ADVANCE UNEDITED VERSION

UNITED NATIONS **E/C.20/2016/8/Add.1**

Economic and Social Council

8 July 2016

Committee of Experts on Global Geospatial Information Management
Sixth session
New York, 3-5 August 2016
Item 8 of the provisional agenda*
Implementation and adoption of standards for the global geospatial information community

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Note by the Secretariat

Summary

The present paper contains the report prepared jointly by the Open Geospatial Consortium (OGC), the technical committee 211 of the International Organization for Standardization (ISO/TC 211), and the International Hydrographic Organization (IHO), on the implementation and adoption of standards for the global geospatial information community for consideration by the Committee of Experts on Global Geospatial Information Management.

At its fifth session, held in New York from 5 to 7 August 2015, the Committee of Experts, in adopting decision 5/108, adopted the "Guide to the role of standards in geospatial information management" and the "Technical compendium" as the international geospatial standards best practice for spatial data infrastructure and encouraged all Member States to adopt and implement the recommended standards appropriate to the level of spatial data infrastructure maturity in their countries. The Committee noted the need for the further development of harmonized and interoperable standards, in particular between the statistical and geospatial communities, through collaboration with the Expert Group on the Integration of Statistical and Geospatial Information, and urged Member States to participate in the proposed joint study group in order to ensure that the geospatial standards are relevant and available to monitor and measure the sustainable development goals. In their report, the international geospatial standards organizations describe the initiatives and activities carried out to demonstrate the collaboration by the geospatial standards community with the Expert Group on the Integration of Statistical and Geospatial Information and the progress achieved by the joint study group in ensuring that geospatial standards are relevant and available to monitor and measure the sustainable development goals in a geospatial context.

* E/C.20/2016/1

I. Introduction

1. At its fifth session, held in August 2015, the Committee of Experts adopted decision 5/108 in which it welcomed the report prepared by the Open Geospatial Consortium (OGC), Technical Committee 211 of the International Organization for Standardization (ISO/TC 211) and the International Hydrographic Organization (IHO), and expressed its appreciation for their efforts in producing the standards Guide and Companion document. In addition, the Committee adopted the final published "Guide to the Role of Standards in Geospatial Information Management" and the "Technical Compendium" as the international geospatial standards best practice for spatial data infrastructure, and encouraged all Member States to adopt and implement the recommended standards appropriate to their countries' level of spatial data infrastructure (SDI) maturity.

2. The present report provides an update on the work of the standards organizations, the work towards standards interoperability between the statistics and geospatial community, and standards requirements for the Sustainable Development Goals. The Committee of Experts is invited to take note of the report and to express its views on the way forward for the implementation and adoption of standards for the global geospatial information community. Points for discussion and decision are provided in paragraph 37.

II. Implementation and adoption of standards in geospatial information management

3. Since the second session of the Committee of Experts, the issues related to standards setting in the global geospatial information community have been extensively discussed and have been reflected in the decisions brought about by the Committee. The work carried out by OGC, ISO/TC 211, IHO and other relevant international organizations has been recognized as valuable and integral to the geospatial information community. These organizations are developing consistent and precise technical geographic standards that form the core building blocks to enable data and information interoperability and to facilitate the integration and use of diverse sources of geospatial data and services.

4. The benefits of developing and implementing technical standards have been recognized by the geospatial community as they bring uniformity, compatibility and interoperability to millions of processes, devices, and applications in all sectors of a global economy. It has been also recognized that the lack of standards, or not using existing relevant standards, could be harmful and detrimental, as has been experienced, for example, in numerous cases of disaster management.

5. While a number of countries are readily adopting and implementing international standards, many others are progressing very slowly or not at all, whether for a lack of resources, lack of knowledge of the standardization processes, or both. Despite the progress being made, many challenges remain with the adoption and implementation of existing standards, especially in national legal and policy frameworks, chief among them being the lack of understanding at the political/policy level. There is a general recognition from Member States' experts that mechanisms are needed that emphasize and support the adoption and implementation of global geospatial standards, and in particular, reach out to the policy makers.

