

Second Meeting of Subcommittee on Geodesy 22 and 23 November 2018 Wukang, Deqing, China

Introduction

1. The second meeting of the UN-GGIM Subcommittee on Geodesy (SCoG) was convened in Deqing City, Zhejiang Province, People's Republic of China, from 22-23 November 2018, and was hosted by the Government of China through the Ministry of Land and Resources. This meeting followed the United Nations World Geospatial Information Congress held from 19-21 November 2018, also hosted by Ministry of Land and Resources, China. The convening of these important technical meetings back to back was welcomed by participants and provided a considerable opportunity to leverage the many synergies and commonalities that existed between these two communities.
2. The SCoG was attended by 24 participants from 14 Member States - Australia, Burkina Faso, China, France, Finland, Japan, Mexico, Norway, Republic of Korea, Saudi Arabia, State of Palestine, Sweden, Tonga, United States of America (NASA Representatives who noted they were not official USA delegates), and Uruguay, international professional organisations (IAG and FIG), industry and academia. There were representatives from the University of Seoul, Ahmadu Bello University, Septentrio, LISAG, World Bank, and DESA and DFS both from the United Nations Secretariat. The list of participants is available in Annex 1.
3. The meeting was chaired only by Mr. Gary Johnston (Australia), as Mr. Alexey Trifonov (Russian Federation) the second co-chair was unable to attend due to unforeseen circumstances. In accordance with Article 8.2 of the Subcommittees terms of reference, Mr. Trifonov asked that Mr. Johnston chair the meeting. He also expressed his readiness for further work in the subcommittee according to the new terms of reference.
4. The objective of the second SCoG was to collectively examine and discuss the recommendations and actions described in the Road Map Implementation Plan and the Governance Position Paper; develop the work plan for the SCoG; provide a detailed focus session on education training and capacity building; plan for outreach and communication, particularly with appropriate regional initiatives and activities; and strengthen ties and arrangements between SCoG and the regional committees of UN-GGIM. The agenda of the meeting is provided in Annex 2 to this report.

Session 1 – Introductory Session: Welcome, introductions and setting- the-scene

Chair: UN SCoG Co-Chair

Purpose: Update SCoG members on progress and other relevant meetings

5. Following the welcome remarks and introductions by the SCoG Co-Chair, the introductory session opened with a review and summary of progress. The last meeting was held in Mexico, 26-27 November 2017 on the margins of the Fifth High Level Forum on UN-GGIM. Since then, the SCoG has presented its progress and decisions have been made by the UN-GGIM Committee of Experts at its eighth session in August 2018.
6. Pertinent discussions, observations and agreements by the SCoG included the following.
 - i. The wish to keep the SCoG meetings open as much as possible to encourage membership and opportunities for partnership discussions.



- ii. The need to focus on the needs of Member States and the reason for including in the agenda an item on country reports. This allow Member Nations to report on the issues affecting their countries and ensure that the SCoG process assists or identifies opportunities for assistance by others.
- iii. Following the United Nations General Assembly (UN GA) resolution, the concern for sustainability and funding for geodetic infrastructure remained. The Co-chair further noted that the SCoG is a forum to discuss these issues including partnerships with space agencies and IAG/GGOS and build on the concerns in the Roadmap and Implementation Plan.
- iv. Reporting on decision 8/103 Global Geodetic Reference Frame (E/2018/46-E/C.20/2018/19) following the Eighth Session of UN-GGIM in August 2018 where the revised Terms of Reference (TOR) were endorsed. This communicates to Member States that the concerns regarding proper governance mechanisms for the SCoG were taken care of (e.g. Executive Committee was changed to Bureau).
- v. Noted the importance of entrusting the Bureau to act on behalf of the SCoG to guide and expedite its decisions and work particularly in cases when time is of the essence.
- vi. Discussed how to deal with the focus groups (FG) and agreed that all the focus groups transition to working groups (WG) of the SCoG, given the continued importance of their dedicated commitment of work activities. The SCoG agreed to have the following Working Groups:
 - Geodetic infrastructure – led by France
 - Standards, Policy and procedures – Canada (the current lead) to be asked to continue
 - Education Training and Capacity building- led by Sweden
 - Outreach and Communications – led by Norway
 - Governance – led by Norway
- vii. The importance of active contributions by Member States in the respective WGs noting:
 - The existing challenge of small numbers of members in the respective WGs creating heavier work load on active members,
 - The SCoG membership requirements were designed to have equitable geographical representation, including a balance between developed and developing countries
 - Some Member States may not have the skills to participate in some WG's (e.g. WG geodetic infrastructure) however there are those which could easily contribute to other WG's which affect all members (e.g. WG capacity building, outreach and communication).

