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| WEATHER CLIMATE WATER | **World Meteorological Organization****COMMISSION FOR WEATHER, CLIMATE, WATER AND RELATED ENVIRONMENTAL SERVICES AND APPLICATIONS****Second Session**17 to 21 October 2022, Geneva | **SERCOM-2/Doc. 7.2** |
| Submitted by:Chair21.X.2022**APPROVED** |

**AGENDA ITEM 7: WORK PROGRAMME AND SUBSIDIARY BODIES OF THE COMMISSION**

**AGENDA ITEM 7.2: Review of the subsidiary bodies of the Commission**

# Amendments to the terms of reference of standing committees and study groups of the commission

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# GENERAL CONSIDERATIONS

### Introduction

1. This document presents proposed amendments to the terms of reference of some of the subsidiary bodies of the commission to align them with emerging needs, directives of governing bodies and changed timelines for delivery of outputs.

### Standing Committee on Services for Aviation (SC-AVI)

2. Proposed amendments to the terms of reference are in respect of: (a) minor editorial and grammatical improvements; (b) addition of a reference to the discontinuation of the [*Technical Regulations*](https://library.wmo.int/doc_num.php?explnum_id=10733) (WMO-No. 49), Volume II, Meteorological Service for International Air Navigation; and (c) addition of a reference to an intent to increase the involvement of women within the aeronautical meteorology community. The proposed amendment corresponds to Recommendation 3 (SC-AVI-2) (March/April 2022).

### Standing Committee on Climate Services (SC-CLI)

3. Proposed amendments to the terms of reference are intended to include reference to the Global Framework for Climate Change (GFCS), mitigation aspects of climate change, data and information-related activities, climate-related methodologies and tools and project proposal components on the different areas of the climate services value chain.

### Standing Committee on Hydrological Services (SC-HYD)

4. Proposed amendments to the terms of reference are motivated by the updated work plan agreed upon by SC-HYD-10 Doc. 5 to better reflect the activities stemming from the WMO Vision and Strategy for Hydrology and its associated Plan of Action, [Resolution 4 (Cg‑Ext(2021)](https://library.wmo.int/doc_num.php?explnum_id=11113#page=36)) for which SC-HYD has been assigned lead responsibilities.

### Study Group on Integrated Health Services (SG-HEA)

5. Proposed amendments to the terms of reference include: (a) changing the timeframe of the implementation plan under development from 2019–2023 to 2023–2033, given it is no longer timely to develop an implementation plan for the 2019–2023 Joint WHO‑WMO workplan; (b) updating the cadence of review from annual, to bi-annual, (c) removing reference to the development of guidance or guidance materials from items (f), (h), and (j).

### Study Group on Integrated Urban Services (SG-URB)

6. Proposed amendments to the terms of reference remove functions that may be outside the scope of the commission (guidance and regulatory material on an emerging area like integrated urban services) and some outputs (development of a collaborative framework and implementation plan), while focusing on developing best practices and proposing guidance, and continuing the assessment of socioeconomic benefits to specific integrated urban services.

### Additional study groups

7. A Joint Study Group on WMO Greenhouse Gas Monitoring (SG-GHG) between the Infrastructure Commission (lead), the Services Commission and the Research Board was established by the Executive Council through [Resolution 4 (EC-75)](https://meetings.wmo.int/EC-75/_layouts/15/WopiFrame.aspx?sourcedoc=/EC-75/English/2.%20PROVISIONAL%20REPORT%20(Approved%20documents)/EC-75-d04(3)-GLOBAL-GREENHOUSE-GAS-MONITORING-approved_en.docx&action=default) – Development of a WMO‑coordinated Global Greenhouse Gas Monitoring Infrastructure, with the terms of reference developed by the presidents of the technical commission as provided in [annex 2](#Annex2) to the draft resolution provided in this document.

8. A Study Group on the Early Warnings for All (SG-EWA) initiative is proposed in document [SERCOM-2/Doc. 5.6(1)](https://meetings.wmo.int/SERCOM-2/_layouts/15/WopiFrame.aspx?sourcedoc=/SERCOM-2/English/1.%20DRAFTS%20FOR%20DISCUSSION/SERCOM-2-d05-6(1)-UN-GLOBAL-EW-ADAPTATION-INITIATIVE-draft1_en.docx&action=default) in close coordination with the Infrastructure Commission, the Research Board and other relevant bodies and including representation from external stakeholders as appropriate, with the terms of reference to be developed by the president of the Commission.

