SATELLITE DISTRIBUTION SYSTEM OPERATIONS GROUP (SADISOPSG)

THIRTEENTH MEETING

Dakar, Senegal, 27 to 29 May 2008

Agenda Item 6: Development of the SADIS
6.1: Report of the SADISOPSG Gateway Development Team

ISSUES RAISED AT THE BMG

(Presented by the SADIS Provider State)

SUMMARY

This paper presents a summary of issues raised at the BMG of relevance to SADISOPSG.

1. INTRODUCTION

1.1 This paper outlines recent activities of the BMG that will be of relevance to the activities of the SADISOPSG. These include the following

- Annex 3 Amd 74 Change Implementation
- EUR OPMET Data Monitoring
- Performance Indices
- RODEX Implementation
- WXXM Activities

2. ANNEX 3 AMENDMENT 74 CHANGES

2.1 A state letter was being prepared by ICAO Paris in order to ascertain the readiness of states in relation to the Amendment 74 changes. The BMG agreed to offer to ICAO Paris Office all the information needed for completion of the state letter, including also a template to be used by the states for their answers, and examples on how the questionnaire should be filled in.

2.2 Initial coordination with the other ICAO regions was intended to be promoted by providing them with the proposed state letter, including the template for responses and examples. It was agreed on the need to provide also the following guidelines to the states, in order to assist in the implementation of the changes:

- for the international exchange, the TAF for one aerodrome should not be included into more than one single bulletin (in order to avoid duplication of data)

- the 30 hr TAFs should be grouped into one bulletin (and not be mixed with 24 hr reports)

- in order to reduce the bulletin length, the FT bulletins should consist of not more than a specified number of individual reports. This number is still to be assessed and agreed. Note: the actual number will be derived following an investigation on the bulletin length issues.

2.3 In order to ensure the regional requirements regarding the availability of the forecasts (30 min before the commencement of the validity period), the production of the forecasts shall be completed at H+15 and the compilation at H+22.

2.4 The State Letter was produced at the beginning of April and responses from the states will be requested by the 9th of May so the group will have a chance to perform a first review of the situation during May.

2.5 The proposed changes to the monitoring tool specifications were presented to the group. These were related merely to the modification of the validity period group of the TAFs.

2.6 The group agreed on the proposal and also considered that further support to the old format should be maintained until the level of implementation of the changes by the states is considered acceptable. With this respect, a monitoring will be planned post-implementation in order to determine who has switched to the new format and who has not.

3. EUR OPMET DATA MONITORING AND REPORTING

3.1 Regarding the monitoring procedure: there were presented the date and type of the monitoring activities in the period 1-14 Feb 2008. The next monitoring is scheduled for 1-14 Sep 2008.

3.2 With regard to the data monitoring, it was agreed that in the future, the whole concept should move towards measuring the difference between what is requested and what is actually received. Every NOC should have a compilation of necessary data, a so called “shopping list”. Efforts should concentrate on data which can not be provided by the responsible ROC – and investigations be made to resolve these deficiencies.

3.3 The group was informed about the results of the latest SIGMET monitoring exercises. When analysing the results, the SIGMET monitoring Focal Point informed the group that the Vienna monitoring switch is able now to provide a detailed verification of the SIGMET messages. As a result, there were pointed out a significant number of bulletins for which, for instance, the FIR name was incorrect. In order to determine the nature of the problem, the group agreed that each instance be investigated so that the error was identified as systematic or an isolated error.

3.4 As the SIGMET monitoring procedure has proven to be mature and providing very good results, it was agreed by the group that support should be requested from ICAO Paris Office to ensure that states from EUR region and from other ICAO regions be invited to take part to the monitoring exercises.

4. ADDRESSING OF EUR AND NON-EUR OPMET DATA

4.1 The group was presented with the results of the investigations made following the inconsistencies between the SADIS and terrestrial monitoring results for the availability and regularity of the NAT/NAM. The main causes were identified (monitoring architecture, temporary monitoring deficiencies, misrouting of FTUS80) and correspondingly addressed.

