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Agenda Item 3: Meteorological information for ATS and search and rescue services units

METEOROLOGICAL INFORMATION FOR ATS AND SEARCH AND RESCUE SERVICES UNITS

(Presented by the Secretariat)

Summary

This paper presents meteorological information to be provided to air traffic management services and search and rescue services.

RÉFÉRENCES

Annex 3 - Meteorological Service for International Air Navigation.
Doc. 7030 - Regional Supplementary Procedures.
Doc. *- 7474 FASID Air Navigation Plan - Africa-Indian Ocean.
Doc. 8400 - PANS-ABC - Procedures for Air Navigation Services - Abbreviations and codes of ICAO.
Doc. 9377 - AN/915 - Manual on coordination between air traffic services, aeronautical information services and aeronautical meteorological services.
Doc. 8896 - AN/893/5 - Manual on Aeronautical Meteorology Practices.

1 Introduction

1.1 The meteorological service for international air navigation is provided by each State under the provisions contained in ICAO Annex 3 and taking into account the regional air navigation agreements. With regard to the AFI region, the details given above are contained in the AFI ANP/FASID, ICAO Doc 7474.

1.2 The meteorological information required by ATS units and provided by their associated meteorological offices includes nearly all types of aeronautical meteorological information. Detailed listings of this information are contained in this paper. A summary of the types of information most frequently supplied to ATS units and to air-ground control radio stations (if established to serve associated FICs/ACCs), the meteorological units responsible for providing the information, the frequency with which it is usually provided and the communications means normally used for this purpose are given in Table 1.

2. Discussion

2.1 In view of the importance of the meteorological information supplied to ATS units for the safety and efficiency of aviation, it is essential that the information be always up to date, accurate and provided in a timely manner. Of particular importance in this connection is information on

significant changes in the meteorological conditions. Such changes include not only changes requiring the issuance of SPECI but may also include, as agreed, changes in wind, temperatures, pressure and other elements that may require ATS units to take action (e.g. change of runway-in-use).

3. Conclusion

3.1 Participants are invited to note of meteorological information to be provided to air traffic services and search and rescue services.

3.2 Participants are also invited to note the need for formulation of clear procedures to follow in an emergency to avoid confusion on the action by the various units of the aerodrome. It should also be noted the need for telecommunications facilities efficiently and effectively, in good working order at all times between meteorological centers/stations and the traffic management units.

3.3 After taking note of MET information to be provided to air traffic management services and search and rescue services, participants are invited to:

a) note that the needs and capacities of the air traffic control authority and meteorological authority to provide the best assistance should be reviewed on an ongoing basis and

b) efficient and effective telecommunications facilities should be implemented to meet the needs of transit time established for the exchange of information under the provisions of Annex 3 and AMBEX scheme.

3.4 It is also desirable that the Meteorological Authority, in coordination with the Civil Aviation Authority, provide updated MET information to the air traffic services units for the conduct of their duties as provided in Appendix 3.

APPENDIX A

METEOROLOGICAL INFORMATION FOR ATS AND SEARCH AND RESCUE SERVICES UNITS

1. **Aeronautical meteorological information supplied to ATS units**:

Information	***Distributor***	***Destination***	***Communications Means***	***Fréquency***
METAR et MET REPORT with trend forecast*, as required	Aeronautical MET station [trend forecast prepared by MET office	TWR APP ACC FIC COM Station	Note 1 Note 1 Note 1 Note 1 Note 2	Hourly**
SPECI et SPECIAL with trend forecast*, as required	Aeronautical MET station [trend forecast prepared by MET office]	TWR APP ACC FIC COM Station	Note 1 Note 1 Note 2 Note 2 Note 2	When warranted
TAF	MET office	TWR APP ACC FIC COM Station	Note 1 Note 1 Note 1 ou 2 Note 1 ou 2 Note 2	Every 3 or 6 hour
Aerodrome warnings .	MET office	TWR APP COM station Aerodrome services	Note 1 Note 1 ou 2 Note 2	When warranted

** Trend forecasts to be added to local reports and METAR/SPECI for those stations so identified in the air navigation plan.*

*** Or half-hourly if so decided by regional air navigation agreement.*

Note 1.— Communications by intranet, closed-circuit TV, video display unit, or similar. If none of these are available, or during unserviceability periods, communications by phone, followed if possible by confirmation by other means.

