

Standardised European Rules of the Air

Appendices to

Regulation (EU) No. 932/2021 as retained (and amended in UK domestic law) under the European Withdrawal Act 2018

APPENDIX 1 SIGNALS

Regulation (EU) 2016/1185

1. DISTRESS AND URGENCY SIGNALS

1.1. General

1.1.1. Notwithstanding the provisions in 1.2 and 1.3, an aircraft in distress shall use any means at its disposal to attract attention, make known its position and obtain help.

1.1.2. The telecommunication transmission procedures for the distress and urgency signals shall be in accordance with **Section 14**.

1.2. Distress signals

1.2.1. The following signals, used either together or separately, mean that grave and imminent danger threatens, and immediate assistance is requested:

- (a) a signal made by radiotelegraphy or by any other signalling method consisting of the group SOS (.. — — — . .. in the Morse Code);
- (b) a radiotelephony distress signal consisting of the spoken word MAYDAY;
- (c) a distress message sent via data link which transmits the intent of the word MAYDAY;
- (d) rockets or shells throwing red lights, fired one at a time at short intervals;
- (e) a parachute flare showing a red light;
- (f) setting of the transponder to Mode A Code 7700.

1.3. Urgency signals

1.3.1. The following signals, used either together or separately, mean that an aircraft wishes to give notice of difficulties which compel it to land without requiring immediate assistance:

- (a) the repeated switching on and off of the landing lights; or
- (b) the repeated switching on and off of the navigation lights in such manner as to be distinct from flashing navigation lights.

1.3.2. The following signals, used either together or separately, mean that an aircraft has a very urgent message to transmit concerning the safety of a ship, aircraft or other vehicle, or of some person on board or within sight:

- (a) a signal made by radiotelegraphy or by any other signalling method consisting of the group XXX (— .. — — .. — — .. — in the Morse Code);
- (b) a radiotelephony urgency signal consisting of the spoken words PAN, PAN;
- (c) an urgency message sent via data link which transmits the intent of the words PAN, PAN.

2. VISUAL SIGNALS USED TO WARN AN UNAUTHORISED AIRCRAFT FLYING IN OR ABOUT TO ENTER A RESTRICTED, PROHIBITED OR DANGER AREA

- 2.1. When visual signals are used to warn unauthorised aircraft flying in or about to enter a restricted, prohibited or danger area by day and by night, a series of projectiles discharged from the ground at intervals of 10 seconds, each showing, on bursting, red and green lights or stars shall indicate to an unauthorised aircraft that it is flying in or about to enter a restricted, prohibited or danger area, and that the aircraft is to take such remedial action as may be necessary.

3. SIGNALS FOR AERODROME TRAFFIC

- 3.1. Light and pyrotechnic signals

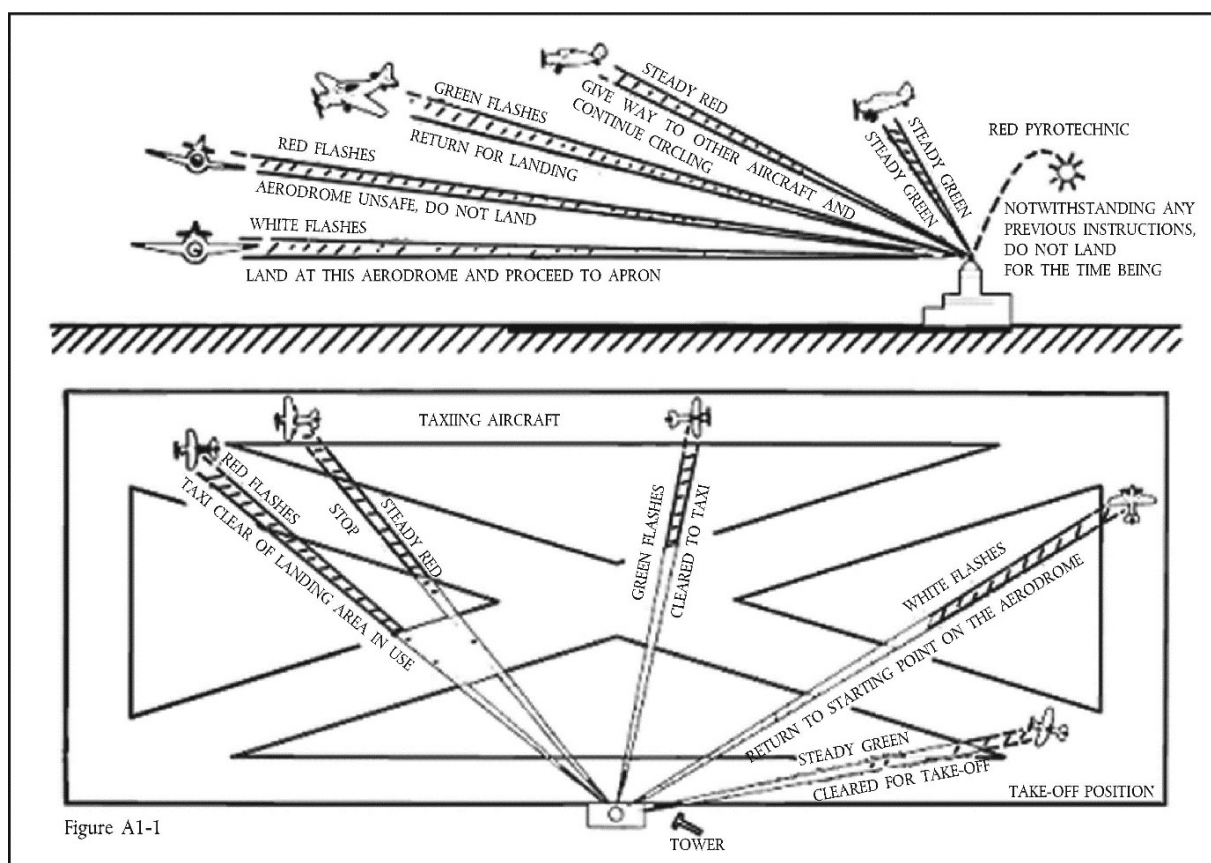
3.1.1. Instructions

Table AP 1-1

Light		From Aerodrome Control to:	
		Aircraft in flight	Aircraft on the ground
Directed towards aircraft concerned (see Figure A1-1).	Steady green	Cleared to land	Cleared for take-off
	Steady red	Give way to other aircraft and continue circling	Stop
	Series of green flashes	Return for landing ¹	Cleared to taxi
	Series of red flashes	Aerodrome unsafe, do not land	Taxi clear of landing area in use
	Series of white flashes	Land at this aerodrome and proceed to apron ²	Return to starting point on the aerodrome
Red pyrotechnic		Notwithstanding any previous instructions, do not land for the time being	

¹ Clearances to land and to taxi will be given in due course.

² Clearances to land and to taxi will be given in due course.



3.1.2. Acknowledgement by an aircraft

- (a) When in flight:
 - (1) during the hours of daylight:
 - by rocking the aircraft's wings, except for the base and final legs of the approach;
 - (2) during the hours of darkness:
 - by flashing on and off twice the aircraft's landing lights or, if not so equipped, by switching on and off twice its navigation lights.
- (b) When on the ground:
 - (1) during the hours of daylight:
 - by moving the aircraft's ailerons or rudder;
 - (2) during the hours of darkness:
 - by flashing on and off twice the aircraft's landing lights or, if not so equipped, by switching on and off twice its navigation lights.

