

GEN 3.5 METEOROLOGICAL SERVICES

1 Responsible Service

- 1.1 The Civil Aviation Authority is the Meteorological Authority for the United Kingdom (UK). This authority is derived from Directions issued under section 66(1) of the Transport Act 2000 relating to the Civil Aviation Authority's performance of air navigation functions. The policy of the UK Met Authority is to discharge its responsibilities for the provision of meteorological services to UK based national and international civil aviation operations in accordance with International, European, and National requirements as may be promulgated from time to time including EASA Implementing Regulation (EU) 1035/2011, ICAO Annex 3 and CAP 746.

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- 1.2 Meteorological forecasting and climatological services for civil aviation in the United Kingdom are provided by the Met Office designated as the Meteorological Air Navigation Service Provider (ANSP) for the UK under the EU Service Provision Regulation:

Post: Executive Head of Air Transport, Met Office, Fitzroy Road, Exeter, EX1 3PB →

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- 1.3 Applicable ICAO Documents

- 1.3.1 The Standards, Recommended Practices and, when applicable, the procedures contained in the following ICAO documents are applied:

Annex 3	- Meteorological Service for International Air Navigation;
Doc 7754	- Air Navigation Plan - EUR Region;
Doc 8400	- PANS - ICAO Abbreviations and Codes;
Doc 8755	- Air Navigation Plan - NAT Region;
Doc 8896	- Manual of Aeronautical Meteorological Practice;
Doc 9328	- Manual of Runway Visual Range Observing and Reporting Practices.

- 1.3.2 The UK Met Authority's objective is to supply operators, flight crew members, ATS units, airport management and other civil aviation users with the meteorological information necessary for the performance of their respective functions, thus contributing towards the safety, regularity and efficiency of air navigation. All ICAO Annex 3 standards and recommended practices, including ICAO definitions listed in Chapter 1 of Annex 3, are applied in the UK unless a difference has been filed with ICAO. UK differences from ICAO standards and recommended practices are listed in GEN 1.7.

2 Area of Responsibility

- 2.1 The United Kingdom provides area Meteorological Watch for the London and Scottish FIR/UIR and for the Shanwick FIR/OCA. The Met Office's Operations Centre, Exeter, acts as the Meteorological Watch Office (MWO) for these areas.
- 2.2 The UK operates one of the two World Area Forecast Centres (WAFC), responsible for the provision of global forecasts of significant weather and the following global grid point data; wind, temperature, humidity, tropopause height and temperature, maximum wind speed, direction and height. In the event of an interruption of the operation of a WAFC, its functions will be provided by the other WAFC. Additionally, the UK operates a Volcanic Ash Advisory Centre; further information on this service can be found at <http://www.icao.int/safety/meteorology/iawwopsg/Pages/default.aspx>

3 Meteorological Observations and Reports

3.1 Observing Systems and Operating Procedures

- 3.1.1 Surface wind sensors on aerodromes are positioned to give the best practical indication of the winds which an aircraft will encounter during take-off and landing within the layer between 6 and 10 m above the runway(s). The surface wind reported for take-off and landing by ATS Units at aerodromes supporting operations by aircraft whose maximum total weight authorised is below 5700 kg is usually an instantaneous wind measurement with direction referenced to Magnetic North. However, at other designated aerodromes the wind reports for take-off and landing are averaged over the previous 2 minutes. Variations in the wind direction are given when the total variation is 60° or more and the mean speed above 3 kt, the directional variations are expressed as the two extreme directions between which the wind has varied in the past 10 minutes. In reports for take-off, surface winds of 3 kt or less include a range of wind directions whenever possible if the total variation is 60° or more. Variations from the mean wind speed (gust and lulls) during the past 10 minutes are only reported when the variation from the mean speed has exceeded 10 kt. Such variations are expressed as the maximum and minimum speeds attained.
- 3.1.1.1 At aerodromes which normally report surface wind averaged over the previous 2 minutes, the instantaneous wind velocity is available on request. Where an instantaneous wind velocity has been requested the word 'instant' will be inserted in the report

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(eg. 'G-CD Runway 34 cleared to land instant surface wind 270 7' or 'G-CD Runway 34 cleared to land instant 270 7'). An indication of the wind velocity normally reported at particular aerodromes is included in Table 3.5.3.2. Aerodromes not featuring in the Table use instant reports with the exception of Wycombe Air Park where an averaged value is normally used.

- 3.1.1.2 Surface wind measurements contained in METAR and SPECI reports are referenced to True North and are averaged over the previous 10 minutes, except when during the 10 minute period there is an abrupt and sustained change in wind direction of 30° or more, with a wind speed of at least 10 kt both before and after the change, or a change in wind speed of 10 kt or more lasting more than 2 minutes. In this case only data occurring since the abrupt change will be used to obtain the mean values. METAR and SPECI reports may give variations in wind direction if during the 10 minute period preceding the time of observation, the total variation in wind direction is 60° or more and the speed greater than 3 kt. The maximum speed is only given if it exceeds the mean speed by 10 kt or more. At aerodromes with wind sensors at two or more sites, METAR surface wind reports are always obtained from one designated 'aerodrome system' irrespective of the system currently in use by the ATS Unit for take-off and landing reports.
- 3.1.2 Information on cloud height is obtained by the use of ceilometers (typically laser), cloud searchlights and alidades, balloons, pilot reports and observer estimation.
- 3.1.3 Temperature is reported in whole degrees from liquid-in-glass or electrical resistance thermometers located in a ventilated screen.
- 3.1.4 Horizontal surface visibility is assessed by human observer, assisted at some aerodromes by a visimeter. Visibility is reported in increments of 50 m up to and including 800 m and then increments of 100 m up to 5000 m and in units of kilometres for 5000 m or more.
- 3.1.4.1 Pilots are reminded that surface visibility forecast in a TAF, TREND or Area Forecast might be subject to marked deterioration caused by smoke at any time. Such deteriorations in surface visibility will be reported as they occur in routine or special aerodrome meteorological reports and forecasts might consequently be amended. It is not possible to forecast the onset or cessation of the smoke, or the precise amount of visibility deterioration. Turbulence and breathing difficulty might be encountered in the area affected by the smoke.

3.2 Accuracy of Meteorological Measurement or Observation

The United Nation's World Meteorological Organisation (WMO) has assessed the attainable accuracy of meteorological measurement or observation of a number of meteorological parameters, described below. However it should be noted that in most cases this exceeds the requirements for aeronautical meteorological observations specified by ICAO.

Element	Accuracy of Measurement or Observation
Mean surface wind	Direction: $\pm 5^\circ$ Speed: ± 1 kt up to 10 kt, $\pm 10\%$ above 10 kt
Variations from the mean surface wind speed	± 1 kt
Visibility	± 50 m up to 550 m $\pm 10\%$ between 600 m and 1500 m $\pm 20\%$ above 1500 m
RVR	± 10 m from 50 m to 400 m ± 25 m from 400 m to 800 m $\pm 10\%$ above 800 m
Cloud amount	± 1 okta
Cloud height	± 30 ft up to 300 ft $\pm 10\%$ above 300 ft
Air temperature and dew point temperature	$\pm 1^\circ\text{C}$
Pressure value (QNH, QFE)	± 0.5 hPa

3.3 Details of Meteorological Observations and Reports for UK aerodromes are listed in Table 3.5.3.2.

3.4 Aerodrome Warnings

3.4.1 Aerodrome Warnings will be issued at the times shown in the table below, and for the periods of validity indicated, if one or more of the specified phenomena occurs or is expected to occur (Note: Thunderstorms will have at least 15 minutes lead time):

Set review and Issue Times between (See Note)	Maximum Validity Period Thunderstorm warnings	Maximum Validity Period All other warnings
0530 - 0545	0600 - 1200	1200 - 1800
1130 - 1145	1200 - 1800	1800 - 0000
1730 - 1745	1800 - 0000	0000 - 0600 (next day)
2330 - 2345	0000 - 0600 (next day)	0600 - 1200 (next day)
Note: For operational reasons certain aerodromes will be provided with an Enhanced Warning Service and at these aerodromes warnings will be issued and amended 24/7 as required.		

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- (a) Gales (when the mean surface wind is expected to exceed 33 kt, and/or if gusts are expected to exceed 42 kt);
- (b) Strong wind warnings (When the surface wind is expected to reach or exceed mean wind speed 20 kt and/or gusts of 28 kt);
- (c) thunderstorms, hail or squalls;
- (d) snow, including the:
 - (i) time of onset;
 - (ii) intensity (slight, moderate or heavy);
 - (iii) expected time of cessation (including thaw if appropriate);
 - (iv) approximate depth of snow likely (cm) and;
 - (v) type of snow (Wet or Dry);
 - (vi) possibility of drifting (significant falls of snow with high winds (>15 kt);
 - (vii) visibility when expected to fall below 600 m.
- (e) frost warnings are issued when any of the following conditions are expected:
 - (i) A ground frost with air temperatures not below freezing point;
 - (ii) the air temperature above the surface is below freezing point (air frost);
 - (iii) frozen deposits (hoar frost, rime or glaze) are expected to form on parked aircraft, runways or taxiways.
- (f) fog (when the visibility is expected to fall below 600 m);
- (g) freezing rain or drizzle. precipitation.

Amendments or cancellations will not be issued.

3.4.2 Aerodrome operators requiring notification of the above warnings should apply to the MET Authority (see GEN 3.5 paragraph 1).

3.4.3 The normal method of notifying Aerodrome Warnings is by a single AFS or email to the aerodrome, with local dissemination of the warning being the responsibility of the aerodrome operator. Warnings will also be published on the Met Office website: <http://www.metoffice.gov.uk/aviation/ga-briefing-services> and all aviation users can register via the website to receive email alerts.

3.5 Special Facilities

3.5.1 Marked Temperature Inversion

3.5.1.1 At certain aerodromes annotated at Table 3.5.3.2, a Warning of Marked Temperature Inversion is issued whenever a temperature difference of 10°C or more exists between the surface and any point up to 1000 ft above the aerodrome. This warning is broadcast on departure and arrival ATIS at aerodromes so equipped, or in the absence of ATIS passed by radio to departing aircraft before take-off, and to arriving aircraft as part of the report of aerodrome meteorological conditions.

3.5.2 Windshear Warning Service - London Heathrow Airport

3.5.2.1 Forecasters for London Heathrow airport regularly review the weather conditions and monitor aircraft reports of windshear experienced on the approach or climb out. Where a potential low level (below 1600 ft) windshear condition exists, a Warning is issued; this will be based on one or more of the following criteria:

- (a) Mean surface wind speed at least 20 kt;
- (b) the magnitude of the vector difference between the mean surface wind and the gradient wind (an estimate of the 2000 ft wind) at least 40 kt;
- (c) thunderstorm(s) or heavy shower(s) within approximately 5 nm of the airport.

Note 1: Warnings are also issued based on recent pilot reports of windshear on the approach or climb-out.

Note 2: Windshear warnings will be cancelled when aircraft reports indicate that windshear no longer exists.

3.5.2.2 The Warning message is given in the arrival and departure ATIS broadcasts at Heathrow in one of three formats:

- (a) 'WINDSHEAR FORECAST' (WSF) - when the meteorological conditions indicate that low level windshear on the approach or climb-out (below 2000 ft) might be encountered;
- (b) 'WINDSHEAR FORECAST AND REPORTED' (WSFR) - as above, supported by a report from at least one aircraft of windshear on the approach or climb-out within the last hour;
- (c) 'WINDSHEAR REPORTED' (WSR) - when an aircraft has reported windshear on the approach or climb-out within the last hour, but insufficient meteorological evidence exists for the issue of a forecast of windshear.

3.5.2.3 Pilot reports of windshear on approach or climb-out can greatly enhance the operational efficiency of this service. In addition, they also serve in the continuous evaluation of the criteria upon which Warnings are forecast. Thus pilots who experience windshear on the approach or climb-out are requested to report the occurrence to ATC, as soon as it is operationally possible to do so, even if a Warning has been issued. Windshear reporting criteria are shown at GEN 3.5 paragraph 6.3.2. Pilots who experience windshear at any UK aerodrome are requested to report it in the same way.

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Note: No UK aerodromes are currently equipped with automated ground-based remote-sensing equipment for the detection of windshear.

3.5.3 Runway Visual Range (RVR)

3.5.3.1 RVR assessment is made by either a Human Observer or an Instrumented RVR system (IRVR). Most IRVR systems have an upper limit of 1500 m; the upper limit of the Human Observer system is normally less than this. The system in use at particular aerodromes is indicated in Table 3.5.3.2, and explained in Table 3.5.3.3.

3.5.3.2 The United Kingdom standard RVR reporting incremental scale is 25 m between 0 and 400 m, 50 m between 400 and 800 m, and 100 m above 800 m. Some IRVR systems are unable to report every incremental point in the scale. Known limitations in IRVR systems are as follows:

Liverpool (EGGP)	IRVR 50 - 1500 m (175 m not reported).
London/City (EGLC)	IRVR 50 - 1100 m IRVR remains serviceable if TDZ fails.
London Gatwick (EGKK)	RWY 08L IRVR remains serviceable if TDZ fails. RWY 26R TDZ IRVR is considerably displaced from Start-to-Roll position.

3.5.3.3 The assessment and reporting of RVR begins whenever the horizontal visibility or the RVR is observed to be less than 1500 m. At those aerodromes where IRVR is available, RVR may also be reported when the observed value is at or below the maximum reportable value or when shallow fog is forecast or reported.

3.5.3.4 RVR is passed to aircraft before take-off and during the approach to landing. Changes in the RVR are passed to aircraft throughout the approach. Additionally, information from pilot reports or ATC observation that the visibility on the runway is worse than that indicated by the RVR report, for example patches of thick fog, are passed.

3.5.3.5 Table 3.5.3.2 shows which IRVR system is provided at an aerodrome. Aerodromes using AGIVIS systems suppress mid-point and/or stop-end values when:

- (a) They are equal to or higher than the touchdown zone value unless they are less than 400 m; or
- (b) they are 800 m or more.

Aerodromes using MET-1 systems suppress mid-point and/or stop-end values unless they are 550 m or less.

3.5.3.6 At those aerodromes having multi-site IRVR the standard UK procedure is that the touchdown zone RVR is always given first, followed by any values for the mid-point RVR and/or stop-end RVR which have not been suppressed. With the above in mind, the co-operation of the pilots is sought in avoiding unnecessary radio requests for mid-point and/or stop-end values when they have not been given. When all three values are given they are passed as a series of numbers, for example, 'RVR 600, 500, 550' relates to touchdown zone, mid-point and stop-end respectively. If two values are to be passed, they are to be individually identified, eg 'touchdown 650, stop-end 550'.

3.5.3.7 If a single transmissometer fails, and the remainder of the IRVR system is still serviceable, RVR readings are not suppressed for the remaining sites and these values are passed to pilots. For example, if the touchdown zone transmissometer is unserviceable, 'RVR: touchdown not available, mid-point 600, stop-end 400'. If two transmissometers fail in a three-site IRVR system, the remaining value is passed and identified provided that it is not the stop-end value, in which event the system is considered unserviceable for that runway direction. In a two-site IRVR system, giving touchdown zone and stop-end values, if the touchdown zone transmissometer fails, the system is considered unserviceable for that runway direction.

