CIVIL AVIATION DIRECTIVE – 2

RULES OF THE AIR

CIVIL AVIATION AUTHORITY OF MALAYSIA

ISSUE 01
REVISION 01 – 15TH NOVEMBER 2022

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Introduction

In exercise of the powers conferred by section 24O of the Civil Aviation Act 1969 [*Act 3*], the Chief Executive Officer makes this Civil Aviation Directive 2 – Rules of the Air, pursuant to Regulation 77 and 81 of the Malaysian Civil Aviation Regulations (MCAR 2016).

This CAD contains the standards and requirements and procedures pertaining to rules of the air and is compliant with Malaysian Civil Aviation Regulations. The standards and requirements in this CAD are based mainly on the Standards and Recommended Practices (SARPs) contained in the International Civil Aviation Organisation (ICAO) Annex 2 – Rules of the Air.

This Civil Aviation Directives 2 – Rules of the Air (CAD 2 – Rules of the Air) is published by the Chief Executive Officer under Section 24O of the Civil Aviation Act 1969 [*Act 3*] and come into operation on 15 November 2022.

Non-compliance with this CAD

Any person who contravenes any provision in this CAD commits an offence and shall on conviction be liable to the punishments under Section 24O (2) of the Civil Aviation Act 1969 [*Act 3*] and/or under Malaysia Civil Aviation Regulation 2016.

(Datuk Captain Chester Voo Chee Soon)
Chief Executive Officer
Civil Aviation Authority of Malaysia

Civil Aviation Directive Components and Editorial Practices

This Civil Aviation Directive is made up of the following components and are defined as follows:

Standards: Usually preceded by words such as “shall” or “must”, are any specification for physical characteristics, configuration, performance, personnel or procedure, where uniform application is necessary for the safety or regularity of air navigation and to which Operators must conform. In the event of impossibility of compliance, notification to the CAAM is compulsory.

Recommended Practices: Usually preceded by the words such as “should” or “may”, are any specification for physical characteristics, configuration, performance, personnel or procedure, where the uniform application is desirable in the interest of safety, regularity or efficiency of air navigation, and to which Operators will endeavour to conform.

Appendices: Material grouped separately for convenience but forms part of the Standards and Recommended Practices stipulated by the CAAM.

Definitions: Terms used in the Standards and Recommended Practices which are not self-explanatory in that they do not have accepted dictionary meanings. A definition does not have an independent status but is an essential part of each Standard and Recommended Practice in which the term is used, since a change in the meaning of the term would affect the specification.

Tables and Figures: These add to or illustrate a Standard or Recommended Practice and which are referred to therein, form part of the associated Standard or Recommended Practice and have the same status.

Notes: Included in the text, where appropriate, Notes give factual information or references bearing on the Standards or Recommended Practices in question but not constituting part of the Standards or Recommended Practices;

Attachments: Material supplementary to the Standards and Recommended Practices or included as a guide to their application.

It is to be noted that some Standards in this Civil Aviation Directive incorporates, by reference, other specifications having the status of Recommended Practices. In such cases, the text of the Recommended Practice becomes part of the Standard.

The units of measurement used in this CAD are in accordance with the International System of Units (SI) as specified in CAD 5. Where CAD 5 permits the use of non-SI alternative units, these are shown in parentheses following the basic units. Where two sets of units are quoted it must not be assumed that the pairs of values are equal and interchangeable. It may, however, be inferred that an equivalent level of safety is achieved when either set of units is used exclusively.

Any reference to a portion of this CAD, which is identified by a number and/or title, includes all subdivisions of that portion.

Throughout this Civil Aviation Directive, the use of the male gender should be understood to include male and female persons.

Record of Revisions

Revisions to this CAD shall be made by authorised personnel only. After inserting the revision, enter the required data in the revision sheet below. The *'Initials'* has to be signed off by the personnel responsible for the change.

ISS/REV No.	Revision Date	Revision Details	Initials
ISS01/REV01	15th November 2022	Refer to summary highlights	CAAM

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Summary of Changes

ISS/REV no.	Item no.	Revision Details
ISS01/REV01	Para 3.1.1.1	The revision is made to add a note, referring to CAD 2001
	Para 3.1.8.2	The revision is made to cross-reference with the requirement established in CAD 2001
	Para 3.1.9.2	The revision is made to cross-reference with the requirement established in CAD 6011
	Para 3.2.3.5	The revision is made to correct the paragraph and remove the note attached to it
	Para 3.6.2.2	To correct the paragraph
	Para 3.6.3.1.1	The revision is made to note referencing CAD 1101
	Para 3.7.1	The revision is made to correct Note 3 and Note 4 referencing CAD 1101 and CAD 6401

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Table of Contents

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1 General

1.1 Citation

1.1.1. These Directives are the Civil Aviation Directive 2 – Rules of the Air (CAD 2 – Rules of the Air), Issue 01/Revision 01, and comes into operation on 15 November 2022.

1.1.2. This Directive contains the standards, requirements and procedures pertaining to the provision of Rules of the Air. The standards and requirements in this Directive are based mainly on standards and recommended practices (SARPs) stipulated in International Civil Aviation Organisation (ICAO) Annex 2 to the Chicago Convention Rules of the Air.

1.2 Applicability

1.2.1. The standards specified in this Directive applies to every person and aircraft.

1.3 Revocation

1.3.1. This CAD revokes Civil Aviation Directive 2 – Rules of the Air (CAD 2 – Rules of the Air), Issue 01/Revision 00, dated 1 May 2021.

1.4 Definitions

Note 1. — Throughout the text of this CAD the term "service" is used as an abstract noun to designate functions, or service rendered; the term "unit" is used to designate a collective body performing a service.

Note 2. — The designation (RR) in these definitions indicates a definition which has been extracted from the Radio Regulations of the International Telecommunication Union (ITU) (see Handbook on Radio Frequency Spectrum Requirements for Civil Aviation including statement of approved ICAO policies (ICAO Doc 9718).

When the following terms are used in the International Standards for Rules of the Air, they have the following meanings:

***Acrobatic flight** means* manoeuvres intentionally performed by an aircraft involving an abrupt change in its attitude, an abnormal attitude, or an abnormal variation in speed.

***ADS-C agreement** means* a reporting plan which establishes the conditions of ADS-C data reporting (i.e. data required by the air traffic services unit and frequency of ADS-C reports which have to be agreed to prior to using ADS-C in the provision of air traffic services).

Note. — The terms of the agreement will be exchanged between the ground system and the aircraft by means of a contract, or a series of contracts.

Advisory airspace means an airspace of defined dimensions, or designated route, within which air traffic advisory service is available.

Advisory route means a designated route along which air traffic advisory service is available.

Aerodrome means a defined area on land or water (including any buildings, installations and equipment) intended to be used either wholly or in part for the arrival, departure and surface movement of aircraft.

Aerodrome control service means Air traffic control service for aerodrome traffic.

Aerodrome control tower means a unit established to provide air traffic control service to aerodrome traffic.

Aerodrome traffic means all traffic on the manoeuvring area of an aerodrome and all aircraft flying in the vicinity of an aerodrome.

Note. — An aircraft is in the vicinity of an aerodrome when it is in, entering or leaving an aerodrome traffic circuit.

Aerodrome traffic zone means an airspace of defined dimensions established around an aerodrome for the protection of aerodrome traffic.

Aeronautical Information Publication (AIP) means a publication issued by or with the authority of a State and containing aeronautical information of a lasting character essential to air navigation.

Aeronautical station (RR S1.81) means a land station in the aeronautical mobile service. In certain instances, an aeronautical station may be located, for example, on board ship or on a platform at sea.

Aeroplane means a power-driven heavier-than-air aircraft, deriving its lift in flight chiefly from aerodynamic reactions on surfaces which remain fixed under given conditions of flight.

Airborne collision avoidance system (ACAS) means an aircraft system based on secondary surveillance radar (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.

Aircraft. means any machine that can derive support in the atmosphere from the reactions of the air other than the reactions of the air against the earth's surface.

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

Air-taxiing means a Movement of a helicopter/VTOL above the surface of an aerodrome, normally in ground effect and at a ground speed normally less than 37 km/h (20 kt).

Note. — The actual height may vary, and some helicopters may require air-taxiing above 8 m (25 ft) AGL to reduce ground effect turbulence or provide clearance for cargo slingloads.

Air traffic means all aircraft in flight or operating on the manoeuvring area of an aerodrome.

Air traffic advisory service means a service provided within advisory airspace to ensure separation, in so far as practical, between aircraft which are operating on IFR flight plans.

Air traffic control clearance is an authorisation for an aircraft to proceed under conditions specified by an air traffic control unit.

Note 1. — For convenience, the term "air traffic control clearance" is frequently abbreviated to "clearance" when used in appropriate contexts.

Note 2. — The abbreviated term "clearance" may be prefixed by the words "taxi", "take- off", "departure", "en route", "approach" or "landing" to indicate the particular portion of flight to which the air traffic control clearance relates.

Air traffic control service is a service provided for the purpose of:

a) preventing collisions:

1) between aircraft, and

2) on the manoeuvring area between aircraft and obstructions, and

b) expediting and maintaining an orderly flow of air traffic.

Air traffic control unit is a generic term meaning variously, area control centre, approach control unit or aerodrome control tower.

Air traffic service is a generic term meaning variously, flight information service, alerting service, air traffic advisory service, air traffic control service (area control service, approach control service or aerodrome control service).

Air traffic services airspaces are airspaces of defined dimensions, alphabetically designated, within which specific types of flights may operate and for which air traffic services and rules of operation are specified.

Note. — ATS airspaces are classified as Class A to G.

Air traffic services reporting office is a unit established for the purpose of receiving reports concerning air traffic services and flight plans submitted before departure.

Note. — An air traffic services reporting office may be established as a separate unit or combined with an existing unit, such as another air traffic services unit, or a unit of the aeronautical information service.

Air traffic services unit is a generic term meaning variously, air traffic control unit, flight information centre or air traffic services reporting office.

Airway is a control area or portion thereof established in the form of a corridor.

Alerting service is a service provided to notify appropriate organisations regarding aircraft in need of search and rescue aid, and assist such organisations as required.

Alternate aerodrome means an aerodrome to which an aircraft may proceed when it becomes either impossible or inadvisable to proceed to or to land at the aerodrome of intended landing where the necessary services and facilities are available, where aircraft performance requirements can be met and which is operational at the expected time of use. Alternate aerodromes include the following:

Take-off alternate. An alternate aerodrome at which an aircraft would be able to land should this become necessary shortly after take-off and it is not possible to use the aerodrome of departure.

En-route alternate. An alternate aerodrome at which an aircraft would be able to land in the event that a diversion becomes necessary while en route.

Destination alternate. An alternate aerodrome at which an aircraft would be able to land should it become either impossible or inadvisable to land at the aerodrome of intended landing.

Note. — The aerodrome from which a flight departs may also be an en-route or a destination alternate aerodrome for that flight.

Altitude means the vertical distance of a level, a point or an object considered as a point, measured from mean sea level (MSL).

Approach control service means an Air traffic control service for arriving or departing controlled flights.

Approach control unit means a unit established to provide air traffic control service to controlled flights arriving at, or departing from, one or more aerodromes.

Appropriate ATS authority means the relevant authority designated by the State responsible for providing air traffic services in the airspace concerned.

Appropriate authority.

a) *Regarding flight over the high seas:* The relevant authority of the State of Registry.

b) *Regarding flight other than over the high seas:* The relevant authority of the State having sovereignty over the territory being overflown.

Apron means a defined area, on a land aerodrome, intended to accommodate aircraft for purposes of loading or unloading passengers, mail or cargo, fuelling, parking or maintenance.

Area control centre means a unit established to provide air traffic control service to controlled flights in control areas under its jurisdiction.

Area control service means an air traffic control service for controlled flights in control areas.

Area navigation (RNAV) is a method of navigation which permits aircraft operation on any desired flight path within the coverage of ground- or space-based navigation aids or within the limits of the capability of self-contained aids, or a combination of these.

Note. — Area navigation includes performance-based navigation as well as other operations that do not meet the definition of performance-based navigation.

ATS route is a specified route designed for channelling the flow of traffic as necessary for the provision of air traffic services.

Note 1. — The term "ATS route" is used to mean variously, airway, advisory route, controlled or uncontrolled route, arrival or departure route, etc.

Note 2. — An ATS route is defined by route specifications which include an ATS route designator, the track to or from significant points (waypoints), distance between significant points, reporting requirements and, as determined by the appropriate ATS authority, the lowest safe altitude.

Automatic dependent surveillance — broadcast (ADS-B) is a means by which aircraft, aerodrome vehicles and other objects can automatically transmit and/or receive data such as identification, position and additional data, as appropriate, in a broadcast mode via a data link.

Automatic dependent surveillance — contract (ADS-C) is a means by which the terms of an ADS-C agreement will be exchanged between the ground system and the aircraft, via a data link, specifying under what conditions ADS-C reports would be initiated, and what data would be contained in the reports.

Note. — The abbreviated term "ADS contract" is commonly used to refer to ADS event contract, ADS demand contract, ADS periodic contract or an emergency mode.

Ceiling is the height above the ground or water of the base of the lowest layer of cloud below 6 000 metres (20 000 feet) covering more than half the sky.

Changeover point means the point at which an aircraft navigating on an ATS route segment defined by reference to very high frequency omnidirectional radio ranges is expected to transfer its primary navigational reference from the facility behind the aircraft to the next facility ahead of the aircraft.

Note. — Changeover points are established to provide the optimum balance in respect of signal strength and quality between facilities at all levels to be used and to ensure a common source of azimuth guidance for all aircraft operating along the same portion of a route segment.

Clearance limit means the point to which an aircraft is granted an air traffic control clearance.

Command and control (C2) link means the data link between the remotely piloted aircraft and the remote pilot station for the purposes of managing the flight.

Control area means a controlled airspace extending upwards from a specified limit above the earth.

Controlled aerodrome means an aerodrome at which air traffic control service is provided to aerodrome traffic.

Note. — The term "controlled aerodrome" indicates that air traffic control service is provided to aerodrome traffic but does not necessarily imply that a control zone exists.

Controlled airspace means an airspace of defined dimensions within which air traffic control service is provided in accordance with the airspace classification.

Note. — Controlled airspace is a generic term which covers ATS airspace Classes A, B, C, D and E as described in CAD 11, 2.6.

Controlled flight means any flight which is subject to an air traffic control clearance.

Controller-pilot data link communications (CPDLC) is a means of communication between controller and pilot, using data link for ATC communications.

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

Cruise climb means an aeroplane cruising technique resulting in a net increase in altitude as the aeroplane mass decreases.

Cruising level means a level maintained during a significant portion of a flight.

Current flight plan means the flight plan, including changes, if any, brought about by subsequent clearances.

Danger area means an airspace of defined dimensions within which activities dangerous to the flight of aircraft may exist at specified times.

Data link communications means a form of communication intended for the exchange of messages via a data link.

Detect and avoid means the capability to see, sense or detect conflicting traffic or other hazards and take the appropriate action.

Estimated off-block time means the estimated time at which the aircraft will commence movement associated with departure.

Estimated time of arrival means, for IFR flights, the time at which it is estimated that the aircraft will arrive over that designated point, defined by reference to navigation aids, from which it is intended that an instrument approach procedure will be commenced, or, if no navigation aid is associated with the aerodrome, the time at which the aircraft will arrive over the aerodrome. For VFR flights, the time at which it is estimated that the aircraft will arrive over the aerodrome.

Expected approach time means the time at which ATC expects that an arriving aircraft, following a delay, will leave the holding fix to complete its approach for a landing.

Note. — The actual time of leaving the holding fix will depend upon the approach clearance.

Filed flight plan means the flight plan as filed with an ATS unit by the pilot or a designated representative, without any subsequent changes.

Flight crew member means a licensed crew member charged with duties essential to the operation of an aircraft during a flight duty period.

Flight information centre means a unit established to provide flight information service and alerting service.

Flight information region means an airspace of defined dimensions within which flight information service and alerting service are provided.

Flight information service means a service provided for the purpose of giving advice and information useful for the safe and efficient conduct of flights.

Flight level means a surface of constant atmospheric pressure which is related to a specific pressure datum, 1013.2 hectopascals (hPa), and is separated from other such surfaces by specific pressure intervals.

Note 1. — A pressure type altimeter calibrated in accordance with the Standard Atmosphere:

a) when set to a QNH altimeter setting, will indicate altitude;

b) when set to a QFE altimeter setting, will indicate height above the QFE reference datum;

c) when set to a pressure of 1 013.2 hPa, may be used to indicate flight levels.

Note 2. — The terms “height” and “altitude”, used in Note 1 above, indicate altimetric rather than geometric heights and altitudes.