3.2. Visual ground signals

3.2.1. Prohibition of landing

- 3.2.1.1. A horizontal red square panel with yellow diagonals (Figure A1-2) when displayed in a signal area indicates that landings are prohibited and that the prohibition is liable to be prolonged.



Figure A1-2

3.2.2. Need for special precautions while approaching or landing

- 3.2.2.1. A horizontal red square panel with one yellow diagonal (Figure A1-3) when displayed in a signal area indicates that owing to the bad state of the manoeuvring area, or for any other reason, special precautions must be observed in approaching to land or in landing.



Figure A1-3

3.2.3. Use of runways and taxiways

- 3.2.3.1. A horizontal white dumb-bell (Figure A1-4) when displayed in a signal area indicates that aircraft are required to land, take off and taxi on runways and taxiways only.

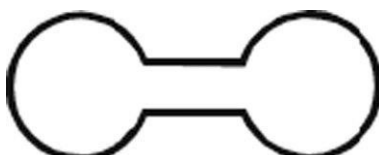


Figure A1-4

- 3.2.3.2. The same horizontal white dumb-bell as in 3.2.3.1 but with a black bar placed perpendicular to the shaft across each circular portion of the dumb-bell (Figure A1-5) when displayed in a signal area indicates that aircraft are

required to land and take off on runways only, but other manoeuvres need not be confined to runways and taxiways.

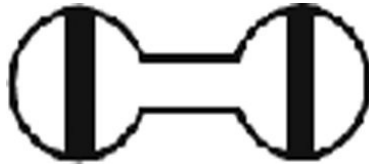


Figure A1-5

3.2.4. Closed runways or taxiways

- 3.2.4.1. Crosses of a single contrasting colour, white on runways and yellow on taxiways (Figure A1-6), displayed horizontally on runways and taxiways or parts thereof indicate an area unfit for movement of aircraft.



Figure A1-6

3.2.5. Directions for landing or take-off

- 3.2.5.1. A horizontal white or orange landing T (Figure A1-7) indicates the direction to be used by aircraft for landing and take-off, which shall be in a direction parallel to the shaft of the T towards the cross arm. When used at night, the landing T shall be either illuminated or outlined in white lights.

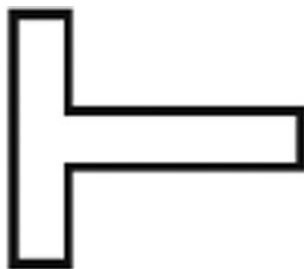


Figure A1-7

- 3.2.5.2. A set of two digits (Figure A1-8) displayed vertically at or near the aerodrome control tower indicates to aircraft on the manoeuvring area the direction for take-off, expressed in units of 10 degrees to the nearest 10 degrees of the magnetic compass.



Figure A1-8

3.2.6. Right-hand traffic

- 3.2.6.1. When displayed in a signal area, or horizontally at the end of the runway or strip in use, a right-hand arrow of conspicuous colour (Figure A1- 9) indicates that turns are to be made to the right before landing and after take-off.

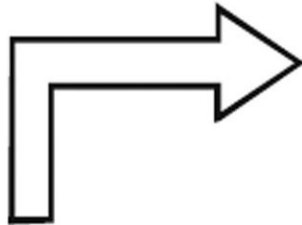


Figure A1-9

3.2.7. Air traffic services reporting office

- 3.2.7.1. The letter C displayed vertically in black against a yellow background (Figure A1-10) indicates the location of the air traffic services reporting office.



Figure A1-10

3.2.8. Sailplane flights in operation

- 3.2.8.1. A double white cross displayed horizontally (Figure A1-11) in the signal area indicates that the aerodrome is being used by sailplanes and that sailplane flights are being performed.

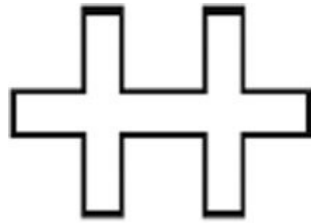


Figure A1-11

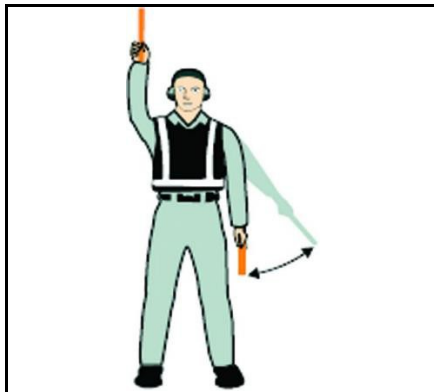
4. MARSHALLING SIGNALS

4.1. From a signalman/marshaller to an aircraft

4.1.1. The signals for use by the signalman/marshaller, with hands illuminated as necessary to facilitate observation by the pilot, and facing the aircraft in a position shall be:

- (a) for fixed-wing aircraft, on left side of aircraft, where best seen by the pilot; and
- (b) for helicopters, where the signalman/marshaller can best be seen by the pilot.





4.1.2. Prior to using the following signals, the signalman/marshaller shall ascertain that the area within which an aircraft is to be guided is clear of objects which the aircraft, in complying with **SERA.3301(a)**, might otherwise strike.

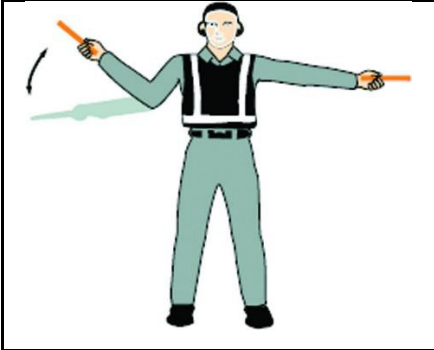
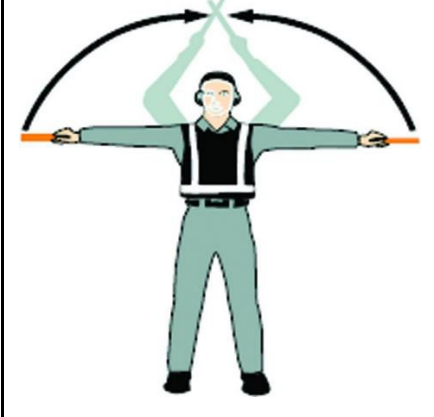








1. Wingwalker/guide¹



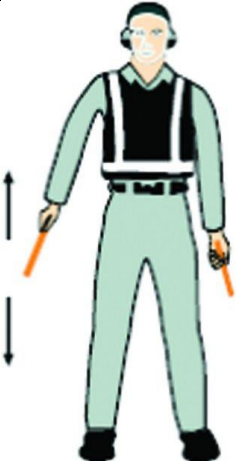
Raise right hand above head level with wand pointing up; move left-hand wand pointing down toward body.




¹ This signal provides an indication by a person positioned at the aircraft wing tip, to the pilot/marshaller/push-back operator, that the aircraft movement on/off a parking position would be unobstructed.

