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Agenda Item 3: Quality control, monitoring, and management of meteorological information exchange

QUALITY CONTROL AND MANAGEMENT OF AVIATION METEOROLOGICAL INFORMATION IN CHINA

(Presented by China)

SUMMARY

The ICAO ROBEX Handbook describes some rules about the quality control (QC) of aviation meteorological information. In light of this, more detailed QC rules are developed in China, and this paper presents the relevant work and experiences therein.

1. INTRODUCTION

1.1 The Regional Operations Centre (ROC) is recommended to conduct quality control (QC) checks as stated in the ROBEX Handbook. These checks involve examining messages for formatting and coding errors, along with ensuring time and space consistency. Moreover, the detailed QC rules are illustrated in Appendix F.

1.2 Based on this, China has implemented detailed and meticulous QC procedures for the aviation meteorological information of various domestic and overseas report types.

1.3 This paper introduces the related work and experiences about QC in China.

2. DISCUSSION

2.1 Most types of aviation meteorological information, such as METAR, SPECI, TAF, SIGMET, AIRMET, and advisories, can be verified.

2.2 The inspection of domestic aviation meteorological messages is strict, with all the fields of each individual report being checked. In contrast, the inspection of overseas messages is relatively lenient, as the content of the meteorological data therein is not checked.

2.3 Both messages in TAC and IWXXM format are verified. The IWXXM files will be verified with the CRUX tool at first, then disassembled, and the message headers and meteorological elements will be examined.

2.4 All the parameters of the QC rules could be configured in the operational system.

WMO Abbreviated Heading Validation

2.5 The validation of the WMO Abbreviated Heading (TTAAii CCCC YYGGgg BBB) is basically consistent with the principles of Appendix F in the ICAO APAC ROBEX Handbook. The rules are detailed and developed in China based on the long-time operational experience.

2.6 The filing time group, YYGGgg, will be used to compute the difference with the system time. Once this difference exceeds the predefined threshold, the bulletin will be tagged as outdated, and then be intercepted.

METAR/SPECI Validation

2.7 The validation rules for the fields before the observation time group are in accordance with the ICAO APAC ROBEX Handbook. The prefixes, METAR/METAR COR OBCC, will be inspected individually and cross-checked against the message type.

2.8 The automatic observation reports, METAR AUTO, will be checked the fields to the observation time group (inclusive).

2.9 Manual observation reports will be fully disassembled. The prefix, observation time, and meteorological elements will be checked for format compliance and numeric ranges.

2.10 The inter-element correlation will also be inspected. For example, if the visibility is less than 5000 meters, the weather phenomenon cannot be NSW.

TAF Validation

2.11 Overseas aviation meteorological reports are checked based on the validation rules of the ICAO APAC ROBEX Handbook. The issue time and the start time of the valid period are used to compare with the system time. Reports with a time that is too early or late will be filtered as error reports.

2.12 In addition, the inspection rules for meteorological elements and the correlation between meteorological elements are the same as those in Sections 2.8 and 2.9.

SIGMET/AIRMET Validation

2.13 The validation rules are similar to the rules in the section 13 of the ICAO APAC Robex Handbook and the section 1.1.3 of Appendix F. The CCCC, prefix SIGMET, and the issue time are checked.

2.14 The issue time group, YYGGggZ, will be used to calculate the difference with the system time. Once this difference exceeds the threshold, the bulletin will be tagged as outdated, and subsequently intercepted.

Other Validations

2.15 Special quality control rules have been set for duplicate reports. The MD5 value of the entire content of each individual report will be calculated and cached. Individual reports with the same MD5 value will be identified as duplicate reports, and those with a later arrival time will be discarded.

2.16 Test or exercise messages, such as those for the exchange of space weather advisories, tropical cyclone advisories, and volcanic ash advisories, will not be filtered.

2.17 When a bulletin with more characters than 1800 will be split into multiple parts, ending with “END PART 01” and “END PART 02/02” respectively. Sometimes, the first part of the bulletin contains the WMO Abbreviated Heading, while the second part doses not. The system is designed to delete the strings “END PART 01” and “END PART 02/02”, and process and store the first part as normal. For the second part, which lacks the TTAAii header, a WMO Abbreviated Heading will be automatically added according to the report type. However, if the meteorological content is truncated in the middle, the entire report will be directly discarded.