5. PERFORMANCE INDICES

5.1 A WP presented to the group updating the methodology for the metrics determination. For each of the three indices (availability, regularity and timeliness) presentations were made on the definition and purpose of the metric, a description of the methodology for calculation and a set of targets.

5.2 It was suggested that the indices be calculated separately for AOP listed aerodromes and for non-AOP, as the AOP listing does not change so often and this way it is expected to have more stable results.

5.3 The results of the OPMET Performance metrics generated during February 2008 were presented to the group. In general, the results proved to be consistent and also showed a positive trend, so there is expected an improvement on the data availability and regularity for in the next period.

5.4 The ICAO EUR Met Regional Officer informed the group that he was invited to have a discussion with the AMBEX group trying to progress with the AFI region on the issue of the OPMET interfaces with Europe.

6. RODEX PROJECT MIGRATION

6.1 RODEX migration is the reorganisation of meteorological data in which the responsibility for distribution will be migrated from a large number of states to 3 Regional OPMET Centres (ROCs) specifically, London, Toulouse and Vienna. The group was informed on the progress with development of Work Package 1 by each of the ROCs, as follows:

6.2 Toulouse ROC has already successfully taken over the responsibilities for Portugal. For the following steps, it was noted again the necessity of cooperation with MOTNE centre Rome. Also, in order to support the transmission of the AIRMET and GAMET data from Spain to the databanks and to

SADIS, it was agreed that Madrid be invited to send the AIRMET and GAMET bulletins in the same manner as the other regular products.

6.3 Vienna informed the group on the status of actions with regard to the taking over the responsibilities for Turkey. At present a list of the bulletins currently routed by Germany to Turkey was forwarded to Austria. Prior to implementation of this list, there were noted many bulletins which are not meant for international distribution, or even not produced at all. So there was agreed that a filtering should be made, the most convenient being by confronting the list against what is currently available (the monitoring results). It was highlighted again the necessity of contacting Italy in order to assist the taking over the responsibilities over Albania.

6.4 The UK took actions to co-ordinate by e-mail and telephone with Belgium and Netherlands on the activities related to taking over the responsibilities of these two MOTNE centres and to organise a meeting in Copenhagen with Denmark and the Baltic States in order to establish a transition plan.

6.5 It was agreed that work should be continued for the transition planning, and the Work Packages be finished by June 2008 and ready to be presented also to the COG meeting.

7. WXXM CONCEPT

7.1 The group was informed on the progress of developing the Weather Exchange Conceptual Model by the corresponding Task Force. There have been presented the conclusions of two meetings that took place since last BMG: a working session of the expert team (19 November 2007) and a Eurocontrol workshop (18-19 December 2007).

8. ACTION BY THE SADISOPSG

8.1 The group is invited to note the information in this paper.

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APPENDIX

EANPG
METEOROLOGICAL GROUP
METG
Bulletin Management Group (BMG)

(Presented by **Error! Unknown document property name.**)

Issue: **Error! Unknown document property name.**
Issue Date: **Error! Unknown document property name.**
Author: Isabel
Status: **Error! Unknown document property name.**

F.1 DOCUMENT IDENTIFICATION SHEET

DOCUMENT DESCRIPTION	
Document title:	
Document Reference Number	**Issue: Error! Unknown document property name.**, **Error! Unknown document property name.**
	Date Of Issue: Error! Unknown document property name.
Abstract: The OPMET performance metrics are generated by the BMG and used to monitor OPMET distribution performance through availability, regularity and timeliness metrics. This document defines the three OPMET performance metrics.	
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Authority for Approval: BMG / METG	

F.2 DOCUMENT CIRCULATION

State or Organisation	Recipient Name
BMG	BMG31 Attendees

F.3 DOCUMENT CHANGE RECORD

ISSUE	DATE	REASON FOR CHANGE
1, Draft A	5/3/08	Initial Version

F.4 REFERENCES

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Chapter 1 1. Introduction

1.1. The BMG produces three metrics: the availability metric, the regularity metric and the timeliness metric. These are intended to allow the BMG to monitor, and improve, the performance of the OPMET distribution schema within the EUR region, and from other regions, in three key areas:

- meeting the user's data requirements;
- consistency of data availability; and
- data provision in a timely manner.

