
Economic and Social Council

13 July 2017

Committee of Experts on Global Geospatial Information Management

Seventh session

New York, 2-4 August 2017

Item 5 of the provisional agenda*

Global geodetic reference frame

Global geodetic reference frame

Note by the Secretariat

Summary

The present paper contains the report of the Working Group on the Global Geodetic Reference Frame for consideration by the Committee of Experts on Global Geospatial Information Management.

At its sixth session, held in New York from 3 to 5 August 2016, the Committee of Experts adopted decision 6/102, in which it commended the considerable efforts of the Working Group in preparing the road map on the global geodetic reference frame as a principle-based briefing document for Governments. The Committee of Experts welcomed the development of an implementation plan to ensure that the recommendations contained in the road map were linked to national policy developments in the area of geodesy. Recognizing the critical importance of an appropriate governance structure to effectively implement the road map, the Committee of Experts supported the establishment of a subcommittee on geodesy to provide stability and longer-term planning for the global geodetic reference frame and requested that the subcommittee determine its modalities and methods of work, including assuming the roles of the existing Working Group. In this report, the Working Group, as the interim subcommittee on geodesy, provides an account of progress made on the development of an implementation plan for the road map, inclusive of the outreach and communication that has taken place. It also describes the development of appropriate modalities, including terms of reference and methods of work, for the new subcommittee on geodesy and the interactions with each of the chairs of the five regional committees of the Committee of Experts in formulating the membership of the subcommittee.

* E/C.20/2017/1

I. Introduction

1. The Global Geodetic Reference Frame (GGRF) is a fundamental spatial dataset supporting the collection, integration and utilization of all other geospatial data. Its application extends from extremely precise decade-long Earth monitoring programs through to Global Navigation Satellite System (GNSS) guidance and control of Unmanned Aerial Vehicles (UAV's) used for the collection of spatial imagery. Much has been written about the application of GNSS to survey, mapping and navigation fields, but increasingly location-based positioning applications are becoming critical for civil engineering, industrial automation, agriculture, construction, mining, recreation, financial transactions, intelligent transport systems, disaster response and emergency management, environmental studies, and scientific research. This GNSS capability cannot occur without the availability of an accurate and sustainable GGRF.
2. Recognising the importance of the GGRF to society, Member States adopted General Assembly resolution 69/266¹ in February 2015, entitled 'A Global Geodetic Reference Frame for Sustainable Development.' A road map for the enhancement and sustainability of the GGRF was subsequently developed by the Working Group and provided to the Committee of Experts at its sixth session, held in August 2016.
3. At its sixth session, the Committee of Experts endorsed the road map and the establishment of a subcommittee on geodesy, and requested the subcommittee to determine its modalities and methods of work. The Committee welcomed the development of an implementation plan to ensure that the recommendations contained in the road map are linked to national policy developments in the area of geodesy. The Committee of Experts also requested the Working Group to continue its outreach and communication, especially in the regional framework.
4. This present report updates the Committee on progress of the road map implementation plan, including the consultation process by the Working Group with the global geodetic community. The report also describes the process of developing the appropriate modalities and methods of work for the establishment of the subcommittee on geodesy, including the establishment of membership through consultation with the Executives of the five regional committees of UN-GGIM. Finally, the report also describes activities on communication and outreach. The Committee of Experts is invited to take note of the report and to express its views on the draft subcommittee modalities (Terms of Reference). Points for discussion and decision are provided in paragraph 21.

II. Activities of the Working Group

5. The Working Group comprises geodetic experts from 32 Member States, the International Association of Geodesy (IAG), the International Federation of Surveyors (FIG) and the World Health Organisation (WHO).

¹ A/RES/69/266: http://ggim.un.org/docs/A_RES_69_266_E.pdf

6. Following the sixth session of the Committee of Experts, the Working Group had three informal meetings to discuss the modalities of the subcommittee on geodesy resulting in a draft Terms of Reference and a transition plan from the existing Working Group to the formal ‘Subcommittee on Geodesy’. These documents were provided to the Expanded Bureau at its annual meeting convened in December 2016 in New York. The draft Terms of Reference were circulated to the chairs of the five regional committees of the Committee of Experts in March 2017 for comments, and with a call for nominations of relevant Subcommittee members as per the Terms of Reference. Subsequent feedback from the regional committees have been incorporated into the draft Terms of Reference. The draft Terms of Reference and transition plan are attached to this present report as Annex I and II respectively. At the time of writing this report, member nominations from the regions of Asia and Pacific, the Americas, and Europe have been received. Upon endorsement of the Subcommittee on Geodesy by the Committee at this seventh session, the inaugural formal workshop of the Subcommittee is tentatively planned to be held on the margins of the Fifth High Level Forum on UN-GGIM being convened in Mexico City in November 2017.