Flight plan means specified information provided to air traffic services units, relative to an intended flight or portion of a flight of an aircraft.

Flight visibility means the visibility forward from the cockpit of an aircraft in flight.

Ground visibility means the visibility at an aerodrome as reported by an accredited observer or by automatic systems.

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

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

IFR means the symbol used to designate the instrument flight rules.

IFR flight means a flight conducted in accordance with the instrument flight rules.

IMC means the symbol used to designate instrument meteorological conditions.

Instrument approach operations means an approach and landing using instruments for navigation guidance based on an instrument approach procedure. There are two methods for executing instrument approach operations:

a) a two-dimensional (2D) instrument approach operation, using lateral navigation guidance only; and

b) a three-dimensional (3D) instrument approach operation, using both lateral and vertical navigation guidance.

Note. — Lateral and vertical navigation guidance refers to the guidance provided either by:

a) a ground-based radio navigation aid; or

b) computer-generated navigation data from ground-based, space-based, self- contained navigation aids or a combination of these.

Instrument approach procedure means a series of predetermined manoeuvres by reference to flight instruments with specified protection from obstacles from the initial approach fix, or where applicable, from the beginning of a defined arrival route to a point from which a landing can be completed and thereafter, if a landing is not completed, to a position at which holding or en-route obstacle clearance criteria apply. Instrument approach procedures are classified as follows:

Non-precision approach (NPA) procedure. An instrument approach procedure designed for 2D instrument approach operations Type A.

Note. — Non-precision approach procedures may be flown using a continuous descent final approach (CDFA) technique. CDFAs with advisory VNAV guidance calculated by on-board equipment (see PANS-OPS (ICAO Doc 8168), Volume I, Part I, Section 4, Chapter 1, paragraph 1.8.1) are considered 3D instrument approach operations. CDFAs with manual calculation of the required rate of descent are considered 2D instrument approach operations. For more information on CDFAs, refer to PANS- OPS (ICAO Doc 8168) Volume I, Part I, Section 4, Chapter 1, paragraphs 1.7 and 1.8.

Approach procedure with vertical guidance (APV). A performance-based navigation (PBN) instrument approach procedure designed for 3D instrument approach operations Type A.

Precision approach (PA) procedure. An instrument approach procedure based on navigation systems (ILS, MLS, GLS and SBAS Cat I) designed for 3D instrument approach operations Type A or B.

Note. — Refer to CAD 6 for instrument approach operation types.

Instrument meteorological conditions means meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling, less than the minima specified for visual meteorological conditions.

Note. — The specified minima for visual meteorological conditions are contained in Chapter 4.

Landing area means that part of a movement area intended for the landing or take-off of aircraft.

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

Manoeuvring area means that part of an aerodrome to be used for the take-off, landing and taxiing of aircraft, excluding aprons.

Movement area means that part of an aerodrome to be used for the take-off, landing and taxiing of aircraft, consisting of the manoeuvring area and the apron(s).

Operator means a person, organisation or enterprise engaged in or offering to engage in an aircraft operation.

Note. — In the context of remotely piloted aircraft, an aircraft operation includes the remotely piloted aircraft system.

Pilot-in-command means the pilot designated by the operator, or in the case of general aviation, the owner, as being in command and charged with the safe conduct of a flight.

Pressure-altitude means an atmospheric pressure expressed in terms of altitude which corresponds to that pressure in the Standard Atmosphere. * (**as defined in CAD 8*)

Problematic use of substances is the use of one or more psychoactive substances by aviation personnel in a way that:

a) constitutes a direct hazard to the user or endangers the lives, health or welfare of others; and/or

b) causes or worsens an occupational, social, mental or physical problem or disorder.

Prohibited area means an airspace of defined dimensions, above the land areas or territorial waters of a State, within which the flight of aircraft is prohibited

Psychoactive substances means alcohol, opioids, cannabinoids, sedatives and hypnotics, cocaine, other psychostimulants, hallucinogens, and volatile solvents, whereas coffee and tobacco are excluded.

Radiotelephony means a form of radio communication primarily intended for the exchange of information in the form of speech.

Remote pilot means a person charged by the operator with duties essential to the operation of a remotely piloted aircraft and who manipulates the flight controls, as appropriate, during flight time.

Remote pilot station is the component of the remotely piloted aircraft system containing the equipment used to pilot the remotely piloted aircraft.

Remotely piloted aircraft (RPA) means an unmanned aircraft which is piloted from a remote pilot station.

Remotely piloted aircraft system (RPAS) means a remotely piloted aircraft, its associated remote pilot station(s), the required command and control links and any other components as specified in the type design.

Repetitive flight plan (RPL) means a flight plan related to a series of frequently recurring, regularly operated individual flights with identical basic features, submitted by an operator for retention and repetitive use by ATS units.

Reporting point means a specified geographical location in relation to which the position of an aircraft can be reported.

Restricted area means an airspace of defined dimensions, above the land areas or territorial waters of a State, within which the flight of aircraft is restricted in accordance with certain specified conditions.

RPA observer means a trained and competent person designated by the operator who, by visual observation of the remotely piloted aircraft, assists the remote pilot in the safe conduct of the flight.

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

Runway-holding position means a designated position intended to protect a runway, an obstacle limitation surface, or an ILS/MLS critical/sensitive area at which taxiing aircraft and vehicles shall stop and hold, unless otherwise authorised by the aerodrome control tower.

Note. — In radiotelephony phraseologies, the expression "holding point" is used to designate the runway-holding position.

Safety-sensitive personnel mean persons who might endanger aviation safety if they perform their duties and functions improperly including, but not limited to, crew members, aircraft maintenance personnel and air traffic controllers.

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

Special VFR flight means a VFR flight cleared by air traffic control to operate within a control zone in meteorological conditions below VMC.

Taxiing means movement of an aircraft on the surface of an aerodrome under its own power, excluding take-off and landing.

Taxiway is a defined path on a land aerodrome established for the taxiing of aircraft and intended to provide a link between one part of the aerodrome and another, including:

a) *Aircraft stand taxi lane.* A portion of an apron designated as a taxiway and intended to provide access to aircraft stands only.

b) *Apron taxiway.* A portion of a taxiway system located on an apron and intended to provide a through taxi route across the apron.

c) *Rapid exit taxiway.* A taxiway connected to a runway at an acute angle and designed to allow landing aeroplanes to turn off at higher speeds than are achieved on other exit taxiways thereby minimising runway occupancy times.

Terminal control area is a control area normally established at the confluence of ATS routes in the vicinity of one or more major aerodromes.

Total estimated elapsed time means for IFR flights, the estimated time required from take-off to arrive over that designated point, defined by reference to navigation aids, from which it is intended that an instrument approach procedure will be commenced, or, if no navigation aid is associated with the destination aerodrome, to arrive over the destination aerodrome. For VFR flights, the estimated time required from take-off to arrive over the destination aerodrome.

Track means the projection on the earth's surface of the path of an aircraft, the direction of which path at any point is usually expressed in degrees from North (true, magnetic or grid).

Traffic avoidance advice means advice provided by an air traffic services unit specifying manoeuvres to assist a pilot to avoid a collision.

Traffic information means information issued by an air traffic services unit to alert a pilot to other known or observed air traffic which may be in proximity to the position or intended route of flight and to help the pilot avoid a collision.

Transition altitude means the altitude at or below which the vertical position of an aircraft is controlled by reference to altitudes.

Unmanned free balloon is a non-power-driven, unmanned, lighter-than-air aircraft in free flight.

Note. — Unmanned free balloons are classified as heavy, medium or light in accordance with specifications contained in Appendix 5.

VFR is the symbol used to designate the visual flight rules.

VFR flight is a flight conducted in accordance with the visual flight rules.

Visibility means, for aeronautical purposes is the greater of:

a) the greatest distance at which a black object of suitable dimensions, situated near the ground, can be seen and recognised when observed against a bright background;

b) the greatest distance at which lights in the vicinity of 1 000 candelas can be seen and identified against an unlit background.

Note 1. — The two distances have different values in air of a given extinction coefficient, and the latter b) varies with the background illumination. The former a) is represented by the meteorological optical range (MOR).

Note. 2.— The definition applies to the observations of visibility in local routine and special reports, to the observations of prevailing and minimum visibility reported in METAR and SPECI and to the observations of ground visibility.

Visual line-of-sight (VLOS) operation means an operation in which the remote pilot or RPA observer maintains direct unaided visual contact with the remotely piloted aircraft.

Visual meteorological conditions are meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling, equal to or better than specified minima.

Note. — The specified minima are contained in Chapter 4.

VMC is the symbol used to designate visual meteorological conditions.

2 Applicability of the Rules of the Air

2.1 Territorial Application of the Rules of the Air

2.1.1. The rules of the air shall apply to aircraft bearing the nationality and registration marks of Malaysia, wherever they may be, to the extent that they do not conflict with the rules published by the State having jurisdiction over the territory overflown.

2.1.2. For purposes of flight over those parts of the high seas where Malaysia has accepted, pursuant to the Asia/Pacific Air Navigation Planning and Implementation Regional Work Group (APANPIRG) agreement, the responsibility of providing air traffic services, the "appropriate ATS authority" referred to in this CAD is the relevant authority designated by Malaysia responsible for providing those services.

Note 1. — The Director of Air Traffic Management Division of Civil Aviation Authority of Malaysia acting under the authority of the CEO, is the authority responsible for the overall administration of ATS in the provision of ATS within the Kuala Lumpur and Kota Kinabalu Flight Information Regions (FIRs).

Note 2. — ATS are provided for the entire territory of Malaysia, including its territorial waters as well as the airspace over the high seas within the Kuala Lumpur and Kota Kinabalu FIRs.

Note 3. — In some cases, in accordance with the regional air navigation agreement, ATS are provided, under the delegated authority, in the airspace within another bordering FIR. Details of such services are provided in Malaysia AIP Section ENR 2.

Note 4. — The airspace of the Kuala Lumpur FIR embraces Peninsular Malaysia and extensive international waters. The airspace of the Kota Kinabalu FIR embraces Sabah/Sarawak including Brunei and extensive international waters.

Note 5. — The boundaries of the Kuala Lumpur, Kota Kinabalu and Singapore FIRs are defined in Malaysia AIP Section ENR 2.1 - 9.

Note 6. — Area of Responsibility of Aerodrome and Approach Control units are listed in Malaysia AIP Section AD 2.17.

2.2 Compliance with the rules of the air

2.2.1. The operation of an aircraft either in flight or on the movement area of an aerodrome shall be in compliance with the general rules and, in addition, when in flight, either with:

a) the visual flight rules; or

b) the instrument flight rules.

Note 1. — Information relevant to the services provided to aircraft operating in accordance with both visual flight rules and instrument flight rules in the seven ATS airspace classes is contained in CAD 11 paragraph 2.6.1 and 2.6.3.

Note 2. — A pilot may elect to fly in accordance with instrument flight rules in visual meteorological conditions or may be required to do so by the appropriate ATS authority.

2.3 Responsibility for compliance with the rules of the air

2.3.1. Responsibility of pilot-in-command

2.3.1.1. The pilot-in-command of an aircraft shall, whether manipulating the controls or not, be responsible for the operation of the aircraft in accordance with the rules of the air, except that the pilot-in-command may depart from these rules in circumstances that render such departure absolutely necessary in the interests of safety.

2.3.2. Pre-flight action

2.3.2.1. Before beginning a flight, the pilot-in-command of an aircraft shall become familiar with all available information appropriate to the intended operation. Pre-flight action for flights away from the vicinity of an aerodrome, and for all IFR flights, shall include a careful study of available current weather reports and forecasts, taking into consideration fuel requirements and an alternative course of action if the flight cannot be completed as planned.

2.4 Authority of pilot-in-command of an aircraft

2.4.1. The pilot-in-command of an aircraft shall have final authority as to the disposition of the aircraft while in command.

2.5 Problematic use of psychoactive substances

2.5.1. No person whose function is critical to the safety of aviation (safety-sensitive personnel) shall undertake that function while under the influence of any psychoactive substance, by reason of which human performance is impaired. No such person shall engage in any kind of problematic use of substances.

3 General Rules

3.1 Protection of persons and property

3.1.1. Negligent or reckless operation of aircraft.

3.1.1.1. An aircraft shall not be operated in a negligent or reckless manner so as to endanger life or property of others.

Note. — For additional requirements for aircraft landing outside a designated aerodrome, refer to CAD2001, Chapter 2.

3.1.2. Minimum heights

3.1.2.1. Except when necessary for take-off or landing, or except by permission from the appropriate authority, aircraft shall not be flown over the congested areas of cities, towns or settlements or over an open-air assembly of persons, unless at such a height as will permit, in the event of an emergency arising, a landing to be made without undue hazard to persons or property on the surface.

Note. — See 4.6 for minimum heights for VFR flights and 5.1.2 for minimum levels for IFR flights.

3.1.3. Cruising levels

3.1.3.1. The cruising levels at which a flight or a portion of a flight is to be conducted shall be in terms of:

a) flight levels, for flights at or above the lowest usable flight level or, where applicable, above the transition altitude;

b) altitudes, for flights below the lowest usable flight level or, where applicable, at or below the transition altitude.

Note. — The system of flight levels is prescribed in the Procedures for Air Navigation Services — Aircraft Operations (ICAO Doc 8168).

3.1.4. Dropping or spraying

3.1.4.1. Nothing shall be dropped or sprayed from an aircraft in flight except under conditions prescribed by the appropriate authority and as indicated by relevant information, advice and/or clearance from the appropriate air traffic services unit.

3.1.5. Towing

3.1.5.1. No aircraft or other object shall be towed by an aircraft, except in accordance with requirements prescribed by the appropriate authority and as indicated by relevant information, advice and/or clearance from the appropriate air traffic services unit.

3.1.6. Parachute descents

3.1.6.1. Parachute descents, other than emergency descents, shall not be made except under conditions prescribed by the appropriate authority and as indicated by relevant information, advice and/or clearance from the appropriate air traffic services unit.

3.1.7. Acrobatic flight

3.1.7.1. No aircraft shall be flown acrobatically except under conditions prescribed by the appropriate authority and as indicated by relevant information, advice and/or clearance from the appropriate air traffic services unit.

3.1.8. Formation flights

3.1.8.1. Aircraft shall not be flown in formation except by pre-arrangement among the pilots-in- command of the aircraft taking part in the flight and, for formation flight in controlled airspace, in accordance with the conditions prescribed by the appropriate ATS authority(ies). These conditions shall include the following:

a) the formation operates as a single aircraft with regard to navigation and position reporting;

b) separation between aircraft in the flight shall be the responsibility of the flight leader and the pilots-in-command of the other aircraft in the flight and shall include periods of transition when aircraft are manoeuvring to attain their own separation within the formation and during join-up and breakaway; and

c) a distance not exceeding 1 km (0.5 NM) laterally and longitudinally and 30 m (100 ft) vertically from the flight leader shall be maintained by each aircraft.

3.1.8.2. Details of formation flights requirements and applications are established in CAD 2001, Chapter 3.

3.1.9. Remotely piloted aircraft

3.1.9.1. A remotely piloted aircraft shall be operated in such a manner as to minimise hazards to persons, property or other aircraft and in accordance with the conditions specified in Appendix 4.

3.1.9.2. UAS operator shall refer to the requirements established in CAD 6011.

3.1.10. Unmanned free balloons

3.1.10.1. An unmanned free balloon shall be operated in such a manner as to minimise hazards to persons, property or other aircraft and in accordance with the conditions specified in Appendix 5.

3.1.11. Prohibited areas and restricted areas

3.1.11.1. Aircraft shall not be flown in a prohibited area, or in a restricted area, the particulars of which have been duly published, except in accordance with the conditions of the restrictions or by permission of the State over whose territory the areas are established.

3.2 Avoidance of collisions

3.2.1. Nothing in these rules shall relieve the pilot-in-command of an aircraft from the responsibility of taking such action, including collision avoidance manoeuvres based on resolution advisories provided by ACAS equipment, as will best avert collision.

Note 1. — It is important that vigilance for the purpose of detecting potential collisions be exercised on board an aircraft, regardless of the type of flight or the class of airspace in which the aircraft is operating, and while operating on the movement area of an aerodrome.

Note 2. — Operating procedures for use of ACAS detailing the responsibilities of the pilot-in- command are contained in PANS-OPS (ICAO Doc 8168), Volume I, Part III, Section 3, Chapter 3.

Note 3. — Carriage requirements for ACAS equipment are addressed in CAD 6, Part I, Chapter 6 and Part II, Chapter 6.