1.2. This document defines each of the three metrics in detail.

Chapter 2 2. The Availability Metric

2.1. Description

2.1.1. The availability index measures the current coverage of the OPMET distribution against the user requirements.

2.1.2. The metric is primarily calculated at the station level per day and individual stations' results may then be combined to provide results at the state, region and global levels.

2.1.3. The metric is defined for METARs, short TAFs and long TAFs.

2.2. Measurement and Calculation

2.2.1. The metric is calculated from standard BMG monitoring. Monitoring for this metric is performed by the UK, the Netherlands and Belgium.

2.2.2. The monitoring locations are:

- EGGY AFTN – monitored on reception into the Meteorological message switch;
- SADIS Gateway – monitored on transmission to the SADIS 1G satellite uplink;
- EHDB – monitored on reception from SADIS 2G.
- EBBR AFTN.

2.2.3. Availability is calculated, using the procedure described below, from the following information contained within the monitoring output:

- Bulletin TT – to determine message type;
- Location indicator;
- Bulletin YYGGgg – for the filing day of the reports;
- Bulletin BBB – To determine if the message should be included in the calculation; and
- Monitoring location determination of NIL, or not NIL.

2.2.4. The metric is calculated on a daily basis by taking the number of stations that are available and required then dividing that by the total number of stations that are required:

$$availability_{tt}(day) = \frac{\sum \text{available} \wedge \text{required}_{tt}(\text{day})}{\sum \text{required}_{tt}}$$

2.2.5. A station is determined to be available if at least one non-NIL report of the correct type (i.e. TT = SA, FC or FT) is monitored in a 24 hour period.

2.2.6. The overall availability index is calculated by taking the daily availability from data captured during the monitoring period and then averaging over the fourteen day monitoring period:

$$availability_{tt/LocInd} = \frac{\sum_{x=1}^{d} availability_{tt}(x)}{d} \qquad \textbf{[II]}$$

2.2.7. The metrics per state and per region are calculated by taking the average metric of the individual stations within that state or region.

2.3. Measurement Frequency

2.3.1. The availability metric is calculated twice a year, at the same time as the routine BMG monitoring exercises in February and September.

2.4. Metric Threshold and Target

2.4.1. The availability metric is a measure of how well the OPMET distribution is meeting the user requirements. Therefore, it is not acceptable to have low availabilities. Previous experience will the availability metric has shown that the metric should not fall below 0.6 Therefore the metric threshold is:

$$0.6 \leq Availability_{TT} \leq 1 \qquad \textbf{[III]}$$

2.4.2. If the metric falls outside of this range for any region or state then the results should be automatically investigated.

2.4.3. The user will usually expect perfect availability, however this is difficult to achieve with OPMET data where requirements undergo frequent change and the delivery system encompasses multiple regions and systems. Therefore, the targets for the availability have been set to levels at 10% above the September 2007 SADIS metrics. The values are given below:

Region	**Target**		
	SA	**FC**	**FT**
AFI	0.649	0.924	0.759
ASI/PAC	0.858	0.561	0.957
CAR/SAM	0.924	0	0.836
EUR	0.990	0.990	0.935
MID	0.957	0.740	1.00
NAT/NAM	0.990	1	0.803
Global	0.924	0.979	0.858

2.5. Metric Units

2.5.1. The metric is a unit-less number that ranges from 0 (indicating no messages of a type were regarded as timely) to 1 (indicating that all messages of a type were regarded as timely.

