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Committee of Experts on Global Geospatial Information Management Thirteenth session New York, 2–4 August 2023 Item 6 of the provisional agenda* The future geospatial information ecosystem

The future geospatial information ecosystem

Note by the Secretariat

Summary

The present paper contains the report of the Secretariat on the future geospatial information ecosystem for consideration by the Committee of Experts on Global Geospatial Information Management.

At its twelfth session, held in New York from 3 to 5 August 2022, the Committee of Experts adopted decision 12/102, in which it welcomed efforts to take steps with regard to exploring the geospatial landscape and determining the future geospatial information ecosystem in view of the rapid changes in technological innovations and advancements, the increasing volumes of location-enabled data, and how it could coexist in a broader digital ecosystem.

The Committee of Experts acknowledged that it was timely and strategically important topic to consider, to reflect on and position the work and vision of the Committee and the geospatial community moving forward within the mandates provided by the Economic and Social Council, and to understand how the future ecosystem would link to the work already carried out by the Committee, including the United Nations Integrated Geospatial Information Framework, which serves as a solid base for the future geospatial information ecosystem.

The Committee reiterated the need to reduce the growing geospatial digital divide between developed and developing countries and to ensure that any consideration of the future ecosystem prioritizes the circumstances of developing countries, including to promote the systematic and comprehensive frameworks that make geospatial data and technology available to decision makers.

In that regard, the Committee of Experts noted that a continuing discussion on the geospatial information ecosystem was necessary for the global community, with the aim of explaining and expanding the role of geospatial information in technological advancements and society in general, and also noted the importance of inclusive global engagement to ensure that the concepts are developed in a collaborative manner and are inclusive of the wider geospatial community.

In this present report, the Secretariat updates the Committee of Experts on discussions and efforts aimed at continuing to explore the geospatial landscape and the future geospatial information ecosystem to assist Member States and national geospatial information agencies in their thinking on current and future geospatial environments, in which technological developments and innovative applications will play a crucial role. The future geospatial information ecosystem will be greatly influenced by the world around us. As the discussions continue, a key consideration may be

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how geospatial data and technologies can enable the global community to overcome challenges facing the world and embrace the opportunities that arise. Such an approach could also provide a greater link to the delivery of the 2030 Agenda for Sustainable Development and other global development agendas. The Committee is expected to provide further inputs and guidance and to discuss elements of the future geospatial information ecosystem.

I. Introduction

1. Now at its thirteenth session, the Committee of Experts has experienced numerous successes and has been commensurately recognized at the apex of the international geospatial community. Anchored by the United Nations Integrated Geospatial Information Framework (UN-IGIF), the Committee has developed frameworks, norms and standards that enable Member States and others within the global geospatial community to harness the potential of geospatial information for the betterment of our people and planet. In keeping a focus on the future, the Committee has kept abreast of future trends and opportunities in the application and use of geospatial technologies and has developed the necessary global policy to assist countries in making change where it will benefit most. This has been greatly assisted by the three editions of the reports entitled [Future Trends in Global Geospatial Information Management](#), led by the United Kingdom's Ordnance Survey. However, we are still far behind where we, as a global community, need to be; the true potential of geospatial information is not yet fully realized as geospatial technologies are constantly improving, leaving a gap between, and within, developed and developing countries – the geospatial digital divide.

2. The rapid pace of technological change is a double-edged sword. By accelerating progress in some areas, previously disconnected areas can become connected; the farmer in the field can know market prices and can plan sales and their next crops accordingly, or the decision-maker can make informed decisions on where to build infrastructure, not just for 5-years' worth of growth, but model what 10 or 30 years of growth will look like. We generate unimaginable amounts of location-referenced information, empowering and inspiring innovators to create new insights and knowledge. Yet, while the role of geospatial information is assured in our global data ecosystem, we must work to ensure equitable access to these new approaches, as the geospatial digital divide continues to grow rather than diminish.

