International Civil Aviation Organization

INFORMATION PAPER

Twenty-fifth Meeting of the Meteorology Sub-group (MET SG/25)

Online, 18 – 22 October 2021

Agenda Item 5: Research, development and other initiatives

WMO ACTIVITIES OF RELEVANCE TO ICAO

(Presented by the World Meteorological Organization, WMO)

SUMMARY

This information paper provides an overview of some of the recent activities of the World Meteorological Organization (WMO) of relevance to ICAO, particularly in the context of WMO Governance Reform and WMO's contribution to global and regional aeronautical meteorology initiatives and the response to the Coronavirus (COVID-19) pandemic. In addition, this paper provides information on upcoming WMO meetings/events of relevance to ICAO as well as links to available WMO resources and further information.

Action by the meeting is in paragraph 3.

1. INTRODUCTION

1.1 At the Twenty-Fourth Meeting of the Meteorology Sub-Group of APANPIRG (METSG/24), held 16 to 20 November 2020 via videoconference, the World Meteorological Organization (WMO) presented METSG/24-IP/17 containing an overview of the activities of WMO of relevance to ICAO, including the response to the Coronavirus (COVID-19) pandemic.

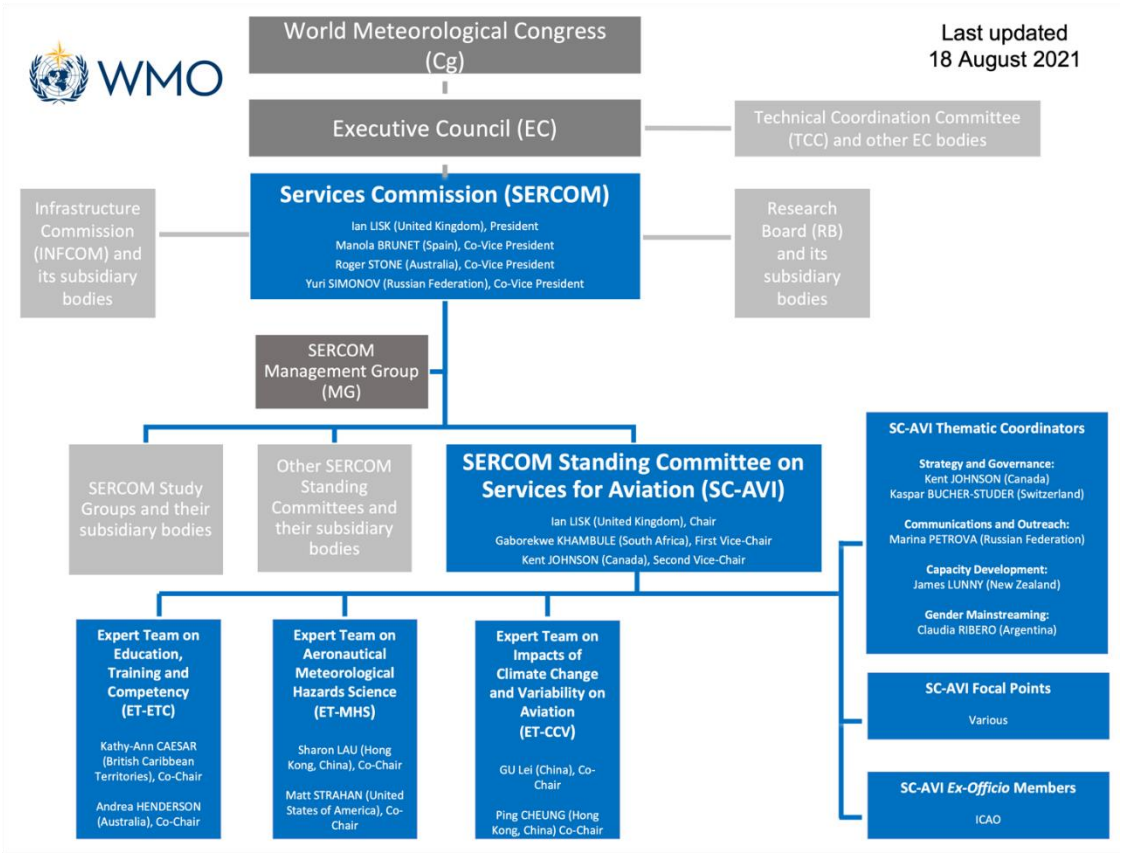
1.2 This information paper here is intended to provide the METSG/25 meeting, 18 to 22 October 2021 via videoconference, with an update on activities that have taken place since METSG/24.