7. The work towards the road map implementation plan, and the position paper to define the appropriate governance arrangements for the GGRF, was organized in five focus groups, each assigned with one of the key issue categories of the road map (geodetic infrastructure; data sharing, policy, standards and conventions; education, training and capacity-building; communication and outreach; and governance). The interim Subcommittee on Geodesy encouraged a broad involvement in the development of the road map implementation plan and the position paper. The call for participation was open and inclusive and not limited only to the formal members of the Working Group. A total of 38 nominations were received. The number of focus group members ranged from 8 in the communication and outreach group to 16 in the geodetic infrastructure group. In addition to Member States, international associations such as the International Association of Geodesy (IAG), the International Federation of Surveyors (FIG) and other key stakeholders (such as NASA) were represented in all groups.

8. The Subcommittee² and the focus group members had two additional joint informal working meetings; a teleconference meeting late November 2016 and a combined face-to-face and teleconference meeting in Vienna in April 2017. The agenda for these meetings were to inform each other on the progress achieved so far and to discuss plans for future work.

9. The activities of the different focus groups has been variable, ranging from the data sharing, policy, standards and conventions focus group, which has only recently had a focus group leader determined and therefore has made no progress; through to the other focus groups who have commenced a gap analysis and have started consultation with relevant stakeholders. For example, the education, training and capacity-building group has had discussions with the United Nations Office for Outer Space Affairs (UN-OOSA) and the International Committee on Global Navigation Satellite Systems (ICG), who are interested in being involved in the work of the focus group. The UN-GGIM Academic Network

² Although to be formally endorsed by the Committee of Experts at this seventh session, this present report refers to the ‘Subcommittee on Geodesy’ from this point forward, as it is under this new identity, membership, and the draft Terms of Reference, that the work programme is being progressed.

was also present at the last education, training and capacity-building group meeting.

10. The scope of the focus groups in developing the road map implementation plan is to determine what actions are required by Member States, and potentially others, to fulfil the recommendations detailed in the road map, ultimately aiming to satisfy the road map measures of success. Defining achievable actions is proving to be very complex, with high levels of dependency on governance, and communications and outreach, emerging consistently. To account for regional differences, regional consultations must be undertaken. It is also important to cooperate with other UN-bodies dealing with similar themes, in an attempt to establish and utilise current best practices.

11. The development of the road map implementation plan is continuing to engage the broader geodetic community. A growing interest in the activities and vision of the Committee of Experts is apparent across the global geodetic community, which is reflected by the growing flow of positive feedback on the initiative.

12. The governance focus group aims to develop a position paper to define the appropriate governance arrangements for global geodesy. The plan is to document which attributes of governance are needed, map the current situation, and make a gap-analysis between the two. Part of the activity will be to conduct a SWOT-analysis of the most relevant types of governance mechanisms, such as an intergovernmental organization, a UN-specialised agency, or a covenant memorandum of agreements. As a part of this process, targeted consultations may be required.

III. Communication and Outreach

13. As encouraged by the Committee of Experts, during the intersessional period the Subcommittee has continued its efforts in making the concept of the GGRF more visible and relatable to stakeholders and society. The dedicated communication and outreach work has resulted in increased engagement and awareness of the importance of the global geodetic reference frame and the work of the Subcommittee. As an example, a Norwegian film company has produced the international documentary film "Quest for the Exact Position" documenting how an accurate, accessible and sustainable GGRF supports science and society. This documentary was broadcasted four times nationally in Norway in 2017 and several other Member States have already expressed their interest in broadcasting it as well.³

14. Subcommittee members have participated in the regional committee meetings of UN-GGIM and have continued close contact with regional UN-GGIM geodesy working groups. Stakeholder consultations on the GGRF have taken place during the American Geophysical Union Fall Meeting in December 2016, GGOS Days in October 2016, and at the UN-GGIM Asia Pacific Executive Board in April 2017. Another arena has been the International Federation of Surveyors (FIG) Working Week 2017 in Helsinki, Finland in May 2017. FIG convened a separate session on the GGRF where the United Nations resolution on the global geodetic reference frame for sustainable development (A/RES/69/266) and the status of the

³ The Film is to be broadcast during the side event on the GGRF, in the margins of this seventh session.

implementation plan of the GGRF road map were presented, as well as a case study from Fiji on the impact of the UN resolution in the Pacific Island countries. A similar presentation will also be delivered at the International Association of Geodesy's General Assembly in Kobe, Japan in July 2017.

