
Economic and Social Council

3 August 2021

Committee of Experts on Global Geospatial Information Management Eleventh session

New York, 23, 24 and 27 August 2021

Item 13 of the provisional agenda*

Implementation and adoption of standards for the global geospatial information community

Implementation and adoption of standards for the global geospatial information community

Note by the Secretariat

Summary

The present paper contains the report prepared jointly by the Open Geospatial Consortium (OGC), 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 tenth session, held virtually on 26 and 27 August and 4 September 2020, the Committee of Experts adopted decision 10/111, in which it welcomed the report on the implementation and adoption of standards for the global geospatial information community, and expressed its appreciation for the support of the three organizations in the development of the Implementation Guide of the Integrated Geospatial Information Framework, principally through strategic pathway 6: standards, and the progress made in maintaining, promoting and advancing new standards, including through the proposed review and updating of the standards guide, to strengthen the contribution of the geospatial information community to the Sustainable Development Goals and the response to the global coronavirus disease (COVID-19) pandemic. The Committee also encouraged the standards development organizations to continue to liaise and work with Member States in their implementation of standards and, in that regard, to support the mobilization of resources and consider access to standards on reasonable terms, especially for developing countries, and to focus on highlighting progress made in the adoption and implementation of standards by Member States.

In this present report, the three organizations elaborate on their collective efforts. They provide details of the Open Geospatial Consortium's work on the development of modernized open application programming interface standards and the integration of geospatial information, statistics and other data to address access to, and integration of, location information related to Earth observations, disaster preparedness and response, health, the environment and climate change. They also describe the work of technical committee 211 and its progress in the development of the multi-part standards ISO 19152 Land Administration Domain Model, the ISO 19144 series on land cover and ISO 19160 on addressing, discuss the increased use of the ISO

* E/C.20/2021/1

Geodetic Registry and demonstrate the use of standards. Last, they present the advances made by the International Hydrographic Organization on the S-100 Universal Hydrographic Data Model to support the creation and maintenance of interoperable maritime data product specifications that are compliant with the ISO 19100 series of geographic information standards.

The organizations also provide an overview of their work regarding the use of geospatial standards in supporting the measurement and monitoring of the Sustainable Development Goals; discuss the role of standards in response to the global coronavirus disease (COVID-19) pandemic; highlight their continued support of the development and preparation of the implementation guidance, options and actions for the standards pathway for the Implementation Guide of the Integrated Geospatial Information Framework; and present a major revision of the Guide to the Role of Standards in Geospatial Information Management, as a living online resource aligned with the Integrated Geospatial Information Framework.

I. Introduction

1. At its tenth session, held virtually on 26 and 27 August and 4 September 2020, the Committee of Experts adopted decision 10/111, in which the Committee expressed its appreciation to the three Standards Development Organisations (SDOs), namely, the Open Geospatial Consortium (OGC), Technical Committee 211 of the International Organization for Standardization (ISO/TC 211), and the International Hydrographic Organization (IHO), for their continuing support and valuable work. The Committee encouraged the SDOs to continue to liaise and work with Member States to implement standards and, *inter alia*, welcomed the proposed review and updating of the standards guide.

2. The SDOs work in partnership to leverage their respective missions and membership expertise to advance the principles of Findable, Accessible, Interoperable and Reusable (F.A.I.R.) through developing standards that support the Committee of Experts in meeting its goals and objectives. The SDOs continue to increase cooperation through formal liaison agreements and joint program initiatives to produce standards and good practice recommendations that could not be fully achieved by working in isolation.

3. This present report details the collective efforts of the SDOs in the intersessional period since the tenth session. In the report, the three SDOs elaborate on their joint efforts, including:

- (a) OGC's work on the development of modernized open Application Programming Interface (API) standards and the integration of geospatial information, statistics and other data to address access to, and integration of, location information related to Earth observations, disaster preparedness and response, health, the environment, weather forecasting, and climate change;
- (b) The progress by ISO/TC 211, which includes: the further development of the multi-part standards ISO 19152 on Land Administration Domain Model, ISO 19144 on Land Cover Land Use, and ISO 19160 on Addressing; the increased use of the ISO Geodetic Register (ISGR); the broad demonstration of the use of standards; and, the increased liaison relations with UN-GGIM functional and regional groups that impacts explicitly the work of ISO/TC 211; and
- (c) The demonstration of the use of standards, including IHO's work on the S-100 framework to support the creation and maintenance of interoperable maritime data product specifications compliant with the ISO 19100 series of geographic information standards.