3. Thus, in alignment with the Committee of Experts' role to consider future trends and opportunities in the application and use of geospatial technologies, at its eleventh session, held virtually on 23, 24 and 27 August 2021, the Committee considered a number of interlinkages with the UN-IGIF as contained in [E/C.20/2021/6/Add.1](#). Aided by the UN-IGIF as the Framework of choice for countries to build and strengthen their national geospatial information management arrangements, combined with rapid technology development and digital transformation, geospatial user expectations and needs are undergoing incremental change. A draft position paper entitled [Towards a Sustainable Geospatial Ecosystem Beyond SDIs](#) was provided as a background document to the Committee, its purpose being to initiate a re-thinking and re-imagining of the way in which geospatial information is shared, analyzed, and used in the rapidly changing environment of today and into the future. The paper provided thoughts and ideas to enable the global geospatial community to be more adequately prepared and to drive and facilitate the transition to a geospatial ecosystem beyond spatial data infrastructures (SDIs) and proposed some initial first steps towards a 'future vision', a sustainable geospatial ecosystem beyond SDIs.

4. The Committee continued its examination of the future geospatial ecosystem at its twelfth session, held in New York from 3 – 5 August 2022, acknowledging that it was a timely and strategically important topic to consider, to reflect on and position the work and vision of the Committee of Experts and the geospatial community moving forward within the mandates provided by the Economic and Social Council, and to understand how the future ecosystem would link to the work already carried out by the Committee, including the UN-IGIF, which serves as a solid base for the future geospatial information ecosystem. Two draft position papers were provided as background documents to the Committee. The first, entitled [Development of contextual understanding, information, and analytics towards determining the national geospatial information ecosystem](#) proposed an assessment framework based on

evaluating a country's political, economic, social, and technological (PEST) environment. The second, entitled [Future Geospatial Information Ecosystem: From SDI to SoS and on to the Geoverse](#) explored the geospatial landscape using the UN-IGIF as a critical thinking tool to examine the SDI construct to look proactively towards the future geospatial information ecosystem.

5. In adopting decision 12/102, the Committee of Experts reiterated the need to reduce the growing geospatial digital divide between developed and developing countries and to ensure that any consideration of the future ecosystem prioritizes the circumstances of developing countries, including promoting the systematic and comprehensive frameworks that make geospatial data and technology available to decision makers. Furthermore, the Committee noted that a continuing discussion on 'geospatial information ecosystem' was necessary for the global community, with the aim of explaining and expanding the role of geospatial information in technological advancements and society in general.

6. In adopting decision 12/102, the Committee of Experts noted the importance of an inclusive global engagement, and urged Member States and relevant stakeholders to provide their feedback and contributions on both background documents to the Secretariat by the end of October 2022 to ensure that the concepts are developed in a collaborative manner and are inclusive of the wider geospatial community. In this regard, there was one response from a Member State to these background documents. Given the potential importance of the future geospatial ecosystem to the Committee's work and the Committee's prior recognition of its role to be both agile and relevant as countries move beyond current geospatial management activities, the Secretariat and the Bureau convened or participated in several activities and conversations with geospatial leaders and stakeholders in the intersessional period to assist with advancing and defining the Committee's position on the future geospatial ecosystem guided by the question "What is the role of UN-GGIM in advancing the future geospatial ecosystem?"

7. In this present report, the Secretariat provides information on efforts aimed at continuing to take steps with regard to exploring the geospatial landscape and determining the future geospatial information ecosystem with a view to assisting Member States and national geospatial information agencies in their thinking on future geospatial environments in which technological developments will play a crucial role. These efforts, as captured in this present report, comprise three elements: the convening of a summit with geospatial leaders as part of Geospatial World Forum in Rotterdam in May 2023; the convening of a global webinar organized by the Secretariat and Bureau in June 2023; and a set of options for future work emanating from these conversations. Specifically, this set of options distil recommendations for the Committee's consideration at this present session. The Committee of Experts is invited to take note of the report, and to express its views on determining the future geospatial information ecosystem. Points for discussion and decision are provided in paragraph 21.