Session 2 – Business of the Subcommittee on Geodesy

Chair: UN SCoG Co-Chairs

Purpose: Update SCoG members on progress of the road map implementation and feedback from the focus groups

7. Session 2 considered the development of the road map and the implementation plan. The following focus groups of the SCoG gave updates on their work: Geodetic infrastructure (Australia); Education, Training and capacity development (Sweden); Outreach and communication (Norway); and, Governance (Norway).

8. Mr. Stefan Schweinfest Director of the United Nations Statistics Division, attended part of this Session and delivered a statement, the main points are as follows:

- i. Thanked the SCoG for the important work being done by the group which led the UN GA resolution A/RES/69/266. The Resolution sent a strong message of the importance of having a common interest across the UN System in improving the Global Geodetic Reference Frame, while acknowledging the challenge of educating the political leaders as many are not aware of the field of geodesy.



- ii. Noted the lack of awareness by the policy and decision makers on the importance of geodesy; The development of communication material to bridge the gap between the technical and political stakeholders was an opportunity for SCoG to share their best practices to the other UN-GGIM groups.
- iii. Acknowledged the importance of linking the regional geodesy groups such as SIRGAS- the Americas, and AFREF – Africa, and how best to link these initiatives to the global context.
- iv. Reminded that the Subcommittees’ structure meant permanency and that it needs to continue to be a “trailblazer” for the UN-GGIM community by not only (1) building normative frameworks and educate policy and technical policy makers but (2) focus on the implementation of the mandate through the Roadmap Implementation Plan and linking of the every-day operational level activities.

Session 2a. Composition and Selection of the SCoG and Bureau

9. This session focused on the nomination and election of Bureau members as per the revised TORs.
10. The following points emanated from the discussions (captured in order of inputs):
 - i. The SCoG Co-Chair communicated that following consultation with the Secretariat, given the new TOR and the fact that the last election took place in November 2017, the current Co-Chair-Australia will continue until the SCoG’s third meeting or until December 2019 when the next election will take place.
 - ii. The SCoG Co-Chair called for the nominations and selection of Bureau members being mindful of the equity and the work done by the focus group team leads, noting the need to have developing country and southern hemisphere representation, and acknowledging the importance of the regional perspectives.
11. The following were the participating voting members (Australia, France, Finland, Japan, Norway, Republic of Korea, Mexico)
12. The participating Members nominated Australia (co-chair), Canada, France, Norway, Mexico, and the Russian Federation (co-chair) as bureau members and subsequently approved them as bureau members.
13. The Bureau members subsequently endorsed Sweden and Tonga as Members of the sub-committee on Geodesy under clause 3.3 of the TORs.
14. The voting members present subsequently nominated and approved Sweden and Tonga as additional bureau members.
15. The voting members present noted that the Russian Federation had nominated Germany in pre-meeting correspondence, however recognising members wish that the initial bureau include WG leads, and also noting the strong dominance of European members within the WG leads (France, Norway, Sweden), it was decided to seek alternative bureau members for this term.
16. The SCoG agreed that the geographical and developed and developing imbalance of the Bureau will be monitored and addressed in the future as the SCoG’s membership and its work plan activities are established and maintained in the coming period.