3.5.3.8 When RVR information is not available, or when the RVR element of Aerodrome Operating Minima falls outside the range of reportable RVR, pilots should use meteorological visibility in the manner specified in their operations manuals, or at AD 1.1 subsection 4 (Aerodrome Operating Minima – Non-public transport flights by aircraft).

3.6 Climatological information for certain UK aerodromes is available for civil aviation purposes from the Met Office, according to the following criteria:

Table 3.5.3.1 — Climatological Information	
A	Climatological statistics readily available based on at least 10 years' of three-hourly (usually hourly) data.
B	Climatological statistics readily available based on less than 10 years' data and/or some gaps in night-time data.
C	Limited climatological statistics available based on available METAR reports starting July 1983 or later.
D	No data available or insufficient data available to provide climatological statistics.

The aerodromes are so classified at Table 3.5.3.2.

3.6.1 Climatological statistics for routes and areas in the United Kingdom are not available. However, global climatology of upper wind and temperature data is held by the Met Office.

3.6.2 Climatological data related to sites for new aerodromes (or additional runways at existing aerodromes) are available from the Met Office.

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Table 3.5.3.2 — Meteorological Observations at Aerodromes								
Aerodrome/ Location Indicator	Observations			Surface Wind	RVR		Obs Hours	Climatological Data
	Type	Freq	Warnings		Sites	Eqpt		
Aberdeen/Dyce EGPD	METAR †*	h/H	AW MTI	Average	16 TDZ/END 34 TDZ/END	BIRAL FSM BIRAL FSM	HO+	A, C
Alderney EGJA	METAR	h	AW	Average	08/26 TDZ	OBS	HO	C
Belfast Aldergrove EGAA	METAR #	h	AW MTI	Average	07 TDZ/MID/END 25 TDZ/MID/END 07 TDZ 17 TDZ 25 TDZ/MID 35 TDZ	AGIVIS AGIVIS OBS OBS OBS OBS	H24	A
Belfast City EGAC	METAR	h	AW MTI	Average	04/22 TDZ/END	AGIVIS FSM	HO	C
Benbecula EGPL	METAR †	h	AW	Average	06/24 TDZ	OBS	HO	A
Biggin Hill EGKB	METAR	h	AW	Average	21 TDZ	OBS	HO	C
Birmingham EGBB	METAR #	h	AW MTI	Average	15 TDZ/MID/END 33 TDZ/MID/END	AGIVIS AGIVIS	H24	C
Blackpool EGNH	METAR	h	AW MTI	Average	10/28 TDZ	OBS	HO	A, C
Bournemouth EGHH	METAR	h	AW	Average	08/26 TDZ/MID/END	AGIVIS	HO	A
Bristol EGGD	METAR ‡	h	AW MTI	Average	09/27 TDZ/MID/END	AGIVIS	H24	C
Cambridge EGSC	METAR	h	AW MTI	Average	05/23 TDZ	Vaisala FSM	HO	C
Campbeltown EGEC	METAR	h	AW	Average			HO	B
Cardiff EGFF	METAR ‡	h	AW MTI	Average	12/30 TDZ/END	AGIVIS	H24	C
Carlisle EGNC	METAR	h	AW	Average	07/25 TDZ	OBS	HO	C
Coventry EGBE	METAR	h	AW	Average	05/23 TDZ	OBS	HO	C
Cranfield EGTC	METAR	h	AW	Average			HO	C
Doncaster Sheffield EGCN	METAR #	h	AW	Average	02/20 TDZ/MID/END	Telvent Almos	H24	D
Dundee EGPN	METAR	h	AW	Average			HO	D
Durham Tees Valley EGNV	METAR	h	AW MTI	Average	05/23 TDZ	OBS	HO	C
East Midlands EGNX	METAR	h	AW MTI	Average	09 TDZ/MID/END 27 TDZ/MID/END	AGIVIS AGIVIS	H24	C
Edinburgh EGPH	METAR ‡	h	AW MTI	Average	06 TDZ/MID/END 24 TDZ/MID/END	AGIVIS AGIVIS	H24	A



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Table 3.5.3.2 — Meteorological Observations at Aerodromes								
Aerodrome/ Location Indicator	Observations			Surface Wind	RVR		Obs Hours	Climatological Data
	Type	Freq	Warnings		Sites	Eqpt		
Exeter EGTE	METAR	h	AW MTI	Average	08/26 TDZ	OBS OBS	HO	A, C
Farnborough EGLF	METAR	h	AW	Average	06/24 TDZ/END	AGIVIS	HO	B
Glasgow EGPF	METAR ‡	h	AW MTI	Average	05 TDZ/MID/END 23 TDZ/MID/END	AGIVIS AGIVIS	H24	A
Gloucestershire EGBJ	METAR	h	AW	Average	09/27 TDZ	OBS	HO	C
Guernsey EGJB	METAR	h	AW	Average	09/27 TDZ/END	AGIVIS	HO+	A
Hawarden EGNR	METAR	h	AW	Average			HO	D
Humberside EGNJ	METAR ¶	h	AW	Average	02/20 TDZ	OBS	HO	C
Inverness EGPE	METAR ¶	h	AW	Average	05/23 TDZ/END	AGIVIS	HO	D
Islay EGPI	METAR ¶	h	AW	Average			HO	D
Isle of Man EGNS	METAR	h/H	AW MTI	Average			H24	A
Jersey EGJJ	METAR	h	MTI AW	Average	08/26 TDZ/END	AGIVIS	HO+	A
Kirkwall EGPA	METAR ¶	h	AW	Average	09/27 TDZ	AGIVIS	HO+	A
Leeds Bradford EGNM	METAR	h	AW MTI	Average	14 TDZ/MID 32 TDZ/MID	MET-1 MET-1	HO+	C
Liverpool EGGP	METAR #	h	AW MTI	Average	09 TDZ/MID/END 27 TDZ/MID/END	Telvent Telvent	H24	A, C
London/City EGLC	METAR ¶	h	AW MTI Windshear	Average	09 TDZ/MID/END 27 TDZ/MID/END	AGIVIS AGIVIS	HO+	C
London Gatwick EGKK	METAR #	h	AW MTI	Average	08R TDZ/MID/END 26L TDZ/MID/END 08L TDZ/MID 26R TDZ/END	AGIVIS AGIVIS AGIVIS AGIVIS	H24	A
London Heathrow EGLL	METAR ‡*	h	AW MTI Windshear	Average	09L TDZ/MID/END 09R TDZ/MID/END 27L TDZ/MID/END 27R TDZ/MID/END	AGIVIS AGIVIS AGIVIS AGIVIS	H24	A
London Luton EGGW	METAR ‡	h	AW MTI	Average	08 TDZ/MID/END 26 TDZ/MID/END	AGIVIS AGIVIS	H24	C
London Stansted EGSS	METAR ‡	h	AW MTI	Average	04 TDZ/MID/END 22 TDZ/MID/END	AGIVIS AGIVIS	H24	A
Londonderry/Eglinton EGAE	METAR	h	AW	Average	08/26 TDZ	OBS	HO	C
Lydd EGMD	METAR ¶	h	AW	Average	03/21 TDZ	OBS	HO	C

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Table 3.5.3.2 — Meteorological Observations at Aerodromes								
Aerodrome/ Location Indicator	Observations			Surface Wind	RVR		Obs Hours	Climatological Data
	Type	Freq	Warnings		Sites	Eqpt		
Manchester EGCC	METAR #*	h	AW MTI	Average	05 TDZ/MID/END 23 TDZ/MID/END	AGIVIS AGIVIS	H24	A, C
Newcastle EGNT	METAR	h	AW MTI	Average	07 TDZ/MID/END 25 TDZ/MID/END	AGIVIS AGIVIS	H24	C
Newquay EGHQ	METAR	h	AW	Average	12/30 TDZ/MID/END	AGIVIS	HO	A
Norwich EGSH	METAR †*	h	AW MTI	Average	09/27 TDZ/END	AGIVIS FSM	HO	C
Oban EGEO	METAR	h	AW	Average			HO	D
Oxford/Kidlington EGTK	METAR	h	AW	Average	19 TDZ	Vaisala FS11	HO	C
Prestwick EGPK	METAR	h/H	AW MTI	Average	12/30 TDZ	OBS	H24	A
Scatsta EGPM	METAR †*	h	AW	Average			HO	C
Scilly Isles/St Mary's EGHE	METAR	h	AW	Average			HO	A, C
Shoreham EGKA	METAR	h	AW	Average			HO	C
Southampton EGHI	METAR	h	AW MTI	Average	02/20 TDZ	OBS	HO	C
Southend EGMC	METAR	h/H	AW MTI	Average	06/24 TDZ/END	Telvent FSM	HO+	C
Stornoway EGPO	METAR †	h	AW	Average	18/36 TDZ	OBS	HO	A
Sumburgh EGPB	METAR †*	h	AW MTI	Average	09/27 TDZ	OBS	HO+	A
Tiree EGPU	METAR †	h	AW	Average			HO	A
Warton EGNO	METAR	h	AW	Average	07/25 TDZ	OBS	HO	D
Wick EGPC	METAR †	h	AW	Average			HO	A

Table 3.5.3.3 — Explanation of Terms used in Table 3.5.3.2		
Observation Type (column 2)	METAR METAR ‡ METAR † METAR # METAR *	Aviation Routine Weather Report (actual) AUTO METAR produced during aerodrome opening hours (AUTO METARs produced during aerodrome opening hours are overseen by a certificated Met Observer) AUTO METAR produced outside aerodrome opening hours AUTO METAR issued during agreed observer duty breaks overnight Trend Forecast appended to METAR
Observation Frequency (column 3)	h h/H	half-hourly half-hourly during operational hours/Hourly overnight
Observation Warnings (column 4)	AW MTI	Aerodrome warning Marked Temperature Inversion
Surface Wind (column 5)		See GEN 3.5, paragraphs 3.1 and 3.2.

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Table 3.5.3.3 — Explanation of Terms used in Table 3.5.3.2		
RVR (columns 6 and 7)	TDZ	touchdown zone
	MID	mid-point
	END	stop end
	OBS	human observer
	AGIVIS, MET-1, Telvent & Vaisala	types of IRVR system
	FSM	Forward Scatter Meter
Observing hours (column 8)	HO	available to meet operational requirements (ie during aerodrome opening hours)
	HO+	more than HO but not H24
	H24	24 hours
Climatological data (column 9)	A, B, C, D	See Table 3.5.3.1
Note: Table 3.5.3.2 lists only those aerodromes with accredited observers that produce METARs. Observations from other aerodromes not listed shall be regarded as unofficial.		

4 Types of Service

4.1 Forecast Offices providing a service to Civil Aviation

4.1.1 The designated forecast office(s) for principal aerodromes are given in AD 2.11 (Meteorological Information Provided), in the Aerodromes section of the AIP. Designated forecast offices operate H24.

4.1.2 Some Military and Government aerodromes provide a forecast and briefing service for Civil Aviation, but only for departures from those aerodromes.

4.2 Pre-flight Briefing

4.2.1 The primary method of meteorological briefing for flight crew in the UK is by self-briefing, using information and documentation routinely displayed in aerodrome briefing areas. English is the language used for all UK documentation and forecast clarification. The primary method of briefing does not require prior notification to a Forecast Office.

4.2.2 Where this primary method is not available, or is inadequate for the intended flight, Special Forecasts, as described at GEN 3.5 paragraph 5, may be provided.

4.2.3 A wide range of meteorological information is available on the world wide web for pre-flight planning. Flight Briefing Information from the Met Office is available at <http://www.metoffice.gov.uk/aviation>. However, users should be aware of the risks of use of the public Internet in this regard. This includes, but not limited to, a browsers' cache facility not providing the user with the very latest information; delays to, or irregular update of sites; or the receipt of falsified data purporting to have come from a legitimate provider. Users should ensure, wherever possible, that the data is up to date and consistent with the general weather situation.

4.2.4 When necessary, the personal advice of a forecaster, or other meteorological information, can be obtained from the appropriate forecast office. Pilots departing from Military or Government aerodromes may find an on-site Forecaster or Briefing Service available. **Forecaster advice or other information for safety related clarification/amplification will only be given on the understanding that full use has already been made of available meteorological briefing material. Forecaster clarification/amplification of conditions en-route is not provided for flights departing from locations outside the UK.**

4.2.5 The Met Office operates a centralised telephone enquiry system. Pilots should state their requirements to the operator who may provide the necessary information or who will promptly transfer the call to the most suitable location.

Table 3.5.4.1 — Forecast Offices providing service to Civil Aviation			
Forecast Office	Services Available	Telephone	Remarks
Met Office	A, B, C, D, E	0870-900 0100	In case of restricted access to 0870 numbers, use 01392- 885680. 0870 calls from anywhere in the UK are charged at the national call rate.
Isle of Man Airport	A, B, C	01624-821641	Isle of Man services B and C available only to departures from within the Isle of Man.
Jersey Airport	A, B, C	0905-8077777	Jersey services B and C available only to departures from the Channel Islands. Calls charged at premium rate. In case of restricted access to 090 numbers, telephone 01534-448765 for further information.

Key to Services Available:

A. – Provision of TAF, warnings and take-off data for the assigned principal aerodrome. Amplification/ clarification of these aerodrome forecasts and warnings only.

B. – Dictation of TAFs and METARs unobtainable from the automated services (usually limited to four aerodromes).

GEN 3.5 METEOROLOGICAL SERVICES (continued)

C. – Amplification/clarification of AIRMET Regional/Area Forecasts and Metforms 214/215, and requests for Special Forecast.

D. – Dictation of AIRMET amendments and Regional Forecasts.

E. – Amplification/clarification and amendments for Metforms 414/415 and EUR Charts

4.2.6 Forecast Offices and self-briefing facilities are under no obligation to prepare briefing documentation packages.

4.2.7 Meteorological observations and forecasts have certain expected tolerances of accuracy. Pilots interpreting observations and forecasts should be aware that information could vary within these tolerances, which are shown at GEN 3.5 paragraph 3.2 and Table 3.5.4.3. respectively. Additionally, observations and forecasts are not normally amended until certain criteria for change are exceeded. These are shown at GEN 3.5 paragraph 4.7.

4.2.8 The specific value of any of the elements given in a forecast shall be understood to be the most probable value which the element is likely to assume during the period of the forecast. Similarly, when the time occurrence or change of an element is given in a forecast, this time shall be understood to be the most probable time.

4.2.9 The issue of a new forecast, such as an aerodrome forecast, shall be understood to automatically cancel any forecast of the same type previously issued for the same place and for the same period of validity or part thereof.

4.3 UK Low Level Weather and Spot Wind Forecast Charts – Metform 215/214

4.3.1 **The UK Low Level Forecast (Metform 215)** is a forecast of in-flight conditions from the surface to 10000 ft, covering the UK and near Continent. The form comprises:

- (a) A fixed time forecast weather chart and text box describing the expected visibility and weather, the cloud and the height of the zero degree isotherm in each separate area of weather highlighted on the chart. An outlook box describes the main weather developments in the 7-hour period beyond the end of the validity period of the forecast.
- (b) A separate outlook chart, available on the internet only, shows the expected position of the principle synoptic features, 1 hour after the end of the validity period of the forecast.

