091 VFR COMMUNICATIONS

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Definitions

1. The student should be familiar with the following definitions and abbreviations:

Advisory Area. A designated area where air traffic advisory service is available.

Advisory Route. A designated route along which air traffic advisory service is available.

Aerodrome. Any area of land or water designed, equipped, set apart or commonly used for affording facilities for the landing and departure of aircraft.

Aerodrome Control Service. Air traffic control service for aerodrome traffic.

Aerodrome control radio station. A station providing radio communication between an aerodrome control tower and aircraft or mobile aeronautical stations.

Aerodrome Traffic. All traffic on the manoeuvring area of an aerodrome and all aircraft operating in the vicinity of an aerodrome.

Aerodrome Traffic Circuit. The specified flight path to be flown by aircraft operating in the vicinity of an aerodrome.

Aerodrome Traffic Zone. Airspace of defined dimensions established around an aerodrome for the protection of aerodrome traffic.

Aeronautical broadcasting service. A broadcasting service intended for the transmission of information relating to air navigation.

Aeronautical fixed circuit. A circuit forming part of the Aeronautical Fixed Service (AFS).

Aeronautical Fixed Service (AFS). A telecommunication service between specified fixed points provided primarily for the safety of air navigation and for the regular, efficient and economical operation of air services.

Aeronautical fixed station. A station in the aeronautical fixed service.

Aeronautical fixed telecommunication network circuit. A circuit forming part of the Aeronautical Fixed Telecommunication Network (AFTN).

Aeronautical Fixed Telecommunication Network (AFTN). A world-wide system of aeronautical fixed circuits provided, as part of the aeronautical fixed service, for the exchange of messages and/or digital data between aeronautical fixed stations having he same or compatible communications characteristics.

Aeronautical mobile service. A mobile service between aeronautical stations and aircraft stations, or between aircraft stations, in which survival craft stations may participate; emergency position-indicating radio beacon stations may also participate in this service on designated distress and emergency frequencies.

Aeronautical radio navigation service. A radio navigation service intended for the benefit and for the safe operation of aircraft.

Aeronautical telecommunication log. A record of the activities of an aeronautical telecommunication station.

Aeronautical telecommunication station. A station in the aeronautical telecommunication service.

Aeronautical Station. A land station in the aeronautical mobile service. In certain instances, an aeronautical station may be placed board a ship or an earth satellite.

AFTN communication centre. An AFTN station whose primary function is the relay or retransmission of AFTN traffic from (or to) a number of other AFTN stations connected to it.

AFTN destination station. An AFTN station to which messages and/or digital data are addressed for processing for delivery to the addressee.

AFTN origin station. An AFTN station where messages and/or digital data are accepted for transmission over the AFTN.

AFTN station. A station forming part of the Aeronautical Fixed Telecommunication Network (AFTN) and operating as such under the authority or control of a State.

Airborne Collision Avoidance System. An aircraft system based on SSR transponder signals which operates independently of ground-based equipment to provide advice to the pilot on potential conflicting aircraft that are equipped with SSR transponders.

Air-ground control radio station. An aeronautical telecommunication station having primary responsibility for handling communications pertaining to the operation and control of aircraft in a given area.

Air-report. A report from an aircraft in flight prepared in conformity with requirements for position, and operational and/or meteorological reporting.

Air-to-ground communication. One-way communication from aircraft to stations or locations on the surface of the earth.

Aircraft Station. A mobile station in the aeronautical mobile service on board an aircraft.

Air-ground Communications. Two-way communication between aircraft and stations or locations on the surface of the earth.

AIRPROX. The code word used in an air traffic incident report to designate aircraft proximity.

Air Traffic. All aircraft in flight or operating on the manoeuvring area of an aerodrome.

Air Traffic Control Clearance. Authorisation for an aircraft to proceed under conditions specified by an air traffic control unit.

Air Traffic Service (ATS). A generic term meaning variously, flight information service, alerting service, air traffic advisory service, air traffic control service, approach control service or aerodrome control service.

Airway. A control area or part of a control area established in the form of a corridor equipped with radio navigation aids.

Altitude. The vertical distance of a level, a point or an object considered as a point, measured from mean sea level.

Approach Control Service. Air traffic control service for arriving or departing controller flights.

Area Control Centre. A term used in the United Kingdom to describe a unit providing en-route air traffic control services.

ATS direct speed circuit. An Aeronautical Fixed Service (AFS) telephone circuit, for direct exchange of information between Air Traffic Services (ATS) units.

Automatic Terminal Information Service (ATIS) (UK). The provision of current, routine information to arriving and departing aircraft by means of continuous and repetitive broadcasts throughout the day or a specified portion of the day.

Base Turn. A turn executed by the aircraft during the initial approach between the end of the outboard track and the beginning of the intermediate or final approach track. The tracks are not reciprocal.

Blind Transmission. A transmission from one station to another station in circumstances where two-way communication cannot be established but where it is believed that the called station is able to receive the transmission.

Broadcast. A transmission of information relating to air navigation that is not addressed to a specific station or stations.

Clearance Limit. The point to which an aircraft is granted an air traffic control clearance.

Communication centre. An aeronautical fixed station which relays or retransmits telecommunication traffic from (or to) a number of other aeronautical fixed stations directly connected to it.

Control Area. A controlled airspace extending upwards from a specified limit above the surface of the earth.

Controlled Airspace. An airspace of defined dimensions within which air traffic control service is provided to IFR flights and to VFR flights in accordance with the airspace classification.

Control Zone. A controlled airspace extending upwards from the surface of the earth to a specified upper limit.

Cruising Level. A level maintained during a significant portion of a flight.

Decision Altitude/Height. A specified altitude/height in a precision approach at which a missed approach must be initiated if the required visual reference to continue the approach to land has not been established.

Duplex. A method in which telecommunication between two stations can take place in both directions simultaneously.

Elevation. The vertical distance of a point or level on, or affixed to, the surface of the earth measured from mean sea level.

Estimated Time of Arrival. The time at which the pilot estimates that the aircraft will be over a specific location.

Expected Approach Time. The time at which ATC expects that an turning aircraft, following a delay, will leave the holding point to complete its approach for landing.

Flight Information Centre. A unit established to promote flight information service and alerting service.

Flight Level. A surface of constant atmospheric pressure, which is related to a specific pressure datum, 1013.2 mb, and is separated from other such surfaces by specific pressure intervals.

Flight Plan. Specified information provided to air traffic services units, relative to an intended flight of an aircraft. Flight Plans fall into two categories: Full Flight Plans and Abbreviated Flight Plans.

General Air Traffic. Flights operating in accordance with civil air traffic procedures.

Ground-to-air communication. One-way communication from stations or locations on the surface of the earth to aircraft.

Headings. The direction in which the longitudinal axis of an aircraft is pointed, usually expressed in degrees from North (true, magnetic, compass or grid).

Height. The vertical distance of a level, a point, or an object considered as a point measured from a specified datum.

Holding Point. A specified location, identified by unusual or other means in the vicinity of which the position of an aircraft in flight is maintained in accordance with ATC clearance.

IFR Flight. A flight conducted in accordance with the instrument flight rules.

Instrument Meteorological Conditions (IMC). Meteorological conditions expressed in terms of visibility, horizontal and vertical distance from cloud, less than the minima specified for visual meteorological conditions.

Interpilot air-to-air communication. Two-way communication on a designated air-to-air channel to enable aircraft engaged in flights over remote and oceanic areas out of range of VHF ground stations to exchange necessary operational information and to facilitate the resolution of operation problems.

Known Traffic. Traffic, the current flight details and intentions of which are known to the controller concerned through direct communication or co-ordination.

Level. A generic term relating to the various position of an aircraft in flight and meaning variously, height, altitude or flight level.

Manoeuvering Area. That part of an aerodrome to be used for the take-off, landing and taxiing of aircraft excluding aprons.

Minimum Descent Altitude/Height. An altitude/height in a non-precision or circling approach below which descent may not be made without visual reference.

Missed Approach Point. The point in an instrument approach procedure at or before which the prescribed missed approach procedure must be initiated in order to ensure that the minimum obstacle clearance is not infringed.

Missed Approach Procedure (MAP). The procedure to be followed if the approach cannot be continued.

Mobile surface station. A station in the aeronautical telecommunication service, other than an aircraft station, intended to be used while in motion or during halts at unspecified points.

Movement Area. The manoeuvering area and the aprons.

Network station. An aeronautical station forming part of a radiotelephony network.

Non-network Communications. Radiotelephony communications conducted by a station of the aeronautical mobile service, other than those conducted as part of a radiotelephony.

Procedure Turn. A manoeuvre in which a turn is made away from a designated track followed by a turn in the opposite direction to permit the aircraft to intercept and proceed along the reciprocal of the designated track.

Radar Approach. An approach, executed by an aircraft, under the direction of a radar controller.

Radar Contact. The situation which exists when the radar blip or radar position symbol of a particular aircraft is seen and identified on a radar display.

Radar Identification. The process of correlating a particular radar blip or radar position symbol with a specific aircraft.

Radar Vectoring. Provision of navigational guidance to aircraft in the form of specific headings, based on the use of radar.

Radio direction-finding station. A radio station intended to determine only the direction of other stations by means of transmissions from the latter.

Radiotelephony network. A group of radiotelephony aeronautical stations which operate on and guard frequencies from the same family and which support each other in a defined manner to ensure maximum dependability of air-ground communications and dissemination of air-ground traffic.

Readback. A procedure whereby the receiving station repeats a received message or an appropriate part thereof back to the transmitting station so as to obtain confirmation of correct reception.

Regular station. A station selected from those forming an en-route air-ground radiotelephony network to communicate with or to intercept communications from aircraft in normal conditions.

Reporting Point. A specified geographical location in relation to which the position of an aircraft can be reported.

Runway. A defined rectangular area on a land aerodrome prepared for the landing and take-off aircraft.

Runway Visual Range. The range over which the pilot of an aircraft on the centre line of a runway can expect to see the runway surface markings, or the lights delineating the runway or identifying its centre line.

Signal Area. An area on an aerodrome used for the display of ground signals.

SIGMET information. Information issued by a meteorological watch office concerning the occurance or expected occurance of specified en-route weather phenomena which may affect the safety of aircraft operations.

Simplex. A method in which telecommunication between two stations takes place in one direction at a time.

Telecommunication. Any transmission, emission, or reception of signs, signals, writing, images and sounds or intelligence of any nature by wire, radio, optical or other electromagnetic systems.

Terminal Control Area. A control area normally established at the confluence of airways in the vicinity of one or more major aerodromes.

Threshold. The beginning of that portion of the runway useable for landing.

Traffic Alert and Collision Avoidance System. See ACAS.

Tributary station. An aeronautical fixed station that may receive or transmit messages and/or digital data but which does not relay except for the purpose of serving similar stations connected through it to a communication centre.

VFR Flight. A flight conducted in accordance with the visual flight rules.

Visual Meteorological Conditions (VMC). Meteorological conditions expressed in terms of visibility, horizontal and vertical distance from cloud, equal to or better than specified minima.

Commonly Used Abbreviations

2. The abbreviations annotated with an asterisk are normally spoken as complete words. The remainder are normally spoken using the constituent letters rather than the spelling alphabet.

Categories of Message

A	
aal	Above Aerodrome Level
ACAS*	(A-kas) Airborne Collision Avoidance System (see TCAS)
ACC	Area Control Centre
ADF	Automatic Direction-Finding Equipment
ADR	Advisory Route
ADT	Approved Departure Time
AFIS	Aerodrome Flight Information Service
AFTN	Aeronautical Fixed Telecommunication Network
agl	Above Ground Level
AAIB	Air Accident Investigation Branch
AIC	Aeronautical Information Circular
AIRPROX*	Aircraft Proximity (replaces Airmiss/APHAZ)
AIP	Aeronautical Information Publication
AIRAC	Aeronautical Information Regulation and Control
AIS	Aeronautical Information Services
amsl	Above Mean Sea Level
ANO	Air Navigation Order

ATA	Actual Time of Arrival
ATC	Air Traffic Control (in general)
ATD	Actual Time of Departure
ATIS*	Automatic Terminal Information Service
ATS	Air Traffic Service
ATSU	Air Traffic Service Unit
ATZ	Aerodrome Traffic Zone
C	
CAA	Civil Aviation Authority
CAVOK*	Visibility, cloud and present weather better than prescribed values or conditions (CAVOK pronounced Cav-okay)
CTA	Control Area
CTR	Control Zone
D	
DAAIS*	Danger Area Activity Information Service (DAAIS pronounced DAY-ES)
DACS*	Danger Area Crossing Service
DF	Direction Finding
DME	Distance Measuring Equipment
DR	Dead Reckoning
E	

EAT	Expected Approach Time
ETA	Estimated Time of Arrival
ETD	Estimated Time of Departure
F	
FAF	Final Approach Fix
FIR	Flight Information Region
FIS	Flight Information Service
FL	Flight Level
Ft	Foot (feet)
G	
GAT	General Air Traffic
GMC	Ground Movement Control
H	
H24	Continuous day and night service (H24 pronounced Aitch Twenty Fower)
HF	High Frequency (3 to 30 MHz)
HJ	Sunrise to Sunset
I	
IAF	Initial Approach Fix
ICAO*	International Civil Aviation Organisation

IF	Intermediate Approach Fix
IFR	Instrument Flight Rules
ILS	Instrument Landing System
IMC	Instrument Meteorological Conditions
IRVR	Instrumented Runway Visual Range
K	
kg	Kilogramme (s)
km	Kilometre (s)
kt	Knot (s)
M	
MAPt	Missed Approach Point
MATZ*	Military Aerodrome Traffic Zone
MDA/H	Minimum Descent Altitude/Height
MEDA*	Military Emergency Diversion Aerodrome
MET*	Meteorological or Meteorology
METAR*	Routine aviation aerodrome weather report
MLS	Microwave Landing System
MNPS	Minimum Navigation Performance & Specification
mb	Millibars

N	
NATS	National Air Traffic Service
NDB	Non-Directional Radio Beacon
NOTAM	A notice containing information concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel concerned with flight operations.
O	
OAC	Oceanic Area Control Unit
OCA	Oceanic Control Area
OCA/H	Obstacle Clearance Altitude/Height
P	
PAPIS*	Precision Approach Path Indicating System (PAPIS pronounced Pa-pee)
PAR	Precision Approach Radar
Q	
QDM	Magnetic heading (zero wind) (Sometimes employed to indicate magnetic heading of a runway)
QDR	Magnetic Bearing
QFE	The observed pressure at a specified datum (usually aerodrome or runway threshold elevation) corrected for temperature

QFF	Meteorologists determine a mean sea level pressure which is more accurate than the QNH by reducing the QFE to mean sea level using ambient rather than standard atmosphere temperature lapse rates. The MSL pressure thus obtained is termed the QFF.
QGH	Ground interpreted letdown procedure using DF equipment.
QNE	When flying above the transition altitude it is normal to set 1013mb on the altimeter subscale and maintain a flight level. When 1013 is set on the subscale, the height shown on the altimeter when the aircraft is on the ground is known as the QNE value.
QNH	The QFE reduced to mean sea level (MSL) pressure using the standard atmosphere lapse rate. The pressure altimeter is calibrated to the standard atmosphere, and so when QNH is set on the altimeter subscale the instrument indicates the airfield elevation at the airfield datum point. We talk above of reducing QFE to QNH. It is however a reduction in height which results in an increase in pressure when changing QFE to QNH for an airfield which is above MSL.
QTE	True Bearing
R	
RA	Resolution Advisory (see TCAS)
RCC	Rescue Co-ordination Centre
RPS	Regional Pressure Setting
RTF	Radiotelephone/Radiotelephony
RVR	Runway Visual Range

S	
SAR	Search and Rescue
SID*	Standard Instrument Departure
SIGMET*	Significant information concerning en-route weather phenomena which may affect the safety of aircraft operations
SRA	Surveillance Radar Approach
SSR	Secondary Surveillance Radar
STAR*	Standard (instrument) Arrival Route
T	
TA	Traffic Advisory (see TCAS)
TAF*	Terminal Aerodrome Forecast
TCAS*	Traffic Alert and Collision Avoidance System (Tee-kas)
TMA	Terminal Control Area
U	
UAS	Upper Airspace
UHF	Ultra-High Frequency
UIR	Upper Flight Information Region
UTA	Upper Control Area
UTC	Co-ordinated Universal Time
V	

VASIS*	Visual Approach Slope Indicator System (VASIS pronounced Var-zi)
VDF	Very High Frequency Direction-Finding Station
VFR	Visual Flight Rules
VHF	Very High Frequency (30 to 300 MHz)
VMC	Visual Meteorological Conditions
VOLMET*	Meteorological information for aircraft in flight
VOR	VHF Omnidirectional Radio Range
VORTAC*	VOR and TACAN combination

Direction Finding

3. Direction-finding stations work either singly or in groups of two or more stations under the direction of a main direction-finding station.