Session 2b. Role of the Regional Working Group Geodesy

17. The SCoG discussed the challenges in clarifying their relationship with other partners such as the IAG (including regional sub-commissions SIRGAS and AFREF), the UN-GGIM regional working groups on geodesy and other regional entities where they exist. Following discussions, the SCoG members agreed that the IAG structure was suited to the development of science used to underpin product generation related to geodesy, whilst the SCoG and the regional UN GGIM bodies were best positioned to deliver a



different set of goals which aim to operationalise geodetic service provision through government and inter-governmental processes. The SCoG members were invited to share their regional experiences:

- i. **GGIM-AP WG Geodesy (Japan):** There are 3 working groups; one on the densification of GNSS observation to realise the Asia Pacific reference framework and its associated GNSS awareness campaign; the second deals with height system questionnaire and analysis; and the third on capacity building through joint workshops with IAG and respective national mapping and cadastral authorities (NMCAs) and continued encouragement of Asia Pacific countries' participation in its regional work.
 - ii. There was a request for clarification whether GGIM-AP WG Geodesy and IAG's regional geodetic community were the same entities and SCoG was informed that these were two different entities formally, but they have the same people reporting to them as a unified entity.
GGIM-Americas (Mexico): This regional committee does not have a working group on geodetic issues and there are two regional IAG sub-commissions (1) NAREF and (2) SIRGAS and they are working towards clarifying their roles. There was also a call or a reminder that there is a need to provide assistance to its sub-regions, the Caribbean and Central America.
 - iii. **GGIM-Europe (Finland):** noted the regional differences, and shared the need to clarify the role of EUREF relative to GGRF as there are several discussions which are ongoing in EUREF meetings seeking to clarify the respective roles of EUREF, GGIM-Europe and its new WG on GRF (France) to avoid duplication of effort.
 - iv. **GGIM-Africa (Burkina Faso):** Within the African region and AFREF context, there is an emphasis on capacity building issues. It was acknowledged that there is a lack of infrastructure and data in the region (e.g. one CORE station in South Africa) and the need to take advantage of the UN GA resolution and World Bank's/UN-GGIM Integrated Geospatial Framework to look into possibilities for future funding in order to improve national reference frames.
 - v. **GGIM-Arab States (Saudi Arabia):** The regional committee has a WG on GRF and noted that out of the 22 countries and territories in the region, only 14 have been participating in the regional committee meetings. It is hoped that through the development of the ArabREF data sharing protocol, plans to expand the data sharing activities and the subsequent calculation of ArabREF will occur, demonstrating the benefit of the data sharing protocol to members.
 - vi. The SCoG members agreed that there is a need to acknowledge regional diversity and that not one solution fits all. Members also recognised the importance of building links between the global and regional working groups and also ensuring that communication linkages are emphasised and included in future agendas.
18. The following were discussed and agreed by the SCoG members:
- To date the SCoG has not been successful in involving the regional WGs and there is a need to consider how to attract their interest and address their concerns.
 - The Regional Committees, regional working groups and IAG 1.3 entities need to work closely together.
 - Urges and encourages regional entities to contribute to SCoG activities.
 - Urges the regional working groups on Geodesy to communicate effectively to their respective regional executives on the importance of geodesy.

Session 2c. SCoG Work plan

19. Following the establishment of the Bureau and the recognition of the importance of the close coordination between the SCoG and the respective regional working groups on geodesy, the SCoG members focused their attention on the work plan of the SCoG working groups towards the implementation of the Roadmap.



20. **The working group on standards (Australia):** Since there was no representation by the lead of this working group (Canada), the Co-Chair debriefed on its work in the areas of ISO standards, geodetic registers, use of coordinates and the International Terrestrial Reference System (ITRS), and also communicated that there was nothing pertinent to discuss at that time. Further, the Co-Chair assured that the Bureau will follow-up with the focal points after the meeting for debrief on the outcomes of the meeting and enquire if they had any further updates.