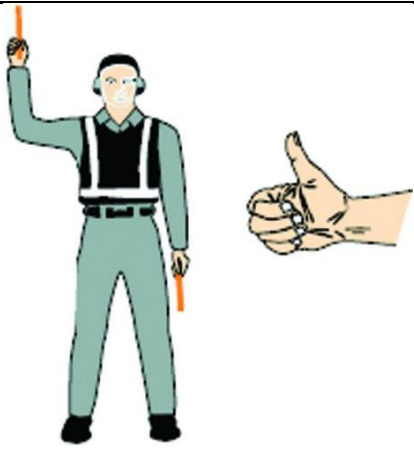
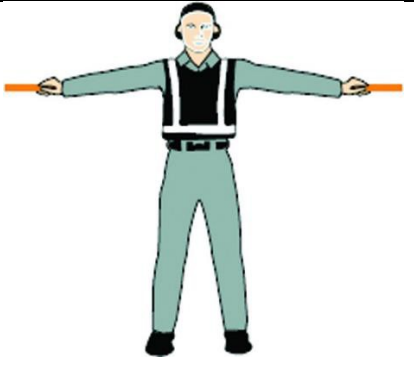
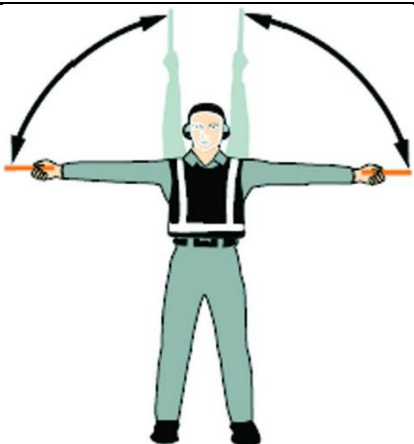
	<p>2. Identify gate</p> <p>Raise fully extended arms straight above head with wands pointing up.</p>
	<p>3. Proceed to next signalman/marshaller or as directed by tower/ground control</p> <p>Point both arms upward; move and extend arms outward to sides of body and point with wands to direction of next signalman/marshaller or taxi area.</p>
	<p>4. Straight ahead</p> <p>Bend extended arms at elbows and move wands up and down from chest height to head.</p>
	<p>5(a) Turn left (from pilot's point of view)</p> <p>With right arm and wand extended at a 90-degree angle to body, make 'come ahead' signal with left hand. The rate of signal motion indicates to pilot the rate of aircraft turn.</p>

	<p>5(b) Turn right (from pilot's point of view)</p> <p>With left arm and wand extended at a 90-degree angle to body, make 'come ahead' signal with right hand. The rate of signal motion indicates to pilot the rate of aircraft turn.</p>
	<p>6(a) Normal stop</p> <p>Fully extend arms and wands at a 90-degree angle to sides and slowly move to above head until wands cross.</p>
	<p>6(b) Emergency stop</p> <p>Abruptly extend arms and wands to top of head, crossing wands.</p>
	<p>7(a) Set brakes</p> <p>Raise hand just above shoulder height with open palm. Ensuring eye contact with flight crew, close hand into a fist. <i>Do not</i> move until receipt of 'thumbs up' acknowledgement from flight crew.</p>

	<p>7(b) Release brakes</p> <p>Raise hand just above shoulder height with hand closed in a fist. Ensuring eye contact with flight crew, open palm. <i>Do not</i> move until receipt of 'thumbs up' acknowledgement from flight crew.</p>
	<p>8(a) Chocks inserted</p> <p>With arms and wands fully extended above head, move wands inward in a 'jabbing' motion until wands touch. <i>Ensure</i> acknowledgement is received from flight crew.</p>
	<p>8(b) Chocks removed</p> <p>With arms and wands fully extended above head, move wands outward in a 'jabbing' motion. <i>Do not</i> remove chocks until authorised by flight crew.</p>
	<p>9. Start engine(s)</p> <p>Raise right arm to head level with wand pointing up and start a circular motion with hand; at the same time, with left arm raised above head level, point to engine to be started.</p>

	<p>10. Cut engines</p> <p>Extend arm with wand forward of body at shoulder level; move hand and wand to top of left shoulder and draw wand to top of right shoulder in a slicing motion across throat.</p>
	<p>11. Slow down</p> <p>Move extended arms downwards in a 'patting' gesture, moving wands up and down from waist to knees.</p>
	<p>12. Slow down engine(s) on indicated side</p> <p>With arms down and wands toward ground, wave either <i>right</i> or <i>left</i> wand up and down indicating engine(s) on <i>left</i> or <i>right</i> side respectively should be slowed down.</p>

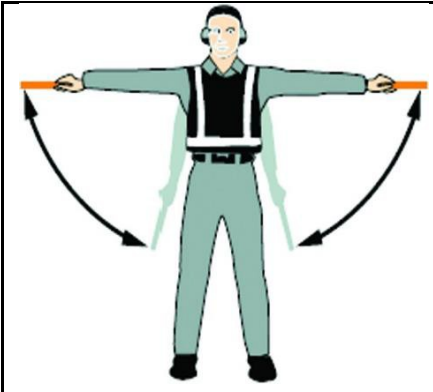

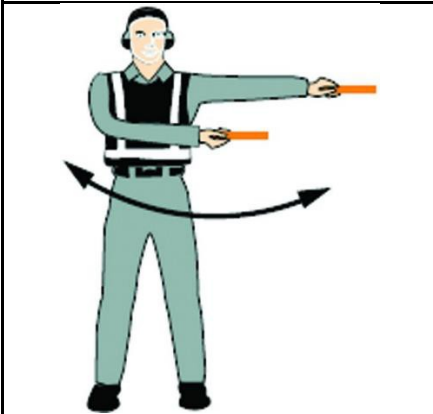
	<p>13. Move back</p> <p>With arms in front of body at waist height, rotate arms in a forward motion. To stop rearward movement, use signal 6(a) or 6(b).</p>
	<p>14(a) Turns while backing (for tail to starboard)</p> <p>Point left arm with wand down and bring right arm from overhead vertical position to horizontal forward position, repeating right-arm movement.</p>
	<p>14(b) Turns while backing (for tail to port)</p> <p>Point right arm with wand down and bring left arm from overhead vertical position to horizontal forward position, repeating left-arm movement.</p>

	<p>15. Affirmative/all clear¹</p> <p>Raise right arm to head level with wand pointing up or display hand with 'thumbs up'; left arm remains at side by knee.</p>
	<p>16. Hover²</p> <p>Fully extend arms and wands at a 90-degree angle to sides.</p>
	<p>17. Move upwards³</p> <p>Fully extend arms and wands at a 90-degree angle to sides and, with palms turned up, move hands upwards. Speed of movement indicates rate of ascent.</p>

¹ This signal is also used as a technical/servicing communication signal.

