
GEN 3.5 METEOROLOGICAL SERVICES

1. RESPONSIBLE SERVICE

The meteorological services for civil aviation are provided by:

1.1 Hungarian Meteorological Service

Unit of Aviation Meteorology

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The services are provided in accordance with the provisions contained in the following ICAO documents:

- ICAO Annex 3 - Meteorological Service for International Air Navigation;
- ICAO Doc 7030 – Regional Supplementary Procedures;
- ICAO Doc 7754 – Air Navigation Plan / European Region;
- ICAO Doc 8400 – Abbreviation and Codes;
- ICAO Doc 8896 – Manual of Aeronautical Meteorological Practice.

2. AREA OF RESPONSIBILITY

The meteorological service is provided for the Budapest FIR.

3. METEOROLOGICAL OBSERVATIONS AND REPORTS

3.1 General Information concerning the execution of Flight Weather Observation in Hungary

Meteorological observations and reports from aeronautical meteorological stations are provided and disseminated according to ICAO Annex 3 regulations.

Flight Weather Observation will be executed depending on personal availabilities as follows:

HUMAN OBS: Local manually:

- Without particular identification label for METAR, SPECI, MET REPORT, SPECIAL
- **Quality Control On-Site**
- Meteorological data acquisition is done with a semiautomatic operational system which allows manual inputs for all weather parameters
- TREND manually
- Supplementary Information manually as required by the weather situation

AUTO OBS: Automatic WITH TREND:

- With "AUTO" as particular label for METAR, SPECI, MET REPORT, SPECIAL
- **Plausibility Check**
- Meteorological data acquisition is done with a full automatic operational system which allows limited manual inputs for:
 - TREND manually
 - Supplementary Information manually as required by the weather situation

AUTO OBS: Automatic WITHOUT TREND:

- With "AUTO" as particular label for METAR, SPECI, MET REPORT, SPECIAL
- Meteorological data acquisition is done with a full automatic operational system which does not allow manual inputs and therefore WITHOUT:
 - Quality Control
 - Plausibility Check
 - TREND
 - Supplementary Information

3.2 General Information concerning AUTOMATIC FLIGHT WEATHER OBSERVATION - AUTO OBS

Fundamental differences HUMAN OBS versus AUTO OBS:

- HUMAN OBS processes a total picture of optical, acoustic and visual impressions on site that are representative of the airport and its vicinity and describes the conditions in the surroundings for elements visibility, cloud cover and weather phenomena.
- AUTO OBS processes the point measurements made by sensors in the airport area, which are usually considered to be representative for the area of the airport. AUTO OBS determines exclusively the conditions at the airport by measurement and calculation using algorithms. AUTO OBS can record weather phenomena which are to be reported in accordance with ICAO Annex 3 if they are within the detection range of the sensors.

No differences AUTO OBS opposite HUMAN OBS consist of:

- Wind
- Temperature / Dew Point
- Air pressure (QNH)
- RVR (RVR)

Differences and limitations of AUTO OBS opposite HUMAN OBS can be found at:

- **VISIBILITY AND ADDITIONAL VIEW:**

AUTO OBS determines the MET VIS by point measurement with forward-scatter-instruments to the TDZ and MID positions and extrapolating the measured values of up to 20 KM. The required summary values are calculated and reported in accordance with ICAO requirements.

HUMAN OBS determines the visual reference to visual targets in the area.

For RVR, there is no difference, as this is determined both HUMAN OBS and AUTO OBS by measuring the forward scattered light measurement systems and calculation.

- **CURRENT WEATHER PHENOMENA (PRESENT WEATHER):**

DRSN, BLSN and more, very rare phenomena in Hungary such as SA, SS, DU, FU, FC cannot be reported by AUTO OBS.

VC weather phenomena in the environment (Vicinity):

- VCTS may be reported by AUTO OBS
- VCSH and VCFG are not recognized

Clouding phenomena (FG, BR, HZ) are detected in AUTO OBS by the sensor. Algorithms ensure consistency with the sight. Deviations between AUTO and HUMAN OBS can occur (e.g. BCFG, PRFG) if, for example, fog occur beside the sensors.

FZFG is in the AUTO OBS according ICAO detected by checking with the air temperature, i.e., from $T < -0.5^{\circ}\text{C}$ FZ is reported.

Rare manifestations (SA, SS, DU, FU, FC) are not recorded and reported according to visibility as FG, BR or HZ.