Note 2.— Communications by teleprinter.

Renseignements à fournir	***Fournisseur***	***Destination***	***Moyen de Communications***	***Fréquence***
Upper wind and temperature forecasts	MET office and/or MWO (data to be obtained through the WAFS)	ACC FIC	Note 2 Note 2	Every 6 hours (if required
Significant en-route weather forecast	MET office and/or MWO (data to be obtained through the WAFS)	ACC FIC	Note 2 Note 2	Every 6 hours
SIGMET and AIRMET	MWO	TWR APP ACC FIC Station COM	Note 1 Note 1 et 2 Note 1 et 2 Note 1 et 2 Note 2	When warranted
Wind shear warnings and alerts	MET office	TWR APP	Note 1 Note 1	When warranted
Avis de cyclone tropical	TCAC/MWO	ACC FIC	Notes 1 et 2	When warranted
Tropical cyclone advisory	VAAC/MWO	ACC/FIC	Notes 1 et 2	When warranted
Information on accidental release of radioactive material, i.e. location of the accident and forecast trajectories of the radioactive material	MWO (normally, the information obtained from the WMO RMSC concerned	ACC/FIC	Notes 1 et 2	When warranted
Information on volcanic eruptions and volcanic ash for which a SIGMET has not yet been issued.	CVM VAAC	TWR APP ACC FIC	Notes 1 et 2	When warranted

2 Displays/Instruments in ATS Units

2.1 It is essential that TWRs and APPs be equipped, as a minimum, with surface wind displays and, where such values are measured by instrumented means, runway visual range (RVR) values and displays providing current pressure data for the altimeter setting for the aerodrome, corresponding to those of the meteorological station at the local aerodrome. The displays in TWRs and APPs must provide the same information, and both must derive that information from the same sensors as the displays in the meteorological station at the aerodrome. Each display should be clearly labelled to show the location of the sensor to which it refers. This applies also to multiple anemometers used at many aerodromes. In those cases, it is usually arranged that ATS units need not be provided with local special reports (SPECIAL) indicating significant changes in those elements.

2.2 It is highly desirable that TWRs and APPs be equipped with remote displays providing:

a) visibility;
b) the height of the cloud base; and
c) temperature and dew-point temperature.

2.3 It is important that the displays mentioned in above § be related to the same locations and fed from the same sensors as the corresponding displays in the meteorological office and/or station.

2.4 Integrated automatic systems for the acquisition, processing, dissemination and display, in real time, of the meteorological parameters affecting landing and take-off operations must be deployed at aerodromes with Category II, III A and III B instrument approach and landing operations. These systems are also desirable for Category I approach and landing operations. Information concerning meteorological elements and phenomena indicated on remote displays of such systems in ATS units should also comply with the principles given above.

3 Information for TWRS and ATS Units Providing Approach Control Service

3.1 The following meteorological information is required to be supplied to a TWR, or ATS unit providing approach control service, by its associated meteorological office and local aeronautical meteorological station(s):

a) local routine and special reports (MET REPORT and SPECIAL), including trend forecasts, METAR and SPECI, TAF and amendments thereto, for the aerodrome concerned;

b) SIGMET and AIRMET information (if appropriate), wind shear warnings and alerts, and aerodrome warnings and, in the case of an approach control unit, also appropriate special air-reports for the airspace with which it is concerned;

c) any additional meteorological information as agreed upon locally (such as forecasts of surface wind for the determination of possible runway changes in the case of TWRs);

d) information received on volcanic ash cloud, for which a SIGMET message has not already been issued, as agreed between the meteorological and ATS authorities concerned; and e) information received on pre-eruption volcanic activity and/or volcanic eruption and volcanic ash cloud as agreed between the meteorological and ATS authorities concerned.