15. The focus group on communication and outreach has initiated a network of communication experts specifically on geodesy and reference frame related issues. The intention is that social media representatives from all geodetic agencies are able to network to promote initiatives originating from these agencies in order to increase the knowledge on global geodesy. The current status is that the network consists of communication experts from three UN-GGIM regions (Europe, Asia Pacific and the Americas).

16. In addition to handling the overall #GGRF Subcommittee communication, the Subcommittee uses the website unggrf.org and twitter account @unggrf as part of the outreach programme and communication tools. The GGRF standard presentation has been updated to reflect the current status on the development of the implementation plan and a new factsheet/newsletter has been produced. (http://ggim.un.org/UN_GGIM_wg1.html).

IV. Vision for the Subcommittee on Geodesy

17. The vision for the Subcommittee on Geodesy is to provide “an accurate, accessible and sustainable global Geodetic Reference Frame to support science and society”. The Subcommittee will work closely with the Regional UN-GGIM geodesy working groups, the national geodetic agencies and the Global Geodetic Community through the International Association of Geodesy (IAG) and the International Federation of Surveyors (FIG), to continue the implementation of the road map towards the vision.

18. The Subcommittee will take on a broader agenda in the medium term including consideration of how the GGRF is best utilized in conjunction with the other foundation geospatial datasets nationally, regionally and globally. Close cooperation with the regional UN-GGIM entities will be needed to ensure maximum impact is achieved.

19. The Subcommittee will have an ongoing role in providing geodetic expertise to the Committee of Experts and the broader intergovernmental community, especially relating to the Sustainable Development Goals, but also to hazards, the environment, and economic development.

20. The Subcommittee on Geodesy will commence the development of a five-year strategic plan describing the role of the Subcommittee beyond the immediate work program.

V. Points for discussion

21. The Committee is invited to:

(a) Take note of the report and the work completed by the Working Group;

(b) Express its views on the modalities of the Subcommittee on Geodesy with a view to endorse its Terms of Reference, its transition plan, and the formal establishment of the Subcommittee;

(c) Take note of the plans for the inaugural formal Subcommittee meeting on the margins of the UN-GGIM High Level Forum in Mexico City, Mexico, November 2017; and

(d) Provide guidance on the planned activities of the Subcommittee, specifically: 1) the development of the road map implementation plan; 2) the development of the position paper describing the appropriate governance arrangements; 3) building the GGRF web of communication experts; and 4) developing a five-year strategic plan.

ANNEX I

**Draft Terms of Reference
UN-GGIM Subcommittee on Geodesy
June 2017**

Background and Purpose

Recognizing:

1. The vital importance of a sustainable and accessible Global Geodetic Reference Frame (GGRF) for integrating geospatial information and quantifying Earth System changes;
2. The importance of the GGRF as a foundation for measurement systems that will assist with the monitoring of the Sustainable Development Goals indicators;
3. The success of the UN-GGIM Working Group on the Global Geodetic Reference Frame (GGRF) for Sustainable Development;
4. The importance of the UN General Assembly adoption of resolution 69/266 in February 2015, entitled 'A Global Geodetic Reference Frame for Sustainable Development';
5. ECOSOC resolution 2016/27 which enhanced the mandate of UN GGIM; and
6. The critical importance of an appropriate intergovernmental governance mechanism for global geodesy in order to effectively implement the GGRF Road Map and provide the required stability and longer-term planning for the global geodetic reference frame;

The United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM), at its sixth session in July 2016 in New York, resolved to create a permanent Subcommittee on Geodesy.

Objectives

The principal objectives of the Subcommittee on Geodesy are to:

1. Provide an intergovernmental forum, with equitable regional representation, for cooperation and exchange of dialogue on issues relating to the maintenance, sustainability and enhancement of the GGRF;
2. Develop an implementation plan for the GGRF Road Map;
3. Develop, as part of the implementation plan, a concept for an appropriate governance mechanism in order to effectively implement the road map for the global geodetic reference frame, particularly with respect to the governance mechanism being owned and driven by Member States, with the aim of eventually implementing the proposed mechanism;
4. Encourage open sharing of geodetic data and information that contribute to the implementation of global, regional and national reference frames, and their inter-relationship;
5. Advocate for guidelines and standards to advance the interoperability of geodetic systems and data;
6. Address various technical, institutional and policy issues related to the implementation of a GGRF;
7. Maintain a dialogue between UN-GGIM Member States and the Non-government international geodetic community;

8. Pursue the implementation of a GGRF Roadmap in coordination with the International Association of Geodesy (IAG) and the International Federation of Surveyors (FIG);
9. Encourage and provide mechanisms for capacity development and knowledge transfer in the field of geodesy among Member States;
10. Provide, through outreach, advocacy for the GGRF as the basis upon which all spatial data and positioning activities should be founded; and
11. Continue outreach and communication, particularly with appropriate regional initiatives and activities.

