

**WORLD METEOROLOGICAL ORGANIZATION**

**COMMISSION FOR AERONAUTICAL METEOROLOGY**

**2<sup>nd</sup> Joint Meeting of ET-ASC and ET-ISA**

**Geneva, Switzerland**

**22-24 May 2017**

**FINAL REPORT**



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## PICTURE



*Clockwise from bottom-left:* Stéphanie Desbios, Herbert Puempel, Matt Strahan, Jan Sondij, Cory Davis, Dimitar Ivanov, Greg Brock, Michael Berechree, Jun Ryuzaki, Ping-Wah Li, Anna Ivanov, Cecilia Miner

*Not pictured (remote participation):* Björn-Rüdiger Beckmann, Pak-Wai Chan, Bart Nicolai

## **1. ORGANIZATION OF THE MEETING**

1.1 The second joint meeting between the Expert Team on Aviation, Science and Climate and the Expert Team on Information and Services for Aviation (ET-ASC/ET-ISA/2) of the WMO Commission for Aeronautical Meteorology (CAeM) took place at WMO headquarters, Geneva, Switzerland from 22 to 24 May 2017. The meeting was opened by Mr Dimitar Ivanov, Chief, Aeronautical Meteorology (AEM) Division of WMO. Mr Ivanov extended a warm welcome to all participants to Geneva on behalf of the WMO Secretary-General, Professor Petteri Taalas, and the President of the CAeM, Mr Chi-Ming Shun. Mr Ivanov emphasized that it was important that the expert teams focus on what will be delivered by the end of the current four-year financial period (2016-2019) and that, with the sixteenth session of the CAeM taking place in mid-2018, it was essential that the expert teams determine who will be doing what and by when through their review and update of their respective work plans. Mr Ivanov was assisted by Mr Greg Brock, Scientific Officer, AEM Division.

1.2 The meeting was chaired by the co-chairs of ET-ASC (Dr Herbert Puempel and Mr Matt Strahan) and the co-chairs of ET-ISA (Ms Stéphanie Desbios and Mr Jun Ryuzaki). Ms Desbios, during her introduction on behalf of ET-ISA, highlighted that two years had elapsed since the last face-to-face meeting of the expert teams (ET-ASC/ET-ISA/1 held 30 March to 1 April 2015, Toulouse, France) and that good progress had been made during the intersessional period for which reports would be provided at the meeting. Dr Puempel, during his introduction on behalf of ET-ASC, highlighted that scientific developments were advancing rapidly and that aviation's interest in the climate change issue was growing.

1.3 The meeting adopted the agenda as shown in Annex 1 to this report. The meeting was predominantly conducted in joint sessions of the expert teams as a whole, however separate sessions were held for the update of the expert team work plans (Agenda Item 8).

1.4 The meeting was attended in-person by five core members of ET-ASC and four core members of ET-ISA. One ET-ASC invited expert (Mr Beckmann) and two ET-ISA core members (Mr Chan and Mr Nicolai) joined the meeting periodically via videoconference.

1.5 In addition, the meeting was attended by a WMO seconded expert (Mr Jan Sondij) and a WMO intern (Mr Yi Wang). Additional WMO secretariat support was provided by Mr Stephen Foreman (Chief, WIS Data Representation, Metadata and Monitoring Division) for Agenda Item 6 and Ms Estelle de Coning (Scientific Officer, Atmospheric Research and Environment Branch) for Agenda Item 7.

1.6 The full list of participants is given in Annex 2 to this report.

## **2. REVIEW OF EXPERT TEAM WORK PLAN PROGRESS AND STATUS OF FOLLOW-UP TO ACTIONS FROM THE LAST MEETING**

### **2.1 ET-ASC work plan progress and action update**

2.1.1 The meeting noted that the expert team had supported the chairs in providing the required input to the ICAO Committee on Aviation Environmental Protection (CAEP) process by contributing to a fundamental White Paper submitted to the CAEP Steering Group in early 2016 and for a contribution to the CAEP Annual Report. The meeting noted that ET-ASC would be reviewing their scientific and personal networks with a view to encouraging the participation of first-rate experts at the forthcoming WMO Aeronautical Meteorology Scientific Conference (AeroMetSci-2017) to be held in Toulouse, France from 6 to 10 November 2017 (Agenda Item 7 refers).

2.1.2 The meeting further noted that ET-ASC had also greatly helped in providing valuable guidance and input for a keynote address given by one of its co-chairs to a WMO Aviation Research Demonstration Project (AvRDP) meeting in Hong Kong, China in July 2016. The interaction with this project was expected to ensure highly relevant expertise is available for

the scientific challenges faced by the CAeM going forwards in support of ICAO's Global Air Navigation Plan (GANP).

2.1.3 The meeting was informed that ET-ASC was planning to cooperate with other CAeM bodies, including ET-ISA, ET-GOV, ET-CCP and the Management Group, to ensure that the outcomes of AeroMetSci-2017, AvRDP and the cooperative developments with ICAO (e.g. CAEP as well as the GANP update process) were made available to Members with a view to support them in their role as proactive providers of meteorological services to aviation.

2.1.4 In respect of the actions arising from ET-ASC/ET-ISA/1, the meeting recalled that nine actions had been assigned to ET-ASC. The meeting undertook a review of the status of the follow-up of the ET-ASC actions, as provided in Annex 3 to this report.

## **2.2 ET-ISA work plan progress and action update**

2.2.1 The meeting was apprised that since ET-ASC/ET-ISA/1, the expert team had mainly focussed on its contribution to the ICAO Meteorology Panel working groups (METP WGs), especially those for the development of concept of operations, roadmaps and implementation guidance on the MET components of the GANP aviation system block upgrades (ASBU) methodology as well as on the transition to system wide information management (SWIM) and implementation of the ICAO meteorological information exchange model (IWXXM).

2.2.2 The meeting noted that some ET-ISA experts, as advisors in the METP WGs and work streams, contributed to the improvement of the description of the B1-AMET ASBU module for terminal area aspects and that they would continue to provide input for the ASBU framework revision in preparation of the next major update of ICAO's GANP expected in 2019. The expertise from within ET-ISA was also currently required in the reviewing process undertaken by the METP WG-MRI (Meteorological Requirements and Integration) of functional and preliminary performance requirements for future MET information in support of the Global Air Traffic Management Operational Concept (GATMOC), as well as linked to specific modules of the GANP/ASBU performance improvement areas.

2.2.3 In addition, the meeting was informed that ET-ISA core members had also been involved in several WMO or ICAO groups on MET information exchange under SWIM (e.g. definition of the IWXXM, guidance for the implementation of exchange of OPMET data) and on SWIM itself (including standards and policies development). Furthermore, through a periodic CAeM Newsletter, the expert team had informed the CAeM community on the availability of first versions of guidance material for the implementation of IWXXM and exchange of OPMET data, and on the coordination with WMO CBS groups about the relationship between SWIM and the WIS.

2.2.4 In respect of the actions arising from the ET-ASC/ET-ISA/1 joint meeting, the meeting recalled that ten actions had been assigned to ET-ISA. The meeting undertook a review of the status of the follow-up of the ET-ISA actions, as provided in Annex 3 to this report.