6. The standards community is interested to learn how Member States have utilized the existing best practice documents, "The Guide to the Role of Standards in Geospatial

Information Management" and its companion technical document. A special area of interest is knowing how these documents have been utilized in implementing and adopting the existing standards within national legal and policy frameworks in geospatial information. This feedback is critical for: 1) the update and review of the documents that will take place in the coming year; and 2) considering how to support Member States better in the area of standards implementation. The standards community also urges Member States to consider translation of the Standards Guide and its Standards Companion as a way to contribute in the capacity building and sharing of best practices, especially for those Member States who could learn from and leverage the experiences from other nations.

III. Uptake on the on the work of the international geospatial standards organizations

7. Underpinning our capacity for global geospatial information management and sharing is an ecosystem of standards provided by a variety of Standards Development Organizations (SDOs). Each plays a role in developing standards for a key technology or domain area, but no suite of standards can exist in isolation, and collaboration to ensure interoperability is key.

8. For the geospatial domain, the key SDOs are the Open Geospatial Consortium (OGC), the International Standards Organization Technical Committee 211 (ISO/ TC 211) and the International Hydrographic Organization (IHO). Each SDO convenes a number of technical and/or plenary meetings throughout each year. The following is a brief update of the significant developments for each organization and the key areas of joint and collaborative work being undertaken.

Update from the Open Geospatial Consortium (OGC)

9. Since August 2015 the OGC membership has convened 4 technical meetings in the United Kingdom, Australia, USA and the Republic of Ireland.

10. Recognizing the increasingly rapid nature of development in the information technology industry, the OGC has adapted its standards development process to include a new type of standard called a "Community Standard". A Community Standard is one that has developed in a de-facto (non-SDO) environment and is proved to have been implemented widely. Because of this record of proven implementation the process of approval through the OGC is reduced, enabling it to be approved more rapidly and ensuring that the standards environment remains agile in its response to developer needs.

11. The OGC has approved a number of new standards since August 2015 and encourages the Committee of Experts to review and implement these where appropriate. Given the important focus for the Committee on the connection between and integration of statistics and geospatial information, an emerging standard known as the Discrete Global Grid Systems (DGGS) needs to be highlighted. This emerging standard relates to the joining of geospatial and statistical data, an area which the Expert Group on the Integration of Statistical and Geospatial Information (EG-ISGI) have been working on and is currently proposing a global statistical geospatial framework (E/C.20/2016/9/Add.1). The OGC encourages interested Committee members to participate in the work to develop the DGGS standard. The DGGS is being developed to enable common global architectures that will assist in:

a. Organizing multiple uniformly spaced measurements over the globe;

b. Calculating gradients faithfully;

c. Comparing time-series of globally distributed data;

d. Making statistically meaningful regional comparisons of global data;

e. Comparing and combining data from multiple measurements taken at different resolutions;

f. Improving operation of numerical models; and

g. Documenting the precision as well as location of spatial data on the globe.

12. Within the OGC there are a number of working groups that discuss the requirements of specific domains. See http://www.opengeospatial.org/projects/groups/wg. Since August 2015 newly approved domain working groups (DWG) of note are:

a. Point Cloud (this working group operates in collaboration with ASPRS);

b. Land administration; and

c. Marine.

13. The Point Cloud DWG was initiated out of a need to review the LiDAR standards currently in use. To ensure good practice and interoperability this work will be undertaken in liaison with both the International Society for Photogrammetry and Remote Sensing (ISPRS) and the American Society for Photogrammetry and Remote Sensing (ASPRS).

14. The Charter for the Land Administration DWG was presented at the side meeting of the Expert Group on Land Administration and Management (UN-EG-LAM) at the Fourth High Level Forum on UN-GGIM in April 2016 in Addis Ababa, Ethiopia. Following its approval at the OGC's 99th Technical Meetings in June 2016, the DWG will form a direct liaison with ISO/TC 211 and the UN-EG-LAM to ensure shared goals are developed and the work programs of both groups are synergistic.

15. The Marine DWG has been charted to provide a forum to discuss a Marine Spatial Data Infrastructure Model and to discuss gaps between the OGC, IHO and the International Association of Oil & Gas Producers (IOGP) standards baseline, and work in collaboration with these liaison organizations to address this.