9. Following [Resolution 1 (SERCOM-1)](https://library.wmo.int/doc_num.php?explnum_id=10767#page=14) – Establishment of Standing Committees and study groups of the Commission for Weather, Climate, Water and Related Environmental Services and Applications (Services Commission), and [Resolution 4 (SERCOM-1)](https://library.wmo.int/doc_num.php?explnum_id=10767#page=64) – Review of the work programme and subsidiary bodies of the Commission, and as indicated in document [SERCOM-2/Doc. 7.1](https://meetings.wmo.int/SERCOM-2/_layouts/15/WopiFrame.aspx?sourcedoc=/SERCOM-2/English/1.%20DRAFTS%20FOR%20DISCUSSION/SERCOM-2-d07-1-REVIEW-OF-THE-WORK-PROGRAMME-draft1_en.docx&action=default), the establishment of a study group on services for land transportation will be considered as part of the overarching review of all SERCOM subsidiary bodies that will take place at its third session in 2024.

**Expected action**

10. The Commission is invited to adopt the following resolution.

# DRAFT RESOLUTION

## Draft Resolution 7.2/1 (SERCOM-2)

## Amendments to the terms of reference of standing committees and study groups of the commission

THE COMMISSION FOR WEATHER, CLIMATE, WATER AND RELATED ENVIRONMENTAL SERVICES AND APPLICATIONS,

**Recalling** [Resolution 1 (SERCOM-1)](https://library.wmo.int/doc_num.php?explnum_id=10767#page=14),

**Having examined** document [SERCOM-2/Doc. 7.2](https://meetings.wmo.int/SERCOM-2/English/Forms/AllItems.aspx?RootFolder=%2FSERCOM%2D2%2FEnglish%2F1%2E%20DRAFTS%20FOR%20DISCUSSION&FolderCTID=0x012000A60A2C5B5006AA41980F5F2A7BA92166&View=%7B1EB384EC%2D8FE1%2D4B79%2DB8F9%2DA0AEB19C9F87%7D),

**Taking into account** the need to periodically review, and as required, update the terms of reference, and in particular the purpose and expected outputs, of its subsidiary bodies to implement the work programme revised through [Resolution 7.1/1 (SERCOM-2)](https://meetings.wmo.int/SERCOM-2/English/Forms/AllItems.aspx?RootFolder=%2FSERCOM%2D2%2FEnglish%2F1%2E%20DRAFTS%20FOR%20DISCUSSION&FolderCTID=0x012000A60A2C5B5006AA41980F5F2A7BA92166&View=%7B1EB384EC%2D8FE1%2D4B79%2DB8F9%2DA0AEB19C9F87%7D),

**Decides** to amend the terms of reference of the following standing committees and study groups as provided in [annex 1](#Annex1) to this resolution:

(1) Standing Committee Services for Aviation (SC-AVI);

(2) Standing Committee on Climate Services (SC-CLI);

(3) Standing Committee on Hydrological Services (SC-HYD);

(4) Study Group on Integrated Health Services (SG-HEA);

(5) Study Group on Integrated Urban Services (SG-URB).

**Takes note** that the terms of reference of the Joint Study Group on WMO Greenhouse Gas Monitoring were approved by the president of the Infrastructure Commission, the president of the Services Commission and the Chair of the Research Board as provided in [Annex 2](#Annex2) to the present resolution.

*[P/SERCOM]*

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[Annexes: 2](#_Annex_to_draft_3)

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Note: This resolution amends the Annex to [Resolution 1 (SERCOM-1)](https://library.wmo.int/doc_num.php?explnum_id=10767#page=14) – Establishment of standing committees and study groups of the Commission for Weather, Climate, Water and Related Environmental Services and Applications (Services Commission), sections A, C, D, G and I.