3.2.2. Proximity

3.2.2.1. An aircraft shall not be operated in such proximity to other aircraft as to create a collision hazard.

3.2.3. Right-of-way

3.2.3.1. The aircraft that has the right-of-way shall maintain its heading and speed.

3.2.3.2. An aircraft that is obliged by the following rules to keep out of the way of another shall avoid passing over, under or in front of the other, unless it passes well clear and takes into account the effect of aircraft wake turbulence.

3.2.3.3. *Approaching head-on.* When two aircraft are approaching head-on or approximately so and there is danger of collision, each shall alter its heading to the right.

3.2.3.4. *Converging.* When two aircraft are converging at approximately the same level, the aircraft that has the other on its right shall give way, except as follows:

a) power-driven heavier-than-air aircraft shall give way to airships, gliders and balloons;

b) airships shall give way to gliders and balloons;

c) gliders shall give way to balloons;

d) power-driven aircraft shall give way to aircraft which are seen to be towing other aircraft or objects.

3.2.3.5. *Overtaking*. An overtaking aircraft is an aircraft that approaches another from the rear on a line forming an angle of less than 70 degrees with the plane of symmetry of the latter, i.e. is in such a position with reference to the other aircraft that at night it should be unable to see either of the aircraft's left (port) or right (starboard) navigation lights. An aircraft that is being overtaken has the right-of-way and the overtaking aircraft, whether climbing, descending or in horizontal flight, shall keep out of the way of the other aircraft by altering its heading to the right, and no subsequent change in the relative positions of the two aircraft shall absolve the overtaking aircraft from this obligation until it is entirely past and clear.

3.2.3.6. *Landing*

3.2.3.6.1. An aircraft in flight, or operating on the ground or water, shall give way to aircraft landing or in the final stages of an approach to land.

3.2.3.6.2. When two or more heavier-than-air aircraft are approaching an aerodrome for the purpose of landing, aircraft at the higher level shall give way to aircraft at the lower level, but the latter shall not take advantage of this rule to cut in in front of another which is in the final stages of an approach to land, or to overtake that aircraft. Nevertheless, power-driven heavier-than-air aircraft shall give way to gliders.

3.2.3.6.3. *Emergency landing.* An aircraft that is aware that another is compelled to land shall give way to that aircraft.

3.2.3.7. *Taking off.* An aircraft taxiing on the manoeuvring area of an aerodrome shall give way to aircraft taking off or about to take off.

3.2.3.8. *Surface movement of aircraft*

3.2.3.8.1. In case of danger of collision between two aircraft taxiing on the movement area of an aerodrome the following shall apply:

a) when two aircraft are approaching head on, or approximately so, each shall stop or where practicable alter its course to the right so as to keep well clear;

b) when two aircraft are on a converging course, the one which has the other on its right shall give way;

c) an aircraft which is being overtaken by another aircraft shall have the right- of-way and the overtaking aircraft shall keep well clear of the other aircraft.

Note. — For the description of an overtaking aircraft see 3.2.3.5.

3.2.3.8.2. An aircraft taxiing on the manoeuvring area shall stop and hold at all runway-holding positions unless otherwise authorised by the aerodrome control tower.

Note. — For runway-holding position markings and related signs, see CAD 14, Volume I, Chapter 5

3.2.3.8.3. An aircraft taxiing on the manoeuvring area shall stop and hold at all lighted stop bars and may proceed further when the lights are switched off.

3.2.4. Lights to be displayed by aircraft

Note 1. — The characteristics of lights intended to meet the requirements of 3.2.4 for aeroplanes are specified in CAD 8. Specifications for navigation lights for aeroplanes are contained in the Appendices to Parts I and II of CAD 6. Detailed technical specifications for lights for aeroplanes are contained in Volume II, Part A, Chapter 4 of the Airworthiness Manual (ICAO Doc 9760) and for helicopters in Part A, Chapter 5 of that document.

Note 2. — In the context of 3.2.4.2 c) and 3.2.4.4 a) an aircraft is understood to be operating when it is taxiing or being towed or is stopped temporarily during the course of taxiing or being towed.

Note 3. — For aircraft on the water see 3.2.6.2.

3.2.4.1. Except as provided by 3.2.4.5, from sunset to sunrise or during any other period which may be prescribed by the appropriate authority all aircraft in flight shall display:

a) anti-collision lights intended to attract attention to the aircraft; and

b) navigation lights intended to indicate the relative path of the aircraft to an observer and other lights shall not be displayed if they are likely to be mistaken for these lights.

Note. — Lights fitted for other purposes, such as landing lights and airframe floodlights, may be used in addition to the anti-collision lights specified in the Airworthiness Manual, Volume II (ICAO Doc 9760) to enhance aircraft conspicuity.

3.2.4.2. Except as provided by 3.2.4.5, from sunset to sunrise or during any other period prescribed by the appropriate authority:

a) all aircraft moving on the movement area of an aerodrome shall display navigation lights intended to indicate the relative path of the aircraft to an observer and other lights shall not be displayed if they are likely to be mistaken for these lights;

b) unless stationary and otherwise adequately illuminated, all aircraft on the movement area of an aerodrome shall display lights intended to indicate the extremities of their structure;

c) all aircraft operating on the movement area of an aerodrome shall display lights intended to attract attention to the aircraft; and

d) all aircraft on the movement area of an aerodrome whose engines are running shall display lights which indicate that fact.

Note. — If suitably located on the aircraft, the navigation lights referred to in 3.2.4.1 b) may also meet the requirements of 3.2.4.2 b). Red anti-collision lights fitted to meet the requirements of 3.2.4.1 a) may also meet the requirements of 3.2.4.2 c) and 3.2.4.2 d) provided they do not subject observers to harmful dazzle.

3.2.4.3. Except as provided by 3.2.4.5, all aircraft in flight and fitted with anti-collision lights to meet the requirement of 3.2.4.1 a) shall display such lights also outside the period specified in 3.2.4.1.

3.2.4.4. Except as provided by 3.2.4.5, all aircraft:

a) operating on the movement area of an aerodrome and fitted with anti-collision lights to meet the requirement of 3.2.4.2 c); or

b) on the movement area of an aerodrome and fitted with lights to meet the requirement of 3.2.4.2 d); shall display such lights also outside the period specified in 3.2.4.2.

3.2.4.5. A pilot shall be permitted to switch off or reduce the intensity of any flashing lights fitted to meet the requirements of 3.2.4.1, 3.2.4.2, 3.2.4.3 and 3.2.4.4 if they do or are likely to*:*

a) adversely affect the satisfactory performance of duties; or

b) subject an outside observer to harmful dazzle

3.2.5. Simulated instrument flights

3.2.5.1. An aircraft shall not be flown under simulated instrument flight conditions unless:

a) fully functioning dual controls are installed in the aircraft; and

b) a qualified pilot occupies a control seat to act as safety pilot for the person who is flying under simulated instrument conditions. The safety pilot shall have adequate vision forward and to each side of the aircraft, or a competent observer in communication with the safety pilot shall occupy a position in the aircraft from which the observer's field of vision adequately supplements that of the safety pilot.

3.2.6. Operation on and in the vicinity of an aerodrome

3.2.6.1. An aircraft operated on or in the vicinity of an aerodrome shall, whether or not within an aerodrome traffic zone:

a) observe other aerodrome traffic for the purpose of avoiding collision;

b) conform with or avoid the pattern of traffic formed by other aircraft in operation;

c) make all turns to the left, when approaching for a landing and after taking off, unless otherwise instructed;

d) land and take off into the wind unless safety, the runway configuration, or air traffic considerations determine that a different direction is preferable.

Note 1. — See 3.6.5.1.

Note 2. — Additional rules may apply in aerodrome traffic zones.

3.2.7. Water operations

Note. — In addition to the provisions of 3.2.7.1 of this CAD, rules set forth in the International Regulations for Preventing Collisions at Sea, developed by the International Conference on Revision of the International Regulations for Preventing Collisions at Sea (London, 1972) may be applicable in certain cases.

3.2.7.1. When two aircraft or an aircraft and a vessel are approaching one another and there is a risk of collision, the aircraft shall proceed with careful regard to existing circumstances and conditions including the limitations of the respective craft:

a) *Converging.* An aircraft which has another aircraft or a vessel on its right shall give way so as to keep well clear.

b) *Approaching head-on.* An aircraft approaching another aircraft or a vessel head-on, or approximately so, shall alter its heading to the right to keep well clear.

c) *Overtaking.* The aircraft or vessel which is being overtaken has the right of way, and the one overtaking shall alter its heading to keep well clear.

d) *Landing and taking off.* Aircraft landing on or taking off from the water shall, in so far as practicable, keep well clear of all vessels and avoid impeding their navigation.

e) *Lights to be displayed by aircraft on the water.* Between sunset and sunrise or such other period between sunset and sunrise as may be prescribed by the appropriate authority, all aircraft on the water shall display lights as required by the International Regulations for Preventing Collisions at Sea (revised 1972) unless it is impractical for them to do so, in which case they shall display lights as closely similar as possible in characteristics and position to those required by the International Regulations.

Note 1. — Specifications for lights to be shown by aeroplanes on the water are contained in the Appendices to Parts I and II of CAD 6.

Note 2. — The International Regulations for Preventing Collisions at Sea specify that the rules concerning lights shall be complied with from sunset to

sunrise. Any lesser period between sunset and sunrise established in accordance with 3.2.7.2 cannot, therefore, be applied in areas where the International Regulations for Preventing Collisions at Sea apply, e.g. on the high seas.

3.3 Flight plans

3.3.1. Submission of a flight plan

3.3.1.1. Information relative to an intended flight or portion of a flight, to be provided to air traffic services units, shall be in the form of a flight plan.

3.3.1.2. A flight plan shall be submitted prior to operating:

a) any flight or portion thereof to be provided with air traffic control service;

b) any IFR flight within advisory airspace;

c) any flight within or into designated areas, or along designated routes, when so required by the appropriate ATS authority to facilitate the provision of flight information, alerting and search and rescue services;

d) any flight within or into designated areas, or along designated routes, when so required by the appropriate ATS authority to facilitate coordination with appropriate military units or with air traffic services units in adjacent States in order to avoid the possible need for interception for the purpose of identification;

e) any flight across international borders.

Note. — The term "flight plan" is used to mean variously, full information on all items comprised in the flight plan description, covering the whole route of a flight, or limited information required when the purpose is to obtain a clearance for a minor portion of a flight such as to cross an airway, to take off from, or to land at a controlled aerodrome.

3.3.1.3. A flight plan shall be submitted, before departure, to an air traffic services reporting office or, during flight, transmitted to the appropriate air traffic services unit or air-ground control radio station, unless arrangements have been made for submission of repetitive flight plans.

3.3.1.4. Unless otherwise prescribed by the appropriate ATS authority, a flight plan for a flight to be provided with air traffic control service or air traffic advisory service shall be submitted at least sixty minutes before departure, or, if submitted during flight, at a time which will ensure its receipt by the appropriate air traffic services unit at least ten minutes before the aircraft is estimated to reach:

a) the intended point of entry into a control area or advisory area; or

b) the point of crossing an airway or advisory route.

3.3.2. Contents of a flight plan

3.3.2.1. A flight plan shall comprise information regarding such of the following items as are considered relevant by the appropriate ATS authority:

a) Aircraft identification

b) Flight rules and type of flight

c) Number and type(s) of aircraft and wake turbulence category

d) Equipment

e) Departure aerodrome (see Note 1)

f) Estimated off-block time (see Note 2)

g) Cruising speed(s)

h) Cruising level(s)

i) Route to be followed

j) Destination aerodrome and total estimated elapsed time

k) Alternate aerodrome(s)

l) Fuel endurance

m) Total number of persons on board

n) Emergency and survival equipment

o) Other information.

Note 1. — For flight plans submitted during flight, the information provided in respect of this item will be an indication of the location from which supplementary information concerning the flight may be obtained, if required.

Note 2. — For flight plans submitted during flight, the information to be provided in respect of this item will be the time over the first point of the route to which the flight plan relates.

Note 3. — The term "aerodrome" where used in the flight plan is intended to cover also sites other than aerodromes which may be used by certain types of aircraft, e.g. helicopters or balloons.

3.3.3. Completion of a flight plan

3.3.3.1. Whatever the purpose for which it is submitted, a flight plan shall contain information, as applicable, on relevant items up to and including "Alternate aerodrome(s)" regarding the whole route or the portion thereof for which the flight plan is submitted.

3.3.3.2. It shall, in addition, contain information, as applicable, on all other items when so prescribed by the appropriate ATS authority or when otherwise deemed necessary by the person submitting the flight plan.

3.3.4. Changes to a flight plan

3.3.4.1. Subject to the provisions of 3.6.2.2, all changes to a flight plan submitted for an IFR flight, or a VFR flight operated as a controlled flight, shall be reported as soon as practicable to the appropriate air traffic services unit. For other VFR flights, significant changes to a flight plan shall be reported as soon as practicable to the appropriate air traffic services unit.

Note 1. — Information submitted prior to departure regarding fuel endurance or total number of persons carried on board, if incorrect at time of departure, constitutes a significant change to the flight plan and as such must be reported.

Note 2. — Procedures for submission of changes to repetitive flight plans are contained in the PANS-ATM (ICAO Doc 4444).

3.3.5. Closing a flight plan

3.3.5.1. Unless otherwise prescribed by the appropriate ATS authority, a report of arrival shall be made in person, by radiotelephony or via data link at the earliest possible moment after landing, to the appropriate air traffic services unit at the arrival aerodrome, by any flight for which a flight plan has been submitted covering the entire flight or the remaining portion of a flight to the destination aerodrome.

3.3.5.2. When a flight plan has been submitted only in respect of a portion of a flight, other than the remaining portion of a flight to destination, it shall, when required, be closed by an appropriate report to the relevant air traffic services unit.

3.3.5.3. When no air traffic services unit exists at the arrival aerodrome, the arrival report, when required, shall be made as soon as practicable after landing and by the quickest means available to the nearest air traffic services unit.

3.3.5.4. When communication facilities at the arrival aerodrome are known to be inadequate and alternate arrangements for the handling of arrival reports on the ground are not available, the following action shall be taken. Immediately prior to landing the aircraft shall, if practicable, transmit to the appropriate air traffic services unit, a message comparable to an arrival report, where such a report is required. Normally, this transmission shall be made to the aeronautical station serving the air traffic services unit in charge of the flight information region in which the aircraft is operated.

3.3.5.5. Arrival reports made by aircraft shall contain the following elements of information:

a) aircraft identification;

b) departure aerodrome;

c) destination aerodrome (only in the case of a diversionary landing);

d) arrival aerodrome;

e) time of arrival.

Note. — Whenever an arrival report is required, failure to comply with these provisions may cause serious disruption in the air traffic services and incur great expense in carrying out unnecessary search and rescue operations.

3.4 Signals

3.4.1. Upon observing or receiving any of the signals given in Appendix 1, aircraft shall take such action as may be required by the interpretation of the signal given in that Appendix.

3.4.2. The signals of Appendix 1 shall, when used, have the meaning indicated therein. They shall be used only for the purpose indicated and no other signals likely to be confused with them shall be used.

3.4.3. A signalman shall be responsible for providing standard marshalling signals to aircraft in a clear and precise manner using the signals shown in Appendix 1.

3.4.4. No person shall guide an aircraft unless trained, qualified and approved by the appropriate authority to carry out the functions of a signalman.

3.4.5. The signalman shall wear a distinctive fluorescent identification vest to allow the flight crew to identify that he or she is the person responsible for the marshalling operation.

3.4.6. Daylight-fluorescent wands, table-tennis bats or gloves shall be used for all signalling by all participating ground staff during daylight hours. Illuminated wands shall be used at night or in low visibility.

3.5 Time

3.5.1. Coordinated Universal Time (UTC) shall be used and shall be expressed in hours and minutes and, when required, seconds of the 24-hour day beginning at midnight.

3.5.2. A time check shall be obtained prior to operating a controlled flight and at such other times during the flight as may be necessary.

Note. — Such time check is normally obtained from an air traffic services unit unless other arrangements have been made by the operator or by the appropriate ATS authority.

3.5.3. Wherever time is utilised in the application of data link communications, it shall be accurate to within 1 second of UTC.

3.6 Air traffic control service

3.6.1. Air traffic control clearances

3.6.1.1. An air traffic control clearance shall be obtained prior to operating a controlled flight, or a portion of a flight as a controlled flight. Such clearance shall be requested through the submission of a flight plan to an air traffic control unit.

Note 1. — A flight plan may cover only part of a flight, as necessary, to describe that portion of the flight or those manoeuvres which are subject to air traffic control. A clearance may cover only part of a current flight plan, as indicated in a clearance limit or by reference to specific manoeuvres such as taxiing, landing or taking off.

Note 2. — If an air traffic control clearance is not satisfactory to a pilot-in-command of an aircraft, the pilot-in command may request and, if practicable, will be issued an amended clearance.