2. DISCUSSION

2.1 WMO Governance Reform status

2.1.1 As reported to METSG/24 (2021) through IP/17, the WMO Secretariat has worked extensively with WMO Members to implement the so-called '*WMO Governance Reform*'. The reform of the WMO constituent and non-consistent bodies as well as Secretariat structures is, to the greatest extent, now complete at the global level. Recent attention has started to turn towards reform at the regional level, including the functioning of the Regional Associations and their subsidiary bodies. The Organization will continually monitor the performance of its new structures – at both global and regional levels – adjusting wherever and whenever necessary.

2.1.2 In the context of the Standing Committee on Services for Aviation (SC-AVI), the latest organizational chart is given below. As illustrated, SC-AVI currently comprises three Expert Teams. The establishment of an advisory group (rather than an expert team) addressing volcanic sciences for applications remains under consideration within SC-AVI, but with the prospect that it may be established later in 2021 or early 2022. The activities and outputs of SC-AVI are supported by a series of Thematic Coordinators and Focal Points as well as an extended network of experts. ICAO has ex-officio member status in SC-AVI and is represented by the ICAO Secretariat plus the Chair and Deputy Chair of the Meteorology Panel (METP).



2.2 WMO contribution to global initiatives (non-exhaustive)

2.2.1 Within available resources, WMO has continued to play an active role in the activities of the ICAO METP and its five working (WG-MRI, WG-MISD, WG-MIE, WG-MOG and WG-MCRGG) addressing an array of topics including but not limited to:

- Air traffic management requirements for MET information services;
- Updates to the ICAO Global Air Navigation Plan (GANP) and its aviation system block upgrades (ASBU) methodology in respect of MET;
- Restructuring of ICAO Annex 3 and (re)introduction of PANS-MET;
- Service requirements as well as scientific and/or technological capabilities in respect of:

  - Releases of radioactive material into the atmosphere (RRM);
  - Hazardous weather information service (as the recent replacement of the RHWAC concept);
  - Space weather (SWx) information service;
  - Volcanic ash and sulphur dioxide (VASD);
- ICAO meteorological information exchange model (IWXXM);
- MET in SWIM (system-wide information management);
- Operation and development of global MET systems including:
  - International airways volcano watch (IAVW);
  - World area forecast system (WAFS); and
  - Secure aviation data information system (SADIS) and WAFS internet file service (WIFS);
- Cost recovery and governance guidance including issues associated with 'meteorological authority' and data management/access policies.

2.2.2 Supplemental to METP involvement, WMO has been actively contributing to Working Group 4 (WG-4) of the ICAO Airport Economics Panel and Air Navigation Services Economics Panel (AEP-ANSEP) as its work relates to cost recovery models of the (global) space weather information service and other such meteorological facilities and services provided on a multi-State (multinational) basis. The work of WG-4 has been undertaken in collaboration with METP WG-MCRGG and will be reported, by the WG-4 Rapporteur, to the AEP-ANSEP/8 meeting scheduled to take place in November/December 2021.

2.2.3 In addition, in early 2021, WMO became an Observer on the ICAO Committee on Aviation Environmental Protection (CAEP), after an absence of nearly a decade. WMO is now actively participating in the activities of the CAEP itself and some of its subsidiary bodies, namely Working Group 2 (Airports and Operations, WG-2) and ISG (Impacts and Science Group). Most recently, WMO delivered keynote addresses and presentations at ICAO's Aviation Green Recovery Seminar held in November 2020 and ICAO's pre-Stocktaking webinar series held in August 2021.

2.2.4 In respect of the International Air Transport Association (IATA), WMO continues to actively contribute to its Accident Classification Task Force (ACTF)[1]. WMO is, in this connection, a key contributor to the preparation of the annual IATA Safety Report – the latest 2020 report is available at https://www.iata.org/en/publications/safety-report/ – which provides an in-depth review and essential insight into global and regional accident rates and contributing factors, including those relating to weather/meteorological conditions and/or the unnecessary penetration by flight crew into adverse weather/meteorological conditions.

