



ICAO

International Civil Aviation Organization**INFORMATION PAPER****Twenty-fourth Meeting of the Meteorology Sub-group (MET SG/24) of the Asia and Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG)**

Web-conference, 16 – 20 November 2020

Agenda Item 5: Research, development and other initiatives**WMO ACTIVITIES OF RELEVANCE TO ICAO INCLUDING THE RESPONSE TO THE CORONAVIRUS (COVID-19) PANDEMIC**

(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 as well as WMO's 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 ICAO and the World Meteorological Organization (WMO) coordinate, collaborate and cooperate on international standards for aeronautical meteorological service provision, as contained in ICAO Annex 3/WMO *Technical Regulations* (WMO-No. 49), Volume II, *Meteorological Service for International Air Navigation* and supporting ICAO and WMO guidance material. Where resources allow, WMO continues to play an active role in supporting its Members and partners including ICAO in the establishment, maintenance and implementation of these international standards.

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

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2. DISCUSSION**2.1 WMO Governance Reform status**

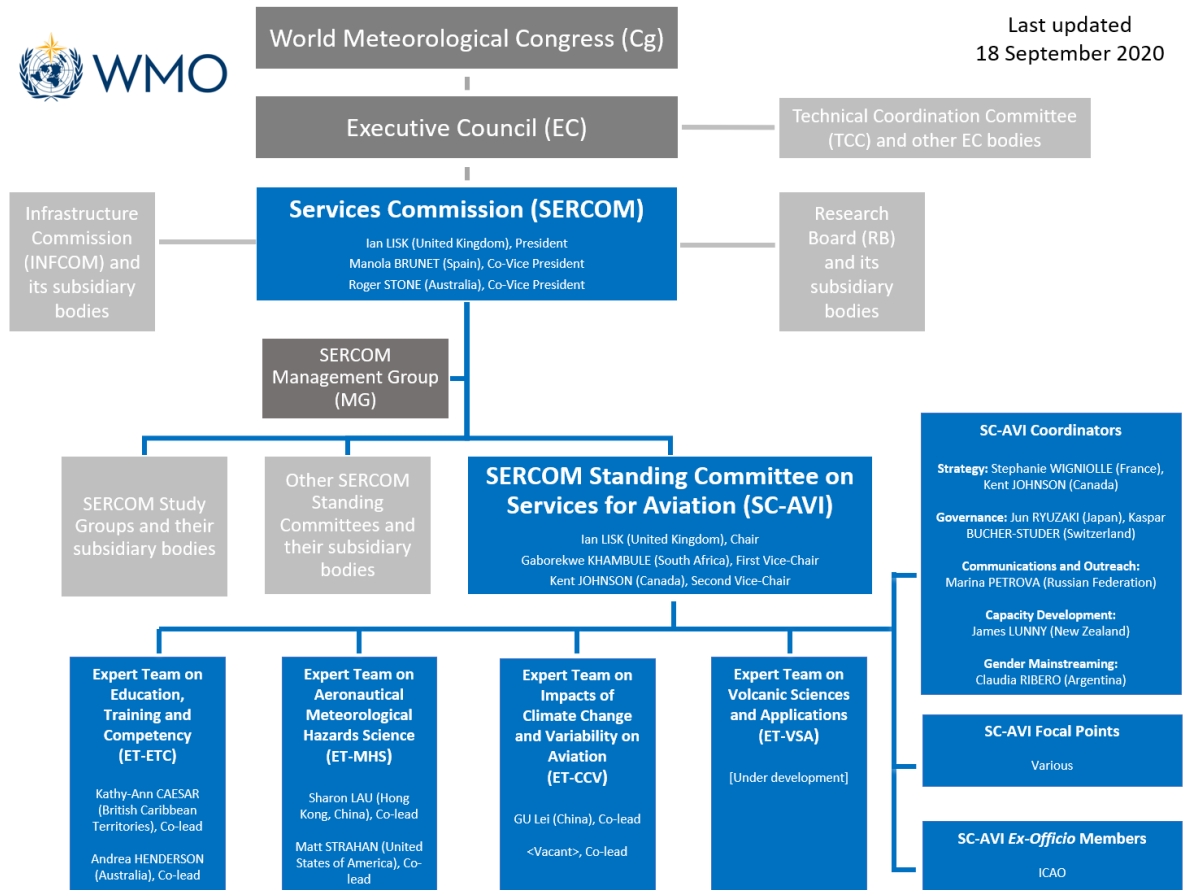
2.1.1 The Eighteenth World Meteorological Congress (Cg-18) was convened by WMO from 3 to 14 June 2019. One of the key outcomes of Cg-18 was WMO Members' endorsement of a major reform of the Organization's constituent bodies in the 2019-2020 timeframe. This reform, by far the largest reform in the Organization's 70-year history, was to include a restructuring (consolidation and repurposing) of all prevailing technical commissions, including the Commission for Aeronautical Meteorology (CAeM), Commission for Basic Systems (CBS), Commission for Instruments and Methods of Observation (CIMO) and Commission for Atmospheric Sciences (CAS), as well as an alignment of the WMO Secretariat with the new WMO constituent bodies structure.