16. A significant joint working group between the World Wide Web Consortium (W3C) and the OGC was initiated in 2015 to develop best practice documentation under the title of Spatial Data on the Web. The scope of this working group includes: geosemantics, linked data, temporal and coverage themes. Noting also ISO/TC 211's contribution in the area of terminology.

17. The OGC would like to inform the Committee of Experts of key international interoperability projects that have been initiated since August 2015 and encourage the Committee members to participate:

a. Arctic Spatial Data Pilot – Interoperability Project.

b. OGC Testbed 12 including Aviation, Compliance, Field Operations, Large-Scale Analytics & Linked Data and Advanced Semantics.

c. Future Cities Pilot, Phase 1.

18. The next 4 OGC technical meetings will be held in USA; Taiwan, Province of China; the Netherlands; and Canada; noting that the meeting in the USA in September 2016 will be the OGC's 100th Technical Meeting since its inception in 1994. The Committee of Experts are invited to participate in these meetings.

Update from the International Standards Organization Technical Committee 211 (ISO/ TC 211)

19. Since August 2015 the ISO/TC 211 membership has convened 2 plenary meetings in Australia (41st) and Norway (42nd), with 4 Member States becoming new Participating Members; (Mexico, Poland, Singapore and Turkey) and Mongolia becoming an Observing Member.

20. At the 41st plenary in Sydney, ISO/TC 211 endorsed the request for a Category A liaison from the United Nations Statistics Division (UNSD), one of the Secretariat offices for the Committee of Experts. Further at the 41st plenary ISO/TC 211 expressed its continuous support to UN-GGIM in a resolution, and offered to contribute the multilingual glossary of terms to the UN-GGIM knowledge base. The multilingual glossary of terms comprises nearly 100 terminology records, and translations (full or partial) into 14 languages including all six official languages of the UN. It is ongoing work in cooperation with OGC/W3C Spatial Data on the Web Working Group (SDWWG) to adopt the ISO terminology for broader purposes. ISO/TC 211 also offered to discuss with the Secretariat how other resources from ISO/TC 211, like ontologies, XML schemas, etc. could be contributed.

21. ISO/TC has established an Ad hoc group to participate in a Joint Study Group on Sustainable Development Goals (SDGs) and the related targets of the UN, which is elaborated in section V.

22. ISO/TC 211 wishes to acknowledge and thank Norway for its role as Chair and Secretariat of ISO/TC 211 since 1994 and welcomes the Swedish Standards Institute (SIS) from Sweden as the new Chair from 2016 forward.

23. ISO/TC 211 continues to develop a multi-part Address Standard to meet the needs and requirements of the World Bank and Universal Postal Union (UPU). In late 2015, the Address Standard Part 1 - Conceptual model was published as an International Standard. Part 2 - Good practices for address assignment schemes, Part 4 - International postal address components and template languages, and Part 5: Address rendering for purposes other than mail, are all under development. While Part 3 – Address data quality is under ballot to be included in the work programme.

24. The next meeting of the ISO/TC 211 will be in Redlands, California (USA), 28 November – 2 December 2016.

Update from the International Hydrographic Organization (IHO)

25. The technical programme of the IHO remained focused on developing the S-100 series of new standards, while keeping the current IHO standards fit for purpose. The implementation of the re-organized structure of the working groups of the IHO Hydrographic Services and Standards Committee (HSSC – the main technical IHO organ) reflected more clearly these two objectives. The work of the HSSC and of its working groups involves representatives from the Member States and partner international organizations as well as expert contributors from industry.

26. Edition 2.0.0 of S-100 - *Universal Hydrographic Data Model* was approved by the IHO Member States and published. The preparation of Edition 3.0.0 was initiated to include extensions addressing in particular additional encoding formats and portrayal elements and the use of alerts and indications.

27. Much effort was devoted to the continuing development of S-100 based product specifications, including S-101 - *Electronic Navigational Chart Product Specification* and various product specifications related to nautical information, tides and surface currents, maritime limits and boundaries. A new work item on the development of a draft product specification for the display of under keel clearance management information was decided. The initial scoping of an S-100 interoperability specification for Electronic Chart Display and Information Systems (ECDIS) was completed.