4. A direction-finding station working alone can only determine the direction of an aircraft in relation to itself.

5. A direction-finding station working alone should give the following, as requested:

(i) True bearing of the aircraft, using the signal QTE or appropriate phrase.

(ii) True heading to be steered by the aircraft, with no wind, to head for the direction-finding station using the signal QUJ or appropriate phrase.

(iii) Magnetic bearing of the aircraft, using the signal QDR or appropriate phrase.

(iv) Magnetic heading to be steered by the aircraft with no wind to make for the station, using the signal QDM or appropriate phrase.

6. When direction-finding stations work as a network to determine the position of an aircraft, the bearings taken by each station should be sent immediately to the station controlling the direction-finding network to enable the position of the aircraft to be determined.

7. The station controlling the network should, on request, give the aircraft its position in one of the following ways:

(i) Position in relation to a point of reference or in latitude and longitude, using the signal QTF or appropriate phrase.

(ii) True bearing of the aircraft in relation to the direction-finding station or other specified point, using the signal QTE or appropriate phrase, and its distance form the direction-finding station or point, using the signal QGE or appropriate phrase.

(iii) Magnetic heading to steer with no wind, to make for the direction-finding station or other specified point using the signal QDM or appropriate phrase, and its distance form the direction-finding station or point, using the signal QGE or appropriate phrase.

8. Aircraft stations shall normally make requests for bearings, courses or positions, to the aeronautical station responsible, or to the station controlling the direction-finding network.

9. To request a bearing, heading or position, the aircraft station shall call the aeronautical station or direction-finding control station on the listening frequency. The aircraft shall then specify the type of service that is desired by the use of the appropriate phrase or Q signal.

10. An aircraft station requiring a series of bearings or headings, shall call the direction-finding station concerned, on the appropriate frequency, and request the service by the signal QDL followed by other appropriate Q signals, except that when the series has commenced, the call signs of the stations may be omitted if no confusion is likely to arise.

11. As soon as the direction-finding station or group of stations is ready, the station originally called by the aircraft station shall where necessary request transmission for direction-finding service or send the appropriate Q signal, and, if necessary, indicate the frequency to be used by the aircraft station, the number of times the transmission should be repeated, the duration of the transmission required or any special transmission requirement.

12. In radiotelegraphy, the aircraft shall, after changing it necessary to the new transmitting frequency, reply by sending its call sign, two dashes of about ten seconds of duration each and then repeating its call sign, unless some other period has been specified by the direction-finding station.

13. In radiotelephony, an aircraft station which requests a bearing shall end the transmission by repeating its call sign. If the transmission has been too short for the direction-finding station to obtain a bearing, the aircraft shall give a longer transmission for two periods of approximately ten seconds, or alternatively provide such other signals as may be requested by the direction-finding station.

NOTE:

Certain types of VHF/DF stations require the provision of a modulated signal (voice transmission) in order to take a bearing.

14. When a direction-finding station is not satisfied with is observations, it shall request the aircraft station to repeat the transmission.

15. When a heading or bearing has been requested, the direction-finding station shall advise the aircraft station in the following form:

(i) The appropriate phrase or Q signal.

(ii) Bearing or heading in degrees in relation to the direction-finding station, sent as three figures.

(iii) Class of bearing except in QDL procedure

(iv) Time of observation, if necessary]

16. When a position has been requested, the direction-finding control station, after plotting all simultaneously observations, shall determine the observed position of the aircraft and shall advise the aircraft station in the following form:

(i) The appropriate phrase or Q signal.

(ii) The position.

(iii) Class of position.

(iv) Time of observation.

17. As soon as the aircraft station has received the bearing, heading or position, it shall repeat back the message for confirmation, or correction, except in QDL procedure.

18. When positions are given by bearing or heading and distance form a known point other than the station making the report, the reference point shall be an aerodrome, prominent town or geographic feature. An aerodrome shall be given in preference to other places. When a large city or town is used as a reference place, the bearing or heading, and the distance given shall be measured from its centre.

19. When the position is expressed in latitude and longitude, groups of figures for degrees and minutes shall be used followed by the letter N or S for latitude and the letter E or W for longitude, respectively. In radiotelephony the words NORTH, SOUTH, EAST or WEST shall be used.

20. According to the estimate by the direction-finding station of the accuracy of the observations, bearings and positions shall be classified as follows:

Bearings:

Class A - accurate within plus or minus 2 degrees;

Class B - accurate within plus or minus 5 degrees;

Class C - accurate within plus or minus 10 degrees;

Class D - accuracy less than Class C.

NOTE:

The observational characteristics for classification of bearings are given in the table of Appendix 41 to the current ITU Radio Regulations.

Positions:

Class A - accurate within 9.3km (5 NM);

Class B - accurate within 37km (20 NM);

Class C - accurate within 93km (50 NM);

Class D - accuracy less than Class C.

21. Direction-finding stations shall have authority to refuse to give bearings, heading or positions when conditions are unsatisfactory or when bearings do not fall within the calibrated limits of the station, stating the reason at the time of refusal.

NOTE:

Certain MF and HF direction-finding stations are maintained for emergency and distress use only. The use of these stations, the hours of service, the call sign, location and frequencies of communication stations, and certain exceptions to the above procedure are shown in the pertinent publications.

Categories of Messages

22. The categories of messages handled by the aeronautical mobile service are in the following order of priority.

Distress messages Urgency messages
Communications relating to direction finding
Flight safety messages
Meteorological messages
Flight Regularity messages

} See Distress andUrgency Procedures

Self Assessed Exercise No. 1

QUESTIONS:

QUESTION 1.

Give the name of airspace of defined dimensions established around an aerodrome for the protection of aerodrome traffic.

QUESTION 2.

Define 'Approach Control Service'.

QUESTION 3.

What is blind transmission?

QUESTION 4.

What is the name given to transmission of information relating to air navigation that is not addressed to a specific station or stations?

QUESTION 5.

What is ATIS?

QUESTION 6.

What is a MATZ?

QUESTION 7.

What does DAAIS stand for?

QUESTION 8.

What is QFF?

QUESTION 9.

What are the following: a. QTE b. QUJ c. QDR d. QDM?

QUESTION 10.

What is QNE?

QUESTION 11.

State the accuracy of VDF bearings Class A, Class B and Class C.

QUESTION 12.

State the accuracy of VDF-derived positions (nm) Class A, Class B and Class C.

QUESTION 13.

List the categories of message in order of priority.

QUESTION 14.

What is UTA?

QUESTION 15.

What is UIR?

QUESTION 16.

What does HJ mean?

QUESTION 17.

What does MNPS mean?

QUESTION 18.

What is a Control Area?

ANSWERS:

ANSWER 1.

Aerodrome Traffic Zone (ATZ)

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ANSWER 2.

An air traffic control service for arriving or departing controlled flights.

091 Communications-Definitions.

ANSWER 3.

A transmission from one station to another in circumstances where two-way communication cannot be established but where it is believed that the called station is able to receive the transmission.

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ANSWER 4.

Broadcast

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ANSWER 5.

Automatic Terminal Information Service

091 Chap 1-Abbreviations

ANSWER 6.

Military Aerodrome Traffic Zone

091 Chap 1-Abbreviations

ANSWER 7.

Danger Area Activity Information Service.

091 Chap 1 abbreviations

ANSWER 8.

QFE reduced to mean sea level using ambient conditions.

091 Chap 1 abbreviations

ANSWER 9.

True bearing from a station

True heading to a station (no wind)

Magnetic bearing from a station

Magnetic heading to a station (no wind)

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ANSWER 10.

The altimeter reading when the subscale is set to 1013mb and the aircraft is on the ground.

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ANSWER 11.

Class A – within 2 degrees

Class B – within 5 degrees

Class C – within 10 degrees

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ANSWER 12.

Class A – within 5nm

Class B – within 20nm

Class C – within 50nm

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ANSWER 13.

Distress messages

Urgency messages

Communication relating to direction-finding

Flight safety messages

Meteorological messages

Flight regularity messages

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ANSWER 14.

Upper Control Area

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ANSWER 15.

Upper Flight Information Region

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ANSWER 16.

Sunrise to sunset

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ANSWER 17.

Minimum Navigation Performance and Specification

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ANSWER 18.

A controlled airspace extending upwards from a specified limit above the surface of the earth

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General Operating Procedures

Transmission of Letters

Transmission of Numbers

General Operating Procedures

Transmission of Letters

1. The words in the table below should be used when individual letters are required to be transmitted. The syllables to be emphasised are underlined.

Letter	Word	Appropriate Pronunciation
A	Alpha	AL FAH
B	Bravo	BRAH VOH
C	Charlie	CHAR LEE
D	Delta	DELL TAH
E	Echo	ECK OH
F	Foxtrot	FOKS TROT
G	Golf	GOLF
H	Hotel	HOH TELL
I	India	IN DEE AH
J	Juliett	JEW LEE ETT
K	Kilo	KEY LOH
L	Lima	LEE MAH

M	Mike	MIKE
N	November	NO VEM BER
O	Oscar	OSS CAH
P	Papa	PAH PAH
Q	Quebec	KEH BECK
R	Romeo	ROW ME OH
S	Sierra	SEE AIR RAH
T	Tango	TANG GO
U	Uniform	YOU NEE FORM
V	Victor	VIK TAH
W	Whiskey	WISS KEY
X	X-ray	ECKS RAY
Y	Yankee	YANG KEE
Z	Zulu	ZOO LOO

Word spelling in radiotelephony. Proper names, service abbreviations and words of which the spelling is doubtful are spelled out in radiotelephony using the above alphabet.

Transmission of Numbers

2. The syllables to be emphasised are underlined.

Numeral or numeral element	Latin alphabet representation
0	ZERO
1	WUN
2	TOO
3	TREE
4	FOWER
5	FIFE
6	SIX
7	SEVEN
8	AIT
9	NINER
Decimal	DAYSEEMAL
Hundred	HUN DRED
Thousand	TOUSAND

3. All numbers, except those contained in paragraph (b) shall be transmitted by pronouncing each digit separately as follows:

(a) When transmitting messages containing aircraft callsigns, altimeter settings, flight levels, headings, wind speeds/directions, transponder codes and frequencies, each digit shall be transmitted separately; examples of this convention are as follows:

Number	Transmitted as	Pronounced as
BAW102	Speedbird One Zero Two	SPEEDBIRD WUN ZERO TOO
FL 280	Flight Level Two Eight Zero	FLIGHT LEVEL TOO AIT ZERO
190 Degrees	One Nine Zero Degrees	WUN NINER ZERO DEGREES
15 Knots	One Five Knots	WUN FIFE KNOTS
122.1	One Two Two Decimal One	WUN TOO TOO DAYSEEMAL WUN
6500	Six Five Zero Zero	SIX FIFE ZERO ZERO (SQUAWK)

(b) All numbers used in the transmission of altitude, height, cloud height, visibility and runway visual range information which contain whole hundreds and whole thousands should be transmitted by pronouncing each digit in the number of hundreds or thousands followed by the word HUNDRED or TOUSAND as appropriate. Combinations of thousands and whole hundreds should be transmitted by pronouncing each digit in the number of thousands followed by the word TOUSAND and the number of hundreds followed by the word HUNDRED; examples of this convention are as follows:

Number	Transmitted as	Pronounced as
10	One Zero	WUN ZERO
100	One Hundred	WUN HUNDRED
2 500	Two Thousand Five Hundred	TOO TOUSAND FIFE HUNDRED
11 000	One One Thousand	WUN WUN TOUSAND
25 000	Two Five Thousand	TOO FIFE TOUSAND

4. Numbers containing a decimal point shall be transmitted as prescribed above with the decimal point in appropriate sequence being indicated by the word decimal.

Number	Transmitted as	Pronounced as
118.1	One One Eight Decimal One	WUN WUN AIT DAY SEE MAL WUN
120.375	One Two Zero Decimal Three seven	WUN TOO ZERO DAY SEE MAL TREE SEVEN

NOTE:

Only the first five figures are used when identifying frequencies separated by 25 kHz.

5. When it is necessary to verify the accurate reception of numbers the person transmitting the message should request the person receiving the message to read back the numbers.

Transmission of Time

6. When transmitting time, only the minutes of the hour are normally required. However, the hour should be included if there is any possibility of confusion. Time checks should be given to the nearest minute. Co-ordinated Universal Time (UTC) is to be used at all times, unless specified. Midnight is given as 2400 hours and constitutes the end of the day. The beginning of the next day is coincident and is designated as 0000 hours.

Number	Transmitted as	Pronounced as
0823	Two Three or Zero Eight Two Three	TOO TREE (or ZERO AIT TOO TREE)
1300	One Three Zero Zero	WUN TREE ZERO ZERO
2057	Five Seven or Two Zero Five Seven	FIFE SEVEN (or TOO ZERO FIFE SEVEN)

Transmitting Technique

7. There are a number of recognised checks that the operator can make before commencing a transmission, to ensure that transmitted speech is received clearly:

(a) First, listen out on the frequency you intend to use to make sure that there is no interference from other transmitting stations. Whilst doing this the receiver volume can be set to the optimum level.

(b) When speaking into the microphone maintain a constant distance between it and your mouth. Transmitted speech can be seriously distorted if the microphone is held too close to the mouth, if the lips are allowed to touch it whilst speaking. When using a combined headset/microphone system, never hold either the microphone or its boom.

(c) Enunciate each word clearly and distinctly and use a normal conversational tone.

(d) Keep your rate of speech constant. About 100 words per minute should be the maximum, but speak more slowly if you know that the recipient will be writing down some or all of your transmission.

(e) Maintain the speaking volume at a constant level.

(f) A slight pause before and after numbers will assist in making them easier to understand.

(g) Avoid using hesitation sounds such as 'er'.

(h) Keep operation of the transmit button to a minimum. Depress the transmit switch fully before speaking and do not release it until the message is complete. This will ensure that the entire message is transmitted. However, do not depress transmit switch until ready to speak.

(i) Remember that the first language of the recipient may not be the same as yours. The use of standard radiotelephony (RT) phraseology, spoken clearly and distinctly, is essential.

(j) Make sure that the transmit switch is released on completion of the transmission and that it cannot be inadvertently switched on when the microphone is returned to its stowage. A 'live' out-of-use microphone is at best irritating to other operators and is potentially dangerous, since it may obstruct an emergency transmission.