4. This report also provides an overview of the SDO's work regarding the use of geospatial standards in supporting the measurement and monitoring of the Sustainable Development Goals (SDGs), the role of standards in response to the ongoing global coronavirus disease (COVID-19) pandemic, its continued support to the development and preparation of the implementation guidance, options and actions for the standards pathway for the Implementation Guide of the Integrated Geospatial Information Framework (IGIF); and a significant revision to the Guide to the Role of Standards in Geospatial Information Management (the "Standards Guide") as a living and online resource aligned with the IGIF.

5. 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 35.

II. Update on the work of the Standards Development Organisations

Update from the Open Geospatial Consortium (OGC)

6. OGC and its more than 540 members from across the private and public sectors have guided the advancement of standards and associated good practices to make geospatial information F.A.I.R in support of global requirements. Through its member meetings, workshops, forums and summit events, OGC is addressing an expanding range of geospatial interoperability challenges facing the international community and is leading the dialogue on the implications of fast-changing technology and community trends. Over the past year, OGC has focused on a range of topics relevant to the SDGs, including the development of a common health emergency data model as part of a Health Spatial Data Infrastructure (SDI) initiative in response to the COVID-19 pandemic, continued focus on improved support to disaster response, and a global forum on climate services. OGC continues with its advancement of an open Application Program Interface (API) standards suite - a modernization of OGC's Web Services standards designed to ease development and deployment and increase flexibility of mobile applications and more efficiently leverage big data and cloud infrastructure. OGC has also implemented a Stakeholder Coordination process to more closely engage the user community in identifying requirements, evaluating and testing standards-based solutions developed in OGC innovation initiatives.

7. **Adoption and Implementation of OGC General Purpose geospatial standards.** Commonly known as OGC Web Services and OGC Sensor Web Enablement (SWE) Services, these core OGC standards continue to be implemented in hundreds of commercial, open-source, and custom-developed geospatial technologies and Internet of Things deployments worldwide. These implementations support greater understanding and decision making related to water resource management, emergency and disaster management, meteorology and ocean science; smart, safe, and resilient cities, communities and infrastructure; and many other areas of high relevance to the attainment of the SDGs. A program to modernize OGC Web Services into more easily implementable Open API Standards is well underway, with OGC Open API-Features now being implemented in major commercial and open-source geospatial technologies supporting the global community. The OGC Environmental Data Retrieval Open API, recently approved, provides greater capability to discover and query big data sources in a location and time context. This standard has broad applicability and is being implemented in major national and international hydro-meteorological offices to help reduce the complexity of discovery and access to critical data supporting weather and climate analyses and forecasts. GeoPackage, an OGC standard designed to manage and use large amounts of geospatial data on a mobile device in connected, limited connectivity or disconnected environment, is rapidly becoming an alternative to vendor-specific formats. GeoPackage is being used in a range of applications, including disaster response, through efforts such as the Humanitarian OpenStreetMap program.

8. **Adoption and Implementation of OGC Domain-Specific Standards** such as WaterML 2.0 applied in conjunction with OGC general-purpose web service standards also impact the community by enabling the integration of disparate water monitoring stations into a comprehensive water resource management framework. New Zealand is among one of the first nations to establish a national water resource management system by using OGC standards to unite hundreds of point source water observations across 16 regional councils that separately manage river catchments across the country. OGC continues to support the SDGs related to resilient infrastructure and liveable cities through expanding implementations of OGC CityGML and associated Application Domain Extensions, IndoorGML and the Indoor Mapping Data Format (IMDF) Community Standard. These standards allow the creation of detailed 3D city models/digital twins and indoor navigation

capabilities that support a range of urban planning, energy efficiency, public safety, accessibility, city service provision, and other applications. These standards have been implemented in commercial and open-source products and are in active implementation across municipalities in Europe, Asia, and North America.

9. **Addressing Health and Disaster Events.** OGC concluded an international Health SDI Concept Development Study in early 2021, which polled health and geospatial experts on the essential location-relevant information needed to support more effective preparation and response to future pandemics and other health emergencies. From this effort, an initial common Health SDI data model has been developed and is being exercised as part of an OGC Disaster Pilot currently underway.