2.1.2 Since Cg-18, the WMO Secretariat has worked extensively with WMO Members to implement so-called '*WMO Governance Reform*'. The CAeM, along with all other *intergovernmental* technical commissions, has been dissolved. In its place, a new *non-governmental* Standing Committee on Services for Aviation (SC-AVI) has been established under a new *intergovernmental* Commission for Weather, Climate, Water and Related Environmental Services and Applications (abbreviated to 'Services Commission' or SERCOM).

2.1.3 SC-AVI comprises approximately 20 experts, with representation from across all six WMO Regions. Its primary purpose is to contribute to furthering the standardized provision of meteorological services for international air navigation and to provide assistance to Members with aeronautical meteorological services to achieve compliance with those standards. ICAO is an ex-officio member of SC-AVI and, as such, is a key collaborator in all the Standing Committee's activities.

2.1.4 SC-AVI has established several subsidiary bodies in the form of Expert Teams (ETs) focussing on: Education, Training and Competency (ET-ETC); Aeronautical Meteorological Hazards Science (ET-MHS); and the Impacts of Climate Change and Variability on Aviation (ET-CCV). The establishment of an additional expert team addressing volcanic sciences and applications ('ET-VSA') is under consideration. The activities and outputs of SC-AVI are also supported by a series of coordinators and focal points as well as an extended network of experts.

2.1.5 SC-AVI has relations and interactions not only with its parent body (SERCOM) but also with numerous other WMO constituent bodies, including subsidiary bodies of the Commission for Observations, Infrastructure and Information Systems (abbreviated to 'Infrastructure Commission' or INFCOM) and the Research Board (RB). A schematic of the WMO constituent bodies structure as it relates to SC-AVI is as follows:



2.1.6 In a related activity, WMO continues to seek opportunities to forge closer working arrangements with ICAO, particularly at the global level. Since WMO’s SC-AVI and ICAO’s Meteorology Panel (METP) are both technical (non-governmental) bodies, and given that WMO and ICAO already have formal working arrangements in place, opportunities exist to pursue ‘joint working groups’ (or equivalent) on topics where there is common interest, for example volcanic ash, cost recovery and governance amongst others. While the mandates of each organization would necessarily be preserved – i.e. ICAO’s primary mandate for establishing the aeronautical requirements and WMO’s primary mandate for establishing the meteorological methods and practices necessary to fulfil the (ICAO) aeronautical requirements – forging closer working arrangements between WMO and ICAO would potentially make more effective and more efficient use of the limited resources available to both organizations and their Members/States in the aeronautical meteorology domain. WMO discussions with ICAO at the global level in this regard continue.

2.1.7 Lastly, in the context of WMO Governance Reform as it relates to Secretariat structures, on 1 January 2020 a new Services for Aviation (AVI) Division was established at WMO headquarters as a successor to a former Aeronautical Meteorology (AEM) Division. The new AVI Division resides within a new Services Department. Greg Brock is Head of the AVI Division and is, at present, its only staff member.

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2.2 WMO contribution to global initiatives (non-exhaustive)

2.2.1 Within the available resources, WMO continues to play an active role in the activities of the ICAO Meteorology Panel (METP) and its five working groups (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 (ASBU) 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 In the context of IWXXM, WMO continues to be responsible, at the request of ICAO, for the development and the publication of the IWXXM schema. The latest version of the IWXXM schema – namely version 3.0 – was published by WMO on 7 November 2019 and is available for operational use via URL: <https://schemas.wmo.int/iwxxm/>. This version enables the IWXXM-related requirements of Amendment 78 to ICAO Annex 3 to be fulfilled. Technical specifications pertaining to IWXXM are included in the WMO *Manual on Codes*, International Codes, Volume I.3 – *Annex II to the WMO Technical Regulations: Part D – Representations derived from data models* available at URL: https://library.wmo.int/index.php?lvl=notice_display&id=19508.