4.3.2 Information on Form. The following sub-paragraphs summarise the contents of Metform 216 (Explanatory Notes for Form 215), available in A4 or larger size on application to the address at GEN 3.5 paragraph 1.2 or from METFAX by dialling 09060-700-505.

4.3.2.1 Main Forecast Weather Chart and Text

- (a) The fixed time weather chart
 - (i) The weather chart shows the forecast position, direction and speed of movement of surface fronts and pressure centres for the fixed time shown in the chart legend. The position of highs (H) and lows (L), with pressure values in hectopascals is shown by the symbols O and X. The direction and speed of movement (in knots) of fronts and other features is given by arrows and figures. Speeds of less than 5 knots are shown as 'SLOW'.
 - (ii) Zones of distinct weather patterns are enclosed by continuous scalloped lines, each zone being identified by a letter within a rectangle. The forecast weather conditions (visibility, weather, cloud and height of the zero degree isotherm) during the period of validity, together with warnings and any remarks are given in the text to the right of the charts, each zone being dealt with separately and completely.
- (b) In the text
 - (i) Surface visibility and weather
 - (1) surface visibility is expressed in metres (m) or kilometres (km), with the change over at 5000 m;
 - (2) weather is described using the METAR code form; the full list of terms is available at GEN 3.5 paragraph 10.6.
 - (3) warnings and the expected occurrence of icing and turbulence are highlighted, using standard ICAO symbolism and abbreviations where possible (see GEN 2.2);
 - (ii) Cloud
 - (1) cloud amount is described using the METAR code form, where FEW indicates 1 to 2 oktas, SCT (scattered) indicates 3 to 4 oktas, BKN (broken) indicates 5 to 7 oktas and OVC (overcast) indicates 8 oktas.
 - (2) cloud type is given using standard meteorological and ICAO abbreviations (see GEN 2.2).
 - (3) the height of the cloud base and top is given in the form 'height of cloud base / height of cloud top' with all heights in hundreds of feet (ft) above mean sea level:
 - (iii) The height of the zero degree Celsius isotherm.
 - (1) the height of the zero degree Celsius isotherm is given with all heights in hundreds of feet (ft) amsl.
 - (2) the height of any sub-zero layer below the main layer will also be given.
- (c) Outlook text

An outlook box describes the main weather developments in the 7-hour period beyond the end of the validity period of the forecast.
- (d) Notes
 - (i) A forecast of thunderstorm (TS) and/or cumulonimbus (CB) implies hail and severe turbulence and icing;

GEN 3.5 METEOROLOGICAL SERVICES (continued)

- (ii) Hill fog will be included as a warning in the text whenever the base of any cloud is forecast to be at the same height or below the height of the highest ground in the zone. Hill fog implies visibility less than 200 m:
- (iii) The specific value of any elements given in a forecast shall be understood to the most probable value which the element is likely to assume during the period of the forecast.

4.3.2.2 Outlook Chart

- 4.3.2.2.1 A separate outlook chart, available on the internet only, shows the expected position of the principle synoptic features 1 hour after the end of the validity period of the forecast. No weather zones are given on the outlook chart but the pattern of surface isobars and frontal positions are shown.

4.3.3 The UK Low Level Spot Wind Forecast (Metform 214) is fixed time, and suitable for use for a period three hours before or after the validity time.

- (a) The data provided is for Latitude/Longitude positions shown at the top of each box;
- (b) Wind Speed and temperature information is provided for a selected range of altitudes and are shown in thousands of feet above mean sea level and Degrees Celsius.

4.3.4 Weather Forecast Chart Issues

- 4.3.4.1 The date and time that each Metform 215/415 is issued by the Met Office will be shown at the bottom of the form. A summary of the times of issue and validity times of the F215 chart is given in the table below.

Time when F215 Forecast Chart becomes available	Front and Weather Zones forecast time	Period of validity
0330	1200	0800 – 1700
0930	1800	1400 – 2300
1530	0000	2000 – 0500
2130	0600	0200 – 1100

4.3.4.2 Amendments

- (a) Amendments may appear as complete re-issues of the Metform in which case the validity start time may be different from the routine issue.
- (b) An amended Metform 215 is indicated by the word AMENDED at the top of the form, and the element amended written in bold and underlined.

4.4 Northwest Europe Low Level Weather and Spot Wind Forecast Charts - Metforms 415/414

- (a) These charts are similar in format to Metforms 214/215 and extend the low-level flight forecast coverage more into continental Europe.
- (b) They are issued daily at the same times as Metform 214/215 and are valid for the same periods.
- (c) Amendments will appear as complete re-issues of the Metform in which case the validity start time may be different from the routine issue.

4.5 European Medium / High Level Spot Wind / Temperature Forecast Chart - Metform 614

- (a) This chart is similar in format to Metforms 214 and 414 but extends the coverage to most of Europe and western parts of the Mediterranean and North Africa.
- (b) It is available only from METFAX (09060 700 541) and provides a single sheet alternative to part of the area covered by the six standard EUR wind/temperature charts between FL 050 and FL 340 to accompany the EUR significant weather chart.

4.6 Global upper-air wind and temperature data

- (a) Global upper-air wind and temperature data, as well as data on upper-air humidity, tropopause heights and temperatures and maximum wind speed, direction and height are available in grid points in digital form, updated four times per day, from the address given in 3.5 paragraph 1.2.
- (b) Specific chart areas representing part or all of the above data may be available from some suppliers.

Table 3.5.4.2 — Meteorological Forecast Charts — Coverage and Validity Times						
Area	Chart	Levels	Coverage	Projection	Issue Times	Validity Times *1
UK (F215)	Weather *3	SFC - 10000 feet amsl	British Isles and near continent		1530 *2	2000 to 0500
					2130 *2	0200 to 1100
					0330	0800 to 1700
					0930	1400 to 2300

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Table 3.5.4.2 — Meteorological Forecast Charts — Coverage and Validity Times						
Area	Chart	Levels	Coverage	Projection	Issue Times	Validity Times *1
UK (F214)	Spot Wind / Temperature	24000, 18000, 10000, 5000, 2000, 1000 *4 ft amsl	British Isles and near continent		1800 *2 0000 0600 1200	0000 0600 1200 1800
Europe (EUR)	Weather / Tropopause / Max wind	FL 100 - FL 450	N53 E065 N25 E034 N26 W018 N54 W050	Polar Stereographic	1100 *2 1700 *2 2300 *2 0500	0000 0600 1200 1800
North Atlantic (NAT)	Weather / Tropopause / Max wind	FL 250 - FL 630	N24 E056 N02 W004 N03 W083 N28 W148	Polar Stereographic	1100 *2 1700 *2 2300 *2 0500	0000 0600 1200 1800
	Isobaric and frontal analysis (ASXX)	Surface	N37 E050 N68 W105 N34 W055 N20 E010	Polar Stereographic	0200 0800 1400 2000	0000 0600 1200 1800
	Isobaric and frontal analysis (FSXX)	Surface			0400 *2 1000 *2 1600 *2 2200 *2	0000 0600 1200 1800
Mid/Far East (MID)	Weather / Tropopause / Max wind	FL 250 - FL 630	N23 E150 S06 E102 S03 E033 N20 W020	Polar Stereographic	1100 *2 1700 *2 2300 *2 0500	0000 0600 1200 1800
Africa (AFI)	Weather / Tropopause / Max wind	FL 250 - FL 630	N70 W032 N70 E065 S38 W083 S38 W032	Mercator	1100 *2 1700 *2 2300 *2 0500	0000 0600 1200 1800
Caribbean/ South America (CARSAM)	Weather / Tropopause / Max wind	FL 250 - FL 630	N23 W113 N72 W003 N33 E059 S48 W052	Tilted mercator	1100 *2 1700 *2 2300 *2 0500	0000 0600 1200 1800

Note 1: (*1): Charts cover the period within 3 hours either side of the quoted fixed time, except 215 charts and surface isobaric charts, which are valid for the time specified.

Note 2: (*2): Previous day.

Note 3: (*3): This chart includes an outlook to the end of the next forecast period.

Note 4: (*4): Where terrain permits.

Table 3.5.4.3 — Accuracy of Meteorological Forecasts		
The percentages in this table are ICAO minimum standards.		
Element	Operationally desirable accuracy of forecast	Minimum percentage of cases within range
Aerodrome Forecast (TAF)		
Wind direction	± 30°	80
Wind speed	± 5 kt up to 25 kt ± 20% above 25 kt	80
Visibility	± 200 m up to 700 m ± 30% between 700 m and 10 km	80
Precipitation	Occurrence or non-occurrence	80
Cloud amount	± 2 okta	70

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Table 3.5.4.3 — Accuracy of Meteorological Forecasts		
The percentages in this table are ICAO minimum standards.		
Element	Operationally desirable accuracy of forecast	Minimum percentage of cases within range
Cloud height	± 100 ft up to 400 ft ± 30% between 400 ft and 10000 ft	70
Air temperature (if forecast)	± 1°C	70
Landing Forecast (TREND)		
Wind direction	± 30°	90
Wind speed	± 5 kt up to 25 kt ± 20% above 25 kt	90
Visibility	± 200 m up to 700 m ± 30% between 700 m and 10 km	90
Precipitation	Occurrence or non-occurrence	90
Cloud amount	± 2 okta	90
Cloud height	± 100 ft up to 400 ft ± 30% between 400 ft and 10000 ft	90
Take-Off Forecast		
Wind direction	± 30°	90
Wind speed	± 5 kt up to 25 kt ± 20% above 25 kt	90
Air Temperature	± 1°C	90
Pressure value (QNH)	± 1 hPa	90
Area, Flight and Route Forecast		
Upper air temperature	± 3°C (mean for 500 nm)	90
Upper wind	± 15 kt up to FL 250 ± 20 kt above FL 250 (modulus of vector difference for 500 nm)	90
Significant en-route WX phenomena and cloud	Occurrence or non-occurrence	80
	Location: ± 60 nm	70
	Vertical extent: ± 2000 ft	70

4.7 Aerodrome Forecast (TAF)

- 4.7.1 The Aerodrome Forecast (TAF) is the primary method of providing the forecast weather information that pilots require about an airfield in an abbreviated format. The TAF consists of a concise statement of the mean or average meteorological conditions expected at an aerodrome or heliport during the specified period of validity.
- 4.7.2 UK civil TAFs are prepared to cover the notified hours of operation of those principal civil aerodromes that have accredited meteorological observers, who produce regular aerodrome weather reports. Being site-specific, to provide an aerodrome forecast in TAF form requires the forecaster to be confident in the knowledge of the weather conditions prevailing at that aerodrome. In the interests of flight safety, continuity of regular reports, and ideally special reports when significant changes occur (particularly if the deterioration or improvement has not been forecast or is mis-timed), are essential for the routine updates and an adequate amendment service to be provided by the forecast office.
- 4.7.3 Therefore, where an aerodrome is not open H24, the issue of a TAF will be delayed until at least two consecutive METARs have been received and accepted by the forecaster at the forecast office responsible for its preparation.
- 4.7.4 The METARs will be produced by an accredited observer and separated by an interval of not less than 20 minutes and not more than 1 hour. In practice, when METARs are prepared every 30 minutes, a TAF will be drafted by the forecaster once the first METAR has been seen, and when the second METAR is received 30 minutes later and confirms the prevailing weather over the aerodrome the forecaster will issue the TAF.
- 4.7.5 However, in the event that an automatic observing system located on the aerodrome regularly issues AUTO METARs containing information on wind speed and direction, visibility, cloud amount and height, present weather, pressure, temperature and dewpoint when the aerodrome is closed, the forecaster will, with agreement of the CAA Met Authority issue the TAF on the basis of the AUTO METAR.
- 4.7.6 If a gap of two hours between METAR reports occurs or if an element is missing from more than three consecutive reports then the TAF will be cancelled. The TAF will not be re-issued until two complete METARs have been received.
- 4.7.6.1 In practical terms this means that the TAF will be cancelled if:

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- (a) More than 3 half hourly METARs are not received;
- (b) More than 3 half hourly METARs contain missing or erroneous data;
- (c) A second hourly METAR is not received.

- 4.7.7 Accredited observers at some H24 aerodromes take a duty break overnight, of maximum two hours duration. A supply of AUTO METARs will be provided during this period. If the duty observer has not recommenced observations after two hours (ie when more than 3 AUTO METARs are issued) the TAF may be cancelled.
- 4.7.8 If a TAF needs to be amended due to a deterioration or improvement that has not been forecast or is mis-timed, such amendments shall be issued within 15 minutes of receipt of the observation at the forecast office.
- 4.7.9 In order to reduce the number of TAF cancellations that are required to be issued when an aerodrome closes, the UK issues TAFs of duration 2-24 hours where appropriate.

Table 3.5.4.4 - List of TAFs Issued by Aerodrome			
Airport	9 Hour TAF	24 Hour TAF	30 hour TAF
Aberdeen/Dyce		•	
Alderney	•		
Belfast Aldergrove		•	
Belfast City	•		
Benbecula	•		
Biggin Hill	•		
Birmingham		•	
Blackpool	•		
Bournemouth	•		
Bristol		•	
Cambridge	•		
Campbeltown	•		
Cardiff		•	
Carlisle	•		
Coventry	•		
Cranfield	•		
Doncaster Sheffield		•	
Dundee	•		
Durham Tees Valley	•		
East Midlands		•	
Edinburgh		•	
Exeter	•		
Farnborough	•		
Glasgow		•	
Gloucestershire	•		
Guernsey	•		
Hawarden	•		
Humberside	•		
Inverness	•		
Islay	•		
Isle of Man	•		
Jersey	•		
Kirkwall	•		
Leeds Bradford		•	
Liverpool		•	
London/City	•		
London Gatwick			•
London Heathrow			•
London Luton		•	

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Table 3.5.4.4 - List of TAFs Issued by Aerodrome			
Airport	9 Hour TAF	24 Hour TAF	30 hour TAF
London Stansted			•
Londonderry/Eglinton	•		
Lydd	•		
Manchester			•
Newcastle		•	
Newquay	•		
Norwich	•		
Oban	•		
Oxford/Kidlington	•		
Prestwick		•	
Scatsta	•		
Scilly Isles	•		
Shoreham	•		
Southampton	•		
Southend	•		
Stornoway	•		
Sumburgh	•		
Tiree	•		
Warton	•		
Wick	•		

Table 3.5.4.5 - TAF Validity and Issue Times		
9 Hour TAF		
Start Time	End Time	Approx Issue Time
0000	0900	2300
0300	1200	0200
0600	1500	0500
0900	1800	0800
1200	2100	1100
1500	2400	1400
1800	0300	1700
2100	0600	2000
24 Hour TAF		
Start Time	End Time	Approx Issue Time
0000	2400	2300
0600	0600	0500
1200	1200	1100
1800	1800	1700
30 Hour TAF		
Start Time	End Time (Next Day)	Approx Issue Time
0000	0600	2300
0600	1200	0500
1200	1800	1100
1800	2400	1700

4.8 Criteria For Special Meteorological Reports and Forecasts

4.8.1 The following are the criteria for the issue of Special Aerodrome Meteorological Reports, TRENDS, TAF Variants/Amendments and Amended Route/Area Forecasts:

(a) Special Report

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- (i) **Surface Wind.** Issued only when no serviceable wind indicator in ATC; criteria to be agreed locally, based on changes of operational significance at aerodrome; for example:
 - (1) A change in mean direction of 60° or more, mean speed before or after change being 10 kt or more; and/or a change of 30°, the speed 20 kt or more;
 - (2) a change in mean speed of 10 kt or more;
 - (3) a change in gust speed of 10 kt or more, the mean speed before or after the change being 15 kt or more.
- (ii) **Visibility**
 - (1) A change in the prevailing visibility from one of the following ranges to another:
 - 10 km or more
 - 5000 m to 9 km
 - 3000 m to 4900 m
 - 2000 m to 2900 m
 - 1500 m to 1900 m
 - 800 m to 1400 m
 - 750 m or less
 - (2) At the onset or cessation of the requirement to report minimum visibility ie. when the minimum visibility in one or more directions is less than 50% of the prevailing visibility.
 - (3) If the minimum visibility is being reported, when the minimum visibility changes from one of the ranges, given in (1) above, to another.
 - (4) Additional change groups of 100 m or less, 150 to 300 m, 350 to 550 m and 600 to 750 m are used where an RVR is not available, either permanently or during temporary unserviceability. These criteria will apply by local arrangement.
 - (5) Additional change groups of 3000 to 3900 m and 4000 to 4900 m apply at Aberdeen/Dyce airport.
- (iii) **Runway Visual Range (RVR)**
 - (1) A change from one of the following ranges to another:
 - 800 m or more
 - 550 m to 750 m
 - 300 m to 500 m
 - 275 m to 175 m
 - 175 m to 50 m
 - 50 m or less
 - (2) Note that special reports for RVR are only made by local arrangement.
- (iv) **Weather**
 - (1) The onset, cessation or change in intensity of any of the following weather phenomena or combinations:
 - Freezing precipitation (of any intensity);
 - Freezing fog ;
 - Moderate or heavy precipitation (including showers)
 - Thunderstorm (with or without precipitation);
 - Squall, funnel cloud;
 - Low drifting or blowing: snow, sand or dust.
- (v) **Cloud**
 - (1) When the base of the lowest cloud of over 4 oktas (BKN or OVC) changes from one of the following ranges to another:
 - 2000 ft or more
 - 1500 ft to 1900 ft
 - 1000 ft to 1400 ft
 - 700 ft to 900 ft
 - 500 ft to 600 ft

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300 ft to 400 ft

200 ft

100 ft

Less than 100 ft*

(2) *This includes state of sky obscured.

(3) When the amount of cloud below 1500 ft changes from 4 oktas or less (nil, FEW, SCT) to more than 4 oktas (BKN or OVC), and vice versa.

(vi) **Temperature.** When the air temperature changes by 2 degrees or more, from that given in the last report.

(vii) **Pressure.** When the 'as read' pressure changes by 1.0 hPa or more since the last report.

(viii) **Severe/Icing/Turbulence.** After confirmation by the duty forecaster, pilot reports of severe icing or severe turbulence, either on the approach to, or climb out from, the aerodrome.

(b) Trend

(i) Surface Wind

(1) A change in mean direction of 30° or more, the mean speed before or after the change being 20 kt or more; a change in mean direction of 60° or more, the mean speed before or after the change being 10 kt or more.

(2) A change in mean speed of 10 kt or more.

(ii) Surface Visibility.

(1) A change in the prevailing visibility from one of the following ranges to another:

5000 m or more

3000 m to 4900 m

1500 m to 2900 m

800 m to 1400 m

600 m to 750 m

350 m to 550 m

150 m to 300 m

100 m or less

(iii) Weather

(1) Onset, cessation or change in intensity of:

– freezing precipitation;

– moderate or heavy: precipitation, including showers;

– freezing fog and freezing precipitation;

– low drifting: sand, dust or snow;

– blowing: sand, dust or snow;

– thunderstorm;

– squall, funnel cloud;

– other phenomena if associated with a significant change in visibility or cloud, whatever the intensity.

(iv) Cloud

(1) When the base of the lowest cloud of over 4 oktas (BKN or OVC) changes from one of the following ranges to another:

1500 ft or more

1000 ft to 1400 ft

500 ft to 900 ft

300 ft to 400 ft

200 ft

100 ft

Less than 100 ft*

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- (2) *This includes state of sky obscured. 3. 4.
- (3) Additional change groups of 500 to 600 feet and 700 to 900 feet apply at aerodromes serving oil rig helicopter operations where a TREND service is provided; Aberdeen, Norwich and Scatsta.
- (4) When the amount of the lowest cloud below 1500 ft changes from half or less (nil, FEW or SCT) to more than half (BKN or OVC) and vice versa. A change to no cloud below 5000 ft and no CB or TCU should be shown as No Significant Cloud - NSC, unless CAVOK applies.

(c) TAF Variants/Amendments**(i) Surface Wind**

- (1) A change in mean direction of 30° or more, the mean speed before or after the change being 20 kt or more; a change in mean direction of 60°, the mean speed before or after the change being 10 kt or more
- (2) a change in mean speed of 10 kt or more.
- (3) a change in gust speed of 10 kt or more, the mean speed before or after the change being 15 kt or more.

(ii) Surface Visibility

- (1) A change in the prevailing visibility from one of the following ranges to another:
 - 10 km or more
 - 5000 m to 9 km
 - 1500 m to 4900 m
 - 800 m to 1400 m
 - 350 m to 750 m
 - 300 m or less
- (2) Additional change groups of 1500 m to 2900 m and 3000 m to 4900 m as well as 5000 m to 6 km and 7 to 9 km apply at aerodromes serving oil rig helicopter operations; Aberdeen, Benbecula, Blackpool, Humberside, Inverness, Kirkwall, Liverpool, Norwich, Scatsta, Sumburgh and Wick.

(iii) Weather

- (1) Onset, cessation or change in intensity of:
 - freezing precipitation;
 - freezing fog;
 - moderate or heavy: precipitation, including showers;
 - low drifting: sand, dust or snow;
 - blowing: sand, dust or snow;
 - thunderstorm;
 - squall, funnel cloud;
 - other phenomena if associated with a significant change in visibility or cloud, whatever the intensity.
- CAVOK conditions.

(iv) Cloud

- (1) When the base of the lowest cloud of over 4 oktas (BKN or OVC) changes from one of the following ranges to another:
 - 5000 ft or more
 - 1500 ft to 4900 ft
 - 1000 ft to 1400 ft
 - 500 ft to 900 ft
 - 200 ft to 400 ft
 - 100 ft or less*
- (2) *This includes state of sky obscured.
- (3) Additional change groups of 500 ft to 600 ft and 700 ft to 900 ft apply at aerodromes serving oil rig helicopter operations; Aberdeen, Benbecula, Blackpool, Humberside, Inverness, Kirkwall, Liverpool, Norwich, Scatsta, Sumburgh and Wick.

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- (4) When the amount of the lowest cloud below 1500 ft changes from half or less (nil, FEW or SCT) to more than half (BKN or OVC) and vice versa. A change to no cloud below 5000 ft and no CB or TCU should be shown as No Significant Cloud - NSC, unless CAVOK applies.

(d) **Amended Route/Area Forecast (Advisory Criteria)**

- (i) 1000 ft, 3000 ft and 6000 ft Wind. A change in direction of 30° or more, the speed before and/or after the change being at least 30 kt. A change of speed of 20 kt or more.
- (ii) Temperature/Dew Point. 5°C or more.
- (iii) Cloud Amount. Changes in the general forecast lowest cloud base below 1500 feet from 4 oktas or less to more than 4 oktas, or more than 4 oktas to 4 oktas or less.

	Element	Original Forecast	Revised Opinion
iv	Surface visibility (general visibility)	8 km or more 5000 m to 8 km 3700 m to 5000 m 2500 m to 3700 m 1600 m to 2500 m 800 m to 1600 m 0 m to 800 m	Less than 8 km Less than 5000 m or more than 8 km Less than 3700 m or more than 5 km Less than 2500 m or more than 3700 m Less than 1600 m or more than 2500 m Less than 800 m or more than 1600 m Less than 800 m
v	Weather phenomena TS, SQ, GR, SA, RASN, SN, FZFG, FZRA, FZDZ	Not included Included	Now expected Not now expected
vi	Cloud Height (general forecast lowest cloud base)	2500 ft or more 1500 ft to 2500 ft 700 ft to 1500 ft 500 ft to 700 ft 300 ft to 500 ft 200 ft to 300 ft Surface to 200 ft	Less than 2500 ft Less than 1500 ft or more than 2500 ft Less than 700 ft or more than 1500 ft Less than 500 ft or more than 700 ft Less than 300 ft or more than 500 ft Less than 200 ft or more than 300 ft Less than 200 ft
vii	Turbulence	Nil Light Moderate Severe	Moderate or severe Severe Nil Nil or light
viii	Zero degree Celsius isotherm	Below 5000 ft Above 5000 ft	Changes of 1000 ft or more Changes of ±25% or 2000 ft, whichever is smaller.
ix	Airframe icing	Nil Light Moderate Severe	Moderate or severe Severe Nil Nil or light
x	Area boundaries, significant fronts and tropical disturbances	Not included Included	Now expected Not now expected or ± 60 nm different from forecast.

5 Notification Required from Operators

5.1 Changes to Meteorological Services

- 5.1.1 Where a change to the MET information being provided is required by an operator, they should notify the Meteorological Authority (contact details are provided in GEN 3.5 paragraph 1) in advance. The Meteorological Authority will review the request for the change and provide a response within an agreed time.

5.2 Special Forecasts and Specialised Information

- 5.2.1 For departures where the standard pre-flight meteorological self-briefing material cannot be obtained or is inadequate for the intended flight, a Special Forecast may be issued on request to the appropriate Forecast Office for a specific period for a designated route, or an area which includes the route. Normally, a Special Flight Forecast will be supplied from the last UK departure point to the first transit aerodrome outside the coverage of standard documentation, at which point pilots should re-brief. However, by prior arrangement, a forecast may be prepared for other legs, provided initial ETD to final ETA does not exceed 6 hours and no stops longer than 60 minutes are planned. The usual method of issuing Special Flight Forecasts is by

GEN 3.5 METEOROLOGICAL SERVICES (continued)

AFS or Fax to the aerodrome of departure, but if the Flight Briefing Unit is not so equipped or will not be open, pilots may telephone the Forecasting Office for a dictation of the forecast. Similarly, Aerodrome Forecasts and reports for the destination and up to four alternates will be provided with the forecast, if not otherwise available.

- 5.2.2 **Ballooning Forecast.** Specialised forecasts for balloon operators containing forecasts of surface wind, thermal activity, inversions, wind shear, sea breezes and lee waves are provided. Forecasts of the lowest pressure (QNH), humidity and surface temperature are also included. These products are provided as a combination of site specific and area text and graphical forecasts. The forecast schedule varies between summer and winter months and details are available from the Met Office web site: <http://www.metoffice.gov.uk/aviation>.
- 5.3 **Prior Notification for Special Forecasts**
- 5.3.1 Forecast Offices normally require prior notification for Special Forecasts as follows:
- (a) For flights up to 500 nm, at least two hours before the time of collection;
 - (b) for flights of over 500 nm, at least four hours before the time of collection.
- 5.3.1.1 Request for Special Forecasts must include details of the route, the period of the flight and where appropriate the ETD/ETA of each leg, the height to be flown and the time at which the forecast is required. Ideally a forecast should be collected no earlier than 90 minutes before departure.
- 5.3.2 It is in the interest of all concerned that the maximum possible period of notice is given. The Forecast Office will give priority to emergencies, in-flight forecast and to forecast requirements which have been properly notified. Other requests could be delayed at busy periods and might not comprise full forecasts. A Forecast collected a long time in advance of departure will be less specific and might be less accurate than one prepared nearer departure time.
- 5.3.3 Forecast Offices providing Special Forecasts are shown at Table 3.5.4.1. They are not provided for flights inbound to the UK.
- 5.3.4 Take-off forecasts containing information on expected conditions over the runway complex in respect of surface wind, temperature and pressure can be made available from Forecast Offices. Requests for the routine provision of these forecasts should be made to the Meteorological Authority (contact details are provided in GEN 3.5 paragraph 1.1). For ad hoc requests prior notification is not normally required, requests should be made directly to the Met Office, three hours before the expected time of departure.
- 5.3.5 Meteorological information for specialised aviation use, as defined below, is not included in the AIRMET service or given as Special Forecasts but arrangements can be made for its provision on prior request:
- (a) To provide meteorological information for special aviation events for which routine forecasts are not adequate;
 - (b) to provide helicopter operators in off-shore areas with forecast winds and temperatures at 1000 ft amsl, information on airframe icing, and sea state and temperature.
- 5.3.6 Appropriate forecasts for (a) above will be made available up to twice in any 24 hour period. For (a), the initial request should be made to the nearest forecasting office designated as providing service 'C' at Table 3.5.4.1 at least 2 hours in advance of the forecast being required. For (b), application must be made to the Meteorological Authority (GEN 3.5 paragraph 1.1) for approval, giving at least 6 weeks notice of the requirement. The application must specify the nature of the aviation activity, the location(s) involved, the meteorological information required and the associated time periods. If appropriate an AFTN address or Fax number should be included. Applicants will be advised of the time at which the information will be available and the means of delivery.
- 5.4 **Additional Meteorological Services**
- 5.4.1 When specialist, non-standard, aviation meteorological services additional to those given above are required (eg forecaster briefings for aerial photography, test flying, crop spraying and for outlooks for over a day ahead), they may be obtained on a repayment basis by prior arrangement with The Met Office. Enquiries should be directed to The Met Office address at GEN 3.5 paragraph 1. 2, or to one of the Forecast Offices listed at Table 3.5.4.1

6 Aircraft Reports

- 6.1 **Routine Aircraft Observations**
- 6.1.1 Routine Observations in any UK FIR/UIR/OCA are only required to be made by aircraft equipped with air ground data link.
- 6.2 **Special Aircraft Observations**
- 6.2.1 Special aircraft observations are required to be issued by aircraft as special air-reports in any UK FIR/UIR/OCA whenever any of the following conditions are encountered or observed:
- (a) moderate icing (MOD ICE) or severe icing (SEV ICE); or
 - (b) moderate turbulence (MOD TURB) or severe turbulence (SEV TURB); or
 - (c) severe mountain wave (SEV MTW); or
 - (d) thunderstorms with or without hail (that are obscured, embedded, widespread or in squall lines) (TSGR or TS); or
 - (e) if volcanic ash cloud is observed or encountered, or if pre-eruption volcanic activity or a volcanic eruption is observed to assist other Users, ATS Providers and the Volcanic Ash Advisory Centre (VAAC);
- 6.2.2 Special aircraft observations may be reported when other meteorological conditions are encountered which, in the opinion of the pilot-in-command, might affect the safety or markedly affect the efficiency of other aircraft operations, for example, other en-route

GEN 3.5 METEOROLOGICAL SERVICES (continued)

weather phenomena specified for SIGMET messages, or adverse conditions during the climb-out or approach not previously forecast or reported to the pilot-in-command.