² For use to hovering helicopters

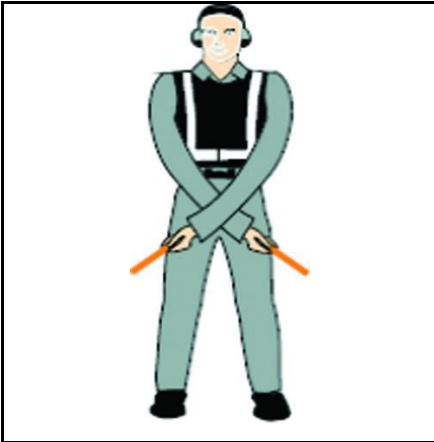
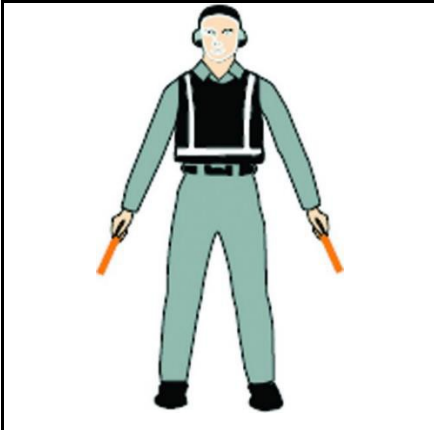
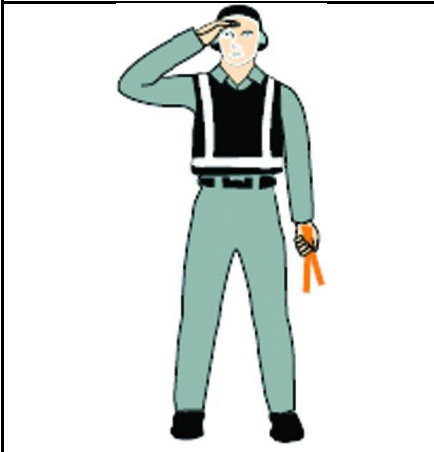
³ For use to hovering helicopters.

	<p>18. Move downwards¹</p> <p>Fully extend arms and wands at a 90-degree angle to sides and, with palms turned down, move hands downwards. Speed of movement indicates rate of descent.</p>
	<p>19(a) Move horizontally left (from pilot's point of view)²</p> <p>Extend arm horizontally at a 90-degree angle to right side of body. Move other arm in same direction in a sweeping motion.</p>
	<p>19(b) Move horizontally right (from pilot's point of view)³</p> <p>Extend arm horizontally at a 90-degree angle to left side of body. Move other arm in same direction in a sweeping motion.</p>


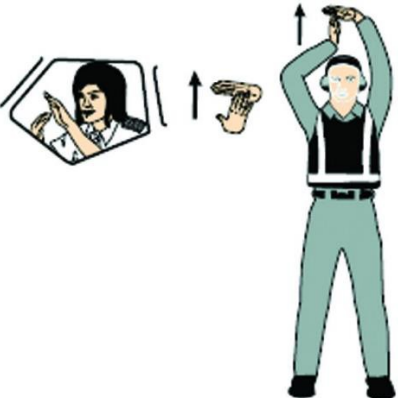
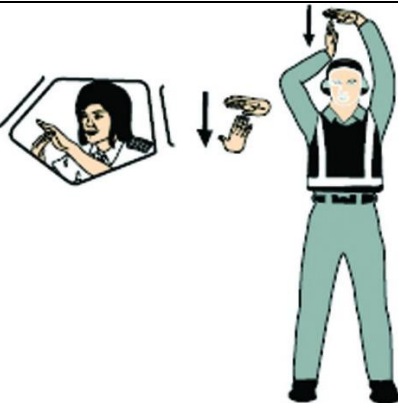
¹ For use to hovering helicopters.

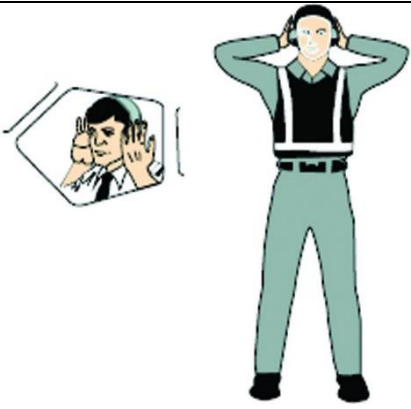

² For use to hovering helicopters.

³ For use to hovering helicopters.

	<p>20. Land¹</p> <p>Cross arms with wands downwards and in front of body.</p>
	<p>21. Hold position/stand by</p> <p>Fully extend arms and wands downwards at a 45-degree angle to sides. Hold position until aircraft is clear for next manoeuvre.</p>
	<p>22. Dispatch aircraft</p> <p>Perform a standard salute with right hand and/or wand to dispatch the aircraft. Maintain eye contact with flight crew until aircraft has begun to taxi.</p>

¹ For use to hovering helicopters.

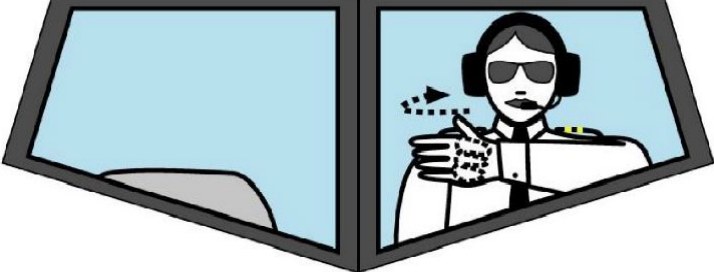



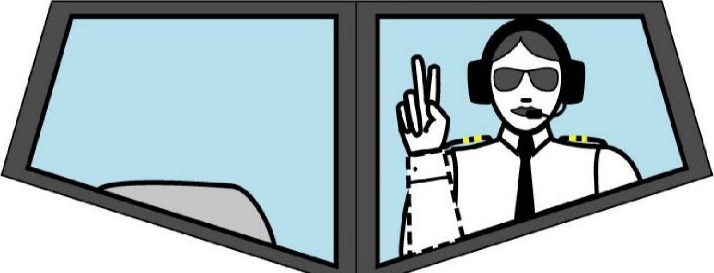
	<p>23. Do not touch controls (technical/servicing communication signal)</p> <p>Extend right arm fully above head and close fist or hold wand in horizontal position; left arm remains at side by knee.</p>
	<p>24. Connect ground power (technical/servicing communication signal)</p> <p>Hold arms fully extended above head; open left hand horizontally and move finger tips of right hand into and touch open palm of left hand (forming a 'T'). At night, illuminated wands can also be used to form the 'T' above head.</p>
	<p>25. Disconnect power (technical/servicing communication signal)</p> <p>Hold arms fully extended above head with finger tips of right hand touching open horizontal palm of left hand (forming a 'T'); then move right hand away from the left. <i>Do not</i> disconnect power until authorised by flight crew. At night, illuminated wands can also be used to form the 'T' above head.</p>

	<p>27. Establish communication via interphone (technical/servicing communication signal)</p> <p>Extend both arms at 90 degrees from body and move hands to cup both ears.</p>
	<p>28. Open/close stairs (technical/servicing communication signal)¹</p> <p>With right arm at side and left arm raised above head at a 45-degree angle, move right arm in a sweeping motion towards top of left shoulder.</p>

¹ This signal is intended mainly for aircraft with the set of integral stairs at the front.

4.2. From the pilot of an aircraft to a signalman/marshaller

4.2.1. These signals shall be used by a pilot in the cockpit with hands plainly visible to the signalman/marshaller, and illuminated as necessary to facilitate observation by the signalman/marshaller.

	<p>(a) Brakes engaged: raise arm and hand, with fingers extended, horizontally in front of face, then clench fist.</p>
	<p>(b) Brakes released: raise arm, with fist clenched, horizontally in front of face, then extend fingers.</p>
	<p>(c) Insert chocks: arms extended, palms outwards, move hands inwards to cross in front of face.</p>
	<p>(d) Remove chocks: hands crossed in front of face, palms outwards, move arms outwards.</p>
	<p>(e) Ready to start engine(s): Raise the appropriate number of fingers on one hand indicating the number of the engine to be started.</p>




4.3. Technical/servicing communication signals


4.3.1. Manual signals shall only be used when verbal communication is not possible with respect to technical/servicing communication signals.