## Annex 1 to draft Resolution 7.2/1 (SERCOM-2)

*[Only the paragraphs for which amendments are recommended are shown, except in the case of SC-HYD, where the other paragraphs are also shown as comments for readability.]*

## A. Standing Committee on Services for Aviation (SC-AVI)

#### Purpose

(a) To contribute, in close collaboration with the International Civil Aviation Organization (ICAO) and other partners, and ~~consistent~~ in line with the implementation of the WMO Strategic Plan, to ~~furthering~~ advancingthe international standardization of meteorological services for international air navigation and to ~~provide~~ the provision of assistance to Members with aeronautical meteorological services to achieve compliance with those standards;

(b) To promote and facilitate, in collaboration with the WMO regional associations and other relevant WMO constituent bodies, the international sharing of implementation experience and good practice, theuptake and exchange of scientific and technological advancements, ~~(~~including pilot projects, where appropriate~~)~~, to meet evolving user requirements for high-quality, borderless, harmonized and cost-effective aeronautical meteorological information and services;

(c) To ~~co-lead~~ contribute, in close coordination with ICAO and other relevant stakeholders, tothe long-term planning and development of enhanced aeronautical meteorological information and services in support of the future globally interoperable, harmonized air traffic management system, and additionally, to ~~support~~ promote the integration of meteorological information, ~~(including~~ i.e. observations, forecasts, warnings and alerts~~)~~, into air traffic management systems and ~~decision-support~~ decision-making, including ~~transition~~ the transfer of new capabilities into operational and impact-based information services enabled by the science-for-services value chain and projects such as an AvRDP (Aviation Research and Development Project);

(d) To analyse, in collaboration with SC-CLI and/or other relevant WMO bodies, the possible impacts of climate change and variability, including extreme weather and climate events, on aviation operations on the ground and in the air and ~~clearly~~ communicate these impacts ~~proactively~~ in a meaningful and proactive manner to ICAO and other ~~relevant~~ stakeholders concerned for further analysis;

(e) To ~~promote~~ sustain, in cooperation with ICAO, regional bodies and Members, efficient and effective governance of aeronautical meteorological service provision through the development and/or enhancement of appropriate cost-recovery mechanisms, ~~(including~~ inter alia, for regional and sub-regional service provision~~)~~, approaches to the definition of efficient and effective service provision, information and data exchange policies and good practices;

(f) To develop, in ~~collaboration~~ linewith relevant WMO and ICAO programmes ~~as well as ICAO~~, guidance, training material and other educational/learning ~~outreach~~ expertiseto assist Members in the implementation of quality management systems and compliance with the competency and qualification requirements of personnel providing meteorological services for international air navigation, with an emphasis on developing and least developed countries;

(g) To respond to Members’ aeronautical meteorology prioritized needs and support capacity development activities, in cooperation with WMO regional associations, ICAO and other relevant partners, aiming to enhance the delivery of fit-for-purpose, high-quality, borderless, harmonized and cost-effective aeronautical meteorological services, particularly ~~with~~indeveloping and least developed countries;

*[…]*

(i) To provide advice, upon request, to INFCOM and its subsidiary bodies on the needs and requirements for enhanced observations, especially on the benefits of aircraft-based meteorological observations, including those derived through the WMO AMDAR programme, to improve services for aviation.

#### Expertise required

*• […]*

• Aeronautical meteorology service delivery including ~~for~~ observations/reports, forecasts, warnings/alerts and advisories;

*• […]*

#### [Editorial note. No amendments are proposed for the sections of the SC-AVI terms of reference titled ‘Membership’, ‘Duration’ and ‘Modalities of work’.]

#### Expected outputs

*[…]*

(b) New or updated WMO technical regulations and supporting guidance, including [*Technical Regulations*](https://library.wmo.int/doc_num.php?explnum_id=10733)(WMO-No. 49), Volume I, *General Meteorological Standards and Recommended Practices, and* Volume II, *Meteorological Service for International Air Navigation*;

 *Note: In response to Recommendation 5 (CAeM-16) and Resolution 27 (Cg-18), SC-AVI is overseeing the discontinuation of WMO-No. 49, Volume II.*

*[…]*

(k) Gender action plan and associated framework to increase the involvement of women and to empower women in leadership within the aeronautical meteorology community;