Chapter 3 3. The Regularity Metric

3.1. Description

3.1.1. The regularity index measures the consistency of the OPMET distribution against the requirements. In practice the regularity is a measure on how good the *available* aerodromes are at getting their OPMET reports in on time and at regular intervals.

3.1.2. The metric is primarily calculated at the station level per day and individual stations' results may then be combined to provide results at the state, region and global levels.

3.1.3. The metric is defined for METARs, short TAFs and long TAFs.

3.2. Measurement and Calculation

3.2.1. The metric is calculated from standard BMG monitoring. Monitoring for this metric is performed by the UK , the Netherlands and Belgium.

3.2.2. The monitoring locations are:

- EGGY AFTN – monitored on reception into the Meteorological message switch;
- SADIS Gateway – monitored on transmission to the SADIS 1G satellite uplink;
- EHDB – monitored on reception from SADIS 2G; and
- EBBR AFTN.

3.2.3. Availability is calculated, using the procedure described below, from the following information contained within the monitoring output:

- Bulletin TT – to determine message type;
- Location indicator;
- Bulletin YYGGgg – for the filing day of the reports;
- Bulletin BBB – To determine if the message should be included in the calculation; and
- Monitoring location determination of NIL, or not NIL.

3.2.4. The metric is calculated on a daily basis by taking the number of stations that are considered to be regular and are required and dividing that number by the total number of stations for which data is required:

$$regularity_{tt}(day) = \frac{\sum \text{regular} \wedge \text{required}_{tt}(\text{day})}{\sum \text{required}_{tt}} \qquad \textbf{[IV]}$$

3.2.5. It should be noted that the regularity index can only be applied properly to stations that are available and is therefore highly dependant on the availability index.

3.2.6. A station is considered to be regular on any given day if the number of reports monitored that meet the following criteria are greater than or equal to a threshold value:

$$isregular(station) \Leftrightarrow \#reports(day) \geq threshold \qquad \textbf{[V]}$$

3.2.7. Only reports that meet the following criteria are counted as part of the daily report count:

- TT = ‘SA’, ‘FC’ or ‘FT’ depending on the threshold being determined;
- The report is not NIL; and
- The BBB group not present, or in Rxx form.

3.2.8. For each station|data type pairing that is required a threshold value is derived. Initially and for new requirements the previous monitoring period’s fourteen day data set was used to calculate individual thresholds per data type for each station in SUG Annex 1. The threshold is determined by subtracting a multiple of the Standard Deviation of the daily report count for each station from the mean daily report count for each station:

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Where k is a constant integer. (and set to one initially)

3.2.9. Following each metric calculation, the monitoring data is then used to update the thresholds for all required station|data type pairings. A new threshold is calculated using [VI] and the new threshold is scaled and added to the existing threshold similar to the way that TCP updates its RTT estimates. This is done to ensure that the thresholds represent the best available information about a station and can be updated to reflect any changes in the station reporting regime. Figure 1 and [VII] show the threshold update process.