2.2.5 WMO also continues to collaborate with IATA on the AMDAR (Aircraft Meteorological Data Relay) observing system, through a WMO-IATA Collaborative AMDAR

[1] Formerly ACTG (Accident Classification Technical Group)

Programme initiative intended to expand and enhance AMDAR, particularly in data-sparse areas and with the extension of the coverage of turbulence and water vapour measurements.

2.2.6 WMO has also periodically held informal discussions with IATA as well as Airports Council International (ACI) on matters linked to the environment and climate change, such as impact mitigation, resilience, and adaptation. Some of these discussions will likely progress more formally through each organizations' respective involvement in the ICAO CAEP mentioned above.

2.3 WMO contribution to regional initiatives (non-exhaustive)

2.3.1 Within the available resources, WMO has contributed to some of ICAO's activities at a regional level. For example, WMO expertise and assistance has been provided in enhancing the provision of SIGMET information by meteorological watch offices (MWO) through the establishment of bilateral and/or multilateral SIGMET coordination arrangements (e.g. in Asia/Pacific) and updates to regional SIGMET guides (e.g. in Europe). In addition, WMO has assisted in other areas such as the implementation of the IWXXM schema and tropical cyclone advisory services.

2.3.2 Additional information on some of WMO's regional activities in aeronautical meteorology are publicised through a biannual community newsletter – see 2.5.10 below.

2.4 WMO response during the COVID-19 pandemic

2.4.1 As reported to METSG/24 (2020) through IP/17, WMO played a role in the international response and relief effort to minimise the impacts of the novel Coronavirus (COVID-19) pandemic on society, since it became a global concern in March 2020. In the context of assisting aeronautical meteorological service providers (AMSPs), WMO prepared preliminary guidelines, only available online here, addressing international obligations of Members and their AMSPs, illustrations of contingency measures implemented by some AMSPs, and access to relevant resources as they relate to quality management, risk management, business continuity and cost recovery. It is worthwhile to note that these preliminary guidelines were *not* intended to be exhaustive *nor* were they intended to supersede or otherwise replace guidelines or other instructions from the competent authorities in the Member/State concerned.

2.4.2 Over the course of the last 12 to 18 months, most if not all AMSPs have had to adjust working practices, not just in response to COVID-19 and the challenges this has presented in the workplace environment such as social distancing, but also in light of shifting (aviation user) service requirements, such as night-time (and some day-time) closures of airports. The subdued and prolonged nature of the aviation sector's recovery will inevitably and invariably have an impact on ancillary and essential air navigation services such as aeronautical meteorological services. It is essential, therefore, that service providers maintain a watch on the prevailing and the potential future impacts of COVID-19 on their operations, revenue streams, etc. WMO remains available to advise Members and their services providers, as necessary.

2.5 Other relevant developments/initiatives

Aviation Research and Development Project

2.5.1 WMO has recently confirmed its commitment to conduct a Phase 2 of an Aviation Research and Development Project (AvRDP). 'AvRDP2' is expected to commence before the end of 2021 and last approximately 4 years (until 2025). Following-on from the success of AvRDP1 (2015-2019), which demonstrated the capability of nowcasting and mesoscale modelling techniques in support of the evolving needs of the aviation user community, particularly as they relate to air traffic

management and meteorological hazards avoidance, AvRDP2 will develop, demonstrate and quantify the benefits of improvements to the forecasting of significant convection and associated hazards. AvRDP2 will also devote special attention on developing and demonstrating advancements in probabilistic forecasting and statistical methods (for providing confidence information and other assessments for the end-users), as well as on forecast verification and validation.

2.5.2 From a governance perspective, an AvRDP2 Scientific Steering Committee (SSC) will oversee the project, conducted under the auspices of WMO's World Weather Research Programme (WWRP) of the Research Board and the Standing Committee on Services for Aviation (SC-AVI) of the Services Commission. There is relationship between the work of the ICAO METP WG-MISD (Working Group on Meteorological Information and Service Development) on the hazardous weather information service (HWIS) and AvRDP2. Indeed, several of the contributing experts involved in maturing the HWIS concept within ICAO METP's WG-MISD are contributing experts within WMO SC-AVI's Expert Team on Aeronautical Meteorological Hazards Science (ET-MHS).