Standard Words and Phrases

8. The following words and phrases are standard in radiotelephony communications as appropriate and have the meaning given below:

Word/Phrase	Meaning
ACKNOWLEDGE	Let me know that you have received and understood this message.
AFFIRM	Yes
APPROVED	Permission for proposed action granted.
BREAK	Indicates the separation between messages.
CANCEL	Annul the previously transmitted message.
CHANGING TO	I intend to call . . . (unit) on . . .(frequency)
CHECK	Examine a system or procedure (no answer is normally expected)
CLEARED	Authorised to proceed under the conditions specified.
CLIMB	Climb and maintain
CONFIRM	Have I correctly received the following . . . ? or Did you correctly receive this message?
CONTACT	Establish radio contact with . . .(your details have been passed)
CORRECT	This is correct
CORRECTION	An error has been made in this transmission (or message indicated). The correct version is . . .

DESCEND	Descend and maintain
DISREGARD	Consider that transmission as not sent
FREECALL	Call . . .(unit) (your details have not been passed - mainly used by military ATC)
HOW DO YOU READ	What is the readability of my transmission
I SAY AGAIN	I repeat for clarity or emphasis
MONITOR	Listen out on (frequency)
NEGATIVE	No; or Permission not granted; or That is not correct
OVER*	My transmission is ended and I expect a response from you
OUT*	This exchange of transmissions is ended and no response is expected
PASS YOUR MESSAGE	Proceed with your message
READ BACK	Repeat all, or the specified part, of this message back to me exactly as received
REPORT	Pass requested information
REQUEST	I should like to know . . . or I wish to obtain . . .
ROGER	I have received all your last transmission
	Under no circumstances to be used in reply to a question requiring a direct answer in the affirmative (AFFIRM) or negative (NEGATIVE)
SAY AGAIN	Repeat all, or the following part of your last transmission
SPEAK SLOWER	Reduce your rate of speech

STANDBY	Wait and I will call you
	No onward clearance to be assumed
VERIFY	Check and confirm
WILCO	I understand your message and will comply with it (abbreviation for will comply)
WORDS TWICE	As a *request* : Communication is difficult. Please send every word twice
	As *information*: Since communication is difficult, every word in this message will be sent twice

* Not normally used in U/VHF communications

Departure Information and Engine Starting Procedures

9. Where no ATIS is provided the pilot may ask for current aerodrome information before requesting start up. Note that in this and all subsequent examples the pilot's transmission is shown in *italics* in the left column and the ATC response in normal type in the right column.

Cranmore Ground Centrair 4516, Request departure Information	Centrair 4516 Cranmore Ground departure runway 24 wind 225 3, QNH 1010, Temperature +7 dewpoint -3, RVR 550 metres
Runway 24, QNH 1010, will Call for start up Centrair 4516	

10. Requests to start engines are normally made to facilitate ATC planning and to avoid excessive fuel wastage by aircraft delayed on the ground. At certain aerodromes, along with the request, the pilot will state the location of the aircraft and acknowledge receipt of the departure ATIS broadcast identifying letter together with the QNH.

Cranmore Ground Centrair 4516, Bay 7 information Bravo QNH 1010 request start up	Centrair 4516 Cranmore Ground start up at time 04

11. When there will be a delay to the departure of the aircraft the controller will normally indicate a time to start up or expect to start up.

Cranmore Ground Centrair 4516 Information Charlie, QNH 1010, request start up	Centrair 4516 Cranmore Ground start up approved, temperature +7 or Centrair 4516 Cranmore Ground Expect start up at time 04 or Centrair 4516 Cranmore Ground Expect departure at time 13 Start up when ready, temperature +7

Taxi Instructions

12. Taxi instructions issued by a controller will always contain a clearance limit, which is the point at which the aircraft must stop unless further permission to proceed is given. For departing aircraft the clearance limit will normally be the holding point of the runway in use, but may be any other position on the aerodrome depending on the prevailing traffic.

Washford Tower G-PPSC C172 at Tango dispersal Request taxi for VFR flight to Bridgwater	G-SC taxi to holding point runway 27 via taxiway Alpha QNH 1018
Taxi to holding point Runway 27 via taxiway Alpha QNH 1018 G-SC	
G-SC request surface wind	
	G-SC surface wind 210 15
G-SC request runway 19	
	G-SC taxi to holding point Runway 19 via taxiway Alpha, follow the Partenavia immediately ahead of you.
Taxi to holding point Runway 19 via taxiway Alpha. Following the Partenavia G-SC	

Washford Tower G-PPSC C172 at the compass base VFR to Bridgwater request taxi

G-SC runway 19QNH 998
taxi to holding point runway 27 via taxiway Bravo

QNH 998 G-SC request taxiway Bravo, and backtrack runway 01

G-SC taxi holding point runway 01 via taxiway Bravo

Taxi holding point runway 01 via taxiway Bravo G-SC

Washford Tower G-PPSC at the compass base request taxi to flying school

G-SC taxi to holding point runway 27 via Bravo

Taxi holding point runway 27 via Bravo G-SC

G-SC holding point Runway 27 request cross

G-SC negative. I will call you

Holding G-SC

G-SC taxi to the flying school via Alpha, cross runway 27 at the threshold report vacated

Taxi to the flying school via Alpha cross runway 27 at the threshold will report vacated G-SC

G-SC runway vacated

G-SC

NOTE:

Report vacated may be omitted when aerodrome control has continuous sight of the aircraft crossing.

13. Where an ATIS broadcast is established the controller does not need to pass departure information to the pilot when giving taxi instructions. He will, however, check that the aircraft is in possession of the latest QNH.

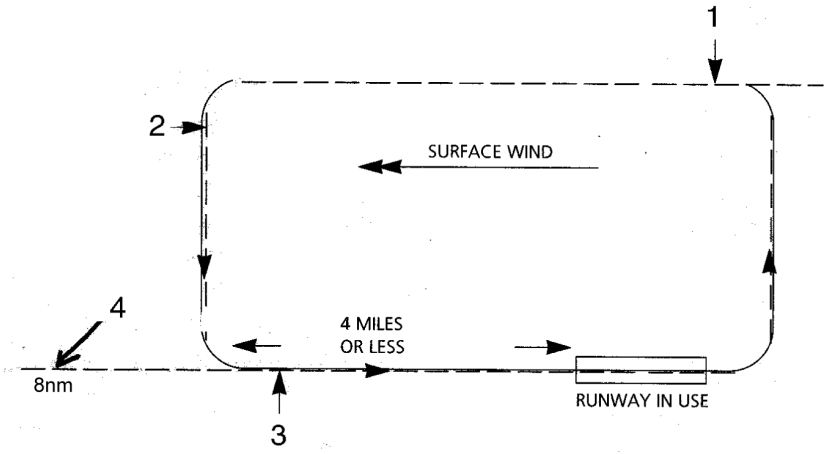
Centrair 4516 Information Bravo, QNH 1005 request taxi

QNH 1004, after Dash 8 holding point runway 19 Centrair 4516

Centrair 4516, QNH 1004, after the Brymon Dash 8 taxi to holding point runway 19

Aerodrome Traffic Circuit

FIGURE 2-1
Typical Left Hand Circuit



Typical Left-hand Circuit

Position 1 Aircraft reports on downwind leg when abeam upwind end of runway.

Position 2 Base leg report (if required).

Position 3 'Final' report. Clearance to land issued here.

Position 4 'Long Final' report (between 8 and 4 miles) when aircraft is on a straight in approach.

NOTE:

For light aircraft operations, circuit dimensions may be reduced but the relative RT reporting points are maintained.

14. Requests for circuit-joining instructions should be made in sufficient time for a planned entry into the circuit taking other traffic into account. Where ATIS is established, receipt of the broadcast should be acknowledged in the initial call to an aerodrome. When the traffic circuit is a right-hand pattern it shall be specified. A left-hand pattern need not be specified although it is essential to do so when the circuit direction is variable.

Crowcombe Tower G-PPSC C172 12 miles north east altitude 2000 feet regional QNH 1018 Request joining instructions

G-SC join right-hand downwind runway 24 height 1000 feet QFE 1002

Join right-hand downwind runway 24 height 1000 feet QFE 1002 G-SC

15. In some circumstances, an aircraft may be instructed to complete a standard overhead joint which comprises the following:

(i) Overfly at 2000ft above Aerodrome Elevation.

(ii) If not already known, determine the circuit direction from the signals square, other traffic or windsock.

(iii) Descend on the 'dead side' to circuit height (G-CD deadside descending).

(iv) Join the circuit by crossing the upwind end of the runway at circuit height.

(v) Position downwind.

NOTE:

Aerodromes with overhead joins at variance to the above standard procedure will notify such differences.

16. Depending on prevailing traffic conditions and the direction from which an aircraft is arriving, it may be possible to make a straight-in approach.

Crowcombe Tower G-PPSC C172 12 miles north east altitude 2000 feet regional QNH 1018 request straight-in approach runway 24

Cleared straight-in approach Runway 24 QFE 1009. Wilco G-SC

G-SC cleared straight-in approach runway 24 surface wind 300 degrees 10 knots QFE 1009 report final

17. The pilot having jointed the traffic circuit makes routine reports as required by local procedures.

G-SC downwind	G-SC Number 2 follow the Robin on base
Number 2, contact with the Robin G-SC	
G-SC base	G-SC
G-SC final	G-CD cleared to land Runway 24 surface wind 295 9
Cleared to land runway 24 G-SC	

18. It may be necessary, in order to co-ordinate traffic in the circuit, to issue delaying or expediting instructions.

	G-SC extend downwind Number 2 to a Robin 4 miles final
Extend downwind, Number 2 G-SC	
	G-SC delaying action. Orbit right report again on base
Orbit right, Wilco G-SC	

19. In order to save taxying time when flying training in the traffic circuit pilots may wish to carry out a 'touch and go', i.e. the aircraft lands, continues rolling and takes-off, without stopping.

G-SC downwind touch and go	G-SC Roger
G-SC final	G-SC cleared touch and go Runway 24 surface wind calm
Cleared touch and go Runway 24 G-SC	
	or
	G-SC unable to approve due traffic make full stop landing cleared to land runway 24 surface wind calm
Cleared to land runway 24 G-SC	

20. It is helpful for circuit management purposes if a controller is informed when an aircraft which has been engaged in multiple approaches is on his last circuit.

G-SC downwind last landing	G-SC Roger

Final Approach And Landing

21. A 'final' report is made when an aircraft turns onto final approach. If the turn on is made at a distance greater than 4nm from touchdown a 'long final' report is made. The landing/touch and go/low approach clearance will include the runway designation.

G-SC final	G-SC cleared to land Runway 24 surface wind 295 9
Cleared to land runway 24 G-SC	
Centrair 4516 long final	Centrair 4516 report final Surface wind 305 15
Wilco Centrair 4516	
Centrair 4516 final	Centrair 4516 cleared to land Runway 32 surface wind 315 18
Cleared to land runway 32 Centrair 4516	

NOTE:

Where an outer marker is installed, an 'outer marker' instead of a 'final' report may be made.

22. Should the runway be obstructed when the aircraft makes its 'final' report at 4nm or less from touchdown, but is expected to be clear in good time for the aircraft to make a safe landing, the controller will delay landing clearance.

G-SC final	G-SC Continue approach Surface wind 290 12
Continue approach G-SC	

23. The controller may or may not explain why the landing clearance has been delayed but the instruction to 'continue' IS NOT an invitation to land and the pilot must wait for landing clearance or initiate a missed approach.

24. An aircraft may have landed, but not yet be clear of the runway. A following aircraft may be permitted to touch down on the same runway provided that:

(i) The runway is long enough to allow safe separation between the two aircraft and there is no evidence to indicate that braking may be adversely affected.

(ii) It is during daylight hours.

(iii) the controller is satisfied that the landing aircraft will be able to see the preceding aircraft which has landed, clearly and continuously, until it is clear of the runway; and

(iv) The pilot of the following aircraft is warned. (Responsibility for ensuring adequate separation rests with the pilot of the following aircraft).

Centrair 4516, land after the Dash 8, runway 32, surface wind calm

Land after the Dash 8 Centrair 4516

25. A pilot may request to fly past the control tower or other observation point for the purpose of visual inspection from the ground

Centrair 4516 request low pass unsafe nose gear indication	Centrair 4516 cleared low pass runway 32 surface wind 295 12 not below 500 feet QFE 1012 report final
Cleared low pass runway 32 not below 500 feet QFE 1012 Wilco Centrair 4516	

26. If the low pass is made for the purpose of observing the undercarriage, on of the following replies could be used to describe its condition but these examples are not exhaustive:

(i) Landing gear appears down.

(ii) Right (or left, or nose) wheel appears up (or down).

(iii) Wheels appear up.

(iv) Right (or left, or nose) wheel does not appear up (or down).

27. For training purposes, a pilot may request permission to make an approach along, or parallel to the runway, without landing.

Centrair 4516 request low approach for training	Centrair 4516 cleared low approach runway 32 surface wind 295 12 not below 300 feet above threshold elevation report final

Cleared low approach runway 32 not below 300 feet above threshold elevation Wilco Centrair 4516

28. FISOs will use different phraseology to indicate that there is nothing to prevent an aircraft from landing.

Saltford Information G-PPSC final runway 19	G-PPSC Saltford Information land at your discretion surface wind 150 4
G-PPSC	

29. Alternatively, if the runway is obstructed, or there are other aircraft ahead on final, FISOs will use

G-PPSC final runway 19	G-PPSC Saltford Information the runway is obstructed with an F28 or G-PPSC Saltford Information, one aircraft ahead on final
G-PPSC	

Essential Aerodrome Information

30. Essential aerodrome information is information regarding the manoeuvring area and it's associated facilities which is necessary to ensure the safe operation of aircraft. Aerodrome information is passed to aircraft whenever possible prior to start-up or taxi and prior to the commencement of final approach.

Centrair 4516 caution Construction work at the end of stand 37

… caution work in progress ahead north side of taxiway Alpha

… caution centreline taxiway lighting unserviceable

… caution PAPIs runway 27 unserviceable

… caution large flock of birds north of runway 27 near centre taxiway

… message from aerodrome authority, fire and rescue services reduced. The aerodrome can only accept aircraft up to and including category (number)

Go Around

31. In order to avoid an unsafe situation, the controller may issue instructions to the pilot to initiate a missed approach. Because cockpit workload is high during the missed approach procedure, transmissions to the aircraft are kept brief and succinct..

Centrair 4516 go around I say again go around acknowledge

Going around Centrair 4516

32. In the event of a missed approach unless instructions are issued to the contrary, an aircraft on an instrument approach procedure and an aircraft operating VFR is to continue into the normal traffic circuit.

33. In the event of missed approach being initiated by the pilot the phrase 'going around' shall be used.

G-SC going around G-SC Roger

34. At military aerodromes 'GO AROUND' is also employed to instruct an aircraft to fly another circuit. Unless otherwise instructed, circuit height should be maintained (or regained) and a 'Deadside' call made before turning Crosswind to report Downwind.

After Landing

35. Unless absolutely necessary, controllers will not give taxi instructions to pilots until the landing roll is complete. Unless otherwise advised pilots should remain on tower frequency until the runway is vacated.

Centrair 4516 vacate left

Vacate left Centrair 4516

Centrair 4516 take next right when vacated contact ground 118.35

Next right when vacated ground 118.35 Centrair 4516

VFR Departures

36. Departing VFR flights, when handled by approach control may be passed information on relevant known traffic in order to assist the pilot in maintaining his own separation. Pilots should report leaving the area of jurisdiction of the approach control units.