28. Edition 6.1.0 of S-52 - *Specifications for Chart Content and Display Aspects of ECDIS*, Edition 4.0(.1) of S-52 Annex A - *IHO Presentation Library for ECDIS* and Edition 3.0(.1) of S-64 - *IHO Test Data Sets for ECDIS* became the normative IHO references for the type approval of new ECDIS as the International Electrotechnical Commission (IEC) published the 4th Edition of its ECDIS test standard, IEC 61174. Edition 1.2.0 of S-63 - *IHO Data Protection Scheme* was approved by the Member States and published.

29. Under the continuous maintenance of S-4 - *Regulations for International (INT) Charts and Chart Specifications of the IHO*, a revised edition 4.6.0 was approved by the Member States and published. The Hydrographic Offices of France, Germany and Spain published new editions of the official French, English and Spanish language versions of INT 1 - *Symbols, Abbreviations and Terms used on Charts* on behalf of the IHO.

30. In support of the United Nations resolution on the Global Geodetic Reference Frame for Sustainable Development (A/RES/69/266), IHO and ISO/TC 211, in collaboration with OGC, have initiated a review and update on their spatial referencing standards. Of particular interest is the work on the International Terrestrial Reference System (ISO 19161-1 Geodetic references – ITRS) and the OGC's Coordinate Reference System (CRS) standards.

31. The importance of Land Administration was highlighted recently at the Fourth High Level Forum (HLF) on UN-GGIM, and with this in mind, IHO, ISO/TC 211 and OGC began a review of the Land Administration Domain Model (LADM, ISO 19152:2012).

IV. Sustainable Development Goals and the Joint Study Group

32. Since August 2015 the Joint Study Group of the OGC, ISO/TC 211 and IHO have met several times to discuss the work plan for developing a guidance for use of geospatial standards in supporting the measurement and monitoring of the Sustainable Development Goals (SDGs). In recognition of the adoption of the 17 SDGs, ISO/TC 211, OGC and the IHO would like to emphasis the important role that geospatial information standards will play in the decision-making processes, measurement and monitoring of the global efforts towards the achievement of the SDGs.

33. The ability to sustainably manage land, the environment and sea and water areas across the planet is reliant on high quality geospatial data that can be easily shared, communicated and utilized across multiple purposes. The adoption of common principles and the consistent application of international geospatial standards can enable decision makers to access the location based information they need to enable their nation to determine the best pathway to achieving the 17 goals.

34. The SDGs also present the possibility for new or modified standards. ISO/TC 211, OGC and the IHO encourage Member States to review their standards requirements as they determine how they will pursue achieving the SDGs in their own country, and invite them

to participate in the standards development processes of ISO/TC 211, OGC and the IHO to assist in the development of any new or enhanced standards as may be required.

35. A side event on Emerging Technologies will take place on the margins of this sixth session of the Committee of Experts to brief Member States on an emerging standard for Discrete Global Grid Systems, and also preliminary work on four case studies highlighting the value of geospatial standards for the SDGs. The emerging standards and some of the preliminary best practice case studies identified for goals 6, 11, 13 & 15 through the Joint Study Group shall be presented together with supplementary information. The SDOs shall continue to review the 100 indicators and develop guidance on the role and applicability of geospatial standards in the measurement and monitoring of the SDGs.

36. With the establishment of the Working Group on Geospatial Information under the auspices of the Inter-agency and Expert Group on Sustainable Development Goal Indicators (IAEG-SDGs), and the global indicator framework being agreed, it offers an opportunity to ensure that existing geospatial standards and interoperability tools are applied in the geospatial inputs and metadata needs for the measuring and monitoring of the SDGs.

V. Points for discussion

37. The Committee is invited to:

(a) Take note of the report and the work undertaken by the international standards organizations;

(b) Provide feedback to the international standards organizations on the use of the Guide and Companion documents presented during the fourth and fifth sessions, and their experiences in implementing the standards outlined in their national policy and legal frameworks;

(c) Participate with the Joint Study Group and Standards for Sustainable Development work of the international standards organizations;

(d) Take note of the encouragement by the Standards Development Organizations (SDOs) for Member States to participate through membership in the international geospatial standards development processes of ISO/TC 211, OGC and the IHO to ensure that the geospatial standards required to achieve the SDGs are available.