6.3 Turbulence and Icing Reporting Criteria

6.3.1 Turbulence (TURB)

- 6.3.1.1 While MOD and SEV TURB are to be reported, TURB remains an important operational factor at all levels but particularly above FL 150 therefore all pilots encountering TURB are requested to report this to the ATS Unit with whom they are in radio contact. High level turbulence (normally above FL 150 not associated with cumuliform cloud, including thunderstorms) should be reported as TURB, preceded by the appropriate intensity or preceded by Light or Moderate Chop.

Table 3.5.6.1 — TURB and other Turbulence Criteria Table		
Incidence	Occasional — less than 1/3 of the time	Intermittent — 1/3 to 2/3 Continuous — more than 2/3
Intensity	Aircraft Reaction (transport size aircraft)	Reaction Inside Aircraft
Light	Turbulence that momentarily causes slight, erratic changes in altitude and/or attitude (pitch, roll, yaw) IAS fluctuates 5 - 15 kt. (<0.5 g at the aircraft's centre of gravity) Report as ' Light Turbulence '. or; turbulence that causes slight, rapid and somewhat rhythmic bumpiness without appreciable changes in altitude or attitude. No IAS fluctuations. Report as ' Light Chop '	Occupants may feel a slight strain against seat belts or shoulder straps. Unsecured objects may be displaced slightly. Food service may be conducted and little or no difficulty is encountered in walking.
Moderate	Turbulence that is similar to Light Turbulence but of greater intensity. Changes in altitude and/or attitude occur but the aircraft remains in positive control at all times. IAS fluctuates 15 - 25 kt. (0.5-1.0g at the aircraft's centre of gravity). Report as ' Moderate Turbulence '. or; turbulence that is similar to Light Chop but of greater intensity. It causes rapid bumps or jolts without appreciable changes in altitude or attitude. IAS may fluctuate slightly. Report as ' Moderate Chop '.	Occupants feel definite strains against seat belts or shoulder straps. Unsecured objects are dislodged. Food service and walking are difficult.
Severe	Turbulence that causes large, abrupt changes in altitude and/or attitude. Aircraft may be momentarily out of control. IAS fluctuates more than 25 kt. (> 1.0 g at the aircraft's centre of gravity). Report as ' Severe Turbulence '	Occupants are forced violently against seat belts or shoulder straps. Unsecured objects are tossed about. Food service and walking impossible.
Note: Pilots should report location(s), time(s) (UTC), incidence, intensity, whether in or near clouds, altitude(s) and type of aircraft. All locations should be readily identifiable. Turbulence reports should be made on request, or in accordance with paragraph 6.2. Example: (a) Over Pole Hill 1230 intermittent Severe Turbulence in cloud, FL 310, B747. (b) From 50 nm north of Glasgow to 30 nm west of Heathrow 1210 to 1250, occasional Moderate Chop TURB, FL 330, MD80. Note: The UK does not use the term 'Extreme' in relation to turbulence.		

6.3.2 Windshear Reporting Criteria

- 6.3.2.1 Pilots using navigation systems providing direct wind velocity readout should report the wind and altitude/height above and below the shear layer, and its location. Other pilots should report the loss or gain of airspeed and/or the presence of up-or-down draughts or a significant change in crosswind effect, the altitude/height and location, their phase of flight and aircraft type. Pilots not able to report windshear in these specific terms should do so in terms of its effect on the aircraft, the altitude/height and location and aircraft type, for example, 'Abrupt windshear at 500 feet QFE on finals, maximum thrust required, B747'. Pilots encountering windshear are requested to make a report even if windshear has previously been forecast or reported.

6.3.3 Airframe Icing

- 6.3.3.1 All pilots encountering unforecast icing are requested to report time, location, level, intensity, icing type* and aircraft type to the ATS Unit with whom they are in radio contact. It should be noted that the following icing intensity criteria are reporting definitions; they are not necessarily the same as forecasting definitions because reporting definitions are related to aircraft type and to the ice protection equipment installed, and do not involve cloud characteristics. For similar reasons, aircraft icing certification criteria might differ from reporting and/or forecasting criteria.

Table 3.5.6.2 — Airframe Icing Intensity Criteria	
Intensity	Ice Accumulation
Trace	Ice becomes perceptible. Rate of accumulation slightly greater than rate of sublimation. It is not hazardous even though de-icing/anti-icing equipment is not utilised, unless encountered for more than one hour.
Light	The rate of accumulation might create a problem if flight in this environment exceeds one hour. Occasional use of deicing/anti-icing equipment removes/prevents accumulation. It does not present a problem if de-icing/anti-icing equipment is used.

GEN 3.5 METEOROLOGICAL SERVICES (continued)

Table 3.5.6.2 — Airframe Icing Intensity Criteria	
Intensity	Ice Accumulation
Moderate	The rate of accumulation is such that even short encounters become potentially hazardous and use of de-icing/anti-icing equipment, or diversion, is necessary.
Severe	The rate of accumulation is such that de-icing/anti-icing equipment fails to reduce or control the hazard. Immediate diversion is necessary.
*Rime Ice:	Rough, milky, opaque ice formed by the instantaneous freezing of small supercooled water droplets.
*Clear Ice:	A glossy, clear, or translucent ice formed by the relatively slow freezing of large supercooled water droplets.

6.3.4 Volcanic Ash Reporting

- 6.3.4.1 Whenever volcanic ash is observed or encountered, a special air-report shall be provided; additionally a post-flight report shall be made on the Volcanic Activity Reporting (Model VAR). All elements which are observed shall be recorded and indicated respectively in the appropriate places on the Model VAR. Once completed, the form should be submitted to the UK Met Office by Fax (+44 (0)1392-884549) or email emarc@metoffice.gov.uk.

GEN 3.5 METEOROLOGICAL SERVICES (continued)

2. Special air-report of volcanic activity form (Model VAR)

MODEL VAR: to be used for post-flight reporting

VOLCANIC ACTIVITY REPORT

Air-reports are critically important in assessing the hazards which volcanic ash cloud presents to aircraft operations.

OPERATOR:			A/C IDENTIFICATION: (as indicated on flight plan)		
PILOT-IN-COMMAND:					
DEP FROM:	DATE:	TIME; UTC:	ARR AT:	DATE:	TIME; UTC:
ADDRESSEE			AIREP SPECIAL		
Items 1–8 are to be reported immediately to the ATS unit that you are in contact with.					
1) AIRCRAFT IDENTIFICATION			2) POSITION		
3) TIME			4) FLIGHT LEVEL OR ALTITUDE		
5) VOLCANIC ACTIVITY OBSERVED AT (position or bearing, estimated level of ash cloud and distance from aircraft)					
6) AIR TEMPERATURE			7) SPOT WIND		
8) SUPPLEMENTARY INFORMATION			Other _____		
SO ₂ detected Yes ☐ No ☐					
Ash encountered Yes ☐ No ☐			(Brief description of activity especially vertical and lateral extent of ash cloud and, where possible, horizontal movement, rate of growth, etc.)		
After landing complete items 9–16 then fax form to: (Fax number to be provided by the meteorological authority based on local arrangements between the meteorological authority and the operator concerned.)					
9) DENSITY OF ASH CLOUD	☐ (a) Wispy	☐ (b) Moderate dense	☐ (c) Very dense		
10) COLOUR OF ASH CLOUD ☐	☐ (a) White ☐ (d) Black	☐ (b) Light grey ☐ (e) Other _____	☐ (c) Dark grey		
11) ERUPTION	☐ (a) Continuous	☐ (b) Intermittent	☐ (c) Not visible		
12) POSITION OF ACTIVITY	☐ (a) Summit ☐ (d) Multiple	☐ (b) Side ☐ (e) Not observed	☐ (c) Single		
13) OTHER OBSERVED FEATURES OF ERUPTION	☐ (a) Lightning ☐ (d) Ash fallout	☐ (b) Glow ☐ (e) Mushroom cloud	☐ (c) Large rocks ☐ (f) All		
14) EFFECT ON AIRCRAFT	☐ (a) Communication ☐ (d) Pitot static	☐ (b) Navigation systems ☐ (e) Windscreen	☐ (c) Engines ☐ (f) Windows		
15) OTHER EFFECTS	☐ (a) Turbulence	☐ (b) St. Elmo's Fire	☐ (c) Other fumes		
16) OTHER INFORMATION (Any information considered useful.)					

6.4 In-flight Procedures

- 6.4.1 Information to aircraft in flight is usually supplied in accordance with area Meteorological Watch procedures, supplemented when necessary by an En-route Forecast service. Information is also available from the appropriate ATS Unit at the commanders request, or from meteorological broadcasts.
- 6.4.2 An in-flight en-route service is available in exceptional circumstances by prior arrangement with the Meteorological Authority (GEN 3.5.1, paragraph 1). A meteorological office is designated to provide the aircraft in flight with the winds and temperatures for a specific route sector. Applications for this service should be made in advance, stating:

GEN 3.5 METEOROLOGICAL SERVICES (continued)

- (a) The flight level(s) and the route sector required;
- (b) the period of validity necessary;
- (c) the approximate time and position in flight at which the request will be made
- (d) the ATS Unit with whom the aircraft is expected to be in contact.

6.4.3 Aircraft can obtain aerodrome weather information from any of the following:

- (a) VOLMET broadcasts (see GEN 3.5 paragraph 7);
- (b) Automatic Terminal Information Service (ATIS) broadcasts;
- (c) by request to an ATS Unit but whenever possible only if the information required is not available from a broadcast.

6.4.4 When an aircraft diverts, or proposes to divert, to an aerodrome along a route for which no forecast has been provided, the commander may request the relevant information from the ATS Unit serving the aircraft at the time, and the necessary forecasts will be provided by the associated Forecast Office.

7 VOLMET Service

Table 3.5.7.1 — Meteorological Radio Broadcasts (VOLMET)						
Call Sign/ID	EM	Frequency MHz	Operating Hours	Stations	Contents	Remarks
1	2	3	4	5	6	7
London Volmet (Main)	A3E	135.375	H24 continuous	Amsterdam Brussels Dublin Glasgow London Gatwick London Heathrow London Stansted Manchester Paris/Charles de Gaulle	1. Half hourly reports (METAR) 2. The elements of each report broadcast in the following order: (a) Surface wind (b) Visibility (or CAVOK) (c) RVR if applicable (d) Weather (e) Cloud (or CAVOK)	The spoken word 'SNOCLO' will be added to the end of the aerodrome report when that aerodrome is unusable for take-offs and landings due to heavy snow on runways or runway snow clearance.
London Volmet (South)	A3E	128.600	H24 continuous	Birmingham Bournemouth Bristol Cardiff Jersey London Luton Norwich Southampton Southend Exeter	(f) Temperature (g) Dewpoint (h) QNH (i) Recent Weather if applicable (j) Windshear if applicable (k) TREND if applicable (l) Runway Contamination Warning if applicable	
London Volmet (North) (Note 1)	A3E	126.600	H24 continuous	Durham Tees Valley East Midlands Humberside Isle of Man Leeds Bradford Liverpool London Gatwick Manchester Newcastle	3. Non-essential words such as 'surface wind', 'visibility' etc are not spoken. 4. Except for 'SNOCLO' (see Column 7), the Runway State Group is not broadcast. 5. All broadcasts are in English	
Scottish Volmet	A3E	125.725	H24 continuous	Aberdeen/Dyce Belfast/Aldergrove Edinburgh Glasgow Inverness London Heathrow		

GEN 3.5 METEOROLOGICAL SERVICES (continued)

Table 3.5.7.1 — Meteorological Radio Broadcasts (VOLMET)						
Call Sign/ID	EM	Frequency MHz	Operating Hours	Stations	Contents	Remarks
1	2	3	4	5	6	7
				Prestwick Stornoway Sumburgh		
Note 1: Broadcasting range extended to cover Southeast England and English Channel.						
Note 2: An HF VOLMET broadcast for North Atlantic flights (Shannon VOLMET) is operated by the Republic of Ireland.						

8 SIGMET and AIRMET Service

Table 3.5.8.1 — SIGMET and AIRMET SERVICES							
Name of MWO Location Indicators	Hours	FIR or CTA served	Type of SIGMET validity	Specific SIGMET Procedures	AIRMET Procedures	ATS Unit Served	Additional Information
1	2	3	4	5	6	7	8
Met Office Exeter EGRR	H24	London FIR/ UIR Scottish FIR/ UIR Shanwick OCA Shanwick FIR	SIGMET 4 hours Volcanic Ash SIGMET 6 hours	Tropical cyclone SIGMET is not issued.	ICAO Annex 3 AIRMET (low level en-route weather warning) is not issued in the UK.	London Area Control Centre (Swanwick), London Terminal Control (Swanwick), Scottish AC (Prestwick), Shanwick OCA	NIL

8.1 MWOs are responsible for the preparation and dissemination of SIGMETs to appropriate ACC/FIC within their own and agreed adjacent FIRs. Aircraft in flight should be warned by the ACC/FIC of the occurrence or expected occurrence of one or more of the following SIGMET phenomena for the route ahead for up to 500 nm or 2 hours flying time:

- thunderstorm (see Note 2);
- heavy hail (see Note 2);
- tropical cyclone;
- freezing rain;
- severe turbulence (not associated with convective cloud);
- severe icing (not associated with convective cloud);
- severe mountain waves;
- heavy sand/dust storm;
- volcanic ash cloud.

Note 1: In general, SIGMET messages are identified by the letters WS at the beginning of the header line, but those referring to tropical cyclones and volcanic ash will be identified by WC and WV respectively. SIGMETs are valid for 4 hours, for volcanic ash cloud and tropical cyclones, a further outlook for up to 6 hours may be included and are re-issued if they are to remain valid after the original period expires. They can be cancelled or amended within the period of validity. SIGMETs are numbered sequentially from 0001 UTC each day.

Note 2: This refers only to thunderstorms (including if necessary, cumulo-nimbus cloud which is not accompanied by a thunderstorm) widespread within an area with little or no separation (FRQ), along a line with little or no separation (SQL), embedded in cloud layers (EMBD), or concealed in cloud layers or concealed by haze (OBSC), but does not refer to isolated or occasional thunderstorms not embedded in cloud layers or concealed by haze. Thunderstorms and tropical cyclones each imply moderate or severe turbulence, moderate or severe icing and hail. However, heavy hail (HVYGR) may be used as a further description of the thunderstorm as necessary.

Note 3: A volcanic ash cloud SIGMET will be issued based on advisory information provided by the relevant VAAC. The Met Watch Office listed in Table 3.5.8.1 will ensure that information included in SIGMET and NOTAM messages is consistent.

Note 4: SIGMET messages will be issued not more than 4 hours before the commencement of the period of validity. In the special case of SIGMET messages for volcanic ash cloud and tropical cyclones, these messages will be issued as soon as practicable but not more than 12 hours before the commencement of the period of validity. SIGMET messages for volcanic ash and tropical cyclones will be updated at least every 6 hours.