$$T = \alpha t_{old} + (1-\alpha) t_{new} \qquad \textbf{[VII]}$$

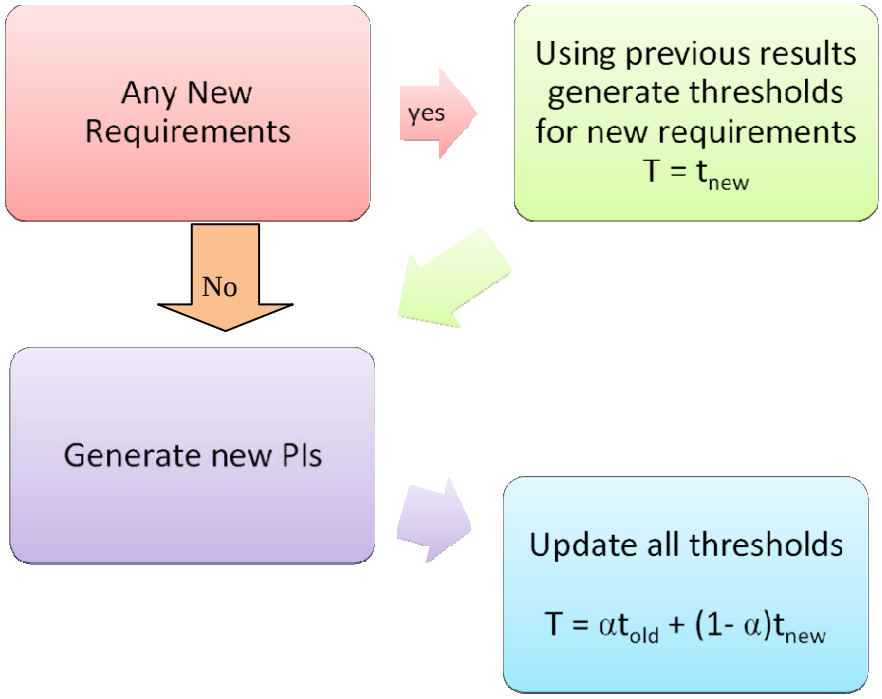

Figure 1 : Threshold Determination

3.2.10. The daily results are then averaged out for the complete monitoring period to give a single metric per station.

$$regularity_{TT\,/\,LocInd} = \frac{\sum_{day=1}^{d}\left(regularity_{TT}(day)\right)}{d} \qquad \textbf{[VIII]}$$

3.2.11. The metrics per state and per region are calculated by taking the average metric of the individual stations within that state or region.

3.3. Measurement Frequency

3.3.1. The regularity metric is calculated twice a year, at the same time as the routine BMG monitoring exercises in February and September.

3.4. Metric Thresholds

3.4.1. The regularity metric is a measure of how consistent the OPMET distribution is. Therefore, it is not acceptable to have low availabilities. Previous experience will the regularity metric has shown that the metric should not fall below 0.5 Therefore the metric threshold is:

$$0.5 \leq Availability_{TT} \leq 1 \qquad \textbf{[IX]}$$

3.4.2. If the metric falls outside of this range for any region or state then the results should be automatically investigated.

3.4.3. The targets for the regularity have been set to levels at 10% above the September 2007 SADIS metrics. The values are given below:

Region	**Target**		
	SA	**FC**	**FT**
AFI	0.759	0.759	0.913
ASI/PAC	0.891	1.000	0.979
CAR/SAM	0.746	0	0.990
EUR	0.891	0.847	0.913
MID	0.746	0.440	0.649
NAT/NAM	0.770	1.00	0.649
Global	0.825	0.847	0.825

3.5. Metric Units

3.5.1. The metric is a unit-less number that ranges from 0 (indicating no messages of a type were regarded as timely) to 1 (indicating that all messages of a type were regarded as timely.

Chapter 4 4. The Timeliness Metric

4.1. Description

4.1.1. The timeliness metric provides an indication of how often an station's, state's or region's (depending on the level) reports and forecasts meet the promulgation time recommendations defined in ICAO Annex 3, appendix 10.

4.1.2. The metric is primarily calculated at the station level per day and individual stations' results may then be combined to provide results at the state, region and global levels.

4.1.3. The metric is defined for METARs, short TAFs and long TAFs.

4.2. Measurement and Calculation

4.2.1. The metric is calculated from standard BMG monitoring. Monitoring for this metric is performed by the UK and the Netherlands.

4.2.2. The monitoring locations are:

- EGGY AFTN – monitored on reception into the Meteorological message switch;
- SADIS Gateway – monitored on transmission to the SADIS 1G satellite uplink;
- EHDB – monitored on reception from SADIS 2G.