2.18 For multiple METAR or TAF lines within a single individual report, multiple TAFs or METARs will be automatically replaced with a single TAF or METAR. This problem was mentioned in an information paper in 2018, IP-10_AI-5_CHN_STATISTICS-ON-REPORTS-MONITORED-BY-BEIJING, which attracted the attention of WIFS. Moreover, this phenomenon has been significantly resolved according to recent statistics.

2.19 Aviation meteorological messages containing special characters, such as “$” , “%”, “&” , “|”, etc., will be filtered out as incorrect messages.

QC Methods

2.20 The QC methods involve automatic software verification and manual validation. The monitoring and statistical results are announced on a monthly basis, and corresponding explanations for error coding messages are given with reference to the relevant specifications.

2.21 Meteorological elements in any messages are not allowed to be modified. When incorrect messages originating from domestic stations are detected and intercepted, operators will try to contact with the original stations and ask them to correct the messages.

2.22 Only the fields of the WMO bulletin headings and the prefixes in the individual reports, such as location indicators or observation times, could be modified according to actual situation. This principle is same with the QC rules of the ROBEX Handbook.

2.23 Overseas aviation meteorological messages containing special characters, will be filtered out as incorrect messages. Operators will delete the special characters and then put the messages into the system for re-processing and forwarding. The meteorological elements of overseas messages are not subject to QC procedures.

2.24 The data quality has indeed been significantly improved, which relieves much burden on airlines. More detailed information about the type and content of the incorrect bulletin or reports are shown in the APPENDIX A of this paper.

2.25 Intercepting domestic aviation meteorological messages risks airlines not collecting these messages, though most meteorological fields are correct. So, we're also thinking about changing the quality control policy to monitor and conduct statistical analysis without interception.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the information contained in this paper; and
b) share QC experiences; and
c) offer some suggestions to future QC work.

INCORRECT AVIATION METEOROLOGICAL MESSAGES IN TAC FORMAT IN JANUARY 2025					
DESCRIPTION	**TOTAL NO. OF EACH TYPE**	**RATIO**	**e.g. RECEIVE TIME**	**e.g. HEAD_CONTENT**	**e.g. CONTENT**
The elements failed to be successfully recognized.	9250	41.446%	2025/1/1 0:12	SACO20 SKBO 311100	METAR SKIB 311100ZVRB02KT 9999 -DZ FEW005 BKN030 21/20 Q1017=
Bulletins was significantly delayed.	3022	13.541%	2025/1/1 6:07	SAZA31 FAPR 010000 CCA	ZCZC 000 SAZA31 FAPR 010000 CCA METAR COR FALW 010000Z AUTO 20003KT //// // ////// 15/11 Q1014= NNNN
Messages contains special characters.	2908	13.030%	2025/1/1 0:19	SAAR20 OEJD 010000	METAR OOSH 312350Z AUTO 24004KT //// ////// 20/17 Q1015 RMK QFE1011 RH083? PR000.0=
Reports with a wrong observation time	1537	6.887%	2025/1/1 0:02	SAUS25 KWBC 010000 RRI	METAR PTKK 012353Z VRB04KT 15SM FEW014 SCT120 BKN280 30/27 A2983 RMK SLP105 8/171 T03020266 10302 20272 52008=

INCORRECT AVIATION METEOROLOGICAL MESSAGES IN TAC FORMAT IN JANUARY 2025					
DESCRIPTION	**TOTAL NO. OF EACH TYPE**	**RATIO**	**e.g.** **RECEIVE TIME**	**e.g.** **HEAD_CONTENT**	**e.g.** **CONTENT**
The meteorological content is truncated in the middle in the second part.	1037	4.646%	2025/1/1 0:00		ZCZC PAP0135 010000 GG ZBBBYPYX 010000 VGHSYNYX L IN THE CAAB WEBSITE). LIST OF AIC ISSUED : 02/24 EFFECTIVE DATE 14 AUG 2024, 01/23 EFFECTIVE DATE 29 MAY 2023, 01/22 EFFECTIVE DATE 06 NOV 2022, 01/21 EFFECTIVE DATE 04 NOV 2021, 01/17 EFFECTIVE DATE 01 JAN 2017, (AVBL IN THE CAAB WEBSITE).) //END PART 02/02// NNNN
…	**…**	**…**	**…**	**…**	**…**
Total NO.	**22318**				

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