21. **The working group on governance (Norway):** The presentation focused on feedback received from the Norwegian Ministry of Foreign Affairs (MOFA) which provided guidance on the way forward and recommended identifying the specific needs of the SCoG, and through informal consultation with the Economic and Social Council's Secretariat to consider the different options, whether to pursue the preparation of a code of conduct or a convention. Following the presentation, the SCoG discussed the following:

- i. Whether Norway could continue to lead the group. They confirmed that they would be happy to do so.
- ii. Prepare a communication strategy to ensure that the global, regional and respective countries were able to consider and verbalise the business case if a Convention option was sought. This led to a further discussion on what medium (e.g. newsletter, letter to regional committees) would be best to convey the case.
- iii. The importance of being reminded of decision 8/103 (f) of the Eighth Session which recommended "the consultation on the establishment of an international organisation and a convention on geodesy and the consultations on associated financial resources should take into consideration the wider mandate, scope and modalities of the Committee of Experts and should be guided by Member States"
- iv. The need to develop communication materials to engage with Member States directly and through regional entities.

22. At this point there was a briefing by the Secretariat on the considerations for interactions with the other UN-GGIM Expert Groups and Working Groups of UN-GGIM. The main points were as follows:

- i. The working group on marine geospatial is examining the integration of land and marine.
- ii. The expert group on land administration and management are building a land administration and management framework and it was important to be reminded that they will be users of the SCoG's services.
- iii. The working group on legal and policy consists of a group of lawyers who are focusing on legal issues of data and data sharing. This working group may be able to assist the SCoG to think through its complex governance issues. The Members were cautioned that it is important to recognise that the Legal and Policy working group has bandwidth challenges and therefore the SCoG should not throw a problem to them, but prepare alternative options or priorities for consultation and their consideration.
- iv. The Secretariat delivered a brief explanation of the "Overarching Strategic Framework" of the Integrated Geospatial Information Framework, a 3 part manual which was prepared in collaboration with the World Bank. The framework should assist the SCoG's governance discussion as it has a global approach.

23. Working group on geodetic infrastructure (France): After extensive discussion the SCoG members present urged the working group to articulate the attributes of governance required to support the development of geodetic infrastructure. The working group was also urged to consider addressing the Committee of Experts at its ninth session asking them for feedback on specific action towards the implementation of Roadmap recommendations, to determine the level of national interest and commitment to advance the work. It was also agreed that the working group should review the list of recommendations and add missing actions and review the membership in order to add other experts



outside the SCoG who would be willing to contribute. The focus will also include building stronger engagement with other actors such as the IAG and GGOS.

24. **The working group on outreach and communication** (Norway) -This working group is responsible for raising awareness through communications. According to the agenda Outreach and Communication actions were presented in Session 6: “Plans for Outreach and Communication, particularly with appropriate regional initiatives and activities.”

Session 3 – Technical Considerations

Chair: UN SCoG Co-Chair

Purpose: Country representatives and invited observers to present and discuss items of technical consideration for the SCoG

Session 3a. Impact of Spectrum allocation and quiet zones on Geodesy

25. Norway, on behalf of Germany, delivered a presentation on spectrum management and its related challenges. With greater use of mobile communications and internet services, there is a higher demand for spectrum use and transmission strength. This trend poses challenges to geodetic observing instruments and their requirements for low interference observatory sites in some countries. Following discussions which reintroduced the distinctions of the roles and responsibilities between the IAG and SCoG, the Members agreed to request a summary of spectrum interference implications from the International VLBI Service (IVS) and work closely with the IVS to determine what additional interaction with ITU is required. Pending the outcome of the IVS consultation, SCoG may develop a submission to ITU to highlight the importance of this issue. The SCoG thanked Norway and Germany for bringing this issue forward and commented that it is useful for these kinds of issues to be brought to the global platform to have the opportunity for global consultation.

Session 3b. Option for VGOS correlation

26. A presentation on VGOS correlation prepared by Norway shared the latest developments in Europe (Sweden, Norway, Germany, Finland, Spain and Portugal) and highlighted that the current capacity to meet VGOS data correlation demand was insufficient. It is feared that delays to data correlation might result in the old VLBI-telescope in Ny-Ålesund being shut down before data from the new VGOS-telescopes can be utilized to estimate the ITRF, due to lack of VGOS correlation capacity globally. The discussions included comments on whether this is a region (Europe) specific issue or an example of where the IVS (the operating entity) failed to develop a global consultation mechanism and procedure for advancing the availability of correlation facilities, resulting in this issue having impact at the global scale. The importance of SCoG coordination with IVS and the preparedness of participating entities within the SCoG to contribute to facilitation of such dialogue with IVS was also discussed. (e.g. NASA as an active GGOS and IVS member)

27. The SCoG agreed that:

- i. It will communicate with the IVS, through the UN-GGIM SCoG Bureau, to raise, as a matter of urgency, the resolution of this shortage of capability, and ask that a representative from the SCoG (Norway) be included in their correlation Working Group
- ii. The working group on infrastructure will monitor this issue and depending on the feedback from the IVS, should prepare a business case to influence governments in Europe to invest.