II. Informal discussion and dialogue with geospatial leaders

8. The [Geospatial Knowledge Infrastructure \(GKI\) Summit](#), with the theme 'strategic infrastructure for [the] future geospatial ecosystem', was convened on 4 – 5 May 2023 as part of the 2023 Geospatial World Forum. The Summit brought together thought leaders, experts, and stakeholders from the geospatial community to explore and discuss the critical role of knowledge infrastructure in shaping the future of geospatial information management. The scene for the Summit was set by presentations from the Secretariat, the vice-chair of the Committee of Expert's Regional Committee for Europe (UN-GGIM: Europe) and representatives of the United States of America and Georgia.

9. During the Summit, participants engaged in insightful discussions on various topics related to the future geospatial ecosystem. The focus was on establishing a strategic

infrastructure that would effectively support the evolving needs of geospatial information management, innovation, and utilization. One key discussion area was the importance of interoperability and integration within the geospatial ecosystem. Participants from both Member States, the private sector and civil society explored ways to enhance the interconnectivity of systems and data, enabling seamless collaboration and information sharing across different sectors and domains. The Summit highlighted the need for standardized frameworks, open data policies, and interoperable technologies to facilitate the efficient exchange and integration of geospatial information and further served to highlight how countries (and other stakeholders) are practically implementing and leveraging the UN-IGIF.

10. In showcasing innovative practices and emerging technologies that contribute to the advancement of the geospatial ecosystem, the Summit explored cutting-edge solutions, including artificial intelligence, machine learning, remote sensing, and geospatial analytics, that have the potential to transform the way we collect, analyze, and utilize geospatial data. This emphasized the potential of geospatial data and technologies in addressing global challenges, such as climate change, urbanization, and disaster management. In this regard, the Summit underscored the need for robust geospatial knowledge infrastructure to support evidence-based decision-making, planning, and policy formulation at local, national, and global levels.

III. Global Webinar on the Future Geospatial Ecosystem: What is the Role of UN-GGIM

11. As part of continuing the conversation initiated in Rotterdam and bringing it into the purview of the Committee of Experts, the Bureau and Secretariat convened the global webinar [Global Webinar on The Future Geospatial Ecosystem: What is the Role of UN-GGIM?](#) on 12 June 2023. Anchored by the Committee's co-Chairs from Belgium and Mexico, regional leaders (the chair of the UN-GGIM: Africa regional committee and the vice chair of the UN-GGIM: Europe regional committee), functional group leaders (the co-Chair of the High-Level Group on the Integrated Geospatial Information Framework – HLG-IGIF) and a representative of the private sector, the webinar enabled for an interactive and in-depth discussion on the role of the Committee in this area, and attended by over 320 participants from around the world.

12. The global webinar recognized that discussions on the future geospatial ecosystem in various fora have raised more questions than provided answers. In some circles of our community, discussions have urged the Committee of Experts to take a proactive role in shaping aspects of the future geospatial ecosystem. Others have urged a more passive approach – that the 'ecosystem' will evolve naturally and take care of itself with or without the Committee's input(s). Noting that this is a timely and strategically important topic to consider, there is a need for the Committee to reach a consensus and position at this present session. There are significant and growing limitations of SDIs, in that they primarily cater to human users (human readable) rather than machines (machine readable) processes, creating a notable obstacle in integrating diverse datasets, including transient data from sources like social media. The UN-IGIF goes some way to helping resolve these issues, but as an anchoring Framework works to provide geospatial information, not geospatial knowledge. In this regard, there is a need for geospatial information to move beyond the limitations of traditional SDIs and embrace a more interconnected and contextualized approach, enabling the integration of diverse datasets for enhanced knowledge extraction, championing the step-change from SDIs to an interlinked system-of-systems approach.