2.2.5 The meeting held a brief discussion on performance metrics and validation in the context of the development of meteorological information and services for aviation. Given the variety of users within the 'ATM user community' – each with their own needs, modes of operation, flexibility and particular sensitivity to different weather scenarios – the meeting agreed that it would be worthwhile for ET-ASC and ET-ISA to jointly prepare a paper that considers performance metrics and validation issues in this context. **ACTION 2/1**

## **3. REVIEW OF THE METEOROLOGICAL COMPONENTS OF THE ICAO GANP AND ASBU METHODOLOGY**

3.1 The meeting appreciated that ICAO was continuing to maintain and update its GANP (ICAO Doc 9750) on a triennial basis and that the fifth edition of the GANP, published in 2016, retained the aviation system block upgrades (ASBU) methodology where aeronautical meteorology (MET) was a key enabler to the future globally interoperable, harmonized air

traffic management system. The meeting noted that, in general, the 2016 GANP represented a minor update (mainly a reorganization of the ASBU blocks into non-overlapping six-year time increments) while the next edition of the GANP (sixth edition, 2019) was expected to represent a more comprehensive update, including a restructuring of the ASBU modules into 'threads' (both operational threads and information threads).

3.2 The meeting was informed that an ASBU Panel Project Team (ASBU-PPT) had been established by ICAO in late 2016 to assist in the preparation of the GANP 2019 update. As a MET expert within the ASBU-PPT, Ms Desbios gave a brief overview of the work that was already underway and a demonstration of the ASBU B0-AMET and B1-AMET templates which were to be updated. The meeting agreed that ET-ASC and ET-ISA would provide assistance to Ms Desbios in the further development of the B0- and B1-AMET templates feeding into the ASBU-PPT/GANP update activities. **ACTION 2/2**

3.3 The meeting considered that the transition from the product-centric to information-centric approach in the context of MET support to global ATM may not yet be fully understood within the community (both from the perspective of the suppliers and the consumers). The meeting therefore agreed that it would be worthwhile for ET-ISA to develop some advice, in the form of a flyer or similar, that could be used to build common understanding of the envisaged changes in the service delivery related to this "paradigm change" including the differentiation between MET products and MET information. Such awareness material should be based on the Concept for the Integration of Meteorological information for Air Traffic Management, already endorsed by the ICAO ATMRPP. **ACTION 2/3**

3.4 The meeting acknowledged the important/intrinsic link between the strategy for air transport modernization set forth in the GANP, the existing and foreseen requirements for MET information and services and the associated underpinning science and research activities.

3.4.1 In the context of existing and foreseen information- and service-related requirements, including MET in future system-wide information management (SWIM), the meeting acknowledged the progress that had been made over the past decade or so, particularly through successive expert teams of the CAeM participating in gathering and analysing users' needs in order to develop innovative solutions that support operations, especially in the terminal area. Appreciating the users' appetite for seamless and consistent MET information in space and time, the meeting noted that there were efforts underway, through the development of the next edition of the GANP, to identify those key feature areas (including with respect to meteorology) that need to be improved in order to achieve a full implementation of the global ATM operational concept. This would require improved specificity of MET observational, nowcast and forecast information with high or very high temporal and spatial resolutions, increase use of probabilistic information that would allow users to account for the uncertainties of the MET information in new ATM operating methods, and a user-oriented translation into the impact of adverse weather on aviation operations. The meeting appreciated that the MET information would need to be organized and provided by solutions that support system-wide interoperability, secured seamless information access and full integration into decision support or aid systems; this need for more interoperability was directly linked to the transition to the SWIM environment.

3.4.2 With regard to existing and foreseen science and research requirements, the meeting considered aspects such as blending of nowcasting and high-resolution modelling as well as predictability, probability and seamless prediction. Blending automated nowcasting techniques with high-resolution model forecasts at very short intervals had shown some recent early promise but complex topography and distinctive boundaries between surface types would demand further efforts before the results of such techniques could be made available to the wider user community (unfiltered) through SWIM. With respect to seamless prediction, it was noted that there was progress but that challenges still remain in providing a 'seamless' service, not least due to the distinct methods and techniques applied, while recognizing that maintaining a consistent, coherent suite of information (through SWIM) was crucial.

3.4.3 Given the 'Big Data' scenario and the variety of users within the user community, each with their own specific use cases, the choice of the 'best' (i.e. most appropriate, most fit for purpose) source of information would be a vital element of the decision support systems. The massive increase of available information in a data-rich environment with increasingly short decision time horizons will require the integration of MET outputs/data into mostly automated decision-making processes while maintaining some form of a consistent, coherent human interpretation.

3.5 In connection with the foregoing, the meeting was apprised that the 68<sup>th</sup> Session of the WMO Executive Council (EC-68) in 2016 had called for the development of a long-term plan for the Aeronautical Meteorology Programme (LTP-AeMP) aligned with ICAO's GANP/ASBU methodology. Following a brief illustration of the methodology that is expected to be applied to the development of a LTP-AeMP in advance of EC-70 and CAeM-16 in 2018, the meeting agreed that ET-ASC and ET-ISA should assist in the maturation of the LTP-AeMP, including the development of suitable performance improvement areas and module/thread descriptions.

#### **ACTION 2/4**

### **4. UPDATE ON NATIONAL OR REGIONAL MET/ATM MODERNIZATION PROGRAMME DEVELOPMENTS**

4.1 Reports were provided on the MET-related developments of the following ATM modernization programmes: SESAR, NextGen, CARATS and CMATS.

4.1.1 The meeting was informed that, having completed a definition phase (2005-08), SESAR was presently in a development phase (2008-2024) with an overlapping deployment phase (2014-2025). It was highlighted that the MET component was just one of many projects in the SESAR deployment programme and that the MET elements that derive the most demonstrable benefit for the ATM network were being selected and are currently in the process of implementation. Building awareness amongst the ATM user community of the current and foreseen MET capabilities was highlighted as a key consideration for SESAR, helping to bridge the gap between expectation and capability, including through scientific and technological advancement.

4.1.2 The meeting noted that in the NextGen, the weather part was being primarily driven by the Federal Aviation Administration (FAA), with NOAA/National Weather Service (NWS) serving as one of many contributing bodies. It was indicated that NOAA/NWS was now referring to this programme support as 'Science Application and Integration'. The FAA's NextGen weather architecture was based upon two pillars: NWP (NextGen Weather Processor) and CSS-Wx (Common Support Services – Weather). It was highlighted that, at present, the major thrusts of the NextGen Weather effort included IT/web services, digital aviation services and enhanced digital services, Integrated Support for Impacted air Traffic Environments (INSITE), enhance observational capability (expand ceilometer range), TRACON approach and departure gate forecast, and near-real time verification of weather elements important to aviation (meet FAA quality management requirements).

4.1.3 In the context of CARATS (Collaborative Actions for Renovation of Air Traffic Systems, Japan), led by the Japanese Civil Aviation Bureau (JCAB), the meeting was informed that, following the development of a long-term vision and roadmap (2009-2011), CARATS had been in an implementation phase since 2011. It was highlighted that all measures of aviation weather within CARATS were identified as enablers. These enablers included improved weather observation capabilities, improved weather forecast capabilities, qualification of the impact of severe weather on capacity and other aircraft operations, and MET information sharing infrastructure.