10. **Increasing Engagement with Regional Committees and other International Bodies.** In concert with the OGC Disaster Pilot, OGC has implemented a Stakeholder Coordination process to directly engage the global stakeholder community, including the regional committees, thematic- and functional groups of the Committee of Experts and the Group on Earth Observations (GEO) involved in health and disaster response, to integrate stakeholder expertise, requirements, and use cases into the pilot process. This coordination process also provides an opportunity for stakeholders to directly field test standards-based capabilities produced by OGC initiatives. Through this stakeholder engagement process, OGC is working to accelerate the transfer of relevant standards-based approaches into community use.

11. **Compliance Testing Resources.** As part of OGC's compliance testing and certification program, OGC implemented several new online compliance tests. Technology developers and organizations implementing OGC standards can use this facility without charge to test for correct implementation of the SensorML 2.0 and GeoTIFF 1.1 and CDB standards, as well as 17 others approved OGC standards. The OGC test engine and test scripts are available as open-source and can be implemented locally by organizations wishing to test for correct implementation of OGC standards in their legacy systems and internally developed software.

Update from the Technical Committee 211 of the International Organization for Standardization (ISO/TC 211)

12. **ISO/TC 211 Geographic information/Geomatics** is the ISO entry point to geospatial standards and develops and maintains an aligned set of standards focused on the geospatial context built upon general Information Communication Technologies. A goal is to provide and recommend geospatial standards accepted and applicable for integration with other standards without re-modelling for use in domains needing location. ISO/TC 211 consists of 37 Participating and 33 Observing members, members being national standards bodies. ISO/TC 211 collaborates with numerous liaisons, both ISO committees and organizations. For information on ISO/TC 211: scope, business environment, stakeholders, liaisons, benefits, objectives, strategies, quantitative indicators, a programme of work, published standards, membership, and contact details, please refer to the Strategic Business Plan and ISO/TC 211 website. Freely available resources such as UML models and XML schemas for supporting standards implementations are also found on ISO/TC 211 website. The committee is active in the ISO pilot work on machine-readable standards.

13. **The Sustainable Development Goals (SDGs).** Geospatial standards support the broader objectives of the 2030 Agenda for Sustainable Development: both general-purpose geospatial standards that are important for industry and infrastructure, and those standards in direct support of the Committee of Experts, specifically in the areas of Geodetic Referencing, Land Administration, Land Cover Land Use, and Addressing. ISO provides tools to help technical committees to map their projects to the SDGs. As reported at the Committee of

Expert's tenth session, several countries report using the ISO 19160-1 standard on addressing in the fight against COVID-19 by enabling monitoring the contagion chain of the disease.

14. General purpose geospatial standards and aligning with the business environment. Several geospatial standards are so basic that users are not always aware of them being implemented. Standards that uniformly describe data (specifications, metadata and quality, and geographic point location by coordinates) are widely used. The metadata standard ISO 19115 and the OGC Web Mapping Service (WMS - also ISO 19128) are the most common standards referred to in the ISO/TC 211 User Story Collection. A successful example of aligning standards with the business environment is the joint work and breakthrough in 2020 between ISO/TC 211 and ISO/TC 204 Intelligent Transportation Systems to find a common data model and align geographic concepts for autonomous vehicles.

15. Participation in standardization and advancing implementation. The user community identifies the requirements for standardization, and therefore stakeholder participation, as essential. The ISO/TC 211 User Story Collection responds to the need to demonstrate that standards are adopted in legislation, and national frameworks and are also implemented. The ISO/TC 211 website provides further details in this regard, detailing some 20 stories with over 80 references to standards, but this is the tip of the iceberg. As an example, the Defence Geospatial Information Working Group (DGIWG) and IHO standards are based on standards from ISO/TC 211 and OGC. ISO/TC 211 has increasingly made outreach efforts in the intersessional period, including: the Standards in Action seminar "Doing standardization together"; the workshop on Terminology and Shared Concepts; and the Joint ISO/TC 211-OGC seminar on Celebration of Women in Geospatial standards held in March, the latter also responding to the ISO Gender plan. Recordings are found on the website of ISO/TC 211.