*[…]*

## C. Standing Committee on Climate Services (SC-CLI)

#### Purpose

(a) Foster development of climate services across all climate timescales (sub-seasonal, seasonal, multi-annual, decadal) ~~and~~ including adaptation to climate change and mitigation aspects of climate change;

*[…]*

(f) Support country-level delivery of climate services under the umbrella of the Global Framework for Climate Services (GFCS) through effective user engagement (UIP), generation of associated service delivery methodologies, good practice guidance on national implementation of the CSIS focused on tailored products and services facilitated and co-produced through National Climate Outlook Forums (NCOFs)/National Climate Forums (NCFs) and national/regional climate projection programmes, and promote the establishment of National Frameworks for Climate Services (NFCSs) to consolidate capacities at the national level and sustain collaboration;

 Ensure that all of the SC-CLI Expert Teams’ Operating Plans, Terms of Reference, and deliverables are aligned with the GFCS components including the aspects provided in the annex to Decision 9 (EC-72) on Operationalization of objective seasonal forecasts and tailored products and aspects of the Next Generation GFCS (EC-75);

(g) Review and provide recommendations on methods, data platforms and software relevant to~~all the core functions of the CSIS, namely~~ climate data, climate information, climate monitoring, climate prediction and climate change projection, with a special focus on the CSIS and the Climate Services Toolkit as a key enabling mechanism, including for the generation and use of tailored products;

*[…]*

(m) Explore and provide guidance on any new climate related methodologies and tools; Develop project proposal components on the different areas of the climate services value chain.

## D. Standing Committee on Hydrological Services (SC-HYD)

#### Purpose

(a) Review existing QMF-H guidance material on hydrological services, including ***~~Technical Regulations~~*** ~~(WMO-No. 49), Volume III:~~ ***~~Hydrology~~***WMO-No. 168 — Guide to Hydrological Practices Vol. II, and develop and promote education and training support material with an emphasis on developing and least developed countries, under the overall coordination of the Hydrological Coordination Panel (HCP) and jointly with the Commission for Observation, Infrastructure and Information Systems (INFCOM) and the Capacity Development Panel (CDP);

(b) Review existing guidance material on flood forecasting and the development of its new components~~, including finalization of assessment guidelines for NHSs to evaluate their end-to-end flood Early Warning Systems (EWSs)~~;

(c) Guide ~~the~~ ~~development of a~~further development and implementation of the WMO community of practice on flood forecasting which provides access to interoperable technologies, including platforms and models, ~~to~~ training and guidance material and ~~to~~ related discussion fora;

(d) Lead the finalization of the ~~Manual~~ Guide on Flood Risk Mapping and develop a Guide on Impact-based Forecasting for Hydrology;

(e) Contribute to the implementation of the WMO Flood Forecasting Initiative (FFI). Ensure that the hydrological component of all major projects related to flood forecasting, i.e. the Coastal Inundation Forecasting Initiative (CIFI), the Flash Flood Guidance System with Global Coverage (FFGS/WGC) and the Severe Weather Forecasting ~~Project~~Programme (SWFP), ~~includes hydrometeorological data, forecast requirements and good practices for effective and sustainable flood forecasting~~considers hydrometeorological data, product and forecast requirements, and reflects good practices for effective and sustainable flood forecasting;

(f) Guide the development of the forecasting and prediction aspects of the Global Hydrological Status and Outlook System (HydroSOS) ~~including the development of Seasonal Hydrological Prediction (SHP) on the basis of Regional Climate Outlook Forums (RCOF) outputs~~;

*[(g) Provide scientific and technical advice to the WMO/GWP Associated Programme on Flood Management (APFM) and to represent WMO at the APFM governance meetings;*

*(h) Provide scientific and technical advice to the WMO/GWP Integrated Drought Management Programme (IDMP) and represent the WMO hydrological community at the IDMP governance meetings;]*

(i) Supervise and provide technical advice on the development of tools for water resources assessment and planning to assist decision-making including under climatic variability and change, and guide the development of a community of practice on water resources assessment;

~~(j) Support SC-AGR in assessing WMO contributions to the food security agenda;~~

(~~k~~j) Support SC-DRR in the provision of assistance to Members in enhancing their service delivery capabilities and enabling effective implementation of Multi-hazard Early Warning Systems (MHEWS);

