



Montréal, 7 to 18 July 2014

CORRIGENDUM

General Portion

1. Page ii-1, title of recommendation 2/5, after “WAFS”, *insert* “in support of ASBU Blocks 1 and 2”.
2. *Replace* pages iii-1, iii-2, iii-3, iii-iv, vi-1 and vi-2 with the attached pages.

Agenda Item 1

3. Page 1.3-1, paragraph 1.3.2, first line, between “three” and “MET-specific”, *insert* “extant” .
4. Page 1.4-1, paragraph 1.4.1, first line, after “ICAO Assembly”, *insert* “in 2013”.
5. Page 1.4-1, paragraph 1.4.1, fifth line, after “specifications.”, *insert* an asterisk (*) and at the bottom of the page *add* the following footnote:

*Resolution A38-11 superseded Appendices A, D and E of Resolution A37-15 of the 37th Session of the ICAO Assembly in 2010.

6. Appendix, page 1.A-1, table, row titled “Optimum capacity and flexible flights — through global collaborative ATM”, *delete* row titled “B3-FRTO Traffic Complexity Management”.

Agenda Item 2

7. Page 2.2-1, paragraph 2.2.1, third line, *replace* “and” with “as well as”.
8. Page 2.2-1, paragraph 2.2.2, ninth line, *replace* “that is” with “that was”.
9. Page 2.2-1, Recommendation 2/4, sub-paragraph a), after “Annex 3 — *Meteorological Service for International Air Navigation*”, *insert* “/Technical Regulations [C.3.1]”.
10. Page 2.2-3, title of recommendation 2/5, after “WAFS”, *insert* “in support of ASBU Blocks 1 and 2”.
11. Page 2.2-4, paragraph 2.2.9, second line, after “Annex 3”, *insert* “/Technical Regulations [C.3.1]”.

12. Page 2.6-1, *delete* the dashes at the bottom of the page.
13. *Insert* the attached page 2.7-1 after page 2.6-1.
14. Appendix A, title, after “BLOCK 0”, *insert* “(2013 TO 2018)”.
15. Appendix B, title, *replace* “BLOCKS 1 AND 2” with “BLOCK 1 (2018 TO 2023) AND BLOCK 2 (2023 TO 2028)”.
16. Appendix F, title, after “BLOCK 3” *insert* “(2028 AND BEYOND)”.

Agenda Item 3

17. Page 3.1-1, paragraph 3.1.3, fifth line, after “Annex 3 — *Meteorological Service for International Air Navigation*”, *insert* “/Technical Regulations [C.3.1]”.
18. Page 3.2-1, paragraph 3.2.2, second line, *replace* “environment is” with “environment was”.
19. Page 3.2-2, paragraph 3.2.4, fourth line, *replace* “developments are” with “developments were”.
20. Appendix A, pages 3.A-1 and 3.A-2, under the heading “1. TRANSITION”, in sub-titles 1), 2), 3) and 4) after “Annex 3” *insert* “/Technical Regulations [C.3.1]”.

Agenda Item 4

21. Page 4.2.1, paragraph 4.2.4, sixth line, *replace* “recommends” with “recommended” and eighth line *replace* “requires” with “required”.
22. Page 4.2-2, paragraph 4.2.5, second line, *replace* “provisions do” with “provisions did”.
23. Page 4.2.4, at the end of paragraph 4.2.13, *replace* the comma (,) with a period (.)
24. Page 4.2-5, paragraph 4.2.15, third line, *replace* “this is” with “this was”, seventh line *replace* “languages does” with “languages did”, and eighth line *replace* “requirements are” with “requirements were”.
25. Page 4.2-5, paragraph 4.2.16, ninth line, between “that” and “since”, *insert* a comma (,) and tenth line between “methods” and “any”, *insert* a comma (,).

Agenda Item 5

26. Cover page to the amendments titled *Notes on the Presentation of the Proposed Amendments*, under Source, *replace* “Meteorological Divisional Meeting (2014)” with “Meteorology Divisional Meeting (2014)”.

HISTORY OF THE MEETING

1. DURATION

1.1 The Meteorology Divisional Meeting (2014) (MET/14) was opened by the First Vice President of the Council, Mr. V. M. Aguado, at 1000 hours on 9 July 2014 in the Assembly Hall of the Headquarters of the International Civil Aviation Organization (ICAO) in Montreal. At the first Plenary, the meeting was also addressed by the President of the World Meteorological Organization (WMO), Mr. D. Grimes, the President of the Air Navigation Commission, Mr. F. Zizi, and the President of the WMO Commission for Aeronautical Meteorology, Mr. C-M. Shun. The meeting was held in part conjointly with the Fifteenth Session of the Commission for Aeronautical Meteorology (CAeM-15) of the WMO. The closing Plenary was held on 18 July 2014.