16. Increasing engagement with regional committees of UN-GGIM. The establishment of a liaison with UN-GGIM Africa is currently underway, and this is expected to facilitate Member States of Africa to engage in standards development nationally. ISO/TC 211 already has liaison relations with UN-GGIM Americas and UN-GGIM Asia Pacific.

17. Coordinate Reference Systems. ISO/TC 211 supports the implementation of the Global Geodetic Reference Frame (GGRF) by developing standards, e.g., ISO 19111 "Referencing by coordinates", ISO 19127 "Geodetic Register", and ISO 19161-1 "ITRS"; and through a long-term sustainable ISO Geodetic Register (ISOGR) and its associated Control body which consists of convenors nominated by the International Association of Geodesy (IAG) and of international geodetic experts. The register is accessible through an online system and is freely available. To further strengthen the engagement between the Committee of Expert's Subcommittee on Geodesy (SCoG) and ISO/TC 211, work to establish a liaison mechanism is currently underway, and ISO/TC211 has been invited to have Observer status within the SCoG. Further, noting the many geospatial users that are familiar with the European Petroleum Survey Group's (EPSG) Dataset and Registry, managed by the International Association of Oil and Gas Producers (IOGP), the relevant parties are currently investigating the possibilities of linking ISOGR and EPSG for the benefit of users.

18. Land Administration. The preparation for the revision of the standard ISO 19152:2012 "Land Administration Domain Model (LADM)" has reached out to OGC, IHO, International Federation of Surveyors (FIG), United Nations Office of Legal Affairs' Division for Ocean Affairs and Laws of the Sea (DOALOS), the World Bank, the United Nations Food and Agriculture Organization (FAO), and UN-Habitat to ensure that the proposed new parts to this standard will cover the organizational requirements. The result of the consultation is an agreement on a multi-part standard: 1) Land Administration Fundamentals; 2) Land Registration; 3) Marine Space Georegulation; 4) Land Valuation; 5)

Spatial Planning; and, 6) Implementations. Currently, Part 1 has been initiated and is part of the ISO/TC 211 work programme. Proposals for Part 2 and 3 will be submitted to ISO/TC 211 during the second half of 2021. Parts 3, 5 & 6 may also progress to a stage where they could be submitted in the first half of 2022.

19. **Land Cover and Land Use (LCLU).** LCLU are essential and fundamental data themes used by millions of professional users globally across various applications. While the explosion of Location Intelligence tied to these essential data layers continues at a pace, the growing need for an agreed-upon LCLU meta language is more urgent than ever. ISO 19144-2:2012 “Geographic information - Classification systems -- Part 2: Land Cover Meta Language (LCML)” was developed under the leadership of FAO. The preparation for a revision and expansion of this standard includes inviting a broad community of UN and regional bodies to prepare the new proposals. This involves:

- (a) The revision of ISO 19144-2;
- (b) The development of ISO 19144-3, a new meta-language standard for Land Use;
- (c) The development of ISO 19144-4 on Registers; Currently, the projects for 19144-2 and 19144-3 have been initiated; and
- (d) Further, to strengthen the focus on LCLU, an ISO/TC 211 advisory group for Land Cover and Land Use was established in 2021.

20. **Addressing.** Addresses provide one of the most common ways to unambiguously determine a physical object for purposes of identification and location; assisting such services as postal delivery, emergency response, marketing, mapping, utility planning and land administration. Addresses and address data are turning out to be crucial in the fight against COVID-19. Authorities need accurate and reliable address data to identify and trace individuals infected by the disease, or others who have been in contact with infected persons. Unfortunately, non-standardized addresses significantly hinder the response to COVID-19. ISO/TC 211 has published a multi-part ISO 19160 “Addressing” standard to assist the many stakeholders involved in addressing activities. The parts cover topics such as: conceptual data model; terminology; good practice for address maintenance and assignment; quality of address data; and international postal addressing, jointly developed with the Universal Postal Union (UPU). During the inter-sessional period:

- (a) The development of ISO 19160-2 was approved as a new project in July 2021. The standard focuses on assigning and maintaining addresses for objects in the physical world, and will facilitate the implementation of address assignment and maintenance, contributing to addressing the unaddressed; and
- (b) In June 2021, the UPU presented a proposed revision of the UPU and ISO jointly developed standard ISO 19160-4:2017 that will add a telephone number to the international postal address components and template language.