(~~l~~k) Ensure collaboration with the Research Board and the Hydrological Coordination Panel on the definition of research priorities and needs for hydrometeorological activities in cooperation with external partners;

(~~m~~l) Lead the finalization of the Guidelines for Verification of Hydrological Forecasts;

(m) Provide technical consultation to the development of GDPFS to assure hydrological data, forecast models and systems are integrated into the GDPFS in coordination with the Standing Committee on Data Processing for Applied Earth System Modelling and Prediction (SC-ESMP) of INFCOM;

(n) Support SC-AGR in assessing WMO contributions to the food security agenda;

#### Expertise required

*[• Operational hydrology;]*

~~• Hydrological forecasting;~~

• Short-term to medium range hydrological forecasts;

• Sub-seasonal to seasonal hydrological forecasts and outlooks;

• Flash flood ~~forecasting~~ and urban flood forecasts and warnings;

• Water resources assessment~~;~~

~~• Water~~ and management;

~~• Hydrometeorology (including application of precipitation forecasts and nowcasts);~~

• Application of NWP and nowcasts in hydrological forecasting;

• Hydrological products and services dissemination and communication to end-users;

*[• Agricultural hydrology;*

*• Hydrological modelling;*

*• Hydrological information systems;*

*• Disaster risk management;*

*• Remote sensing for hydrology;]*

• Water quality modelling and assessment.

#### Membership

Approximately ~~20~~ 25 technical experts, including the chair and vice-chair~~(s)~~, selected from the Expert Network by the president of the Services commission assisted by the management group and~~,~~ the Secretariat. ~~and r~~Representatives of IHP-UNESCO, IAHS, IAHR and GWP, to be nominated by their parent organization on the basis of the terms of reference of the Standing Committee.

*[Other technical experts may be invited, as needed, to serve as Observers on the Standing Committee, as determined by the chair/vice-chair of the Standing Committee in consultation with the president of the Services Commission.*

*Note: To the extent practicable, the composition of Members of the SC-HYD should appropriately reflect regional and gender balance.*

#### Duration

*Until the next ordinary session of the Services Commission where, if required, the Standing Committee can be re-established at the discretion of the Services Commission.]*

#### Modalities of work

~~Note:~~ Normally WMO would be expected to convene a face-to-face Standing Committee meeting once every two years at its headquarters in Geneva, Switzerland. Consideration may be given by WMO to convening at an alternative location provided that it increases efficiency without increasing costs to the Organization. *[Bold removed]*

*[• Tele/video conference;]*

~~Note:~~ Normally the Standing Committee would be expected to convene tele/video conferences on at least a quarterly basis. *[Bold removed]*

*[• Correspondence, including email exchanges and other appropriate online interactions.]*

#### Expected outputs

(a) New edition of ***~~Technical Regulations~~*** ~~(WMO-No. 49), Vol. III~~ WMO-No. 168 — Guide to Hydrological Practices, Vol. II (services part);

(b) Capacity building material related to the Guidelines for the assessment of End-to-end Early Warning Systems for Flood Forecasting;

(c) Community of practice on flood forecasting~~established~~ maintained and online repository of material accessible to NMHSs enriched with additional interoperable models and platforms for flood forecasting and a repository of capacity building materials;

(d) Guiding principles for engagement of the private sector to support flood-related EWS and Flood risk management established;

(~~d~~e) ~~Manual~~ Guide on Flood Risk Mapping;

(f) Guidelines on “Impact-based Forecasting” in hydrology;

(g) Implementation Plan for FFGS/WGC;

(h) Concept note on the use of Satellite data for flood forecasting and product requirements;

(~~e~~i) Hydrological contribution to the Concept Document requested by Resolution 15 (Cg-18) - Strengthening multi-hazard early warning services in areas prone to all flooding types and severe weather; integration, in consultation with SC-DRR, SC-MMO and support of FFGS/WGC, CIFI, and ~~/~~SWFP; framework of practices and interoperability guidelines, standards and protocols in cooperation with SC-DRR and SC-MMO;

(j) Guidelines on Socio-Economic Benefit Analysis of flood forecasting services;