Session 3c. Development of a SCoG resolution on the ITRS as a reference in Geospatial, Scientific and Positioning Applications

28. Two presentations and briefings were delivered by Australia and France which proposed the adoption of an ITRS / ITRF agreement by the SCoG to recognise the ITRS as a reference standard for geospatial, scientific and positioning applications.

29. Following the presentations, the SCoG:

- i. Recognized the importance of having a clearly defined standard for inter-relating geospatial data which is collected on different reference frames;
- ii. Acknowledged the value of the ITRS, and its numerical realization (ITRF); that ITRF is derived from geodetic products provided by the IAG services; also noted that ITRS and ITRF are products of the IERS, and were previously endorsed by IUGG/IAU;
- iii. Agreed to the three recommendations in the submitted paper (with minor edits) after the addition of a preamble describing the role of IERS in the delivery of ITRF and the previous adoption by IUGG and IAU;
- iv. Agreed to undertake broader consultation on the paper before the ninth session of UN-GGIM.

Session 4 – Special Joint session SCoG and UN-GGIM-AP WG1 on Education, Training and Capacity Building

Chair: UN SCoG Co-Chair

Purpose: Discuss the business of the SCoG

Session 4a. Working Group on Education, Training and Capacity Building (ETCB)

30. A briefing was provided by Sweden where the main highlights focused on the following:

- i. 5 year mission of the ETCB working group
 - There is a high level of geospatial technology capability among developing nations
 - Capacity building is focused at the regional level and supports developing nations efforts
 - Recognized certification and achievement documentation programs are supported by regular technical training courses and the material is available to all nations
- ii. Working Group Objectives:
 - To develop a strategic implementation plan in line with the GGRF ETCB 5-year strategy
 - Funding is required
 - Need to conduct educational needs assessment that is globally focused and regionally orientated; with the need to work with regional committees and with dedicated key focal points
 - Outreach for Geodetic organizational support and advocacy
 - Expand University, research institute and other academic collaboration including NGOs
 - Support progress towards SDGs and Sendai Framework
- iii. Update on evaluation questionnaire
 - The first version of the questionnaire had been available for participation since April 2018
 - As of September 2018, 80 responses have been received from 52 countries There has been a lack of responses from Africa and CIS countries
 - Results: Greatest barriers to the implementation plan, according to the responses, were time, money and political will; language preference of English, French/Spanish (no mention of A, C and R languages)
- iv. Recent initiatives and next steps:
 - Provide a framework for Member States to identify the level of competency required



- Maintain a register of Member States self-reported levels of competency and professional and technical requirements
- Identify training and educational gaps for Member States, working through partnership agreements or regionally based workshops where appropriate to delivery training needs

31. The most critical items discussed during this session were:

- i. There are increased requests for capacity building and training but limited bandwidth due to the limited number of SCoG members and other trainers
- ii. The importance of organized and centralized access to training and the need to identify the best web site(s) for these materials to be easily accessed by users (e.g. FIG, IAG, UN-GGIM, etc.)
- iii. The challenges created by misunderstanding the principle concepts of GGRF against ITRF and national geodetic reference frame
- iv. Training and educational gaps of Member States, working on partnership formats or regionally based workshops where appropriate (e.g. UN ICG UN-OOSA WG C for GNSS, GGIM-Americas, Quito meeting in 2020, etc.)
- v. Concern on how to manage the UN-GGIM branding associated with training. Members heard the Asia-Pacific experience of having a validation/certification process involving the GGIM-AP.
- vi. The need to consider other forms of capacity building arrangements (e.g. secondment arrangements) as some participating Member States do have the academic knowledge but may lack the applications in practical terms (e.g. calculating and analyzing their own national geodetic datasets)
- vii. The possibility of co-publishing the updated/revised *Reference Frames in Practice Manual* (FIG publication)
- viii. Explore the possibility of reaching out to GGIM-Academic Network to ensure that the work of SCoG is relevant to the future generation