Regarding precipitation some rare phenomena are not specified by the sensors. If detected, these other genera are assigned.

Comparisons have shown that the following differences between HUMAN OBS and AUTO OBS is to be expected:

- The precipitation is detected occasionally different, for example, DZ instead of RA, SN instead of SG.
- Mixed precipitation (RASN) is often reported by the sensor as RA or SN.
- In the evaluation of the intensity, there are often deviations between light/moderate and moderate/severe categories.
- There are also differences in the assignment of characterization SH.

AUTO OBS recognizes thunderstorm TS and VCTS. The data from Weather radar and lightning detection systems are used. The recording quality is good, but there may occasionally be incorrect detections because of wrong positioning of lightnings and unregistered lightning discharges.

The perception of visual and acoustic observations (thunder and lightning) is given at HUMAN OBS with greater reliability in detecting the near thunderstorms and the redundancy of the system components fail.

The lack of coverage of SQ in AUTO OBS is mitigated by the availability of current wind data.

- **CLOUDS (CLOUD TYPE AND CLOUD COVER):**

Ceilometers are positioned in the areas where the approach path intersects the relevant IFR approaches decision height. The measurement of the lower limit is determined by point measurement (principle laser gun).

Cloudiness is therefore only recorded in the AUTO OBS, when clouds appear above the sensors.

Cloud cover (FEW, SCT, ...): Calculation using algorithms based on all existing airport environmental sensors. From the period duration of the ceilometer detecting the presence of cloud amount is extrapolated:

- This works well for homogeneous cloud distribution and rapidly moving clouds.
- Clouds off the sensors cannot be detected.

- In stationary situations and orographic clouds significant differences between HUMAN OBS and AUTO OBS may result.

CB and TCU clouds are detected by weather radar and lightning detection system. The degree of coverage and the height of cloud base, however, cannot be determined automatically. Therefore, it is reported in AUTO OBS as ///.

SKC is not reported: AUTO OBS reports "NCD = no cloud detected" when no clouds are detected by the sensors.

CAVOK is reported in AUTO OBS.

Comparisons have shown that in rare cases groups of clouds are reported FEW001 or FEW002 by false detections of the sensors in the AUTO OBS, although although there are no clouds.

• **MONITORING and FAILURE:**

The system for the production and distribution of AUTO METAR is monitored REMOTE by MET and centrally by the technical service of Hungarian Meteorological Service. In case of technical failure of individual sensor, the missing data are replaced by slashes as usual in AUTO reports.

3.3 Meteorological observations at airports

Name of station / Location Indicator	Type and frequency of observations/ automatic observing equipment	Types of MET reports and Supplementary Information included	Observation System and Site(s)	Hours of operation	Climatological information
1	2	3	4	5	6
Budapest Liszt Ferenc International Airport LHBP	Half hourly plus special observations	METAR, SPECI, MET REPORT, SPECIAL, TREND, WS	SFC wind sensors: see AD Chart RVR EQPT: see AD Chart Ceilometer: see AD Chart Thermometer: see AD Chart Pressure tube: at 13L ILS	H24	Climatological tables available on request
Debrecen International Airport LHDC	Half hourly plus special observations	METAR AUTO, SPECI AUTO, TREND*, WS**	SFC wind sensors, RWY thermometer: at 22L TDZ SFC wind sensors, thermometer, pressure tube, visibility instrument: at 04R GP Ceilometer: at NDB 295	H24 *2 hours before AD HR SER and AD HR SER ** AD HR SER	Climatological tables available on request
Pecs-Pogany Airport LHPP	Half hourly plus special observations	METAR AUTO, SPECI AUTO, WS*	SFC wind sensors, thermometer, pressure tube: at 34 GP SFC wind sensors RWY thermometer: at 16 TDZ Ceilometer: at centerline 34, 900M from THR	H24 * AD HR SER	Climatological tables available on request