(~~f~~k) Progress report of the HydroSOS ~~Pilot projects in the Lake Victoria and GangesBrahmaputra basins~~development and implementation;

(~~g~~l) Leadership of APFM;

(m) Guidelines on transboundary flood risk management;

(~~h~~n) Hydrological contribution to IDMP;

(~~i~~o) Water Resources Assessment (WRA) guidance materials and tools: WMO webpage on WRA ~~launched~~maintained and enriched with additional material; Community of Practice on WRA launched;

(p) Outlook component of HydroSOS operational;

~~(j) Guidelines for verification of hydrological forecasts;~~

~~(k) Seasonal hydrological prediction guidelines;~~

~~(l) Support to the INFCOM Standing Committee on Data Processing for Applied Earth System Modelling and Prediction in the further development of the concept for inclusion of Hydrological Centres into the GDPFS Manual;~~

~~(m) Support to the INFCOM Standing Committee on Data Processing for Applied Earth System Modelling and Prediction in the review of the evolving role of existing global hydrological data centres;~~

(~~n~~q) Contribution to the revision of the WMO Cataloguing of Hazardous Events (WMO-CHE) hazard list;

(r) Guidelines on communication for hydrological information with priority to flood, forecasting results and related risks;

(s) Hydrological contribution to ET-GMAS and to ET-WCM;

(t) Database of research needs from NHSs as a project topics repository for scientists, and inventory of research outputs for operational hydrology;

(u) Guidelines for verification of hydrological forecasts;

(v) WMO Hydrological Centres established including flash flood, sub-seasonal to seasonal, cryosphere and water resources assessment.

~~(p) Provide technical consultation to the development of GDPFS to assure hydrological data, forecast models and systems are integrated into the GDPFS in coordination with the Standing Committee on Data Processing for Applied Earth System Modelling and Prediction (SC-ESMP) of INFCOM.~~

## G. Study Group on Integrated Health Services (SG-HEA)

#### Expected outputs

(a) Development of the Implementation and Resource Plan of the WHO-WMO Health, Environment, and Climate Science to Services Master Plan ~~2019-~~2023–2033,1 and on a~~n~~ bi-annual basis review and update of the joint work plan including to establish a research agenda, and mechanisms and goals for technical cooperation, training and capacity building, within NMHSs and the Health Community;

*[…]*

(d) Inform~~ation~~ and engage~~ment of~~ other bodies, including the INFCOM and Research Board, other relevant SERCOM bodies, and health, research and Earth observation bodies, on needs and requirements for the execution of health-oriented science and services;

*[…]*

(f) Identification or development of tools,~~guidelines, and~~ technical advisory, and capacity development in support of WMO and WHO Member efforts to deliver relevant products and services to effectively support public health research and operations;

*[…]*

(h) ~~Guidance on the~~Identify needs related to modelling, development and application of sub-seasonal and seasonal forecasts, outlooks and early warning systems, and climate projections for health;

*[…]*

(j) Review and update relevant WMO-WHO publications ~~and guidance materials~~as required.

## I. Study Group on Integrated Urban Services (SG-URB)

#### Purpose

WMO Members recognize the need for the specialized services for urban ~~complexes~~areas. This is related to the fact that on the urban scale the connection between many phenomena is stronger and more pronounced and an individual extreme event may cause a series of urban infrastructure failures. Cities are also the places with high population and property density and hence the impacts of events on life and economic losses are substantially higher.

The general purpose of the Study Group on Integrated Urban Services (SG-URB) is to implement the WMO Strategic Plan (Long-term Goal 1, Strategic Objectives 1.1, 1.2, 1.3, 1.4; Long-term Goal 3 , Strategic Objectives 3.2 and Long-term Goal 4, Strategic Objectives 4.1, 4.2, 4.3) under the overall guidance of the Services Commission in collaboration with the Research Board and Infrastructure Commission in creating and sustaining an ongoing programme of service delivery for urban ~~complexes~~areas and thus contribute to reducing the risk of hydrometeorological hazards for urban areas.