Harnham Approach G-SC

G-SC Flight Information available from Greeston 124.55

Greeston Information 124.55 G-SC

37. Special VFR flights will be given specific instructions in the clearance to leave the control zone.

G-SC cleared to the zone boundary route via November Special VFR not above altitude 1500 feet

Cleared to the zone boundary, route via November Special VFR not above altitude 1500 feet G-SC

G-SC correct

VFR Arrivals

38. Depending on the procedures in use, the pilot of an arriving VFR flight may be required to establish contact with the approach control unit and request instructions before entering its area of jurisdiction e.g. before entering a control zone. Where there is an ATIS broadcast the pilot should acknowledge that he h as received it; where no ATIS broadcast is provided the approach controller will pass the aerodrome data.

Longbarrow Approach G-PPSC

G-PPSC Longbarrow Approach pass your message

G-PPSC C172 inbound from Washford VFR 2000 feet regional QNH 1018 estimating zone boundary 08 Kennington 18 information Golf

G-SC cleared from the zone boundary to Longbarrow VFR, at 2000 feet Kennington QNH 1016. Traffic information there is a southbound Warrior 2500 feet VFR estimating zone boundary 09

Cleared from the zone Boundary to Longbarrow VFR at 2000 feet QNH 1016, traffic in sight G-SC

G-SC report aerodrome in sight

Wilco G-SC

G-SC aerodrome in sight

G-SC contact Tower 118.5

Tower 118.5 G-SC

Special VFR Flights

39. Special VFR clearances are only issued for flights within Control Zones and are normally at the request of the pilot. The pilot:

(i) Must comply with ATC instructions.

(ii) Is responsible for ensuring that his flight conditions enable him to remain clear of cloud, determine his flight path with reference to the surface and to keep clear of obstructions.

(iii) Is responsible for ensuring that he flies within the limitations of his licence.

(iv) Is responsible for complying with the relevant low flying restrictions of Rule 5 of the Rules of the Air Regulations. Note: Whilst the 1500ft rule may not apply to a pilot in receipt of Special VFR clearance, the 'alight clear' rule always applies. The responsibility to determine whether to accept a Special VFR clearance and still comply with this rule rests with the pilot.

(v) Is responsible for avoiding aerodrome traffic zones unless prior permission for penetration has been obtained from the relevant ATSU.

40. A full flight plan is not required for Special VFR flight but the pilot must give brief details of the call-sign, aircraft type and pilot's intentions, including ETA at entry point. A full flight plan is required if the pilot wishes his destination to be notified.

41. Aircraft are not normally given a specific height to fly but vertical separation from aircraft flying above can be achieved by requiring the Special VFR flight to fly not above a specified level (Section (v) above must be borne in mind by pilots).

42. No separation will be provided between Special VFR flights which are flying in notified areas or routes where an individual clearance is not required, or between flights using such areas or routes and other flights on Special VFR clearances. Full details of the procedures for Special VFR flights appear in the UK AIP.

Callsigns for Aeronautical Stations

43. Aeronautical stations are identified by:

(i) The name of the location, and

(ii) The unit or service available.

44. The unit or service may be identified in accordance with the table below except that the name of the location or the unit/service may be omitted provided satisfactory communication has been established.

Unit/Service Available	Call Sign Suffix
Area Control Centre	CONTROL
Approach Control	APPROACH
Approach Control Radar Arrivals	ARRIVAL
Approach Control Radar Departures	DEPARTURE
Aerodrome Control	TOWER
Surface Movement Control	GROUND
Radar (in general)	RADAR
Precision Approach Radar	PRECISION
Direction-Finding Station	HOMER
Flight Information Service	INFORMATION
Clearance Delivery	DELIVERY
Apron Control	APRON
Company Dispatch	DISPATCH
Aeronautical Station	RADIO

45. There are three main categories of aeronautical communications service:

- Air Traffic control service (ATC) which can only be provided by licensed Air Traffic Control Officers who are closely regulated by the CAA.

- Flight information service at aerodromes can be provided only by licensed Flight Information Service Officers (FISOs) who are mainly self-regulating.
- Aerodrome air/ground communications service (A/G) which can be provided by Radio Operators who are not licensed but have obtained a certificate of competency to operate radio equipment on aviation frequencies from the CAA. These operations come under the jurisdiction of the radio license holder, but are not regulated in any other way.

46. It is an offense to use a callsign for a purpose other than that for which it has been notified.

47. When satisfactory communication has been established, and provided that it will not be confusing, the name of the location or the callsign suffix may be omitted.

Aircraft Callsigns

48. An aircraft radiotelephony call-sign shall be one of the following types:

Type a) The characters corresponding to the registration marking of the aircraft, or

Type b) the telephony designator of the aircraft operating agency, followed by the last four characters of the registration marking of the aircraft.

Type c) The telephony designator of the aircraft operating agency, followed by the flight identification.

NOTE:

Note 1 The name of aircraft manufacturer or name of aircraft model may be used as a radiotelephony prefix to the Type a) call-sign above.

NOTE:

Note 2 The call-signs referred to in (a), (b) and (c) above comprise combinations in accordance with the ITU Radio Regulations (No.2129 and No.2130).

NOTE:

Note 3 The telephony designators referred to in (b) and (c) above are contained in IAO Document 8585 - Designators for Aircraft Operating Agencies, Aeronautical Authorities and Services.

NOTE:

Note 4 Any of the foregoing call-signs may be inserted in Field 7 of the ICAO flight plan as the aircraft identification. Instructions on the completion of the flight plan from are contained in PANS-RAC, Document 4444.

49. When establishing communication an aircraft shall use the full callsigns of both stations.

Washford Tower G-PPSC G-PPSC Washford Tower

50. After satisfactory communication has been established and provided that no confusion is likely to occur, the ground station may abbreviate callsigns (see table below). A pilot may only abbreviate the callsign of his aircraft if it has been abbreviated by the aeronautical ground station.

51. Abbreviated call-signs shall be in the following form:

Type a) The first character of the registration and at least the last two characters of the call-sign.

Type b) the telephony designator of the aircraft operating agency, followed by at least the last two characters of the call-sign.

Type c) No abbreviated form.

NOTE:

***Note*: Either the name of the aircraft manufacturer or the aircraft model may be used in place of the first character in Type (a) above.**

Full callsign	Abbreviation
G-PPSC	G-SC
Speedbird G-BOAC	Speedbird AC

N31029	N029
N753DA	N3DA
Midland 120	No abbreviation
*Piper G-BSZT	Piper ZT

52. * The name of either the aircraft manufacturers or name of aircraft model may be used as a prefix to the callsign.

53. An aircraft should request the service required on initial contact when freecalling a ground station.

Storrington Approach, G-PPSC
Request Lower Airspace Radar Service

Oakford Control, G-PPSC I wish to
file an airborne flight plan

54. An aircraft shall not change its callsign type during a flight. However, where there is likelihood that confusion may occur because of similar callsigns, an aircraft may be instructed by an air traffic service unit (ATSU) to change the type of its callsign temporarily. When the likelihood of confusion no longer exists an aircraft will be instructed to revert to flight plan callsign.

55. Aircraft in the heavy wake turbulence category shall include the word 'HEAVY' immediately after the aircraft callsign in the initial call to each ATSU.

Transfer of Communications

56. An aircraft will normally be advised by the appropriate aeronautical station to change from one radio frequency to another in accordance with agreed procedures.

Centrair 4516 contact Oakford Control 127.4

Oakford Control 127.4 Centrair 4516

57. *In the absence of such advice, the aircraft shall notify the aeronautical station before such a change takes place*. Aircraft flying in controlled airspace must obtain permission from the controlling authority before changing frequency.

58. An aircraft may be instructed to 'standby' on a frequency when it is intended that the ATSU will initiate further communications, and to monitor a frequency on which information is being broadcast.

Centrair 4516 standby for Longbarrow weather

Centrair 4516

Centrair 4516 monitor 117.5 for Tower

Monitor 117.5 for Tower Centrair 4516

59. If the airspace does not indicate that an aircraft must remain in contact with a specific ATSU and the pilot wishes to freecall another agency he should request, or notify such an intention.

Westbury G-PPSC request change to Oakford Information on 126.5

Wrayton Information G-PPSC changing to Oakford Centre on 121.5 for Practice Plan

Test Procedures

60. Test transmissions should take the following form:

(a) the identification of the aeronautical station being called;

(b) the aircraft identification;

(c) the words 'RADIO CHECK';

(d) the frequency being used.

61. Replies to test transmission should be as follows:

(a) the identification of the station calling;

(b) the identification of the station replying;

(c) information regarding the readability of the transmission.

62. The readability of a transmission should be classified by the number in the table below, together with any other information regarding the transmission that may be useful to the station making the test.

Readability Scale	Meaning
1	Unreadable
2	Readable now and then
3	Readable but with difficulty
4	Readable
5	Perfectly readable

Washford Tower G-PPSC radio check 118.7

G-PPSC Washford Tower readability *5*

Or

G-SC Washford Tower readability 3 with a loud background whistle

Or

Station calling Washford Tower readability 1

63. When it is necessary for a ground station to make test signals, either for the adjustment of a transmitter before making a call or for the adjustment of a receiver, such signals shall not continue for more than 10 seconds. The test should comprise spoken numbers (WUN, TOO, TREE etc) followed by the radio callsign of the station transmitting the test signals.

Issue of Clearance and Readback Requirements

64. Provisions governing clearances are contained in the PANS-RAC (ICAO Doc 4444). A clearance may vary in content from a detailed description of the route and levels to be flown to a brief standard instrument departure (SID) according to local procedures.

65. Controllers will pass a clearance slowly and clearly since the pilot needs to write it down; wasteful repetition will thus be avoided. Whenever possible a route clearance should be passed to an aircraft before start up and the aircraft's full callsign will always be used. *Generally controllers will avoid passing a clearance to a pilot engaged in complicated taxiing manoeuvres and on no occasion when the pilot is engaged in line up or take-off manoeuvres.*

66. An ATC route clearance is not an instruction to take-off or enter an active runway. ***The words* 'take-off'** *are used only when an aircraft is cleared for take-off. At all other times the word 'departure' is used.*

67. The stringency of the read back requirement is directly related to the possible seriousness of a misunderstanding in the transmission and receipt of ATC clearance and instructions. ATC route clearances shall always be read back unless otherwise authorised by the appropriate ATS authority in which case they shall be acknowledged in a positive manner. Read backs shall always include the aircraft callsign.

Centrair 4516 cleared to Longbarrow via R3, at FL 85 Request level change en-Route, squawk 5501

Cleared to Longbarrow via R3, at FL 85, request level change en-route, squawk 5501 Centrair 4516

Centrair 4516 correct

Fastair 4516 cleared to Longbarrow via R3, Twyford 3 Delta departure, squawk 5501

Cleared to Longbarrow via R3, Twyford 3 Delta departure, squawk 5501, Fastair 4516

Fastair 4516 correct

G-PPSC after departure cleared to zone boundary via route Charlie. Climb altitude 2500 feet QNH 1018, squawk 6783

After departure cleared to zone boundary via route Charlie. Climb altitude 2500 feet QNH 1018, squawk 6783 G-PPSC

G-SC correct

68. Pilots of departing aircraft flying in controlled airspace which suffer radio communication failure prior to reaching cruising level should be aware of the procedures to be adopted when the following types of clearance (detailed in UK AIP RAC 6) are issued:

(a) Request level change en-route.

(b) Climb under radar.

(c) Temporary restriction to climb.

69. The ATC messages listed below are to be read back in full by the pilot. If the controller does not receive a readback the pilot will be asked to do so. Similarly, the pilot is expected to request that instructions are repeated or clarified if any are not fully understood.

(i) Level Instructions

(ii) Heading Instructions

(iii) Speed Instructions

(iv) Airways or Route Clearances

(v) Runway-in-Use

(vi) Clearance to Enter, Land On, Take-Off On, Backtrack, Cross, or Hold Short of an Active Runway

(vii) SSR Operating Instructions

(viii) Altimeter Settings

(ix) VDF Information

(x) Frequency Changes

(xi) Type of Radar Service

G-PPSC cleared to cross R3 at Twyford, maintain FL 95 whilst in controlled airspace. Report entering the airway

Cleared to cross R3 at Twyford, maintain FL 95 in controlled airspace, Wilco. G-PPSC

G-SC hold position

Holding G-SC

G-SC contact Ground 118.05

Ground on 118.05 G-SC

Centrair 4516 Squawk 5408

5408 Centrair 4516

70. Items which do not appear in the above list may be acknowledged with an abbreviated read back.

Centrair 4516 after the A340 passing left to right, taxi to the holding point runway 27

After the A340, holding point 27, Centrair 4516

71. If an aircraft read back of a clearance or instructions is incorrect, the controller shall transmit the word 'NEGATIVE' followed by the correct version.

G-SC QNH 1003

QNH 1013 G-SC

G-SC Negative, QNH 1003

QNH 1003 G-SC

72. If at any time a pilot receives a clearance or instruction with which he cannot comply, he should advise the controller using the phrase 'UNABLE' (COMPLY) and give the reason (s).

Centrair 4516 Corsham climb FL 280, cross Twyford FL 150 or above

Corsham Centrair 4516 unable climb FL 280 due weight

Self Assessed Exercise No. 2

QUESTIONS:

QUESTION 1.

Write the phonetic pronunciation of the frequency 145.9

QUESTION 2.

Write the following registration identifier in phonetic pronunciation style: ZV-LHD.

QUESTION 3.

In words, how would the following heights be transmitted: a. 2500ft b. 1350ft c. 1500ft d. 25000ft

QUESTION 4.

In words, how would the following frequency be transmitted: 132.375

QUESTION 5.

In words, how would the following time be transmitted: 0642

QUESTION 6.

What should be the maximum number of words per minute spoken on RT?

QUESTION 7.

What is the purpose of standard words and phrases?

QUESTION 8.

What is the difference between ‘roger’ and ‘affirm’?

QUESTION 9.

What is the difference between ‘contact’ and ‘freecall’?

QUESTION 10.

What word is used for “let me know that you have received and understood this message”?

QUESTION 11.

When may a pilot abbreviate his/her callsign?

QUESTION 12.

When, and at what range, is the call “long final” made?

QUESTION 13.

When is a full flight plan required for a special VFR flight?

QUESTION 14.

In controlled airspace, before changing frequency, what must a pilot do?

QUESTION 15.

On the readability scale, what are 3 and 5 respectively?

QUESTION 16.

When may a pilot use the phrase “take-off”?

QUESTION 17.

List the ATC messages for which readback is mandatory.

QUESTION 18.

If you are asked to climb to a new level, and for some reason you cannot, what phrase is used to inform ATC?

ANSWERS:

ANSWER 1.

Wun fower fife dayseemal niner

ANSWER 2.

Zulu Victor Lima Hotel Delta

ANSWER 3.

two thousand five hundred feet

one thousand three hundred and fifty feet

one thousand five hundred feet

two five thousand feet

ANSWER 4.

One three two decimal three seven

ANSWER 5.

Four two OR zero six four two

ANSWER 6.

About 100.

ANSWER 7.

To eliminate ambiguity because of different languages

ANSWER 8.

Roger – I have received your last transmission

Affirm – yes

ANSWER 9.

Contact – establish contact with XXXX. Details have been passed.

Freecal – call XXXX. Details have not been passed.

ANSWER 10.

Acknowledge

ANSWER 11.

Only if it has been first abbreviated by the ground station

ANSWER 12.

When doing a straight-in approach at between 4 and 8 miles.

ANSWER 13.

If the pilot requires the destination to be notified.

ANSWER 14.

Request permission to change.

ANSWER 15.

3 – readable with difficulty

5 – perfectly readable

ANSWER 16.

Only when cleared for take-off.

ANSWER 17.

Level instructions

Heading instructions

Speed instructions

Airways or route clearances

Runway in use

Clearance to enter, land on, take-off on, backtrack, cross, or hold short of an active runway

SSR operating instructions

Altimeter settings

VDF information

Frequency changes

Type of radar service

ANSWER 18.