Update from the International Hydrographic Organisation (IHO)

21. The IHO continued to work on its S-100 Universal Hydrographic Data Model framework to support the creation and maintenance of interoperable maritime data product specifications compliant with the ISO-19100 series of geographic information standards. The S-100 infrastructure, which includes the Geospatial Information Registry, Feature Catalogue and Portrayal Catalogue builder, have been developed and tested. The new version 3.1 of the GI registry was launched in November 2020. S-100 based product specifications assigned to IHO, the International Association of Light Authorities (IALA), the Intergovernmental Oceanographic Commission (IOC), the Inland ENC Harmonization Group (IEHG), the World Meteorological Organization (WMO), the International Electrotechnical Commission (IEC) and NATO are being maintained on the IHO website. IHO S-131 - Marine Harbour

Infrastructure and S-164 - Test Data Sets for S-100 navigation systems are newly assigned, and work has commenced for the development and testing of these standards.

22. S-100 based products of S-101 - Electronic Navigational Chart, S-102 - Bathymetric Surface, S-111 - Surface Currents and S-129 - Under Keel Clearance are under initial implementation, testing and evaluation for vessel navigation in IHO testbed programmes. IHO approved a new project S100P - S-100 Open Online Platform that is aimed to be the foundation for a digital ocean and accelerate the wide adoption of the S-100 hydrographic framework by jointly developing and making available the technical requirements needed to overcome any S-100 implementation barriers.

23. New publications are under development, including the S-98 Interoperability Specification and S-164 Test Data Sets for S-100 navigation systems. These developments will ensure that S-100 products can be used at the operational level together with S-101 Electronic Navigational Charts (ENCs) – the next generation of ENCs - which also means that all data flows are well managed, that data qualification requirements are consistent, and data protection schemes can be applied to products before distribution to end-users and stakeholders.

24. The IHO approved an S-100 implementation strategy, which centres on the future provision of S-101 ENCs. The main drivers to develop S-100 are further digitization in the shipping industry - for classic and autonomous navigation – and the benefits of “smart hydrography”. S-100 will not only improve the safety of navigation and shipping in ports but will provide a cyber-secure, easily maintained software foundation that will support creative industry policy. The IHO has commenced coordination with the International Maritime Organization (IMO) and industry stakeholders concerning the transition to the S-101 ENC production, coverage and utilization in end-user applications.

25. The IHO has deployed a questionnaire to assess the status of Marine Spatial Data Infrastructure (MSDI) and Marine Spatial Planning (MSP) in their respective Member States and developed a template to assess the status of maturity of MSDI and MSP in their respective Member States. IHO is working on an online publication of the IHO publication C-17 Spatial Data Infrastructures: “The Marine Dimension” - Guidance for Hydrographic Offices, which will be continuously updated in a decentralized approach. An important undertaking is the IHO-OGC MSDI Concept Development Study (CDS), funded by the USA/NGA. The goal of the CDS was to demonstrate to stakeholders the diversity, richness and value of a Marine SDI, specifically data, analysis, interoperability and associated IT services -including web services -in addressing the needs of the marine domain. The study is also available at <https://iho.int/en/body-of-knowledge>. As recommended by the successful OGC-IHO MSDI Concept Development Study (CDS), a full-scale Pilot to demonstrate a multi-country, federated MSDI under a land/sea boundary use case is now under development. The goal of the Pilot is to show how the value of MSDI can unlock data and information for use beyond traditional providers and consumers of hydrographic data, across borders, and across domains inclusive of improved connections between the terrestrial and marine foundational communities.

26. To improve the incomplete image of the ocean’s seabed topography from all available data resources, IHO has continued to develop its “Crowdsourced Bathymetry campaign” and its supporting guidance document (IHO B-12). In addition, significant developments have been undertaken to the IHO’s Data Centre for Digital Bathymetry (DCDB) to enhance uploading, data viewing and download functionality. The resulting GEBCO (General Bathymetric Chart of the Oceans) grid of global ocean seabed topography is publicly available under open data policy terms for download and re-use. The grid is now updated on an annual basis; the 2021 grid now has 20.6% coverage, an increase of more than 14% over the past four years.