3.6.1.2. Whenever an aircraft has requested a clearance involving priority, a report explaining the necessity for such priority shall be submitted, if requested by the appropriate air traffic control unit.

3.6.1.3. *Potential re-clearance in flight.* If prior to departure it is anticipated that depending on fuel endurance and subject to re-clearance in flight, a decision may be taken to proceed to a revised destination aerodrome, the appropriate air traffic control units shall be so notified by the insertion in the flight plan of information concerning the revised route (where known) and the revised destination.

Note. — The intent of this provision is to facilitate a re-clearance to a revised destination, normally beyond the filed destination aerodrome.

3.6.1.4. An aircraft operated on a controlled aerodrome shall not taxi on the manoeuvring area without clearance from the aerodrome control tower and shall comply with any instructions given by that unit.

3.6.2. Adherence to flight plan

3.6.2.1. Except as provided for in 3.6.2.2 and 3.6.2.4, an aircraft shall adhere to the current flight plan or the applicable portion of a current flight plan submitted for a controlled flight unless a request for a change has been made and clearance obtained from the appropriate air traffic control unit, or unless an emergency situation arises which necessitates immediate action by the aircraft, in which event as soon as circumstances permit, after such emergency authority is exercised, the appropriate air traffic services unit shall be notified of the action taken and that this action has been taken under emergency authority.

3.6.2.1.1. Unless otherwise authorised by the appropriate ATS authority, or directed by the appropriate air traffic control unit, controlled flights shall, in so far as practicable:

a) when on an established ATS route, operate along the defined centre line of that route; or

b) when on any other route, operate directly between the navigation facilities and/or points defining that route.

3.6.2.1.2. Subject to the overriding requirement in 3.6.2.1.1, an aircraft operating along an ATS route segment defined by reference to very high frequency omnidirectional radio ranges shall change over for its primary navigation guidance from the facility behind the aircraft to that ahead of it at, or as close as operationally feasible to, the changeover point, where established.

3.6.2.1.3. Deviation from the requirements in 3.6.2.1.1 shall be notified to the appropriate air traffic services unit.

3.6.2.2. *Deviations* from the current flight plan. In the event that a controlled flight deviates from its current flight plan, the following action shall be taken:

a) Deviation from track: if the aircraft is off track, action shall be taken forthwith to adjust the heading of the aircraft to regain track as soon as practicable.

b) Deviation from ATC assigned Mach number/indicated airspeed: the appropriate air traffic services unit shall be informed immediately.

c) Deviation from Mach number/true airspeed: if the sustained Mach number/true airspeed at cruising level varies by plus or minus Mach 0.02 or more, or plus or minus 19 km/h (10 kt) true airspeed or more from the current flight plan, the appropriate air traffic services unit shall be so informed.

d) Change in time estimate: except where ADS-C is activated and serviceable in airspace where ADS-C services are provided, if the time estimate for the next applicable reporting point, flight information region boundary or destination aerodrome, whichever comes first, changes in excess of 2 minutes from that previously notified to air traffic services, or such other period of time as is prescribed by the appropriate ATS authority or on the basis of regional air navigation agreements, the flight crew shall notify the appropriate air traffic services unit as soon as possible.

3.6.2.2.1. Additionally, when an ADS agreement is in place, the air traffic services unit shall be informed automatically via data link whenever changes occur beyond the threshold values stipulated by the ADS event contract.

3.6.2.3. *Intended changes.* Requests for flight plan changes shall include information as indicated hereunder:

a) *Change of cruising level:* aircraft identification; requested new cruising level and cruising speed at this level, revised time estimates (when applicable) at subsequent flight information region boundaries.

b) Change of route:

1) *Destination unchanged:* aircraft identification; flight rules; description of new route of flight including related flight plan data beginning with the position from which requested change of route is to commence; revised time estimates; any other pertinent information.

2) *Destination changed:* aircraft identification; flight rules; description of revised route of flight to revised destination aerodrome including related flight plan data, beginning with the position from which requested change of route is to commence; revised time estimates; alternate aerodrome(s); any other pertinent information.

3.6.2.4. *Weather deterioration below the VMC.* When it becomes evident that flight in VMC in accordance with its current flight plan will not be practicable, a VFR flight operated as a controlled flight shall:

a) request an amended clearance enabling the aircraft to continue in VMC to destination or to an alternative aerodrome, or to leave the airspace within which an ATC clearance is required; or

b) if no clearance in accordance with a) can be obtained, continue to operate in VMC and notify the appropriate ATC unit of the action being taken either to leave the airspace concerned or to land at the nearest suitable aerodrome; or

c) if operated within a control zone, request authorisation to operate as a special VFR flight; or

d) request clearance to operate in accordance with the instrument flight rules.

3.6.3. Position reports

3.6.3.1. Unless exempted by the appropriate ATS authority or by the appropriate air traffic services unit under conditions specified by that authority, a controlled flight shall report to the appropriate air traffic services unit, as soon as possible, the time and level of passing each designated compulsory reporting point, together with any other required information. Position reports shall similarly be made in relation to additional points when requested by the appropriate air traffic services unit. In the absence of designated reporting points, position reports shall be made at intervals prescribed by the appropriate ATS authority or specified by the appropriate air traffic services unit.

3.6.3.1.1. Controlled flights providing position information to the appropriate air traffic services unit via data link communications shall only provide voice position reports when requested.

Note. —The conditions and circumstances in which ADS-B or SSR Mode C transmission of pressure-altitude satisfies the requirement for level information in position reports are indicated in the CAD 1101 Air Traffic Management.

3.6.4. Termination of control

3.6.4.1. A controlled flight shall, except when landing at a controlled aerodrome, advise the appropriate ATC unit as soon as it ceases to be subject to air traffic control service.

3.6.5. Communications

3.6.5.1. An aircraft operated as a controlled flight shall maintain continuous air-ground voice communication watch on the appropriate communication channel of, and establish two-way communication as necessary with, the appropriate air traffic control unit, except as may be prescribed by the appropriate ATS authority in respect of aircraft forming part of aerodrome traffic at a controlled aerodrome.

Note 1. — SELCAL or similar automatic signalling devices satisfy the requirement to maintain an air-ground voice communication watch.

Note 2. — The requirement for an aircraft to maintain an air-ground voice communication watch remains in effect after CPDLC has been established.

3.6.5.2. *Communication failure*. If a communication failure precludes compliance with 3.6.5.1, the aircraft shall comply with the voice communication failure procedures of CAD 10, Volume II, and with such of the following procedures as are appropriate. The aircraft shall attempt to establish communications with the appropriate air traffic control unit using all other available means. In addition, the aircraft, when forming part of the aerodrome traffic at a controlled aerodrome, shall keep a watch for such instructions as may be issued by visual signals.

3.6.5.2.1. If in visual meteorological conditions, the aircraft shall:

a) continue to fly in visual meteorological conditions; land at the nearest suitable aerodrome; and report its arrival by the most expeditious means to the appropriate air traffic services unit;

b) if considered advisable, complete an IFR flight in accordance with 3.6.5.2.2.

3.6.5.2.2. If in instrument meteorological conditions or when the pilot of an IFR flight considers it inadvisable to complete the flight in accordance with 3.6.5.2.1 a), the aircraft shall:

a) unless otherwise prescribed on the basis of regional air navigation agreement, in airspace where radar is not used in the provision of air traffic control, maintain the last assigned speed and level, or minimum flight altitude if higher, for a period of 20 minutes following the aircraft's failure to report its position over a compulsory reporting point and thereafter adjust level and speed in accordance with the filed flight plan;

b) in airspace where radar is used in the provision of air traffic control, maintain the last assigned speed and level, or minimum flight altitude if higher, for a period of 7 minutes following:

1) the time the last assigned level or minimum flight altitude is reached; or

2) the time the transponder is set to Code 7600; or

3) the aircraft's failure to report its position over a compulsory reporting point; whichever is later, and thereafter adjust level and speed in accordance with the filed flight plan;

c) when being radar vectored or having been directed by ATC to proceed offset using area navigation (RNAV) without a specified limit, re-join the current flight plan route no later than the next significant point, taking into consideration the applicable minimum flight altitude;

d) proceed according to the current flight plan route to the appropriate designated navigation aid or fix serving the destination aerodrome and, when required to ensure compliance with e) below, hold over this aid or fix until commencement of descent;

e) commence descent from the navigation aid or fix specified in d) at, or as close as possible to, the expected approach time last received and acknowledged; or, if no expected approach time has been received and acknowledged, at, or as close as possible to, the estimated time of arrival resulting from the current flight plan;

f) complete a normal instrument approach procedure as specified for the designated navigation aid or fix; and

g) land, if possible, within 30 minutes after the estimated time of arrival specified in e) or the last acknowledged expected approach time, whichever is later.

Note 1. — The provision of air traffic control service to other flights operating in the airspace concerned will be based on the premise that an aircraft experiencing communication failure will comply with the rules in 3.6.5.2.2.

Note 2. — See also 5.1.2.

3.7 Unlawful interference

3.7.1. An aircraft which is being subjected to unlawful interference shall endeavour to notify the appropriate ATS unit of this fact, any significant circumstances associated therewith and any deviation from the current flight plan necessitated by the circumstances, in order to enable the ATS unit to give priority to the aircraft and to minimise conflict with other aircraft.

Note 1. — Responsibility of ATS units in situations of unlawful interference is contained in CAD 11 ATS.

Note 2. — Guidance material for use when unlawful interference occurs and the aircraft is unable to notify an ATS unit of this fact is contained in Attachment B.

Note 3. — Action to be taken by SSR-, ADS-B- and ADS-C-equipped aircraft which are being subjected to unlawful interference is contained in CAD 11 ATS, CAD 1101 ATM, CAD 6401 FPD and the PANS-OPS (ICAO Doc 8168).

Note 4. — Action to be taken by CPDLC-equipped aircraft which are being subjected to unlawful interference is contained in CAD 11 ATS, CAD 1101 ATM, and guidance material on the subject is contained in the Manual of Air Traffic Services Data Link Applications (ICAO Doc 9694).

3.7.2. If an aircraft is subjected to unlawful interference, the pilot-in-command shall attempt to land as soon as practicable at the nearest suitable aerodrome or at a dedicated aerodrome assigned by the appropriate authority unless considerations aboard the aircraft dictate otherwise.

Note 1. — Requirements for State authorities with respect to aircraft on the ground that are subject to unlawful interference are contained in CAD 17, Chapter 5.

Note 2. — See 2.4 regarding the authority of the pilot-in-command of an aircraft.

3.8 Interception

Note. — The word "interception" in this context does not include intercept and escort service provided, on request, to an aircraft in distress, in accordance with Volumes II and III of the International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual (ICAO Doc 9731).

3.8.1. Interception of civil aircraft shall be governed by appropriate regulations and administrative directives issued by Contracting States in compliance with the Convention on International Civil Aviation, and in particular Article 3(d) under which Contracting States undertake, when issuing regulations for their State aircraft, to have due regard for the safety of navigation of civil aircraft. Accordingly, in drafting appropriate regulations and administrative directives due regard shall be had to the provisions of Appendix 1, Section 2 and Appendix 2, Section 1.

Note. — Recognising that it is essential for the safety of flight that any visual signals employed in the event of an interception which should be undertaken only as a last resort be correctly employed and understood by civil and military aircraft throughout the world, the Council of the International Civil Aviation Organisation, when adopting the visual signals in Appendix 1 to this CAD, urged Contracting States to ensure that they be strictly adhered to by their State aircraft. As interceptions of civil aircraft are, in all cases, potentially hazardous, the Council has also formulated special recommendations which Contracting States are urged to apply in a uniform manner. These special recommendations are contained in Attachment A.

3.8.2. The Pilot-in-Command of a civil aircraft when intercepted, shall comply with the Standards in Appendix 2, Section 3 and Section 3, interpreting and responding to visual signals as specified in Appendix 1, Section 2.

Note. — See also 2.1.1 and 3.4 VMC visibility and distance from cloud minima

3.9 VMC visibility and distance from cloud minima

3.9.1. VMC visibility and distance from cloud minima are contained in Table 3-1.

Table 3-1*

(see 4.1)

Altitude band	Airspace class	Flight visibility	Distance from cloud
At and above 3 050 m (10 000 ft) AMSL	A*** B C D E F G	8 km	1 500 m horizontally 300 m (1 000 ft) vertically
Below 3 050 m (10 000 ft) AMSL and above 900 m (3 000 ft) AMSL, or above 300 m (1 000 ft) above terrain, whichever is the higher	A***B C D E F G	5 km	1 500 m horizontally 300 m (1 000 ft) vertically
At and below 900 m (3 000 ft) AMSL, or 300 m (1 000 ft) above terrain, whichever is the higher	A***B C D E	5 km	1 500 m horizontally 300 m (1 000 ft) vertically
	F G	5 km**	Clear of cloud and with the surface in sight

* When the height 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.

** When so prescribed by the appropriate ATS authority:

a) flight visibilities reduced to not less than 1 500 m may be permitted for flights operating:

1) at speeds that, in the prevailing visibility, will give adequate opportunity to observe other traffic or any obstacles in time to avoid collision; or

2) in circumstances in which the probability of encounters with other traffic would normally be low, e.g. in areas of low volume traffic and for aerial work at low levels.

b) HELICOPTERS may be permitted to operate in less than 1 500 m flight visibility, if manoeuvred at a speed that will give adequate opportunity to observe other traffic or any obstacles in time to avoid collision.

***The VMC minima in Class A airspace are included for guidance to pilots and do not imply acceptance of VFR flights in Class A airspace.

4 Visual Flight Rules

4.1 General

4.1.1. Except when operating as a special VFR flight, VFR flights shall be conducted so that the aircraft is flown in conditions of visibility and distance from clouds equal to or greater than those specified in Table 3-1.

4.1.2. Except when a clearance is obtained from an air traffic control unit, VFR flights shall not take off or land at an aerodrome within a control zone, or enter the aerodrome traffic zone or traffic pattern:

a) when the ceiling is less than 450 m (1 500 ft); or

b) when the ground visibility is less than 5 km.

4.1.3. VFR flights between sunset and sunrise, or such other period between sunset and sunrise as may be prescribed by the appropriate ATS authority, shall be operated in accordance with the conditions prescribed by such authority.

4.1.4. Unless authorised by the appropriate ATS authority, VFR flights shall not be operated:

a) above FL 200;

b) at transonic and supersonic speeds.

4.1.5. Authorisation for VFR flights to operate above FL 290 shall not be granted in areas where a vertical separation minimum of 300 m (1 000 ft) is applied above FL 290.

4.1.6. Except when necessary for take-off or landing, or except by permission from the appropriate authority, a VFR flight shall not be flown:

a) over the congested areas of cities, towns or settlements or over an open-air assembly of persons at a height less than 300 m (1 000 ft) above the highest obstacle within a radius of 600 m from the aircraft;

b) elsewhere than as specified in 4.1.6 a), at a height less than 150 m (500 ft) above the ground or water.

Note. — See also 3.1.2.

4.1.7. Except where otherwise indicated in air traffic control clearances or specified by the appropriate ATS authority, VFR flights in level cruising flight when operated above 900 m (3 000 ft) from the ground or water, or a higher datum as specified by the appropriate ATS authority, shall be conducted at a cruising level appropriate to the track as specified in the tables of cruising levels in Appendix 3.

4.1.8. VFR flights shall comply with the provisions of 3.6:

a) when operated within Classes B, C and D airspace;

b) when forming part of aerodrome traffic at controlled aerodromes; or

c) when operated as special VFR flights.

4.1.9. A VFR flight operating within or into areas, or along routes, designated by the appropriate ATS authority in accordance with 3.3.1.2 c) or d) shall maintain continuous air- ground voice communication watch on the appropriate communication channel of, and report its position as necessary to, the air traffic services unit providing flight information service.

Note. — See Notes following 3.6.5.1.

4.2 VFR to IFR

4.2.1. An aircraft operated in accordance with the visual flight rules which wishes to change to compliance with the instrument flight rules shall:

a) if a flight plan was submitted, communicate the necessary changes to be affected to its current flight plan; or

b) when so required by 3.3.1.2, submit a flight plan to the appropriate air traffic services unit and obtain a clearance prior to proceeding IFR when in controlled airspace.

5 Instrument Flight Rules

5.1 Rules applicable to all IFR flights

5.1.1. Aircraft equipment

5.1.1.1. Aircraft shall be equipped with suitable instruments and with navigation equipment appropriate to the route to be flown.