"unable" (comply) and give reasons.

Radar Procedural Phraseology

Radar Procedural Phraseology

1. The following paragraphs contain general radar phraseology that is commonly used in communications between aircraft and all types of radar unit.

2. The phrase 'under radar control' shall only be used when a radar control service is being provided. Normally however, the callsign suffix used by the radar unit is sufficient to indicate its function.

3. In a radar environment heading information given by the pilot and heading instructions given by controllers are normally in degrees magnetic.

Radar Identification and Vectoring

4. An aircraft must be identified before it can be provided with a radar service. However, the act of identifying aircraft is not a service in itself and pilots should not assume that they are receiving a radar service, particularly when they are flying outside controlled airspace.

G-SC report heading

G-SC heading 120

G-SC for identification turn Left heading 090

Left heading 090 G-SC

G-SC identified 24 miles west of Kennford, Radar Advisory

Radar Advisory G-SC

or

G-SC not identified. Resume own navigation.

Wilco G-SC

5. When a controller has identified an aircraft he will inform the pilot, according to the circumstances, of the following:

(a) that the aircraft is identified, and

(b) the position of the aircraft.

6. The occasions when the above information will be passed can be summarised as follows:

Method of Identification	Aircraft flying inside controlled airspace		Aircraft flying outside controlled airspace	
	Inform Identified	Pass Position	Inform Identified	Pass Position
SSR	No	No	Yes	Yes
Turn	Yes	Yes	Yes	Yes
Departing aircraft	No	No	Yes	No
Position Report	No	No	Yes	No

7. The pilot will be warned if identification is lost, or about to be lost, and appropriate instructions given.

	G-SC radar service terminated due radar failure. Resume own navigation. Flight Information available from Oakford on 125.75
Changing to Oakford 125.75 G-SC	
	G-SC will shortly be leaving radar cover, radar service terminated. Flight Information available from Oakford on 125.75
G-SC Changing to Oakford 125.75	G-CD

Secondary Surveillance Radar

8. The following phrases are instructions that may be given by controllers to pilots regarding the operation of SSR transponders. The phrases used by controllers are given together with their meanings; assignment of a code does not constitute the provision of a radar service.

Phrase	Meaning
Squawk (code)	Set the mode and code as instructed
Confirm squawk	Confirm the mode and code set on the transponder
Recycle (mode) (code)	Reselect assignment mode and code
Squawk Ident	Operate the special position identification feature
Squawk Mayday	Select Emergency
Squawk standby	Select the standby feature
Squawk Charlie	Select altitude reporting feature
Check altimeter setting and report your level	Check pressure setting and report your level
Stop squawk	Charlie Deselect altitude reporting
Stop squawk Charlie, Wrong indication	Stop altitude report, incorrect level readout
*Verify your level	Check and confirm your level

9. *Used to verify the accuracy of the Mode C derived level information displayed to the controller.

10. The pilot must respond to SSR instructions, reading back specific settings.

Centrair 4516 squawk 6411

6411 Centrair 4516

Centrair 4516 squawk ident

Squawk ident, Centrair 4516

Centrair 4516 squawk 6411 and ident

6411 and ident, Centrair 4516

Centrair 4516 confirm squawk

Alpha 6411 Centrair 4516

Centrair 4516 recycle 6411

Recycling 6411 Centrair 4516

Centrair 4516 check altimeter setting

1018 set Centrair 4516

Centrair 4516 confirm transponder Operating

Centrair 4516 negative, transponder unserviceable

Radar Service

11. Where it is not self-evident pilots will normally be informed by the controller when they are under radar control, advisory or information service.

Centrair 4516 under Radar Control

Radar Control Centrair 4516

G-SC Radar Advisory

Radar Advisory G-SC

G-SC Radar Information

Radar Information G-SC

Centrair 4516 radar service terminated

Centrair 4516

Radar Vectoring

12. Aircraft may be given specific vectors to fly in order to establish separation. Pilots may be informed of the reasons for radar vectoring.

Centrair 4516 delaying action. Turn left heading 090

Left heading 090 Centrair 4516

13. It may be necessary for a controller to know the heading of am aircraft a separation can often be established by instructing an aircraft to continue on its existing heading.

Centrair 4516 continue present heading

Continue heading Centrair 4516

Centrair 4516 report heading

Centrair 4516 heading 090

Centrair 4516 continue present heading and report that heading

Continue heading 050 Centrair 4516

Centrair 4516 continue heading 050

Continue heading 050 Centrair 4516

14. A controller may not know the aircraft's heading but does require the aircraft to fly a particular heading.

G-SC fly heading 045

Roger, turning left heading 045, G-SC

or

Roger, turning left 20 degrees heading 045, G-SC

15. When vectoring is complete, pilots will be instructed to resume their own navigation, given position information and appropriate instructions as necessary.

Centrair 4516 resume own navigation for Twyford, magnetic track 350 distance 18 miles

Wilco Centrair 4516

G-SC resume own navigation for Blackdown position is 19 miles north of Shaftesbury

Wilco G-SC

16. Occasionally an aircraft may be instructed to make a complete turn (known as an orbit or a 360-degree turn), for delaying purposes or to achieve a required spacing behind preceding traffic.

G-SC delaying action, orbit left for sequencing

Orbit left G-SC

Centrair 4516 delaying action. Make a 360-degree turn left

360 turn left Centrair 4516

Traffic Information and Traffic Avoidance

17. Whenever practicable, information regarding traffic on a possible conflicting path should be given in the following form:

(a) relative bearing of the conflicting traffic in terms of the 12 hour clock; or, if the aircraft under service is established in a turn, the relative position of the conflicting traffic in relation to cardinal points i.e.: north-west, south etc;

(b) distance from the conflicting traffic;

(c) direction of flight of the conflicting traffic; and

(d) relative speed of the conflicting traffic or type of aircraft and level if this is known.

18. Relative movement should be described by using one of the following terms as applicable:

(i) 'closing, converging, parallel, same direction, opposite direction diverging, overtaking, crossing left to right, crossing right to left'.

(ii) … 'closing … crossing right to left; (if level is known) - 1000ft above or below.

19. The controller will inform the pilot when the conflict no longer exists.

G-SC unknown traffic 4 o'clock crossing right to left height unknown fast moving. If not sighted turn left heading 090

Left heading 090 G-SC

G-SC clear of traffic resume own navigation direct Blackdown magnetic track 350 distance 27 miles

Wilco G-SC

20. Avoiding action to be taken by the pilot is given when the controller considers that an imminent risk of collision will exist if action is not taken immediately.

G-SC avoiding action, turn left immediately heading 090 traffic at 4 o'clock 5 miles crossing right to left slightly above fast moving

Left heading 090 G-SC

ACAS/TCAS

21. ACAS/TCAS equipment reacts to transponders of other aircraft in the vicinity to determine whether or not there is a potential confliction. The warning (Traffic Advisory (TA)), based on the time to an assumed collision enables the pilot to identify the conflicting traffic, and if necessary, take avoiding action (Resolution Advisory (RA)). In the UK, this equipment is mainly referred to as 'TCAS'; however, the use of 'ACAS' is an acceptable alternative in phraseology terms.

22. Pilots should report TCAS manoeuvres.

Centrair 4516 TCAS climb/descent	Centrair 4516 Roger
Centrair 4516 TCAS clear of conflict, returning to (assigned clearance)	Centrair 4516 Roger

(Controllers may issue a revised clearance at this point.)

23. The pilot should report a TCAS manoeuvre even if it was not possible to notify the Controller that an RA had occurred

Centrair 4516 TCAS climb/descent, clear of conflict, (assigned clearance) resumed	Centrair 4516 Roger

(Controllers may issue a revised clearance at this point.)

24. Pilots should report that they are unable to comply with a clearance as a result of a TCAS alert.

Centrair 4516 unable comply, TCAS RA	Centrair 4516 Roger

25. In these circumstances the pilot should report when clear of the TCAS conflict

Radar Assistance to Aircraft with Radio Communication Failure

26. When a controller suspects that an aircraft is able to receive but not transmit messages, the radar may be used to confirm that the pilot has received instructions. When further instructions are given they should be passed slowly, clearly and be repeated.

G-SC reply not received if you read Oakford turn left heading 260
I say again turn left heading 260

G-SC turn observed I will continue
to pass instructions

or

Centrair 4516 reply not received If you read Oakford squawk ident
I say again squawk ident

Centrair 4516 squawk observed I will
continue to pass instructions

NOTE:

An aircraft experiencing a radio communications failure is expected to select the appropriate SSR code.

UK Danger Area Crossing Service/Danger Area Activity Information Service

27. In-flight information on the status of Danger Areas (DAs) is available from the nominated service units:

(a) Listed in the UK AIP.

(b) Detailed on the legend of the appropriate UK 1:500 000 Aeronautical Chart.

28. When available the DA service will either be a Danger Area Crossing Service (DACS) or a Danger Area Activity Information Service (DAAIS). If there is no reply from the appropriate nominated service unit which is to be called for these services, pilots are advised to assume that the relevant danger area is active.

Danger Area Crossing Service

29. The appropriate nominated service unit will, whenever the DA activity permits, provide a clearance for an aircraft to cross the danger area under a RIS or FIS. The clearance is only in relation to Danger Area activity and does not, in traffic management terms, constitute separation from aircraft that might be operating in the area.

Carhampton Approach, G-PPSC Request Danger Area Crossing Service Of Aberfeldy Range	G-PPSC Carhampton Approach Flight Information Service. Aberfeldy active. Report 10 miles from Aberfeldy

Wilco G-PPSC

Carhampton Approach G-PPSC 10 miles from Aberfeldy

G-SC Aberfeldy remains active. Suggest you re-route

Re-routing to the south of Aberfeldy and changing to Oakford Information 125.75 G-SC

G-SC

or

G-PPSC Carhampton Approach. Aberfeldy not active, range crossing approved report vacating the range

Range crossing approved. Wilco G-PPSC

G-PPSC vacating Aberfeldy Range

G-SC Carhampton Approach Roger, Flight Information available from Oakford on 125.75

Changing to Oakford on 125.75 G-SC

Danger Area Activity Information Service

30. The nominated service unit will pass to the pilot, on request, an update on the known activity status of the danger area. Such an update will assist the pilot to decide whether it would be prudent, on flight safety grounds, to penetrate the Danger Area. A DAAIS does NOT constitute a clearance to cross a Danger Area.

Carhampton Approach G-PPSC request DAAIS for Aberfeldy Range	G-PPSC Carhampton Approach Aberfeldy Active/Not Active
Aberfeldy Active/Not Active G-PPSC	

31. Full details of DACS/DAAIS can be found in the UK AIP and AICs.

Relevant Weather Information Terms

Meteorological Information

METAR

Voice Weather Broadcast (VOLMET) UK

Automatic Terminal Information Service (ATIS) UK

Relevant Weather Information Terms

Meteorological Information

1. Meteorological information in the form of reports, forecasts or warnings is made available to pilots using the aeronautical mobile service either by broadcast (e.g. VOLMET) or by means of specific transmissions from ground personnel to pilots. Such information may be provided by:

(i) **VOLMET (VHF).** METARS and TRENDS.

(ii) **VOLMET (HF).**METARS and TRENDS and TAFS

(iii) **ATIS.** Aerodrome weather.

(iv) **SIGMET.** Significant or hazardous weather.

2. Standard meteorological abbreviations and terms should be used and the information should be transmitted slowly and enunciated clearly in order that the recipient may record such data as necessary.

G-SC Highbridge Tower 1530 Weather surface wind 265 degrees 15 knots visibility 15 km, Nil weather, 4 oktas 20,000 feet temperature plus 10, dew point plus 3, QNH 10002

QNH 1002 G-SC

NOTE:

Cloud may also be reported as follows:

3. 'Scattered at five hundred feet, scattered cumulonimbus at one thousand feet, broken at two thousand five hundred feet'.

4. In the above example 'scattered' equates to 3 or 4 Octas and 'broken' equates to 5 – 7 Octas.

METAR

5. The METAR is a routine meteorological aerodrome report and contains information concerning **actual conditions at the time of the observation**.

6. The basic format of the METAR message is as follows:

REPORT TYPE	METAR, a routine weather report, or SPECI, a special report which is issued between routine reports when conditions change significantly. Special reports are discussed shortly.
LOCATION	Given as an ICAO four-letter station identifier.

DATE/TIME	Where it is necessary to include this group after the station identifier (normally when the report is completed more than ten minutes removed from the normal observation time) a six-figure date/time group is given, followed by the letter Z to denote UTC. The first two figures give the day of the month and the last four figures the time. eg: 241530Z
SURFACE WIND	The wind direction is expressed as three digits and represents the **true** wind direction rounded to the nearest whole 10°.
	The wind speed is expressed as two (exceptionally three) digits and is followed by an abbreviation which represents the units of measurement of wind speed (**KT** for knots, **KMH** for kilometres per hour and **MPS** for metres per second. For example 32025KT represents a wind of 320°(T) blowing at 25 knots.
	The wind which is given is the mean wind over the ten minutes preceding the time of the observation.
	An additional two (exceptionally three) figures are added when the maximum wind speed during the ten minutes preceding the time of the report exceeds the mean wind speed by 10kt or more. The mean wind speed digits and the maximum wind speed digits are separated by the letter G, for example 18025G40KT, signifying a mean wind speed of 25 knots, gusting 40 knots.

A calm condition is indicated by 00000 followed by the abbreviation for the wind speed units. With a wind of 3kt or less which is variable in direction the wind direction digits are replaced by the letters **VRB** followed by the wind speed and the abbreviation for the wind speed units. When the wind speed is 4kt or more, **VRB** will only be used when the variation in direction exceeds 180°.

If, during the ten minutes preceding the time of the observation, the total variation in wind direction is 60° or more, the two observed extreme directions between which the wind has varied are given in clockwise order, but only when the wind speed is greater than 3kt. The two extremes of wind direction are separated by the letter **V**. For example 32020G35KT 290V350 decodes as a wind which is varying in direction from 290°(T) to 350°(T) with a mean direction of 320°(T) and which has a mean speed of 20kt but a maximum speed (over a ten minute period) of 35kt.

VISIBILITY

When there is no marked variation in visibility by direction the surface horizontal visibility is given by four digits which represent the visibility expressed in metres. 9999 represents a visibility of 10km or more and 0000 a visibility of less than 50 metres.

When there is a marked directional variation in the visibility the reported minimum is followed by one of the eight points of the compass to indicate the direction, for example 3000SW decodes as a visibility of 3000 metres in a south-westerly direction (the visibility being better in other directions).

When the minimum visibility is less than 1500 metres and the visibility in another direction greater than 5000 metres, the value and direction of the maximum visibility will also be given, for example 1300SE 7000N.

RVR (if applicable)

An RVR group always includes the prefix **R** followed by the runway designator and the diagonal followed by the touchdown zone RVR in metres. If the RVR is assessed on two or more runways simultaneously the RVR group is repeated for each runway. Parallel runways are distinguished by appending the letters L, C or R (left, centre or right) to the runway designator. For example R23L/1100 R23R/1200.

When the RVR is greater than the maximum value which can be assessed the group will be preceded by the letter **P** followed by the highest value which can be assessed. When the RVR is assessed as more than 1500 metres it is reported as P1500. When the RVR is below the minimum value that can be assessed it is shown as a letter **M** followed by that minimum value, for example R04/M0050 means that the RVR in the touchdown zone of runway 04 is measured as less than the minimum assessable value of 50 metres.