4.3.2. Signalmen/marshalls shall ensure that an acknowledgement is received from the flight crew with respect to technical/servicing communication signals.

5. STANDARD EMERGENCY HAND SIGNALS

5.1. The following hand signals are established as the minimum required for emergency communication between the ARFF incident commander/ARFF firefighters and the cockpit and/or cabin crews of the incident aircraft. ARFF emergency hand signals should be given from the left front side of the aircraft for the cockpit crew.

	<p>1. Recommend evacuation</p> <p>Evacuation recommended based on aircraft rescue and fire-fighting and Incident Commander's assessment of external situation.</p> <p>Arm extended from body, and held horizontal with hand upraised at eye level. Execute beckoning arm motion angled backward. Non-beckoning arm held against body.</p> <p>Night — same with wands.</p>
	<p>2. Recommend stop</p> <p>Recommend evacuation in progress be halted. Stop aircraft movement or other activity in progress.</p> <p>Arms in front of head — Crossed at wrists</p> <p>Night — same with wands.</p>
	<p>3. Emergency contained</p> <p>No outside evidence of dangerous conditions or 'all-clear.'</p> <p>Arms extended outward and down at a 45 degree angle. Arms moved inward below waistline simultaneously until wrists crossed, then extended outward to starting position.</p> <p>Night — same with wands.</p>

	<p>4. Fire</p> <p>Move right-hand in a 'fanning' motion from shoulder to knee, while at the same time pointing with left hand to area of fire.</p> <p>Night — same with wands.</p>
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APPENDIX 2 UNMANNED FREE BALLOONS

1. CLASSIFICATION OF UNMANNED FREE BALLOONS

1.1. Unmanned free balloons shall be classified as (see Figure AP2-1):

- (a) *light*: an unmanned free balloon which carries a payload of one or more packages with a combined mass of less than 4 kg, unless qualifying as a heavy balloon in accordance with (c)(2),(3) or (4); or
- (b) *medium*: an unmanned free balloon which carries a payload of two or more packages with a combined mass of 4 kg or more, but less than 6 kg, unless qualifying as a heavy balloon in accordance with (c)(2), (3) or (4) below; or
- (c) *heavy*: an unmanned free balloon which carries a payload which:
 - (1) has a combined mass of 6 kg or more; or
 - (2) includes a package of 3 kg or more; or
 - (3) includes a package of 2 kg or more with an area density of more than 13 g per square centimetre, determined by dividing the total mass in grams of the payload package by the area in square centimetres of its smallest surface; or
 - (4) uses a rope or other device for suspension of the payload that requires an impact force of 230 N or more to separate the suspended payload from the balloon.

2. GENERAL OPERATING RULES

- 2.1. An unmanned free balloon shall not be operated without authorisation from the State from which the launch is made.
- 2.2. An unmanned free balloon, other than a light balloon used exclusively for meteorological purposes and operated in the manner prescribed by the competent authority, shall not be operated across the territory of another State without authorisation from the other State concerned.
- 2.3. The authorisation referred to in 2.2 shall be obtained prior to the launching of the balloon if there is reasonable expectation, when planning the operation, that the balloon may drift into airspace over the territory of another State. Such authorisation may be obtained for a series of balloon flights or for a particular type of recurring flight, e.g. atmospheric research balloon flights.
- 2.4. An unmanned free balloon shall be operated in accordance with conditions specified by the State of Registry and the State(s) expected to be overflown.
- 2.5. An unmanned free balloon shall not be operated in such a manner that impact of the balloon, or any part thereof, including its payload, with the surface of the earth, creates a hazard to persons or property.
- 2.6. A heavy unmanned free balloon shall not be operated over the high seas without prior coordination with the ANSP(s).

Figure AP2-1

CHARACTERISTICS		PAYLOAD MASS (kilogrammes)					
		1	2	3	4	5	6 or more
ROPE or OTHER SUSPENSION 230 Newtons or MORE		HEAVY					
INDIVIDUAL PAYLOAD PACKAGE	AREA DENSITY more than 13 g/cm ² <div>AREA DENSITY CALCULATION <div>MASS (g)</div><div>Area of smallest surface (cm²)</div></div> AREA DENSITY less than 13 g/cm ²						
COMBINED MASS (if Suspension OR Area density OR Mass of individual package are not factors)		LIGHT		MEDIUM			

3. OPERATING LIMITATIONS AND EQUIPMENT REQUIREMENTS

- 3.1. A heavy unmanned free balloon shall not be operated without authorisation from the ANSP(s) at or through any level below 18 000 m (60 000 ft) pressure-altitude at which:
- (a) there are clouds or obscuring phenomena of more than four oktas coverage; or
 - (b) the horizontal visibility is less than 8 km.

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- 3.2. A heavy or medium unmanned free balloon shall not be released in a manner that will cause it to fly lower than 300 m (1 000 ft) over the congested areas of cities, towns or settlements or an open-air assembly of persons not associated with the operation.
- 3.3. A heavy unmanned free balloon shall not be operated unless:
- (a) it is equipped with at least two payload flight-termination devices or systems, whether automatic or operated by telecommand, that operate independently of each other;
 - (b) for polyethylene zero-pressure balloons, at least two methods, systems, devices, or combinations thereof, that function independently of each other are employed for terminating the flight of the balloon envelope;
 - (c) the balloon envelope is equipped with either a radar reflective device(s) or radar reflective material that will present an echo to surface radar operating in the 200 MHz to 2 700 MHz frequency range, and/or the balloon is equipped with such other devices as will permit continuous tracking by the operator beyond the range of ground-based radar.
- 3.4. A heavy unmanned free balloon shall not be operated under the following conditions:
- (a) in an area where ground-based SSR equipment is in use, unless it is equipped with a secondary surveillance radar transponder, with pressure-altitude reporting capability, which is continuously operating on an assigned code, or which can be turned on when necessary by the tracking station; or
 - (b) in an area where ground-based ADS-B equipment is in use, unless it is equipped with an ADS-B transmitter, with pressure-altitude reporting capability, which is continuously operating or which can be turned on when necessary by the tracking station.
- 3.5. An unmanned free balloon that is equipped with a trailing antenna that requires a force of more than 230 N to break it at any point shall not be operated unless the antenna has coloured pennants or streamers that are attached at not more than 15 m intervals.
- 3.6. A heavy unmanned free balloon shall not be operated below 18 000 m (60 000 ft) pressure-altitude at night or during any other period prescribed by the competent authority, unless the balloon and its attachments and payload, whether or not they become separated during the operation, are lighted.
- 3.7. A heavy unmanned free balloon that is equipped with a suspension device (other than a highly conspicuously coloured open parachute) more than 15 m long shall not be operated during night below 18 000 m (60 000 ft) pressure-altitude unless the suspension device is coloured in alternate bands of high conspicuity colours or has coloured pennants attached.

4. TERMINATION

- 4.1. The operator of a heavy unmanned free balloon shall activate the appropriate termination devices required by 3.3(a) and (b):
- (a) when it becomes known that weather conditions are less than those prescribed for the operation;
 - (b) if a malfunction or any other reason makes further operation hazardous to air traffic or to persons or property on the surface; or

- (c) prior to unauthorised entry into the airspace over another State's territory.