4.1.4 The meeting was informed that CMATS (Civil-Military ATM System, Australia) had been initiated in 2015 as a successor to TAAATS. By 2021 CMATS was intended to deliver the most advanced integrated (civil-military) air traffic control system unified under 'one sky' for Australia. The implementation phase was expected to begin in 2018, providing new levels of operational and cost efficiency and improved safety through a shared situational awareness for

civil and military controllers, use of common data, new safety nets and alerts, and greater information security. From a MET perspective, it was highlighted that the Bureau of Meteorology was an embedded part of a CMATS centre in Canberra.

4.2 Having considered these reports, the meeting identified a need to ensure that the wider MET community was informed of such developments, with a view to raising awareness. In this regard, the meeting agreed that relevant, publically-accessible information on these programmes, and other such national or regional ATM modernization programmes identified, should be compiled by ET-ISA and made available on the WMO website and publicized via the CAeM Newsletter. **ACTION 2/5**

4.3 To supplement the foregoing, the meeting was provided an update on AvRDP which, through international collaboration, was demonstrating nowcasting and mesoscale modelling techniques at a selection of airports around the world (currently six airports in five countries) and the translation of MET conditions into ATM impacts. AvRDP had completed Phase I (MET capabilities research) and was now in Phase II (MET-ATM impact translation and validation) through to mid-2018. Consideration was currently being given to organizing an AvRDP training workshop in the 2017 or 2018 timeframe (funds permitting); further information on AvRDP was available at URL: <https://avrpd.hko.gov.hk>

## **5. CLIMATE CHANGE IMPACTS ON AVIATION**

5.1 The meeting was apprised of a current outlook with respect to climate change and variability impact on aviation stakeholders. The following key considerations were highlighted (see [Doc. 5](#)).

5.2 The meeting considered that some aviation stakeholders, e.g., airport operators, aircraft/equipment manufacturers and aviation authorities, often have very long-term planning horizons (several years to several decades or more) which are climate change sensitive. Any specific impacts on aviation infrastructure, accessibility, demand, etc. would therefore require localized studies specific to the users' area(s) of operation, i.e., a downscaling of the global outlooks.

5.3 The meeting noted that while some of the identified risks on aviation operations were *qualitatively* evident and would need to be addressed by a comprehensive risk management system, the relative importance of these risks for different regions, climate scenarios and aviation stakeholders would require a significant effort in joint research between aviation and climate scientists. It was noted that individual stakeholders (e.g. ICAO, operators, OEMs, ATM, airports) have already made efforts and achieved progress in addressing their priority issues.

5.4 The meeting affirmed that it would be important for WMO, as a global meteorological standardization and coordinating body, to encourage and enable multi-disciplinary efforts in research and best practice models in climate service provision, develop the necessary standards and risk management methodologies and ensure that environmentally driven issues are cross-linked into ICAO's GANP for consistency and resilience of the global aviation system. The meeting therefore appreciated the direct relevance of the foregoing with AeroMetSci-2017 (Agenda Item 7 refers).

## **6. COORDINATION NEEDS**

6.1 The meeting was informed of the ongoing coordination needs and activities across various ICAO and WMO technical bodies involved in the operation and development of aeronautical MET services as well as in aviation environmental protection. Such coordination includes, inter alia, the working groups of the ICAO Meteorology Panel (such as WG-MIE) and expert teams of WMO (such as TT-AvXML). It was appreciated that much coordination of the various work streams was taking place – both within and outside of WMO – and that the work should progress as efficiently and effectively as possible (given available resources) with duplication best avoided.



6.2 The meeting also appreciated the involvement of several of the ET-ASC and ET-ISA experts in the advancement of the discussion on future IWXXM schema, MET in SWIM and the interoperability between the WMO Information System and SWIM, as well as assistance of experts to a rolling review of (aeronautical meteorology) requirements in a WMO Integrated Global Observing System (WIGOS) context.

6.2.1 The meeting was briefed by Mr Stephen Foreman (Chief, WIS Data Representation, Metadata and Monitoring Division) on the development of a WIS 2.0 Strategy, advancement of the WMO governance structure for WIS, initiation of information management considerations for WIS, interoperability between WIS and SWIM, inclusion of IWXXM in the WMO Manual on Codes, the status of the latest IWXXM schema (version 2.1) and the development of the next iteration of the schema (version 3.0) to support Amendment 78 to ICAO Annex 3/WMO-No. 49, Technical Regulations, Volume II – *Meteorological Service for International Air Navigation*. The briefing was much appreciated by the ET-ASC and ET-ISA members and the meeting thanked Mr Foreman for his presence and for information provided.

6.2.2 The meeting acknowledged efforts currently being led by Dr Jitze van der Meulen (the Netherlands) to review and update a Statement of Guidance on behalf of CAeM for the CBS Inter-Programme Expert Team on Observing System Design and Evolution (IPET-OSDE) (available here: <http://www.wmo.int/pages/prog/www/OSY/SOG/SoG-Aero.pdf>). The meeting agreed that ET-ASC and ET-ISA core members should assist Dr van der Meulen in this regard and that the ET-ISA co-chairs should coordinate this task. **ACTION 2/6**

## 7. UPCOMING EVENTS

7.1 The meeting noted that the CAeM was directly involved in organizing several key WMO upcoming events in 2017 and 2018:

- the Aeronautical Meteorology Scientific Conference (AeroMetSci-2017) in Toulouse, France from 6 to 10 November 2017;
- the CAeM-16 session and a Technical Conference in (subject to confirmation) Exeter, United Kingdom from 23 to 27 July 2018;
- the African Conference on Aeronautical Meteorology (ACMA) in RA I (Africa) in late 2017 or early 2018 (the exact dates are being coordinated through the WMO Regional Office for Africa and Least Developed Countries (AFLDC)).

7.2 In respect of AeroMetSci-2017, the meeting was informed that the co-chairs of ET-ASC and ET-ISA were directly involved in the organizing of the conference (through an Organizing Committee) and that a number of materials has already been developed including a concept note, long list of session topics, provisional programme and [conference website](#). In connection with the list of session topics, the meeting worked in-session to assist the co-chairs of the Conference Scientific Committee (Dr Puempel and Mr Li) in improving the scope and structure of the list. It was noted that the formal WMO announcement and call for papers for AeroMetSci-2017 was expected shortly.

7.3 In respect of the CAeM-16/TECO, the meeting was apprised that the members of the CAeM Management Group were serving as members of the Organizing Committee and that preparations for the session and technical conference were at an early stage. The meeting took note of the fact that the ongoing WMO constituent bodies reform discussions would likely have a bearing on the working arrangements of the session and its agenda. The CAeM Management Group has been monitoring these developments to determine any potential impacts on the commission and its work caused by the planned reform. It was further noted that CAeM-16 will take place shortly after the 70<sup>th</sup> session of the Executive Council (June 2018) which is expected to endorse a mature proposal for the new structure of technical commissions, including their number and scope.