8.2 AIRMET Service

GEN 3.5 METEOROLOGICAL SERVICES (continued)

- 8.2.1 AIRMET is a general aviation weather briefing service. There are ten routine forecasts, in plain language, which detail the current Met situation and also contain forecasts of wind, freezing level and weather conditions, a forecast outlook is also provided. AIRMET covers the UK and near Continent. A map showing the coverage of the forecast areas is published after GEN 3.5, paragraph 9.1.5.1. Information is provided in text form via the AFS, facsimile and Internet.
- 8.2.2 The forecasts will reflect the contents of SIGMETs which are current at the time of issue or amendments of the forecasts. Safety related amplification of an AIRMET forecast may be obtained from a forecaster by telephoning one of the forecast offices listed in Table 3.5.4.1 as providing service 'E'. Callers must be able to confirm that they have obtained a current AIRMET forecast on contacting the forecast office, otherwise no additional forecast information will be given.
- 8.2.3 Special Forecasts in accordance with GEN 3.5 paragraph 5. 2 are not provided for flights within the coverage of AIRMET Forecasts. For flights which extend beyond the area of coverage, Special Forecasts will be available on request from selected forecast offices providing a service to civil aviation (see Table 3.5.4.1).
- 8.2.4 Jersey AIRMET. The States of Jersey Meteorological Department provides a 100 nm radius Channel Islands low level forecast called Jersey AIRMET. Available on the Internet at <http://www.gov.je/Weather/AviationForecast/Pages/Aviation.aspx>. Amplification or clarification of the current Jersey AIRMET forecast may be obtained, following receipt of the forecast, by consulting the Forecast Office at Jersey Airport. Telephone numbers are shown in Table 3.5.4.1. Telephone calls to the forecast office are charged at a premium rate and are not available outside the Channel Islands and UK.

Table 3.5.8.2 — AIRMET SERVICES

AIRMET	Update Time	Validity Time	Update Time	Validity Time	Update Time	Validity Time	Update Time	Validity Time
AIRMET South	0430	0513	1000	1119	1600	1701	2200	2307
AIRMET North	0430	0513	1000	1119	1600	1701	2200	2307
AIRMET Scottish	0430	0513	1000	1119	1600	1701	2200	2307
AIRMET UK Weather	0530	0612	1130	1218	1730	1824	2330	0006
AIRMET UK Upper Winds	0530	0612	1130	1218	1730	1824	2330	0006
AIRMET UK Update and Outlook	0830	0915	1430	1521	2030	2103	0230	0309
AIRMET South West	0430	0615	1230	1321	1630	1701		
AIRMET South East	0430	0615	1230	1321	1630	1701		
AIRMET Central England	0430	0615	1230	1321	1630	1701		
AIRMET Cross Channel	0430	0615	1230	1321				

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9 Other Meteorological Services

9.1 Meteorological charts are available from the automated Broadcast Fax Service.

9.1.1 **Broadcast Fax** is a routine broadcast service available to users requiring a minimum number of charts regularly each week.

(a) Charts routinely transmitted over the Broadcast Fax network cover:

- (i) Low and medium level flights within the UK and Near Continent;
- (ii) Medium and high level flights to Europe and the Mediterranean;
- (iii) High level flights to North America;
- (iv) High level flights to the Middle/Far East;
- (v) High level flights to Africa.

(b) There are additional charts which are not routinely available by Broadcast Fax, for example ERSAM significant weather for high level flights to South America and upper winds / temperatures at other levels. These may be obtained on prior request from the Met Office's Operations Centre, Exeter. A charge to cover handling and transmission costs will be made for this facility (and if Broadcast Fax is not used, an account must be set up in advance by application to the address at GEN 3.5 paragraph 1.2).

(c) Table 3.5.4.2 gives the geographical and vertical coverage, the times of issue and validity of charts which are routinely available by Broadcast Fax.

(d) It should be noted that forecasts may be amended at any time, which charts received via facsimile may not show. Therefore, it is advisable to check there are no changes to the forecast conditions prior to departure. Amendment criteria for forecasts are given in GEN 3.5 paragraph 4.7.

9.1.2 Broadcast Text Meteorological Information

9.1.2.1 This information is distributed in the UK by National Air Traffic Services Ltd (NATS) via the AFS. Data from three fixed groups of countries are available to broadcast text recipients; these are listed below. Alternatively, NATS offer tailored broadcasts to meet individual customer's needs. Information includes METAR, TAF and warnings of weather significant to flight safety (SIGMET), including volcanic activity reports.

(a) Contents of the **OPMET 1** teleprinter broadcast - METARs, TAFs and SIGMETs for the following areas:

Belgium	France	Italy	Spain/Canaries
Denmark	Germany	Netherlands	Sweden
Faeros	Iceland	Norway	Switzerland
Finland	Ireland	Portugal	United Kingdom

(b) Contents of the **OPMET 2** teleprinter broadcast - METARs, TAFs and SIGMETs for the following areas:

Algeria	Egypt	Kyrgyz	Morocco	Tajikstan
Armenia	Estonia	Latvia	Near East	Tunisia
Austria	Georgia	Lebanon	Poland	Turkey
Azerbaijan	Greece	Libya	Romania	Turkmenistan
Bahrain	Hungary	Lithuania	Russian Fed East	Ukraine
Belarus	Iran	Macedonia	Russian Fed West	Uzbekistan
Bulgaria	Iraq	Malta	Saudia Arabia	
Croatia	Israel	Med - Eastern	Serbia and Montenegro	
Cyprus	Jordan	Med - Central	Slovakia	
Czech Republic	Kazakhstan	Middle Europe	Slovenia	
Eastern Europe	Kuwait	Moldova	Syria	

(c) Contents of the **OPMET 3** teleprinter broadcast - METARs, TAFs and SIGMETs for the following areas:

Austria	Faeros	Iceland	Netherlands	Switzerland
Belgium	Finland	Ireland	Norway	Turkey
Bulgaria	France	Italy	Portugal	United Kingdom
Denmark	Germany	Malta	Romania	
Eastern Europe	Greece	Med - Central	Serbia and Montenegro	
Estonia	Hungary	Middle Europe	Sweden	

Note 1: METARs are broadcast as routine at half-hourly (exceptionally hourly) intervals during aerodrome opening hours.

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Note 2: TAFs valid for periods of less than 12 hours, usually for 9 hours, (FC) are broadcast every three hours and TAFs valid for periods of 12 hours or more, usually 24 hours, (FT) are broadcast every six hours. Amendments are broadcast between routine times as required.

9.1.2.2 Additional Information

- (a) Local special meteorological reports (SPECIAL) are issued for operational use locally when conditions change through limits specified at GEN 3.5 paragraph 4.7;
- (b) Special reports in the SPECI code form are defined as Special Reports disseminated beyond the aerodrome of origin (not applicable at UK civil aerodromes);
- (c) In general, TAFs are provided only for those aerodromes where official meteorological observations are available;
- (d) Amended TAFs and AIRMET area forecasts are issued when forecast conditions change significantly, see GEN 3.5 paragraph 4.7;
- (e) The formats and codes used for METAR, SPECI, TREND, TAF and the METAR Runway State Group are described at GEN 3.5 paragraph 10;
- (f) The actual or forecast meteorological conditions for which a SIGMET warning is prepared are detailed at GEN 3.5 paragraph 8.

9.1.2.3 Further information on Broadcast Text information can be obtained from the Meteorological Authority.

9.1.2.4 GetMet

9.1.2.4.1 GetMet is an information tool that contains essential information on accessing aviation related meteorological information from a variety of sources. GetMet is provided by the Met Office and can be downloaded from the iBook store or obtained in PDF format from the following website <http://www.metoffice.gov.uk/aviation/ga>. To enquire about obtaining a hard copy of GetMet please email aviation@metoffice.gov.uk.

9.2 Meteorological Observer Training

9.2.1 Accredited Aerodrome Meteorological Observer Training

9.2.1.1 At most aerodromes, there is usually a requirement to provide weather reports for aircraft taking-off and landing and flying in the area. An observer does not need accreditation to give an opinion on the latest meteorological conditions but these are not regarded as 'official' for air navigation purposes, and the observer is required to have a basic competency in assessing conditions and reading instrumentation. However, a METAR issued from a UK aerodrome and disseminated beyond the aerodrome must be prepared by an accredited meteorological observer.

9.2.2 Accredited Aerodrome Meteorological Observer Training Courses

9.2.2.1 Training for aerodrome personnel to enable them to gain accreditation in meteorological observing is provided by CAA approved training organisations. Applications for the training courses should be made to the approved training organisation and can only be accepted from aerodrome sponsors (e.g. ATS Managers) prepared to accept responsibility for trainees.

9.2.2.2 The duration of each Full Met Observer course is two weeks. The first week covers theory training followed by a week of practical experience (including night-time observations) under the supervision of a professional meteorological trainer.

9.2.2.3 A 5 day course is available for staff at aerodromes using a semi-automatic observing system, this course develops the skills necessary to observe, report and encode the 'visual' elements of the METAR to a standard that meets CAA requirements.

9.2.2.4 Further details and costs on Full and Restricted Observer courses are available from approved training organisations. However, it is essential that those nominated for courses have a basic knowledge of the aeronautical weather code, sufficient at least to decode a METAR without difficulty, prior to attending the course. It is also desirable to have had experience of an Air Traffic Services environment.

9.2.2.5 Trainees successfully completing a course are awarded an Aeronautical Met Observing Certificate for the production of aerodrome weather reports that meet the requirements of ICAO Annex 3. Restricted certificates are for use solely at aerodromes similarly equipped to the training site at which the trainee gained their certification.

9.2.3 Other Aviation Meteorological Observer Training

9.2.3.1 Refresher & Met Focal Point training is aimed at qualified observers who have not carried out the making of official Met reports for some considerable time, or who are designated aerodrome Met Focal Points, and Offshore Observer Training which is designed to enable observers make accurate weather reports for offshore helicopter operations.

9.2.4 Approved Training Organisations

9.2.4.1 For Full, Restricted and Offshore Observer courses contact:

Post: Account Manager Aviation Observer Courses, Met Office College, Met Office, Fitzroy Road, Exeter, Devon, EX1 3PB
 Fax: 01392-885681
 Email: moc.enquiries@metoffice.gov.uk

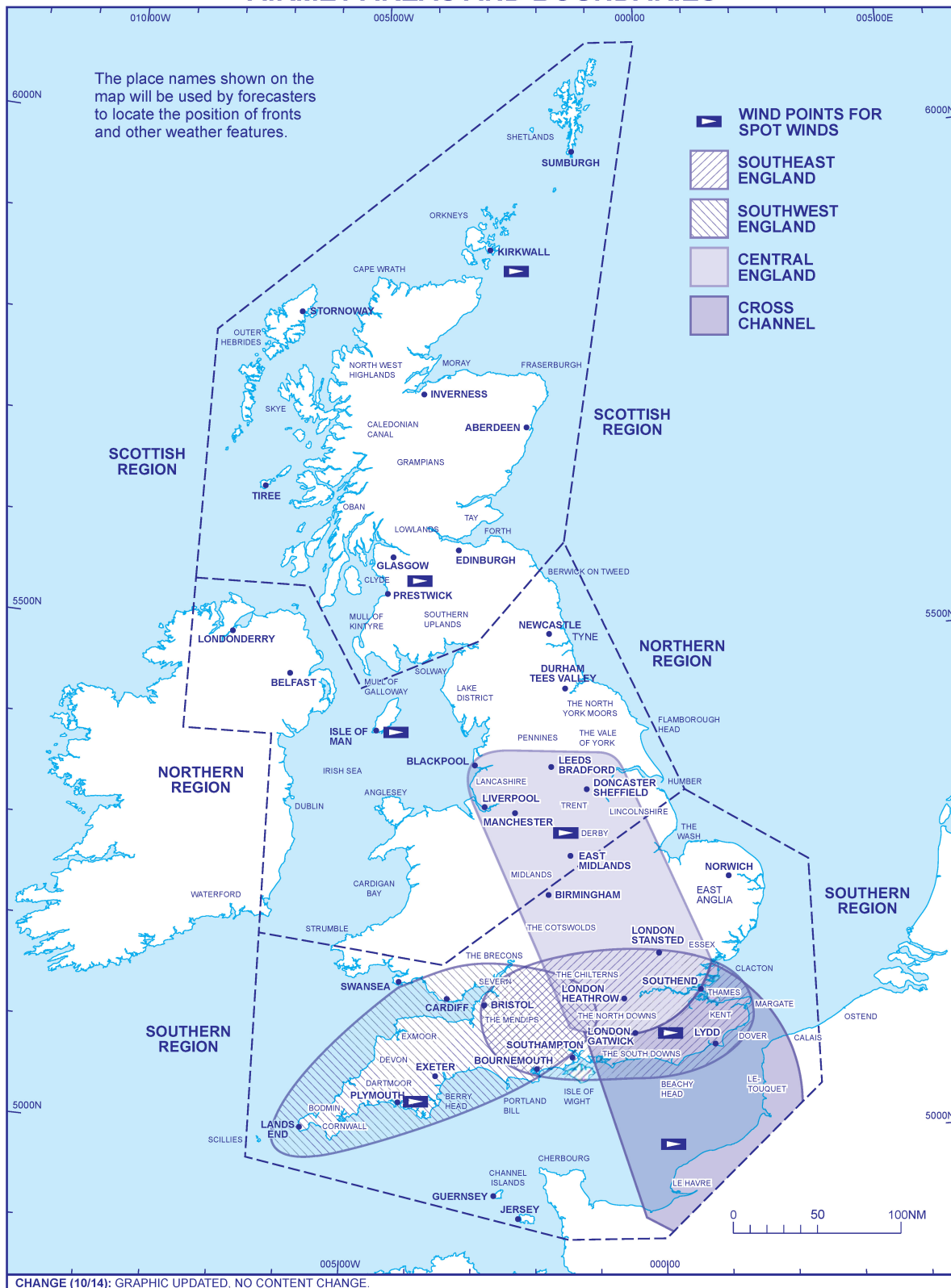
9.2.4.2 For Restricted and Offshore Observer courses contact:
 Training Co-ordinator, StormGeo:

Phone: +44 (0)1224-766581
 Email: training@stormgeo.com



GEN 3.5 METEOROLOGICAL SERVICES (continued)

AIRMET AREAS AND BOUNDARIES



GEN 3.5 METEOROLOGICAL SERVICES (continued)

10 Meteorological Codes

10.1 Aerodrome Weather Report Codes (Actuals)

10.1.1 The content and format of an actual weather report is as shown in the following table:

Report Type	Location Identifier	Date/Time	Automatic Observation	Wind	Visibility	RVR	Present weather
METAR	EGZZ	231020Z	AUTO	31015G30KT 280V350	6000 2500SW	R24/P1500	SHRA
Cloud	Temp/ Dew-point	QNH	Recent Weather	Windshear	Sea Surface Temperature and Sea State	Runway State	TREND
FEW005 SCT010CB BKN025	10/03	Q0995	RETS	WS RWY 24	W07/S4	R24/6205//	NOSIG

Note: UK Aerodromes should not insert windshear groups in METAR since these are passed to pilots by the ATS unit.

10.2 Identifier

10.2.1 The identifier has three components as shown below:

(a) Report type

- (i) METAR - Aviation routine weather report. These are compiled half-hourly or hourly at fixed times while the aeronautical station is open;
- (ii) SPECI - Aviation selected special weather report. Special reports are prepared to supplement routine reports when improvements or deteriorations through certain criteria occur. However, by ICAO Regional Air Navigation agreement, they are not disseminated in Europe.