5. FLIGHT NOTIFICATION

5.1. Pre-flight notification

5.1.1. Early notification of the intended flight of an unmanned free balloon in the medium or heavy category shall be made to the appropriate air traffic services unit not less than seven days before the date of the intended flight.

5.1.2. Notification of the intended flight shall include such of the following information as may be required by the appropriate air traffic services unit:

- (a) balloon flight identification or project code name;
- (b) balloon classification and description;
- (c) SSR code, aircraft address or NDB frequency as applicable;
- (d) operator's name and telephone number;
- (e) launch site;
- (f) estimated time of launch (or time of commencement and completion of multiple launches);
- (g) number of balloons to be launched and the scheduled interval between launches (if multiple launches);
- (h) expected direction of ascent;
- (i) cruising level(s) (pressure-altitude);
- (j) the estimated elapsed time to pass 18 000 m (60 000 ft) pressure-altitude or to reach cruising level if at or below 18 000 m (60 000 ft), together with the estimated location. If the operation consists of continuous launchings, the time to be included shall be the estimated time at which the first and the last in the series will reach the appropriate level (e.g. 122136Z–130330Z);
- (k) the estimated date and time of termination of the flight and the planned location of the impact/recovery area. In the case of balloons carrying out flights of long duration, as a result of which the date and time of termination of the flight and the location of impact cannot be forecast with accuracy, the term 'long duration' shall be used. If there is to be more than one location of impact/recovery, each location shall be listed together with the appropriate estimated time of impact. If there is to be a series of continuous impacts, the time to be included shall be the estimated time of the first and the last in the series (e.g. 070330Z–072300Z).

5.1.3. Any changes in the pre-launch information notified in accordance with point 5.1.2 shall be forwarded to the ATS unit concerned not less than 6 hours before the estimated time of launch, or in the case of solar or cosmic disturbance investigations involving a critical time element, not less than 30 minutes before the estimated time of the commencement of the operation.

5.2. Notification of launch

5.2.1. Immediately after a medium or heavy unmanned free balloon is launched the operator shall notify the appropriate air traffic services unit of the following:

- (a) balloon flight identification;
- (b) launch site;
- (c) actual time of launch;
- (d) estimated time at which 18 000 m (60 000 ft) pressure-altitude will be passed, or the estimated time at which the cruising level will be reached if at or below 18 000 m (60 000 ft), and the estimated location; and
- (e) any changes to the information previously notified in accordance with 5.1.2(g) and (h).

5.3. Notification of cancellation

5.3.1. The operator shall notify the appropriate air traffic services unit immediately it is known that the intended flight of a medium or heavy unmanned free balloon, previously notified in accordance with paragraph 5.1, has been cancelled.

6. POSITION RECORDING AND REPORTS

- 6.1. The operator of a heavy unmanned free balloon operating at or below 18 000 m (60 000 ft) pressure-altitude shall monitor the flight path of the balloon and forward reports of the balloon's position as requested by air traffic services. Unless air traffic services require reports of the balloon's position at more frequent intervals, the operator shall record the position every 2 hours.
- 6.2. The operator of a heavy unmanned free balloon operating above 18 000 m (60 000 ft) pressure-altitude shall monitor the flight progress of the balloon and forward reports of the balloon's position as requested by air traffic services. Unless air traffic services require reports of the balloon's position at more frequent intervals, the operator shall record the position every 24 hours.
- 6.3. If a position cannot be recorded in accordance with 6.1 and 6.2, the operator shall immediately notify the appropriate air traffic services unit. This notification shall include the last recorded position. The appropriate air traffic services unit shall be notified immediately when tracking of the balloon is re-established.
- 6.4. One hour before the beginning of planned descent of a heavy unmanned free balloon, the operator shall forward to the appropriate ATS unit the following information regarding the balloon:
 - (a) the current geographical position;
 - (b) the current level (pressure-altitude);
 - (c) the forecast time of penetration of 18 000 m (60 000 ft) pressure-altitude, if applicable;
 - (d) the forecast time and location of ground impact.
- 6.5. The operator of a heavy or medium unmanned free balloon shall notify the appropriate air traffic services unit when the operation is ended.

APPENDIX 3 TABLE OF CRUISING LEVELS

1.1. The cruising levels to be observed are as follows:

TRACK ¹											
From 000 degrees to 179 degrees						From 180 degrees to 359 degrees					
IFR Flights			VFR Flights			IFR Flights			VFR Flights		
Level			Level			Level			Level		
FL	Feet	Metres	FL	Feet	Metres	FL	Feet	Metres	FL	Feet	Metres
010	1000	300	—	—	—	020	2000	600	—	—	—
030	3000	900	035	3500	1050	040	4000	1200	045	4500	1350
050	5000	1500	055	5500	1700	060	6000	1850	065	6500	2000
070	7000	2150	075	7500	2300	080	8000	2450	085	8500	2600
090	9000	2750	095	9500	2900	100	10000	3050	105	10500	3200
110	11000	3350	115	11500	3500	120	12000	3650	125	12500	3800
130	13000	3950	135	13500	4100	140	14000	4250	145	14500	4400
150	15000	4550	155	15500	4700	160	16000	4900	165	16500	5050
170	17000	5200	175	17500	5350	180	18000	5500	185	18500	5650
190	19000	5800	195	19500	5950	200	20000	6100	205	20500	6250
210	21000	6400	215	21500	6550	220	22000	6700	225	22500	6850
230	23000	7000	235	23500	7150	240	24000	7300	245	24500	7450
250	25000	7600	255	25500	7750	260	26000	7900	265	26500	8100
270	27000	8250	275	27500	8400	280	28000	8550	285	28500	8700
290	29000	8850				300	30000	9150			
310	31000	9450				320	32000	9750			
330	33000	10050				340	34000	10350			
350	35000	10650				360	36000	10950			
370	37000	11300				380	38000	11600			
390	39000	11900				400	40000	12200			
410	41000	12500				430	43000	13100			
450	45000	13700				470	47000	14350			
490	49000	14950				510	51000	15550			
etc.	etc.	etc.				etc.	etc.	etc.			

¹ Magnetic track, or in polar areas at latitudes higher than 70 degrees and within such extensions to those areas as may be prescribed by the competent authorities, grid tracks as determined by a network of lines parallel to the Greenwich Meridian superimposed on a polar stereographic chart in which the direction towards the North Pole is employed as the Grid North.