3.2 If agreed between the meteorological authority and the appropriate ATS authority, local special reports in respect of surface wind and other elements are not issued and supplied to a TWR, or an APP, if the TWR, or APP, has displays for these elements corresponding to the displays in the meteorological station concerned. Similarly, local special reports in respect of RVR are not issued and supplied to a TWR, or an APP, if the TWR, or APP, and the meteorological station concerned are

equipped with corresponding RVR displays or if changes in RVR are continuously reported to the TWR, or APP, by an observer at the aerodrome concerned. It is important that the appropriate meteorological and ATS authorities develop an agreement on all aspects of this practice for inclusion in the Letter of Agreement.

4 Information for ACCs or FICs

4.1 The following meteorological information is required to be supplied to an ACC or FIC by its associated MWO:

a) METAR and SPECI, including current pressure data, trend forecasts and TAF (and amendments thereto) covering the FIR or the control area and, if required by the FICs or ACCs, covering aerodromes in neighbouring FIRs, as determined by regional air navigation agreement;

b) forecasts of upper winds, upper-air temperatures and significant en-route weather phenomena and amendments thereto (particularly those which are likely to render operations under visual flight rules impracticable), SIGMET and AIRMET information and appropriate special air-reports1 covering the FIR or control area concerned and, if required, covering neighbouring FIRs/control areas; Appropriate special air-reports are those which have not been incorporated in a SIGMET message.

c) any other meteorological information required by the FIC/ACC to meet requests from aircraft in flight. If the information requested is not available in the associated MWO, another meteorological office will be requested to supply it;

d) information received on volcanic ash cloud, for which a SIGMET message has not already been issued, as agreed between the meteorological and ATS authorities concerned;

e) tropical cyclone advisory information issued by the corresponding TCAC and received in accordance with regional air navigation agreement;

f) volcanic ash advisory information issued by the corresponding VAAC and received in accordance with regional air navigation agreement;

g) information received concerning the accidental release of radioactive materials into the atmosphere, as agreed between the meteorological and ATS authorities concerned; and

h) information received on pre-eruption volcanic activity and/or volcanic eruption as agreed between the meteorological and ATS authorities concerned.

4.2 The METAR and SPECI, TAF for other aerodromes and the SIGMET and AIRMET information for other FIRs that are to be provided to the FIC/ACC are determined by regional air navigation agreement. They are normally those which are located within two hours= flying time of the border of the local FIR to which there is traffic, including overflying traffic. It should be noted, however, that in order to meet the requirements for extended range operations and flights conducted under centralized operational control, the exchange of OPMET messages determined by air navigation agreement may also include additional reports from aerodromes beyond the two hours= flying time. Furthermore, in view of the importance of SIGMET information concerning volcanic ash and tropical cyclones for long-haul flights, the dissemination of this information and appropriate special air-reports for volcanic ash cloud (see 4.2) should be extended beyond the two hours= flying time to cover the whole of the routes to be flown. The messages resulting from such exchanges of OPMET information should be made available to the FICs and ACCs as agreed between the meteorological and ATS authorities concerned.

5 Information for ATS Units Providing Service for Low-Level Flights

Meteorological information required by the ATS units for low-level flights

5.1 Information on en-route meteorological conditions for low-level flights, including flights under visual flight rules (VFR), should cover the layer between the ground and flight level 100 (or up to flight level 150 in mountainous areas, or higher, where necessary). Owing to the variability of meteorological conditions, which may be markedly affected by the surrounding topography, information on actual en-route weather conditions and the relevant forecasts to be supplied to ACCs/FICs and/or to respective VFR positions in the centres are usually specified for smaller topographically homogenous geographical sub-areas of the FIR/control area concerned. Such sub-areas are defined by the meteorological authority in coordination with users and the ATS authority.

5.2 In view of the higher sensitivity of low-level flights and, in particular, VFR operations, to some weather conditions and phenomena, the information supplied to the ATS units concerned should include detailed specifications regarding the horizontal and vertical distribution of these conditions and phenomena and their intensity. Low cloud base and visibility conditions represent limiting factors for low-level flights, particularly VFR flights. It is clear that the meteorological phenomena that may affect the safety of flight operations at cruising levels and are subject to the issuance of SIGMET information also affect the safety of low-level operations. In addition, there are other weather phenomena (such as moderate icing, moderate turbulence, isolated thunderstorms, cumulonimbus (CB) and towering cumulus (TCU) clouds, mountain obscuration, moderate mountain wave, and areas with widespread strong surface wind) that are of significance to the safety of low-level flight operations. Information concerning all of these phenomena should be supplied to the ATS units concerned.