It if possible to determine the mean values of RVR, the mean values over the ten minute period immediate preceding the observation are reported. Trends and significant variations are reported as follows:

Trends. If the RVR values during the ten minute period preceding the observation show a distinct increasing or decreasing tendency, such that the mean value during the first five minutes differs from the mean value during the second five minutes by 100 metres or more, this trend is reported. This is done by following the RVR value by the letter **U** (increasing) or **D** (decreasing). The letter **N** is used to indicate no significant change during the ten minute period. For example R30/1000D means that the mean touchdown zone value of RVR on runway 30 within the ten minutes preceding the time of observation is 1000 metres and that it has decreased by 100 metres or more during that ten minutes.

Significant Variations. When the RVR varies significantly such that, during the ten minute period preceding the observation, the one minute mean extreme values vary from the ten minute mean value by either more than fifty metres or more than 20% of the ten minute mean value (whichever is the greater), the one minute mean minimum and maximum values will be given in that order separated by the letter **V**. This group will replace the ten minute mean value, for example R09/0800V1100.

You might be relieved to learn that UK aerodromes will not be using RVR trend or significant variation reports for the time being, however you may encounter them on overseas METARs (or in the examination).

WEATHER

Each weather group may consist of the appropriate intensity indicators (+ or -) and letter abbreviations combined in groups of two to nine characters. If they appear (as two figures) the intensity indicators are taken from the full synoptic code. The abbreviations that are used in the weather groups are shown in the table at Figure 1.

When neither a -(light) or a +(heavy) appears where you might expect an intensity indicator, the phenomena should be assumed to be moderate.

Mixtures of precipitation types are reported in combinations as one group with the dominant type given first, possible prefixed by +(heavy), -(light), SH or TS as appropriate.

Up to three separate groups may be given to indicate the presence of more than one independent weather type.

Each weather group is encoded by working from top to bottom of the table at Figure 1, that is to say that the intensity or proximity comes first, followed by description and then the weather phenomena, for example MIFG (shallow fog), VCBLSN (blowing snow adjacent to but not at the aerodrome), +SHRA (heavy showers or rain) or RASN (predominately rain but also snow.

If necessary to clarify the difference between **BCFG** and **PRFG**. **BCFG** is taken to mean fog patches randomly covering the aerodrome. **PRFG** indicates that a substantial part of the aerodrome is covered by fog while the remainder is clear, in other words fog banks.

Note that the abbreviations BR, HZ, FU, IC, DU and SA are not reported when the visibility is greater than 5000 metres.

Abbreviation	Meaning
Intensity or Proximity	
- + VC	Light Heavy, or well developed when preceding PO or FC In the vicinity (within 8km of the aerodrome perimeter)
Descriptor	
MI BC PR DR BL SH TS FZ	Shallow Patches Partial conv Drifting Blowing Shower(s) Thunderstorm Super Cooled
Precipitation	

DZ	Drizzle
RA	Rain
SN	Snow
SG	Snow Grains
IC	Diamond Dust
PE	Ice Pellets
GR	Hail
GS	Small Hail (less than 5mm diameter) and/or snow pellets
Obscuration	
BR	Mist
FG	Fog
FU	Smoke
VA	Volcanic Ash
DU	Widespread Dust
SA	Sand
HZ	Haze
Other	
PO	Well developed dust/sand whirls
SQ	Squalls
FC	Funnel cloud(s) (tornado or water-spout)
SS	Sand Storm
DS	Dust Storm

CLOUD

Cloud (other than significant convective cloud) is reported in six character groups. In each group the first three characters are letters as follows:

FEW (few) to indicate one or two oktas.

SCT (scattered) to indicate three or four oktas.

BKN (broken) to indicate five to seven oktas.

OVC (overcast) to indicate eight oktas.

The last three characters are figures which indicate the height of the cloud above aerodrome level in hundreds of feet.

Significant convective clouds are considered to be CB (cumulonimbus) and TCU (towering cumulus). When this type of cloud is observed the letters CB or TCU as appropriate are added to the six character group, for example SCTO18CB which indicates three or four oktas cumulonimbus with a base height of 1800ft above aerodrome level.

The reporting of layers or masses of cloud is made as follows:

The first group gives the lowest individual layer of any amount.

The second group gives the next individual layer of more than two oktas.

The third group gives the next higher layer of more than four oktas.

Any additional groups give details of any significant convective cloud (regardless of amount) if not already reported in the first three groups.

The cloud groups are given in ascending order of base height, for example SCT005 SCT010 SCT018CB.

When there is no cloud to report and CAVOK does not apply (discussed shortly), the cloud group is replaced by the letters **SKC** (sky clear).

Sky obscured is encoded as **VV** followed by the vertical visibility in hundreds of feet. When the vertical visibility cannot be assessed the group will read VV///. VV003 therefore decodes as sky obscured, vertical visibilty 300 feet.

Vertical visibility is not presently reported in UK METARS.

CAVOK

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

The visibility is 10km or more.

There is no cloud below 5000ft or below the Minimum Sector Altitude, whichever is the greater, and there is no cumulonimbus.

There is no precipitation, thunderstorms, shallow fog or low drifting snow.

AIR TEMPERATURE AND DEWPOINT

This group normally consists of two figures followed by an oblique followed by two figures, giving first the surface air temperature and then the dew-point, both in degrees celsius. When the temperature and the dew-point are below zero the figures are preceded by the letter **M**. Examples of the temperature/dew-point group follow:

03/01 =	temperature +30C, dew-point +10C
M01/M03 =	temperature -10C, dew-point -30C

QNH	This is reported as a four figure group, preceded by the letter Q, giving the QNH rounded down to the nearest whole millibar. If the QNH is less than 1000mb the first figure in the group will be a 0, for example Q0994, In the USA, QNH is given in inches of mercury. This will again be a four figure group, representing hundredths of inches, prefixed by the letter A. Therefore A2919 is a QNH of 29.19 inches.

SUPPLEMENTARY INFORMATION

RECENT WEATHER	Operationally significant weather which has been observed at the station since the last routine report or in the last hour (whichever period is shorter) but not at the time of the report (or if the phenomena is present at the time of the report, but has decreased in intensity), is included in the METAR and is preceded by the letters RE, for example RETS. Operationally significant weather is considered to be moderate or heavy rain (RERA), moderate or heavy drizzle (REDZ), moderate or heavy rain and drizzle (RERA), snow (RESN), blowing snow (REBLSN), ice pellets (REPE), hail (REGR), small hail and/or snow pellets (REGS), thunderstorms (RETS), dust or sand storms (RESS or REDS), volcanic ash (REVA) and funnel cloud (REFC).

WIND SHEAR

Windshear may be inserted if it is reported along the approach or take-off paths in the lowest 1600ft with reference to the runway. Windshear reports are preceded by the letters WS, for example WS TKOF RWY09, WS LDG RWY09.

Windshear is not presently reported in UK METARs.

RUNWAY STATE

An additional eight-figure runway state group may be added to the end of a METAR when the runway is contaminated (by snow, standing water and so on).

The format of the eight-figure runway state group is as follows:

First two digits	Runway designator.
Third digit	The type of contamination (wet snow, water patches and so on).
Fourth digit	Extent of runway contamination.
Fifth and sixth digits	Depth of deposit.
Seventh and eight digits	Friction co-efficient or braking action.

It is not intended to include the decode of the eight-figure group in this manual, it would be unwise to try and remember the full decode, mistakes could be painful. As an operating pilot however, you would be well advised to keep a copy of the decode in your flight folder. The full decode is to be found n the UK AIP, MET Section, Pages 3-5 to 3-7.

AUTO and RMK	Where a report contains fully automated observations with no human intervention, it will be indicated by the word AUTO inserted immediately before the wind group. The indicator RMK (remarks) denotes an optional section containing additional meteorological elements. RMK is not used with UK METARs.
MISSING INFORMATION	Information that is missing in a METAR or SPECI may be replaced by diagonals.
TRENDS	For selected aerodromes, a forecast of significant changes in conditions during the two hours following the time of observation may be given. The letters BECMG (becoming) or TEMPO (temporarily) may appear and may then be followed by FM (from) followed by a four-figure time group and possibly TL (until) followed by a further four-figure time group. Alternatively the letters AT (at) followed by a four-figure time group may be used. Standard weather codes are then used to describe the expected changes. The letters NOSIG (no significant change) may be used to replace the trend groups. Examples of trends are given below: BECMG FM1100 25034G59kt TEMPO FM0630 TL0830 3000 SHRA

A trend will be appended to a METAR, providing that a forecaster is on duty (as opposed to an observer), whenever one or more of the following significant changes are expected to occur:

Wind velocity:

Changes in direction of 30 degrees or more, if the mean speed exceeds 20kt.

Changes in the mean speed of 10kt or more.

Changes in the gust speed of 10kt or more if the mean speed is 15kt or more.

Visibility:

Changes through 150m, 350m, 600m, 1500m, 3000m and 5000m.

Weather:

(i) Onset, cessation, or change in intensity of thunderstorms, freezing precipitation, moderate or heavy drizzle or rain.

(ii) Onset or cessation of low drifting or blowing sand, dust or snow, squall, funnel cloud, sand or dust storm.

Cloud:

(i) Change in cloud ceiling through or to 100, 200, 300, 500, 1000 or 1500ft (cloud ceiling is defined as the lowest level of cloud which obscures more than 4 oktas of the sky).

(ii) Change through or to 4 oktas for clouds having a base at or below 1500ft.

Special Reports

7. Additional METARs will be issued if the conditions change significantly since the last observation. The conditions which would give rise to a SPECI (special) METAR are given below. Note that within the UK a SPECI METAR is not normally transmitted beyond the station of origin.

Wind Velocity:

Change in direction of 30 degrees or more, if speed exceeds 20kt, or a change of 60 degrees or more if the mean speed is 10kt or more.

Changes in the mean speed of 10kt or more.

The difference between mean and maximum speed increases by 10kt or more, with a mean speed of 15kt or above.

Visibility:

Changes through 800, 1500, 5000 or 10,000 metres, also, when RVR values are not available, changes through 150, 350 and 600 metres.

8. RVR:

9. Changes through 150m, 350m, 600m and 800m.

Weather:

The onset or cessation of moderate or heavy rain, rain and snow, snow, ice pellets, snow pellets or hail.

The onset or cessation of freezing fog or freezing precipitation.

The onset or cessation of thunderstorms, squalls, funnel cloud, sand or dust storms and low drifting or blowing snow, sand or dust.

A change in intensity of any of the precipitation forms listed above from slight to moderate or heavy or from moderate or heavy to slight.

Cloudbase:

Changes of cloud ceiling through 100, 200, 300, 500, 700, 1000, 1500 or 2000ft.

Changes through or to 4 oktas for clouds having a base at or below 1500ft.

QNH:

Changes of pressure of 1mb or more.

CAVOK:

A METAR which contained a CAVOK report will be replaced by a Special (SPECI) report if the visibility falls to below 10km or the cloud base falls to below 2000ft, or if CB is present.

10. The notes above on the METAR code may have served only to thoroughly confuse the reader. If so, an attempt at decoding the METARs given below will hopefully serve to prove how easy it really is. Remember that the information is always given in the order in which it was discussed above.

METAR 1

11. METAR EGLL 091220Z 14005KT 045E R12/1000N DZ BCFG W//// 09/07 Q1004 NOSIG =

Decode

EGLL	London Heathrow
091220Z	At 1220 UTC on the 9th day of the month
14005KT	Mean surface wind (over a ten minute period) 140(T)/05kt
0450E	Visibility 450 metres to the east of the aerodrome

R12/1000	RVR at the touchdown zone of the runway 12 is 1000 metres with no significant change over a ten minute period
DZ	Moderate drizzle
BCFG	Patches of fog randomly covering the aerodrome
W////	Sky obscured, vertical visibility cannot be assessed
09/07	Air temperature +90C, dew-point +70C
Q1004	QNH 1004mb
NOSIG	No significant changes are forecast for the next two hours

METAR 2

METAR LFPB 091220Z 24015KT 200V280 8000 -RA SCT010

BKN025 OVC080 18/15 Q0983 TEMPO 3000 RA BKN008

OVC020 =

Decode

LFPB	Paris Le Bourget
091220Z	At 1220 UTC on the 9th day of the month

24015KT	Mean surface wind 240°(T)/15kt
200V280	Extremes of wind direction over a ten minute period from 200°(T) to 280°(T)
	8000 Visibility 8000 metres
-RA	Light rain
SCT010	Lowest cloud base height 1000ft above aerodrome level (three or four oktas)
BKN025	Five to seven oktas of cloud base height 2500ft above aerodrome level
OVC080	Eight oktas of cloud base height 8000ft above aerodrome level
18/15	Air temperature +18°C, dew-point +15°C
Q0983	QNH 983mb
TEMPO	Temporarily within the next two hours
3000	Visibility 3000 metres
RA	Moderate rain
BKN008	Five to seven oktas of cloud base height 800ft above aerodrome level
OVC020	Eight oktas of cloud base height 2000ft above aerodrome level

METAR 3

METAR EGAA 091220Z 30025G38KT 270V360 1200NE 6000S

+SHSNRAGS SCT005 BKN010CB 03/M01 Q0999 RETS WS LDG

RWY27 BECMGAT1300 9999 SCT015 BKN100 =

Decode

EGAA	Belfast Aldergrove
091220Z	At 1220 UTC on the 9th day of the month
30025G37KT	Mean surface wind direction 300(T), mean surface wind speed (over ten minutes 25 kt, maximum wind speed (over ten minutes) 37 kt
270V360	Extremes of wind direction over a ten minute period from 2700(T) to 3600(T)
1200NE	Minimum visibility 1200 metres to the northeast
6000S	Maximum visibility 6000 metres to the south
+SHSNRAGS	Heavy showers of snow, rain and small hail
SCT005	Lowest cloud base height 500ft above aerodrome level (three or four oktas)
BKN010CB	Five to seven oktas cumulonimbus, base height 1000ft above aerodrome level
03/M01	Air temperature +3°Air temperature, dew-point -10°C,

Q0999	QNH 999mb
RETS	Thunderstorms since the last report or in the last hour (whichever period is the shorter) but not at this time
WS LDG R RWY27	Windshear has been reported below 1600ft on the approach to Runway 27
BECMGAT1300	Becoming at 1300 UTC
9999	Visibility 10km or more
SCT015	Three or four oktas, base 1500ft aal
BKN100	Five to seven oktas, base 10,000ft aal

12. Volmet broadcasts are essentially METARs transmitted in plain language. Similarly ATIS broadcasts (Automatic Terminal Information Service) contain plain language METARs (but now with the wind direction in degrees magnetic), together with details of runway in use, initial contact frequency, work in progress, and so on.

Voice Weather Broadcast (VOLMET) UK

13. VOLMET broadcasts are aerodrome meteorological reports for certain aerodromes. They take two forms, continuous and scheduled broadcasts. Details of the callsign, frequency, operating hours and aerodromes for which the service is provided are contained in the UK AIP.

14. Continuous VOLMET broadcasts are normally transmitted in the VHF band and they contain current meteorological reports for aerodromes, with trends where available.

15. Schedule VOLMET broadcasts are normally transmitted in the HF band and, in addition to aerodrome weather reports andtrends where available, may also contain forecasts.

16. The content of a VOLMET broadcast is as follows:

(a) Aerodrome identification (e.g. Bratton)

(b) Surface wind

(c) Visibility (Note 1)

(d) RVR (if applicable) (Note 1)

(e) Weather

(f) Cloud (Note 1)

(g) Temperature

(h) Dewpoint

(i) QNH

(j) Trend (if applicable).

NOTE:

Non essential words such as 'surface wind', 'visibility' etc are not spoken. 'SNOCLO' is used to indicate that aerodrome is unusable for take-off/landings due to heavy snow on runways or snow clearance. All broadcasts are in English.

