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**A Concept Document for the Certification Process of GOOS Regional Alliances
(GRA) as the Executing Body for the Regional Enhancements to the GOOS,
The Global Ocean Observing System,
The Ocean Component of GEOSS**

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Purpose of this Document

At the May 2005 meeting of the IOC Assembly in Paris, GOOS was designated as the ocean component of GEOSS, The Global Earth Observation System of Systems, by the Chair of GEO, Vice Admiral Conrad Laughtenbacher. In response to that declaration, The IOS Assembly made a commitment to support the integration process of the two efforts primarily through the JCOMM working with the IGOOS and supported by the GOOS Program Office (the GPO). GOOS will now be expected to address each of the 9 societal goals of the GEOSS which overlap and extend its original 7 societal area goals as outlined in the GOOS Strategic Plan. The explicit intention to do so was expressed in an intervention from the GOOS Delegation at the recent GEO Meeting of the Parties in Geneva, December 2005. GEOSS is being configured as a “system of systems” with specified architectural requirements, including standards, protocols and operating procedures applicable for the sensors and systems, the data management, the data assimilation and modelling and the development of societally-relevant products. Thus, if GOOS is to become a “bonified” element of the GEOSS system of systems, it must develop certification criteria based on performance metrics to assess of the current “state” of maturity of each of its regional as well as global components. It must also develop a set of performance targets to keep all of the subsystems progressing toward maturity. The purpose of this document is to introduce the concepts behind a “certification process” for the GOOS Regional Alliances (GRA) to assess international performance and guide future development for system completion (maturity) as well as sustained funding. We believe that it is necessary to have such guidance formalized to establish a blueprint for Regional approaches to governance as well as execution of the GOOS system of systems envisioned and advocated in the GOOS Strategic Plan. These criteria conform to the GOOS Design Principles as well as the Principles of Involvement as outlined in the 1998 document. They take the development of GOOS to the next step in that they provide the basis for “Principles of Execution or Implementation” which provide metrics to rate performance along a timeline for system development.

What is the Purpose of the GRA Certification?

The purpose of certification is to provide proof of a demonstrated capability, expertise and capacity of the collective body of members of a GOOS Regional Alliance to perform the requisite activities and functions necessary for the governance, coordination, operation and management of observing system assets of the members and the production of products and services for the users in their region. It will ensure that there is a legal entity or partnership which will be able to accept funds, both grants and contracts, from many sources as well as distribute those funds in an equitable, transparent and accountable manner. This does not entitle a GRA to a funding stream provided by GOOS; it certifies that they are eligible for funding because they have the knowledge and knowhow to provide quality products and services. Some aspects can be likened to the ISO certification process, which is based on qualifications and past performance, and signifies to a potential sponsor that the technical merit of the work is assured. The reason that this is needed is that the GOOS system is envisioned as the intergovernmental sustained contribution to GEOSS which must be capable of routinely delivering data and information 24x7, in an interoperable and accountable way, to users in the general public, academic, government and private sector.

The certification also signifies that the partners to the legal GRA entity have the intention of becoming a component in the GOOS systems architecture as envisioned in the Strategic. The premise for the architecture of the GOOS is that the system would be based on (1) the Nationally and Internationally funded components of the observing system (2) Regional Enhancements based on local and regional user needs. The certification process will attempt to move these regional enhancements with proven merit, and reliable governance out of an unstable funding situation. Therefore, one of the major goals of the certification process is to attract stable sources of funding for the Regional Enhancements through the identification of capability and presentation of an orderly plan to transition the observing system to operational status. Such certified regional enhancements could potentially be incorporated into the funding base of Ministries and regional development agencies.

In summary, the purpose of the certification process is not to establish another layer of bureaucracy or top down structure, but rather to allow and ensure the seamless integration of disparate, diverse “extant”, bottom-up systems into the GOOS and provide for maximum diversity in the approach to forming the system to reflect the regional diversity of the issues, funding and user requirements. All of the criteria are set to allow maximum flexibility and innovation in matching observing system configuration and operation to regional user needs while ensuring connectivity and interoperability of its sub components to the national, regional and global architecture. Certification will help ensure that the regional enhancements collectively governed and managed by GOOS Regional Alliances are recognized as performing a mission critical to their member nations’ interests and performing a critical mission to the governments by ensuring the information is used for maximum benefit of the citizens. It is seen as the entity capable of conclusively demonstrating societal value.