Survey on gender equality in aeronautical meteorology

2.5.3 In June 2021, WMO launched a global survey on gender equality in aeronautical meteorology. The purpose of the survey was to obtain feedback on the status of gender equality in aeronautical meteorology, with a particular focus on the viewpoints of research scientists, technicians, observers, forecasters, service managers and senior managers working at aeronautical meteorological stations, offices or other centres across all six WMO regions. The survey sought to obtain additional insight of the policies, action plans and/or guidelines pertaining to gender equality in aeronautical meteorology that may exist in the workplace.

2.5.4 Upon the closure of the survey on 31 August 2021, in excess of 500 individual replies have been received from nearly 100 countries. WMO will undertake an analytical assessment of the anonymized responses and will prepare and then publish a concise report containing findings and recommendations.

2.5.5 The results of the survey will be used by SC-AVI to devise strategies to increase the involvement of women in the work of WMO in the aeronautical meteorology domain and will contribute to both SERCOM's and WMO's gender action plans and related initiatives.

Extraordinary Session of the World Meteorological Congress, including WMO Unified Policy for the International Exchange of Earth System Data

2.5.6 Between 11 and 22 October 2021, WMO will convene an Extraordinary Session of the World Meteorological Congress (Cg-Ext. (2021)). Congress is the supreme governing body of the Organization. It convenes regularly once every four years and, occasionally, on an extraordinary basis during the intersession period.

2.5.7 Due to the prevailing impacts of the COVID-19 pandemic, Cg-Ext. (2021) will be held as a virtual (online) session on an exceptional basis. Its primary focus will be on addressing the following topics: the status of WMO Governance Reform, including advancements and impacts of the COVID-19 pandemic and the enhancement of regional working mechanisms; WMO support to the global water agenda, including the proposed adoption of a Water Declaration to accelerate implementation of the United Nations Sustainable Development Goal (SDG) No. 6; and the WMO policy and practice for Earth system data exchange, including the proposed adoption of a WMO Unified Policy for the International Exchange of Earth System Data.

2.5.8 Additional information on Cg-Ext. (2021) is available at URL: https://meetings.wmo.int/Cg-Ext-2021/

2.5.9 It is worthwhile to note that the WMO Unified Policy for the International Exchange of Earth System Data is intended to succeed existing WMO policy/practice on the international exchange of weather, water and climate data, as currently conveyed through Resolution 40 (Cg-XII, 1995), Resolution 25 (Cg-XIII, 1999) and Resolution 60 (Cg-17, 2015) respectively. Additional information on the proposed new WMO Unified Policy is available at URL: https://public.wmo.int/en/our-mandate/what-we-do/observations/Unified-WMO-Data-Policy-Resolution

Biannual newsletters

2.5.10 WMO continues to issue 'Services for Aviation Newsletters' on a biannual basis to bring the community up-to-date on the latest global and regional developments in aeronautical meteorology, including national and regional case studies or good practice examples. The most recent newsletter (Issue No. 1/2021) was published in April 2021 and is available at URL: https://mailchi.mp/5b08a8ec034f/wmo-avi-newsletter-issue-1-2021. Anyone wishing to subscribe (for free) to future newsletters is invited to email a request to: aviation@wmo.int.

New and recently updated WMO publications

2.5.11 New and recently updated WMO publications of direct or indirect relevance to aeronautical meteorology include:

- WMO-No. 49, Volume II, *Meteorological Service for International Air Navigation* (https://library.wmo.int/index.php?lvl=notice_display&id=21806)
- WMO-No. 306, *Manual on Codes – International Codes*, Volume I.2, *Part B – Binary Codes and Part C – Common Features to Binary and Alphanumeric Codes* (https://library.wmo.int/index.php?lvl=notice_display&id=10684)
- WMO-No. 306, *Manual on Codes – International Codes*, Volume I.3, *Part D – Representations derived from data models* (https://library.wmo.int/index.php?lvl=notice_display&id=19508)
- WMO-No. 782, *Aerodrome Reports and Forecasts: A User's Handbook to the Codes* (https://library.wmo.int/index.php?lvl=notice_display&id=716)
- WMO-No. 930, *Compendium of Tropical Meteorology for Aviation Purposes* (https://library.wmo.int/index.php?lvl=notice_display&id=786)
- WMO AeM SERIES No. 6, *Outcomes of the 2020 Survey on the Impacts of Climate Change and Variability on Aviation* (https://library.wmo.int/doc_num.php?explnum_id=10387)
- WMO WIGOS Technical Report No. 2021-01, *The Benefits of AMDAR Data to Meteorology and Aviation* (https://library.wmo.int/index.php?lvl=notice_display&id=16116)