APPENDIX 4 ATS AIRSPACE CLASSES – SERVICES PROVIDED AND FLIGHT REQUIREMENTS

(SERA.6001 and SERA.5025(b) refers)

Class	Type of flight	Separation provided	Service provided	Speed limitation ¹	Radio communication capability requirement	Continuous two-way air-ground voice communication required	Subject to an ATC clearance
A	IFR only	All aircraft	Air traffic control service	Not applicable	Yes	Yes	Yes
B	IFR	All aircraft	Air traffic control service	Not applicable	Yes	Yes	Yes
	VFR	All aircraft	Air traffic control service	Not applicable	Yes	Yes	Yes
C	IFR	IFR from IFR IFR from VFR	Air traffic control service	Not applicable	Yes	Yes	Yes
	VFR	VFR from IFR	(1) Air traffic control service for separation from IFR; (2) Air traffic control service, VFR/VFR traffic information (and traffic avoidance advice on request)	250 kts IAS below 3 050 m (10 000 ft) AMSL	Yes	Yes	Yes
D	IFR	IFR from IFR	Air traffic control service, traffic information about VFR flights (and traffic avoidance advice on request)	250 kts IAS below 3 050 m (10 000 ft) AMSL	Yes	Yes	Yes
	VFR	Nil	Air traffic control service, IFR/VFR and VFR/VFR traffic information (and traffic avoidance advice on request)	250 kts IAS below 3 050 m (10 000 ft) AMSL	Yes	Yes	Yes
E	IFR	IFR from IFR	Air traffic control service and, as far as practical, traffic information about VFR flights	250 kts IAS below 3 050 m (10 000 ft) AMSL	Yes	Yes	Yes
	VFR	Nil	Traffic information as far as practical	250 kts IAS below 3 050 m (10 000 ft) AMSL	No ²	No ²	No

¹ When the level of the transition altitude is lower than 3 050 m (10 000 ft) AMSL, FL 100 should be used in lieu of 10 000 ft. Competent authority may also exempt aircraft types, which for technical or safety reasons, cannot maintain this speed.

² Pilots shall maintain continuous air-ground voice communication watch and establish two-way communication, as necessary, on the appropriate communication channel in RMZ.

Class	Type of flight	Separation provided	Service provided	Speed limitation ¹	Radio communication capability requirement	Continuous two-way air-ground voice communication required	Subject to an ATC clearance
F	IFR	IFR from IFR as far as practical	Air traffic advisory service; flight information service if requested	250 kts IAS below 3 050 m (10 000 ft) AMSL	Yes ³	No ³	No
	VFR	Nil	Flight information service if requested	250 kts IAS below 3 050 m (10 000 ft) AMSL	No ²	No ²	No
G	IFR	Nil	Flight information service if requested	250 kts IAS below 3 050 m (10 000 ft) AMSL	Yes ²	No ²	No
	VFR	Nil	Flight information service if requested	250 kts IAS below 3 050 m (10 000 ft) AMSL	No ²	No ²	No

¹ When the level of the transition altitude is lower than 3 050 m (10 000 ft) AMSL, FL 100 should be used in lieu of 10 000 ft. Competent authority may also exempt aircraft types, which for technical or safety reasons, cannot maintain this speed.

² Pilots shall maintain continuous air-ground voice communication watch and establish two-way communication, as necessary, on the appropriate communication channel in RMZ.

³ Air-ground voice communications mandatory for flights participating in the advisory service. Pilots shall maintain continuous air-ground voice communication watch and establish two-way communication, as necessary, on the appropriate communication channel in RMZ.

APPENDIX 5 TECHNICAL SPECIFICATIONS RELATED TO AIRCRAFT OBSERVATIONS AND REPORTS BY VOICE COMMUNICATIONS

A. REPORTING INSTRUCTIONS

MODEL AIREP SPECIAL

ITEM	PARAMETER	TRANSMIT IN TELEPHONY as appropriate
—	Message- type designator — special air-report	[AIREP] SPECIAL
Section 1	1 Aircraft identification	(<i>aircraft identification</i>)
	2 Position	POSITION (<i>latitude and longitude</i>) OVER (<i>significant point</i>) ABEAM (<i>significant point</i>) (<i>significant point</i>) (<i>bearing</i>) (<i>distance</i>)
	3 Time	(<i>time</i>)
	4 Level	FLIGHT LEVEL (<i>number</i>) or (<i>number</i>) METRES or FEET CLIMBING TO FLIGHT LEVEL (<i>number</i>) or (<i>number</i>) METRES or FEET DESCENDING TO FLIGHT LEVEL (<i>number</i>) or (<i>number</i>) METRES or FEET
	5 Next position and estimated time over	(<i>position</i>) (<i>time</i>)
	6 Ensuing significant point	(<i>position</i>) NEXT
Section 2	7 Estimated time of arrival	(<i>aerodrome</i>) (<i>time</i>)
	8 Endurance	ENDURANCE (<i>hours and minutes</i>)
Section 3	9 Phenomenon encountered or observed prompting a special air-report: — Moderate turbulence — Severe turbulence — Moderate icing — Severe icing — Severe mountain wave — Thunderstorms without hail — Thunderstorms with hail — Heavy dust/sandstorm — Volcanic ash cloud — Pre-eruption volcanic activity or volcanic eruption	TURBULENCE MODERATE TURBULENCE SEVERE ICING MODERATE ICING SEVERE MOUTAINWAVE SEVERE THUNDERSTORMS THUNDERSTORMS WITH HAIL DUSTSTORM or SANDSTORM HEAVY VOLCANIC ASH CLOUD PRE-ERUPTION VOLCANIC ACTIVITY or VOLCANIC ERUPTION

1. CONTENTS OF AIR-REPORTS

1.1. Position reports and special air-reports

- 1.1.1. Section 1 of the model set out in point A is obligatory for position reports and special air-reports, although Items 5 and 6 thereof may be omitted. Section 2 shall be added, in whole or in part, only when so requested by the operator or its designated representative, or when deemed necessary by the pilot-in-command. Section 3 shall be included in special air-reports.
- 1.1.2. Condition prompting the issuance of a special air-report are to be selected from the list presented in point **SERA.12005(a)**.
- 1.1.3. In the case of special air-reports containing information on volcanic activity, a post-flight report shall be made using the volcanic activity reporting form (Model VAR) set out in point B. All elements which are observed shall be recorded and indicated respectively in the appropriate places on the form Model VAR.
- 1.1.4. Special air-reports shall be issued as soon as practicable after a phenomenon calling for a special air-report has been observed.

2. DETAILED REPORTING INSTRUCTIONS

- 2.1. Items of an air-report shall be reported in the order in which they are listed in the model AIREP SPECIAL form.

MESSAGE TYPE DESIGNATOR. Report 'SPECIAL' for a special air-report.

Section 1

Item 1 — AIRCRAFT IDENTIFICATION. Report the aircraft radiotelephony call sign as prescribed in point **SERA.14050**.

Item 2 — POSITION. Report position in latitude (degrees as 2 numerics or degrees and minutes as 4 numerics, followed by 'North' or 'South') and longitude (degrees as 3 numerics or degrees and minutes as 5 numerics followed by 'East' or 'West'), or as a significant point identified by a coded designator (2 to 5 characters), or as a significant point followed by magnetic bearing (3 numerics) and distance in nautical miles from the point. Precede significant point with 'ABEAM', if applicable.

Item 3 — TIME. Report time in hours and minutes UTC (4 numerics) unless reporting time in minutes past the hour (2 numerics) is prescribed on the basis of regional air navigation agreements. The time reported must be the actual time of the aircraft at the position and not the time of origination or transmission of the report. Time shall always be reported in hours and minutes UTC when issuing a special air-report.

Item 4 — FLIGHT LEVEL OR ALTITUDE. Report flight level by 3 numerics when on standard pressure altimeter setting. Report altitude in metres followed by 'METRES' or in feet followed by 'FEET' when on QNH. Report 'CLIMBING' (followed by the level) when climbing or 'DESCENDING' (followed by the level) when descending to a new level after passing the significant point.