(b) Location indicator

ICAO four-letter code letters (for UK aerodromes, see GEN 2.4)

(c) Date/Time

The date and time of observation, specified as the day of the month, hours and minutes UTC, followed by the letter Z.
Example: METAR EGSS 231020Z.

(d) AUTO

At aerodromes where a Met observing system is installed that can be operated automatically, it may be possible for the system to generate fully automated weather reports in the form of AUTO METARs. Should an aerodrome wish to provide AUTO METARs then the permission of the CAA is required. Where a report contains fully automated observations with no human intervention, it will be indicated by the code word 'AUTO', inserted immediately before the wind group. Users are reminded that in particular reports of visibility, present weather and cloud from automated systems should be treated with caution due to the limitations of the sensors themselves, the spatial area sampled by the sensors and the associated algorithms employed by the observing system. AUTO METAR shall indicate the limitations of the observing equipment through the use of additional codes, where applicable, given in paragraph 10.17.

10.3 Wind

10.3.1 Wind direction is given in degrees True (three digits) rounded to the nearest 10 degrees, followed by the windspeed (two digits, exceptionally three), both usually meaned over the ten minute period immediately preceding the time of observation. These are followed without a space by one of the abbreviations KT, KMH or MPS, to specify the unit used for reporting the windspeed.

Example: 31015KT

10.3.2 A further two or three digits preceded by a G gives the maximum gust speed in knots when it exceeds the mean speed by 10 kt or more

Example: 31015G30KT.

10.3.3 Calm is indicated by '00000', followed by the units abbreviation, and variable wind direction by the abbreviation 'VRB' followed by the speed and unit.

10.3.4 If, during the 10 minute period preceding the time of the observation, the total variation in wind direction is 60° or more, the observed two extreme directions between which the wind has varied will be given in clockwise order, separated by the indicator letter V but only when the speed is greater than 3 kt.

Example: 31015G30KT 280V350.

10.4 Horizontal Visibility

10.4.1 In the METAR, the visibility reported is the prevailing visibility and, under certain conditions, the minimum visibility. Prevailing visibility is the visibility value that is reached or exceeded within at least half the horizon circle or within at least half of the surface of the aerodrome. These areas could comprise contiguous or non-contiguous sectors.

GEN 3.5 METEOROLOGICAL SERVICES (continued)

- 10.4.2 If the visibility in one direction which is not the prevailing visibility, is less than 1500 metres or less than 50% of the prevailing visibility, the lowest visibility observed should also be reported and its general direction in relation to the aerodrome indicated by reference to one of the eight points of the compass. If the lowest visibility is observed in more than one direction, then the most operationally significant direction should be reported. When the visibility is fluctuating rapidly and the prevailing visibility cannot be determined, only the lowest visibility should be reported, with no indication of direction.

Note: There is no requirement to report the lowest visibility if it is 10 km or more.

- 10.4.3 Visibility is recorded in metres (m) rounded down to:

- (a) the nearest 50 m when the visibility is 800 m or less;
- (b) the nearest 100 m when the visibility is greater than 800 m but less than or equal to 5000 m, and expressed in kilometres (km);
- (c) The nearest 1 kilometre when the visibility is greater than 5000 m.

Note: The code 9999 indicates a visibility of 10 km or more; 0000 a visibility of less than 50 m.

10.5 RVR

- 10.5.1 An RVR group always includes the prefix R followed by the runway designator and a diagonal, in turn followed by the touch-down zone RVR in metres. If the RVR is assessed on two or more runways simultaneously, the RVR group will be repeated; parallel runways will be distinguished by appending, to the runway designator, L, C or R indicating the left, central or right parallel respectively.

Examples: R24L/1100 R24R/0750.

- 10.5.2 When the RVR is greater than the maximum value which can be assessed the group will be preceded by the letter indicator P followed by the highest value which can be assessed.

Example: R24/P1500.

- 10.5.3 When the RVR is below the minimum value which can be assessed, the RVR will be reported as M followed by the appropriate minimum value assessed.

Example: R24/M0050.

- 10.5.4 If it is possible to determine mean values of RVR, the mean value of RVR over the 10 minute period immediately preceding the observation will be reported; trends and significant variations may be reported as follows:

- (a) Trends. If RVR values during the 10 minute period preceding the observation show a distinct increasing or decreasing tendency, such that the mean during the first five minutes varies by 100 m or more from the mean during the second five minutes, this will be indicated by subscripts U or D for increasing or decreasing tendencies; otherwise, subscript N will indicate no distinct change during the period.

Example: R24/1100D.

- (b) Significant Variations. When the RVR at a runway varies significantly such that, during the 10 minute period preceding the observation, the 1 minute mean extreme values vary from the 10 minute mean value by either more than 50 metres or more than 20% of the 10 minute mean value (whichever is greater), the 1 minute mean minimum and maximum values will be given in that order, separated by V, instead of the 10 minute mean.

Example: R24/0750V1100.

- 10.5.5 If the 10 minute period immediately preceding the observation includes a marked discontinuity in runway visual range values, only those values occurring after the discontinuity should be used to obtain mean values.

- 10.5.6 A complete RVR group may therefore be of the form:

Example: R24L/0750V1100U.

Note: Until further notice, UK aerodromes will not be required to report RVR trends and significant variations. RVR is reported when the horizontal visibility or RVR is less than 1500 m. For multi-site RVR/IRVR systems, the value quoted is that for the Touch Down Zone (TDZ). If the RVR is assessed for two or more runways simultaneously, the value for each runway is given.

10.6 Weather

- 10.6.1 Each weather group may consist of appropriate intensity indicators and letter abbreviations combined in groups of two to nine characters and drawn from the following table:

Table 3.5.10.1 — Significant Present and Forecast Weather Codes				
Qualifier		Weather Phenomena		
Intensity or Proximity	Descriptor	Precipitation	Obscuration	Other
- Light	BC — Patches BL — Blowing	DZ — Drizzle GR — Hail	BR — Mist DU — Widespread Dust	DS — Duststorm FC — Funnel Cloud(s) (tornado or water-spout)
Moderate				

GEN 3.5 METEOROLOGICAL SERVICES (continued)

Table 3.5.10.1 — Significant Present and Forecast Weather Codes				
Qualifier		Weather Phenomena		
Intensity or Proximity	Descriptor	Precipitation	Obscuration	Other
+ Heavy ('Well developed' in the case of FC and PO)	DR — Drifting	GS — Small hail (<5 mm diameter) and/or snow pellets)	FG — Fog	PO — Dust/Sand Whirls (Dust Devils)
VC In the vicinity (not at the aerodrome but not further away than approx 8 km from the aerodrome perimeter)	FZ — Freezing (Super-Cooled)		FU — Smoke	SQ — Squall
	MI — Shallow	PL — Ice-Pellets	HZ — Haze	SS — Sandstorm
	PR — Partial (covering part of aerodrome)	RA — Rain	SA — Sand	—
	SH — Shower(s)	SG — Snow Grains	VA — Volcanic Ash	—
	TS — Thunderstorm	SN — Snow	—	—

10.6.2 Mixture of precipitation types may be reported in combination as one group, but up to three separate groups may be inserted to indicate the presence of more than one independent weather type.

Examples: MIFG, VCSh, +SHRA, RASN, -DZ HZ.

Note 1: BR, HZ, FU, DU and SA will not be reported when the visibility is greater than 5000 m.

Note 2: Some codes are shown that will not be used in UK METARs and TAFs but may be seen in continental reports and when flying in Europe.

10.7 Cloud

10.7.1 A six character group will be given under normal circumstances. The first three to indicate cloud amount:

- (a) FEW to indicate 1 to 2 oktas;
- (b) SCT (scattered) to indicate 3 to 4 oktas;
- (c) BKN (broken) to indicate 5 to 7 oktas;
- (d) OVC (overcast) to indicate 8 oktas.

and the last three characters indicate the height of the base of the cloud layer in hundreds of feet above aerodrome level.

Example: FEW018.

10.7.2 Types of cloud other than significant convective clouds are not identified. Significant clouds are:

- (a) CB Cumulonimbus;
- (b) TCU Towering Cumulus.

Example: SCT018CB.

10.7.3 Reporting of layers or masses of cloud is made as follows:

- (a) First Group: Lowest individual layer of any amount;
- (b) Second Group: Next individual layer of more than 2 oktas;
- (c) Third Group: Next higher layer of more than 4 oktas;
- (d) Additional Group: Significant convective cloud if not already reported.

The cloud groups are given in ascending order of height.

Example: FEW005 SCT010 SCT018CB BKN025

10.7.4 When there is no cloud below 5000 ft or below the highest minimum sector altitude (whichever is the greater) and there is no towering cumulus or cumulonimbus, 'NSC' (no significant cloud) is reported. However, the amount, height of cloud base and cloud type of towering cumulus or cumulonimbus shall be reported, irrespective of the cloud base height.

10.7.5 Sky obscured is coded by VV followed by the vertical visibility in hundreds of feet. When the vertical visibility cannot be assessed the group will read VV///: (See GEN 1.7)

Example: VV003.

10.8 CAVOK

10.8.1 The visibility, RVR, weather and cloud groups are replaced by CAVOK when the following conditions exist:

GEN 3.5 METEOROLOGICAL SERVICES (continued)

- (a) Prevailing visibility is 10 km or more;
- (b) No minimum visibility is reported
- (c) No cloud below 5000 ft or below the highest Minimum Sector Altitude, whichever is the greater.
- (d) No towering cumulus or cumulonimbus clouds.
- (e) No significant weather phenomena at or in the vicinity of aerodrome.

10.9 Air Temperature/Dewpoint

10.9.1 These are given in Degrees Celsius, M indicates a negative value.

Examples: 10/03, 01/M01.

If the dew point is missing, the temperature would be reported as 10///.

10.9.2 Temperatures are reported to the nearest whole degree Celsius, with observed values involving 0.5°C rounded up to the next higher degree Celsius, for example +2.5°C is rounded off to +3°C, -2.5°C is rounded off to -2°C.

10.10 QNH

10.10.1 QNH is rounded down to the next whole hectopascal and reported as a four digit group preceded by the letter indicator Q. If the value of QNH is less than 1000 hPa the first digit will be 0.

Example: Q0995.

10.10.2 Where reported in inches of mercury, the pressure is prefixed by 'A', and the pressure entered in hundredths of inches, viz with the decimal point omitted between the second and third figure.

Example: A3027

10.11 Supplementary Information

(a) **Recent Weather.** Recent Weather will be operationally significant weather observed in the period since the previous observation (or in the last hour whichever period is the shorter), but not now. The appropriate present weather code will be used, preceded by the letter indicator RE; up to three groups may be inserted to indicate the former presence of more than one weather type.

(b) **Windshear** The Windshear may be inserted if reported along the take-off or approach paths in the lowest 1600 ft with reference to the runway. WS is used to begin the group. The format is WS Rnn[L], Rnn[C],Rnn[R] or WS ALL RWY, where nn is the runway direction in use and L,C ,R refer to left, centre and right respectively.

Examples: WS R03L, (Windshear reported on runway 03 left) WS ALL RWY (Windshear all runways).

Until further notice, UK aerodromes will not insert windshear groups in the METAR, instead it is passed by the local ATS unit to flight crew via RTF.

(c) **Sea surface temperature and state.** The sea surface temperature is preceded by the letter indicator W and given in Degrees Celsius, with M indicating a negative value. The sea state is a single numerical value, 0-9, preceded by the letter indicator S and decodes to give the height in metres of well-developed wind waves over the open sea. Sea surface temperature and state are not used in the UK.

Table 3.5.10.2 - State of the Sea		
Code	Description	Height (M)
0	Calm (Glassy)	0
1	Calm (Rippled)	0 - 0.1
2	Smooth (Wavelets)	0.1 - 0.5
3	Slight	0.5 - 1.25
4	Moderate	1.25 - 2.5
5	Rough	2.5 - 4
6	Very Rough	4 - 6
7	High	6 - 9
8	Very High	9 - 14
9	Phenomenal	Over 14

Note 1: These height values may be used by observers when reporting the total state of agitation of the sea resulting from various factors such as wind, swell, currents, angle between swell and wind etc.

Note 2: The exact bounding height shall be assigned for the lower code: eg a height of 4 m is coded as sea state 5.

Example: Sea surface temperature of 13°C with a moderate sea state would be coded in the METAR as: W13 S4.

10.12 Runway State Group

GEN 3.5 METEOROLOGICAL SERVICES (continued)

- 10.12.1 A Runway State Group may be added to the end of the METAR (or SPECI) when there is lying precipitation or other runway contamination. It is composed as follows:

(a) **Runway Designator**

The format for the Runway Designator is Rnn[L], Rnn[C],Rnn[R] where nn is the runway direction in use and L,C ,R refer to left, centre and right respectively. After the Runway Designator a slash (/) should be inserted.

R27L/ = Runway 27 left

R88/= All Runways

R09R/ = Runway 09 right

R99/= A repetition of the last message received because no new information received

(b) **Runway Deposits**

0 = Clear and dry

6 = Slush

1=Damp

7= Ice

2 = Wet or water patches

8 = Compacted or rolled snow

3 = Rime or frost covered (depth normally less than 1 mm)

9 = Frozen ruts or ridges

4 = Dry Snow

/ = Type of deposit not reported
(eg due to runway clearance in progress)

5 = Wet Snow

(c) **Extent of Runway Contamination**

1 = 10% or less

9 = 51% to 100%

2 = 11% to 25%

/ = Not Reported (eg due to runway clearance in progress)

5 = 26% to 50%

(d) **Depth of Deposit**

The quoted depth is the mean number of readings or, if operationally significant, the greatest depth measured.

00 = less than 1 mm

96 = 30 cm

01 = 1mm etc through to

97 = 35 cm

90 = 90 mm

98 = 40 cm or more

91 = not used

99 = Runway(s) non-operational due to snow, slush, ice, large drifts or runway clearance, but depth not reported.

92 = 10 cm

// = Depth of deposit operationally not significant or not measurable.

93 = 15 cm

94 = 20 cm

95 = 25 cm

(e) **Friction Co-efficient or Braking Action**

The mean value is transmitted or, if operationally significant, the lowest value. For example:

28 = Friction co-efficient 0.28

95 = Braking action: Good

35 = Friction co-efficient 0.35

99 = Figures unreliable

or

// = Braking action not reported.

91 = Braking action: Poor

92 = Braking action: Medium/Poor

93 = Braking action: Medium

94 = Braking action: Medium/Good

Note 1: Within the UK friction co-efficient measurements are only made on runways contaminated by ice (gritted or un-gritted) and compacted snow. Where contamination is caused by water, slush or wet snow then the friction coefficient or braking action should be reported as //.

Note 2: It should be noted that runways can only be inspected as frequently as conditions permit, so that a re-issue of a previous half hourly report does not necessarily mean that the runway has been inspected again during this period, but might mean that no significant change is apparent.

Note 3: It is emphasised that this reporting system is completely independent of the normal NOTAM system and these reports are not used by AIS for amending SNOWTAM received from originators.