III. Revising the Integrated Geospatial Information Framework’s Strategic Pathway 6 on Standards, and the Standards Guide

27. In late 2020, the SDOs completed a major revision of the draft IGIF Strategic Pathway 6 following comments received from the Committee of Expert’s Member States and Observers.

28. From January to July 2021, a team of over 30 member representatives from the SDOs completed a major revision of the Guide to the Role of Standards in Geospatial Information Management (the “Standards Guide”). The Standards Guide has been structured to align with the IGIF’s Strategic Pathway 6 on Standards.

29. The draft Standards Guide is in the process of being transitioned to a web-based online presence to enable more efficient maintenance and expansion as new standards and good practices evolve and as feedback and additional contributions are received from the global community. The web-based implementation will include the capability to produce a PDF version of the Standards Guide for countries with limited connectivity and users that wish to use an offline version.

30. The draft third edition of the Standards Guide is now provided to the Committee of Experts as a background document to this present report for consideration and endorsement.

IV. Geospatial Standards in measuring and monitoring the SDGs

31. The SDOs continue to maintain and advance a framework of geospatial standards and good practices that support the mapping, visualization, analysis and forecasting related to each of the 17 SDGs. The general purpose of the SDOs is to urge the continued adoption of geospatial standards by technology suppliers worldwide to make it easier for the user community to implement F.A.I.R. solutions that are broadly compatible for collaboration and data sharing. The SDO’s domain-specific standards are helping to address specific SDG goals such as addressing hunger, health, and sustainable communities.

32. Some specific examples of SDO support to SDGs over this past year include: Goal 2: Zero Hunger (ISO/TC 211 Land Cover/Land Use); Goal 3: Good Health and Well Being (OGC Health Spatial Data Infrastructure Data Model); Goal 9: Industry, Innovation and Infrastructure (All SDO general-purpose standards apply); Goal 11: Sustainable Cities and Communities (implementation of OGC CityGML, OGC Indoor Mapping Data Format Community Standard); Goal 13: Climate Action (SDO General Purpose Standards, OGC Open API: Environmental Data Retrieval); Goal 14: Life Below Water (IHO Electronic Navigational Chart, S-102 – Bathymetric Surface, S-111 – Surface Currents, and S-129 – Under Keel Clearance).

33. Geospatial standards will continue to be key ‘enablers’ for the implementation of the SDGs, especially given the continual pace of societal and technological change. This includes a commitment to geospatial data integration and interoperability based on open, consensus-based standards. Standards provide the critical architecture by which data for the SDGs can be discovered, collected, published, shared, stored, combined, and applied. The application of standards facilitates the management and sharing of geospatial information, not only from government authoritative sources, but also from the private sector, academia and citizens, and among each other. Most importantly, and like the SDGs themselves, standards facilitate the integration and location enablement of all kinds of information to enable more effective policies and decision-making.

34. In summary, and noting the cross-cutting nature of standards across the SDOs, the SDOs reiterate their support for the ongoing work programme of the Committee of Experts and welcome guidance on its draft Standards Guide. In the coming intersessional period, the SDOs will incorporate the feedback provided by the Committee on the Standards Guide and will continue its work to advance the principles of Findable, Accessible, Interoperable and Reusable (F.A.I.R.) principles in the development of its standards.

V. Points for Discussion

35. **The Committee of Experts is invited to:**

- (a) Take note of the present report of the SDOs and express its views on the activities undertaken by the three standards development organizations, in facilitating the Integrated Geospatial Information Framework, and towards achieving the Sustainable Development Goals;**
- (b) Consider the draft Third Edition of the Standards Guide, provided as a background document to this present report, with a view to its endorsement as a living document;**
- (c) Encourage broad review, feedback, and contributions to the Third Edition of the Standards Guide, in particular, contributions documenting geospatial standards implementations and user stories to feature in the Standards Guide and its annexes;**
- (d) Encourage broad use of the Standards Guide to support implementation of standards-based solutions that ensure interoperability, data sharing, and flexibility to adapt to changing data sources and technologies; and**
- (e) Urge Member States to participate, through membership, in the international geospatial standards development processes and meetings of the OGC, ISO/TC 211, and IHO to follow, provide input into, and review standards as they are developed, finalized and approved.**