2. REPRESENTATION

2.1 The MET/14 meeting was attended by 308 participants from 95 States and 7 international organizations. A link to the list of participants is on page iv-1.

3. OFFICERS

3.1 The following officers were elected at the first Plenary meeting to serve both the Plenary and the MET Committee:

Chairman:	Mr. P. Lechner
First Vice-Chairman:	Mr. W. Maynard
Second Vice-Chairman:	Mr. D. Egere

4. SECRETARIAT

4.1 The Secretary of the meeting was Mr. G. Brock, Chief, Meteorology Section, ICAO assisted by Mr. D. Ivanov, Chief, Aeronautical Meteorology Division, WMO. Mr. Brock and Mr. Ivanov were assisted by:

<u>Agenda Item</u>	<u>Item Secretary</u>	<u>Assisted by</u>
1	Mr. N. Halsey	Mr. P. Dunda and Mr. J. Armoa
2	Mr. R. Romero	Mr. N. Halsey and Mr. G. Vega
3	Mr. N. Halsey	Mr. R. Romero
4	Mr. R. Romero	Mr. N. Halsey and Mr. A. B. Okossi
5	Mr. R. Romero	Mr. V. Ahago and Mr. N. Halsey

4.2 General administrative arrangements for the meeting were made under the direction of Dr. F. Lui, Director, Bureau of Administration and Services. Language services were provided under the direction of Mr. L. Cherif, Deputy Director, Languages and Publications, assisted by Mr. V. Samochkine, Chief, Interpretation Section, Mr. A. El Sehemawi (Chief, Arabic Translation Section), Mr. W. Wen (Chief, Chinese Translation Section), Mr. A. Detchou (Chief, French Translation Section), Ms. J. Antony (Chief, Russian Translation Section) and Ms. A. De Cuadra-Lindstrom (Chief, Spanish Translation Section).

4.3 The physical arrangements for the meeting were made by Mr. M. Romero, Chief, Conference, Security and General Services Section, Mr. S. Dehinde, Chief, Information and Communication Technology Section, and Ms. D. Rahmani, Supervisor, Document Management and Outsourcing Section. Other specialist officers of the ICAO Secretariat provided advice to the meeting as required.

5. **ADOPTION OF THE AGENDA**

5.1 The agenda developed by the Air Navigation Commission and submitted to States in advance of the meeting was adopted without change at the first Plenary meeting.

6. **WORKING ARRANGEMENTS**

6.1 The organization plan developed by the Air Navigation Commission and submitted to States in advance of the meeting was approved without change at the first Plenary meeting.

6.2 A coordinating group was established in accordance with the *Directives to Divisional-type Air Navigation Meetings and Rules of Procedure for their Conduct* (Doc 8143), and met as necessary during the course of the meeting. The coordinating group comprised the Chairman and Vice-Chairmen of the meeting (Plenary Committee and subordinate MET Committee), the Secretary of the meeting and representatives of the various Secretariat services catering to the meeting. The coordinating group was able to coordinate the activities of the meeting using the services and accommodations available.

7. **OPENING REMARKS**

7.1 **First Vice President of the Council of ICAO, Mr. Victor Manuel Aguado**

On behalf of the Council of the International Civil Aviation Organization and its President, Dr. O. Benard Aliu, I have the privilege to welcome you to Montreal and to ICAO headquarters, and the honour to declare the 2014 Meteorology Divisional Meeting open. This meeting is being held conjointly with the 15th Session of the World Meteorological Organization Commission for Aeronautical Meteorology. You will be aware that WMO is a sister United Nations organization with whom ICAO has had formal working arrangements since 1953 and you may recall that the last MET Divisional Meeting in 2002 was also held in Montreal conjointly with the 12th Session of this WMO technical commission. I wish to extend a warm welcome to all of you.

I would like to extend a special welcome to Mr. David Grimes, President of the World Meteorological Organization. Mr. Grimes has been Canada's Permanent Representative with WMO since December 2006 and was elected to serve as the organization's President in 2011 for a four-year term. I also extend a special welcome to Mr. Chi-Ming Shun, President of the WMO Commission for Aeronautical Meteorology and Mr. Farid Zizi, President of the Air Navigation Commission of ICAO. It is a pleasure to have the presence of Mr. Grimes, Mr. Chi-Ming Shun and Mr. Zizi during this opening session.

It goes without saying that the work to be undertaken during this meeting will have implications for both ICAO and WMO. With the customary assistance and cooperation of WMO, we believe that the output of the meeting will be responsive to the evolving requirements for aeronautical MET services and therefore of utmost importance for the future of international air transport.