5.3 The processed data from ground-based weather radar and meteorological satellites may complement the information on actual weather conditions obtained from meteorological stations and aircraft in flight. These data are important for the issuance of forecasts and advisories prepared to support low-level operations.

5.4 he meteorological information to be supplied to ACCs/FICs, as outlined in above, constitutes the basis for the information to be supplied to the ATS units providing the service for low-level operations. Nevertheless, it is important that *all* available information on weather conditions which are likely to render lowlevel operations en route impracticable, including VFR flights, is made available to the ATS units concerned. All special and non-routine aircraft observations and reports received (or obtained), together with the relevant SIGMET in force, should be closely watched and employed by personnel. The role and purpose of AIRMET information are discussed below.

5.5 Pressure data for altimeter settings throughout the FIR/control area concerned should be available in the ATS units concerned. The lowest QNH forecast values for the FIR/control area or their subareas should be made available to the ACCs/FICs (and their VFR positions) concerned.

5.6 Upper wind and upper-air temperature forecasts supplied to the ATS units should relate to the layer up to flight level 100, or 150 in mountainous terrain, and should be presented at least for the altitudes of 600, 1 500 and 3 000 m (2 000, 5 000 and 10 000 ft) and 4 500 m (15 000 ft) in mountainous areas and for points separated by no more than 500 km (300 NM). The height indications of freezing level(s) for the layer should also be included, if applicable.

5.7 TAF and, if required, trend forecasts and aerodrome and wind shear warnings and alerts should be available in the ATS units concerned to be used in support of the approach, landing, take-off and climbout phases of low-level flights.

Information to be supplied to low-level flights by the ATS units

5.8 It should be noted that the meteorological information dealt with above is used by ATS units mostly for flight information service purposes. ATS units providing service for low-level operations must also ensure that:

a) SIGMET messages are relayed, as appropriate, to aircraft in flight;

b) special air-reports are relayed, as appropriate, to aircraft in flight until such time as a corresponding SIGMET is issued; and

c) where AIRMET information is issued in accordance with regional air navigation agreement, this information is relayed, as appropriate, to aircraft in flight.

6 Information for Air-Ground Control Radio Stations, VOLMET Broadcasts and Uplink of OPMET Data to Aircraft in Flight

6.1 Where necessary for flight information purposes, METAR and SPECI and TAF can be supplied to air-ground control radio stations. A copy of such information shall be forwarded to the FIC or ACC concerned.

6.2 The ATS unit designated to provide VHF or HF VOLMET broadcasts, in accordance with the relevant requirement in the regional air navigation plan, will be supplied with the necessary METAR/SPECI and, if required, associated trend forecasts, SIGMET messages and TAF, from a meteorological office or a communications centre designated by the meteorological authority. Guidance on the phraseologies to be used when compiling VOLMET broadcast transmissions is given in Doc 9377 Appendix 1.

6.3 In the CNS/ATM environment, many of the flight information services carried out at present using continuous broadcasts, general calls or directed transmissions from the appropriate ATS unit, will be replaced by data link services. Two specific data link services have already been developed for meteorological information, which will require coordination between the ATS and meteorological authorities concerned:

a) data link VOLMET service (D-VOLMET); and

b) data link automatic terminal information service (D-ATIS). The D-VOLMET and D-ATIS will replace the corresponding VOLMET and ATIS broadcasts. The D-VOLMET service will include the data link flight information service (D-FIS), including METAR/SPECI, SIGMET and TAF applications.