5.1.2. Minimum levels

5.1.2.1. Except when necessary for take-off or landing, or except when specifically authorised by the appropriate authority, an IFR flight shall be flown at a level which is not below the minimum flight altitude established by the State whose territory is overflown, or, where no such minimum flight altitude has been established:

a) over high terrain or in mountainous areas, at a level which is at least 600 m (2 000 ft) above the highest obstacle located within 8 km of the estimated position of the aircraft;

b) elsewhere than as specified in a), at a level which is at least 300 m (1 000 ft) above the highest obstacle located within 8 km of the estimated position of the aircraft.

Note 1. — The estimated position of the aircraft will take account of the navigational accuracy which can be achieved on the relevant route segment, having regard to the navigational facilities available on the ground and in the aircraft.

Note 2. — See also 3.1.2.

5.1.3. Change from IFR flight to VFR flight

5.1.3.1. An aircraft electing to change the conduct of its flight from compliance with the instrument flight rules to compliance with the visual flight rules shall, if a flight plan was submitted, notify the appropriate air traffic services unit specifically that the IFR flight is cancelled and communicate thereto the changes to be made to its current flight plan.

5.1.3.2. When an aircraft operating under the instrument flight rules is flown in or encounters visual meteorological conditions it shall not cancel its IFR flight unless it is anticipated, and intended, that the flight will be continued for a reasonable period of time in uninterrupted visual meteorological conditions.

5.2 Rules applicable to IFR flights within controlled airspace

5.2.1. IFR flights shall comply with the provisions of 3.6 when operated in controlled airspace.

5.2.2. An IFR flight operating in cruising flight in controlled airspace shall be flown at a cruising level, or, if authorised to employ cruise climb techniques, between two levels or above a level, selected from:

a) the tables of cruising levels in Appendix 3; or

b) a modified table of cruising levels, when so prescribed in accordance with Appendix 3 for flight above FL 410; except that the correlation of levels to track prescribed therein shall not apply whenever otherwise indicated in air traffic control clearances or specified by the appropriate ATS authority in Aeronautical Information Publications.

5.3 Rules applicable to IFR flights outside controlled airspace

5.3.1. Cruising levels

5.3.1.1. An IFR flight operating in level cruising flight outside of controlled airspace shall be flown at a cruising level appropriate to its track as specified in:

a) the tables of cruising levels in Appendix 3, except when otherwise specified by the appropriate ATS authority for flight at or below 900 m (3 000 ft) above mean sea level; or

b) a modified table of cruising levels, when so prescribed in accordance with Appendix 3 for flight above FL 410.

Note. — This provision does not preclude the use of cruise climb techniques by aircraft in supersonic flight.

5.3.2. Communications

5.3.2.1. An IFR flight operating outside controlled airspace but within or into areas, or along routes, designated by the appropriate ATS authority in accordance with 3.3.1.2 c) or d) shall maintain an air-ground voice communication watch on the appropriate communication channel and establish two-way communication, as necessary, with the air traffic services unit providing flight information service.

Note. — See Notes following 3.6.5.1.

5.3.3. Position reports

5.3.3.1. An IFR flight operating outside controlled airspace and required by the appropriate ATS authority to:

a) submit a flight plan,

b) maintain an air-ground voice communication watch on the appropriate communication channel and establish two-way communication, as necessary, with the air traffic services unit providing flight information service, shall report position as specified in 3.6.3 for controlled flights.

Note.— Aircraft electing to use the air traffic advisory service whilst operating IFR within specified advisory airspace are expected to comply with the provisions of 3.6, except that the flight plan and changes thereto are not subjected to clearances and that two-way communication will be maintained with the unit providing the air traffic advisory service.

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6 Appendices

6.1 Appendix 1 – Signals

(Note. — See Chapter 3, 3.4 of this CAD)

Note 1. — None of the provisions in this section shall prevent the use, by an aircraft in distress, of any means at its disposal to attract attention, make known its position and obtain help.

Note 2. — For full details of telecommunication transmission procedures for the distress and urgency signals, see CAD 10, Volume II, Chapter 5.

Note 3. — For details of the search and rescue visual signals, see CAD 12.

1 Distress and Urgency Signals

1.1 Distress signals

1.1.1 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.

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 by means of an automatic instrument is recommended.

3270 The radiotelephone alarm signal consists of two substantially sinusoidal audio frequency tones transmitted alternately. One tone shall have a frequency of 2 200 Hz and the other a frequency of 1 300 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.

1.2 Urgency signals

1.2.1 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.

1.2.2 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;

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 Signals for Use in The Event of Interception

2.1 Signals initiated by intercepting aircraft and responses by intercepted aircraft

Series	INTERCEPTING Aircraft Signals	Meaning	INTERCEPTED Aircraft Responds	Meaning
1	DAY or NIGHT — Rocking aircraft and flashing navigational lights at irregular intervals (and landing lights in the case of a helicopter) from a position slightly above and ahead of, and normally to the left of, the intercepted aircraft (or to the right if the intercepted aircraft is a helicopter) and, after acknowledgement, a slow level turn, normally to the left (or to the right in the case of a helicopter) on the desired heading. *Note 1. — Meteorological conditions or terrain may require the intercepting aircraft to reverse the positions and direction of turn given above in Series 1.* *Note 2.— If the intercepted aircraft is not able to keep pace with the intercepting aircraft, the latter is expected to fly a series of racetrack patterns and to rock the aircraft each time it passes the intercepted aircraft*	You have been intercepted. Follow me.	DAY or NIGHT — Rocking aircraft, flashing navigational lights at irregular intervals and following. *Note. — Additional action required to be taken by intercepted aircraft is prescribed in Chapter 3, 3.8.*	Understood, will comply.

Series	INTERCEPTING Aircraft Signals	Meaning	INTERCEPTED Aircraft Responds	Meaning
2	DAY or NIGHT — An abrupt breakaway manoeuvre from the intercepted aircraft consisting of a climbing turn of 90 degrees or more without crossing the line of flight of the intercepted aircraft.	You may proceed.	DAY or NIGHT — Rocking the aircraft.	Understood, will comply.
3	DAY or NIGHT — Lowering landing gear (if fitted), showing steady landing lights and overflying runway in use or, if the intercepted aircraft is a helicopter, overflying the helicopter landing area. In the case of helicopters, the intercepting helicopter makes a landing approach, coming to hover near to the landing area.	Land at this aerodrome.	DAY or NIGHT — Lowering landing gear,(if fitted), showing steady landing lights and following the intercepting aircraft and, if, after overflying the runway in use or helicopter landing area, landing is considered safe, proceeding to land.	Understood, will comply.

2.2 Signals initiated by intercepted aircraft and responses by intercepting aircraft

Series	INTERCEPTING Aircraft Signals	Meaning	INTERCEPTED Aircraft Responds	Meaning
4	DAY or NIGHT — Raising landing gear (if fitted) and flashing landing lights while passing over runway in use or helicopter landing area at a height exceeding 300m (1000 ft) but not exceeding 600m (2000 ft) (in the case of a helicopter, at a height exceeding 50m (170 ft) but not exceeding 100m (330 ft) above the aerodrome level, and continuing to circle runway in use or helicopter landing area. If unable to flash landing lights, flash any other lights available.	Aerodrome you have designated is inadequate.	DAY or NIGHT — If it is desired that the intercepted aircraft follow the intercepting aircraft to an alternate aerodrome, the intercepting aircraft raises its landing gear (if fitted) and uses the Series 1 signals prescribed for intercepting aircraft. If it is decided to release the intercepted aircraft, the intercepting aircraft uses the Series 2 signals prescribed for intercepting aircraft.	Understood, follow me. Understood, you may proceed.
5	DAY or NIGHT — Regular switching on and off of all available lights but in such a manner as to be distinct from flashing lights.	Cannot comply.	DAY or NIGHT — Use Series 2 signals prescribed for intercepting aircraft.	Understood.
6	DAY or NIGHT — Irregular flashing of all available lights.	In distress	DAY or NIGHT — Use Series 2 signals prescribed for intercepting aircraft.	Understood.

3 Enter a Restricted, Prohibited or Danger Area

3.1 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 will 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.

4 Signals for Aerodrome Traffic

4.1 Light and pyrotechnic signals

4.1.1 Instructions

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 Flashed	Return for Landing*	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*	Return to Starting Point
	Red Pyrotechnic	Notwithstanding any previous instructions, Do not Land for the time being	
**Clearances to Land and to Taxi will be given in due course*			

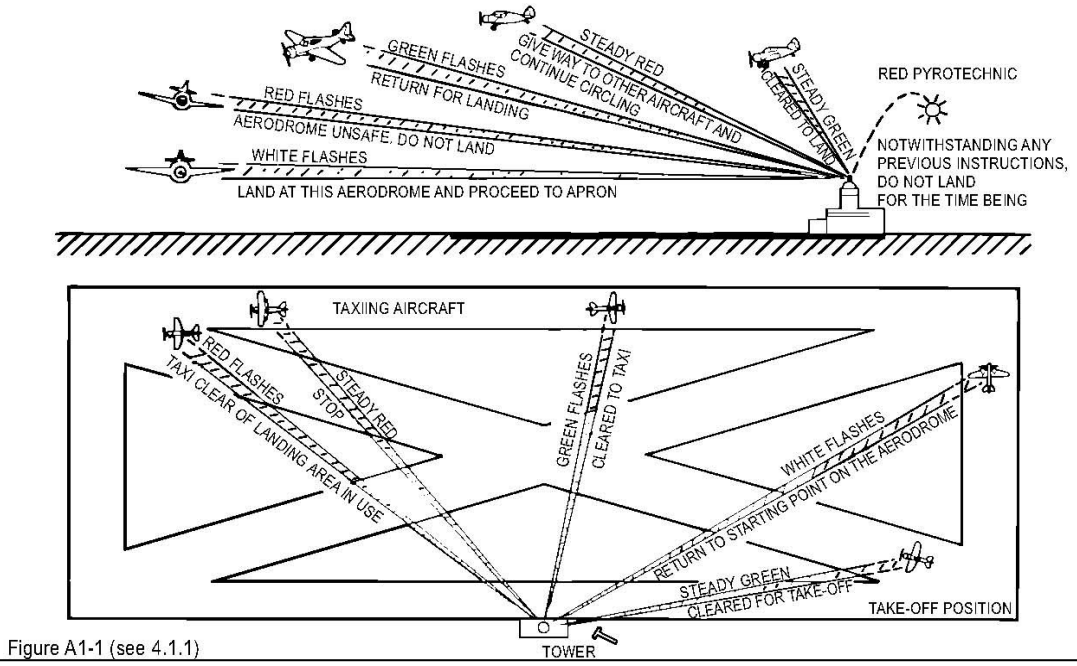


Figure A1-1 (see 4.1.1)

4.1.2 Acknowledgement by an aircraft

a) When in flight:

1) during the hours of daylight:

i) by rocking the aircraft's wings;

Note. — This signal should not be expected on the base and final legs of the approach.

2) during the hours of darkness:

i) 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:

i) by moving the aircraft's ailerons or rudder;

2) during the hours of darkness:

i) 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.

4.2 Visual ground signals

Note. — For details of visual ground aids, see CAD 14.

4.2.1 Prohibition of landing

4.2.1.1 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

4.2.2 Need for special precautions while approaching or landing

4.2.2.1 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 o in landing.

Figure A1-3

4.2.3 Use of runways and taxiways

4.2.3.1 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.

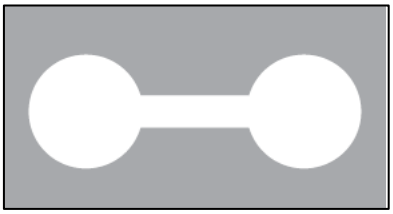


Figure A1-4

4.2.3.2 The same horizontal white dumb-bell as in 4.2.3.1 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.

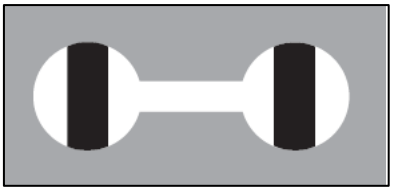


Figure A1-5

4.2.4 Closed runways or taxiways

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

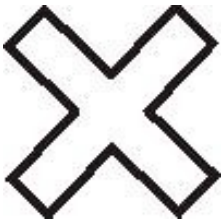


Figure A1-6

4.2.5 Directions for landing or take-off

4.2.5.1 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.

Note. — When used at night, the landing T is either illuminated or outlined in white lights.

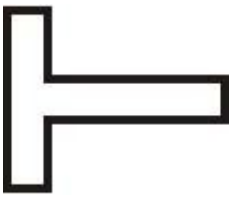


Figure A1-7

4.2.5.2 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

4.2.6 Right-hand traffic

4.2.6.1 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.

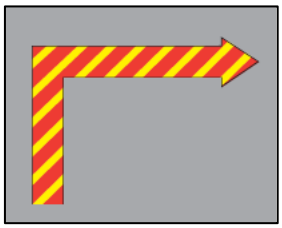


Figure A1-9

4.2.7 Air traffic services reporting office

4.2.7.1 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

4.2.8 Glider flights in operation

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

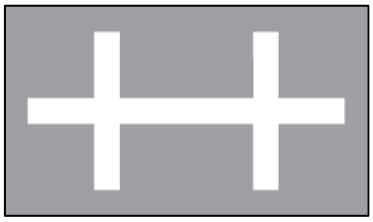


Figure A1-11

5 Marshalling Signals

5.1 From a signalman to an aircraft

Note 1. — These signals are designed for use by the signalman, with hands illuminated as necessary to facilitate observation by the pilot, and facing the aircraft in a position:

a) for fixed-wing aircraft, on left side of aircraft, where best seen by the pilot; and

b) for helicopters, where the signalman can best be seen by the pilot.

Note 2. — The meaning of the relevant signals remains the same if bats, illuminated wands or torchlights are held.

Note 3. — The aircraft engines are numbered, for the signalman facing the aircraft, from right to left (i.e. No. 1 engine being the port outer engine).

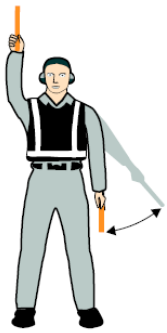
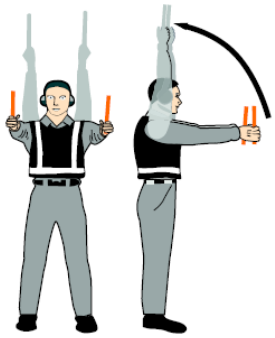
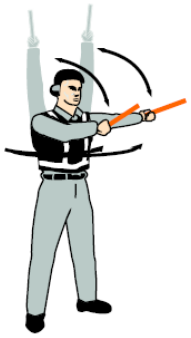
Note 4. — Signals marked with an asterisk (*) are designed for use to hovering helicopters.

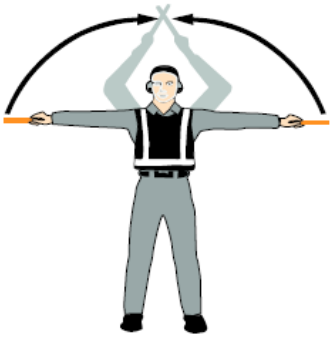
Note 5. — References to wands may also be read to refer to daylight-fluorescent table-tennis bats or gloves (daytime only).

Note 6. — References to the signalman may also be read to refer to marshaller.

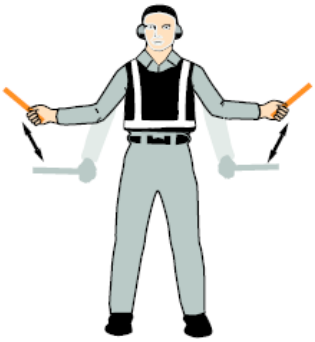
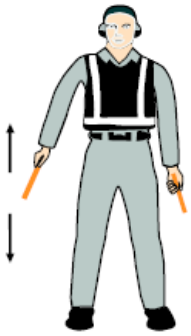
5.1.1 Prior to using the following signals, the signalman shall ascertain that the area within which an aircraft is to be guided is clear of objects which the aircraft, in complying with Chapter 3 para 3.4.1, might otherwise strike.

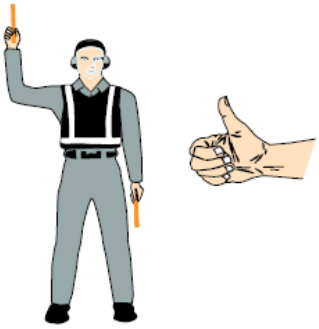
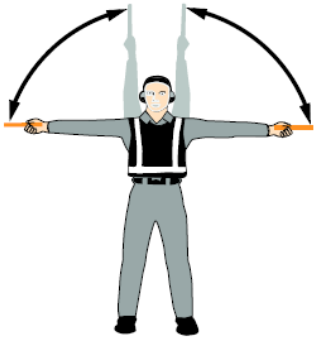
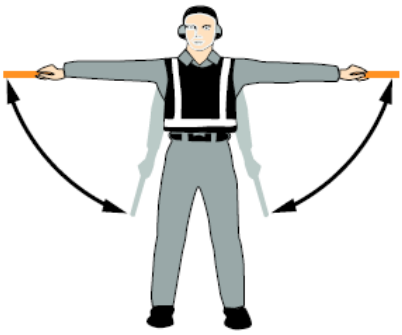
Note. — The design of many aircraft is such that the path of the wing tips, engines and other extremities cannot always be monitored visually from the flight deck while the aircraft is being maneuverer on the ground.