13. Participants emphasized that the responsibility for considering and/or defining the future geospatial ecosystem falls well within the purview of the Committee of Experts, in that the Committee has a crucial role in enhancing global geospatial information management

and reducing the geospatial digital divide. They also reiterated the significance of the UN-IGIF as the cornerstone of any future geospatial ecosystem, observing that the UN-IGIF enables data to be ‘knowledge ready’ and be easily disseminated in machine readable formats. In this regard, discussants noted that the Committee is already helping define the future geospatial ecosystem by its substantive work and distilled three challenges concerning the future geospatial ecosystem:

- (a) **Perceiving a ‘single’ ecosystem and defining it:** One challenge lies in the perception that there is a singular and easily definable geospatial ecosystem. Ecosystems are complex and multifaceted, making it difficult to establish a clear-cut definition.
- (b) **Engaging expertise from other sectors:** To progress from data to knowledge and actionable impact, it is essential to incorporate expertise from domains beyond the geospatial community. Failure to do so may result in a disconnect between data producers, consumers, and users, leading to a solutions-driven approach rather than a user-driven one. Bridging this gap requires articulating the value, benefits, and use cases of the geospatial ecosystem.
- (c) **Influence of the external world:** The future geospatial information ecosystem will be significantly shaped by global circumstances. It is important to consider how geospatial data and technologies can contribute to overcoming global challenges and embracing emerging opportunities. Aligning the geospatial ecosystem with delivering the Sustainable Development Goals (SDGs) and the post-2030 Agenda can establish a stronger connection.

14. When considering the relationship of the future geospatial ecosystem vis-à-vis the geospatial digital divide, discussants urged the need to promote development so to not hinder progress. Participants advocated for a future geospatial ecosystem that is inclusive and belongs to everyone, emphasizing the Committee’s role in assisting countries in developing their geospatial capacity. In this respect, the discussion noted that there will not be a single geospatial ecosystem, but one that is multifaceted in nature that prioritises the fostering of the interconnectivity of different systems and ecosystems. This would include the ability to collect data from various hardware vendors and integrate it seamlessly into different software platforms. The discussants underscored how interoperability plays a crucial role in enabling effective collaboration and maximizing the potential of the geospatial ecosystem and called to promote interoperability as a key principle of the future geospatial ecosystem.

15. In summary, SDIs must evolve from their initial purpose of making data accessible to humans, signifying a shift from focusing solely on data to processing and synthesizing it into contextualized information. This will necessitate the interconnectivity of systems of systems, allowing data to be accessible to machines. To achieve this, discussants urged the Committee to broaden its perspective and consider innovative methods for extracting new knowledge, insights, and impact from geospatial information. This entails engaging with a diverse group of users and embracing the concept of digital ecosystems, of which the (future) geospatial ecosystem is a crucial part. Furthermore, they encouraged the Committee to take proactive action in shaping the future geospatial ecosystem with a forward-looking and aspirational mindset.

IV. Towards defining the future geospatial ecosystem

16. While it may seem difficult to determine and define the future geospatial information ecosystem, the Committee of Expert’s experience and expertise gained from the development, and now implementation, of the UN-IGIF and other global frameworks provides a valuable and geographically balanced context. This is important given that rapid technology innovations are influencing the definition of the ‘geospatial ecosystem’. Industry

and the technology sectors have already advanced from the traditional definition of geospatial information to a much more dynamic definition of geospatial applications inclusive of digital cities, digital twins, and even the metaverse. However, these rapidly evolving technology advancements bring with them an alternative scenario – an increasing ‘digital’ and ‘geospatial’ divide between developed and developing nations, a widening technology understanding gap among users, a lack of skilled personnel to exploit new opportunities, and the need to protect the privacy and deal with bias and cybersecurity issues – which necessitates governments worldwide exploring a modern, knowledge-driven and sustainable geospatial information ecosystem.