2.2.3 Since publication of IWXXM version 3.0, issues have been identified, mostly related to the schematron rules used in the validation of IWXXM instances while the rest involve enhancements to

the schema to further improve the XML/GML representation. Fixes to these issues will be included in an upcoming release of IWXXM. At the same time, an analysis of the necessary changes required to advance IWXXM to meet the requirements of Amendment 79 to ICAO Annex 3 had been made. This analysis indicates that almost all existing report types will have to include *non-backwards* compatible changes, as well as the introduction of a new report type to support the provision of WAFS SIGWX forecasts.

2.2.4 In addition to the above-mentioned METP-related activities, WMO actively contributes to the ICAO Airport Economics Panel and Air Navigation Services Economics Panel (AEP-ANSEP) on matters that include charges for and cost recovery of aeronautical meteorological service provision. The most recent discussions in this regard relate to the cost recovery models of the (new) space weather information service that became operational in November 2019.

2.2.5 In respect of the International Air Transport Association (IATA), WMO continues to actively contribute to its Accident Classification Technical Group (ACTG). WMO is, in this connection, a key contributor to the preparation of the annual IATA Safety Report – the latest 2019 report is available at <https://www.iata.org/en/publications/safety-report/> - which provide 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. The IATA Flight Operations Support Task Force (FOSTF) has been largely in abeyance for the past 12 months, therefore WMO has had little or no opportunity to contribute to FOSTF-related activities recently.

2.2.6 WMO continues to collaborate with IATA on the further expansion and enhancement of the WMO AMDAR (Aircraft Meteorological Data Relay) observing system. Following Cg-18 endorsement, WMO is entering into an updated working arrangement with IATA encompassing the development and operation of a WMO-IATA Collaborative AMDAR Programme (WICAP) based on a defined set of principles. The WICAP has the primary aim to expand and enhance AMDAR, particularly in data-sparse areas and with extension of the coverage of turbulence and water vapour measurement. Based on meeting requirements for a minimal global coverage, this WMO-IATA collaboration would be expected to lead to at least a doubling of the current airline participation of 40 airlines over the medium to longer term.

2.2.7 In connection with the WICAP, WMO is also collaborating with IATA in respect of their Turbulence Aware initiative. Turbulence Aware is intended to improve aviation safety by reducing the number of in-flight injuries caused by turbulence, and to optimise fuel burn and thus reduce CO₂ emissions. The WICAP arrangement described above will pave the way for AMDAR data to be integrated into Turbulence Aware.

2.2.8 Further information on the AMDAR observing system is available at URL: <https://community.wmo.int/activity-areas/aircraft-based-observations/amdar>

2.2.9 Recognizing growing interest on the impacts of climate change and variability on aviation, experts from WMO and IATA have recently initiated informal discussions to explore areas of common interest, such as the downscaling of climate scenarios to the regional or local level, climate resilience and extreme weather event preparedness and mitigation. Conceivably, these discussions may lead to a more extensive collaboration between the two organizations over time. For now, however, they remain informal.

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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 and updates to regional SIGMET guides. In addition, WMO has assisted in other areas such as the IWXXM schema, forecast verification methodologies, tropical cyclone advisory services implementation, and the competency and qualification of personnel providing meteorological service for international air navigation.

2.3.2 Additional information on some of WMO's regional activities in aeronautical meteorology are publicised through a biannual community newsletter – see 2.5.8 below.

2.4 WMO response during the COVID-19 pandemic

2.4.1 WMO, as a specialized agency of the United Nations, has played a role in the international response and relief effort to minimise the effects of the novel coronavirus pandemic on society. The following report focusses primarily on the efforts of WMO at the global level to assist WMO Members and their aeronautical meteorological service providers during this crisis.

2.4.2 On 30 January 2020, the World Health Organization (WHO) declared the Coronavirus disease 2019 (COVID-19) a Public Health Emergency of International Concern. On 11 March 2020, WHO declared COVID-19 a pandemic. Since the COVID-19 infectious disease was first identified in late 2019 it has spread around the world. At time of writing (13 October 2020), [according to WHO](#), there have been more than 37 million confirmed cases of COVID-19 in humans and more than 1 million deaths worldwide.