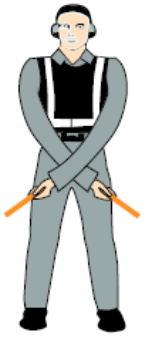
	**1. Wing walker/guide** Raise right hand above head level with wand pointing up; move left-hand wand pointing down toward body. *Note. — This signal provides an indication by a person positioned at the aircraft wing tip, to the pilot/ marshaller/ push-back operator, that the aircraft movement on/off a parking position would be unobstructed.*
	**2. Identify gate** Raise fully extended arms straight above head with wands pointing up.
	**3. Proceed to next signalman or as directed by tower/ground control** Point both arms upward; move and extend arms outward to sides of body and point with wands to direction of next signalman or taxi area.

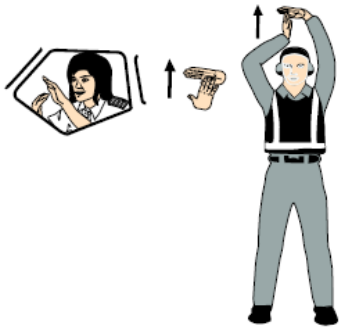
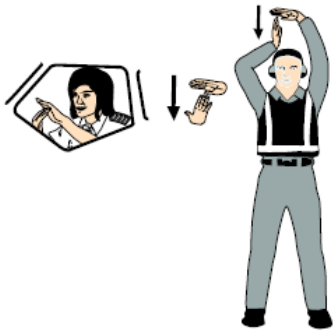
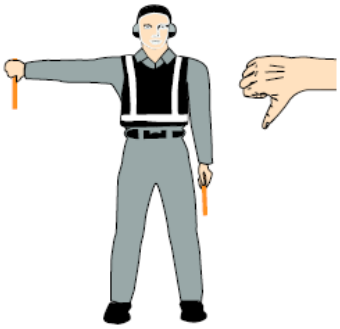
	**4. Straight ahead** Bend extended arms at elbows and move wands up and down from chest height to head.
	**5 a). Turn left (from pilot's point of view)** With right arm and wand extended at a 90-degree angle to body, make "come ahead" signal with left hand. The rate of signal motion indicates to pilot the rate of aircraft turn.
	**5 b). Turn right (from pilot's point of view)** 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.
	**6 a). Normal stop** Fully extend arms and wands at a 90-degree angle to sides and slowly move to above head until wands cross.
	**6 b). Emergency stop** Abruptly extend arms and wands to top of head, crossing wands.

	**7 a). Set brakes** Raise hand just above shoulder height with open palm. Ensuring eye contact with flight crew, close hand into a fist. **Do not** move until receipt of “thumbs up” acknowledgement from flight crew.
	**7 b). Release brakes** Raise hand just above shoulder height with hand closed in a fist. Ensuring eye contact with flight crew, open palm. **Do not** move until receipt of “thumbs up” acknowledgement from flight crew.
	**8 a). Chocks inserted** With arms and wands fully extended above head, move wands inward in a “jabbing” motion until wands touch. **Ensure** acknowledgement is received from flight crew.
	**8 b). Chocks removed** With arms and wands fully extended above head, move wands outward in a “jabbing” motion. **Do not** remove chocks until authorised by flight crew.
	**9. Start engine(s)** 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.

	**10. Cut engines** 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.
	**11. Slow down** Move extended arms downwards in a “patting” gesture, moving wands up and down from waist to knees.
	**12. Slow down engine(s)** on indicated side With arms down and wands toward ground, wave either right or left wand up and down indicating engine(s) on left or right side respectively should be slowed down.
	**13. Move back** 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).
	**14 a). Turns while backing (for tail to starboard)** Point left arm with wand down and bring right arm from overhead vertical position to horizontal forward position, repeating right-arm movement.

	**14 b). Turns while backing (for tail to port)** Point right arm with wand down and bring left arm from overhead vertical position to horizontal forward position, repeating left-arm movement.
	**15. Affirmative/all clear** Raise right arm to head level with wand pointing up or display hand with “thumbs up”; left arm remains at side by knee. *Note.— This signal is also used as a technical/ servicing communication signal.*
	***16. Hover** Fully extend arms and wands at a 90-degree angle to sides.
	***17. Move upwards** 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.
	***18. Move downwards** 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.

	***19 a). Move horizontally left (from pilot's point of view)** Extend arm horizontally at a 90-degree angle to right side of body. Move other arm in same direction in a sweeping motion.
	***19 b). Move horizontally right (from pilot's point of view)** Extend arm horizontally at a 90-degree angle to left side of body. Move other arm in same direction in a sweeping motion.
	***20. Land** Cross arms with wands downwards and in front of body.
	**21. Hold position/stand by** Fully extend arms and wands downwards at a 45-degree angle to sides. Hold position until aircraft is clear for next manoeuvre.
	**22. Dispatch aircraft** 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.

	**23. Do not touch controls (technical/servicing communication signal)** Extend right arm fully above head and close fist or hold wand in horizontal position; left arm remains at side by knee.
	**24. Connect ground power (technical/servicing communication signal)** 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.
	**25. Disconnect power (technical/servicing communication signal)** 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. Do not disconnect power until authorised by flight crew. At night, illuminated wands can also be used to form the “T” above head.
	**26. Negative (technical/servicing communication signal)** Hold right arm straight out at 90 degrees from shoulder and point wand down to ground or display hand with “thumbs down”; left hand remains at side by knee.
	**27. Establish communication via interphone (technical/servicing communication signal)** Extend both arms at 90 degrees from body and move hands to cup both ears.

	**28. Open/close stairs (technical/servicing communication signal)** 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. *Note. — This signal is intended mainly for aircraft with the set of integral stairs at the front.*

5.2 From the pilot of an aircraft to a signalman

Note 1. — These signals are designed for use by a pilot in the cockpit with hands plainly visible to the signalman, and illuminated as necessary to facilitate observation by the signalman.

Note 2. — The aircraft engines are numbered in relation to the signalman facing the aircraft, from right to left (i.e. No. 1 engine being the port outer engine).

5.2.1 Brakes

Note. — The moment the fist is clenched or the fingers are extended indicates, respectively, the moment of brake engagement or release.

a) Brakes engaged: raise arm and hand, with fingers extended, horizontally in front of face, then clench fist.

b) Brakes released: raise arm, with fist clenched, horizontally in front of face, then extend fingers.

5.2.2 Chocks

a) Insert chocks: arms extended, palms outwards, move hands inwards to cross in front of face.

b) Remove chocks: hands crossed in front of face, palms outwards, move arms outwards.

5.2.3 Ready to start engine(s)

5.2.3.1 Raise the appropriate number of fingers on one hand indicating the number of the engine to be started.

5.3 Technical/servicing communication signals

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

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

Note. — The technical/servicing communication signals are included in Appendix 1 to standardise the use of hand signals used to communicate to flight crews during the aircraft movement process that relate to servicing or handling functions

6 Standard Emergency Hand Signals

6.1 The following hand signals are established as the minimum required for emergency communication between the aircraft rescue and firefighting (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 flight crew.

Note. — In order to communicate more effectively with the cabin crew, emergency hand signals may be given by ARFF firefighters from other positions.

	**1. Recommend evacuation** Evacuation recommended based on ARFF and incident commander's assessment of external situation. 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. Night — same with wands.
	**2. Recommended stop** Recommend evacuation in progress be halted. Stop aircraft movement or other activity in progress. Arms in front of head, crossed at wrists. Night — same with wands.
	**3. Emergency contained** No outside evidence of dangerous conditions or "all clear." 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 (umpire's "safe" signal). Night — same with wands.

	**4. Fire** Move right-hand in a “fanning” motion from shoulder to knee, while at the same time pointing with left hand to area of fire. Night — same with wands.

6.2 Appendix 2 – Interception of Civil Aircraft

(Note. — See Chapter 3, 3.8 of the CAD)

1 Principles to be observed by States

1.1 To achieve the uniformity in regulations which is necessary for the safety of navigation of civil aircraft due regard shall be had by Contracting States to the following principles when developing regulations and administrative directives:

a) interception of civil aircraft will be undertaken only as a last resort;

b) if undertaken, an interception will be limited to determining the identity of the aircraft, unless it is necessary to return the aircraft to its planned track, direct it beyond the boundaries of national airspace, guide it away from a prohibited, restricted or danger area or instruct it to effect a landing at a designated aerodrome;

c) practice interception of civil aircraft will not be undertaken;

d) navigational guidance and related information will be given to an intercepted aircraft by radiotelephony, whenever radio contact can be established; and

e) in the case where an intercepted civil aircraft is required to land in the territory overflown, the aerodrome designated for the landing is to be suitable for the safe landing of the aircraft type concerned.

1.2 Contracting States shall publish a standard method that has been established for the manoeuvring of aircraft intercepting a civil aircraft. Such method shall be designed to avoid any hazard for the intercepted aircraft.

Note. — Special recommendations regarding a method for the manoeuvring are contained in Attachment A, Section 3.

1.3 Contracting States shall ensure that provision is made for the use of secondary surveillance radar or ADS-B, where available, to identify civil aircraft in areas where they may be subject to interception

2 Action by intercepted aircraft

2.1 An aircraft which is intercepted by another aircraft shall immediately:

a) follow the instructions given by the intercepting aircraft, interpreting and responding to visual signals in accordance with the specifications in Appendix 1;

b) notify, if possible, the appropriate air traffic services unit;

c) attempt to establish radio communication with the intercepting aircraft or with the appropriate intercept control unit, by making a general call on the emergency frequency 121.5 MHz, giving the identity of the inter- cepted aircraft and the nature of the flight; and if no contact has been established and if practicable, repeating this call on the emergency frequency 243 MHz;

d) if equipped with SSR transponder, select Mode A, Code 7700, unless otherwise instructed by the appropriate air traffic services unit.

e) if equipped with ADS-B or ADS-C, select the appropriate emergency functionality, if available, unless otherwise instructed by the appropriate air traffic services unit.

2.2 If any instructions received by radio from any sources conflict with those given by the intercepting aircraft by visual signals, the intercepted aircraft shall request immediate clarification while continuing to comply with the visual instructions given by the intercepting aircraft.

2.3 If any instructions received by radio from any sources conflict with those given by the intercepting aircraft by radio, the intercepted aircraft shall request immediate clarification while continuing to comply with the radio instructions given by the intercepting aircraft.

3 Radio communication during interception

3.1 If radio contact is established during interception but communication in a common language is not possible, attempts shall be made to convey instructions, acknowledgement of instructions and essential information by using the phrases and pronunciations in Table A2-1 and transmitting each phrase twice:

Table A2-1

Phrases for use by INTERCEPTING aircraft			Phrases for use by INTERCEPTED aircraft		
Phrase	Pronunciation1	Meaning	Phrase	Pronunciation1	Meaning
CALL SIGN	KOL SA-IN	What is your call sign?	CALL SIGN (call sign)2	KOL SA-IN (call sign)	My call sign is (call sign)
FOLLOW	FOL-LO	Follow me	WILCO Will comply	VILL-KO	Understood
DESCEND	DEE-SEND	Descend for landing	CAN NOT	KANN NOTT	Unable to comply
YOU LAND	YOU LAAND	Land at this aerodrome	REPEAT	REE-PEET	Repeat your instruction
PROCEED	PRO-SEED	You may proceed	AM LOST	AM LOSST	Position unknown
			MAYDAY	MAYDAY	I am in distress
			HIJACK3	HI-JACK	I have been hijacked
			LAND (place name)	LAAND (place name)	I request to land at (place name)
			DESCEND	DEE-SEND	I require descent

1. *In the second column, syllables to be emphasised are underlined.*
2. *The call sign required to be given is that used in radiotelephony communications with air traffic services units and corresponding to the aircraft identification in the flight plan.*
3. *Circumstances may not always permit, nor make desirable, the use of the phrase "HIJACK".*

6.3 Appendix 3 – Table of Cruising Levels

The cruising levels to be observed when so required by this CAD are as follows:

RVSM — FEET

a) in areas where feet are used for altitude and where, in accordance with regional air navigation agreements, a vertical separation minimum of 1 000 ft is applied between FL 290 and FL 410 inclusive: *

TRACK**											
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
10	1 000	300	–	–	–	20	2 000	600	–	–	–
30	3 000	900	35	3 500	1 050	40	4 000	1 200	45	4 500	1 350
50	5 000	1 500	55	5 500	1 700	60	6 000	1 850	65	6 500	2 000
70	7 000	2 150	75	7 500	2 300	80	8 000	2 450	85	8 500	2 600
90	9 000	2 750	95	9 500	2 900	100	10 000	3 050	105	10 500	3 200
110	11 000	3 350	115	11 500	3 500	120	12 000	3 650	125	12 500	3 800
130	13 000	3 950	135	13 500	4 100	140	14 000	4 250	145	14 500	4 400
150	15 000	4 550	155	15 500	4 700	160	16 000	4 900	165	16 500	5 050
170	17 000	5 200	175	17 500	5 350	180	18 000	5 500	185	18 500	5 650
190	19 000	5 800	195	19 500	5 950	200	20 000	6 100	205	20 500	6 250
210	21 000	6 400	215	21 500	6 550	220	22 000	6 700	225	22 500	6 850
230	23 000	7 000	235	23 500	7 150	240	24 000	7 300	245	24 500	7 450
250	25 000	7 600	255	25 500	7 750	260	26 000	7 900	265	26 500	8 100
270	27 000	8 250	275	27 500	8 400	280	28 000	8 550	285	28 500	8 700
290	29 000	8 850				300	30 000	9 150			
310	31 000	9 450				320	32 000	9 750			
330	33 000	10 050				340	34 000	10 350			
350	35 000	10 650				360	36 000	10 950			
370	37 000	11 300				380	38 000	11 600			
390	39 000	11 900				400	40 000	12 200			
410	41 000	12 500				430	43 000	13 100			
450	45 000	13 700				470	47 000	14 350			
490	49 000	14 950				510	51 000	15 550			
etc.	etc.	etc.				etc.	etc.	etc.			

**Except when, on the basis of regional air navigation agreements, a modified table of cruising levels based on a nominal vertical separation minimum of 1 000 ft (300 m) is prescribed for use, under specified conditions, by aircraft operating above FL 410 within designated portions of the airspace.*

*** 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 appropriate ATS 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.*

**** Except where, on the basis of regional air navigation agreements, from 090 to 269 degrees and from 270 to 089 degrees is prescribed to accommodate predominant traffic directions and appropriate transition procedures to be associated therewith are specified.*

Note. — Guidance material relating to vertical separation is contained in the Manual on Implementation of a 300 m (1 000 ft) Vertical Separation Minimum Between FL 290 and FL 410 Inclusive (ICAO Doc 9574

RVSM — METRES

b) in areas where metres are used for altitude and where, in accordance with regional air navigation agreements, a vertical separation minimum of 300 m is applied between 8 900 m and 12 500 m inclusive: *

TRACK**											
From 000 degrees to 179 degrees***						From 180 degrees to 359 degrees***					
IFR Flights			VFR Flights			IFR Flights			VFR Flights		
	Level			Level			Level			Level	
Standard Metric	Metres	Feet	Standard Metric	Metres	Feet	Standard Metric	Metres	Feet	Standard Metric	Metres	Feet
30	300	1 000	–	–	–	60	600	2 000	–	–	–
90	900	3 000	105	1 050	3 500	120	1 200	3 900	135	1 350	4 400
150	1 500	4 900	165	1 650	5 400	180	1 800	5 900	195	1 950	6 400
210	2 100	6 900	225	2 250	7 400	240	2 400	7 900	255	2 550	8 400
270	2 700	8 900	285	2 850	9 400	300	3 000	9 800	315	3 150	10 300
330	3 300	10 800	345	3 450	11 300	360	3 600	11 800	375	3 750	12 300
390	3 900	12 800	405	4 050	13 300	420	4 200	13 800	435	4 350	14 300
450	4 500	14 800	465	4 650	15 300	480	4 800	15 700	495	4 950	16 200
510	5 100	16 700	525	5 250	17 200	540	5 400	17 700	555	5 550	18 200
570	5 700	18 700	585	5 850	19 200	600	6 000	19 700	615	6 150	20 200
630	6 300	20 700	645	6 450	21 200	660	6 600	21 700	675	6 750	22 100
690	6 900	22 600	705	7 050	23 100	720	7 200	23 600	735	7 350	24 100
750	7 500	24 600	765	7 650	25 100	780	7 800	25 600	795	7 950	26 100
810	8 100	26 600	825	8 250	27 100	840	8 400	27 600	855	8 550	28 100
890	8 900	29 100				920	9 200	30 100			
950	9 500	31 100				980	9 800	32 100			
1010	10 100	33 100				1040	10 400	34 100			
1070	10 700	35 100				1100	11 000	36 100			
1130	11 300	37 100				1160	11 600	38 100			
1190	11 900	39 100				1220	12 200	40 100			
1250	12 500	41 100				1310	13 100	43 000			
1370	13 700	44 900				1430	14 300	46 900			
1490	14 900	48 900				1550	15 500	50 900			
etc.	etc.	etc.				etc.	etc.	etc.			