32. Following the discussions, the SCoG agreed to:

- i. summarize the results from the evaluation questionnaire on a regional basis and communicate with the regions;
- ii. there is a need to understand/articulate how to use UN-GGIM branding for seminars and take advantage of the process used by the Asia Pacific region and understand the mechanisms;
- iii. find a way to bring together the useful resources related to geodetic issues and identify a strategic landing site (e.g. IAG, FIG, UN-GGIM) including outreach to the UN-GGIM-Academic Network;
- iv. update / revise the Reference Frames in Practice Manual and publish under co-publication with the UN.
- v. Explore the opportunities of the wider UN-GGIM framework to build capacity (e.g. use of UN-GGIM-Academic Network)

33. Following the presentation of the perspectives and status of Asia Pacific Capacity Development Framework (FIG), the SCoG members recognized that:

- i. modernisation and output focused delivery are the new business models in NMCA's and there is a need to ensure that they understand that geodesy underpins everything as a common reference framework
- ii. capacity building strategies and business models need to change (e.g. MOU between VietNam and Japan, building business cases, templates for resourcing and support)
- iii. there is a need for stronger regional links



Session 5. Country reports

34. The SCoG members present reported their national geodetic situation / issues using the roadmap and implementation plan as context; members agreed that collaboration in terms of data sharing and technical cooperation is important; they also noted the value of the participation in these meetings to exchange the latest developments and discuss common challenges.

35. This session included a briefing by FIG on their geodetic activities, largely under commission 5, and then opened for discussion.

36. Following the briefing, the SCoG members agreed that the Country reports will become a standard agenda item in its annual SCoG meetings and countries should come prepared to discuss their national geodetic issues and successes.

Session 6a: Plans for outreach and communication, particularly with appropriate regional initiatives and activities

37. The presentation by the Working Group on Outreach and Communication (Norway) reminded the SCoG and the Secretariat that solid communication and engagement work is necessary to realize the intentions of the UN resolution and the roadmap implementation plan's actions

38. Following the briefing on the plans for outreach and communication as stated in the implementation plan as four actions (as endorsed at the 8th Session); *1) Build a geospatial communications network 2) Establish a geospatial communications coordinator 3) Develop a geospatial collaboration space 4) Establish a UN Subcommittee on Geodesy working group for outreach and communication*, the SCoG:

- i. recognised the need to define the scope of communication initiatives through a broader geospatial communications network, and explore the opportunities with GEO in this vision;
- ii. asked the working group to prepare a letter through the Bureau in coordination with other SCoG working groups to request Member States to nominate a communication contact point for this network; additionally this letter is to be forwarded to the regional committees to also encourage their representatives to join the communication network;
- iii. Noted also the need for dedicated communications experts whilst recognizing the reality of limited resources and therefore urged present working group Member States and other interested Member States to take an active role in communication activities;
- iv. requested the working group to carry out identification and specification of a collaboration space in consultation with the Secretariat and its other working groups to avoid duplication of communications and outreach efforts; and
- v. asked the working group to develop and update the standard information template that all SCoG members could use for general outreach and communication.

Session 6B: Strengthening ties and arrangements between UN-GGIM SCoG and UN-GGIM-AP working group 1 on Geodesy

39. A briefing on the GGIM-AP's WG 1 on Geodesy (Japan) was provided which focused on the following three activities which are all related to the SCoG focus areas

- densification of GNSS sites
- regional height system through capacity building
- Capacity building through seminars;



40. Following the briefing, the SCoG:
- i. Discussed data sharing as an important prerequisite for a targeted effort towards unification of height systems. Due to the sparsity of appropriate data for geoid determination, data sharing is very important.
 - ii. Recognised the importance of Asia Pacific countries participating in the Roadmap Implementation.
 - iii. Noted the proposal by Geoscience Australia to host the third SCoG meeting in Canberra in November 2019 in collaboration with GEO and the plenary session of UN-GGIM Asia Pacific.