As you may imagine, since the last MET Divisional Meeting in 2002 the world has changed, and consequently, international civil aviation has changed even more. In spite of some local and regional economic ups and downs, aviation has been growing globally at an annual rate close to 5%. Since 2002, passenger and cargo traffic has doubled reaching in 2013 the level of 3.1 billion passengers/year carried by 37 million flights, with an overall economic impact of more than US \$ 2.4 trillion. And most probably by the time we meet again at the next MET Divisional Meeting, the volume of the industry would have doubled once more. In the meantime, the technology that is available at our finger tips today would have not been dreamt of only a few years ago.

This broad perspective leads us to the fundamental challenge we collectively will be facing, that is how to enable the sustainable growth of aviation. To face that challenge we need to address with vigour the efforts to enhance the safety and efficiency of air navigation while reducing the impact of aviation in the environment, and that is why aeronautical meteorology becomes critical in those three strategic objectives.

This meeting comes at a very important, very relevant time when our Member States are embarking on the implementation of sector-wide air transport improvements over the period to 2028 and beyond, as detailed in the fourth edition of ICAO's Global Air Navigation Plan. The fourth edition of the Plan, which was approved by the Council and endorsed by the 38th Session of the ICAO Assembly in October 2013, explores the need for more integrated civil aviation planning at a global, regional and State level. It also identifies solutions by introducing a novel aviation system block upgrades methodology. This methodology is based on defining quantum leaps in operational performance, making sure of the convergence of procedures and standards with technological development, all together delivering cost effective operational gains.

The GANP and other complementary ICAO publications such as the Global Aviation Safety Plan are intended to set the roadmap and assist Member States in the realization of a "One Sky" concept for international air navigation. This is a concept that, while fully embracing the formal responsibilities of the State, understands and addresses the international flows of traffic well beyond national frontiers.

During the course of this meeting you will therefore elaborate on technical issues of direct relevance to the modernization strategy put forward in the GANP, including the enhancement of existing MET services and the development of new services that will be required. And, you will also address a number of institutional issues that are either already present or that are likely to emerge as MET service provision adapts to the evolving needs of the aviation user community and as the underlying science and technology advance. So, issues concerning the working arrangements between ICAO and WMO, the cost recovery and the oversight of MET services, and the competence of personnel engaged in the provision of MET services, all of which are considered to be fundamental cornerstones, will be addressed amongst others.

In all, this meeting comes at a fitting moment to address the short-, medium- and long-term enhancements to MET service provision that are needed to ensure safer and more efficient international civil aviation for the next 15 years and beyond.

The President of the Air Navigation Commission, Mr. Farid Zizi, will provide a more detailed explanation of your agenda shortly.

With forty-eight working papers to be addressed, your programme over the coming days is extensive and interesting. The Council of ICAO recognizes the great importance of your work for the enhanced safety and efficiency of international civil aviation. Rest assured therefore that the Air Navigation Commission and then the Council will review the recommendations arising from the meeting with keen interest. Now, it only remains for me to wish you a successful meeting and, last but not least, a very pleasant stay in Montreal.

7.2 President of WMO, Mr. David Grimes

Mr. Victor Aguado, First Vice-President of ICAO Council, Mr. Farid Zizi, President of the Air Navigation Commission, Dr. Xu Tang, Director Weather and Disaster Risk Reduction Service Department and representative of the WMO Secretary General, Dr. C.M. Shun, President of the WMO Commission for Aeronautical Meteorology, distinguished experts and guests.

It is a great pleasure for me to welcome you all, on behalf of the World Meteorological Organization, to the Meteorology Divisional Meeting (2014), organized and held conjointly between the International Civil Aviation Organization and the WMO. I would like to express my thanks to our colleagues from ICAO for hosting this meeting on their premises and for the excellent working arrangements.

Mr. Aguado already outlined the link of the Divisional Meeting with the most important developments in air transport such as the implementation of the Global Air Navigation Plan through the Aviation System Block Upgrades methodology. I would highlight also that the integration of the aeronautical meteorological information in the System-Wide Information Management (SWIM) is regarded as a key enabler.

The provision of services to aviation has been a significant driver for global meteorology stimulated by the rapid growth of civil aviation since the 1950's. The cooperation established at the early stages between WMO and ICAO helped develop a sound international regulatory framework designed to contribute to the safety of international air navigation as set out in Annex III to the ICAO Convention and WMO Technical Regulations, Volume II. The regulatory framework as defined in these two documents serves as a model in the development technical regulations for other service domains.