Name of station / Location Indicator	Type and frequency of observations/ automatic observing equipment	Types of MET reports and Supplementary Information included	Observation System and Site(s)	Hours of operation	Climatological information
1	2	3	4	5	6
Heviz-Balaton Airport/Sarmellek LHSM	Half hourly plus special observations	METAR AUTO, SPECI AUTO, TREND*, WS**	SFC wind sensors, thermometer, pressure tube, visibility instrument: at 16 GP SFC wind sensors, RWY thermometer: at 34 TDZ Ceilometer: at centerline 16, 1200M from THR	H24 *2 hours before AD HR SER and AD HR SER ** AD HR SER	Climatological tables available on request
Gyor-Per Airport LHPR	Half hourly plus special observations	METAR AUTO, SPECI AUTO, TREND*, WS**	SFC wind sensors, thermometer, pressure tube, visibility instrument: at 29 GP SFC wind sensors, RWY thermometer: at 11 TDZ Ceilometer: at centerline 29, 450M from THR	H24 *2 hours before AD HR SER and AD HR SER ** AD HR SER	Climatological tables available on request

Automated aviation meteorological reports:

Automated aviation meteorological observations for Debrecen International Airport (LHDC), Heviz-Balaton Airport (LHSM) and Gyor-Per Airport (LHPR) Aviation in the form of METAR and SPECI are created and disseminated and marked with „AUTO” according to the following conditions:

- All meteorological parameters which are part of human aviation meteorological reports corresponding to ICAO Annex 3, i.e. including TCU, CB, TS, VCTS. Please note that the automated reporting of TCU and CB will not contain TCU/CB amount and TCU/CB height of base.
- TREND (2 hours before operational time and in operational time)
- Supplementary information

Example:

METAR LHPR 241115Z **AUTO** 25003KT 210V290 5000 BR OVC005 15/14 Q1019 **BECMG 6000 NSW BKN015=**

Automated aviation meteorological observations for Pecs-Pogany Airport (LHPP), in the form of METAR and SPECI are created and disseminated and marked with „AUTO” according to the following conditions:

- All meteorological parameters which are part of human aviation meteorological reports corresponding to ICAO Annex 3, i.e. including TCU, CB, TS, VCTS. Please note that the automated reports of TCU/CB will not contain TCU/CB amount and TCU/CB height of base.
- NO TREND
- Supplementary Information

Example:

METAR LHPP 240545Z **AUTO** 07002KT 0650 R34/1000D FG FEW003 11/10 Q1019=

The generation of automated aviation meteorological reports is based on measurements at specific locations and algorithms only and not on human observations. A plausibility check of the measured observational data before they are disseminated is done from a remote observing site with the help of video cameras.

3.4 Meteorological Observing Stations at Military Aerodromes

- LHKE Kecskemet
- LHPA Papa
- LHSN Szolnok

Manual Observation Sites are under continuous quality check control by Military Aerodromes.

3.5 Weather radar stations

Synop No.	Name of station	Coordinates	ELEV (FT)	Coverage (radius)
1	2	3	4	5
12843	Budapest-Lorinc	N47.4294 E19.1817	528	240 KM
12892	Napkor	N47.9622 E21.8866	501	240 KM
12921	Poganyvar	N46.6603 E17.0624	1020	240 KM
12985	Szentes	N46.6396 E20.4325	406	240 KM
12840	Harmashegy	N46.1775 E18.3372	2057	240 KM

4. TYPES OF SERVICES**4.1 Meteorological information for Civil Aviation****a) General**

Meteorological information for Civil Aviation normally consists of documentation and if necessary consultation. The provision of flight documentation is arranged by Hungarian Meteorological Service via e-mail. For all aerodromes, consultation is available by telephone.

b) Documentation

Meteorological flight documentation consists of:

- METAR/SPECI for aerodrome of departure, destination and alternate aerodromes
- TAF for aerodrome of departure, destination and alternate aerodromes
- SIGWX charts and upper-wind/temperature charts
- SIGMET and SPECIAL AIREP en-route
- Volcanic Ash Advisory, Tropical Cyclone Advisory and Space Weather Advisory

For every flight the following charts are available:

Region	SWL	SWM	SWH	FL 050	FL 100	FL 140	FL 180	FL 240	FL 270	FL 300	FL 340	FL 390	FL 450	FL 530
EUR	a	b	b	x	x	x	x	x	x	x	x	x	x	x
MID			c	c	c	c	c	c	c	c	c	c	c	c
NAT			c	c	c	c	c	c	c	c	c	c	c	c
AFI			c	c	c	c	c	c	c	c	c	c	c	c

SWL = Low Level Significant Weather Chart (Surface - FL 100)

SWM = Medium Level Significant Weather Chart (FL 100 - FL 250)

SWH = High Level Significant Weather Chart (FL 250 - FL 450)

a. available via website:

URL: <https://aviation.met.hu>

and available at Aerodrome Meteorological Offices

SWL available for Central-European Region for fixed time of 0600, 1200 and 1800 UTC.

b. mixed version of SWM and SWH (FL 100 - FL 450)

c. by prior request

Additional information is available by consultation.

c) Consultation

The Hungarian Meteorological Service supplies the pilot-in-command with a detailed explanation of the existing synoptic situation and the expected weather conditions during the flight via telephone.