17. National Geospatial Information Agencies (NGIAs) are the natural institutions that can be used to bridge these divides as the traditional custodians and curators of national geospatial information. But with the expansion and evolution of the geospatial stakeholder ecosystem, including technological enablers, these same national agencies must re-evaluate their roles and responsibilities in line with the new and emerging opportunities to adapt towards an enabling ecosystem for enhanced adoption and use of geospatial knowledge across industry sectors and domains. In this regard, there are three drivers for change:

(a) **The need for solutions to global problems.** Our world is at a critical moment. We are recovering from the global coronavirus COVID-19 pandemic, at the mid-point of the 2030 Agenda for Sustainable Development, and climate change – among many other challenges. It is now clear that the global preparedness for the pandemic was lacking, and geospatially integrated data will be key to helping mitigate the impacts of the next pandemic and climate change while helping us accelerate progress towards the 2030 Agenda;

(b) **The need for equitable access to knowledge.** The digital economy has increased the ability of our populations to access knowledge, enabling our data to be (re)used for many other purposes. This provides context and meaning to differing domains, enhancing the value proposition of geospatial information.

(c) **The need to bridge the geospatial digital divide.** The overriding goal of the 2030 Agenda is to ensure that ‘no one is left behind’, but despite our technological progress and the seemingly limitless potential of geospatial technologies, populations are still marginalized, and these technologies are not universally available.

18. For each of these drivers, advancements in technology are key enablers. In NGIAs looking beyond ‘data’ as a focal point of activity, considering data processing and synthesis into contextualized information, NGIAs can be at the forefront of delivering new knowledge, insights, and impact through various means to a much wider group of users. Simply, there are new actors and stakeholders in our environment, raising questions about how NGIAs and our global community can transform to take advantage of these new opportunities. This is not the first time NGIAs have been asked to transform. The very nature and business of an NGIA is to understand, manage and embrace change, and it is vital to consider efforts to define the future geospatial ecosystem as the next step in their journey. Technological developments and innovations, what many call the fourth industrial revolution, are disrupting traditional methods of geospatial data delivery and dissemination, but as NGIAs embraced the transformation from paper maps to digitized geospatial information, they can continue to evolve. In essence, the Committee is now challenged to look into the global crystal ball – towards a landscape that comprises digital ecosystems, of which the geospatial ecosystem is a foundation for other digital ecosystems.

V. Options for the Committee to consider

19. A broad consensus was reached with the global webinar, there was a strong call from participants for the Committee of Expert’s to continue its consideration of the future

geospatial ecosystem. This question now is how the Committee progresses this item. Therefore, to provide further inputs and guidance and to discuss elements of the future geospatial information ecosystem, the Committee's example options could be:

- (a) **Option 1: Take a passive approach.** The Committee decides to take a passive approach to the definition and development of the future geospatial ecosystem. This option nominally assumes this agenda item would be closed;
- (b) **Option 2a: Develop a set of principles for the future geospatial ecosystem.** The Committee entrusts the Bureau, perhaps supported by a small writing team composed of regional leaders, to develop a position paper composed of key principles of the future geospatial ecosystem for the Committee's consideration at its fourteenth session, akin to how the Committee developed the Global Fundamental Geospatial Data Themes, to help navigate the complexities inherent in defining our nebulous, complex, and evolving geospatial ecosystem; or,
- (c) **Option 2b: Establishing a working group on the future geospatial ecosystem** in addition to the existing functional groups under the purview of the Committee currently.

20. These options each contain a myriad of advantages and risks, with implications for resourcing and capacity. In discussion, the Bureau and Secretariat consider Option 2, 'principles for the future geospatial ecosystem', as the option with the most potential for positive outcomes, balancing currently available resourcing.

VI. Points for discussion

- 21. **The Committee of Experts is invited to:**
 - (a) **Take note of the present report and express its views on determining the future geospatial ecosystem;**
 - (b) **Provide guidance and feedback on the options suggested by the Bureau and Secretariat to identify a suitable mechanism to advance this topic.**
 - (c) **Provide further inputs and guidance towards the next steps and elements of the future geospatial ecosystem.**