**Except when, on the basis of regional air navigation agreements, a modified table of cruising levels based on a nominal vertical separation minimum of 1 000 ft (300 m) is prescribed for use, under specified conditions, by aircraft operating above FL 410 within designated portions of the airspace.*

*** 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 appropriate ATS 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.*

**** Except where, on the basis of regional air navigation agreements, from 090 to 269 degrees and from 270 to 089 degrees is prescribed to accommodate predominant traffic directions and appropriate transition procedures to be associated therewith are specified.*

Note. — Guidance material relating to vertical separation is contained in the Manual on Implementation of a 300 m (1 000 ft) Vertical Separation Minimum Between FL 290 and FL 410 Inclusive (ICAO Doc 9574

Non-RVSM — FEET

c) in other areas where feet are the primary unit of measurement for altitude:

TRACK**											
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
10	1 000	300	–	–	–	20	2 000	600	–	–	–
30	3 000	900	35	3 500	1 050	40	4 000	1 200	45	4 500	1 350
50	5 000	1 500	55	5 500	1 700	60	6 000	1 850	65	6 500	2 000
70	7 000	2 150	75	7 500	2 300	80	8 000	2 450	85	8 500	2 600
90	9 000	2 750	95	9 500	2 900	100	10 000	3 050	105	10 500	3 200
110	11 000	3 350	115	11 500	3500	120	12 000	3 650	125	12 500	3 800
130	13 000	3 950	135	13 500	4 100	140	14 000	4 250	145	14 500	4 400
150	15 000	4 550	155	15 500	4 700	160	16 000	4 900	165	16 500	5 050
170	17 000	5 200	175	17 500	5 350	180	18 000	5 500	185	18 500	5 650
190	19 000	5 800	195	19 500	5 950	200	20 000	6 100	205	20 500	6 250
210	21 000	6 400	215	21 500	6 550	220	22 000	6 700	225	22 500	6 850
230	23 000	7 000	235	23 500	7 150	240	24 000	7 300	245	24 500	7 450
250	25 000	7 600	255	25 500	7 750	260	26 000	7 900	265	26 500	8 100
270	27 000	8 250	275	27 500	8 400	280	28 000	8 550	285	28 500	8 700
290	29 000	8 850	300	30 000	9 150	310	31 000	9 450	320	32 000	9 750
330	33 000	10 050	340	34 000	10 350	350	35 000	10 650	360	36 000	10 950
370	37 000	11 300	380	38 000	11 600	390	39 000	11 900	400	40 000	12 200
410	41 000	12 500	420	42 000	12 800	430	43 000	13 100	440	44 000	13 400
450	45 000	13 700	460	46 000	14 000	470	47 000	14 350	480	48 000	14 650
490	49 000	14 950	500	50 000	15 250	510	51 000	15 550	520	52 000	15 850
etc.	etc.	etc.	etc.	etc.	etc.	etc.	etc.	etc.	etc.	etc.	etc.

**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 appropriate ATS 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.*

*** Except where, on the basis of regional air navigation agreements, from 090 to 269 degrees and from 270 to 089 degrees is prescribed to accommodate predominant traffic directions and appropriate transition procedures to be associated therewith are specified.*

Note. — Guidance material relating to vertical separation is contained in the Manual on Implementation of a 300 m (1 000 ft) Vertical Separation Minimum Between FL 290 and FL 410 Inclusive (ICAO Doc 9574

Non-RVSM — METRES

d) in other areas where metres are the primary unit of measurement for altitude

TRACK**											
From 000 degrees to 179 degrees***						From 180 degrees to 359 degrees***					
IFR Flights			VFR Flights			IFR Flights			VFR Flights		
	Level			Level			Level			Level	
Standard Metric	Metres	Feet	Standard Metric	Metres	Feet	Standard Metric	Metres	Feet	Standard Metric	Metres	Feet
30	300	1 000	–	–	–	60	600	2 000	–	–	–
90	900	3 000	105	1 050	3 500	120	1 200	3 900	135	1 350	4 400
150	1 500	4 900	165	1 650	5 400	180	1 800	5 900	195	1 950	6 400
210	2 100	6 900	225	2 250	7 400	240	2 400	7 900	255	2 550	8 400
270	2 700	8 900	285	2 850	9 400	300	3 000	9 800	315	3 150	10 300
330	3 300	10 800	345	3 450	11 300	360	3 600	11 800	375	3 750	12 300
390	3 900	12 800	405	4 050	13 300	420	4 200	13 800	435	4 350	14 300
450	4 500	14 800	465	4 650	15 300	480	4 800	15 700	495	4 950	16 200
510	5 100	16 700	525	5 250	17 200	540	5 400	17 700	555	5 550	18 200
570	5 700	18 700	585	5 850	19 200	600	6 000	19 700	615	6 150	20 200
630	6 300	20 700	645	6 450	21 200	660	6 600	21 700	675	6 750	22 100
690	6 900	22 600	705	7 050	23 100	720	7 200	23 600	735	7 350	24 100
750	7 500	24 600	765	7 650	25 100	780	7 800	25 600	795	7 950	26 100
810	8 100	26 600	825	8 250	27 100	840	8 400	27 600	855	8 550	28 100
890	8 900	29 100	920	9 200	30 100	950	9 500	31 100	980	9 800	32 100
1010	10 100	33 100	1040	10 400	34 100	1070	10 700	35 100	1100	11 000	36 100
1130	11 300	37 100	1160	11 600	38 100	1190	11 900	39 100	1220	12 200	40 100
1250	12 500	41 100	1280	12 800	42 100	1310	13 100	43 000	1370	13 400	44 000
1370	13 700	44 900	1400	14 000	46 100	1430	14 300	46 900	1460	14 600	47 900
1490	14 900	48 900	1520	15 200	49 900	1550	15 500	50 900	1580	15 800	51 900
etc.	etc.	etc.	etc.	etc.	etc.	etc.	etc.	etc.	etc.	etc.	etc.

**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 appropriate ATS 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.*

*** Except where, on the basis of regional air navigation agreements, from 090 to 269 degrees and from 270 to 089 degrees is prescribed to accommodate predominant traffic directions and appropriate transition procedures to be associated therewith are specified.*

Note. — Guidance material relating to vertical separation is contained in the Manual on Implementation of a 300 m (1 000 ft) Vertical Separation Minimum Between FL 290 and FL 410 Inclusive (ICAO Doc 9574).

6.4 Appendix 4 – Remotely Piloted Aircraft Systems

(Note. — See Chapter 3, 3.1.9 of this CAD)

Note. — The circular Unmanned Aircraft Systems (UAS) (*Cir 328) contains explanatory information related to remotely piloted aircraft systems.*

1 General operating rules

1.1 A remotely piloted aircraft system (RPAS) engaged in international air navigation shall not be operated without appropriate authorisation from the State from which the take-off of the remotely piloted aircraft (RPA) is made.

1.2 An RPA shall not be operated across the territory of another State without special authorisation issued by each State in which the flight is to operate. This authorisation may be in the form of agreements between the States involved.

1.3 An RPA shall not be operated over the high seas without prior coordination with the appropriate ATS authority.

1.4 The authorisation and coordination referred to in 1.2 and 1.3 shall be obtained prior to take-off if there is reasonable expectation, when planning the operation, that the aircraft may enter the airspace concerned.

1.5 An RPAS shall be operated in accordance with conditions specified by the State of Registry, the State of the Operator, if different, and the State(s) in which the flight is to operate.

1.6 Flight plans shall be submitted in accordance with Chapter 3 of this CAD or as otherwise mandated by the State(s) in which the flight is to operate.

1.7 RPAS shall meet the performance and equipment carriage requirements for the specific airspace in which the flight is to operate.

2 Certificates and licensing

Note 1. — Assembly Resolution A37-15 Appendix G resolves that pending the coming into force of international Standards respecting particular categories, classes or types of aircraft, certificates issued or rendered valid, under national regulations, by the Contracting State in which the aircraft is registered shall be recognised by other Contracting States for the purposes of flight over their territories, including landings and take-offs.

Note 2. — Certification and licensing Standards are not yet developed. Thus, in the meantime, any certification and licensing need not be automatically deemed to comply with the SARPs of the related CADs, including CAD 1, 6 and 8, until such time as the related RPAS SARPs are developed.

Note 3. — Notwithstanding Assembly Resolution A37-15, Article 8 of the Chicago Convention assures each Contracting State of the absolute sovereignty over the authorisation for RPA operations over its territory.

2.1 An RPAS shall be approved, taking into account the interdependencies of the components, in accordance with national regulations and in a manner that is consistent with the provisions of related CADs. In addition:

a) an RPA shall have a certificate of airworthiness issued in accordance with national regulations and in a manner that is consistent with the provisions of CAD 8; and

b) the associated RPAS components specified in the type design shall be certificated and maintained in accordance with national regulations and in a manner that is consistent with the provisions of related CADs.

2.2 An operator shall have an RPAS operator certificate issued in accordance with national regulations and in a manner that is consistent with the provisions of CAD 6.

2.3 Remote pilots shall be licensed, or have their licences rendered valid, in accordance with national regulations and in a manner that is consistent with the provisions of CAD 1.

3 Request for authorisation

3.1 The request for authorisation referred to in 1.2 above shall be made to the appropriate authorities of the State(s) in which the RPA will operate not less than seven days before the date of the intended flight unless otherwise specified by the State.

3.2 Unless otherwise specified by the State(s), the request for authorisation shall include the following:

a) name and contact information of the operator;

b) RPA characteristics (type of aircraft, maximum certificated take-off mass, number of engines, wing span);

c) copy of certificate of registration;

d) aircraft identification to be used in radiotelephony, if applicable;

e) copy of the certificate of airworthiness;

f) copy of the RPAS operator certificate;

g) copy of the remote pilot(s) licence;

h) copy of the aircraft radio station licence, if applicable;

i) description of the intended operation (to include type of operation or purpose), flight rules, visual line-of-sight (VLOS) operation if applicable, date of intended flight(s), point of departure, destination, cruising speed(s), cruising level(s), route to be followed, duration/frequency of flight;

j) take-off and landing requirements;

k) RPA performance characteristics, including:

1) operating speeds;

2) typical and maximum climb rates;

3) typical and maximum descent rates;

4) typical and maximum turn rates;

5) other relevant performance data (e.g. limitations regarding wind, icing, precipitation); and

6) maximum aircraft endurance.

l) communications, navigation and surveillance capabilities:

1) aeronautical safety communications frequencies and equipment, including:

i) ATC communications, including any alternate means of communication;
ii) command and control links (C2) including performance parameters and designated operational coverage area;
iii) communications between remote pilot and RPA observer, if applicable; 2) navigation equipment; and 3) surveillance equipment (e.g. SSR transponder, ADS-B out);

m) detect and avoid capabilities;

n) emergency procedures, including: 1) communications failure with ATC; 2) C2 failure; and 3) remote pilot/RPA observer communications failure, if applicable;

o) number and location of remote pilot stations as well as handover procedures between remote pilot stations, if applicable; p) document attesting noise certification that is consistent with the provisions of CAD 16, Volume 1, if applicable; q) confirmation of compliance with national security standards in a manner that is consistent with the provisions of CAD 17, to include security measures relevant to the RPAS operation, as appropriate; r) payload information/description; and s) proof of adequate insurance/liability coverage.

3.3 When certificates or other documents identified in 3.2 above are issued in a language other than English, an English translation shall be included.

3.4 After authorisation has been obtained from the appropriate State(s), air traffic services notification and coordination shall be completed in accordance with the requirements of the State(s).

Note. — A request for authorisation does not satisfy the requirement to file a flight plan with the air traffic services units.

3.5 Changes to the authorisation shall be submitted for consideration to the appropriate State(s). If the changes are approved, all affected authorities shall be notified by the operator.

3.6 In the event of a flight cancellation, the operator or remote pilot shall notify all appropriate authorities as soon as possible

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6.5 Appendix 5 – Unmanned Free Balloons

(Note. — See Chapter 3, 3.1.10 of this CAD)

1 Classification of unmanned free balloons

1.1 Unmanned free balloons shall be classified as:

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) below; 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; 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.

Note 1. — The area density referred to in c) 3) is determined by dividing the total mass in grams of the payload package by the area in square centimetres of its smallest surface.

Note 2. — See Figure A5-1.

2 General operating rules

2.1 An unmanned free balloon shall not be operated without appropriate 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 appropriate authority, shall not be operated across the territory of another State without appropriate 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 not associated with the operation.

2.6 A heavy unmanned free balloon shall not be operated over the high seas without prior coordination with the appropriate ATS authority.

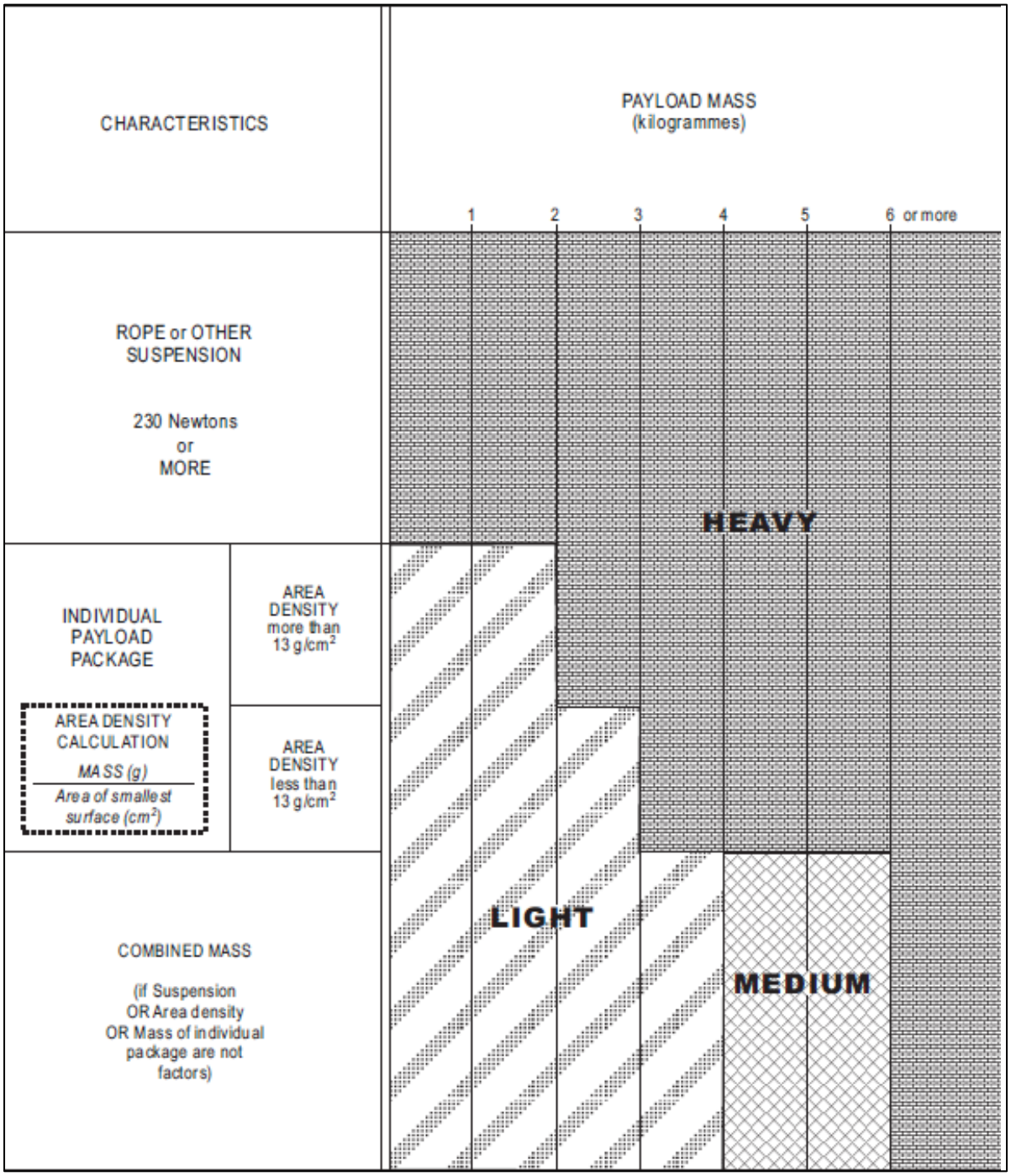

Figure A5-1. Classification of unmanned free balloons

3 Operating limitations and equipment requirements

3.1 A heavy unmanned free balloon shall not be operated without authorisation from the appropriate ATS authority 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.