These and many other WMO publications are available via the WMO e-Library (https://library.wmo.int/) as well as via URL: https://community.wmo.int/activity-areas/aviation/resources/tech-regs-guidance

2.5.12 It is worthwhile to note that WMO is currently undertaking major reviews of WMO-No. 731 and WMO-No. 732 as they pertain to aeronautical meteorological service delivery and WMO-No. 904 as it pertains to the cost recovery of aeronautical meteorological services, with a view to the publication of updates in 2022 or 2023. In addition, an iterative update to WMO-No. 782 (referenced above) is currently in development with a view to publication later in 2021 or early 2022. WMO has also commenced work to prepare a 2023 update of its long-term plan for aeronautical meteorology (LTP-AeM). The LTP-AeM was first published (and last updated) in 2019 and is available via URL: https://community.wmo.int/activity-areas/aviation/services/long-term-plan.

2.5.13 Furthermore, before the end of 2021, WMO expects to commence work to discontinue *Technical Regulations* (WMO-No. 49), Volume II, *Meteorological Service for International Air Navigation*, in response to the outcomes of the Sixteenth Session of the Commission for Aeronautical Meteorology (CAeM-16) in 2018 (Recommendation 5 (CAeM-16) refers) and the Eighteenth World Meteorological Congress (Cg-18) in 2019 (Resolution 27 (Cg-18) refers). More information on these aspects can be expected from WMO through the course of 2022 and 2023, via the WMO Services for Aviation Newsletters (mentioned above), the WMO Services for Aviation website (mentioned below) and other fora.

2.6 Upcoming WMO meetings/events

2.6.1 The following provides an indication of meetings/events of relevance to aeronautical meteorology. Note, the information provided here is subject to change and is non-exhaustive.

- First Meeting of the SC-AVI Expert Team on Aeronautical Meteorological Hazards Science (ET-MHS-1), 13 to 16 September 2021, Online [Link]
- Extraordinary Session of the World Meteorological Congress (Cg-Ext. (2021)), 11 to 22 October 2021, Online [Link]
- Seventy-Fourth Session of the Executive Council (EC-74), 25 to 29 October 2021, Online [Link]
- WMO/United Kingdom Met Office/Meteorological Service of Singapore Aviation Meteorology Training Seminar, 2 to 4 November 2021, Online [Information available via this link but please note that the closing date for nominations is 24 September 2021]
- First Meeting of the SC-AVI Expert Team on the Impacts of Climate Change and Variability on Aviation (ET-CCV-1), 1 to 3 December 2021, Online [Link]
- First Meeting of the SC-AVI Expert Team on Education, Training and Competency (ET-ETC-1), 6 to 8 December 2021, Online [Link]
- Second Meeting of the Standing Committee on Services for Aviation (SC-AVI-2), March/April 2022, Geneva or Online [Information will appear via this link]

2.7 Available WMO resources and further information

2.7.1 WMO maintains a Services for Aviation website at URL: https://www.wmo.int/aviation or https://community.wmo.int/activity-areas/aviation. This website is a *one-stop shop* for all information and resources associated with WMO's Services for Aviation activity area, including direct access to regulatory and guidance materials, meeting documentation and reports, survey findings, newsletters, capacity development training aids and more.

2.7.2 In addition, WMO maintains a Moodle training portal at URL: https://aviationtraining.wmo.int/moodle/. The aim of this resource is to provide aeronautical meteorology training and guidance material sourced from around the world. Its content covers both operational and non-operational aspects of aeronautical meteorology, although the primary focus is the specialist needs of the aeronautical forecaster. All the materials on the Moodle training portal are reviewed and maintained by SC-AVI ET-ETC.

3. ACTION BY THE MEETING

3.1 Note the information contained in this paper.

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