## **8. UPDATE OF EXPERT TEAM WORK PLANS**

Taking into account the foregoing discussions, ET-ASC and ET-ISA each developed an update to their respective work plans (see Annex 4). It was appreciated that both work plans were now based upon a series of defined activities/tasks with accountabilities, deliverables and deadlines.

## **9. ACTIONS ARISING FROM THE MEETING**

The meeting formulated an agreed actions list in respect of ET-ASC and ET-ISA as presented in Annex 5 to this report.

## **10. ANY OTHER BUSINESS**

10.1 Concerning expert representation in the activities of ICAO's CAEP, it was agreed that the WMO Secretariat should seek clarification from the ICAO Secretariat in respect of the latest working arrangements, including WMO's continuing membership. **ACTION 2/7**

10.2 Concerning core membership of the ET-ASC, it was agreed that Dr Puempel should seek clarification from Mr Matthew Hort on his continued ability to participate in the expert team activities. **ACTION 2/8** In the event of Mr Hort's inability to continue as a core member, the meeting noted that a new core member would need to be sought as soon as possible.

10.3 In respect of the convening of teleconferences (virtual meetings) of the expert teams to ensure appropriate coordination across the two expert teams and to help the progression of the work between face-to-face/joint meetings, Dr Puempel suggested that two types of virtual meeting could be convened: i) teleconferences involving only the co-chairs of ET-ASC and ET-ISA; and ii) teleconferences involving only the members of each respective expert team (i.e. one virtual meeting for ET-ASC members only and one for ET-ISA members only). There was a general agreement with this approach going forwards.

## **11. CLOSURE OF THE MEETING**

After the customary exchange of courtesies, the meeting closed at 15:30 hours on 24 May 2017.

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## AGENDA

### 1. ORGANIZATION OF THE MEETING

- 1.1 Opening of the meeting
- 1.2 Adoption of the agenda
- 1.3 Working arrangements

### 2. REVIEW OF EXPERT TEAM WORK PLAN PROGRESS AND STATUS OF FOLLOW-UP TO ACTIONS FROM THE LAST MEETING

- 2.1 ET-ASC work plan and action item status
- 2.2 ET-ISA work plan and action item status

### 3. REVIEW OF THE METEOROLOGICAL COMPONENTS OF THE ICAO GANP AND ASBU METHODOLOGY

- 3.1 Review of the fifth edition (2016) of the GANP and expectations for the sixth edition (2019)
- 3.2 Existing and foreseen information- and service-related requirements, including MET in future SWIM (ET-ISA focus)
- 3.3 Existing and foreseen science and research requirements (ET-ASC focus)

### 4. UPDATE ON NATIONAL OR REGIONAL MET/ATM MODERNIZATION PROGRAMME DEVELOPMENTS

- 4.1 SESAR, NextGen and CARATS
- 4.2 Other known/relevant developments

### 5. CLIMATE CHANGE IMPACTS ON AVIATION (ET-ASC focus)

- 5.1 Latest developments and future considerations
- 5.2 Contributions to ICAO CAEP and/or other bodies

### 6. COORDINATION NEEDS

- 6.1 Coordination with ICAO METP, its working groups and other relevant ICAO bodies (global and/or regional)
- 6.2 Coordination with other WMO expert teams/bodies
- 6.3 Other related coordination needs

### 7. UPCOMING EVENTS

- 7.1 WMO Aeronautical Meteorology Scientific Event (AeroMetSci-2017)
- 7.2 16<sup>th</sup> Session of WMO Commission for Aeronautical Meteorology (CAeM-16) and Technical Conference (TECO)
- 7.3 Other relevant upcoming events

### 8. UPDATE OF EXPERT TEAM WORK PLANS

- 8.1 ET-ASC work plan update
- 8.2 ET-ISA work plan update

### 9. ACTIONS ARISING FROM THE MEETING

### 10. ANY OTHER BUSINESS

### 11. CLOSURE OF THE MEETING

## LIST OF PARTICIPANTS

## 1. ET-ASC MEMBERS

COUNTRY	NAME	E-MAIL
AUSTRIA	PUEMPEL, Herbert ( <b>co-chair</b> )	<a href="mailto:hpuempel@gmail.com">hpuempel@gmail.com</a>
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## 2. ET-ISA MEMBERS

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## 3. INVITED EXPERTS

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## 5. OBSERVERS

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**STATUS OF FOLLOW-UP OF ACTIONS ARISING  
FROM ET-ASC/ET-ISA/1 (30/03-01/04/2015)**

ET-ASC						
Action Item	Action	Responsibility	Deliverables	Deadline	Status at 22 May 2017	Note
1/1	Ensure close coordination of ET-ASC activities with other relevant WMO bodies, such as VASAG and ICTSW	Chair, Dimitar	<ul style="list-style-type: none"> <li>propose ET-ASC experts participation in VASAG and ICTSW</li> </ul>	MG/1	<b>COMPLETED</b>	
1/2	Update the ET-ASC terms of reference	Chair, Dimitar	<ul style="list-style-type: none"> <li>Propose appropriate wording to clarify the scope of the expected work in the field of nowcasting and VSRF</li> </ul>	MG/1	<b>COMPLETED</b>	
1/3	Publication on State-of-the-art of nowcasting methodology that would also reflect the situation in different regions and needs for observations	Chair	<ul style="list-style-type: none"> <li>"Issue paper" on nowcasting for aviation</li> </ul>	Mid 2016	To be advised	Coordinate with AvRDP and WWRP
1/4	Contribute to WWRP workshop on nowcasting and VSRF in 2016	Peter	<ul style="list-style-type: none"> <li>Information to ET members on the plans for the WWRP workshop in order to plan appropriate contribution on aviation aspects</li> </ul>	June 2015	<b>COMPLETED</b>	
1/5	Prepare questions for the AMDAR community and verification community on the use of and the need of data for verification/validation	Herbert, Bob	<ul style="list-style-type: none"> <li>Questionnaire</li> <li>Use the AMDAR expert network for gathering more information</li> </ul>	Dec 2017	<b>ON-GOING</b>	
1/6	Prepare an information document on data needs for high-resolution models	Matt, Bob, Cory, PW	<ul style="list-style-type: none"> <li>Information document for ET members</li> </ul>	Dec 2017	<b>ON-GOING</b>	
1/7	Develop a "white paper" (scoping paper) on climate change impacts on infrastructure and design, demand, hazards, operations.	Chair	<ul style="list-style-type: none"> <li>Engagement of climate experts to support the task</li> <li>Draft white paper</li> <li>Submit to ICAO CAEP</li> </ul>	Dec 2015 ?	<b>COMPLETED</b>	Herbert to clarify with ICAO CAEP about status

ET-ASC						
Action Item	Action	Responsibility	Deliverables	Deadline	Status at 22 May 2017	Note
1/8	Review of aerodrome climatology requirements included in the WMO Technical Regulations, Volume II	Anna	<ul style="list-style-type: none"> <li>Initial review and report to ET Members on further action needed</li> <li>Draft amendment for consideration of CAeM-16</li> </ul>	30 Sep 2015  Mar 2018	<b>ON-GOING</b>	
1/9	"Issue paper" for future WAFS development	Matt, Cory	<ul style="list-style-type: none"> <li>"Issue paper"</li> </ul>	Dec 2017	<b>ON-GOING</b>	