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;

Note. — Superpressure balloons do not require these devices as they quickly rise after payload discharge and burst without the need for a device or system designed to puncture the balloon envelope. In this context a superpressure balloon is a simple non-extensible envelope capable of withstanding a differential of pressure, higher inside than out. It is inflated so that the smaller night-time pressure of the gas still fully extends the envelope. Such a superpressure balloon will keep essentially constant level until too much gas diffuses out of it.

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 between sunset and sunrise or such other period between sunset and sunrise (corrected to the altitude of operation) as may be prescribed by the appropriate ATS 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 between sunrise and sunset 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) above:

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;

Note. — If the operation consists of continuous launchings, the time to be included is 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.

Note. — If there is to be more than one location of impact/recovery, each location is to 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 is 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 5.1.2 above shall be forwarded to the air traffic services 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 when it is known that the intended flight of a medium or heavy unmanned free balloon, previously notified in accordance with 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

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7 Attachments

7.1 Attachment A – Interception of Civil Aircraft

(Note. — See Chapter 3, 3.8 of this CAD and associated Note)

Note. — In the interest of completeness, the substance of the provisions in Appendix 2 to the CAD is incorporated in this Attachment.

1 In accordance with Article 3 d) of the Convention on International Civil Aviation the Contracting States of ICAO "undertake, when issuing regulations for their state aircraft, that they will have due regard for the safety of navigation of civil aircraft". As interceptions of civil aircraft are, in all cases, potentially hazardous, the Council of ICAO has formulated the following special recommendations which Contracting States are urged to implement through appropriate regulatory and administrative action. The uniform application by all concerned is considered essential in the interest of safety of civil aircraft and their occupants. For this reason, the Council of ICAO invites Contracting States to notify ICAO of any differences which may exist between their national regulations or practices and the special recommendations hereunder.

2 General

2.1 Interception of civil aircraft should be avoided and should be undertaken only as a last resort. If undertaken, the interception should be limited to determining the identity of the aircraft, unless it is necessary to return the aircraft to its planned track, direct it beyond the boundaries of national airspace, guide it away from a prohibited, restricted or danger area or instruct it to effect a landing at a designated aerodrome. Practice interception of civil aircraft is not to be undertaken.

2.2 To eliminate or reduce the need for interception of civil aircraft, it is important that:

a) all possible efforts be made by intercept control units to secure identification of any aircraft which may be a civil aircraft, and to issue any necessary instructions or advice to such aircraft, through the appropriate air traffic services units. To this end, it is essential that means of rapid and reliable communications between intercept control units and air traffic services units be established and that agreements be formulated concerning exchanges of information between such units on the movements of civil aircraft, in accordance with the provisions of CAD 11;

b) areas prohibited to all civil flights and areas in which civil flight is not permitted without special authorisation by the State be clearly promulgated in Aeronautical Information Publications (AIP) in accordance with the provisions of CAD 15, together with the risk, if any, of interception in the event of penetration of such areas. When delineating such areas in close proximity to promulgated ATS routes, or other frequently used tracks, States should take into account the availability and overall systems accuracy of the navigation systems to be used by civil aircraft and their ability to remain clear of the delineated areas;

c) the establishment of additional navigation aids be considered where necessary to ensure that civil aircraft are able safely to circumnavigate prohibited or, as required, restricted areas.

2.3 To eliminate or reduce the hazards inherent in interceptions undertaken as a last resort, all possible efforts should be made to ensure coordinated actions by the pilots and ground units concerned. To this end, it is essential that Contracting States take steps to ensure that:

a) all pilots of civil aircraft be made fully aware of the actions to be taken by them and the visual signals to be used, as specified in Chapter 3 and Appendix 1 of this CAD;

b) operators or pilots-in-command of civil aircraft implement the provisions in CAD 6, Parts I, II and III, regarding the capability of aircraft to communicate on 121.5 MHz and the availability of interception procedures and visual signals on board aircraft;

c) all air traffic services personnel be made fully aware of the actions to be taken by them in accordance with the provisions of CAD 11, Chapter 2, and the PANS-ATM (ICAO Doc 4444);

d) all pilots-in-command of intercepting aircraft be made aware of the general performance limitations of civil aircraft and of the possibility that intercepted civil aircraft may be in a state of emergency due to technical difficulties or unlawful interference;

e) clear and unambiguous instructions be issued to intercept control units and to pilots- in-command of potential intercepting aircraft, covering interception manoeuvres, guidance of intercepted aircraft, action by intercepted aircraft, air-to-air visual signals, radio communication with intercepted aircraft, and the need to refrain from resorting to the use of weapons;

Note. — See paragraphs 3 to 8.

f) intercept control units and intercepting aircraft be provided with radiotelephony equipment compatible with the technical specifications of CAD 10, Volume I, so as to enable them to communicate with intercepted aircraft on the emergency frequency 121.5 MHz; g) secondary surveillance radar and/or ADS-B facilities be made available to the extent possible to permit intercept control units to identify civil aircraft in areas where they might otherwise be intercepted. Such facilities should permit recognition of aircraft identity and immediate recognition of any emergency or urgency conditions.

3 Interception maneuvers

3.1 A standard method should be established for the manoeuvring of aircraft intercepting a civil aircraft in order to avoid any hazard for the intercepted aircraft. Such method should take due account of the performance limitations of civil aircraft, the need to avoid flying in such proximity to the intercepted aircraft that a collision hazard may be

created and the need to avoid crossing the aircraft's flight path or to perform any other manoeuvre in such a manner that the wake turbulence may be hazardous, particularly if the intercepted aircraft is a light aircraft.

3.2 An aircraft equipped with an airborne collision avoidance system (ACAS), which is being intercepted, may perceive the interceptor as a collision threat and thus initiate an avoidance manoeuvre in response to an ACAS resolution advisory. Such a manoeuvre might be misinterpreted by the interceptor as an indication of unfriendly intentions. It is important, therefore, that pilots of intercepting aircraft equipped with a secondary surveillance radar (SSR) transponder suppress the transmission of pressure-altitude information (in Mode C replies or in the AC field of Mode S replies) within a range of at least 37 km (20 NM) of the aircraft being intercepted. This prevents the ACAS in the intercepted aircraft from using resolution advisories in respect of the interceptor, while the ACAS traffic advisory information will remain available.

3.3 Manoeuvres for visual identification

The following method is recommended for the manoeuvring of intercepting aircraft for the purpose of visually identifying a civil aircraft:

Phase I

The intercepting aircraft should approach the intercepted aircraft from astern. The element leader, or the single intercepting aircraft, should normally take up a position on the left (port) side, slightly above and ahead of the intercepted aircraft, within the field of view of the pilot of the intercepted aircraft, and initially not closer to the aircraft than 300 m. Any other participating aircraft should stay well clear of the intercepted aircraft, preferably above and behind. After speed and position have been established, the aircraft should, if necessary, proceed with Phase II of the procedure.

Phase II

The element leader, or the single intercepting aircraft, should begin closing in gently on the intercepted aircraft, at the same level, until no closer than absolutely necessary to obtain the information needed. The element leader, or the single intercepting aircraft, should use caution to avoid startling the flight crew or the passengers of the intercepted aircraft, keeping constantly in mind the fact that manoeuvres considered normal to an intercepting aircraft may be considered hazardous to passengers and crews of civil aircraft. Any other participating aircraft should continue to stay well clear of the intercepted aircraft. Upon completion of identification, the intercepting aircraft should withdraw from the vicinity of the intercepted aircraft as outlined in Phase III.

Phase III

The element leader, or the single intercepting aircraft, should break gently away from the intercepted aircraft in a shallow dive. Any other participating aircraft should stay well clear of the intercepted aircraft and rejoin their leader.

3.4 Maneuvers for navigational guidance

3.4.1 If, following the identification manoeuvres in Phase I and Phase II above, it is considered necessary to intervene in the navigation of the intercepted aircraft, the element leader, or the single intercepting aircraft, should normally take up a position on the left (port) side, slightly above and ahead of the intercepted aircraft, to enable the pilot-in-command of the latter aircraft to see the visual signals given.

3.4.2 It is indispensable that the pilot-in-command of the intercepting aircraft be satisfied that the pilot-in-command of the intercepted aircraft is aware of the interception and acknowledges the signals given. If repeated attempts to attract the attention of the pilot-in-command of the intercepted aircraft by use of the Series 1 signal in Appendix 1, Section 2, are unsuccessful, other methods of signalling may be used for this purpose, including as a last resort the visual effect of the reheat/afterburner, provided that no hazard is created for the intercepted aircraft.

3.5 It is recognised that meteorological conditions or terrain may occasionally make it necessary for the element leader, or the single intercepting aircraft, to take up a position on the right (starboard) side, slightly above and ahead of the intercepted aircraft. In such case, the pilot-in-command of the intercepting aircraft must take particular care that the intercepting aircraft is clearly visible at all times to the pilot-in-command of the intercepted aircraft.

4 Guidance of an intercepted aircraft

4.1 Navigational guidance and related information should be given to an intercepted aircraft by radiotelephony, whenever radio contact can be established.

4.2 When navigational guidance is given to an intercepted aircraft, care must be taken that the aircraft is not led into conditions where the visibility may be reduced below that required to maintain flight in visual meteorological conditions and that the manoeuvres demanded of the intercepted aircraft do not add to already existing hazards in the event that the operating efficiency of the aircraft is impaired.

4.3 In the exceptional case where an intercepted civil aircraft is required to land in the territory overflown, care must also be taken that:

a) the designated aerodrome is suitable for the safe landing of the aircraft type concerned, especially if the aerodrome is not normally used for civil air transport operations;

b) the surrounding terrain is suitable for circling, approach and missed approach manoeuvres;

c) the intercepted aircraft has sufficient fuel remaining to reach the aerodrome;

d) if the intercepted aircraft is a civil transport aircraft, the designated aerodrome has a runway with a length equivalent to at least 2 500 m at mean sea level and a bearing strength sufficient to support the aircraft; and

e) whenever possible, the designated aerodrome is one that is described in detail in the relevant Aeronautical Information Publication.

4.4 When requiring a civil aircraft to land at an unfamiliar aerodrome, it is essential that sufficient time to be allowed for it to prepare for a landing, bearing in mind that only the pilot-in-command of the civil aircraft can judge the safety of the landing operation in relation to runway length and aircraft mass at the time.

4.5 It is particularly important that all information necessary to facilitate a safe approach and landing be given to the intercepted aircraft by radiotelephony.

5 Action by intercepted aircraft

5.1 The Standards in Appendix 2, Section 2, specify as follows:

"2.1 An aircraft which is intercepted by another aircraft shall immediately:

a) follow the instructions given by the intercepting aircraft, interpreting and responding to visual signals in accordance with the specifications in Appendix 1;

b) notify, if possible, the appropriate air traffic services unit;

c) attempt to establish radio communication with the intercepting aircraft or with the appropriate intercept control unit, by making a general call on the emergency frequency 121.5 MHz, giving the identity of the intercepted aircraft and the nature of the flight; and if no contact has been established and if practicable, repeating this call on the emergency frequency 243 MHz;

d) if equipped with SSR transponder, select Mode A, Code 7700, unless otherwise instructed by the appropriate air traffic services unit.

e) if equipped with ADS-B or ADS-C, select the appropriate emergency functionality, if available, unless otherwise instructed by the appropriate air traffic services unit.

"2.2 If any instructions received by radio from any sources conflict with those given by the intercepting aircraft by visual signals, the intercepted aircraft shall request immediate clarification while continuing to comply with the visual instructions given by the intercepting aircraft.

"2.3 If any instructions received by radio from any sources conflict with those given by the intercepting aircraft by radio, the intercepted aircraft shall request immediate clarification while continuing to comply with the radio instructions given by the intercepting aircraft."

6 Air-to-air visual signals

6.1 The visual signals to be used by intercepting and intercepted aircraft are those set forth in Appendix 1. It is essential that intercepting and intercepted aircraft adhere strictly to those signals and interpret correctly the signals given by the other aircraft, and that the intercepting aircraft pay particular attention to any signals given by the intercepted aircraft to indicate that it is in a state of distress or urgency.

7 Radio communication between the intercept control unit or the intercepting aircraft and the intercepted aircraft

7.1 When an interception is being made, the intercept control unit and the intercepting aircraft should:

a) first attempt to establish two-way communication with the intercepted aircraft in a common language on the emergency frequency 121.5 MHz, using the call

signs *"INTERCEPT CONTROL", "INTERCEPTOR (callsign)" and "INTERCEPTED AIRCRAFT"* respectively; and

b) failing this, attempt to establish two-way communication with the intercepted aircraft on such other frequency or frequencies as may have been prescribed by the appropriate ATS authority, or to establish contact through the appropriate ATS unit(s).

7.2 If radio contact is established during interception but communication in a common language is not possible, attempts must be made to convey instructions, acknowledgement of instructions and essential information by using the phrases and pronunciations in Table A-1 and transmitting each phrase twice.

8 Refraining from the use of weapons

8.1 The use of tracer bullets to attract attention is hazardous, and it is expected that measures will be taken to avoid their use so that the lives of persons on board and the safety of aircraft will not be endangered.

9 Coordination between intercept control units and air traffic services units

9.1 It is essential that close coordination be maintained between an intercept control unit and the appropriate air traffic services unit during all phases of an interception of an aircraft which is, or might be, a civil aircraft, in order that the air traffic services unit is kept fully informed of the developments and of the action required of the intercepted aircraft.

Phrases for use by INTERCEPTING aircraft			**Phrases for use by INTERCEPTED aircraft**		
Phrase	Pronunciation1	Meaning	Phrase	Pronunciation1	Meaning
CALL SIGN	KOL SA-IN	What is your call sign?	CALL SIGN (call sign)2	KOL SA-IN (call sign)	My call sign is (call sign)
FOLLOW	FOL-LO	Follow me	WILCO	VILL-KO	Understood Will comply
DESCEND	DEE-SEND	Descend for landing	CAN NOT	KANN NOTT	Unable to comply
YOU LAND	YOU LAAND	Land at this aerodrome	REPEAT	REE-PEET	Repeat your instruction
PROCEED	PRO-SEED	You may proceed	AM LOST	AM LOSST	Position unknown
			MAYDAY	MAYDAY	I am in distress
			HIJACK3	HI-JACK	I have been hijacked
			LAND (place name)	LAAND (place name)	I request to land at (place name)
			DESCEND	DEE-SEND	I require descent

7.2 Attachment B – Unlawful Interference

1 General

1.1 The following procedures are intended as guidance for use by aircraft when unlawful interference occurs and the aircraft is unable to notify an ATS unit of this fact.

2 Procedures

2.1 If the pilot-in-command cannot proceed to an aerodrome in accordance with the rules in Chapter 3, 3.7.2, he/she should attempt to continue flying on the assigned track and at the assigned cruising level at least until able to notify an ATS unit or until within radar or ADS-B coverage.

2.2 When an aircraft subjected to an act of unlawful interference must depart from its assigned track or its assigned cruising level without being able to make radiotelephony contact with ATS, the pilot-in-command should, whenever possible:

a) attempt to broadcast warnings on the VHF channel in use or the VHF emergency frequency, and other appropriate channels, unless considerations aboard the aircraft dictate otherwise. Other equipment such as on- board transponders and data links should also be used when it is advantageous to do so and circumstances permit; and

b) proceed in accordance with applicable special procedures for in-flight contingencies, where such procedures have been established and promulgated in the Regional Supplementary Procedures (ICAO Doc 7030); or

c) if no applicable regional procedures have been established, proceed at a level which differs from the cruising levels normally used for IFR flight by:

1) 150 m (500 ft) in an area where a vertical separation minimum of 300 m (1 000 ft) is applied; or

2) 300 m (1 000 ft) in an area where a vertical separation minimum of 600 m (2 000 ft) is applied.

Note. — Action to be taken by an aircraft which is intercepted while being subject to an act of unlawful interference is prescribed in 3.8 of this CAD

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