2.4.3 In March/April 2020, as the effects of the pandemic took hold more widely on societies and nations worldwide and as so-called 'lockdowns' were imposed by governments to control the spread of the disease amongst their populations through restrictions on the movement and interaction of people, there was an abrupt and significant downturn in the demand and the supply of domestic and international civil aviation. According to IATA analyses, the decline in daily commercial air transport compared with the same period in 2019 was, in some regions, in excess of 90% (Example source: IATA Press Release No. 49 issued on 3 June 2020 available at URL: <https://www.iata.org/en/pressroom/pr/2020-06-03-01/>). In some regions the only commercial flights that were operating were repatriation flights and cargo flights. This rapid and marked downturn in air traffic had, in some Members/States, immediate or near-term impacts on aeronautical meteorological service provision and, where applied, its cost recovery. Since March/April 2020, as the peak of the first outbreak of the pandemic passed and as lockdown restrictions were eased or lifted in some countries, international civil aviation resumed, albeit to levels still well-below the same period in 2019. However, further 'waves' (outbreaks) are now challenging that recovery in some countries and regions.

2.4.4 Around March/April 2020, WMO became aware of anecdotal reports plus direct feedback from some Members that they would benefit from WMO's expertise and advice on how their aeronautical meteorological service providers (AMSPs) should reactively or proactively respond during the COVID-19 pandemic. Accordingly, WMO prepared a set of preliminary guidelines for AMSPs that were already impacted or that may become impacted by COVID-19. The preliminary guidelines were first published online on 10 April 2020 and were updated several times thereafter taking into account new information. The preliminary guidelines address, *inter alia*, 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. The preliminary guidelines are published online (English only) at URL: <https://www.wmo.int/aviation/covid-19>

2.4.5 It is worthwhile to note that these preliminary guidelines are *not* intended to be exhaustive and they are *not* intended to supersede or otherwise replace guidelines or other instruction from the competent authorities in the Member/State concerned.

2.4.6 WMO is continuing to monitor the impacts of COVID-19 on its Members and their service providers and is working collaboratively with other UN and non-UN partners to help the COVID-19 response. Additional information on the WMO community in action is available at URL: <https://public.wmo.int/en/resources/coronavirus-covid-19>

2.5 Other relevance developments/initiatives

Aviation Research and Development Project

2.5.1 At time of writing (13 October 2020), WMO is in the process of reviewing its Aviation Research and Development Project (AvRDP). This review is a recognition of the progress of the project over recent years to demonstrate 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, in order to determine how the project should evolve, particularly given the impacts of WMO Governance Reform.

2.5.2 A proposal for the next phase of AvRDP is still under development prior to consideration by the (new) WMO Research Board or one of its subsidiary bodies. The next phase of the project may potentially cover observing and/or forecasting advances in respect of significant convection, convection-induced turbulence, ice crystal icing and airframe icing amongst others.

Survey on the impacts of climate change and variability on aviation

2.5.3 Earlier this year WMO conducted a survey with aviation professionals around the world to gauge their understanding and awareness of the impacts of climate change and variability on aviation. More than 70 replies were received from a range of aviation professionals, including airline operators, air traffic service personnel and pilots.

2.5.4 At time of writing (13 October 2020), WMO has completed its analysis of the responses to the survey. The final report on the survey will be published by WMO in late-2020 or early-2021 as part of the ‘Aeronautical Meteorology Series’ of publications and accessible via the new WMO Services for Aviation website (see 2.7 below).

Long-term plan for aeronautical meteorology

2.5.5 In 2019, following endorsement by Cg-18, WMO published its inaugural long-term plan for aeronautical meteorology – available (English only) via URL: <https://www.wmo.int/aviation/services/long-term-plan>. The long-term plan provides a framework upon which aeronautical meteorological service providers of Members/States in particular, and the broader meteorology and aviation communities in general, can plan a progressive transformation from a conventional “product-centric” approach to a modern “information-centric” approach to service provision for aviation through to 2030 and beyond.

2.5.6 Over the coming months, through its Standing Committee on Services for Aviation (SC-AVI referenced at 2.1.2 above), WMO will commence the preparation of an update to the long-term

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plan. In view of ex-officio membership of SC-AVI, ICAO will be a key contributor to WMO's update of the long-term plan.

2.5.7 In light of the impacts of the COVID-19 pandemic on the aviation and meteorology sectors, including associated adjustments to service requirements, human and financial resources and suchlike, it is conceivable that the next edition of the long-term plan may consider these impacts and other risk factors more extensively as they relate to the foreseen future provision of aeronautical meteorological services. The next edition of the long-term plan is expected to be published by WMO in the 2023 timeframe.