Session 7 – Closing session

Chair: UN SCoG Co-Chairs

41. The following are the summary statements of each of the Sessions deliberated on and accepted by members present.

Session 1: Welcome, Introduction and Scene-setting

42. The SCoG Co-Chair welcomed, communicated the open nature of the meeting format to encourage participation and interest, and increasing its engagement with developing countries and having feedback from the Member States.

Session 2: Composition and Selection of the SCoG and Bureau

43. The SCoG discussed the role of the SCoG, its current membership and the dedicated contributions by the respective Focus Groups in the past period. Australia indicated a desire to step down as lead of the geodetic infrastructure focus group. France was nominated and subsequently endorsed by the members present as the new focus group leader. The members also agreed to strengthen the focus group efforts by converting them to working groups. Working group leads were encouraged to broaden the number of participants within their working group.

44. Whilst noting the geographical, the developed and developing imbalance and challenges in new Member State engagement, the SCoG voting Members (Australia, France, Finland, Japan, Norway, Republic of Korea) nominated and approved that the Bureau Members will consist of Australia, Canada, France, Norway, Mexico, Russian Federation, Sweden and Tonga. The SCoG agreed that the geographical, and the developed and developing imbalance of the Bureau will be monitored and addressed in the future as the SCoG's membership and its work plan activities are established and maintained in the coming period. The Bureau members (less Sweden and Tonga) subsequently endorsed Sweden and Tonga as Members of the sub-committee on Geodesy under clause 3.3 of the Subcommittees terms of reference.

Session 2: Role of the Regional Working Groups on Geodesy

45. The SCoG agreed that Regional Geodetic Committees and IAG commission 1.3 Regional Reference Frames entities need to work closely together and recognize their respective attributes and capabilities. In circumstances where they need to function independently because of existing regional structure, they should ensure they align closely. The SCoG urged regional entities to contribute to SCoG activities and also urged UN-GGIM regional Geodesy working groups to communicate the importance of geodesy and its associated issues to their regional executives.

Session 2 (continued): SCoG Work plan

46. Governance: The SCoG agreed that the work on governance necessitates continuation and that Norway continues its leadership, and in the initial work plan it will concentrate on collating the attributes of governance to inform the eventual implementation options. The working group will consult with the



Secretariat to ensure that the approach taken is consistent with the broader UN-GGIM Committee of Experts modalities, scope and mandate within the United Nations system, and develop communication materials to engage with Member States directly and through its regional committees. The working group will also explore potential options for governance models based on consultations.

47. Infrastructure: The SCoG urged that there is the need to articulate the infrastructure requirements in terms of governance mechanism. The working group should consider addressing the Committee of Experts asking them for feedback on specific action towards the implementation of Roadmap recommendations, review the list of recommendations and add missing actions, review the membership and add other experts willing to contribute. The focus will also include building stronger engagement in the development of an IAG science plan that is easily communicated to non-specialists.

48. Standards: The SCoG Bureau will communicate with the lead that its Focus Group has been elevated to Working Group and request an update on its progress.

Session 3: Technical considerations

49. Spectrum management at Geodetic sites: The SCoG recognised that with the increased use of mobile communication and internet services there is a higher demand for spectrum use and transmission strengths which poses challenges to geodetic observing instruments and their requirements for low interference observation sights in some countries. SCoG agreed to request a summary of spectrum interference implications from the International VLBI Service for Geodesy and Astrometry (IVS), work closely with IVS to determine what additional interaction with the International Telecommunication Union (ITU) is required. Pending the outcome of the IVS consultation, SCoG may develop a submission to ITU to highlight the importance of this issue.