4.2 Meteorological Information for General Aviation**4.2.1 Written briefing**

The service is provided H24.

Information is accessible via the following website:

URL: <https://aviation.met.hu>

To use the website pilots have to register for the services, registration will also help to prove that every necessary weather information was acquired before their flight. After the preliminary registration the general aviation bulletins such as METARs, SPECIs, TAFs, GAMETs, AIRMETs and SIGMETs, as well as Weather information with forecast for hazardous weather elements in chart form will be made available, however the full service is not free of charge.

The informations listed below

1. Free of charge

a. Bulletins

- METARs issued every 30/60 minutes
- TAFs issued every three/six hours
- GAMETs issued twice a day, 0500 UTC for 0600-1200 UTC and 1100 UTC for 1200-1800 UTC
 - strong surface wind speed (>30KT)
 - low surface visibility (≤5KM) + weather
 - significant weather phenomena
 - significant clouds
 - icing
 - turbulence
 - applicable SIGMET
- SPECIs issued if necessary
- AIRMETs issued if necessary
- SIGMETs issued if necessary

b. Observation

- ground-based observation
- radar
- lightning
- satellite

c. Weather information: general forecast and warning for hazardous elements in chart form for Hungary issued in every three hours as follows:

Time of issue (UTC)	Validity period (UTC)	
	Summer time (1 April - 30 September)	Winter time (1 October - 31 March)
0300	0300-1200	-
0600	0600-1500	0600-1500
0900	0900-1800	0900-1800
1200	1200-2100	1200-1800
1500	1500-2100	1500-1800
1800	1800-2100	-

d. Low level significant weather chart (LLSIGWX) issued three times a day as follows:

Time of issue (UTC)	Validity time (UTC)
0200	0600
0800	1200
1400	1800

e. Outlook in meteogram form is provided for planning purposes (not MET briefing) for given locations.

2. Services for fee

Forecast charts for Hungary twice a day

- wind forecasts for different levels up to 3000M

- wind and temperature chart
- 0 °C heights
- thermal lift for gliders and para-gliders
- forecast for hot-air ballooning
- forecast for mountain wave gliding
- instability parameters

4.2.2 Verbal briefing

Verbal consultation can be achieved H24 in Hungarian and English language by dialling telephone number (charged) (+36) 90-603-424.

5. NOTIFICATION REQUIRED FROM OPERATORS

Notification from operators in respect of briefing, consultation, flight documentation and other meteorological information needed by them (ref. ICAO Annex 3, 2.3) is normally required for non-scheduled intercontinental flights. Such notification should be received at least six hours before the expected time of departure.

6. AIRCRAFT REPORTS

Special observations shall be made and reported by all aircraft whenever the following conditions are encountered or observed:

1. moderate or severe turbulence; or
2. moderate or severe icing; or
3. severe mountain wave; or
4. thunderstorms, with or without hail, that are obscured, embedded, widespread or in squall lines; or
5. heavy dust storm or heavy sandstorm; or
6. volcanic ash cloud; or
7. pre-eruption volcanic activity or a volcanic eruption; or
8. RWYCC given differs from the actual value based on the opinion of the crew; or
9. on request by MET-office.

Other conditions which shall be reported by all aircraft when encountered or observed:

1. other meteorological conditions which, in the opinion of the pilot-in-command, may affect the safety or markedly affect the efficiency of other ACFT operations, for example, the en-route weather phenomena specified for SIGMET messages are encountered;
2. wind shear encountered during the climb-out or approach phases of flights, not previously reported to the pilot-in-command, which in his/her opinion are likely to affect the safety of other aircraft operations.