ET-ISA						
Action Item	Action	Responsibility	Deliverables	Deadline	Status at 22 May 2017	Note
1/1	Organize 2 <sup>nd</sup> Teleconference.	Co-chairs, Michael	<ul style="list-style-type: none"> <li>review the draft report of the 1st meeting to be sent to the MG meeting</li> <li>debrief the outcomes of the ICAO METP 1st meeting (by Michael Dimitar and Jun)</li> <li>refine the tasks under the work plan to suit the Job Card developed by the METP</li> </ul>	April 28	<b>COMPLETED</b>	2 <sup>nd</sup> teleconference on May 4. 3 <sup>rd</sup> sub-action to be continued.
1/2	Update the ET-ISA work plan according to ET-ISA/1 discussion, and ICAO MET Panel's 1st meeting outcomes and WG job cards and work programs.	Co-chairs, Dimitar	<ul style="list-style-type: none"> <li>Map the ET-ISA tasks and milestones to the ICAO WG work program activities</li> <li>Develop such job cards for each team task or activity</li> </ul>	MG meeting, 12-14 May (first draft)	<b>COMPLETED</b>	To be continued gradually as WG work programs are developed.
1/3	Provide input to the METP meeting in regards of job card on ATM requirements	Dimitar	<ul style="list-style-type: none"> <li>suggest change the title of the job card as "ATM requirement for ATM operation"</li> <li>propose inclusion of the meteorological services for the terminal area in the job card</li> <li>propose inclusion of clear linkage with WMO ET-ISA in the job card</li> </ul>	METP	<b>COMPLETED</b>	

ET-ISA						
Action Item	Action	Responsibility	Deliverables	Deadline	Status at 22 May 2017	Note
1/4	Provide input to the Appendices A and B of the TBO concept document	Stéphanie, Bart, Jun	<ul style="list-style-type: none"> <li>consolidate views of members and provide revised version of the Appendices A &amp; B to Dennis Hart (two steps : one with comments on US feedback, one as a cleaned-up version)</li> <li>provide further comments on the TBO main document, if any</li> </ul>	10 April	COMPLETED	Complete on May 13
1/5	Adding example(s) of verification methodology to the TBO concept document	Stéphanie, Bart, Michael	<ul style="list-style-type: none"> <li>ask ET members to provide examples of verification methodology hopefully regarding "impact-based" analysis</li> <li>propose addition of the example(s) to the Appendix A &amp; B of the TBO document to Dennis Hart</li> </ul>	30 June	CANCELLED	No further information to be added to the TBO document was requested by the ICAO WG-MRI Rapporteur
1/6	Input to the METP meeting in regards of future availability of AMHS	Dimitar	<ul style="list-style-type: none"> <li>raise the issue at the METP, in regards of keen need to determine future availability of the AMHS for the digital data exchange of MET information.</li> </ul>	April 20	COMPLETED	
1/7	WP to the METP regarding issues with XML	Dimitar, TT-AvXML	<ul style="list-style-type: none"> <li>consolidate questions to be raised at the METP/1 meeting</li> <li>submit WP to the meeting</li> </ul>	April 20	COMPLETED	



ET-ISA						
Action Item	Action	Responsibility	Deliverables	Deadline	Status at 22 May 2017	Note
1/8	Information about Australian new ATM System "One Sky"	Michael	<ul style="list-style-type: none"> <li>Information paper for ET members</li> </ul>	Oct 2015	<b>COMPLETED</b>	First input provided by Michael in Dec 2016. Updated information provided in May 2017 at ET-ASC/ET-ISA/2
1/9	Update contents on the legacy ET's web-site	Dimitar	<ul style="list-style-type: none"> <li>ask Members to check the contents and update information on "Demonstration Project" on the previous ET's web-site</li> <li>upload updated on the current ET-ISA web-site with ID/Password setting</li> </ul>	30 Sep 2015	<b>ON-GOING</b>	
1/10	Use of Yammer as a sharing platform for ET-ISA members	Michael	<ul style="list-style-type: none"> <li>Study the feasibility and inform</li> </ul>	June 2015	<b>CANCELLED</b>	

## UPDATE OF EXPERT TEAM WORK PLANS

### ET-ASC Work Programme (updated 24 May 2017)

#### I. Terms of Reference (updated by CAeM-MG in May 2015)

- a. **To coordinate the response to science related requests in support of the development of new and evolving service delivery concepts and related observing and forecasting system requirements in collaboration with the relevant WMO bodies and programmes;**

**Translated into actions:**

- *Identify the need for focused research in the field of observational data and forecasting at different scales*
- *Advise on the evolution of systems (such as the WAFS) through the deployment of research and technology results*
- *Facilitate the exchange within the science and research community working in the field of aeronautical meteorology*

- b. **To coordinate the response to science related requests for advice to support the development of new and evolving aviation nowcasting and very short-range forecasting concepts in collaboration with the relevant WMO bodies and programmes;**

**Translated into actions:**

- *Support the Aviation Research Demonstration Project (AvRDP) on advanced nowcasting techniques for aerodromes and terminal areas*
- *Support research in translation of MET information into ATM impacts*

- c. **To provide expert representation to the ICAO CAEP and coordination of responses to science related requests for advice relating to the impacts of climate change and variability on aviation, including seasonal and inter-annual changes, in collaboration with GFCS and relevant WMO bodies and programmes; and to make WMO Members aware of emerging opportunities for related services;**

**Translated into actions:**

- *Ensure WMO representation at ICAO CAEP*
- *Raise awareness of the climate change impacts on aviation*
- *Review and amend as necessary climate-related parts of Technical regulations*

- d. **To develop and maintain a repository of relevant research activities in collaboration with the relevant organizations and bodies;**

**Translated into actions:**

- *Create a platform for information sharing among ET-ASC members*

- e. **To report regularly on progress to the president of CAeM**

**Translated into actions:**

- *Submit regular reports on progress*
- *Submit other relevant information to raise awareness of developments in the area of responsibility of the ET-ASC*

## II. Work Packages (WP), Tasks, Activities

WP A (TOR a)	Coordinate the response to science related requests in support of the development of new and evolving service delivery concepts and related observing and forecasting system requirements in collaboration with the relevant WMO bodies and programmes		Responsibility	Deliverable	Target date	Status
Task A1	<b>Prepare information on observational data requirements for high-resolution NWP models</b>					
	Activity A1.1	Study the need for the AMDAR and other aircraft-based observational data, including observations of humidity and turbulence	MS, CD	Study note	Dec 2017	
	Activity A1.2	Study the needs for other data fo use in data assimilation for high-resolution NWP and ensemble forecasting	MS, CD			
Task A2	<b>Advice on the future of WAFS and other forecasting systems for aviation</b>					
	Activity A2.1	Prepare an "Issue paper" for future WAFS development	MS	Issue paper	Dec 2017	
	Activity A2.2	Prepare Input to Guidance material (WMO-No.732) on WAFS	MS, All	Chapter for the Guide	Dec 2017	
	Activity A2.3	Prepare Input to Guidance material (WMO-No.732) on probabilistic forecasting	MS, All	Chapter for the Guide	Dec 2017	
Task A3	<b>Prepare WMO Scientific Conference - AMSC-2017 (with ET-ISA and others)</b>					
	Activity A3.1	Establish and chair the Scientific Committee of AMSC-2017	HP, PL		till Dec 2017	
	Activity A3.2	Prepare the scientific programme for the event; review and selection of abstracts	HP, PL	Sci Programme	Oct 2017	
	Activity A3.3	Assist in preparing the AMSC-2017 final deliverables: Conference Proceedings with recommendations	HP, PL	WMO Publication	Feb 2018	