What is the Decertification Process and what does it mean?

It is important as well to put in place a process for decertifying a GOOS Regional Alliance based on performance criteria. This “sunsetting” clause will ensure that the observing system components within a region will not fall behind in their development because of poor governance. Decertification does not mean that a region “goes away” or is not represented. It means that the governing body, the incumbent so to speak, will be eligible for replacement. In addition, it must be recognized that the original boundaries may change. Fixed geographic boundaries of the initial GRAs may evolve over time and adjacent GRAs may merge or one GRA may divide if there are compelling scientific, technical, management, political, fiscal or societal reasons to do so. All parties involved must prepare a merger/division plan for consideration by the IGOOS and its board.

What are the levels of certification and what do they mean?

It is critical over the next few years that regional enhancements to the GOOS are in place and the components of the observing system architecture begin to evolve and progress in an orderly fashion towards maturity. Certification at various performance levels ensures that evaluations are tied to a timeline for GOOS development which will allow IGOOS to chart the progress of the system and evaluate the return on investment for the system. The performance levels correspond roughly to the research, pilot, pre-operational and operational levels spelled out in the GOOS Strategic Plan. GRAs will receive different levels of

certification based on performance. Levels of certification are determined based on the maturity of the regional observing system as it progresses from disparate non-connected entities to an interoperable, integrated system of systems streaming state of the art data and information in support of products and services to users in the regions. It is the GRA's responsibility to ensure that their regional system progresses up the maturity scale which they have developed as part of their strategic and tactical plans to coincide with the International Plan.

The levels of performance are set to fulfill the goal of developing and maintaining an interoperable, "cutting edge", integrated, coordinated and "used" system at all levels of the system. Performance metrics will be set for all components of the system from measurements and data telemetry through data management and communications, to the models and visualizations to the decision support tools and best practices. All standards, protocols and best practices will be clearly articulated in Guidance Manuals to be created and updated annually by the committees of the IGOOS, JCOMM and GPO and or their delegates. Internationally accepted protocols will be fostered. National Ministries programs, to be considered part of the GOOS must become compliant as well.

Level 1 - Creation of the Legal Regional Governance Structure, The GOOS Regional Alliance (GRA)

Certification at Performance Level 1 indicates the existence of a GOOS regional governance structure capable of guiding and coordinating the development of observing system components that serves the needs of user groups in the region and is interoperable with other GOOS elements including those of the global ocean module of GOOS. The minimal set of requirements necessary to be certified at Performance Level 1 are the following:

- A legal governance structure in place.¹
- A Mission Statement, Goals, Objectives, and Preliminary Evaluation of the Regional Issues expressed as Users Needs completed so as to define the program in terms of strategic direction and justification for Advisory Board Composition
- The regional priority issues to be reflected in the composition of the stakeholder council
- The geographic boundaries set based on the regional needs assessment allowing for the establishment of new boundaries as described above. In addition, recognizing that "functional" boundaries are determined by the problem being addressed (e.g., boundaries for ecosystem-based management of salmon will be different that boundaries for ecosystem-based management of point source discharges), GRAs should formulate plans for collaborating with other GRAs , when observations and analysis require cross-boundary data.
- Board has met at least once
- At least 1 stakeholder meeting held
- Have extant observing system assets within the region

Anticipated time to attain Certification at Level 1: 1 to 2 years

New GRAs may propose to be accepted into the GOOS at any time by submitting their strategic plans to the IGOOS Board for consideration.

Level 2- Definition of System Requirements, Inventory and Initial Implementation Phase

For certification at this level, inventories of observing system assets are complete. A business plan has been developed which articulates the vision, mission, users needs, assessment of current state, gap analysis, observing system requirements, marketing, system development and fiscal plans for the development of the regional system. Minimal requirements for this level of certification are:

- Business Plan completed including strategic and tactical plan with budgets and milestones
- Web site developed; training and outreach program active
- Inventories of existing observing, Data management and communications and modeling capabilities completed

¹ This may include a wide range of legal entities including 501c3, MOU/MOEntities including NGOs with a fiscal designee capable of administering grants, contracts and other types of contractual vehicles, or other legal partnership.