7 Information for RCCs and RSCs

7.1 Information to be supplied on request to RCCs and RSCs should include the meteorological conditions that existed in the last known position of a missing aircraft and along the intended route of that aircraft with particular reference to:

a) significant en-route weather phenomena;

b) cloud amount and type (particularly cumulonimbus), height indications of bases and tops;

c) visibility and phenomena reducing visibility;

d) surface wind and upper wind;

e) state of ground, in particular, any snow cover or flooding;

f) sea-surface temperature, state of the sea, ice cover if any and ocean currents, if relevant to the search area; and

g) sea-level pressure data.

7.2 On request from the RCC, the designated meteorological office (usually the associated MWO) should arrange to obtain for the RCC and RSC details of the meteorological forecast given in the flight documentation supplied to the missing aircraft and any amendments subsequently issued. It should also supply to aircraft and/or ships undertaking search and rescue operations information on current and expected meteorological conditions en route to and in the search area or at the scene of the accident.

8 Emergencies

8.1 Any meteorological information requested by an ATS unit or an RCC or RSC in connection with an aircraft emergency is to be supplied as rapidly as possible. Following notification by the ATS unit in charge that an aircraft accident/incident has occurred in the vicinity of an airport, meteorological stations should:

a) make a special accident/incident observation, either manually or prompted through the automated observing system in use;

b) mark the time on all instrument recordings; and

c) ensure that all pertinent meteorological observation and forecast data are retained for at least 30 days.

8.2 Copies of the flight documentation that was supplied to flight crew members and which, in accordance with Annex 3, is to be retained or stored in computer memory for a period of at least 30 days, should be made available on request for aircraft accident/incident inquiries. The flight documentation produced by the relevant WAFC (significant weather forecasts, upper-air forecasts, etc.) and supplied to the personnel involved in the accident/incident investigation should, if necessary, be validated by the WAFC concerned.

9 Communication between ATS Units and Meteorological Centres, Offices and Stations

9.1 Suitable telecommunications facilities should be provided to permit meteorological offices and aeronautical meteorological stations to supply the necessary meteorological information to ATS units and to respond quickly to requests for non-routine information. The telecommunications facilities should also permit the transmission of meteorological information and requests for information from ATS units to meteorological offices and stations. It is particularly important that the telecommunications facilities permit the rapid and reliable exchange of information between meteorological offices and search and rescue services units.

9.2 Telecommunications facilities between meteorological offices and/or aeronautical meteorological stations, and TWRs and/or APPs should permit communications by direct speech, the speed with which such communications can be established being approximately 15 seconds (this requirement can be met if switchboards are used).

9.3 Telecommunications facilities between MWOs and ACCs, FICs and/or RCCs should permit contacts between the respective offices and centres to be established within approximately 15 seconds. In addition, for printed communications, when a record is required, the transit time should not exceed 5 minutes.

9.4 The telecommunications facilities mentioned above may be supplemented by other forms of communications (e.g. data, visual and audio).

9.5 Although computerized automated information systems, automatic meteorological observing stations, closed-circuit television or automatic data transfer using keyboard input and video display units (VDUs) are employed for transmitting information from meteorological offices and stations to ATS units, this does not remove the need for efficient speech circuits.

9.6 Where non-routine data (special reports, SIGMET and AIRMET information, warnings, etc.) are transmitted in addition to routine data via methods such as automated information systems, automatic meteorological observing stations, closed-circuit television, VDUs and audio communications, aural and visual arrangements are needed to draw attention to this information (e.g. by means of a cueing feature). If such messages are supplied by direct-speech communications, a confirmatory hard copy of these messages may also be required.

9.7 In an increasing number of cases, information is supplied to certain ATS units (particularly FICs/ACCs) by more than one meteorological office, using various sources of information and methods of communication. In such cases an agreement should be developed between the meteorological and ATS authorities concerned regarding the supply of necessary OPMET messages to ACCs and FICs direct from international sources of OPMET information (e.g. SADIS and ICAO regional schemes for OPMET data exchange, such as AMBEX and ROBEX). Similarly, ACCs and FICs may be offered access to the communications systems/networks of the meteorological authority of the State concerned and to international OPMET data banks.

9.8 Finally, it should be noted that suitable means of communication should be agreed for the transmission of tropical cyclone and volcanic ash advisories from TCACs and VAACs to the FICs and ACCs concerned.