

THE IEEE COMMITTEE ON EARTH OBSERVATIONS STANDARDS WORKING GROUP

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1. INTRODUCTION

The IEEE Committee on Earth Observations (ICEO) [7] Standards Working Group (ISWG) is an international body working to further the use of international standards in the development of the Global Earth Observation System of Systems (GEOSS). It was formed by the ICEO in 2006 with a primary aim of helping to establish a process for reaching agreement on standards and other practices for achieving interoperability among components contributed to GEOSS.

2. INITIAL TASKS

In support of GEOSS the ISWG took on three initial tasks:

- Perform a global survey of existing portals serving Earth Observation data;
- Produce a reference database of common standards in use by EO systems;
- Write a summary of Standards Development Organizations relevant to GEOSS, including information on domain of operation, membership, openness, and method for achieving consensus.

In 2007, the ISWG generated a report detailing an analysis of a large collection of Earth observation web portals [4], in order to aid in the determination of what features and behaviors an acceptable GEOSS web portal should have. This analysis used industry-adopted standards and guidelines [5], [6], [17], [19], [20]. One of the lessons learned from this effort is that the discipline of web usability does not have many international standards to support it. It was also determined that many factors that go into usability decision making are qualitative and not quantitative [13], [15], which causes conclusions to be subjective.

In 2006 the Group on Earth Observation (GEO) Architecture & Data Committee (ADC) initiated the GEOSS Interoperability Process Pilot Project (IP3) to begin implementing the GEOSS infrastructure and testing the interoperability processes [10], [11], [18]. It developed scenarios involving different systems and disciplines: Climate, Seismography, Biodiversity, and Weather, with the aim of developing a suite of demonstrations to be presented at the 2007 GEO Summit in Capetown, South Africa. The ISWG supported this effort by managing the process through regular conference calls, as well as dealing with interoperability issues as they arose.

3. SUPPORTING THE SIF

July, 2007 saw the formation of the Standards and Interoperability Forum (SIF) in support of GEOSS [9]. The SIF was created to provide advice, expertise, and impartial guidance on issues relating to standards and interoperability for the GEOSS. The mission of the SIF extends beyond that of the ISWG and includes:

- Identification and promotion of standards required to achieve GEOSS interoperability objectives;
- Facilitating cooperation among the many organizations, including national agencies of member countries, in selecting, developing and using diverse standards applicable to GEOSS;
- Identifying gaps in current standards and facilitating the creation of standards to fill such gaps;
- Supporting education and outreach to help increase technical and public awareness of interoperability issues.

The ISWG, in addition to pursuing its own objectives, plays a primary supporting role to the SIF. In 2007 the ISWG was instrumental in designing the Standards and Interoperability Registry (SIR) for the GEOSS architecture. To support the SIR, a standards taxonomy was developed to help categorize the standards accepted into the SIR.

4. CURRENT AND UPCOMING TASKS

ISWG members are involved in many high priority tasks related to standards for GEOSS, evolution of the SIR, and advocacy for interoperability. New usability and interoperability features of the SIR have been designed and released into the GEOSS architecture. A formal review of SIR entries is underway, which requires a certain amount of expertise to determine whether GEOSS interoperability principles are being met by the proposed standard. Work has commenced on a policy, and supporting procedure, for converging to a smaller set of open international standards from the SIR that can be used in advocating interoperability to GEOSS providers of data and services. Because of the open nature of GEOSS, some sort of objective rating system is currently being considered.

The ISWG, based upon feedback of the initial standards taxonomy, has developed a new version of this taxonomy that is broader and more textured. This new taxonomy was presented at a semantic interoperability workshop [2]. There is also discussion beginning on whether to evolve this taxonomy into an ontology. This new standards taxonomy will be entered in an Ontology Register, incorporated into the SIR, and made available to other aspects of GEOSS as necessary. ISWG members are also engaged in developing a new version of the Earth observation portal study. This time, an effort is being made to do research in order to develop a quantitative metric for determining usability [12], [14]. This metric will take into account usability features, science community requirements, and existing standards, where applicable. The finished study will be able to be used by

organizations to decide on requirements, features, and behaviors of their Earth observation portals in order to attain the desired compliance with usability standards. This study will eventually be published as either a standard or best practice.

5. CONCLUSIONS

The ISWG is exemplifying, within the GEOSS context, the use of international standards in its own work, as well as advocating their use to communities of scientists outside of GEOSS. The SIR design, and its continued evolution within the GEOSS architecture, is guided by the ISO standard for registers [8]. ISWG members advocate the standards process being used to populate the SIR [1], and the interoperability mechanisms realized by the GEOSS architecture [2], [3]. Through the close cooperative arrangement between the ISWG and the SIF, GEOSS interoperability and standards usage continues to improve as the GEOSS evolves through the Architecture Implementation Pilot phases [16], a series of implementation pilot programs that include a growing number of participants every cycle. The ISWG participates in the writing of Calls for Participation for these pilot programs, detailing areas of standards usage needed, and also participates in the engineering reports written at the end of the pilot programs, detailing the lessons learned and the obstacles that need to be addressed. The ISWG, in support of the SIF, is reaching out to more GEOSS tasks, as these tasks begin to develop taxonomies and ontologies, in order to help manage the evolution of interoperability for the GEOSS.

6. REFERENCES

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