- Relevant User decision support tools identified and dependencies with observation system parameters determined
- Regional Users Requirements Documents (for academic, private sector and government sectors) prepared and matched with observing system inventories
- Concepts of Operation Document prepared
- At least one demonstration projects undertaken with users

Anticipated time to attain Certification at Level 2: 2-3 years

Level 3- The Interoperability and Integration Phase

This is primarily the systems engineering phase which ensures that the system will be interoperable and networked with GEOSS, so data and information-products from any of the distributed sources can be used by any other. All of the evaluation for certification at this level will be based on the compliance to the sets of codes, standards, protocols and practices as laid out in Guidance Manuals and Systems Manuals produced by JCOMM, IGOOS and designated working groups. Minimal requirements for this phase include:

- Demonstrated Conformance to Observations standards and protocols as laid out by GOOS/JCOMM
- Demonstrated Conformance to Data Management and Communications protocols as laid out by JCOMM/GOOS
- Demonstrated Conformance to Models standards and protocols as laid out by JCOMM/GOOS
- Demonstrated conformance to national and international network and transport standards and protocols as defined by GEOSS and JCOMM

Anticipated time to attain Certification at Level 3: 5-7 years

Level 4- Sustained Activities and Build out Phase

Sustained activity phase does not mean that the system stays at the same level but is constantly evolving through the integration of new technologies and methods. Thus monies identified for this sustained phase will include research and development monies as well as maintenance money.

- Sustained funding achieved for extant programs by following the financial investment strategy developed in Level 2
- System enhancements begun based on the plans developed in the regional business plan
- Refreshing technologies, science, practices in place and conforming to “science and technology insertion process” guidelines as developed by IGOOS, JCOMM, and GSSC
- Products and services streamed to end users and feedback supplied

Anticipated time to attain Certification at Level 4: 7-10 years

What is the Role of IGOOS?

IGOOS will specify the certification process including criteria and levels of performance and is responsible for the development of the performance metrics, the development of the standards and protocol Guidance Manuals upon which the performance metrics are based along with JCOMM. It is anticipated that the Manuals and Guidebooks will be completed within a year. IGOOS board will conduct the Certification site visit and provide certification.

What would be the end results of a successful certification process?

The certification process would demonstrate measurable progress of the development of the GOOS towards maturity. This “proof of progress” is used to document development and justify future investment based on performance necessary to obtain sustained funding for the system. In summary, the certification process would:

- Ensure that there are legal regional governance structures in place capable of guiding the development of the various sub-components of the observing system of systems. In addition it would ensure accountability for the fiscal transactions of the region.
- Ensure National, Regional and International Interoperability of the “extant” system through compliance with established protocols. The standards for interoperability will be set in accordance with the international standards and protocol of GOOS and GEOSS and their participating bodies such as the WMO, UNEP and ICCSU. The system will become compliant at the following system levels: the sensors and sampling level, the data management and communications level , the data assimilation modeling and visualization and at the Knowledge transfer (application) level. Performance metrics will established for each of the levels. Technology performance metrics as well as societal performance metrics (e.g. increasing reliability, decreasing risk, increasing efficiency and cost effectiveness) will be used to measure progress.
- Ensure National, Regional and International Integration and Networking of the “interoperable” system components. Once the extant system has incorporated accepted methods and protocols, it is ready for integration into a GEOSS “system of systems”.
- Ensure a “Cutting Edge” Evolving System through new science and technology insertion. Validated and verified methods, understanding, technology, (IT, tangible, control) and best practices must be “inserted” into the system and solid “on ramps” (insertion processes) must be built and performance metrics set for upgrading and refreshment. Thus this ensures that the system will “evolve” and not simply be “maintained”. This concept is also important in the funding context, as research dollars must be maintained along this pathway.
- Ensure free and open access and open exchange of the data and in an accepted format (i.e. web based) in accordance with the international architecture standards being set for GEOSS.
- Ensure societal value through the creation of new products for user groups in the nine societal goal areas as well as ensuring regional and National excellence in education, science and technology.