented Architecture view of complex systems. Services are described, along with information about their operating organizations, in the *GEOSS Service Registry*.
Services Oriented Architecture	[get official website] OASIS, W3C
Interoperability	The ability to link two or more components/services to execute a particular task that spans those components without knowledge of underlying implementation. Interoperability may be addressed at the component level and/or defined at the service interface level through the adoption of common standards.
Interoperability arrangement	A registered declaration by one or more GEO Members or Participating Organizations to provide access to *services* and data through identified non-proprietary standards. Formal international standards are documented and referenced in the Standards Registry. Interoperability arrangements that document informal standards are referenced in the *Special Arrangements Registry*. Special arrangements are not required when referencing formal international standards starting from those in the Standards Registry.
Standard:	Documented approach for conducting an activity or task. Standards may be de jure (formally recognized) or de facto (informally adopted) within a community of application. De jure standards are typically managed by a standards development organization. Formal international standards are documented and referenced in the *Standards Registry*. Interoperability arrangements that document informal standards are referenced in the *Special Arrangements Registry*.
GEOSS Clearinghouse	A component that provides access to a network of catalogues and registries that conform to identified catalogue service and metadata standards. The Clearinghouse supports access to data, documents, services, and other resources through the search of descriptive properties (metadata) offered by GEO Members and Participating Organizations.
GEOSS Web Portal	A website that provides access through *standard* interfaces to the *GEOSS Clearinghouse*, GEOSS registries, and related information.

Register	Set of files containing identifiers assigned to items with descriptions of the associated items (from ISO 19135)
Registry	Information system on which a register is maintained [and accessed] (from ISO 19135)