7. VOLMET SERVICE

Name of transmitting station	Call sign / IDENT / Abbreviation (EM)	Channel	Broadcasting period	Hours of service	Aerodromes / areas included	Contents and formats of REP and remarks
BUDAPEST	BUDAPEST VOLMET (A3E)	127.405 CH	H + 05, H + 35	H24	Budapest Praha Bratislava Bucuresti Beograd Wien Budapest FIR	METAR + TREND METAR + TREND METAR + TREND METAR + TREND METAR + TREND METAR + TREND SIGMET

8. SIGMET AND AIRMET SERVICE

Name of MWO ICAO Location Indicator	Hours	FIR or CTA served	SIGMET validity periods	Specific procedures to SIGMET	Procedures applied to AIRMET	ATS unit served	Additional information
BUDAPEST (Hungarian Meteorological Service/Unit of Aviation Meteorology) LHBM	H24	Budapest FIR	1-4 HRS	SIGMET VA validity 6 HRS	Validity 1-4 HRS. Issued only BTN 0600-1800 UTC as AMENDMENT for GAMET	Budapest ACC	If no AIRMET is issued, the significant weather INFO is stated in the GAMET forecast.

8.1 General

For the safety of air traffic, the Hungarian Meteorological Service - Unit of Aviation Meteorology as Meteorological Watch Office (MWO) maintains an area meteorological watch and warning service. The service consists of the continuous weather watch within the Budapest FIR and if necessary, the issuance of appropriate SIGMET and AIRMET information.

8.2 Area meteorological watch service

The area meteorological watch service is performed by the Hungarian Meteorological Service - Unit of Aviation Meteorology. The MWO issues SIGMET and AIRMET information in accordance with ICAO Annex 3. Chapter 7 and Appendix 6.

8.2.1 SIGMET and AIRMET

SIGMET information is an information issued by a Meteorological Watch Office concerning the occurrence or expected occurrence of specified en-route weather phenomena which may affect the safety of aircraft operations.

SIGMET information for the Budapest FIR is disseminated internationally as well as nationally and will be broadcast by Budapest VOLMET.

SIGMET refer to the following phenomena:

- OBSC, EMBD, FRQ, SQL thunderstorms with or without hail
- severe turbulence
- severe icing
- severe icing due to freezing rain
- severe mountain waves
- volcanic ash cloud
- heavy duststorm
- heavy sandstorm
- radioactive cloud

SIGMETs concerning tropical cyclones are not issued by MWO due to meteorological reasons.

SIGMETs are numbered sequentially from 0001 UTC.

AIRMET information gives a concise description in abbreviated plain language, concerning the occurrence or expected occurrence of specified en-route weather phenomena.

AIRMET information is provided by MWO Budapest and refers to the portion of Budapest FIR from the ground up to FL100

AIRMET is used as amendment of GAMET.

AIRMET information refers to the following phenomena:

- widespread mean surface wind speed above 30 KT
- widespread area of visibility less than 5000 M
- widespread area of BKN or OVC CLD with cloud base below 1000 FT AGL
- ISOL, OCNL thunderstorms with or without hail
- ISOL TCU, OCNL TCU, FRQ TCU, ISOL CB, OCNL CB, FRQ CB
- moderate icing
- moderate turbulence

AIRMETs are numbered sequentially from 0001 UTC.

AIRMET messages relevant to the Budapest TMA will be included in the ATIS broadcast for Budapest Liszt Ferenc International Airport.

Transmission of SIGMET and AIRMET information will only be made by the ATC units of Budapest ATS centre in the case of equipment failure or when requested by the pilot.

The flight information sectors of the Budapest ATS centre will communicate SIGMET and AIRMET for Budapest FIR without pilot request to aircraft operating on flight plan and maintaining radio communication.

8.2.2 SPECI and TAF AMD

SPECI and TAF AMD for foreign aerodromes are provided by the ATS units on pilot request only.

The flight information sectors of the Budapest ATS centre will communicate SPECI and TAF AMD for individual domestic aerodromes to aircraft without the need for the pilot to request such information.

9. OTHER AUTOMATED METEOROLOGICAL SERVICES

Service name	Information available	Area, route and aerodromes covered	Telephone, telefax, email, website address
1	2	3	4
Internet website	OPMET, satellite imagery, weather-radar info, lightning data, charts of MSL pressure, meteorological measurements and observation for HU, SIGWX charts, aviation weather warning, special weather forecast for GA	Hungary, Central Europe	https://aviataion.met.hu registration needed
eGAFOR forecast	Probabilistic, graphical, colour-coded Low Level Forecast (LLF) for VFR Flights up to FL100 with an assessment of the impact of MET phenomena on flight routes Uniform, cross border harmonized product	Budapest FIR and other FIRs in central and SE part of Europe	https://www.egafor.eu/ https://aviation.met.hu/hu/egafor/

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