A week ago, we concluded the 66th session of the WMO Executive Council and I am happy to inform you that aviation meteorology not only remains one of our priorities but the level of engagement of the Council in the issues being discussed here at the MET Divisional meeting was both deep and informed. One of our conclusions was to reinforce aviation meteorology, particularly the implementation of Quality Management Systems, professional competencies and improvement in service delivery remain a priority for the Organization as reflected in our draft Strategic Plan of WMO for the period 2016–2019. This strategic plan will to be concluded next year when all 191 Member States and Territories come together for the Seventeenth World Meteorological Congress. The decisions and recommendations of this Conjoint meeting will be fully integrated into our planning process.

This being said, we recognize that the current challenges related to ensuring compliance with the ICAO and WMO requirements on quality and competency require continued focused attention and concerted action. Whereas WMO has invested significant effort through the CAeM, our Education and Training programme and enabled investments from donors, there remains much work to accomplish. I assure you the Organization remains focused on the quality of services rendered by NMSs and the competency its personnel that underpin safe operations.

An important part of this conjoint Meeting is the examination of the requirements for the provision of space weather information for ionospheric disturbances. The international meteorological community has worked hard during the last decade to mature operational space weather services. By monitoring and predicting the impact of solar flares, solar radiation and geomagnetic storms on a wide range of temporal and spatial scales. We will enable informed decisions on potential disturbances or outages of the communication and navigation systems. This is essential to mitigate the safety risks and I might add that this is particularly important for operations over Polar Regions.

Advisories and warnings for volcanic ash, tropical cyclones and radioactive releases in the atmosphere are other examples of specialized services provided by regional centres around the world. Recent events illustrate the disruptive nature of these hazards to the global air navigation system. ICAO and WMO are proud of the

GLOSSARY OF TERMS

AMHS	ATS message handling system
AFS	aeronautical fixed service
AMOFSG	Aerodrome Meteorological Observation and Forecast Study Group
AN-Conf/12	Twelfth Air Navigation Conference
ANSEP	Air Navigation Services Economics Panel
ANSP	air navigation service provider
ASBU	aviation system block upgrade
ATC	air traffic control
ATM	air traffic management
ATMRPP	Air Traffic Management Requirements and Performance Panel
ATS	air traffic services
BIP-M	Basic Instruction Package – Meteorology [WMO]
BUFR	binary universal form for the representation of meteorological data
CDM	collaborative decision making
CTA	controlled time of arrival
EDR	eddy dissipation rate
ET-M&M	Expert Team on Meteorological Services to ATM and Meteorological Information
GANP	<i>Global Air Navigation Plan (Doc 9750)</i>
GASP	<i>Global Aviation Safety Plan (Doc 10004)</i>
IAVW	International airways volcano watch
IAVWOPSG	International Airways Volcano Watch Operations Group
ICTSW	Inter-programme Coordination Team on Space Weather [WMO]
IROG	inter-regional OPMET gateways
ISO	International Organization for Standardization
IVATF	International Volcanic Ash Task Force
IUGG	International Union of Geophysics and Geodesy
IWXXM	ICAO meteorological information exchange model
MARIE-PT	Meteorological Aeronautical Requirements and Information Exchange Project Team
MET	meteorological or meteorology
METWSG	Meteorological Warnings Study Group
MET/02	Meteorology Divisional Meeting (2002)

MWO	meteorological watch office
PANS	Procedures for Air Navigation Services
PIRGs	planning and implementation regional groups
RHWAC	regional hazardous weather advisory centre
SADISOPSG	Satellite Distribution System Operations Group
SARPs	Standards and Recommended Practices
SADIS	satellite distribution system for information relating to air navigation
SIGWX	significant weather
SWIM	system-wide information management
TBO	trajectory-based operations
TMA	terminal control area
VAAC	volcanic ash advisory centre
VASAG	volcanic ash scientific advisory group
W AFC	world area forecast centre
WAFS	world area forecast system
WAFSOPSG	World Area Forecast System Operations Group
WIFS	WAFS Internet file service
XML/GML	extensible markup language/geography markup language

2.7 **Statement by the Delegations of China and the Russian Federation**

Global space weather centres

2.7.1 We both generally support the inclusion of space weather services under Annex 3 to support and satisfy the requirements of the international aviation, and to provide users with the accurate and effective space weather products and service which will increase the sustainability of the global system. However, we have some difficulty with the proposed framework of two global centres with mutual backup and augmented by regional centres. A three or more global centre framework with mutual backup will have more advantages considering geographical coverage of space-based observations augmented by ground-based observations and specific characteristics for data assimilation, model simulation and validation than that for the two global centre framework proposed by some States, and will have a higher chance of meeting the aviation user requirements for space weather.

2.7.2 We suggest that the standards and technical specifications of space weather products and service to international aviation should be developed and approved, and the selection criteria for global space weather centres should be defined.

2.7.3 We also suggest that the number of global space weather centres with mutual backup and augmented by regional centres to ensure smooth coordination between the global and regional levels should be quantified.