Automatic Terminal Information Service (ATIS) UK

17. At busy aerodromes the amount of voice radio transmissions necessary for control of aircraft in the air and on the ground is high. In order to avoid overloading controllers an Automatic Terminal Information Service (ATIS) continuously broadcasts routine arrival and departure information on a discrete RTF frequency or in conjunction with an appropriate VOR.

18. Pilots of inbound aircraft are normally required, when first contacting the aerodrome Air Traffic Service Unit (ATSU), to acknowledge receipt of current information by quoting the appropriate code letter of the ATIS broadcast.

19. Pilots of outbound aircraft are normally only required to acknowledge receipt of departure information unless the ATIS broadcast requests them to do so. In such cases the QNH given in the broadcast should be repeated, so that ATC can check that the ATIS quoted QNH is current.

20. The duration of the ATIS broadcast should not exceed thirty seconds and will include the following:

(a) Message identification i.e.: 'This is Bratton Information Alpha'. Each message is consecutively coded using the phonetic alphabet.

(b) Time of origin of weather report.

(c) Weather report.

(d) Runway (s) in use.

(e) Short term AIS information such as unserviceability of NAV AIDS, runway surfaces etc.

(f) Any other routine information useful to pilots operating at the aerodrome.

NOTE:

RVR/RVRs are not included, however, IRVRs may be available where approved.

NOTE:

Rapidly changing meteorological situations sometimes make it impractical to include weather reports in the broadcast. In these circumstances, ATIS messages will indicate that weather information will be passed on RTF. Any significant change to the content of a current ATIS message will be passed to pilots by RTF until such time as a new message is broadcast. The highest cloud base that will be reported is 10000 feet.

Example of ATIS broadcast:

'This is Bratton Approach Information Alpha. 1230 hours weather. 180° 8 kts. 15 km. Intermittent drizzle. 4 octas 1000 ft, 8 octas 1800 ft. Temperature +5. Dew point +7 QNH 997 mbs. Landing runway 19. Report information Alpha received on first contact with Bratton'.

NOTE:

A Trend may be included in an ATIS broadcast.

Action Required to be Taken in Case of Communication Failure

Air to Ground

Ground to Air

Action Required to be Taken in Case of Communication Failure

Air to Ground

1. When an aircraft fails to establish contact with the aeronautical station on the designated frequency, the pilot should attempt to establish contact on another frequency, appropriate to the route being flown. If this fails, the aircraft station should then attempt to establish communication with other aircraft or other aeronautical stations, on frequencies appropriate to the route being flown. In addition, an aircraft operating within a network should monitor the appropriate VHF frequency for calls from nearby aircraft.

(a) When communication failure occurs or is suspected, the following points should be checked:

(i) the correct frequency has been selected for the route being flown.

(ii) the Aeronautical Station being called is open for watch.

(iii) the aircraft is not out of radio range.

(iv) receiver volume correctly set.

(b) If these points are in order, it may be that the aircraft equipment is not functioning correctly. Complete the checks of headset and radio installation appropriate to the aircraft.

(c) If the pilot is still unable to establish communication on any designated aeronautical station frequency, or with any other aircraft, he should then transmit his message twice, on the designated frequency, preceded by the phrase 'TRANSMITTING BLIND'. This is in case the transmitter is still functioning.

(d) Where a transmitter failure is suspected, check or change the microphone. Listen out on the designated frequency for instructions. It should be possible to answer questions by use of the carrier wave if the microphone is not functioning (see Speechless Code, Chapter 6, paragraph 6.5).

(e) In the case of a receiver failure transmit reports twice at the scheduled times or positions on the designated frequency preceded by the phrase 'TRANSMITTING BLIND DUE TO RECEIVER FAILURE'.

(f) An aircraft which is being provided with air traffic control, advisory service or aerodrome flight information is to transmit information regarding the intention of the pilot in command with respect to the continuation of the flight. Specific procedures for the action to be taken by pilots of IFR and Special VFR flights are contained in the appropriate AIP sections.

(g) When an aircraft is unable to establish communication due to airborne equipment failure it shall, when so equipped, select the appropriate SSR code to indicate radio failure (A7600).

(h) When the aircraft forms part of the aerodrome traffic at a controlled aerodrome, the pilot should keep a watch for such instructions as may be issued by visual signals.

Ground to Air

2. After completing checks of ground equipment (most airports have standby and emergency communications equipment) the ground station will request other aeronautical stations and aircraft to attempt to communicate with the aircraft that has failed to maintain contact.

3. If still unable to establish communication the aeronautical station will transmit messages addressed to the aircraft by blind transmission on the frequency on which the aircraft is believed to be listening.

These will consist of:

(a) The level, route and expected approach time (EAT), or estimated time of arrival (ETA), to which it is assumed the aircraft is adhering.

(b) The weather conditions at the destination aerodrome and suitable alternate. Also, if practicable, the weather conditions in an area or areas suitable for a procedural descent through cloud to be effected. (See AIP Section).

In Visual Meteorological Conditions, the Aircraft Shall:

(a) continue to fly in visual meteorological conditions;

(b) land at the nearest suitable aerodrome; and

(c) report its arrival by the most expeditious means to the appropriate air traffic control unit.

Distress and Urgency Procedures

States of Emergency

VHF Emergency Service

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Distress and Urgency Procedures

1. During an emergency in UK airspace there are specific RTF procedures that should be used under the Aeronautical Mobile Service. The characteristics of these procedures and of the VHF International Aeronautical Emergency Service are described in this Chapter.

States of Emergency

There are two recognised states of emergency, classified as follows:

(a) **Distress** – A condition of being threatened by serious and/or imminent danger and of requiring immediate assistance.

(b) **Urgency** – A condition concerning the safety of an aircraft or other vehicle, or of some person on board or within sight, but not requiring immediate assistance.

Distress Signals

2. When a condition of grave and/or imminent danger threatens, requiring immediate assistance, distress signals are made using one or more of the following methods:

(a) the group SOS (...---...) in Morse Code is sent repeatedly by radiotelegraphy or by any other signalling method available (e.g. hand lamp or flashing the aircraft landing lights);

(b) a voice message is transmitted by radiotelephony, consisting of the word 'MAYDAY' repeated at least three times and followed, if practicable, with a brief description of the emergency and the aircraft location;

(c) rockets or shells throwing red lights, fired one at a time at short intervals;

(d) a parachute flare showing a red light.

NOTE:

Article 41 of the ITU Radio Regulations (Nos. 3268, 3270 and 3271 refer) provides information on the alarm signals for actuating radiotelegraph and radiotelephone auto-alarm systems:

3268 The radiotelegraph alarm signal consists of a series of twelve dashes sent in one minute; the duration of each dash being four seconds and the duration of the interval between consecutive dashes one second. It may be transmitted by hand but its transmission of an automatic instrument is recommended.

3270 The radiotelephone alarm signal consists of two substantially sinusoidal audio frequency tones transmitted alternatively. One tone shall have a frequency of 2200 Hz and the other a frequency of 1300 Hz, the duration of each tone being 250 milliseconds.

3271 The radiotelephone alarm signal, when generated by automatic means, shall be sent continuously for a period of at least thirty seconds but not exceeding one minute; when generated by other means, the signal shall be sent as continuously as practicable over a period of approximately one minute.

Urgency Signals

3. When a pilot is experiencing difficulties that compel him to land the aircraft, but which do not require immediate assistance, the following signals are used, either together or separately:

(a) switching the landing lights on and off repeatedly;

or

(b) switching the navigation lights on and off repeatedly, but in such a manner as to be distinct from automatic flashing navigation lights.

4. When a pilot has a very urgent message to transmit concerning the safety of another vehicle (ship, aircraft, etc.) or of a person either onboard his aircraft or within sight, the following signals are used:

(a) a signal made by radiotelegraphy or by any other signalling method consisting of the group XXX;

(b) a signal sent by radiotelephony consisting of the spoken words 'PAN, PAN, PAN'.

VHF Emergency Service

The UK Distress and Diversion Service

5. Within the United Kingdom there are two Distress and Diversion (D&D) Sections located at Area Control Centres (ACC), one at West Drayton near London and the other at Kinloss in Scotland. They are manned by RAF control staff, who are assisted by suitably equipped civil and military units and certain HM Coastguard stations. They provide a VHF emergency service on the International Aeronautical Emergency frequency of 121.5 MHz.

6. The service provided is available continuously to all pilots flying within UK airspace. It provides assistance where pilots are in distress, in urgent need of assistance or experiencing difficulties that could develop into an emergency, such as uncertainty of location.

7. Provided that there is no actual emergency in progress on the UHF or VHF frequencies the service may also be available for practice emergencies. the UK AIP (COM Section) contains further information on the emergency service for civil pilots.

8. The principal function of the two D & D Sections is to provide an emergency aid and position fixing service for civil and military pilots. Over most of the London FIR and to the south and east of Manchester autotriangulation (Direction Finding) is available on 121.5 MHz. For other civil aircraft incidents where the VHF frequency is used the Sections rely on DF bearings passed by telephone from VDF equipped stations. it should be appreciated that this position-fixing procedure is relatively slow. This is because the bearing information received must be manually plotted onto 1:250,000 charts, which normally requires several minutes concentrated activity.

9. The accuracy of the position fix depends to a large extent upon the altitude of the aircraft requesting the service and its distance from the VDF stations used to obtain bearings. Below 3000 ft amsl the VHF fixing service coverage is limited and in areas where there is intervening high ground, such as Scotland, Wales and SW England, VDF location of low flying aircraft may be severely inhibited.

10. Where direction finding data on 121.5 MHz is unavailable the D & D controller is limited to that information available from secondary surveillance radar (SSR) and what the pilot in distress can provide concerning his route, last known position and observed topography.

11. An effective emergency communications aid service is also available at certain UK aerodromes, listed in the UK AIP. Some of these aerodromes maintain a continuous VHF listening watch on 121,5 MHz, although they may not necessarily be equipped with VDF or SSR.

12. Others which do have VDF, but do not maintain a listening watch on the VHF emergency frequency, may be asked by the D & D controller to provide bearing information and other assistance. In such a case, the controller may instruct the pilot the switch temporarily to the frequency of the station where VDF is available.

Use of the Service – General Procedures

13. The London D & D Section covers UK airspace south of latitude N55 and the Scottish Section covers the airspace north of N55. Emergency calls on 121.5 MHz should be addressed accordingly, unless the pilot is in doubt regarding his position in relation to latitude N55.

14. Once two-way communication with the D & D Controller has been established the pilot should not change frequency from 121.5 MHz without first telling the controller. It should be noted that the provision of emergency services by the D & D Sections of the ACC's is unique to the UK. Information on Search and Rescue (SAR) services is detailed in the UK AIP.

15. It is very much in pilots' own interest to contact the emergency services as soon as there is any doubt concerning the safe conduct of their flight. When so doing, it is vital to pass details of the difficulty being experienced and the nature of the service required as clearly and fully as possible. For example, a vague request for 'confirmation of position' is unlikely to be accorded the same priority as a clear statement that he is lost.

16. If a pilot is already in communication with a civil or military ATSU, before the emergency arises, assistance should be requested from the controller on the frequency is use. In this case, any SSR code setting previously assigned by ATC (other than the Conspicuity Code 7000) should be retained until instructions are received to change the code setting.

17. If however, the pilot is not in direct communication with an ATSU and the aircraft is equipped with an SSR transponder it should be switched, preferably before the emergency call is made, to Mode A Emergency Code 7700, with Mode C if available. If the transponding aircraft is high enough to be within secondary radar cover, the selection of the Emergency 7700 Code will alert the Emergency Controller to the presence of an incident by means of an audio and visual warning. The received SSR plot will show the precise location of the aircraft on the controller's radar display, and will then obviate the need for the emergency controller to carry out the more time-consuming manual aircraft position plotting procedure. Information on SSR operating procedures, including Special Purpose Codes 7700 (Emergency), 7600 (Radio Failure) and 7500 (Hijack or Other Act of Violence) are detailed in the AIP.

Emergency Message

18. The emergency message shall contain the following information (time and circumstance permitting) and, whenever, should be possible, should be passed in the order given.

(a) 'MAYDAY/MAYDAY/MAYDAY' (or 'PAN PAN/PAN PAN/PAN PAN);

(b) Name of the station addressed (when appropriate and time and circumstances permitting);

(c) Callsign;

(d) Type of aircraft;

(e) Nature of the emergency

(f) Intention of the person-in-command;

(g) Present or last known position, flight level/altitude and heading;

(h) Pilot qualifications (See Note 1), viz:

(i) Student pilots (see Note 2);

(ii) No Instrument Qualification;

(iii) IMC Rating

(iv) Full Instrument Rating.

(i) Any other useful information e.g. endurance remaining, number of people of board (POB) etc.

NOTE:

There are no ICAO requirements to include pilot qualifications in a distress message. However, this information should be included whenever possible in UK emergency messages as it may help the controller to plan a course of action best suited to a pilot's ability.

NOTE:

Inexperienced civil pilots are invited to use the callsign prefix 'TYRO' when in communication with a military unit or the D&D Section to indicate their lack of experience. Upon hearing this code word, military controllers will ensure that they do not issue complex instructions that the pilot could have difficulty in following.

MAYDAY MAYDAY MAYDAY
Woodcombe Tower G-PPSC Cherokee engine failure losing height intend an immediate forced landing 15 mileseast of Woodcombe. passing4500 feet heading 260 PPL no instrument qualification 2 POB

G-PPSC Woodcombe Tower roger
MAYDAY.....(any pertinent information)

MAYDAY MAYDAY MAYDAY
Woodcombe Tower G-PPSC Cherokee engine failed. will attempt to land Woodcombe,10 miles east, 4500 ft heading 270 PPL no instrument qualification 2 POB

G-PPSC Woodcombe Tower roger MAYDAY
cleared straight-in runway 24 wind 260 10 knots
QFE 1018 you are number one

Action by the station addressed or first station acknowledging the distress message.

19. The station addressed by aircraft in distress, or first station acknowledging the distress message, shall:

(a) Immediately acknowledge the distress message.

(b) Take control of the communications or specifically and clearly transfer that responsibility, advising the aircraft if a transfer is made.

(c) Take immediate action to ensure that all necessary information is made available, as soon as possible, to:

(d) The ATS unit concerned.

(e) The aircraft operating agency concerned, or its representative, in accordance with pre-established arrangements.

(f) Warn other stations, as appropriate, in order to prevent the transfer of traffic to the frequency of the distress communication.

NOTE:

The requirement to inform the aircraft operating agency concerned does not have priority over any other action which involves the safety of the flight in distress, or of any other flight in the area, or which might affect the progress of expected flights in the area.

Speechless Code

20. If an emergency message received by the Military Emergency Controller is weak or distorted to the point of being unintelligible, the pilot may be asked to adopt the Speechless Code. This entails the pilot pressing his transmit button a certain number of times and using carrier wave only transmissions which, by convention, have the following code meanings:

Number of Transmissions	Meaning
One Short	'Yes' or an acknowledgement
Two Short	'No'
Three Short	'Say again' (to be used by the pilot when he has not fully heard the controller's transmission , or he has not understood the transmission , or was an instruction and the pilot is unable to comply)
Four Short (letter H in morse)	'Request Homing' (to an airfield), or used for initial alerting. (A civil pilot should only use the four short transmissions if he is aware, or suspects before attempting to make initial contact with the Emergency Controller, that his own aircraft microphone is unserviceable. The Emergency Controller will then interrogate the pilot, using the callsign 'Speechless Aircraft' if the identity of the aircraft is unknown)
One long (2 secs)	'Manoeuvre Complete' (eg steady on heading)
One Long, Two Short and One Long (-..-) (letter X in morse)	'My aircraft has developed another emergency'

21. An aircraft SSR transponder can also be used, during times of communication difficulties, by a pilot to acknowledge or respond to messages by the transmission of SSR Code changes or squawking 'Ident' as requested by the controller.