- 10.12.2 If a runway is being cleared of ice, snow, slush, etc., this shall be reported as follows: RDRDR///99//. Example: R14///99// = RWY 14 non-operational due to runway clearance in progress.

GEN 3.5 METEOROLOGICAL SERVICES (continued)

- 10.12.3 If runways are contaminated but runway reports are not available or are not updated due to aerodrome closure or curfew, etc., this should be reported as follows: RDRDR///// . Examples: R14/////; R88/////.
- 10.12.4 If contamination conditions on a single runway or on all runways at an aerodrome have ceased to exist, this should be reported as follows: RDRDR/CLRD//. Examples: R14/CLRD//; R88/CLRD//.
- 10.12.5 If the aerodrome is closed due to contamination of runways, the abbreviation **SNOCLO** is used in place of a runway state group. Example R/SNOCLO.
- 10.13 **TREND**
- 10.13.1 For selected aerodromes, this is a forecast of significant changes in conditions during the two hours after the observation time:
- (a) Change Indicator: BECMG (becoming) or TEMPO (temporary), which may be followed by a time group (hours and minutes UTC) preceded by one of the letter indicators FM (from), TL (until), AT (at);
 - (b) Weather: Standard codes are used. NOSIG replaces the trend group when no significant changes are forecast to occur during the trend forecast period.
- Examples: BECMG FM1100 25035G50KT; TEMPO FM0630 TL0830 3000 SHRA.
- 10.14 **'RMK'**
- 10.14.1 The indicator 'RMK' (remark) denotes an optional section containing additional meteorological elements. It will be appended to METARs by national decision and should not be disseminated internationally. In the UK, the section will not be inserted without the prior agreement of the Met Authority.
- 10.15 **Missing Information**
- 10.15.1 Information that is missing in a METAR or SPECI may be replaced by diagonals.
- 10.16 **Examples of METAR:**
- (a) METAR EGGX 301220Z 14005KT 1200 0600E R12/1000N DZ BCFG VV/// 08/07 Q1004 NOSIG=
 - (b) METAR EGLY 301220Z 24015KT 200V280 8000 -RA SCT010 BKN025 18/15 Q0983 TEMPO 3000 RA BKN008 OVC020=
 - (c) METAR EGPZ 301220Z 30025G37KT 270V360 1200 0800NE +SHSNRAGS FEW005 SCT010 BKN020CB 03/M01 Q0999 RETS BECMG AT1300 9999 NSW SCT015 BKN100=
- The above METAR for 1220 UTC on the 30th of the month, in plain language:**
- EGGX:** Surface wind: mean 140 Deg True, 5 kt; Prevailing visibility 1200 m, minimum visibility 600 m to east; mean RVR 1000 m (at threshold Runway 12, no apparent tendency); moderate drizzle with fog patches ; Sky obscured, vertical visibility not available; dry bulb temperature Plus 8 C, dew point Plus 7 C; Aerodrome QNH 1004 hPa; Trend: no significant change expected next two hours;
- EGLY:** Surface wind: mean 240 Deg True, 15 kt; varying between 200 and 280 deg; Prevailing visibility 8 km; Light rain; cloud 3-4 oktas base 1000 ft, 5-7 oktas 2500 ft; dry bulb: plus 18 C, dew point: plus 15 C; QNH 983 hPa; Trend: temporarily 3000 m in moderate rain with 5-7 oktas 800 ft, 8 oktas 2000 ft;
- EGPZ:** Surface wind: mean 300 Deg True, 25 kt; Gust 37 kt, varying between 270 and 360 deg; Prevailing visibility 1200 m, minimum visibility 800 m to northeast; heavy shower of snow, rain and small hail; 1-2 oktas base 500 ft, 3-4 oktas base 1000 ft, 5-7 oktas CB base 2000 ft; dry bulb: plus 3 C, dew point: minus 1 C; QNH 999 hPa; thunderstorm since previous report. Trend: improving at 1300 UTC to 10 km or more, nil weather, 3- 4 oktas 1500 ft, 5-7 oktas 10000 ft.
- 10.17 **AUTO METAR coding**
- 10.17.1 Where the observation is generated by an automatic observing system without any human input, the code 'AUTO' shall be inserted between the date/time of the report group and the wind group. In an AUTO METAR or automated weather report on ATIS, the presence or absence of the phenomena may not have been verified by a human observer. Aircraft operators are therefore advised to exercise caution with respect to phenomena likely to affect their flight.
- 10.17.2 Where the observation is generated by an automatic observing system without any human input or supervision and the present weather cannot be detected due to unserviceable or missing present weather sensors, the lack of present weather information should be indicated by two slashes (/). If the present weather sensor is unable to determine the state or form of the precipitation, 'UP' (unidentified precipitation) or 'FZUP' (freezing unidentified precipitation), together with any intensity qualifiers, should be reported as appropriate. If the present weather sensor is serviceable but not detecting any present weather, then no present weather group shall be reported in the METAR.
- 10.17.3 Recent unidentified precipitation ('REUP') shall be reported if moderate or heavy unidentified precipitation has ceased or decreased in intensity since being reported in the last routine report or within the last hour, whichever is the shorter.
- 10.17.4 When the observation is generated by an automated observing system without human input or supervision the following coding may be seen related to cloud observations.
- (a) NNNhhh// Cloud detected, but it is unknown whether it is a convective cloud type (ie TCU or CB).
 - (b) // Detection of cloud height & type not available.
 - (c) NCD No Clouds Detected. No cloud of operational significance or convective cloud detected by the automated system
 - (d) //TCU Towering Cumulus detected, but no information on its height or cloud cover is available.

GEN 3.5 METEOROLOGICAL SERVICES (continued)

(e) /////CB Cumulonimbus detected, but no information on its height or cloud cover is available.

(f) VCTS Indicates lightning has been detected between 9-16 km from the aerodrome reference point.

10.17.5 Examples of AUTO METAR coding:

(a) METAR EGZZ 292220Z AUTO 29010KT 6000 // FEW010/// BKN025/// 17/12 Q0996=

(b) METAR EGZZ 300450Z AUTO VRB02KT 3000 BR NCD 10/09 Q1002=

(c) METAR EGZZ 301220Z AUTO 25015KT 9999 TS FEW010/// BKN025/// /////CB 18/12 Q1001 =

10.18 **Aerodrome Forecast (TAF) Codes**

10.18.1 TAFs describe the forecast prevailing conditions at an aerodrome and usually cover a period of 9, 24 or 30 hours. TAFs valid for 9 hours are updated and re-issued every 3 hours and those valid for more than 12 hours, every 6 hours. Amendments are issued as and when necessary. TAFs are issued separately from the METAR or SPECI and do not refer to any specific report; however, many of the METAR groups are also used in TAFs and significant differences are detailed in paragraph 10.19.

10.18.2 The content and format of a TAF is as in the following table:

Report Type	Location Identifier	Date/Time of Origin	Validity Time	Wind	Visibility	Weather
TAF	EGZZ	130505Z	1306/1315	31015KT	8000	-SHRA

Cloud	Variant	Validity Times
FEW005 SCT018CB BKN025	TEMPO	1311/1315

Visibility	Weather	Cloud	Probability	Validity Time	Weather
4000	+SHRA	BKN010CB	PROB30	1312/1315	TSRA

10.18.2.1 Example of TAF

(a) 9 hr TAF:

TAF EGGY 162005Z 1621/1706 13018KT 9999 BKN012 BECMG 1623/1702 FEW020 BECMG 1704/1706 3000 BR BKN007=

The validity group should be read as 2100 UTC on the 16th of the month to 0600 UTC on the 17th of the month. The first BECMG group should be read as 2300 UTC on the 16th of the month to 0200 UTC on the 17th of the month. The second BECMG group should be read as 0400 UTC on the 17th of the month to 0600 UTC on the 17th of the month.

(b) 24 hr TAF:

Example 24 Hour TAF illustrating the use of the FM group, as used regularly by some states to indicate a change to alternative conditions, from a specific time:

TAF KGGY 160505Z 1606/1706 13018KT 9999 BKN020 TEMPO 1608/1612 17025G45KT 3000 TSRA BKN010CB FM161230 21015KT TEMPO 1703/1706 4000 BR =

The example above shows 'FM161230', which should be read as from 1230 UTC on the 16th of the month.

(c) 30 hr TAF:

TAF EGGY 160505Z 1606/1712 13018KT 9999 BKN020 TEMPO 1608/1612 17025G45KT 3000 TSRA BKN008CB BECMG 1612/1614 20015KT FEW020 TEMPO 1703/1706 4000 BR TEMPO 1709/1712 BKN012=

The validity group should be read as 0600 UTC on the 16th of the month to 1200 UTC on the 17th of the month. The first TEMPO group should be read as from 0800 UTC on the 16th of the month to 1200 UTC on the 16th of the month. The BECMG group should be read as 1200 UTC on the 16th of the month to 1400 UTC on the 16th of the month. The last TEMPO should be read as 0900 UTC on the 17th of the month to 1200 UTC on the 17th of the month.

10.19 **Differences from the METAR**

- Identifier.** In the validity period, the first two digits indicate the day on which the period begins, the next two digits indicate the time of commencement of the forecast in whole hours UTC and the last two digits are the time of ending of the forecast in whole hours.
- Wind.** In the forecast of the surface wind, the expected prevailing direction will be given. When it is not possible to forecast a prevailing surface wind direction due to its expected variability, for example, during light wind conditions (3 kts or less) or thunderstorms, the forecast wind direction will be indicated by the use of the abbreviation 'VRB'.
- Horizontal Visibility.** As with the METAR code, except that only one value (the prevailing visibility) will be forecast. Visibility is reported in steps detailed in para 10.4.3.
- Weather.** If no significant weather is expected the group is omitted. However, after a change group, if the weather ceases to be significant, the abbreviation NSW is used for No Significant Weather.

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- (e) **Cloud.** When no cumulonimbus, towering cumulus or clouds below 5000 ft or below the highest minimum sector altitude, whichever is the greater, are forecast and CAVOK is not appropriate, then NSC (No Significant Cloud) is used. Only CB and TCU clouds will be specified.

- (f) **Significant Changes.** The abbreviation FM followed by the date and time to the nearest hour and minute UTC is used to indicate the beginning of a self contained part in a forecast. All conditions given before this group are superseded by the conditions indicated after the group.

Example: FM161220 27017KT 4000 BKN010.

The change indicator BECMG followed by a eight figure date and time group, indicates an expected permanent change in the forecast meteorological conditions, at either a regular or irregular rate, occurring at an unspecified time within the period. The time period should not normally exceed 2 hours but in any case should not exceed 4 hours.

Example: BECMG 1721/1724 1500 BR

The change indicator TEMPO followed by a eight figure date and time group indicates a period of temporary fluctuations to the forecast meteorological conditions which may occur at any time during the period given. The conditions following these groups are expected to last less than one hour in each instance and in aggregate less than half the period indicated. The conditions following these groups are expected to last one hour in each instance and in aggregate less than half the period indicated.

Example: TEMPO 0911/0916 4000 +SHRA BKN010CB.

- (g) **Probability.** The probability of occurrence happening will be given as a percentage, although only 30% and 40% will be used. The abbreviation PROB is used to introduce the group, followed by a time group, or an indicator and a time group.

Examples:

(i) PROB30 1205/1207 0800 FG BKN004;

(ii) PROB40 TEMPO 1214/1216 TSRA.

- (h) **Amendments.** When a TAF requires amendment, the amended forecast shall be indicated by inserting AMD after TAF in the identifier and this new forecast covers the remaining validity period of the original TAF.

Example: TAF AMD EGZZ 130820Z 1308/1316 21007KT 9999 BKN020 BECMG 1309/1312 4000 RADZ BKN008=

Any further amendments to a TAF that has already been amended will result in the same 'TAF AMD' coding being used; however the date and time of origin will be updated

- (i) **Corrections.** When a METAR or TAF requires correction, the correction shall be indicated by inserting COR after TAF or METAR in the identifier.

Example:

Original: TAF EGZZ 140905Z 1409/1418 27012KT 4000 RUDZ BKN012 TEMPO 1410/1419 BKN008=

Update: TAF COR EGZZ 140918Z 1409/1418 27012KT 4000 RADZ BKN012 TEMPO 1410/1419 BKN008=

Note: A correction will be issued only to correct an obvious typographical error. However a TAF amendment shall be issued instead whenever such a change would result in the meteorological conditions forecast being better or worse than previously stated, for example, 3000 RADZ instead of 4000 RADZ.

- (j) **Cancellations.** Where the forecaster has cancelled a TAF, for example when routine METARs are not being made available the abbreviation CNL will be used.

Example: TAF AMD EGZZ 101030Z 1009/1018 CNL=

- (k) **Other Groups.** Three further TAF groups are not used for civil aerodromes in the UK but are shown here to assist in decoding overseas and UK military TAF.

Forecast Temperature		TXaa/ggZ TNbb/hhZ
aa	Maximum temperature preceded by the letter indicators TX and given in Degrees Celsius, with M indicating a negative value.	
gg	Time of maximum temperature, in UTC.	
bb	Minimum temperature preceded by the letter indicators TN and given in Degrees Celsius, with M indicating a negative value.	
hh	Time of minimum temperature, in UTC.	

Example: TX25/13Z TN09/05Z

- (i)

Airframe
Ice Accretion

6 Ic hhh tL

6 Group Indicator

Ic Type of airframe ice accretion:

0 none

GEN 3.5 METEOROLOGICAL SERVICES (continued)

1	light
2	light in cloud
3	light in precipitation
4	moderate
5	moderate in cloud
6	moderate in precipitation
7	severe
8	severe in cloud
9	severe in precipitation
hhh	Height above ground level of lowest icing level (hundreds of feet)
t _L	Thickness of icing layer:
0	up to top of clouds
1-9	thickness in thousands of feet

Example of an icing forecast: 650104.

This decodes as moderate icing potential is expected in clouds (code 5) from 1000 feet (code 010 in hundreds of feet) to 5000 feet AGL (4000 feet thickness as denoted by the ending '4')

(ii)

Turbulence		5 B hhh tL
0	none	
1	light	
2	moderate in clear air, infrequent	
3	moderate in clear air, frequent	
4	moderate in cloud, infrequent	
5	moderate in cloud, frequent	
6	severe in clear air, infrequent	
7	severe in clear air, frequent	
8	severe in cloud, infrequent	
9	severe in cloud, frequent	
hhh	Height above ground level of lowest level of turbulence (hundreds of feet)	
t _L	Thickness of turbulent layer:	
0	up to top of clouds	
1-9	thickness in thousands of feet	

Example of a turbulence forecast: 530804.

This decodes as frequent moderate turbulence is expected in clear air (code 3 from the table) and that the turbulence will extend from 8000 feet to 12000 feet AGL. As with the icing forecast above, if a layer of turbulence is forecast to exceed 9000 feet in thickness, a second group would be required.

10.20 Reports in Abbreviated Plain Language

10.20.1 Some reports may be disseminated in abbreviated plain language. These will use:

- (a) Standard ICAO abbreviations and
- (b) numerical values of a self explanatory nature.

The abbreviations referred to under (a) are contained in the Procedures for Air Navigation Services - ICAO Abbreviations and Codes (ICAO Doc 8400).

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