*[…]*

(b) Facilitate identification of the agencies, institutions and other organizations, including the ones within the United Nations System (for example, UN-Habitat, World Health Organization, United Nations Environment Programme and others) involved in the development, delivery and utilization of integrated urban services and ~~establish~~promote a partnership on urban matters by establishing working relations with ~~these agencies~~them (e.g. inviting them as members of the study group);

~~(c) Develop a collaborative framework with the agencies involved in development, delivery and utilization of the integrated urban services;~~

~~(d) Promote renewed and expanded partnerships on urban matters, involving the United Nations (including UN-Habitat, World Health Organization and others) and other international organizations, government institutions, academia and the private sector;~~

(~~e~~c) ~~Develop Implementation plan for the contribution of WMO to the collaborative framework, including working arrangements,~~Propose updated guidance on the implementation of integrated urban services taking into consideration the emerging impact-based forecasting and warning systems;

(~~f~~d) Promote strengthened cooperation between National Meteorological and Hydrological Services and the appropriate national authorities to further develop integrated urban services for decision-makers~~,~~ and promote their uptake by stakeholders and the general public~~, and to~~ by deploying the latest communication technologies in service delivery;

(~~g~~e) ~~Develop~~ Propose and guide the development of effective metrics to assess the socioeconomic benefits of the specific and integrated urban services and their contribution towards~~meeting the United Nations’ goal (SDG-11) of~~ sustainable cities and communities;

(~~h~~f) Document and promote good practices for the verification of relevant products in light of the requirements of urban stakeholders, taking into account national policies and NMHSs’ roles and responsibilities and recommendations on possible inclusion as recommended practices;

(~~i~~g) Advise on the need to grow ~~development of~~ good practices, training and capacity-development activities related to very high-resolution forecasting, predictions and warning systems and evaluate their available operational applications, to be shared with Members who are lacking such capacities;

(~~j~~h) ~~Develop~~Propose guidance on verification, quality management and assessment processes that enables a smooth transition of research products to operational services;

(~~k~~i) Promote pilot and demonstration projects related to integrated urban services;

(~~l~~j) Facilitate the revision of the Guidance on Integrated Urban Hydrometeorological, Climate and Environmental Services, taking a lessons learned perspective based on the data collected by ~~in a view of lessons learned from~~ the earlier implementors of pilot and demonstration projects on integrated urban services.

#### Expected outputs

*[…]*

~~(b) A collaborative framework document identifying role and responsibilities of the agencies involved in the development, delivery and utilization of the integrated urban services including the rules of engagement with these agencies;~~

(~~c~~b) Revised partnership agreements (with UN-Habitat, and other relevant organizations and institutions) on urban matters;

(~~d~~c) ~~Implementation plan for the contribution of WMO to the collaborative framework, including working arrangements~~Good practices document on the implementation of integrated urban services, taking into consideration the emerging impact-based forecasting and warning systems;

(~~e~~d) ~~Guidelines~~Good practices on effective metrics to assess the benefits of the specific urban services;

(~~f~~e) Good practices document for the verification of relevant products in light of the requirements of urban stakeholders, taking into account national policies and NMHSs’ roles and responsibilities and recommendations on possible inclusion as recommended practices;

(~~g~~f) Good practices document on approaches to very high-resolution forecasting, predictions and warning systems;

(~~h~~g) Revised requirements for urban observations considering the needs of integrated urban services including the requirements of the health sector;

(~~i~~h) ~~Guidance~~Good practices document on the steps required for verification, quality management and assessment processes to ensure the smooth transition from science to operations;

(~~j~~i) Updated Guidance on Integrated Urban Hydrometeorological, Climate and Environmental Services.

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## Annex 2 to draft Resolution 7.2/1 (SERCOM-2)

*[As per Annex (E) to* [*draft Resolution 5.2/1 (INFCOM-2)*](https://meetings.wmo.int/INFCOM-2/_layouts/15/WopiFrame.aspx?sourcedoc=/INFCOM-2/English/1.%20DRAFTS%20FOR%20DISCUSSION/INFCOM-2-d05-2-SUBSIDIARY-BODIES-draft1_en.docx&action=default)*]*

**Joint Study Group on WMO Greenhouse Gas Monitoring**

### Terms of Reference

**1. Mandate**

The June 2022 meeting of the Executive Council (EC-75) decided to form a joint Study Group between INFCOM, SERCOM and the Research Board, with appropriate involvement of external stakeholders, to undertake the following tasks:

*(1) To develop the concept, including identifying the future vision for WMO-coordinated GHG‑related activities, its outputs and expected contributions from and benefits for Members, leveraging synergies with existing frameworks such as the Global Atmosphere Watch (GAW) and the Integrated Global Greenhouse Gas Information System (IG3IS);*

*(2) To submit a final proposal of the concept for its architecture with identified key gaps between Members’ operational needs and existing relevant WMO activities to the nineteenth World Meteorological Congress (Cg-19) in 2023;*

Furthermore, the Executive Council decided:

*to delegate the authority to develop and approve the Terms of Reference of this Study Group to the President of the Infrastructure Commission (INFCOM), the President of the Services Commission (SERCOM) and the Chair of the Research Board (RB);*

The role of the Study Group is to oversee and coordinate a number of tasks (see Section 5). Many of these will need to be completed in time to provide necessary decision materials for consideration by SERCOM-2 and INFCOM-2 in October 2022; others will support decision‑making by the nineteenth World Meteorological Congress in May to June 2023.

**2. Reporting arrangements**

The Study Group will present the interim results of its work to INFCOM, SERCOM and the Research Board and seek their feedback and/or endorsements. The ultimate aim is to present a concept proposal to the nineteenth World Meteorological Congress for its deliberation and approval.

**3. Secretariat support**

The Secretariat will arrange any necessary meetings and conference calls, provide drafting of documents, record decisions and actions items, and track issues and actions as needed.

**4. Modalities of work**

Most of the work will be conducted by email and videoconference, with the possibility of holding physical meetings when deemed appropriate by the Chair and if resources are available.

**5. Tasks**

(a) Oversee and guide the further development of the concept for the GHG monitoring system, as per EC-75/Resolution 4, taking into account the need to:

 Identify the primary users of GHG information and services and establish the priority needs of these users;

 Secure continued broad support for this development in the existing greenhouse gas monitoring community through building on existing activities and coordination mechanisms;

 Act without delay, given the importance of providing input to currently ongoing First Global Stocktake by the Parties to the Paris Agreement;

 Engage, as appropriate, all elements of the WMO governance structure in this development;

 Engage and closely collaborate with the wider scientific community and other UN agencies international entities (e.g. CEOS; CGMS; GEO; IOC/GOOS) with GHG monitoring activities, in particular the land surface and ocean observation and modelling communities;

 Minimize overlap with WMO activities by clearly positioning this infrastructure with respect to GAW and IG3IS;

(b) Aim to present an early version of the draft proposal for the concept of this at INFCOM-2 and SERCOM-2 in October 2022 and the Research Board in December 2022 for their feedback and preliminary endorsement;

(c) Convene a WMO Greenhouse Gas Monitoring Symposium in January 2023, with the aim of seeking input to the concept from a broad group of scientific, operational and policy-setting stakeholders;

(d) Provide a draft concept proposal to EC-76 in February 2023, with the aim of getting EC recommendation for approval by Congress-19 in May 2023;

(e) Take every opportunity to further socialize and seek input to the development of this concept, e.g. via scientific conferences, IPCC meetings, UNFCCC Workshops, COP27, IOC meetings, WMO Climate Policy Advisors.

**6. Membership**

The joint Study Group should be chaired by an INFCOM designated lead and is expected to consist of up to 20 members, representing

Infrastructure Commission (in particular SC-ON, SC-ESMP, SC-MINT);

 Services Commission (in particular SC-CLI, SG-URB and SG-ENE);

 Research Board (in particular GAW, IG3IS, WCRP, WWRP);

 GCOS

 GOOS

 CEOS

 CGMS

 GEO

 IPCC TFI

 Particular regional or national activities upon which the GHG monitoring infrastructure will be building on, e.g. from the European Union, Japan, US;

All WMO Regions should be represented. In addition to the representation listed above, the Executive Council may wish to appoint (a) focal point(s) as members. Furthermore, given the high level of interest in this topic it is likely that some WMO Members may wish to nominate their own representatives as additional members. Such requests may in principle be accommodated but should be discussed on an ad hoc basis between the Chair of the group and the respective member.

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