22. If neither the state if DISTRESS nor URGENCY applies, a service is available at lower priority to pilots who find themselves in DIFFICULTY. Such pilots should make their situation cleat and then provide as much information as possible to the emergency controller from the list previously described.

Practice Emergencies Radio Procedures

23. Pilots may simulate emergency incidents (BUT NOT THE STATE OF DISTRESS) on 121.50 MHz to enable them to gain experience of the ATC service provided. Before calling, pilots should listen out on the emergency frequency to ensure that no actual or practice incident is already in progress. Practice calls need not disrupt a planned flight or involve additional expense in fuel or time since the pilot can request 'diversion' to his intended destination or cancel the exercise when necessary. Simulated emergency calls must be prefixed 'PRACTICE' and should be brief, e.g.:

24. '*PRACTICE PAN, PRACTICE PAN, PRACTICE PAN London Centre G-PPSC*'

25. The Emergency Controller will then indicate acceptance of the Practice Pan by transmitting:

26. 'G-PPSC, London Centre continue with PRACTICE PAN'

27. The Emergency Controller may instruct the pilot to call at another time, if the practice cannot be accommodated.

28. If a practice is accepted, the pilot should then pass his details. SSR Mode A Code 7700 should not be selected during a practice emergency exercise unless required by the Emergency Controller. Mode C should be switched on, if available.

Training Fix

29. Pilots who do not wish to carry out a practice emergency but only wish to confirm their position may request a 'Training Fix' on 121.5 MHz. This 'Training Fix' is secondary in importance to actual emergency calls, but takes precedence over practice emergency calls in the event of simultaneous incidents.

(Listen out before transmitting)

Training Fix, Training Fix, Training Fix, G-PPSC

G-PPSC, London Centre your position is 15 miles west of Dorchester

Relayed Emergency Message

30. Any aeronautical station or aircraft knowing of an emergency incident may transmit a distress message whenever such action is necessary to obtain assistance for the aircraft or vessel in distress. In such circumstances, it should be made clear that the aircraft transmitting is not itself in distress.

MAYDAY MAYDAY MAYDAY Woodcombe Tower G-PPSC has intercepted MAYDAY from G-OOPS I say again G-OOPS Piper Cub engine failure forced landing 5 miles south of Detling VOR, 2000 feet descending, heading 355, IMC rating, over

G-PPSC Woodcombe Tower Roger your relayed MAYDAY from G-OOPS

Imposition of Silence

31. Transmissions from aircraft in distress have priority over all other transmissions. On hearing a distress call, all stations must maintain radio silence on that frequency unless they themselves are required to render assistance and should continue to listen on the frequency concerned until it is evident that assistance is being provided. Stations should take care not to interfere with the transmission of urgency calls.

32. The aircraft in distress or the station in control of a distress incident may impose silence either on all stations in the area or on any particular station that interferes with distress transmissions. In either case, the message should take the following form:

All stations Milthorpe Tower Stop transmitting MAYDAY

or

G-PPSC stop transmitting MAYDAY

33. The aeronautical station acknowledging a distress message on a particular frequency may consider it prudent to transfer other aircraft from that frequency in order to avoid any disruption or transmission from or to the emergency aircraft.

MAYDAY G-OOPS. All other aircraft contact Woodcombe Tower on 123.8, out

Cancellation of Emergency Communication and RTF Silence

34. When an aircraft is no longer in distress it shall transmit a message cancelling the emergency condition.

Woodcombe Tower G-OOPS cancel MAYDAY, engine restarted, runway in sight. request landing

G-PS cleared to land Runway 24. Surface wind 260 8

Cleared to land runway 24 G-PS

35. When a distress incident has been resolved, the station that has been controlling the emergency traffic will transmit a message indicating that normal working may be resumed.

All stations Woodcombe Tower MAYDAY traffic ended

General Principles of VHF Propagation and Allocation of Frequencies

General Principles of VHF Propagation and Allocation of Frequencies

The radio frequency spectrum is divided into the following bands:

Band	Frequency Range
VLF Very Low Frequency	3 - 30 KHz
LF Low Frequency	30 - 300 KHz
MF Medium Frequency	300 KHz - 3 MHz
HF High Frequency	3 - 30 MHz
VHF Very High Frequency	30 - 300 MHz
UHF Ultra High Frequency	300 MHz - 3 GHz
SHF Super High Frequency	3 - 30 GHz
EHF Extremely High Frequency	30 - 300 GHz

1. The student should already appreciate, from the Aircraft General Knowledge Syllabus, that the various factors which affect the transmission distance of a radio wave or transmitter power, type of surface over which propagation takes place, frequency in use, atmospheric and ionospheric interference, and the relative heights of the Tx and Rx. In addition, interference from other stations, terrain or obstacle screening and the simultaneous preception of direct and ground reflected waves can reduce the effective range and quality of radio transmission.

2. The propagation path for VHF radio transmissions is by direct wave, which limits the maximum range of VHF reception to line-of-sight. At VHF frequencies therefore, the type of surface over which propagation takes place has little effect on range, similarly atmospheric and ionospheric interference is generally not a problem. However screening due to its terrain or obstacles can limit range and quality. Also at longer ranges and especially at low level the reception of direct and reflected waves can reduce signal quality.

3. Using the line of sight formula it can be seen that the maximum range at which an aircraft at 37,000 feet can receive a VHF transmission from a ground station at mean sea level will be:

(H_1 = TX height H_2 = Receiver height)

$$1.25(\sqrt{H_1} + \sqrt{H_2})$$

$$= 1.25(\sqrt{0} + \sqrt{37,000})$$

$$= 240\text{nm}$$

NOTE:

Some references use the simplified formula: $\text{Range} = (\sqrt{\text{flt level}}) \times 12$ **which in this example would give a range of 231 nm.**

4. The basic airborne VHF set comprises a transceiver, antenna and control unit. In large aircraft the transceiver is normally rack-mounted in a radio equipment compartment and the control unit is panel-mounted in a position on the flight deck for convenient use. Light aircraft VHF sets usually comprise a panel-mounted combined transceiver and control unit.

5. VHF antennae need not be very long and in large aircraft usually take the form of blade antennae about 15 cm in length. Whip aerials are commonly used in light aircraft. In all cases the antennae are vertically mounted and blade antennae involve complex circuitry in order to further reduce the length so as to reduce aerodynamic drag.

General Allotment of Frequency Band 117.975 – 137 MHz

NOTE:

The plan includes a general Allotment Table that subdivides the complete band 117.975 – 137 MHz, the chief subdivisions being the bands of frequencies allocated to both national and international services, and the bands allocated to national services. Observance of this general subdivision should keep to a minimum the problem of co-ordinating national and international applications.

6. The block allotment of the frequency band 117.975 – 137 MHz shall be as shown below.

7. In the case of the new band 136 – 137 MHz, international applications have not yet been agreed, and these frequencies should be brought into use on a regional basis where and in the manner required.

	Block Allotment of Frequencies (MHz)	World-wide utilisation	Remarks
a)	118 to 121.4 inclusive	International and National Aeronautical Mobile Services	Specific international allotments will be determined in the light of regional agreement.
b)	121.5	Emergency frequency	In order to provide a guard band for the protection of the aeronautical emergency frequency, the nearest assignable frequencies on either side of 121.5 MHz are 121.4 MHz and 121.6 MHz, except that by regional agreement it may be decided that the nearest assignable frequencies are 121.3 MHz and 121.7 MHz.

c)	121.6 to 121.975 inclusive	International and National aerodrome surface communications	Reserved for ground movement, pre-flight checking, air traffic services clearances,and associated operations.
d)	122 to 123.05	National Aeronautical Mobile Services	Reserved for national allotments.
e)	123.1	Auxillary frequency SAR	See below.
f)	123.15 to 123.675	National Aeronautical Mobile Services	Reserved for national allotments.
g)	123.7 to 129.675 inclusive	International and National Aeronautical Mobile Services	Specific international allotments will be determined in the light of regional agreement.
h)	129.7 to 130.875 inclusive	National Aeronautical Mobile Services	Reserved for national allotments but may be used in whole or in part, subject to regional agreement.

i)	130.9 to 136.975 inclusive	International and National Aeronautical Mobile Services	Specific international allotments will be determined in the light of regional agreement.(See remark above regarding the band 132-137 MHz)

Frequency Separation and Limits of Assignable Frequencies

8. The minimum separation between assignable frequencies in the Aeronautical Mobile (R) Service shall be 25 kHz.

NOTE:

It is recognised that, in some regions or areas, 100 kHz or 50 kHz channel spacing may provide an adequate number of frequencies suitably related to international and national air services and that equipment designed specifically for 100 Khz or 50 kHz channel spacing will remain adequate for services operating within such regions or areas.

9. In the band 117.975 – 137 MHz, the lowest assignable frequency shall be 118 MHz and the highest 136.975 MHz.

Frequencies Used for Particular Functions

Emergency Channel

10. The emergency channel (121.5 MHz) shall be used only for genuine emergency purposes, as broadly outlined in the following:

(a) to provide a clear channel between aircraft in distress or emergency and a ground station when the normal channels are being utilised for other aircraft;

(b) to provide a VHF communication channel between aircraft and aerodromes, not normally used by international air services, in case of an emergency condition arising;

(c) to provide a common VHF communication channel between aircraft, either civil or military, and between such aircraft, and surface services, involved in common search and rescue operations, prior to changing when necessary to the appropriate frequency;

(d) to provide air-ground communication with aircraft when airborne equipment failure prevents the use of the regular channels;

(e) to provide a frequency channel for the operation of survival radio equipment or emergency location beacon – aircraft (ELBA), and for communication between survival craft and aircraft engaged in search and rescue operations;

(f) to provide a common VHF channel for communication between civil aircraft and intercepting aircraft or interceot control units and between civil or intercepting aircraft and air traffic services units in the event of interception of the civil aircraft.

NOTE:

The use of the frequency 121.5 MHz for the purpose outlined in c) above is to be avoided if it interferes in any way with the efficient handling of distress traffic.

NOTE:

The current Radio Regulations make provisions that the aeronautical emergency frequency 121.5 MHz may also be used by mobile stations of the Maritime Mobile Service, using A3E emission to communicate on this frequency for safety purposes with stations of the Aeronautical Mobile Service (RR 593, 2990 and 2991).

11. The frequency of 121.5 MHz shall be provided at:

(a) all area control centres and flight information centres;

(b) aerodrome control towers and approach control offices serving international aerodromes and international alternate aerodromes; and

(c) any additional location designated by the appropriate ATS authority,

12. where the provision of that frequency is considered necessary to ensure immediate reception of distress calls or to serve the purposes specified above.

Air-to-air Communications Channel

13. Subject to regional air navigation agreement, an air-to-air VHF communications channel shall be designated to enable aircraft engaged in flights over remote and oceanic areas out of range of VHF ground stations to exchange necessary operational information and to facilitate the resolution of operational problems.

NOTE:

The assignment of the frequency to be used for the VHF air-to-air communications channel is intended to be co-ordinated whenever necessary between adjacent regions.

Auxiliary Frequencies for Search and Rescue Operations

14. Where a requirement is established for the use of a frequency auxiliary to 121.5 MHz, the frequency 123.1 MHz shall be used.

Utilisation in the Band 108-117.975 MHz

15. The block allotment of the frequency band 108-117.975 MHz shall be as follows:

16. Band 108-111.975 MHz:

(a) ILS Localiser.

(b) VOR provided that:

(i) no harmful adjacent channel interference is caused to ILS;

(ii) only frequencies ending in either *even tenths* or *even tenths plus a twentieth* of a megahertz are used.

Band 111.975-117.975 MHz: VOR.

Self Assessed Exercise No. 3

QUESTIONS:

QUESTION 1.

What is the minimum separation between assignable frequencies in the Aeronautical Mobile Service?

QUESTION 2.

What are the nearest assignable frequencies above and below 121.5 MHz?

QUESTION 3.

What is the auxiliary search and rescue frequency?

QUESTION 4.

What frequency band does VHF cover?

QUESTION 5.

What band of frequencies is allocated to ILS localisers and VORs, and how would you recognise a VOR frequency in this band?

QUESTION 6.

What is the difference between Estimated Time of Arrival and Expected Approach Time?

QUESTION 7.

During a straight-in approach, when may a “long final” call be omitted?

QUESTION 8.

What is the callsign used by a direction-finding station?

QUESTION 9.

Abbreviate the following callsigns: a. G-BALL b. N61058 c. N342VD d. Caledonian 451

Cessna G-CLUB

QUESTION 10.

If an aircraft fails to establish radio contact with a ground station, what is the first action which should be taken?

QUESTION 11.

If, following the above procedure, comms failure is suspected, what are the next four points which should be checked?

QUESTION 12.

If it is suspected that lack of communication is due to aircraft equipment failure, what procedure should now be followed, and why?

QUESTION 13.

Following comms failure, what is the full SSR code to be used?

QUESTION 14.

Define the state of distress

QUESTION 15.

Define the urgency message

QUESTION 16.

What is the morse code for distress?

QUESTION 17.

Can emergency incidents be practised on 121.5 Mhz, and can the state of distress be practised also?

QUESTION 18.

During a practise emergency, should SSR code A7700 be used?

QUESTION 19.

Write out the full distress message in the correct order

QUESTION 20.

In a weather report, with reference to cloud, what is the difference between “scattered” and “broken”?

QUESTION 21.

What is a Metar?

ANSWERS:

ANSWER 1.

25 KHz

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ANSWER 2.

121.4 MHz and 121.6 MHz

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ANSWER 3.

123.1 MHz

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ANSWER 4.

30 – 300 MHZ

091 Chap 7 page 7-1

ANSWER 5.

108 – 117.975 MHz. VOR frequencies will end in even tenths

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ANSWER 6.

ETA – the time at which the pilot estimates that the aircraft will be over a specific location

ETA – the time at which ATC expects that an arriving aircraft, following a delay, will leave the holding point to complete its approach for landing

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ANSWER 7.

When an ILS is installed the call "outer marker" may be used instead.

ANSWER 8.

Homer

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ANSWER 9.

a. G-LL

b. N058

c. N2VD

d. No abbreviation

e. Cessna UB

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ANSWER 10.

Attempt to establish contact with other aircraft or stations on frequencies appropriate to the route

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ANSWER 11.

the correct frequency has been selected

the station being called is open for watch

the aircraft is not out of radio range

the receiver volume is correctly set

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ANSWER 12.

Messages should be transmitted twice on the designated frequency, preceded by the phrase "TRANSMITTING BLIND", in case the transmitter is serviceable

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ANSWER 13.

A7600 + C

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ANSWER 14.

A condition of being threatened by serious and/or imminent danger and of requiring assistance

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ANSWER 15.

A condition concerning the safety of an aircraft or other vehicle, or of some person on board or within sight, but not requiring immediate assistance

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ANSWER 16.

•••_ _ _•••

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ANSWER 17.

Yes, no

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ANSWER 18.

No, unless required by the controller

091 Chap 6 page 9

ANSWER 19.

MAYDAY MAYDAY MAYDAY

Name of station addressed (when appropriate and time and circumstances permitting)

callsign

Type of aircraft

Nature of the emergency

Intention of the person-in-command

Present or last known position, flight level/altitude, and heading

Any other useful information

Note: In the UK, pilot qualifications should be included whenever possible as it may help the controller

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ANSWER 20.

Scattered = 3 or 4 octas

Broken = 5-7 octas

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ANSWER 21.

A routine meteorological aerodrome report

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