Biannual newsletters

2.5.8 WMO issues 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 WMO Services for Aviation Newsletter (Issue No. 1/2020) was published in May 2020 and is available at URL: <https://mailchi.mp/bcd2031b9b1d/wmo-avi-newsletter-issue-1-2020>. 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

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

- 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. 485, *Manual on the Global Data-processing and Forecasting System* (https://library.wmo.int/index.php?lvl=notice_display&id=12793)
- WMO-No. 1060, *Manual on the WMO Information System* (https://library.wmo.int/index.php?lvl=notice_display&id=9254)
- WMO-No. 1061, *Guide to the WMO Information System* (https://library.wmo.int/index.php?lvl=notice_display&id=6856)
- WMO-No. 1160, *Manual on the WMO Integrated Global Observing System* (https://library.wmo.int/index.php?lvl=notice_display&id=19223)
- WMO-No. 1165, *Guide to the WMO Integrated Global Observing System* (https://library.wmo.int/index.php?lvl=notice_display&id=20026)
- WMO-No. 1209, *Compendium of WMO Competency Frameworks* (https://library.wmo.int/doc_num.php?explnum_id=10075)

- WMO-No. 1239, *Guidelines on Emerging Data Issues*
(https://library.wmo.int/index.php?lvl=notice_display&id=21644)

2.5.10 These and many other WMO publications are available via the WMO e-Library (<https://library.wmo.int/>).

2.5.11 Note, a 2020 update to WMO *Technical Regulations* (WMO-No. 49), Volume II, *Meteorological Service for International Air Navigation* to align with Amendment 79 to ICAO Annex 3 is expected to be published in October or November 2020, following endorsement by the 72nd Session of the WMO Executive Council in September 2020. The update to WMO-No. 49, Volume II will be published in all official languages and accessible via the WMO e- Library (<https://library.wmo.int/>).

2.5.12 It is worthwhile to note that given the exceptional Amendment 80 to ICAO Annex 3 with applicability on 4 November 2021, as announced by ICAO through the issuance of State letter AN 10/1.1, AN 11/1.3.33, AN 11/6.3.32, AN 3/5.13, AN 4/1.2.29, AN 2/2.7, AN 13/2.1, AN 4/27 and AN 2/33-20/73 on 30 July 2020, WMO may undertake an exceptional 2021 update to WMO-No. 49, Volume II to align with the 2021 edition of ICAO Annex 3. It may be expected that a 2021 update to WMO-No. 49, Volume II could be the last ever update owing to a recommendation of the CAEM-16 Session in 2018 and a resolution of the Cg-18 Session in 2019 to seek the discontinuation of WMO-No. 49, Volume II owing, essentially, to its duplication of ICAO Annex 3. WMO is holding discussions with ICAO at present to explore options that would enable WMO Members and their aeronautical meteorological service providers necessary and appropriate access to ICAO Annex 3 as a minimum. These discussions remain ongoing.

2.6 *Upcoming WMO meetings/events*

2.6.1 The COVID-19 pandemic has, inevitably, had an impact on planned meetings/events of WMO. Many meetings/events that were due to be held physically (i.e. with in-person attendance) have been cancelled or postponed or have reverted to virtual presence (i.e. video/teleconference). The following provides an indication of upcoming global WMO meetings/events of relevance, together with weblinks where available. The information provided here is subject to change.

- WMO Infrastructure Commission (INFCOM) Session, 9 to 13 November 2020,
<https://meetings.wmo.int/infcom-1/>
- WMO Data Conference, 16 to 19 November 2020,
<https://public.wmo.int/en/events/WMO-Data-Conference>
- WMO Services Commission (SERCOM) Session, week commencing 22 February 2021
- WMO Executive Council, 73rd Session, week commencing 19 April 2021
- Extraordinary Session of the World Meteorological Congress, 31 May to 4 June 2021
- WMO Executive Council, 74th Session, 7 to 9 June 2021

2.7 Available WMO resources and further information

2.7.1 In light of WMO Governance Reform, including the establishment of a new Services for Aviation Division and a new Standing Committee on Services for Aviation (2.1 above refers), WMO has taken the opportunity to significantly enhance its web presence. Major improvements have been made to WMO’s public website and to its Extranet. In respect of Services for Aviation, a new Extranet (public-access) website has been created at URL: <https://www.wmo.int/aviation/>

2.7.2 This new 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.

2.7.3 Note, WMO’s legacy Aeronautical Meteorology Programme (AeMP) website at URL <https://www.wmo.int/aemp/> is no longer maintained and will be decommissioned. Readers are therefore strongly encouraged to bookmark the new website: <https://www.wmo.int/aviation/>



3. ACTION BY THE MEETING

3.4 Note the information contained in this paper.