4.2.3. Timeliness is calculated, using the procedure described below, from the following information contained within the monitoring output:

- Bulletin TT – to determine message type;
- Location indicator;
- Bulletin YYGGgg – for the (approximate) filing time of the reports;
- Bulletin BBB – To determine if the message should be included in the calculation;
- Monitoring location receive time;
- TAF validity period
- Monitoring location determination of NIL, or not NIL.

4.2.4. Before the metric is calculated, each message undergoes a process to determine if it is considered to be timely. For all data types the only messages that are considered for timeliness determination are those that are not NIL and, in the case of TAFs are not amended (i.e. BBB is of the AAx form).

4.2.5. A station is only considered for inclusion in the metric if it forms part of the user requirements for the particular data type. For simplicity the SADIS User Guide Annex 1 is considered to be the definitive set of user requirements.

4.2.6. A METAR is considered to be timely if the difference between the filing time and the time of reception is less than, or equal to, 10 minutes.

$$isTimely_{SA} \Leftrightarrow \left(\left(rxTime - fileTime \right) \leq 600s \right) \quad \textbf{[X]}$$

4.2.7. A short TAF is considered to be timely if the difference between the filing time and the time of reception is less than, or equal to, 10 minutes, and if the reception time is 30 minutes, or more, before the start of validity.

$$isTimely_{FC} \Leftrightarrow \left(\left(rxTime - fileTime\right) \leq 600s\right) \wedge \left(\left(validityStart - rxTime\right) \geq 1800s\right) \quad \textbf{[XI]}$$

4.2.8. A long TAF is considered to be timely if the difference between the filing time and the time of reception is less than, or equal to, 10 minutes, and if the reception time is 6 hours, or more, before the start of validity.

$$isTimely_{FT} \Leftrightarrow \left(\left(rxTime - fileTime\right) \leq 600s\right) \wedge \left(\left(validityStart - rxTime\right) \geq 21600s\right) \quad \textbf{[XII]}$$

4.2.9. The final calculation of the timeliness metric is relatively straight forward. For each station on each day of monitoring and for each data type a metric is calculated by dividing the total number of timely messages by the total number of non-NIL messages. The daily results are then averaged out for the complete monitoring period to give a single metric per station.

$$timely_{TT}(day) = \frac{\sum isTimely_{TT}(day)}{\sum reports_{TT}(day) - \sum NIL - reports(day)} \quad \textbf{[XIV]}$$

[XIV]

$$Timely_{TT\,/\,LocInd} = \frac{\sum_{day=1}^{d}\left(timely_{TT}(day)\right)}{d}$$

4.2.10. The metrics per state and per region are calculated by taking the average metric of the individual stations within that state or region.

4.3. Measurement Frequency

4.3.1. The timeliness metric is calculated twice a year, at the same time as the routine BMG monitoring exercises in February and September.

4.4. Metric Thresholds

4.4.1. Each metric should define thresholds that detail the expected bounds of the metric. Any value outside of these bounds would then automatically require investigation. In the case of the timeliness metric the limited experience with the metric means that it is difficult to estimate sensible values for the metric at this time. Therefore the metric threshold is:

$$0 \leq Timely_{TT} \leq 1$$

4.4.2. The targets for the regularity have been set to levels at 10% above the September 2007 SADIS metrics. The values are given below:

Region	**Target**		
	SA	**FC**	**FT**
AFI	0.453	0.605	0.100
ASI/PAC	0.575	0.660	0.110
CAR/SAM	0.803	0	0

EUR	0.669	0.572	0.601
MID	0.520	0.715	0
NAT/NAM	0.690	0.242	0
Global	0.669	0.572	0.165

4.5. Metric Units

4.5.1. The metric is a unit-less number that ranges from 0 (indicating no messages of a type were regarded as timely) to 1 (indicating that all messages of a type were regarded as timely.

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