WP B (TOR b)	Coordinate the response to science related requests for advice to support the development of new and evolving aviation nowcasting and very short-range forecasting concepts in collaboration with the relevant WMO bodies and programmes;		Responsibility	Deliverable	Target date	Status
Task B1	<b><i>Organize and coordinate AvRDP activities in coordination with CAS and WWRP</i></b>					
	Activity B1.1	Organize Phase 1: Nowcasting capabilities development	PL	Project implementation plan and activities	End June 2017	On-going
	Activity B1.2	Support the Nowcasting Symposium WSN-16 and training workshop	PL			
	Activity B1.3	Organize Phase 2: Translation of MET information n into ATM impacts	PL			

WP C (TOR c)	Provide expert representation to the ICAO CAEP and coordinate responses to science related requests for advice relating to the impacts of climate change and variability on aviation, including seasonal and inter-annual changes, in collaboration with GFCS and relevant WMO bodies and programmes; make WMO Members aware of emerging opportunities for related services		Responsibility	Deliverable	Target date	Status
Task C1	<b>Provide WMO representation at ICAO CAEP</b>					
	Activity C1.1	Participate in CAEP and provide inputs on behalf of WMO and CAeM (pending agreement by ICAO)	DI to coordinate with ICAO; HP		July 2017	
	Activity C1.2	Prepare a "white paper" to raise awareness of the issues	HP	White paper	??	<i>Completed</i>
Task C2	<b>Raise awareness of WMO Members</b>					
	Activity C2.1	Article for the WMO Bulletin on climate change impact on aviation	HP	Article	Nov 2016	<i>Completed (published in WMO Bulletin Vol 65(2), 2016)</i>
Task C3	<b>Review and amendment of climate-related provisions in WMO Technical Regulations (WMO-No.49), Vol II</b>					
	Activity C3.1	Review of aerodrome climatology requirements included in the WMO Technical Regulations, Volume II, Part III; prepare draft amendment proposal for consideration of CAeM-16	AI, DI, GB	Amendment proposal	Dec 2017; May 2018	
	Activity C3.2	Coordinate the climate-related provisions with CCI, ICAO and ACI	AI, DI, GB		1Q 2018	
	Activity C3.3	Collect national practices of climatological data processing for airports from ET-ASC members	AI, all ET members		Dec 2017	

WP D (TOR d)	Develop and maintain a repository of relevant research activities in collaboration with the relevant organizations and bodies		Responsibility	Deliverable	Target date	Status
	Task D1	<b><i>Collect and publish online relevant materials to the ToRs of ET-ASC (research in NWP, nowcasting, observations, climate change impact and climate data processing)</i></b>				
	Activity D1.1	Create collaborative way of sharing publications (Google docs or use the moodle website?)	CD, All	Sharing platform; materials posted	July 2017; then ongoing	

WP E (TOR e)	Reporting and outreach		Responsibility	Deliverable	Target date	Status
Task E1	<b>Submit regular reports on progress</b>					
	Activity E1.1	Yearly reporting	Co-chairs	Report	Each year	Report for MG Nov 2016
Task E2	<b>Prepare and disseminate other relevant information to raise awareness of CAeM community on developments in the area of responsibility of the ET-ASC</b>					
	Activity E2.1	Prepare relevant information to raise awareness of the CAeM Community on developments under the ET-ASC scope (reports, web pages, etc)	All	Y ?	As available	
	Activity E2.2	Communicate through the ET-CCP articles for the Newsletter	Co-chairs	Y	On a quarterly basis	

## UPDATE OF EXPERT TEAM WORK PLANS

### ET-ISA Work Programme (updated 24 May 2017)

#### I. Terms of Reference

- a. To work closely with ICAO and other partners in developing relevant background material, methodology and implementation guidance on the MET components of the Aviation System Block Upgrades (ASBU) based on identified user requirements;

**Translated into actions:**

- Support the development and finalization of CONOPS and roadmaps: 'Concept for the Integration of MET Information for ATM', RRM, SWx, WAFS, RHWAC
- Advise on current MET capabilities vis-à-vis requirements established by ICAO

- b. To contribute to the development of new or enhanced MET information and services in close collaboration with ICAO;

**Translated into actions:**

- Organize repository of development of new MET I&S under the large-scale projects (SESAR, NextGen, CARATS, etc.) and facilitate result sharing
- Assist in WMO projects and dissemination of results (e.g., AvRDP)

- c. To develop relevant performance metrics and validation methodologies for new or enhanced MET information and services;

**Translated into actions:**

- Develop a "white paper" on performance metrics and validation to build common understanding
- Collect examples of current performance metrics and verification/validation methods, containing evaluation of MET impact on ATM
- Develop draft guidance on performance metrics and verification/validation including impact-oriented approach

- d. To contribute to the development of SWIM MET data standards and policies, and to promote implementation of MET information exchange under SWIM by Members;

**Translated into actions:**

- Contribute to the development of guidance and training materials on the implementation of IWXXM through the relevant WMO and ICAO bodies
- Support trials and testing of MET information exchange under SWIM
- Address issues related to information management governance in coordination with CBS

- e. To report regularly on progress to the president of CAeM

**Translated into actions:**

- Submit regular reports on progress
- Submit other relevant information to raise awareness of developments in the area of responsibility of the ET-ISA