Item 5 — NEXT POSITION AND ESTIMATED TIME OVER. Report the next reporting point and the estimated time over such reporting point, or report the estimated position that will be reached one hour later, according to the position reporting procedures in force. Use the data conventions specified in Item 2 for position.

Report the estimated time over this position. Report time in hours and minutes UTC (4 numerics) unless reporting time in minutes past the hour (2 numerics) as prescribed by regional air navigation agreements.

Item 6 — ENSUING SIGNIFICANT POINT. Report the ensuing significant point following the ‘next position and estimated time over’.

Section 2

Item 7 — ESTIMATED TIME OF ARRIVAL. Report the name of the aerodrome of the first intended landing, followed by the estimated time of arrival at this aerodrome in hours and minutes UTC (4 numerics).

Item 8 — ENDURANCE. Report ‘ENDURANCE’ followed by fuel endurance in hours and minutes (4 numerics).

Section 3

Item 9 — PHENOMENON PROMPTING A SPECIAL AIR-REPORT. Report one of the following phenomena encountered or observed:

- moderate turbulence as ‘TURBULENCE MODERATE’, and
- severe turbulence as ‘TURBULENCE SEVERE’.

The following specifications apply:

- Moderate - Conditions in which moderate changes in aircraft attitude and/or altitude may occur but the aircraft remains in positive control at all times. Usually, small variations in airspeed. Changes in accelerometer readings of 0,5 g to 1,0 g at the aircraft's centre of gravity. Difficulty in walking. Occupants feel strain against seat belts. Loose objects move about.
- Severe - Conditions in which abrupt changes in aircraft attitude and/or altitude occur; aircraft may be out of control for short periods. Usually, large variations in airspeed. Changes in accelerometer readings greater than 1,0 g at the aircraft's centre of gravity. Occupants are forced violently against seat belts. Loose objects are tossed about.
- moderate icing as ‘ICING MODERATE’, severe icing as ‘ICING SEVERE’;
 - The following specifications apply:
 - Moderate - Conditions in which change of heading and/or altitude may be considered desirable.
 - Severe - Conditions in which immediate change of heading and/or altitude is considered essential.
- Severe mountain wave as ‘MOUNTAIN WAVE SEVERE’;

The following specification applies:

- Severe - Conditions in which the accompanying downdraft is 3,0 m/s (600 ft/min) or more and/or severe turbulence is encountered.
- Thunderstorm without hail as ‘THUNDERSTORM’, thunderstorm with hail as ‘THUNDERSTORM WITH HAIL’;

The following specification applies:

Only report those thunderstorms which are:

- obscured in haze, or
- embedded in cloud, or
- widespread, or
- forming a squall line.
- Heavy duststorm or sandstorm as ‘DUSTSTORM HEAVY’ or ‘SANDSTORM HEAVY’;
- Volcanic ash cloud as ‘VOLCANIC ASH CLOUD’;
- Pre-eruption volcanic activity or a volcanic eruption as ‘PRE-ERUPTION VOLCANIC ACTIVITY’ or ‘VOLCANIC ERUPTION’;

The following specification applies:

‘Pre-eruption volcanic activity’ in this context means unusual and/or increasing volcanic activity which could presage a volcanic eruption.

- 2.2. Information recorded on the volcanic activity reporting form (Model VAR) is not for transmission by RTF but, on arrival at an aerodrome, is to be delivered without delay by the operator or a flight crew member to the aerodrome meteorological office. If such an office is not easily accessible, the completed form shall be delivered in accordance with local arrangements agreed upon between MET and ATS providers and the aircraft operator.

3. FORWARDING OF METEOROLOGICAL INFORMATION RECEIVED BY VOICE COMMUNICATIONS

When receiving special air-reports, ATS units shall forward these air-reports without delay to the associated meteorological watch office (MWO). In order to ensure assimilation of air-reports in ground-based automated systems, the elements of such reports shall be transmitted using the data conventions specified below and in the order prescribed.

- ADDRESSEE. Record the station called and, when necessary, relay required.
- MESSAGE TYPE DESIGNATOR. Record ‘ARS’ for a special air-report.
- AIRCRAFT IDENTIFICATION. Record the aircraft identification using the data convention specified for Item 7 of the flight plan, without a space between the operator's designator and the aircraft registration or flight identification, if used.

Section 1

Item 0 — POSITION. Record position in latitude (degrees as 2 numerics or degrees and minutes as 4 numerics, followed, without a space, by N or S) and longitude (degrees as 3 numerics or degrees and minutes as 5 numerics, followed without a space by E or W), or as a significant point identified by a coded designator (2 to 5 characters), or as a significant point followed by magnetic bearing (3 numerics) and distance in nautical miles (3 numerics) from the point. Precede significant point with ‘ABEAM’, if applicable.

Item 1 — TIME. Record time in hours and minutes UTC (4 numerics).

Item 2 — FLIGHT LEVEL OR ALTITUDE. Record ‘F’ followed by 3 numerics (e.g. ‘F310’) when a flight level is reported. Record altitude in metres followed by ‘M’ or in feet followed by ‘FT’ when an altitude is reported. Record ‘ASC’ (level) when climbing or ‘DES’

(level) when descending.

Section 2

Item 9 — PHENOMENON PROMPTING A SPECIAL AIR-REPORT. Record the phenomenon reported as follows:

- moderate turbulence as 'TURB MOD',
- severe turbulence as 'TURB SEV',
- moderate icing as 'ICE MOD',
- severe icing as 'ICE SEV',
- severe mountain wave as 'MTW SEV',
- thunderstorm without hail as 'TS',
- thunderstorm with hail as 'TSGR',
- heavy duststorm or sandstorm as 'HVV SS',
- volcanic ash cloud as 'VA CLD',
- pre-eruption volcanic activity or a volcanic eruption as 'VA',
- hail as 'GR',
- cumulonimbus clouds as 'CB'.
- TIME TRANSMITTED. Record only when Section 3 is transmitted.

4. SPECIFIC PROVISIONS RELATED TO REPORTING WIND SHEAR AND VOLCANIC ASH

4.1. Reporting of wind shear

- 4.1.1. When reporting aircraft observations of wind shear encountered during the climb-out and approach phases of flight, the aircraft type shall be included.
- 4.1.2. Where wind shear conditions in the climb-out or approach phases of flight were reported or forecast but not encountered, the pilot-in-command shall advise the appropriate ATS unit as soon as practicable unless the pilot-in-command is aware that the appropriate ATS unit has already been so advised by a preceding aircraft.

4.2. Post-flight reporting of volcanic activity

- 4.2.1. On arrival of a flight at an aerodrome, the completed report of volcanic activity shall be delivered by the aircraft operator or a flight crew member, without delay, to the aerodrome meteorological office, or if such office is not easily accessible to arriving flight crew members, the completed form shall be dealt with in accordance with local arrangements agreed upon between MET and ATS providers and the aircraft operator.
- 4.2.2. The completed report of volcanic activity received by an aerodrome meteorological office shall be transmitted without delay to the meteorological watch office responsible for the provision of meteorological watch for the flight information region in which the volcanic activity was observed.

B. SPECIAL AIR-REPORT OF VOLCANIC ACTIVITY FORM (MODEL VAR)

MODEL VAR: to be used for post- flight reporting

VOLCANIC ACTIVITY REPORT

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

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