The Subcommittee on Geodesy will build on initiatives being undertaken within the global geodetic community in developing its approach to achieving these objectives.

Membership and Governance

The Subcommittee on Geodesy shall be comprised of:

1) Members:

Delegates from national governments who are appointed by the UN Member States to the regional UN-GGIM entities, and subsequently nominated by the executive of the regional entities on a pro-rata basis to serve on the Subcommittee and to be reviewed every two years. The review will be based on actual participation and contribution from the members, i.e. if no action they can be replaced. Asia Pacific Region (10 members); America's (7 members); Arab States (5 members); Europe (9 members); and Africa (9 members); Total (40 members). In making the nominations the regional entities should ensure appropriate inclusion of both developing and developed Member States.

In appointing their national representatives, Member States should seek to designate representatives with specific knowledge of and responsibility for global, regional, continental or national geodetic reference frames for positioning, navigation or timing applications. The Subcommittee will also seek to utilize Member State skills on management, administration and communications in delivering key elements of its work program. Consideration should also be given to how the national representatives coordinate inputs from all interested parties within the national system including, but not limited to, national mapping agencies, national and international space agencies, and government research institutes.

2) Associate Members:

- a. Experts from national governments who are appointed by Member States, in addition to those nominated by the regional entities as per 1) above; and
- b. Representatives from the International Association of Geodesy (IAG), and the International Federation of Surveyors (FIG).

3) Observers:

- a. Other international organizations may be invited to participate in the Subcommittee as observers.
- b. Other geodetic experts not directly representing Member States may be invited to participate as observers.

The Subcommittee will elect 2 co-Chairs to serve for 2-year periods, with chair elections occurring annually, such that one new co-Chair is elected each year in order to secure continuity. The co-Chairs will be selected from the members as defined in 1) above, such consideration of the equity between developed and developing countries occurs.

The Subcommittee on Geodesy will report to the UN Committee of Experts on Global Geospatial Information Management (UN-GGIM).

Liaison

The Subcommittee on Geodesy will liaise with other international organizations that have an interest in the GGRF, including:

- The Office for Outer Space Affairs as the executive secretariat of the International Committee on Global Navigation Satellite Systems (ICG).
- The Global Geodetic Observing System (GGOS), and the IAG services (IERS, IGS, ILRS, IVS, IDS, etc.) and associated entities (e.g. BIPM).
- The European Space Agency (ESA).
- The Group on Earth Observations (GEO) and the Global Earth Observing System of Systems (GEOSS).
- The Committee on Earth Observation Satellites (CEOS).

Meetings and Secretariat

The Subcommittee on Geodesy will convene annually for a dedicated meeting, generally hosted by a Member State, or occurring at a UN Regional commission premises. This annual meeting will be technical in nature and will be several (2-3) days in duration, allowing ample time for business related items including the formal election of chairs, and technical discussions of relevance to the Subcommittee and members.

The Subcommittee will otherwise utilize telecommunication options wherever possible to advance its work program. They will also meet in conjunction with appropriate UN or other meetings where topic matter experts may be present.

The UN-GGIM Secretariat will support the Subcommittee co-Chairs to coordinate, monitor and report on the activities of the Subcommittee.

ANNEX II

**Working Group on the Global Geodetic Reference Frame transition plan to
UN-GGIM Subcommittee on Geodesy**

The Co-chairs and Members of the GGRF Working Group propose a transitional arrangement be established to ensure the creation and activation of the Subcommittee on Geodesy at the earliest convenience, in order to ensure continued momentum in the delivery of the work program.

We propose the following steps for consideration by the UN-GGIM Bureau:

- 1) The draft Terms of Reference (TOR) be given provisional approval by the Bureau pending substantive approval at the seventh session of UN-GGIM Committee of Experts.
- 2) The current Working Group members be appointed as associate members of the Subcommittee pending the completion of the member nomination process as detailed in the draft TOR.
- 3) Planning commence for the inaugural annual workshop on Geodesy, to be held sometime after the seventh session at a location yet to be determined.
- 4) Informal Subcommittee meetings be held, potentially in April at EGU (Vienna) and July (New York/Japan) to progress the work program of the subcommittee.
- 5) The current co-Chairs continue as co-Chairs of the Subcommittee until the members are assembled at the inaugural workshop, where they will elect co-Chairs in accordance with the draft TOR.
- 6) The co-chairs will write to the regional executives of UN-GGIM identifying the current members of the GGRF Working Group as possible nominations for their consideration.