## II. Work Packages (WP), Tasks, Activities

WP A (TOR a)	Development of relevant background material, methodology and implementation guidance on the MET components of the Aviation System Block Upgrades (ASBU) based on identified user requirements		Responsibility	Deliverable	Target date	Status
Task A1	<b>Assist in finalizing the TBO roadmap by providing background material on the envisaged new or enhanced MET information and services</b>					
	Activity A1.1	Provide comments and additions to the TBO roadmap as required by the ICAO METP WG-MRI Rapporteur	All, coord. by co-chairs	Comments on TBO doc provided to WG-MRI Rapporteur	As required by the WG-MRI Rapporteur	Comments provided on 25.09.2015 No other request since then. <b>COMPLETE</b>
	Activity A1.2	Complete/update the Appendices A & B to the TBO roadmap, with information on performance of the current and foreseen MET capabilities, when available, and with generic examples ( See also A4.1)	All, coord. by co-chairs	Updated Appendices A & B to the TBO roadmap (To coordinate with WG-MRI Rapporteur)	To coordinate with WG-MRI Rapporteur.	No request from WG-MRI Rapporteur (see A4.1) <b>COMPLETE</b>
Task A2	<b>Assist in development of other relevant roadmaps and CONOPS (WAFS, SpWx, RRM, RHWAC), as necessary</b> (Note: need to define to what extent ET-ISA will be into this task and who will be responsible)					
	Activity A2.1	Contribute to the development of other relevant roadmaps and CONOPS	ET-ISA members as advisors in the ICAO METP WG	Inputs as necessary	According to WG-MISD work streams time lines.	On-going WAFS, RRM, SpWx: inputs provided in July 2016 RHWAC : new concept for IAHW adopted by METP/2, new CONOPS and roadmap to be defined by WG-MISD.  <b>COMPLETE INsofar AS ET-ISA IS CONCERNED</b> (any future inputs to be fed through experts membership of the METP WGs).
	Activity A2.2	Report to the ET-ISA on foreseeable consequences on existing or foreseen MET information & services; raise any issues related to this development	ET-ISA members as advisors in the ICAO METP WG	As necessary	METP WG meetings ; METP meeting	Summary of MISD/2 and MRI/2 and of METP/2 provided in Q1 2017.  Issues related to WAFS ConOps and process for REQs definition to be presented in a SN at MRI/3 in July 2017 (or MISD/3)
Task A3	<b>Support development of implementation guidance on new MET information and services</b> (Note: this is relevant for mature information and services that are in or close to implementation phase)					
	Activity A3.1	Communicate to the ET-ISA on new services requirements, starting with Met Services for the terminal area ; seek and collate feedback	Bart & Stephanie (SESAR Projects); Cecilia (NextGen and other US projects); Jun & Michael (ASIAPAC)	Communication through reports, web pages about requirements for these new services.	July 2018	<b>On-going.</b>  Discussed at F2F meeting in May 2017.  Communication of latest developments to Members via AeMP website, CAeM Newsletters as necessary

	Activity A3.2	Review, comment and report (one page) on implementation guidance on new MET information and services, starting with Met Services for the terminal area	All. Through ICAO METP WG-MRI or WG-MISD or regional groups	Provide input to the implementation guidance	When guidance is available.	Draft of APAC's implementation guidance to be shared by Jun within ET-ISA in May 2017.
Task A4	<b>Study and inform on current and future MET capabilities to support requirements of GANP and ASBU</b>					
	Activity A4.1	Update the existing demonstration documentation, with information on performance of the current and foreseen MET capabilities, when available, and with generic examples (See also A1.2)	Bart & Stephanie (Europe); Cecilia (N&S America); Jun & PW (Asia); Michael (S Pacific, Australia, NZ); Albert (Africa)	Y	End September 2017	Demonstration documentation from the former CAeM ET-M&M sent by Stephanie to the group. On-going action to update it with performance information of the Met capabilities
	Activity A4.2	Gather information on science supporting foreseen and future MET capabilities, in coordination with ET-ASC	All	Inputs to Scientific Conference	6-10 Nov 2017	Co-chairs are members of Organizing Committee. Stephanie acts as host representative. Scientific topics and possible presenters discussed at F2F meeting in May 2017.
Task A5	<b>Contribute to further development of MET ASBU modules</b>					
	Activity A5.1	Contribute to the development of ASBU-2 Met module (description to be included in update of GANP)	ET-ISA members as advisors in the ICAO METP WG-MRI	Y		<b>On hold.</b> Waiting for WG-MRI to start the activity. Relates to WG-MRI activity 3.2.
	Activity A5.2	Contribute to the description improvement on terminal area aspects of ASBU-1 Met module (A-MET)	ET-ISA members as advisors in the ICAO METP WG-MRI	Y	First draft by Stephanie in May 2016	<b>Complete.</b> First draft discussed at MRI/2 in July 2016, revised version endorsed at METP/2. Approval from ANC in Mar 2017
	Activity A5.3	Assist WG-MRI in the development of functional requirements of MET information & services to support selected ASBU-1 Met modules (A-MET)	ET-ISA members as advisors in the ICAO METP WG-MRI	N	According to WG-MRI time line. Activity 2.1 of WG-MRI started in Jul 2016	<b>On-going.</b> Assistance from ET-ISA members as advisors in the ICAO METP WG-MRI agreed at MRI/2. Draft development of functional & performance requirements sent by the WG-MRI task leader on 23 March 2017. Feedback from ET-ISA members is requested.
	Activity A5.4	Contribute to the ICAO Review of ASBU framework (GANP update in 2019 ; inputs to be ready mid-2017)	Stephanie (in coordination with Dennis Hart and Sue O'Rourke)	N	June 2017	<b>On-going.</b> First teleconference on 20 Oct 2016. F2F meeting in May 2017 : AMET thread restructured and reworted. Dependencies of operational threads on MET identified.

WP B (TOR b)	Current and future MET capabilities to support requirements of GANP and ASBU		Responsibility	Deliverable	Target date	Status	
	<b>Task B1</b>	<b>Organize repository of development of new MET I&amp;S under the large-scale projects (SESAR, NextGen, CARATS, etc.) and facilitate result sharing</b>					
		Activity B1.1	Organize the repository into WMO web facilities ; provide URLs and communicate to the CAeM community through the ET-CCP	Dimitar & ET-ISA Co-chairs	Y	End June 2017	<b>On-going.</b>  Team members to check for existing demo projects on MSTA website to be made public on the AeM website
	<b>Task B2</b>	<b>Assist in WMO projects and dissemination of results (e.g., AvRDP)</b>					
		Activity B2.1	Contribute to WMO CAeM-CAS Av-RDP project as appropriate; report to the ET and the CAeM-MG	Jun, Cecilia, Stéphanie, Albert (for JNB airport)	Y	According to the AvRDP time line.	<b>On-going.</b>  <i>Link with ET-ASC Activity B1.3</i>
		Activity B2.2	Contribute to other WMO projects as appropriate; report to the ET and the CAeM-MG	All	Y	According to those projects time line.	No other project up to now.  <b>COMPLETE</b>

WP C (TOR c)	Develop relevant performance metrics and validation methodologies for new or enhanced MET information and services		Responsibility	Deliverable	Target date	Status	
	<b>Task C1</b>	<b>Develop a briefing note (or similar) on performance metrics and validation to build common understanding</b>					
		Activity C1.1	Develop a briefing note (or similar) on: i) performance metrics and verification; and ii) validation including ATM impact-oriented approach, taking into account any necessary outcomes of the Scientific event	All	Y	Feb 2018	<i>Not started</i>
		Activity C1.2	Develop a "white paper" on evaluation of MET impact on ATM	All	Y	First draft end Sep 2017	<i>DELETED. Superseded by update to C1.1</i>
	<b>Task C2</b>	<b>Collect examples of current performance metrics and verification/validation methods, containing evaluation of MET impact on ATM</b>					
		Activity C2.1	Establish a catalogue of current performance metrics and verification/validation methods [refer to existing ET-M&M documentation] (See also A4.1)	All	Y	End Dec 2017	<i>Not started</i>
		Activity C2.2	Identify generic performance metrics and verification/validation methods	All	Y	Feb 2018	<i>Not started</i>
	<b>Task C3</b>	<b>Develop draft guidance on performance metrics and verification/validation including impact-oriented approach</b>					
		Activity C3.1	Develop draft guidance on performance metrics and verification/validation including impact-oriented approach [Predecessors C2.1 and C2.2]		Y	April 2018	<i>Not started</i>
		Activity C3.2	Communicate to the CAeM community through the ET-CCP		N	As available	<i>DELETED. See E2.2</i>