50. VGOS: The SCoG agreed that in the area of VGOS signal correlation challenges it will (a) communicate to IVS through the UN-GGIM SCoG Bureau to raise the matter of urgency for a resolution of this shortage of capability, and ask that a representative (Norway) from the SCoG be included in their correlation WG, with an open offer to come back to SCoG for specific business case and (b) The working group on infrastructure is to monitor the issue and depending on the feedback received should develop a business case to influence the outcome.

51. ITRS/ITRF adoption agreement: A paper on this item was submitted by France and Australia. The SCoG recognizes the importance of having a clearly defined standard of inter-relating geospatial data which is collected on different reference frames. It acknowledged the value of the ITRS, and its numerical realization, ITRF that is derived from geodetic products provided by the IAG services; it noted that ITRS and ITRF are products of IERS which were previously endorsed by IUGG/IAU. The SCoG agreed to the three recommendations in the submitted paper (with minor edits) after the addition of a preamble describing the role of IERS in the delivery of ITRF and the previous adoption by IUGG and IAU, agrees to undertake broader consultation on the paper before the ninth session of UN-GGIM.

Session 4: Special Joint session SCoG and UN-GGIM-AP WG1 Education, Training and Capacity Building

52. The SCoG would like to summarize the results from questionnaire on a regional basis and have communications with the regions. There is a need to understand/articulate how to use UN-GGIM branding for seminars and should take advantage of the processes and understand the mechanisms adopted by the UN-GGIM Asia Pacific region. There is the need to find a way to bring together the useful resources related to geodetic issues and identify a strategic landing site (e.g. IAG, FIG, UN-GGIM) including outreach to the UN-GGIM-Academic Network. The SCoG agreed to update/revise the Reference Frames in Practice Manual and publish under co-publication with the United Nations.

Session 5: Country Reports

53. The SCoG members present reported on their national context with regards to geodetic issues, agreed that collaboration in terms of data sharing and technical cooperation is important but, also noted



the value of the participation in these meetings to exchange their latest developments and challenges. Country reports will become a standard agenda item at the annual SCoG meeting and member States should come prepared to discuss its national geodetic issues and successes.

Session 6: Plans for outreach and communication, particularly with appropriate regional initiatives and activities

54. The SCoG will consult with the Secretariat defining the scope of the communication on a broader geospatial communications network and explore the opportunities with GEO in this vision. A letter is to be prepared through the Bureau in coordination with other SCoG working groups to request Member States to nominate a communication contact point for this network. Additionally, this letter is to be forwarded to the UN-GGIM regional committees to also encourage them to join the communication network. It was noted that there is the need for dedicated communications experts whilst recognizing the reality of limited resources, and urged present working group Member States and other interested Member States to take an active role in communication activities, and carry out identification and specification of the collaboration space in consultation with the Secretariat and its other working groups to avoid duplication of communications and outreach efforts. It was agreed that a standard template would be developed and updated to be used by all SCoG members for general outreach and communication,

Session 6: Strengthening ties and arrangements between UN-GGIM SCoG and UN-GGIM-AP Working Group 1 on Geodesy

55. The SCoG was briefed on the latest developments of the Working Group and its work plan of (a) densification (b) regional height system and (c) capacity building through seminars, all related to activities of SCoG Working Groups. Member States from the Asia Pacific region were urged to commit to the Roadmap Implementation Plan. The SCoG noted the need to review the global and regional geodesy work plans and assess whether they are aligned and provide feedback to the SCoG; and recognised the opportunities of setting joint meetings by the SCoG and UN-GGIM-AP WG1 Geodesy in November 2019 on the margins of the UN-GGIM-AP Plenary and GEO Plenary.

56. The SCoG discussed the need for greater engagement with strategic partners leading up to and during the plenary meetings. The SCoG also discussed a proposal of circulating a draft agenda for the subsequent meeting.

Session 7: Closing Session

57. The SCoG agreed to discuss and identify the venue for the third meeting of the Subcommittee on Geodesy and circulate the possible options to the members.

58. The Co-Chair thanked the members for their active participation, noted the positive impact of the activities and the challenges by the small number of Members, shared the vision with concrete practical actions, and encouraged the participation of the members.

59. The meeting was closed by remarks by the Co-Chair, thanking the Secretariat and the host, China.