WP D (TOR d)	SWIM MET data standards and policies; Implementation of MET information exchange under SWIM by WMO Members		Responsibility	Deliverable	Target date	Status	
	<b>Task D1</b>	<b>Contribute to the development of SWIM MET data standards and policies</b>					
		Activity D1.1	Contribute to this development in coordination with WMO CBS TT-AvXML and other relevant WMO teams	Bart, Stephanie	N	According to WMO CBS time line.	On-going. Bart : communication on IWXXM releases Stephanie & Greg : contribution to the new ICTT on WIS, for CAeM requirements on WIS (12-13 Sep)
		Activity D1.2	Contribute to this development in coordination with the ICAO METP WG-MIE and other relevant ICAO groups	Albert, PW, Stephanie	N	According to WG-MIE time line.	On-going.
		Activity D1.3	Contribute to the CBS Task Team on Information Management (under ICT-ISS) as necessary	Stephanie, Jun	N	According the TT-IM time line	TT endorsed by the CBS in Nov 2016
	<b>Task D2</b>	<b>Development of guidance and training materials on the implementation of IWXXM</b>					
		Activity D2.1	Contribute to the development of guidance and training materials based on the CONOPS on IWXXM ; in coordination with the ICAO METP WG-MIE	All	Y	According to WG-MIE time line.	On-going.
<b>Task D3</b>	<b>Support trials and testing of MET information exchange under SWIM</b>						
	Activity D3.1	Inform the CAeM-MG on trials and testing of MET information exchange under SWIM	All	N	As available	On-going	
	Activity D3.2	Inform the CAeM-MG on the status of implementation of MET information exchange under SWIM, in States	All	N	As available	On-going	

WP E (TOR e)	Reporting and outreach		Responsibility	Deliverable	Target date	Status
	Task E1	<b>Submit regular reports on progress</b>				
		Activity E1.1	Yearly reporting	Co-chairs	Y	May each year
	Task E2	<b>Prepare and disseminate other relevant information to raise awareness of CAeM community on developments in the area of responsibility of the ET-ISA</b>				
		Activity E2.1	Prepare relevant information to raise awareness of the CAeM Community on developments under the ET-ISA scope (reports, web pages, etc)	All	Y ?	As available
	Activity E2.2	Communicate through the ET-CCP articles for the CAeM Newsletter	Co-chairs	Y	As necessary	Three articles on ET-ISA in CAeM Newsletter 1/2017.

List of meetings:

Teleconference, 23 Jan 2015; First joint ET-ISA / ET-ASC face-to-face meeting, 30 March – 1 April 2015, Toulouse, France; Teleconference, 4 May 2015; Informal co-chairs meeting, 18 Nov 2015, Washington, DC, USA; Teleconference, 1 March 2016; Teleconference, 7 April 2016; Informal co-chairs meetings, Jul and 20 Oct 2016, Montreal, Canada; CAeM Management Group meeting (co-chairs), 8-10 Nov 2016, Innsbruck, Austria; Teleconference, 8 Dec 2016; Teleconference, 31 Mar 2017, Second joint ET-ISA / ET-ASC face-to-face meeting, 22 to 24 May 2017.

## ACTIONS ARISING FROM THE ET-ASC/ET-ISA/2 MEETING (22-24/05/2017)

Action Item	Action	Responsibility	Deliverable(s)	Deadline	Status	Note
2/1	Develop an 'Issues paper' that considers performance metrics and validation issues in the context of the sensitivity of different ATM users to different weather scenarios  [Paragraph 2.2.5]	<b>ET-ASC and ET-ISA</b>  <b>(Lead: Herbert)</b>	<ul style="list-style-type: none"> <li>An 'Issues' paper that can be used to inform and educate both the providers and the consumers of MET</li> </ul>	31 October 2017		
2/2	Assist in the maturation of the B0-AMET and B1-AMET thread template for the GANP 2019 update  [Paragraph 3.2]	<b>ET-ASC and ET-ISA</b>  <b>(Lead: Jun and Matt)</b>	<ul style="list-style-type: none"> <li>Updated MET thread template provided to Stéphanie (for ASBU-PPT) in support of GANP 2019</li> </ul>	30 June 2017		
2/3	Develop guidelines on the distinction between MET products and MET information  [Paragraph 3.3]	<b>ET-ISA</b>  <b>(Lead: Bart)</b>	<ul style="list-style-type: none"> <li>Set of guidelines available on WMO AeMP website (or other repository) to build awareness</li> </ul>	31 October 2017		
2/4	Assist in the further development of the draft long-term plan for the AeMP  [Paragraph 3.5]	<b>Secretariat assisted by ET-ASC and ET-ISA</b>  <b>(Lead: Dimitar and Greg)</b>	<ul style="list-style-type: none"> <li>Draft LTP-AeMP that includes performance improvement areas and module/thread descriptions consistent with ICAO GANP/ASBU methodology</li> </ul>	31 October 2017		

Action Item	Action	Responsibility	Deliverable(s)	Deadline	Status	Note
2/5	Compile summaries (2 or 3 pages each) of national and regional MET/ATM modernization programmes of relevance to the MET community [Paragraph 4.2]	<b>ET-ISA</b>  <b>(Lead: Stéphanie)</b>	<ul style="list-style-type: none"> <li>• A compendium of information on SESAR, NextGen, CARATS, CMATS and other such programmes</li> <li>• Information available via the WMO AeMP website, CAeM Newsletter (or elsewhere) to build awareness</li> </ul>	30 Sept 2017		
2/6	Assist Jitze van der Meulen with the review and update of the Statement of Guidance on Aeronautical Meteorology [Paragraph 6.2.2]	<b>ET-ISA</b>  <b>(Lead: Michael)</b>	<ul style="list-style-type: none"> <li>• SoG that reflects the current and foreseen meteorological observation capabilities to support the needs of aviation</li> </ul>	To be confirmed with Jitze van der Meulen		
2/7	Seek clarification from the ICAO secretariat in respect of the latest working arrangements of the CAEP, including WMO's continuing membership [Paragraph 10.1]	<b>Secretariat</b>  <b>(Lead: Dimitar)</b>	<ul style="list-style-type: none"> <li>• Confirmation of WMO's continued role in the activities of the CAEP and/or its contributory groups</li> </ul>	31 October 2017		
2/8	Seek clarification from Matt Hort of his continued ability to participate in the ET-ASC activities [Paragraph 10.2]	<b>ET-ASC</b>  <b>(Lead: Herbert)</b>	<ul style="list-style-type: none"> <li>• Confirmation of ET-ASC core membership status</li> </ul>	30 June 2017		